# AFF – Cognitive Biotechnology – CPWW 2022 – Michigan Summer Debate Institutes

## Notes

#### Thank you to Devin S, Rohan L, Roan M, Suditi C, Saturn G, Seiji A, Gideon W, and William A for all of their hard work on these files

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## 1AC Tools

### Advantage—Bio-Revolution

#### Advantage \_\_ is Bio-Revolution –

#### There is a bio-revolution arms race in the squo – lack of effective standards unleashes Pandora’s Box

Jessup 21 (Thomas Jessup | May 17, 2021 | Candidate of Master of Public and International Law | ‘‘Avengers, [Lawfully] Assemble!’ – Military Human Enhancement and the Disruption of Fundamental Principles of International Humanitarian Law” | <https://dx.doi.org/10.2139/ssrn.3847474> | DOA: 6/18/2022 | SAoki)

\*IHL = international humanitarian law

Consequently, it has been predicted that human enhancements will be commonplace within military operations in the near future26 , spurning governmental interest in a ‘Bio-Revolution’ to develop their military forces to surpass human beings’ innate limitations27 to ‘make the individual warfighter stronger, more alert, more endurant, and better able to heal’28 , and reducing or eliminating the physiological, psychological or cognitive limitations that impaired soldiers’ ‘operational dominance’ 29 that have traditionally acted as inhibitors of warfare.30 However, the pursuit of this ‘Bio-revolution’ has revealed countries’ true intentions of thirsting to create the ultimate killing machine that surpasses the capabilities of traditional unenhanced soldiers31 . As a result, this has produced a modernised arms-race that is rapidly outpacing policy development regulating the development and deployment of enhancement modalities , leaving some states to continue untrammelled in their pursuits, whilst others signal the need for legal and ethical evaluation to inform enhanced soldiers’ development33 . Albeit the intersection of ethics and soldier enhancement receiving avid attention in academic circles, there remains a paucity of discussion regarding IHL and human enhancement34 despite IHL’s integral nature in regulating wartime developments by striking a balance between military necessity and humanity. For clarity’s sake, if military necessity or winning a battle whatever the cost was to be the overriding guiding principle in warfare, any humanity in military conduct would be discarded, unleashing a carte Blanche Pandora’s Box36 of the brutality of war. As aptly put by Enemark: ‘if war is to remain […] a pursuit more virtuous than organized murder, it is vital also to think in terms of what is permissible… ethics is thus constitutive of the practice of war as a form of violence that is (or is held to be) morally distinguishable from other forms’ 37 . In essence, human enhancement has a myriad of varying forms that stands to either severely denigrate or significantly improve compliance with the fundamental principles of IHL, albeit the preponderance of commentators remaining sceptical as to any auspicious application. Expressing that human enhancement will ‘quicky diminish’ the ‘existing ethical, customary, and legal norms of warfare as inscribed . . . [within] the Geneva Conventions’’ 38 , and that new technologies mark a paradigm shift that cannot be easily accommodated by current IHL frameworks39 , it has led to calls for the updating of the current IHL framework to reflect modern battlefield techniques and operations40 . As expressed by Nayef Al-Rodhan, ‘with roughly onethird of all military research worldwide being devoted to technology, the era of using super soldiers will require us to occasionally rewrite the rules of war within the Geneva Conventions’.

#### We have two scenarios:

#### Scenario 1 – Neuro Weaponization –

#### There is a massive race between the US and adversaries in neuroS/T research now – risks weaponization

**Kosal and Putney 02/08** (Margaret Kosal and Joy Putney, Associate Professor in the Sam Nunn School of International Affairs at Georgia Institute of Technology, where she also directs the Sam Nunn Security Program., PhD in Quantitative Biosciences from the School of Biological Sciences at Georgia Institute of Technology and was a National Science Foundation Graduate Research Fellow. Sam Nunn Security Program Fellow through the Sam Nunn School of International Affairs at GT, focusing on the national security and policy issues surrounding dual-use neurotechnologies like brain-machine interfaces. Cambridge University Press, "Neurotechnology and international security", 02/08/2022, https://www.cambridge.org/core/journals/politics-and-the-life-sciences/article/neurotechnology-and-international-security-predicting-commercial-and-military-adoption-of-braincomputer-interface-bci-in-the-us-and-china/29155A74DBB0FDE5CB0CBA4D3DF6AF0C, accessed on 6/18/2022)//gideon

The human brain, with its approximately 100 billion interconnected neurons, enables our higher cognitive abilities without being a physiological outlier from other primate species (Herculano-Houzel, Reference Herculano-Houzel2012). This incredibly complex organ can also host debilitating clinical disorders, including seizures, depression and anxiety, Parkinson’s disease, and many others. Unlocking the secrets of the human brain is one of the largest scientific challenges to ever be undertaken. Advances in neuroscience research have enabled us to further our understanding of the brain and develop technologies to read and write brain activity, with implications for understanding behavior and decision-making.

In the past decade, the United States and the People’s Republic of China have begun large neuroscience research projects along with several other international actors, including Canada, Korea, Japan, Australia, and the European Union (EU) (International Brain Initiative, n.d.). These brain initiatives have ambitious goals that are only now possible with advances in genetic tools and imaging techniques (National Institutes of Health, n.d.c). The U.S. BRAIN (Brain Research through Advancing Innovative Neurotechnologies) Initiative has a stated goal of “accelerating the development and application of innovative technologies … to produce a revolutionary new dynamic picture of the brain that … shows how individual cells and complex neural circuits interact in both time and space” (National Institutes of Health, n.d.b). Additionally, the BRAIN Initiative was highlighted as a major component of the United States’ innovation strategy for breakthrough technologies (Office of Science and Technology Policy, 2015). The China Brain Project’s framework focuses on the ability to develop technologies both for diagnosis and treatment of brain disorders and for mimicking human intelligence and connecting humans and machines (Poo et al., Reference Poo, Du, Ip, Xiong, Xu and Tan2016).

While the initial public focus of these brain projects has been clinical technologies to cure disease and return faculties to people, such research is likely to enable augmentation and use for healthy people in both the commercial and military sectors. The U.S. BRAIN Initiative and the China Brain Project emphasize the importance of neuroscience research to treat and prevent brain disorders in aging populations, but they also highlight additional goals for accelerating basic research in the United States and applied research in human-machine teaming in China (National Institutes of Health, n.d.b; Poo et al., Reference Poo, Du, Ip, Xiong, Xu and Tan2016). The dual-use technologies made possible by all seven brain projects are likely to have profound implications for society, public health, and national security. From a national security perspective, it would be valuable to be able to predict the dissemination of neurotechnologies to both the commercial and military sectors. This research presents the first analytical framework that attempts to do so.

Like past scientific and technological breakthroughs, cognitive sciences research is purported to have an impact on future security policies. Since the cognitive sciences focus on humans, they are intricately tied to the study of social processes, including the realms of politics and security. International scientific bodies, including the U.S. National Academy of Sciences and the United Kingdom’s Royal Society, have also engaged in discussions on the field’s policy relevance (National Research Council, 2008, 2009; Royal Society, Reference Society2012). Experts involved in developing NATO’s New Strategic Concept released in 2010 noted that “less predictable is the possibility that research breakthroughs will transform the technological battlefield,” and that “allies and partners should be alert for potentially disruptive developments in such dynamic areas as information and communications technology, cognitive and biological sciences, robotics, and nanotechnology” (NATO, 2010, p. 15; emphasis added). Interest in neurosciences is not limited to any specific nation, and the potential for new technology to affect conflict and cooperation has been recognized.

Security-related research in neuroscience and operationalization of scientific discoveries into commercial or deployable neurotechnologies present concerns for policymakers and scholars. Not only do the effects and use of military applications of cognitive science and neuroscience research require their attention, but also the increasing understanding of cognitive processes continues to provide new perspectives on how we understand policy and politics.

#### Weaponization of neuroS/T has a laundry list of impacts – CBWs, PSYOPS, genetic warfare, etc.

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**The weaponization of neuroS/T in military/warfare contexts** (**e.g., combat**) **seeks to alter functions of the nervous system to affect physical and/or cognitive capabilities required for military operations**. As noted, the weaponized use of neuroscientific tools and products is not new. Historically, **such weapons have included nerve gas and various drugs**. Weaponized gas has taken several forms: lachrymatory agents (e.g., tear gases), toxic irritants (e.g., phosgene, chlorine), vesicants (blistering agents; e.g., mustard gas), and paralytics (e.g., sarin). Pharmacologic stimulants (e.g., amphetamines) and various ergogenics (e.g., anabolic steroids) have been used to augment performance of combatants, and sedatives (e.g., barbiturates) have been employed to enhance cooperation during interrogation. **Sensory stimuli** (e.g., high intensity sound, prolonged flashing lights, irritating music or noise) **have been applied as neuroweapons to incapacitate the enemy, and even sleep deprivation and distribution of emotionally provocative information in** psychological operations (i.e., **PSYOPS**) **could rightly be regarded as forms of weaponized applications of neuroscientific and neurocognitive research**. The 2013 conflict in Syria involving the use of nerve gas, as well as the use of the neuroactive agent VX to assassinate Kim Jong-nam, estranged half-brother of North Korean leader Kim Jong-un, demonstrate the ongoing relevance of nervous system targets. Indeed, **North Korea affords a prime example of a state resorting to chemical weapons in order to gain advantage when their military is out-competed by other nations’**.

Moreover, **computational neuroscience and neuropharmacologic research could be more indirectly utilized to optimize human functions modulating brain activity instrumental to signal detection and integration, so as to bio-engineer aspects of “human weak links” out of the chain(s) of military and intelligence operations**. There is additional interest in employing neurotechnology to augment the role, capability, and effects of PSYOPS in military and political missions. Programs such as Sociocultural Content in Language (SCIL) and the Metaphor program at IARPA were directed toward improving insight into cultural linguistic and emotional norms, and DARPA’s Narrative Networks entailed a neurocognitive approach to understanding and modelling narratives in socio-cultural contexts. As noted in several SMA reports to the Pentagon, the intent and desired outcome of this research is an improved understanding of neural bases and effects of narratives that can afford insights to influences and processes that affect brain development, function, and behavior which can be operationalized to mitigate violence on a variety of scales.

Additionally there is ongoing neuropharmacologic, neurotoxicologic, neuromicrobiologic, and neurotechnologic research that has potential to develop non-lethal or lethal weapons in combat related and/or special operations’ deterrence operations. Weaponizable products of neuroscientific and neurotechnological research can be utilized to affect 1) memory, learning, and cognitive speed; 2) wake-sleep cycles, fatigue, and alertness; 3) impulse control; 4) mood, anxiety, and self-perception; 5) decision-making; 6) trust and empathy; and 7) movement and performance (e.g., speed, strength, stamina, motor learning, etc.).

As summarized by Table 3, **non-lethal and lethal neuroweapons include various categories and classes of psycho-neuroactive drugs, a variety of microbial agents** (**e.g., bacterial and viral strains**) **that act directly or exert effect upon the central and/or peripheral nervous system; organic toxins; and neurotechnological devices** (e.g., sensory and brain stimulation approaches) **and products** (e.g., nanotechnologically derived substances). Additionally, brain-machine interfacing and neural network derived computational decision systems could be employed to develop remote control or autonomous/semi-autonomous capability for unmanned aerial, ground, and marine (surface and subsurface) vehicles that could function as weapon platforms. The use of unmanned vehicles as weapons is not novel, and the realization of fully autonomous capability is iterative. Such progression and integration of neurotechnologically-enabled capabilities render these weapons increasingly viable and therefore a source of trepidation about near-term future developments that could be generated from ongoing research in neural architectures and human-machine systems.

Neurodata10

The conjoinment of the physical, social, and computational sciences and concomitant “technique and technology sharing” has synergized the pace and breadth of discoveries and developments in the neurosciences. Such advanced integrative scientific convergence (AISC) paradigmatically de-silos disciplines to establish and sustain complementary knowledge and skills to create new methods and tools to (1) foster innovation and (2) further understanding and capability. 11 The AISC approach relies upon computational (i.e., big data) systems to allow the level(s) and scope of multi-tiered informational acquisition, processing, assimilation, and synthesis required for neuroS/t research and its translational applications. **Taken together, the capabilities of computational and brain sciences have biosecurity and defense implications**. While much of weaponizable neuroS/T (**e.g., chemicals, biological agents, and toxins**) are addressed in and by extant forums, treaties, conventions, and laws, newer techniques and technologies—including neurodata—have not. “Neurodata” is defined as the gathering and use of multi-scalar information to (1) establish increasingly detailed assessment of brain structure and function and (2) develop large-scale databases to enable (descriptive and/or predictive) evaluative metrics (for clinical medicine, law, socio-economic, and potentially political uses).

Of note is that the rapidity of such advances can—and often does—outpace securitization, and the uniquity of brain science and its applications—and meanings—render particular security vulnerabilities. Namely, the fact that the brain is regarded as the “source of the mind,” and all of the functions and implications arising therein, establishes a normative aspect to neurodata. Simply put, neurodata can afford bases of what constitutes “normality” of brain structure, and functions (viz., thought, emotion, and behavior). Access to such information can enable insertion of data (e.g., in medical records, databases, registries, etc.) to alter the normative stature of targeted individuals (e.g., developing data profiles that depict them to have, be premorbid for, and/or predisposed to neurological and psychiatric conditions). **Access and use of this information could impact national security by affecting** (1) **the type of medical care that is (or is not) provided to both civilian and military populations; and** (2) **ways that individuals and groups are socially, economically, legally, and politically regarded and treated**.

**Neurodata can also afford genotypic and phenotypic information that can be used to develop “**precision pathogens**” capable of selectively affecting specific targets** (e.g., individuals, communities, domestic animals, livestock, etc.). Recent development in gene editing tools and techniques, such as CRISPR-Cas 9 (when employed with other, existing molecular biological methods), can facilitate both the modification of extant agents to be more viable, durable, and/or virulent, as well as the development of novel bacteria and viruses that have unique properties, specific affinities, and/or no known treatment. **The COVID-19 pandemic has put into stark relief those ways that public reaction**— **and** public health preparedness, **readiness, and response**(s)—**could be engaged by the use of “precision pathologies” and disseminated misinformation to incur multi-domain and multidimensional disruptions within society** (and military and intelligence communities) **to incur and exploit weak elements of** public health, social **stability, and national security**. 12

Thus, we argue that digital biosecurity—the effective prevention or mitigation of current and emerging risks at the intersection of computational systems and biological information—is increasingly important and necessary. **Given that several countries that are currently strategically competitive with the US and its allies are dedicating effort(s), resources and funding to neuro- and cyber-S/T research and capabilities**, **there is increasing likelihood of attempts to engage neurodata for leverageable informational, social, legal, and military power advantage(s)**.

Therefore, we posit that an integrative approach to digital biosecurity is required that can effectively and efficiently address present and future challenges. The integration must occur in the domains and dimensions that are most relevant and crucial to surveillance, oversight, and direction of neurocognitive and other types of biodata. Such an approach would necessitate: (1) an integrative scientific convergent paradigm; (2) at least a whole-of-government, if not whole-of-nation dedication13; and (3) a multi-national re-address to more effectively guide and govern the ways that neurodata—and other bioinformation—are and can be used in both non-kinetic and kinetic engagements14.

#### Precision pathogens risk mass death on the level of nuclear annihilation

Amy Webb ’22, is the founder of the Future Today Institute and a professor of strategic foresight at New York University’s Stern School of Business, “THE NEXT PANDEMIC COULD START WITH A TERRORIST ATTACK”, The Atlantic, 2/14/22, https://www.theatlantic.com/science/archive/2022/02/pandemic-terrorist-attack-biowarfare/622067/

We’ve just lived through a global pandemic that no one wants to see replicated. We may have COVID-19 vaccines, but **the path to endemicity is bumpy and will entail incalculable death and morbidity**. Before we can even hope to eradicate SARS-CoV-2, as we eventually did with smallpox, there will be more mutations and many new strains. Some could affect the body in ways we’ve not yet seen or even imagined. **We will continue to live with tremendous uncertainty over how and when the virus will further mutate**.

Obviously, one would hope that virus research would be undertaken in a lab where fanatical adherence to safety and rigorous oversight policies were strictly enforced. Just before the WHO declared smallpox eradicated, a photographer named Janet Parker was working at a medical school in Birmingham, England. She developed a fever and body aches, and, a few days later, a red rash. At the time, she thought it was chicken pox. (That vaccine had not yet been developed.) The tiny, pimple-like dots she’d been expecting, however, developed into much bigger lesions, and they were full of a yellowish, milky fluid. As her condition worsened, doctors determined that she’d contracted smallpox, almost certainly from a sloppily managed high-security research lab inside the same building where she worked.

Parker, sadly, is now remembered as the last person known to have died from smallpox. Does the benefit of being able to accurately predict virus mutations outweigh the public risks of gain-of-function research (that is, research that involves intentionally mutating viruses to make them stronger, more transmissible, and more dangerous)? It depends on whom you ask.

Or, rather, which agency you ask. The NIH issued a series of biosafety guidelines for research on H5N1 and other flu viruses in 2013, but the guidelines were narrow and didn’t cover other kinds of viruses. The White House Office of Science and Technology Policy announced a new process to assess the risks and benefits of gain-of-function experiments in 2014. It included influenza along with the MERS and SARS viruses. But that new policy also halted existing studies intended to develop flu vaccines. So the government reversed course in 2017, when the National Science Advisory Board for Biosecurity determined that such research wouldn’t pose a risk to public safety. In 2019, the U.S. government said that it had resumed funding for—wait for it—a new round of gain-of-function experiments intended to make the H5N1 bird flu more transmissible again.

Meanwhile, **this back-and-forth doesn’t stop bad actors from gaining access to open-source research papers and mail-order genetic material**. When it comes to synthetic biology, security experts are particularly concerned about future dual-use issues. **Traditional force protection**—the security strategies to keep populations safe—**won’t work against an adversary that has adapted gene products or designer molecules to use as bioweapons**.

In an August 2020 paper published in the academic journal CTC Sentinel, which focuses on contemporary terrorism threats, Ken Wickiser, a biochemist and the associate dean of research at West Point, wrote: “**As molecular engineering techniques of the synthetic biologists become more robust and widespread, the probability of encountering one or more of these threats is approaching certainty** … The change to the threat landscape created by these techniques is rivaled only by the development of the atomic bomb.”

#### Genetic warfare leads to extinction – outweighs nuclear war both on magnitude and timeframe

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International Politics of Genetic Warfare Just one week after the September 11 attacks, letters laced with anthrax began arriving at media and congressional offices. Coupled with the earlier revelations about the magnitude of the Soviet and Iraqi biowarfare programs, biological weapons came to be viewed as “one of the key security issues of the twenty-first century.”82 Two decades later, the specter of biowarfare reemerged. With the COVID-19 pandemic came the fear that “the invisible enemy can hide within our ranks, multiplying in secret, planting time bombs in our bodies, and all before we know what’s hit us.”83 The fear of secret genetic weapons capability and use is not limited to malicious non-state actors. In what has been characterized as a sign of “a new Cold War,” a Chinese foreign ministry spokesman suggested in March 2020 that the US Army may have brought COVID-19 to Wuhan.84 The US secretary of state responded in kind by alleging that the outbreak originated in a Chinese laboratory.85 All the while, conspiracy theories about the origins of the disease spread on online platforms. Among them were the claims that the virus was part of China’s “covert biological weapons program” and that a Canadian-Chinese spy team sent the virus to Wuhan.86 Such undiplomatic exchanges and conspiratorial claims are particularly hazardous in the era of global competition among great powers.87 Biological weapons have always been more accessible than nuclear ones. However, with genetic engineering increasingly solving the problems of weaponization, delivery, and precision, Ebola expert Karl Johnson predicts that “any ~~crackpot~~ individual with a few thousand dollars’ worth of equipment and a college biology education under ~~his~~ [their] belt could manufacture bugs that would make Ebola look like a walk around the park.”88 Predictions about genetic warfare would benefit from identifying the closest parallels and then adjusting and synthesizing the ensuing models. Genetic weapons have the destructive potential of nuclear weapons, but their ease of development is akin to cyber weapons. Both genetic and cyber warfare require inexpensive equipment and only a college-level understanding of these fields. Unlike nuclear weapons that demand enormous engineering expertise, a small team can develop and hone cyber and genetic weapons using common equipment.89 Dual-use capability is another similarity. Unlike nuclear and chemical weapons, genetically engineered bioweapons do not require equipment or materials exclusively tailored to their purpose. This concern was among the first raised in the US National Security Strategy in 2017.90 As one military analyst stated, “A nuclear weapons facility has obvious signals to the outside world. We can look at it and immediately say, ‘Ugh, that is a nuclear reactor. However, the technology for conducting biological weapons research is essentially the same as [for] what keeps a population healthy.”91 Many biological engineering techniques with dual-use potential are holy grails of medicine. Research journals publish techniques and results inter-nationally, publicly, and without consideration for their security implications.92 Dissemination of this information limits the effectiveness of the Biological Weapons Convention (BWC) and domestic control regimes.93 Biological weapons programs are far more challenging to detect than nuclear programs. They look like other biological research programs. The body charged with enforcing compliance with the BWC, the Implementation Support Unit, is significantly underfunded compared to the enforcement arms of the Chemical Weapons Convention and Non-Proliferation of Nuclear Weapons agreements. Much like for cyber weapons, custom bioweapon development is effectively unregulated.94 Genetic and cyber weapons are also similar in their strategic utility in terms of versatility, durability, and deniability. The scope and specificity of genetic weapons make them more analogous to cyber than any of the traditional weapons of mass destruction. Genetically engineered bioagents can achieve levels of specificity that were previously impossible using traditional pathogens. Targets can include ethnic groups and even specific individuals. They need not even be human: tailored pathogens can affect rubber, plastics, and other defense and infrastructure-related materials.95 Similarly, cyberweapons can attack power grids and other nonhuman targets. Versatility, or the capacity to take on different forms of varying lethality against varied targets, makes genetic weapons potentially even more hazardous than nuclear weapons. Finally, unlike nuclear, but similar to cyber, genetic weapons can be used covertly. Thus, those who employ them have plausible deniability. Much like North Korea proxies’ use of ransomware or Russia’s disinformation campaigns, a genetic weapon would be difficult to attribute. Even chemical weapons do not have this advantage. Attempts to deny their use, such as in Ghouta, Syria, typically fail miserably upon investigation.96 The ease of development and strategic benefits of genetic weapons make them, as one forecaster put it, “the most dangerous threat humanity has ever faced.”97 What would states and non-state actors do once they acquired them? Would they keep their genetic war capability secret? Would they use genetic weapons openly or covertly? These questions are considered next. Genetic War Capability: Reveal or Conceal? Underlying the question of whether to reveal or conceal genetic military capability is a trade-off. To conceal it is to gain a potent secret edge over rivals. To reveal it is to deter or frighten others from attacking.98 20 STRATEGIC STUDIES QUARTERLY → FALL 2021 Yelena Biberman Deterrence works “because the expected reaction of the attacked will result in one’s own severe punishment.”99 It is “the power to dissuade.”100 Two factors determine whether actors reveal their clandestine capability, according to Brendan Rittenhouse Green and Austin Long.101 The first is the uniqueness of the capability—the less unique, the less attractive is concealing relative to revealing. The second is the prospect that the adversary will implement countermeasures. Successful countermeasures can sharply degrade a weapon’s military value.102 The lower the odds of countermeasures, the more likely the actors are to reveal their clandestine capability. The decision to reveal one’s clandestine capability ultimately depends on one’s need for deterrence. Traditional biological weapons could not deter because their outcome was always uncertain. However, without the problems of weaponizability, delivery, and precision plaguing them, genetic weapons could deter even countries with nuclear weapons. The destructive outcome of genetic weapons may be assured, immediate, and massive. A genetically engineered bioagent with a short incubation period could be released as instantly as a nuclear agent on a population of millions.103 And, unlike nuclear weapons, which rely on city and civilian attacks, an attack by a genetic weapon is more likely to be militarily decisive—that is, to influence leaders’ decisions about war and surrender. Its effects could inflict harm not only on civilians but also on the leaders themselves.104 All of these factors make genetic weapons potentially more potent than nuclear weapons as a mechanism of deterrence. Accordingly, state and non-state actors that need to demonstrate credible deterrence are most likely to reveal their genetic war capability. These actors lack the only other rivaling source of deterrence—nuclear weapons. Because they may be threatened or greedy, they are “willing to incur costs or risks for non-security expansion.”105 Nuclear states are the actors most disposed to conceal genetic war capability. They can reap the strategic benefits of hidden genetic power without worrying about survival-threatening aggression or retaliation. Do the effects of genetic weapons need to be demonstrated for them to have a deterrence outcome similar to nuclear weapons? It may be that recent outbreaks, such as Ebola or COVID-19, provide the element of proof needed to convince a population and its political representatives of the credibility of the threat. The recent experience with outbreaks may instill, at least in the current generations, strong aversion and even fear. The collective memory of the atomic bombings of Hiroshima and Nagasaki, and even the Cold War–era duck-and-cover drills, has faded. However, the memory of the COVID-19 pandemic is fresh and potent, especially for the generation that came of age during the pandemic.106 What makes genetic weapons unique is their combination of accessibility and destructive potential. Nuclear deterrence requires some evidence that an actor is capable of creating and delivering a nuclear weapon. However, with genetic weapons—including those the Imperiale Framework has deemed most urgent and concerning—no evidence of capability is necessary. Of itself, the accessibility of relevant technologies and knowhow can portend a threat. A mere statement of one’s willingness to use genetic weapons, combined with some signals of credibility of intention, may be enough to deter others from an attack. This possibility may be a dream for structural realists like Kenneth Waltz, if not for the accessibility of genetic weapons to states and non-state actors alike.107

#### The plan solves – harmonizing regulation, creation, and development of neuroS/T by NATO is prevents development of weapons and use by adversaries

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The US National Academies of Science, Engineering, and Medicine has identified the need for the US and its allies to recognize dual obligations to the emerging bioeconomy. First is a responsibility for prudent direction and oversight, as failure to promote progress in/by biological and technological industries could result in losing leadership of the international community. Meeting this obligation could include adequately funding research and development in key areas, implementing appropriate research oversight, and educating the research workforce. Second is the need to protect the bioeconomy from deliberate adversarial acts that could impede biotechnological progress and allow other international individuals, groups, or countries to gain power advantage. Engaging this responsibility could entail developing more rigorous methods of proper handling and oversight of biologicals and/or technology, affording ample protection of biological data and digital infrastructures, and the development and implementation of (more effective, and globally relevant and responsive) intellectual property laws.

Additionally, **it is important to note that although the US National Academies of Science, Engineering, and Medicine report briefly mentioned recent developments in brain-controlled robotics and brainmachine interface (BMI), neuroS/T, writ large, was not a core aspect of their address**. At present, a majority of countries do not yet identify the brain sciences as a principal economic focus. Of the 41 nations that pursued specific political strategies to expand and promote their bioeconomies in 2018, only 10 included neuroS/T research and development objectives.16 So, while there may be little doubt that neuropsychiatric disorders are a significant public health problem, brain research is relatively costly, and the perceived return-on-investment for those countries that do not have substantial neuroepidemiological burdens may not be sufficient to justify pursuing dedicated neuroS/T initiatives. **However, while intranational human capital and socio-political agendas of a given nation may not prompt investment and engagement in neuro-bioeconomics, the relative economic**—and perhaps cultural and political—**hegemony afforded by leveraging global neuroS/T** (**and overall biological**) **markets might prove influential to changing perspectives, postures, and participation**. To be sure, **due to the current lack of emphasis on brain science in national bioeconomic strategies, those countries that initiate policies and programs to invest in neuroS/T may achieve significant financial successes and economic power, and thereby direct future** (ethical, technical, and legal) **standards of research and use**.

This power can be engaged in kinetic and non-kinetic operations, as evidenced by multinational interest and effort in brain science in military and intelligence agendas. **Notable in this regard is that current treaties** (e.g., the BTWC and CWC) **do not specifically address neurotechnologies and neuroinformatics**.

Furthermore, several aspects of the brain sciences make them particularly problematic for the biosecurity community. First, the field has become increasingly interdisciplinary and strives to integrate several sciences and technologies (e.g., biology, chemistry, psychology, physics, computational sciences) to address neuroscientific questions and forge innovative discoveries and interventions. For instance, state and non-state actors can use novel neurotechnologies (e.g., BMIs and transcranial neural stimulation devices) and advances in neuroinformatics (i.e., analyzing neuroscientific data to better assess, access, and affect the nervous system) for WINS applications. At present, **the development and use of these devices are underregulated and not included in dual-use export safeguards, thus making effective oversight of potential dual-use research of concern** (DURC) **difficult**. Second, these neurotechnologies are as yet underexplored for their augmentative and destructive capabilities and uses. In contrast to other conventional biological and chemical weapons (e.g., microbes, toxins, chemicals), devices that affect the nervous system are relatively new and have only recently been engaged for their WINS potential. **This combination of “blank slate” and “unknown ground” dimensions of neurotechnology creates difficulties in realistic biosecurity forecasting and preparedness**.

For the last two decades, publications in the brain sciences have steadily increased. Yet, for the aforementioned reasons oversight remains a problem, as surveillance of potential WINS applications is complexified by persistent challenges in tracking and evaluating (any) neuroS/T research and product development. **Thus, the potential for dual- or direct-use of neuroS/T for disruptive or destructive purposes becomes increasingly viable**.

Moreover, as previously stated, **much of neuroS/T is reliant upon and force multiplied by big data and computational approaches**. In this light it is important to note that the rapidity of advances in cybertechnology and data analytics often outpaces securitization. The term “cyberbiosecurity” has been proposed to describe the intersection of computational systems, biological information, and the processes required to effectively mitigate and/or prevent new and emerging risks and threats.

Clearly, **brain science has become a multinational enterprise**. And as previously noted, although some nations have not committed investments and resources to escalate neuroS/T initiatives, others most certainly have, and with ardent intent. Therefore, **it is important to note** (1) **the distinct influence(s) that neuroS/T capabilities can exert within and between developed, developing, and non-developed nations; and** (2) **the differing cultural and political values that can affect the ethical codes that guide and govern the conduct of scientific research**. Taken together, **these asymmetries** (**in capability and ethical standards**) can—and often do—**create opportunistic windows that can expedite neuroS/T research and advance outcomes and products to ultimately affect international markets and global balances of power**. **Key examples of such exercise in capability include recent neuroS/T endeavors in/by China and Russia** (Chen, et al., 2018; Giordano, et al., 2019; Giordano, 2017).

#### Scenario 2 is REMS –

#### The US and NATO are facing severe supply chain bottlenecks in REMs due to Chinese and Russian control of resources – renewed focus on solutions by the alliance is key to avoid getting cut off – US lead is crucial

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As it stands, **Chinese domination of the critical mineral supply chains dwarves the U.S. by all conceivable metrics: China commands 85% of the REE export market, producing 62% of global raw mineral materials and importing $2 billion worth of critical minerals and REEs**. **In the event of an acute international crisis, the PRC would likely use its leverage to further geostrategic aims by imposing critical mineral embargos**. **Considering the United States derives roughly 80% of its REEs from China,** these would likely be catastrophic for the economy**, including the high tech, computers, electronics, electric mobility, aerospace, and military-industrial complex**.

Given China’s track record and threats in this space, the potential for future embargos is realistic. Like the Strategic Petroleum Reserve (SPR), **the stockpiling of rare earths and critical minerals would provide sustainability in the face of international crisis**. Supply delays during the COVID-19 pandemic exposed the U.S. lack of preparedness and supply chain bottlenecks, which is beginning to have short-term ramifications for U.S. semiconductors, appliances, autos, and other industries. Current semiconductor shortages in car and appliances factories are threatening to interrupt production and are leading to wait periods of up to six-month delivery times.

In the event of a critical minerals embargo, U.S. companies would be left stranded with limited REE stockpile capabilities. **To** **counter the strategic vulnerabilities associated with reliance on Chinese critical mineral and REE supply chains, the United States must immediately establish a reserve of critical minerals like that of the SPR for oil imports**. The capacity of such a reserve is open to discussion, but one third-to-half of annual REE demand seems appropriate at the first stage, later expanding the reserve to a whole year of supply.

Developing domestic capacities to mine and refine critical minerals across the United States should be a priority for the U.S. government agencies, yet the private sector should be the primary driver behind REE exploration and production, like other mineral mining and processing. The sole Mountain Pass mine in California will not be sufficient for long-term aims of decoupling from Chinese critical mineral supply. Plans made by Lynas and Blue Line Corp to build domestic REE refinement facilities in the United States should be the pioneering projects, leading to bigger and better ones throughout North America. The Biden administration should also reauthorize the Defense Production Act to speed up the planning, construction, and operation of these facilities, as expanding domestic mineral projects addresses a key strategic vulnerability.

U.S. corporations should be encouraged to expand rare earths extraction operations in Africa, Asia, and Latin America. The construction of mining infrastructure in African nations would be relatively inexpensive, given lower labor costs and less stringent environmental regulations. Africa’s rich mineral reserves make it an ideal destination for supply chain diversification. However, the security challenges, from Al Shabaab to Boko Haram will require U.S. and its allies to project power in order to protect the supply chain. Importantly, the African governments and audiences should be aware of U.S. efforts to address developmental needs of host countries, regions, and communities—in competition with China. Roads, schools, medical facilities, and environmental protection should be front and center for U.S. REE operations in Africa.

Finally, U.S. policymakers must set specific targets to decrease reliance on Chinese REEs and critical minerals. Targeting specific non-China reliance goals will increase intergovernmental and business sector cooperation and signal clear intent to international partners to build robust levels of Western REE self-reliance.

**The United States and its allies should pursue policies that guarantee dependable access to these critical resources at affordable prices**, like those in response to the 1970s Arab embargo-triggered energy crisis. President Richard Nixon launched Project Independence after the 1973 oil embargo, attempting to ensure that the U.S. would increase its capacity to refine and extract oil domestically while promoting a union of consumer countries to study the industry and influence oil pricing. The International Energy Agency arose from such cooperative efforts of oil-consuming democracies. Similarly, **the U.S. must now explore critical mineral supply expansion while gathering allies into an REE “consumer club” to develop policies and build strategic cooperation and partnerships in the diversification of extraction and refinement facilities**.

**Critical minerals are the lifeblood of the 21st century, fueling high-tech manufacturing and renewable energy transition**. These resources are the keystones of economic progress and industrial leadership in building 21st century defenses. The U.S. and ~~her~~ allies must diversify their critical mineral supply chains. **Governments who underestimate their importance do so at their own risk**.

#### Rare earth scarcity prompts catastrophic military degradation and multiple hotspots for US-Sino escalation

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\*edited for language

It is the year 2030 and as projected nearly two decades ago, China has risen to be not only a hegemon in the Asia-Pacific region but also a nation capable of significant power projection outside of its normal sphere of influence. China’s military has grown in size and capability to a point where it is at near parity with the United States. Confrontations between competing claimants in the South China Sea have increased considerably over the years due to the exploration and now production of both oil and natural gas resources within the area. Additionally, the Association of Southeast Asian Nations (ASEAN) and China were never able to negotiate a final agreement on a code of conduct for operations in the South China Sea, with China preferring a bilateral approach to the issue in order to exert its power more decisively against smaller states. These events have culminated in a crisis in the South China Sea between the Philippines and China over competing claims to the Scarborough Shoal. Repeated Chinese bullying via harassing naval operations against both Philippine commercial and military vessels has prompted the Philippines to seek assistance from the United States based on the mutual defense agreement between the two nations. At this point, the United States and China are poised for a possible military confrontation in the South China Sea. This hypothetical scenario hopefully will never come to fruition; however, it is not inconceivable. In fact, many would argue it is very plausible based on present day Chinese military expenditures, a lack of transparency of Chinese intentions, and ongoing territorial disputes in the South China Sea. The above scenario could be used as a backdrop for a multitude of potential security issues between the United States and China. This article, however, will focus on the single issue of China’s monopoly on the production of rare earth elements and the pursuant implications to U.S. national security. Currently, China produces nearly 95 percent of the global supply of rare earth elements.1 These elements are critical resources in the manufacturing of both commercial and military goods. Precision guided munitions, engine coatings for fighter aircraft, and ship-building components are just a few examples of defense weapons systems that require rare earths.2 For a nation to rely on a near sole producer of a vital resource is imprudent. This point is especially concerning when put into a contextual framework vis-à-vis the United States and China. Can the United States afford to remain dependent on a potential adversary for a resource that has direct implications on the outcome of a military confrontation? Can the United States find viable alternatives from either within its borders or from more reliable partners in the global community? Finally, what are the costs with regards to national security? In order to answer these questions and develop a deeper understanding of the rare earths challenge from a security context, this article will first define rare earth elements, including where they are found, how they are mined and processed into the end-use product, and who currently has the capacity to produce these elements. Next, the article will examine China’s monopoly of the industry as well as China’s export policies. The 2010 crisis between China and Japan over territorial claims to the Senkaku/Diaoyu Islands illustrates the control China exercises over importing nations who rely on Chinese rare earth elements for commercial manufacturing, and serves as an example of potential adverse effects of not finding an alternative source. Finally, this piece will scrutinize four potential solutions to release China’s stranglehold on the production of rare earths. RARE EARTH ELEMENTS The elements known as rare earths are a series of fifteen elements residing within the periodic table and having an atomic number ranging from fifty-seven to seventy-one.3 The elements are commonly known as the lanthanides and include lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, and lutetium.4 Yttrium and scandium are also considered rare earth elements due to their similar chemical and physical properties with the lanthanides.5 The term “rare” is somewhat of a misnomer. The lanthanides are not so much as rare in abundance as they are seldom found in large quantities together.6 This fact makes mining for the elements more difficult and therefore costly with respect to return on investment. Cerium is the most abundant rare earth and is actually more common than copper or lead in the Earth’s crust.7 With the exception of promethium, all of the rare earths are more prominent than silver or mercury.8 As an example, most rare earths range from 150 to 220 parts per million in the crust versus the more commercially mined elements such as copper (fifty-five parts per million) and zinc (seventy parts per million).9 In order to mine and produce rare earth elements, geologists must first locate a base mineral with known rare earth elements-bearing capacity in a commercially viable quantity. Furthermore, it is advantageous to find rare earth elements-bearing minerals in their lowest phase. A phase is defined as having distinct physical and chemical attributes that can be physically separated from a system.10 Minerals that have multiple phases require more complex separation techniques thus increasing the cost of production.11 Therefore, minerals consisting of a single phase provide the most cost effective means for producing rare earth elements.12 With regards to mining rare earths, bastnasite and monazite are single phase minerals found in the most abundant quantities.13 A significant downside to monazite, however, is its tendency to contain the radioactive element thorium, which encumbers additional environmental protection and health safety issues.14 Once the base ore is discovered in sufficient quantity, the ore is extracted and then processed into rare earth oxides (REO). The process for separating the ore into a REO is complex, requiring the use of acid solutions to dissolve the rare earth ions followed by further processing to separate the rare earths into both heavy and light oxides.15 REOs are the key element for the production of specific metals, which are in turn manufactured into a number of commercial and defense products. As previously explained, rare earths exist throughout the planet. However, there are currently only limited locations where the mining and production of rare earths occur. The largest rare earths mines are in China and account for almost 95 percent of the planet’s production. The Bayan Obo mine in southern China and the Mountain Pass mine in California are the largest known single phase mineral deposits of bastnasite.16 Proven reserves also exist in Australia, Brazil, Russia, India, Malaysia, and the United States, while other nations account for approximately twenty percent of the remaining reserves.17 Currently, the only manufacturers of rare earth elements are China, India, Brazil, and Malaysia, in descending order of production.18 The United States and Australia are in the process of restarting and developing the production of rare earth elements.19 This article will later cover in more detail China’s current monopoly and the potential growth of the industry outside of China. USES OF RARE EARTH ELEMENTS The concern over access to a secure and reliable supply of rare earths stems from the ubiquitous nature of the commercial and defense sector products made from these elements. These products range from touch screens for iPhones to guidance components on advanced air-to-air missiles. Without a sufficient supply of rare earths, numerous everyday products would no longer be available to the American consumer. More importantly, essential components in U.S. weapons systems would be difficult if not impossible to produce without them. Rare earths are important in the manufacture of a myriad of products due to their unique ability to readily give up and accept electrons.20 This property makes them beneficial in many electronic, optical, magnetic, and catalytic applications.21 Permanent magnets and rare earth phosphors are the most prevalent of the rare earths–based products in today’s market. Permanent magnets incorporate neodymium, praseodymium, dysprosium, and terbium as key elements.22 Rare earth phosphors use yttrium, europium, terbium, gadolinium, and cerium, which contribute to the brilliant display of colors on flat panel television screens.23 Additionally, rare earths also aid in fiber optic signal amplification through the incorporation of yttrium, europium, terbium, and erbium.24 Nickel metal hydride batteries use lanthanum to increase energy storage capacity.25 Finally, catalytic crackers and convertors employ cerium and lanthanum.26 Many rare earth products and technologies possess dual-use attributes, meaning they are used for both commercial and military purposes. In the commercial sector, for example, today’s hybrid vehicles employ rare earths permanent magnets in their electric traction drives,27 which either replace or supplement internal combustion engines in hybrid automobiles, increasing energy efficiency.28 Additionally, the Toyota Prius has a nickel metal hydride (Ni-MH) battery for energy storage, which increases overall fuel economy.29 Wind turbines also integrate permanent magnets in gearless generators for better reliability and online performance.30 The new fluorescent light bulbs on the market utilize rare earth phosphors. These light bulbs consume 70 percent less energy than the older incandescent bulbs.31 Finally, rare earths are found in automobile catalytic convertors to reduce dangerous emissions of CO2 and ozone, contributing to a cleaner environment.32 Furthermore, dual-use components made from rare earths play a vital role in U.S. national security through defense sector applications. Permanent magnets are incorporated in critical guidance and control mechanisms of U.S.-built weapons, enabling kinetic weapons to impact their target.33 Today’s advanced jet engines are coated with rare earth elements for increased thermal stress resistance.34 The performance requirements for the engines on the F-22A Raptor and F-35 Joint Strike Fighter (JSF) are extremely stringent based on the environment in which these aircraft routinely operate. Without the added thermal protection rare earths provide, engine performance may be degraded with catastrophic results. Rare earths technology used in electronics also has numerous defense applications. The same technology used in manufacturing commercial Ni-MH batteries is also found in both electronic warfare systems and directed energy weapons.35 Examples of their use include smart jammers on advanced U.S. fighter aircraft, area denial weapons systems, and the electromagnetic railgun.36 All of these weapons require high efficiency battery technology to function properly. Additionally, computer drives manufactured with critical rare earths enable precision weapons systems to reach their targets, while laser technology depends on the amplification properties of rare earths for targeting.37 Without these critical components, accuracy would deteriorate, potentially resulting in increased collateral damage and weapons expenditure. CHINA’S HOLD ON RARE EARTHS China has not always been the leader in the mining and production of rare earth elements. Only since the mid-1980s has China become the predominant producer on the global market. Before that time, the United States was the world’s largest supplier of rare earths. The decline of U.S. rare earth mining coincided with China’s growth, which has contributed to China’s stranglehold on the trade. China’s appetite for internal consumption of rare earths has also increased due to its booming economy, which is starting to affect availability. With 95 percent of the world’s production capacity in China, rare earths are simply not readily available outside of the Chinese market. The reason for the decline in the U.S. industry was due in part to lower labor costs in China, combined with environmental issues at the Mountain Pass mine, the largest source of U.S. rare earths during this period.38 The latter issue was over a main wastewater pipeline that did not meet regulatory and environmental standards under U.S. law, leading to a shutdown of the mine.39 Since that time, a small amount of rare earths has been produced from bastnasite stockpiles that existed prior to the closure.40 Molycorp reopened the Mountain Pass mine in 2011, and its potential impact on the rare earths industry will be discussed later. China’s ability to provide low cost labor significantly contributed to its rise to the top of the industry. Lower labor costs allowed China to produce rare earths at a more competitive price than other, smaller producers around the world, thus making it economically unattractive for those producers to stay in the market or for new producers to enter. Second, China’s low environmental standards played a role in its emergence as the world’s leader in rare earths production.41 It certainly helped that China was more concerned during this rise with fueling its growing economy than addressing environmental concerns pertaining to rare earths production. A third contributor to China’s rise is its access to large deposits of ores within its borders. The majority of China’s rare earths are produced at the Bayan Obo mine in northeast China and at a number of mines in southern China and Sichuan.42 These mines have significant deposits of bastnasite.43 The Bayan Obo mine provides 50 percent of the rare earths mining production for China’s industry, while the mines in southern China and Sichuan account for 41 percent and 9 percent of production respectively.44 The demand for rare earths continues to rise. In 2010, the worldwide demand for rare earth oxides was 127,500 metric tons.45 China produced over 130,000 metric tons of rare earths in 2010 and 2011, eclipsing world demand.46 The next largest producer was India with a paltry 3,000 metric tons, followed by Brazil at 550 metric tons, and Malaysia at thirty metric tons.47 These production rates exemplify the disparity between China and its closest competitors in the industry. By 2014, it is estimated that total demand for rare earth oxides will reach 177,200 metric tons.48 This increase equates to a 75 percent growth in demand for battery alloy production and a 57 percent growth in demand for permanent magnets.49 Capacity for meeting the increased demand is uncertain. Of the world’s estimated 110,000,000 metric tons of reserves, China controls half.50 The Commonwealth of Independent States is second, controlling approximately 19,000,000 metric tons, with the U.S. in third at 13,000,000 metric tons.51 Despite the large number of reserves deposited across the planet, very few countries possess the capacity to mine the ores and process them into rare earth oxides. However, with increasing demand on the horizon accompanied by increasing value, more nations as well as private corporations may be willing to enter the market. With a firm hold over the industry, China clearly has the upper hand with regards to controlling both supply and overall pricing of rare earths. The price for rare earth elements has risen exponentially over the past several years due to both increased demand for rare earths products and a limited supply chain. For example, lanthanum sold for $3.44 per kilogram in 2007 but, by the third quarter of 2011, was selling for $153 per kilogram.52 That is a forty-four-fold increase in just under four years. Other rare earths have seen similar price spikes over the same period. Neodymium, which is a key ingredient in the manufacturing of permanent magnets, sold for $30.24 per kilogram in 2007 and, in July 2011, hovered near $340 per kilogram.53 As of April 2013, the market prices for lanthanum and neodymium declined and are approximately $11 and $75 per kilogram respectfully.54 The decrease in price is welcome news for manufacturers and is attributed mostly to lower demand for rare earths due to recent high prices. There are several reasons for the skyrocketing rare earths prices from 2007 to 2011, and they all stem from policy decisions within China. These policy decisions resulted in a decrease in supply of rare earths to the outside world. One such policy decision was China’s deliberate move to address environmental issues within the mining industry. According to a 2011 New York Times article, Chinese officials were concerned with polluted water, air, and radioactive residues from the rare earths industry.55 Most of China’s rare earths facilities closed during the fall of 2011 in order to install pollution control equipment.56 Another policy decision addressed the overwhelming number of mine operators operating illegally without a license. These operators conducted business without any concern for the environment or labor practices.57 China’s solution for these issues is to consolidate the mining industry into larger enterprises under government control. For example, in northern China a single, government-controlled monopoly named Bao Gang Rare Earth was formed incorporating thirtyone mostly private rare earths processing companies.58 The same consolidation process is occurring in southern China, where the government has created three distinct companies en route to consolidating 80 percent of production in the region.59 The combination of stricter adherence to environmental regulations and government consolidation of the industry equates to an increase in prices. A third, more ominous factor is also affecting overall supply of Chinese rare earths. China has deliberately cut export quotas for rare earths over the past several years due to its own internal appetite for the resource. This trend is not likely to change in the near future. Molycorp’s former chief executive officer, Mark Smith, reported after a trip to China that Chinese officials told him they did not intend to remain the world’s major supplier of rare earths.60 Molycorp also predicts China may be a net importer of rare earths by as early as 2015.61 This prediction may be a ploy by Molycorp to boost outside investment or to gain greater attention from Congress; however, China’s export quotas provide empirical data that is hard to refute. In 2004 and 2005, China exported 65,609 metric tons of rare earths against a global demand of 90,000 and 98,000 respectively.62 From 2006 through 2009, Chinese exports decreased at a 6 to 7 percent annual rate to 50,145 metric tons in 2009.63 According to a U.S. Geological Survey report, China’s 2010 rare earth elements export quota was 37 percent lower than that of 2009, and a further reduction of 35 percent was designated for 2011.64 Global demand over that period rose to 124,000 metric tons in 2008 with a precipitous drop-off to 85,000 metric tons in 2009 due to the global economic downturn.65 Despite the downturn, demand climbed back up to 127,500 metric tons in 2010. China’s domestic consumption has risen rapidly over the last ten years from an estimated 19,000 metric tons in 2001 to 77,000 metric tons in 2010.66 The increased internal demand combined with a somewhat lower production capacity due to consolidation of the Chinese industry and tougher enforcement of environmental laws signals that declining export quotas will remain a Chinese policy for years to come. China’s rise to become the world leader in rare earths production was not by chance. The U.S. decision to suspend operations at Mountain Pass in the 1990s versus financing the cleanup and upgrade costs required to meet environmental regulations was a key contributor. Furthermore, China’s own decision to increase its production capacity through investment in research and development projects culminated in their monopoly of the rare earths industry. GEO-STRATEGIC IMPLICATIONS For one nation to possess 95 percent of the production capacity of an increasingly global, vital natural resource is cause for concern. The fact that the nation that controls that resource has not proven to be a transparent and accountable global partner with regards to territorial claims and increased military spending raises the level of concern significantly. For these reasons, China’s monopoly of the rare earths industry presents national security and manufacturing concerns for the United States and its partners and allies. It is difficult to envision the United States or any other nation relying exclusively on a single supplier for its vital resource needs. The United States diversifies its petroleum imports to avoid such a scenario. Even if the United States were able to import all of its petroleum requirements from a single, secure, external source, such as Canada, it would be a dangerous choice due to a number of factors. For instance, contingencies such as labor strikes, souring diplomatic relations, and natural disasters make overreliance on one source a strategic miscalculation. It is therefore wise for nations to diversify their imports of vital natural resources, using a variety of suppliers and geographic regions if domestic sources are insufficient or unavailable. As demonstrated in the hypothetical scenario at the beginning of this paper, China’s hold on rare earths may be a decisive factor in a future confrontation with the United States. The numerous weapons systems that rely on rare earths technology place the United States at a strategic disadvantage with regards to China. If a prolonged, large-scale conflict between the two nations broke out over a Taiwan Strait or South China Sea dispute, the United States may find itself squeezed to obtain sufficient supplies of rare earths to manufacture replacement parts or systems to remain engaged in the fight. Much as the lack of secure access to oil was ~~crippling~~ devastating to the Germans at the end of World War II, rare earths could play a similar, pivotal role in a future conflict with China. In the air-to-air arena alone, the requirement to replace expended stockpiles of advanced air-to-air missiles could become a factor very quickly based on the number of aircraft China would be capable of employing. Japan recently learned that relying on a single resource supplier was imprudent following an incident between the Japanese Coast Guard and a Chinese fishing trawler near the Senkaku, or Diaoyu Islands.67 In September 2010, a Japanese Coast Guard vessel attempted to stop a Chinese trawler purported to be fishing illegally in Japanese waters. During the incident, the captain of the trawler intentionally rammed the coast guard vessel. Subsequently, the Japanese Coast Guard apprehended the captain. The ensuing political spat boiled over for several weeks with the Japanese threatening to try the captain, while the Chinese suspended high-level contacts with Japan.68 During this period, an unanticipated consequence unfolded. The Chinese were scheduled to deliver several metric tons of rare earths to Japan for use in Japanese commercial industries. In what can only be seen as a direct use of its economic power in a diplomatic tussle, the Chinese withheld shipments of the rare earths during the dispute while awaiting an apology, reparations, and the release of the captain.69 China denied all accusations that it was purposefully withholding the shipments as a political bargaining tool against Japan.70 Whether China purposefully withheld the shipments or not, the lesson learned by Japan as well as outside observers was that China possesses a powerful economic instrument to employ against nations that depend on Chinese rare earths to sustain their economic livelihood. BREAKING CHINA’S GRIP The United States cannot remain dependent on China for its rare earths needs. In order to gain resource independence, the United States must formulate a plan that will ensure reliable, secure access to rare earths. Fortunately, this issue has not been ignored. Currently, Congress has multiple acts addressing the issue in different stages of approval on the floors of the House of Representatives and the Senate. These bills recommend exploring options for stockpiling, recycling, and domestic production of rare earths. This section will examine all three options, as well as a fourth incorporating a multi-national course of action. It will conclude by recommending that the United States develop a program similar to its approach to building the JSF.71

#### China goes nuclear

**Auslin 6/11** (Michael Auslin, a fellow at Stanford University’s Hoover Institution and the author of Asia’s New Geopolitics: Essays on Reshaping the Indo-Pacific. Foreign Policy, "The United States Needs to Relearn Nuclear Strategy", 6/11/2022, https://foreignpolicy.com/2022/06/11/us-nuclear-weapons-strategy-putin-ukraine-war-threat-china-arms-race-geopolitics/, accessed on 6/22/2022)//gideon

The last serious nuclear crisis was over Cuba in 1962—two entire generations ago. The 1973 Yom Kippur War, the 1983 Able Archer scare, and the 1995 Norwegian rocket incident all created mini-emergencies at most. Throughout the Cold War, nuclear strategists such as Schelling, Wohlstetter, and Nolan attempted to learn from various crises, fitting various scenarios into war-gaming and estimation activities. All foreign policy, especially when it was focused on Europe and Asia, was viewed at least in part through a nuclear lens, so as not to miscalculate or underestimate nuclear adversaries. Once the Cold War ended, so did this sense of urgency. Much of the focus of the post-Cold War nuclear studies community shifted away from deterrence to disarmament, nonproliferation, rogue regimes, and the enduring challenge of the North Korean nuclear program. All were worthy issues, even as the world’s other nuclear powers didn’t follow the new U.S. agenda. Yet as tensions continue to grow between Beijing and Washington and meaningful confidence-building measures fail to take root, prudence dictates that the United States’ nuclear experts return to serious thinking about war planning, escalation ladders, off-ramps, signaling, counterforce targeting, command and control, and all the rest of the nuclear enterprise—all in the context of a variety of potential scenarios for nuclear escalation. The fragility of U.S.-Chinese political relations and the limitations of meaningful diplomatic dialogue mean that unsolved problems retain the potential of becoming crises—and in those crises, a more capable and powerful Chinese nuclear element may play a role. To rejuvenate its capacity for strategic thinking, the United States needs to quickly get better at reading Chinese sources in the original language, so as to immerse as much as possible in the untranslated writings and statements of authoritative Chinese voices. So far, not nearly enough attempts have been made to really grapple with primary sources in Chinese or to translate or sponsor research by Chinese scholars. Foreign-policy specialists and historians need to be brought into discussions and research on nuclear issues. U.S. Strategic Command should increase its outreach among academics and researchers—to help educate but also to be exposed to the perspectives of specialists not normally talking with nuclear planners. One hesitates to call for yet more university or think tank programs, but a renewed emphasis on training for the next generation of nuclear strategists is long past due. Above all, the United States must return to a discipline of strategic thinking, sponsoring serious cross-disciplinary discussions on nuclear issues, preparing the intellectual and policy landscape in advance of a crisis, and refraining from spasmodic and uncoordinated grasping at straws amid a crush of events. A crucial role will be played by the U.S. Nuclear Posture Review (NPR), whose current iteration was just completed as part of the National Defense Strategy. Though not yet released publicly, the NPR is already making waves for walking back then-presidential candidate Joe Biden’s comments during the 2020 campaign that the “sole purpose of the U.S. nuclear arsenal should be deterring—and if necessary, retaliating against—a nuclear attack.” The Biden administration initially indicated that its focus would be on arms control and reducing the role of nuclear weapons in U.S. national security strategy, according to the 2021 Interim National Security Strategic Guidance. Now, according to the Arms Control Association, the NPR “leaves open the option to use nuclear weapons not only in retaliation to a nuclear attack, but also to respond to non-nuclear threats” in extreme emergencies. According to a Pentagon fact sheet, the Biden administration remains committed to “reducing the role of nuclear weapons and reestablishing our leadership in arms control,” as well as avoiding costly arms races. Yet the nuclear policies of both Russia and China may make those goals obsolete—or overtaken by events, as they say in government. The NPR will play a critical role if it can respond to geostrategic reality and help reinsert the nuclear issue into a broader, whole-of-defense framework integrating the highest-level political questions with operational plans. Given Putin’s nuclear saber rattling, the NPR may understandably fail to set the stage for a pivot to Asia on nuclear issues. But the Kremlin’s threats only underline why it is not enough for the NPR to consider issues such as U.S. nuclear modernization—it is questions of strategy, intent, psychology, doctrine, and escalation that must come to the fore. Nuclear blackmail, attempts to curtail U.S. conventional operations, threatening allies, and even the use of tactical nukes must all be considered as options Beijing might pursue. Deterring such threats will require a more flexible and robust U.S. nuclear strategy tied to geopolitical scenarios and possible contingencies. But even more importantly, all these scenarios must be thoroughly thought through beforehand. Historically, states have escalated when facing the prospect of imminent defeat—and Putin has a track record of following through on his threats. And if Biden truly intends to focus on arms reduction, then he must figure out how to do so with China, given that Beijing has, since the 1960s, steadfastly refused to enter any arms control talks or even set up a reliable nuclear hotline. The announcement that Biden and Xi agreed to explore talks on arms control during their mid-November 2021 virtual summit is welcome, but there is a long road ahead to reach substantive discussions. The White House must guard that the Chinese don’t use the tactic of talking about talks to endlessly delay meaningful engagement on nuclear issues. Unlike with the multiple agreements and constant negotiations between Washington and Moscow during the Cold War and its immediate aftermath, the Chinese consistently fall back on their “no first use” pledge, defensive orientation, and low number of warheads relative to the United States and Russia as excuses for not joining any arms reduction talks. If the PLA is to have 1,000 warheads across multiple delivery systems in just a decade’s time—and with tensions over Taiwan and the South China Sea at their highest level in decades—“there will be much talk about slowing that arms race down with arms control agreements, but that is unlikely to happen, as we learned during the first cold war,” University of Chicago political scientist John Mearsheimer told me. Wishing for dialogues about strategic stability will not make any substantive talks come about, nor should anyone believe that, after years of contentious Sino-U.S. ties, Beijing will suddenly have a change of heart and limit its nuclear arsenal. China refused the Trump administration’s attempts to bring it into strategic security talks and join U.S.-Russia negotiations over the New START treaty. Washington will have to figure out a different type of signaling. The new NPR could do its part by making clear that U.S. Strategic Command now takes China seriously as a nuclear threat and will be adjusting doctrine and operational activities accordingly. A half-century after the U.S. reopened relations with Beijing, the specter of the world’s most populous nation becoming a full-on adversary with nuclear arms is the last outcome Washington wanted, especially in an environment where Russia’s nuclear brinkmanship has returned to geopolitics. U.S. policymakers have consistently underestimated China’s intentions, given a pass to its aggressive international behavior, and seemed hesitant to respond to the massive growth of its military. They must not make the same mistake with China’s ambitious nuclear armament plans. China has repeatedly surprised the United States, and while the thought of any nuclear conflict between the two may seem unthinkable, the risks from complacency are simply too high. Many will see any resumption of serious nuclear planning as provocative and will want to continue reducing the role of nuclear weapons in U.S. defense strategy. They can take solace from the fraught, dangerous, and sometimes terrifying Cold War era. It was the unpleasant task of taking nuclear war seriously that likely prevented it from ever breaking out. In an imperfect world, that is the best that can be hoped for, and a lesson we ignore at our peril.

#### US-led sharing and investment in biotechnology for the alliance solves – leads to effective development of biomining

Joe Gould ’21, is senior Pentagon reporter for Defense News, covering the intersection of national security policy, politics and the defense industry., “Pentagon seeks microbe miners to cut rare earth reliance on China”, AirForceTimes, 9/8/21, https://www.airforcetimes.com/pentagon/2021/09/08/pentagon-seeks-microbe-miners-to-cut-rare-earth-reliance-on-china/?contentQuery=%7B%22section%22%3A%22%2Fhome%22%2C%22exclude%22%3A%22%2Findustry%22%2C%22from%22%3A235%2C%22size%22%3A10%7D&contentFeatureId=f0fmoahPVC2AbfL-2-1-8

WASHINGTON ― Researchers at the Pentagon have launched a project that aims to extract rare earth minerals critical for military technologies from domestic sources ― using microscopic bugs.

The potentially **revolutionary biotechnology doesn’t exist yet, but the Defense Advanced Research Projects Agency wants to develop it as a step toward ending American dependence on China**, the globe’s top supplier of the minerals. DARPA’s director, Stefanie Tompkins, said at the Defense News conference Wednesday she would determine whether it’s worthwhile on an industrial scale to use microbes as biofilters.

“From a DARPA perspective, we’re looking at: what are some of the barriers for the U.S. to maintain dominance in rare earth processing,” said Tompkins, a former Army intelligence officer and geologist who joined DARPA from the Colorado School of Mines.

DARPA in July launched the Environmental Microbes as a BioEngineering Resource, or Ember, a four-year program to leverage advances in microbial and biomolecular engineering to develop what it envisions as a scalable, bio-based separation and purification strategy. It’s aimed at expanding supplies of 17 elements used in magnets for electric motors, high-temperature ceramics and lasers.

“We don’t even have an evaluation of proposals yet, but we’ve done enough early assessment of the science to say the physics and the chemistry that underlies the science make it something that should be possible to be able to demonstrate sufficient scale and the potential to scale up manufacturing to make it worthwhile,” Tompkins said.

**Biomining uses microorganisms to extract metals from rock ores or mine waste and can be used to clean up sites polluted with metals**, according to the American Geosciences Institute. When valuable metals like copper, nickel and gold are bound up in solid rock, one biomining technique uses microbes to break down the surrounding minerals and another breaks down the metal itself.

**Biomining is considered an environmentally friendly alternative to toxic, chemical-intensive processes that could**, Tompkins said, **be deterring U.S. companies from extraction efforts**.

The effort is just part of Washington’s stepped-up efforts to shore up defense supply chain vulnerabilities laid bare by the global coronavirus pandemic. The Pentagon’s Office of Industrial Policy announced last week it had established a two-year, department-wide “supply chain resiliency working group.”

**The House Armed Services Committee’s own supply chain task force recently** highlighted shortages of personal protective equipment and **warned that China and other adversaries “are capable of weaponizing supply chain vulnerabilities**.” Its recommendations on rare earth materials called for developing alternate extraction and processing methods, as well as increasing collaboration with allies to lessen U.S. reliance on China.

**Those broader supply chain efforts include a push to reshore supplies of rare earths**. Earlier this year, the Pentagon awarded a $30.4 million contract to Lynas Rare Earths Limited to boost domestic processing of light rare earth elements. The firm will use the funds to open a processing facility in Hondo, Texas, through its U.S. subsidiary, Lynas USA.

#### Specifically, DOD security cooperation over biotech is key – only way to harness innovative collaboration

C. Todd Lopez ’22, writer for DOD News, “DOD Looks at U.S.-South Korea Technology Collaboration”, U.S. Department of Defense News, 6/9/22, https://www.defense.gov/News/News-Stories/Article/Article/3058558/dod-looks-at-us-south-korea-technology-collaboration/

**Further investments in biotechnology**, Honey said, **can help with everything from fighting global pandemics to reducing logistics and sustainment costs and increasing energy efficiency**.

"Biotechnology can help change the way the department conducts missions, performs in contested logistics environments, and adapts to major global changes," he said. "Biotechnology innovation is largely through global collaborations. DOD partnerships domestically and internationally de-risk and accelerate the transition of research to operational demonstrations and capabilities."

### Advantage—Brain Computer Interface

#### Advantage \_\_ is Brain-Computer-Interface –

#### The US and China are racing for neurotechnological supremacy

**Kosal and Putney 02/08** (Margaret Kosal and Joy Putney, Associate Professor in the Sam Nunn School of International Affairs at Georgia Institute of Technology, where she also directs the Sam Nunn Security Program., PhD in Quantitative Biosciences from the School of Biological Sciences at Georgia Institute of Technology and was a National Science Foundation Graduate Research Fellow. Sam Nunn Security Program Fellow through the Sam Nunn School of International Affairs at GT, focusing on the national security and policy issues surrounding dual-use neurotechnologies like brain-machine interfaces. Cambridge University Press, "Neurotechnology and international security", 02/08/2022, https://www.cambridge.org/core/journals/politics-and-the-life-sciences/article/neurotechnology-and-international-security-predicting-commercial-and-military-adoption-of-braincomputer-interface-bci-in-the-us-and-china/29155A74DBB0FDE5CB0CBA4D3DF6AF0C, accessed on 6/18/2022)//gideon

The human brain, with its approximately 100 billion interconnected neurons, enables our higher cognitive abilities without being a physiological outlier from other primate species (Herculano-Houzel, Reference Herculano-Houzel2012). This incredibly complex organ can also host debilitating clinical disorders, including seizures, depression and anxiety, Parkinson’s disease, and many others. Unlocking the secrets of the human brain is one of the largest scientific challenges to ever be undertaken. Advances in neuroscience research have enabled us to further our understanding of the brain and develop technologies to read and write brain activity, with implications for understanding behavior and decision-making.

In the past decade, the United States and the People’s Republic of China have begun large neuroscience research projects along with several other international actors, including Canada, Korea, Japan, Australia, and the European Union (EU) (International Brain Initiative, n.d.). These brain initiatives have ambitious goals that are only now possible with advances in genetic tools and imaging techniques (National Institutes of Health, n.d.c). The U.S. BRAIN (Brain Research through Advancing Innovative Neurotechnologies) Initiative has a stated goal of “accelerating the development and application of innovative technologies … to produce a revolutionary new dynamic picture of the brain that … shows how individual cells and complex neural circuits interact in both time and space” (National Institutes of Health, n.d.b). Additionally, the BRAIN Initiative was highlighted as a major component of the United States’ innovation strategy for breakthrough technologies (Office of Science and Technology Policy, 2015). The China Brain Project’s framework focuses on the ability to develop technologies both for diagnosis and treatment of brain disorders and for mimicking human intelligence and connecting humans and machines (Poo et al., Reference Poo, Du, Ip, Xiong, Xu and Tan2016).

While the initial public focus of these brain projects has been clinical technologies to cure disease and return faculties to people, such research is likely to enable augmentation and use for healthy people in both the commercial and military sectors. The U.S. BRAIN Initiative and the China Brain Project emphasize the importance of neuroscience research to treat and prevent brain disorders in aging populations, but they also highlight additional goals for accelerating basic research in the United States and applied research in human-machine teaming in China (National Institutes of Health, n.d.b; Poo et al., Reference Poo, Du, Ip, Xiong, Xu and Tan2016). The dual-use technologies made possible by all seven brain projects are likely to have profound implications for society, public health, and national security. From a national security perspective, it would be valuable to be able to predict the dissemination of neurotechnologies to both the commercial and military sectors. This research presents the first analytical framework that attempts to do so.

Like past scientific and technological breakthroughs, cognitive sciences research is purported to have an impact on future security policies. Since the cognitive sciences focus on humans, they are intricately tied to the study of social processes, including the realms of politics and security. International scientific bodies, including the U.S. National Academy of Sciences and the United Kingdom’s Royal Society, have also engaged in discussions on the field’s policy relevance (National Research Council, 2008, 2009; Royal Society, Reference Society2012). Experts involved in developing NATO’s New Strategic Concept released in 2010 noted that “less predictable is the possibility that research breakthroughs will transform the technological battlefield,” and that “allies and partners should be alert for potentially disruptive developments in such dynamic areas as information and communications technology, cognitive and biological sciences, robotics, and nanotechnology” (NATO, 2010, p. 15; emphasis added). Interest in neurosciences is not limited to any specific nation, and the potential for new technology to affect conflict and cooperation has been recognized.

Security-related research in neuroscience and operationalization of scientific discoveries into commercial or deployable neurotechnologies present concerns for policymakers and scholars. Not only do the effects and use of military applications of cognitive science and neuroscience research require their attention, but also the increasing understanding of cognitive processes continues to provide new perspectives on how we understand policy and politics.

#### Specifically, China is focusing on integrating Brain-Computer-Interfaces (BCI) into military functions – allows them to position themselves as a first-mover of cognitive weapons

**Kosal and Putney 02/08** (Margaret Kosal and Joy Putney, Associate Professor in the Sam Nunn School of International Affairs at Georgia Institute of Technology, where she also directs the Sam Nunn Security Program., PhD in Quantitative Biosciences from the School of Biological Sciences at Georgia Institute of Technology and was a National Science Foundation Graduate Research Fellow. Sam Nunn Security Program Fellow through the Sam Nunn School of International Affairs at GT, focusing on the national security and policy issues surrounding dual-use neurotechnologies like brain-machine interfaces. Cambridge University Press, "Neurotechnology and international security", 02/08/2022, https://www.cambridge.org/core/journals/politics-and-the-life-sciences/article/neurotechnology-and-international-security-predicting-commercial-and-military-adoption-of-braincomputer-interface-bci-in-the-us-and-china/29155A74DBB0FDE5CB0CBA4D3DF6AF0C, accessed on 6/18/2022)//gideon

Though the United States has spent more money on its brain project, started its brain project earlier, and has a more robust innovation system that has led to better R&D capabilities in both the private and public sectors, China is a more likely to be the first adopter of BCI technologies in both the commercial and military sectors because of its government structure, sociocultural norms, and greater alignment of brain project goals with military goals. Its coordinated national focus has driven investment in brain-machine intelligence and BCI technologies. While the U.S. military has also indicated high interest in human-machine teaming and the United States has invested a large sum of money in brain-related research, there is a disconnect between the stated military goals for brain research and the basic research goals driving the U.S. BRAIN Initiative. Additionally, the cultural values of the United States, including an emphasis on individual identity and a distrust of new technologies that have not proven their usefulness, will hinder BCI adoption both commercially and militarily.

China’s early adoption of BCIs could have important implications for U.S. national security. These truly emerging technologies, though nascent, may give China a military advantage through cognitive enhancement of warfighters and improved human-machine teaming when matured. Additionally, China’s native supply of research monkeys, coupled with lack of ideational drive away from primate research, will lower barriers to developing commercially and militarily viable invasive BCIs that can read and write brain activity with better accuracy and precision.

Security risks also exist for commercial applications of BCIs. If China is the most viable place to produce and market BCI technologies, it may have a large influence on the supply of BCIs that will eventually be used in the United States and other countries. This could lead to privacy issues for very personal data—the activity of a human brain and interpretations of that activity that give insight into mental state and mood. Finally, being a first mover on BCI technology may allow China to set ethical norms for BCI use. Understanding the brain to treat disease is a noble cause and should be pursued. However, the technologies enabled by this heavy investment in brain research have clear dual-use capabilities that will shape society and warfare.

#### We have 3 scenarios:

#### Scenario 1 – Democracy –

#### Chinese BCI advantage allows them to challenge and subvert Western military might

**Gertz 21** (Bill Gertz, a national security correspondent for The Washington Times. He has been with The Times since 1985. He studied English literature at Washington College in Chestertown, Md., and journalism at George Washington University. The Washington Times, "Chinese ‘brain control’ warfare work revealed", 12/29/2021, https://www.washingtontimes.com/news/2021/dec/29/pla-brain-control-warfare-work-revealed/, accessed on 6/22/2022)//gideon

The Commerce Department imposed sanctions on Chinese technology companies and announced recently that China’s military is engaged in dangerous work related to “brain control” warfare research. The announcement of the sanctions provided limited specific details of the work by China’s Academy of Military Medical Sciences and 11 related Chinese research institutes. Commerce’s Bureau of Industry and Security said only that the academy and its affiliates are using “biotechnology processes to support Chinese military end-uses and end-users, to include purported brain-control weaponry.” However, three reports by the People’s Liberation Army obtained by Inside the Ring shed light on the depths of China’s brain warfare research and show that it has been underway for several years. The translated 2019 reports discuss developing brain control weaponry as part of what Chinese officials call the “intelligentization” of warfare. According to one of the reports, advances in science and technology are leading to upgrades in methods and the ability to subdue enemies. “War has started to shift from the pursuit of destroying bodies to paralyzing and controlling the opponent,” said the report headlined, “The Future of the Concept of Military Supremacy.” “The focus is to attack the enemy’s will to resist, not physical destruction,” it stated. Brain science is being used to extend warfare in the sphere of human consciousness “causing the brain to become the main target of offense and defense of new concept weapons,” the report added. “To win without fighting is no longer far-fetched,” it stated, quoting ancient strategist Sun Tzu’s maxim. The report, which was published in the official military newspaper PLA Daily, also asserted that China is merging four major technology fields for military purposes: nano, bio, information and cognition. The intended result will be enhanced individual capabilities. “Future human-machine merging will revolve around the contest for the brain,” the report said. “The two combatant sides will use various kinds of brain control technologies and effective designs to focus on taking over the enemy’s way of thinking and his awareness, and even directly intervene in the thinking of the enemy leaders and staff, and with that produce war to control awareness and thinking,” the report said. A second Chinese report, also from 2019, disclosed that brain-machine interface is part of Beijing’s plan for the development of intelligentized warfare. The second report said “interactive intelligentization” will involve “direct control of machines using thoughts through mature brain-machine interface.” Fused intelligentization is also being studied and involves integrating humans and machines toward the goal of creating enhanced human physiological and cognitive capacities. A third report published by the PLA revealed that the China Electronic Technology Group is working on “brain confrontation” technology for warfare. Among its various research focuses are “brain control technologies, such as measuring neuronal activity in the brain and translating neuro-signals into computer signals, establishing uni-directional or bi-directional signal transmission between the brain and external equipment,” the third report said. Research also is being conducted on “neuro-defense” technology such as “leveraging electromagnetic, biophysical, and material technologies to enhance human brain’s defense towards brain-control attacks,” it said. One brain enhancement technology involves wearable equipment that stimulates or manipulates brain electrical activities. Another is the use of brain-implanted microchips or other computer interfaces that enhance brain functions. In sanctioning the Chinese institutes, the Commerce Department said the research activities are “contrary to U.S. national security and foreign policy.” The other institutes hit with sanctions include China’s Institute of Health Service and Medical Information; the Institute of Radiation and Radiation Medicine; the Institute of Basic Medicine; the Institute of Hygiene and Environmental Medicine; the Institute of Microbiology and Epidemiology; the Institute of Toxicology and Pharmacology; the Institute of Medical Equipment; the Institute of Bioengineering; the Field Blood Transfusion Institute; the Institute of Disease Control and Prevention; and the Military Veterinary Research Institute. The 11 institutes have been added to the Commerce blacklist called the Entity List.

#### That decimates democracy

Claverie et al. ’22 [Bernard; ENSC Bordeaux INP Prebot; Baptiste Prébot, DDM Carnegie Mellon University; Norbou Buchler, US Army DEVCOM Analysis Center, Aberdeen Proving Ground; François du Cluzel, Innovation Hub NATO-ACT Norfolk; March 2022, “Cognitive Warfare Symposium”; NATO-OTAN; <https://www.innovationhub-act.org/sites/default/files/2022-03/Cognitive%20Warfare%20Symposium%20-%20ENSC%20-%20March%202022%20Publication.pdf>; Accessed 6-18-2022; RL]

8.2 WEAKNESSES OF THE WEST Although the Chinese strategic culture is more adapted to cognitive warfare, the West has facilitated the Chinese policy at two levels: the state of our democracies and the outdated Western strategic culture. Polarization within democracies is a blessing for Beijing. People are more likely to look at information that confirms their ideology, rather than contradictory information. Technological developments have amplified the importance of information and data in our security environment. Information is a resource that is and will increasingly be used to destabilize countries, in particular democracies. While they are not new, disinformation campaigns, fake news, or conspiracy theories, are used to fragment Western states and polarize the public opinion, thereby weakening our democratic values and systems, increasing distrust and discontent towards political systems, and promoting populist and nationalist movements. People look for information and people on social networks that confirm their logic (echo chambers). This exacerbates existing antagonisms, sows social division, and undermines faith in institutions. This is facilitated through microtargeting and behavioral data (e.g., Cambridge Analytica) based on Open Sources Intelligence (OSINT). The rise of populist leaders and increasing support for digital authoritarianism worldwide illustrates the penetration and success of cognitive warfare by authoritarian states. Our democratic and open information society will increasingly be targeted by such operations of information manipulation. Disruptive technologies will increase this trend, as the operational surface and speed increase tenfold with AI and quantum computing. The human brain is the battlefield of the 21st century (MWI, 2018). By relying on human cognitive flaws such as confirmation bias or our natural intellectual laziness (leading to an absence of critical thinking), manipulating information through the information environment will continue to be a preferred means to weaken our democracies. These clashes of narratives, storytelling and communication will be an integral part of the operational strategy in future conflicts. The opponents of democracies have understood, as Nick Reynolds (2020) notes, that “in political warfare, disgust is a more powerful tool than anger. Anger drives people to the polls; disgust breaks up countries.” Moreover, citizens of democratic countries participate in this decline, reinforcing these logics of silos and tribalism, as this false information is “liked” and/or re-shared. Alicia Wanless talks about “participative propaganda.” All this is further facilitated by bots and troll factories as well as by repetitive and characterized exposure, by mutually reinforcing stories. Therefore, the development of more and more sophisticated means such as artificial intelligence, communication strategies, marketing, branding and neurosciences facilitate manipulation and form a major challenge because of the inherent characteristics of human brain functioning, such as cognitive bias and heuristics. In a world in which the dominance of “Western values” is increasingly challenged by other cultures and models, it would be naïve to believe that the way of fighting, implying rules of engagement and codes of honor, will be maintained in the wars to come. On the contrary, opposing cultures and strategic visions will multiply in the coming years. One of the two colonels who wrote Unrestricted Warfare amplified his thoughts in August 1999: “War has rules, but they are set by the West.... If you use these rules, then the weak CHINA AND COGNITIVE WARFARE: WHY IS THE WEST LOSING? 8 - 4 NATO-CSO-STO states don’t stand a chance... We are a weak state, so should we fight according to your rules? No.” There is a tendency in the West towards “mirror imaging” the enemy, presupposing that he will follow the same rationality. The contemporary vision of conflicts is in this way still too much impregnated with “the Western paradigm of war”: the confrontation between States with the same political, cultural and ideological concepts. Consequently, Western strategic culture is not adapted to hybrid and cognitive warfare. The West appears to forget too often that war is a contest of wills, and even more today than in the past, a battle for perceptions and worldviews. We can retain different reasons for this. First, Western strategic culture is linked to a binary approach to things: good or bad, white or black. The West finds itself in a predetermined theory-practice relationship, leaving little room for out-of-the-box thinking. For Womack, Western thought is determined by a “transaction logic.” This is characterized by a contractual relationship and a desire to be in a win-lose, cost-benefit relationship (Pan, 2016). The Chinese will place more emphasis on the relationship itself and its mutual benefits by playing on respect in order to ultimately gain an advantage. Also, unlike the West, for example, China will avoid calling states enemies. This is a big advantage in cognitive warfare. In other words, Western strategy is often going to be pre-established in a well-defined canvas, from which it is difficult to break out – the facts having to fit the conceptualization or modeling, even forcing the facts into the model. Hence also, that China defends the principles of non-interference, and that it often avoids taking a definitive and clear-cut position in international issues (e.g., Syria, Libya, etc.). By refusing to see things through a binary reading (good-evil, democracy-dictatorship), it leaves itself a continuous margin of maneuver, avoiding forcing or imposing the situation, allowing it to ride the wave of the situation’s potential, which is not the case for the West. Second, the Western way of war is based on technology and is kinetic in a logic of a zero sum game. The Revolution in Military Affairs or Offset strategies of the US for example are based on technologic superiority in the different domains (air, land, sea, space and cyberspace), the cognitive or human domain is absent. Chinese approach is more people-centric, less techno-centric, based on relative wins and subversion and deception. China plays Go, the West chess. Technological superiority is not synonymous with winning wars as Libya, Afghanistan and Iraq have shown. The West suffers from strategic atrophy and incompetence, always fighting the last war, and not understanding the next one. Cognitive warfare is an excellent example of this Western strategic paralysis. Third, the West additionally differentiates peace from war: this is not the case for China. The rules of war are not determined anymore by the West but by our adversaries and we have not yet grasped it: “Cunning adversaries leverage the space between war and peace for devastating effect. Washington has a buzz phrase for this: the “Gray Zone.” Others have a strategy” (McFate, 2019). The peace-war distinction is outdated and the West has not conformed and adapted to this new reality. Fourth, Western military is still too hierarchical, bureaucratic, slow, working in a logic of silos or tunnel vision, whereas society is more horizontal, networked, adaptive and flexible. As explained by General McChrystal: “Our culture does not force leaders to reckon with the intersection of strategy and adaptability (…) we must combine outside-the-box and ordered thinking. This kind of hybrid leadership will be necessary not only for success in warfare, but in other worlds as well” . Finally, these differences of strategic culture between China and the West are also reflected in cognitive differences between Asians and Westerners. R. Nisbett in different studies argues that Easterners, compared to Westerners “have a contextual view of the world” and events are seen as “highly complex and determined by many factors,” whereas Westerners will follow a logic of “objects in isolation from their context” and thus “control the objects’ behavior” (Nisbett, 2003). For Nisbett, Chinese thought is more dialectical for Nisbett then logical: things happen in an appropriate context. It is also more relationship based and finally where Westerners believe in stability, Easterners see more change. Still according to Nisbett, the Chinese have a holistic approach of the world, emphasizing relationships, interrelations, cycles, whereas the West separates the objects of the environment, sees a linear movement of events and has the impression to be CHINA AND COGNITIVE WARFARE: WHY IS THE WEST LOSING? NATO-CSO-STO 8 - 5 personally in control of events: “Asians see the big picture and they see objects in relation to their environments ‒ so much so that it can be difficult for them to visually separate objects from their environments. Westerners focus on objects while slighting the field and they literally see fewer objects and relationships in the environment than do Asians” (Nisbett, 2003).

#### Democratic model failure cascades and prevents a global erosion to authoritarianism that causes nuclear war

Dr. Larry Diamond 19, Professor of Political Science and Sociology at Stanford University, Senior Fellow at the Hoover Institution, Senior Fellow at the Freeman Spogli Institute for International Studies, PhD in Sociology from Stanford University, Ill Winds: Saving Democracy from Russian Rage, Chinese Ambition, and American Complacency, p. 199-202

The most obvious response to the ill winds blowing from the world’s autocracies is to help the winds of freedom blowing in the other direction. The democracies of the West cannot save themselves if they do not stand with democrats around the world.

This is truer now than ever, for several reasons. We live in a globalized world, one in which models, trends, and ideas cascade across borders. Any wind of change may gather quickly and blow with gale force. People everywhere form ideas about how to govern—or simply about which forms of government and sources of power may be irresistible—based on what they see happening elsewhere. We are now immersed in a fierce global contest of ideas, information, and norms. In the digital age, that contest is moving at lightning speed, shaping how people think about their political systems and the way the world runs. As doubts about and threats to democracy are mounting in the West, this is not a contest that the democracies can afford to lose.

Globalization, with its flows of trade and information, raises the stakes for us in another way. Authoritarian and badly governed regimes increasingly pose a direct threat to popular sovereignty and the rule of law in our own democracies. Covert flows of money and influence are subverting and corrupting our democratic processes and institutions. They will not stop just because Americans and others pretend that we have no stake in the future of freedom in the world. If we want to defend the core principles of self-government, transparency, and accountability in our own democracies, we have no choice but to promote them globally.

It is not enough to say that dictatorship is bad and that democracy, however flawed, is still better. Popular enthusiasm for a lesser evil cannot be sustained indefinitely. People need the inspiration of a positive vision. Democracy must demonstrate that it is a just and fair political system that advances humane values and the common good.

To make our republics more perfect, established democracies must not only adopt reforms to more fully include and empower their own citizens. They must also support people, groups, and institutions struggling to achieve democratic values elsewhere. The best way to counter Russian rage and Chinese ambition is to show that Moscow and Beijing are on the wrong side of history; that people everywhere yearn to be free; and that they can make freedom work to achieve a more just, sustainable, and prosperous society.

In our networked age, both idealism and the harder imperatives of global power and security argue for more democracy, not less. For one thing, if we do not worry about the quality of governance in lower-income countries, we will face more and more troubled and failing states. Famine and genocide are the curse of authoritarian states, not democratic ones. Outright state collapse is the ultimate, bitter fruit of tyranny. When countries like Syria, Libya, and Afghanistan descend into civil war; when poor states in Africa cannot generate jobs and improve their citizens’ lives due to rule by corrupt and callous strongmen; when Central American societies are held hostage by brutal gangs and kleptocratic rulers, people flee—and wash up on the shores of the democracies. Europe and the United States cannot withstand the rising pressures of immigration unless they work to support better, more stable and accountable government in troubled countries. The world has simply grown too small, too flat, and too fast to wall off rotten states and pretend they are on some other planet.

Hard security interests are at stake. As even the Trump administration’s 2017 National Security Strategy makes clear, the main threats to U.S. national security all stem from authoritarianism, whether in the form of tyrannies from Russia and China to Iran and North Korea or in the guise of antidemocratic terrorist movements such as ISIS.1 By supporting the development of democracy around the world, we can deny these authoritarian adversaries the geopolitical running room they seek. Just as Russia, China, and Iran are trying to undermine democracies to bend other countries to their will, so too can we contain these autocrats’ ambitions by helping other countries build effective, resilient democracies that can withstand the dictators’ malevolence.

Of course, democratically elected governments with open societies will not support the American line on every issue. But no free society wants to mortgage its future to another country. The American national interest would best be secured by a pluralistic world of free countries—one in which autocrats can no longer use corruption and coercion to gobble up resources, alliances, and territory.

If you look back over our history to see who has posed a threat to the United States and our allies, it has always been authoritarian regimes and empires. As political scientists have long noted, no two democracies have ever gone to war with each other—ever. It is not the democracies of the world that are supporting international terrorism, proliferating weapons of mass destruction, or threatening the territory of their neighbors.

#### **2025 is the brink – its try or die for the aff to maintain the balance of power**

Emmanuel et al. 19 (Peter Emanuel, the Senior Research Scientist for Bioengineering at the U.S. Army Combat Capabilities Development Command Chemical Biological Center. In this role he advises Army leadership on emerging technologies in synthetic biology and bioengineering and exploitation of these new fields for applications that support national defense, Scott Walper, Diane DiEuliis, Natalie Klein, James Petro, James Giordano. U.S. Army Combat Capabilities Development Command Chemical Biological Center, "Cyborg Soldier 2050: Human/Machine Fusion and the Implications for the Future of the DOD", October 2019, https://apps.dtic.mil/sti/pdfs/AD1083010.pdf, accessed on 6/21/2022)//gideon

The overall strategic significance and game-changing aspects of enhanced soldiers and technologies aimed at developing cyborg soldiers may be viewed as a threat by some. The threat perspective is supported by the argument that cyborg technology is almost impossible to detect, very difficult to deter, and therefore, highly challenging to defend against. If the strategic landscape after the year 2025 changes sooner than expected or contains ambiguous threats against which we lack capabilities to detect and defend, the balance of power as well as the very definition of “asymmetric warfare” will be forever altered. What is clear is that the introduction of human/machine enhancements into military and civilian populations will create new vulnerabilities that will need to be mitigated by security architectures. Cyborg technologies will create a world awash in data in which individuals will record images and audios or generate geographic coordinates and time stamps. In some cases, these processes will occur automatically in the background without willful intention as part of the course of daily events (called “transactional records” by Wittes and Chong).27 To record or to transmit data is also to enable collection or interception of that data. Unless one specifically engineers the cyborg to resist such collection or interception, it will by default facilitate surveillance. Relatedly, due to their surveillance capabilities, cyborgs could be selectively tracked and targeted unless appropriately shielded.

From a national security perspective, adversaries may piggyback surveillance and tracking technologies within implanted cyborg mechanisms. In the words of one study participant, “If I can’t walk into a sensitive compartmented information facility wearing an iWatch or carrying a cellphone, how will security be confident it is safe to allow a cyborg to walk in there?” In short, an enhanced soldier with a machine interface presents a potential security risk and complicates work within secure environments.

Machines respond to commands, and if command and control are hacked, the human/machine will be compromised. Hackability by external forces could generate the fear of control by others. Even if this risk can be mitigated through enhanced encryption methods, variable authentication requirements, or other methods, the perception that control could be subverted may lead to issues of trust among peers. For example, if a hostile actor could override an optogenetic body suit or neural implant that controls muscle movement, this could not only create a true threat to the individual, organization, and mission, but could promulgate fears among the ranks of non-enhanced and enhanced individuals.

Lastly, consider that these are advanced technologies that can and will travel the world outside of traditional security controls put in place to prevent exploitation. Technology ownership and chain of command of an enhanced soldier is nontraditional (e.g., an enhanced soldier plans a vacation to foreign countries, which poses diplomatic and security risks). Thus, there is a need for increased and sustained trust at the individual-user level that the system will perform reliably (i.e., that verification and validation have been done) in and across a range of settings and circumstances.

#### Scenario 2 – Nuclear Deterrence –

#### Allowing China to take the lead in BCI erodes privacy protections and nuclear deterrence

**Kosal and Putney 02/08** (Margaret Kosal and Joy Putney, Associate Professor in the Sam Nunn School of International Affairs at Georgia Institute of Technology, where she also directs the Sam Nunn Security Program., PhD in Quantitative Biosciences from the School of Biological Sciences at Georgia Institute of Technology and was a National Science Foundation Graduate Research Fellow. Sam Nunn Security Program Fellow through the Sam Nunn School of International Affairs at GT, focusing on the national security and policy issues surrounding dual-use neurotechnologies like brain-machine interfaces. Cambridge University Press, "Neurotechnology and international security", 02/08/2022, https://www.cambridge.org/core/journals/politics-and-the-life-sciences/article/neurotechnology-and-international-security-predicting-commercial-and-military-adoption-of-braincomputer-interface-bci-in-the-us-and-china/29155A74DBB0FDE5CB0CBA4D3DF6AF0C, accessed on 6/18/2022)//gideon

This research looks at public funding for neuroscience research and development (R&D) through the U.S. BRAIN Initiative and the China Brain Project. Though other sources of funding for neuroscience are present in both nations, we chose to analyze these brain projects because of their importance as an articulation of national strategy for neuroscience research that could enable earlier adoption. Their stated goals and directed funding, which involves stakeholders from government, academia, military, and industry, can be viewed as a cohesive national strategy for identifying top-priority areas of neuroscience research and determining how findings from this research will be translated into new technologies. Each project also has components to enable translational research—that is, moving from basic research through applied R&D. Additionally, the brain projects serve as a diplomatic interface for international collaboration by fostering data inventorying and sharing, as well as promoting consensus on international norms for ethical use of these technologies (International Brain Initiative, n.d.).

Focusing on one emerging neurotechnology, instead of a broad investigation of many neurotechnologies, enables more robust analysis of the sociocultural, governmental, and economic influences that could drive adoption of a specific dual-use technology. BCIs are a dual-use technology directly enabled by brain project funding that both the United States and China have a stated interest in developing for commercial and military applications. These devices have the potential for high adoption by healthy people for both civilian and military purposes, and they are already available on the market (Emondi, Reference Emondin.d.; Farnsworth, Reference Farnsworth2017). Additionally, these devices may raise significant or even profound ethical concerns involving data privacy and individual autonomy (Global Neuroethics Summit Delegates et al., Reference Rommelfanger, Jeong, Ema, Fukushi, Kasai and Singh2018; Moreno, Reference Moreno2003). Likely for these reasons, the U.S. Congressional Research Service (2021) identified BCIs as an emerging technology that should be considered for export controls to nations like China. BCIs fit the definition of dual-use technology in two ways: BCIs can be used for both civilian and military purposes, and BCI technologies intended for civilian use could be co-opted for malicious or deleterious misuse.

While other papers have addressed the potential commercial and military applications of BCIs, none has attempted to predict adoption likelihood or compared adoption likelihood of these devices. The ability to make predictions about adoption likelihood in the United States and other countries has been identified as a priority by the U.S. Army Combat Capabilities Development Command (DEVCOM), since so few studies have been conducted to assess attitudes toward BCIs in both the public and military sectors (Emanuel et al., Reference Emanuel, Walper, DiEuliis, Klein, Petro and Giordano2019). These devices, which can connect human and machine intelligence, have the potential to shape society and change the nature of warfare.

In the last decade or so, a small but significant body of literature has emerged on the intersection of advances in the cognitive and neurosciences and conflict across multiple disciplines. A significant portion of the studies and policy literature on cognitive sciences research is concerned with the ethics of such research. The ethical concerns raised largely fall into two areas of debate—(1) human enhancement and (2) thought privacy and autonomy—both of which are relevant to the current security research on cognition. The issue of cognitive enhancement has been a contested area of research (Parens, Reference Parens and Illes2006). While some embrace the potential of “neuropharmaceuticals” and advocate industry’s self-regulation, others have raised concerns about the potential for political inequality and the possible disruption of natural physiological processes (Fukuyama, Reference Fukuyama2003; Gazzaniga, Reference Gazzaniga2005; Hitchens, Reference Hitchens2021; Naam, Reference Naam2005). The issue of thought privacy often emanates from advancements in noninvasive imaging and stimulation techniques used for neurological research. Many of the concerns relate to how such advancements could be used for lie detection and interrogation, including applications for domestic or foreign intelligence (Canli et al., Reference Canli, Brandon, Casebeer, Crowley, DuRousseau, Greely and Pascual-Leone2007; Wild, Reference Wild2005).

These ethical discussions have also extended to military R&D in the cognitive sciences. What role, if any, neuroscience research should play in national security and how its impact should be understood have been hotly debated (Evans, Reference Evans2021; Krishnan, Reference Krishnan2018; Marcus, Reference Marcus2002; Moreno, Reference Moreno2006; Munyon, Reference Munyon2018; Tracey & Flower, Reference Tracey and Flower2014). Some have advocated against the inclusion and use of neuroscience techniques for national security purposes, while others justify the defense and intelligence community’s involvement in consideration of maintaining the superpower status of the United States (Giordano et al., Reference Giordano, Forsythe and Olds2010; Rippon & Senior, Reference Rippon and Senior2010; Rosenberg & Gehrie, Reference Rosenberg and Gehrie2007). Still, some have contended that neuroethics must be considered in national security discussions, while others have advocated that the security use of neuroscience research is best framed as a consideration for human rights (Justo & Erazun, Reference Justo and Erazun2007; Lunstroth & Goldman, Reference Lunstroth and Goldman2007; Marks, Reference Marks2010). In discussing classified research on brain imaging, an open dialogue between scientists and government officials has been called for (Resnik, Reference Resnik2007). The place and role of neurosciences research and neurotechnology in security policy remain contested, and neither a security nor an ethical framework acceptable to all parties under which such research can be analyzed exists.

Another major area of social science work, often empirical and positivist in nature (rather than normative), can be found in research that approaches neuroscience and neurotechnology from a technology survey or qualitative case study method to probe its implications, including understanding the national security implications and approaches to reducing risk (Binnendijk et al., Reference Binnendijk, Marler and Bartels2020; DeFrancoet al., Reference DeFranco, DiEuliis and Giordano2019; Huang & Kosal, Reference Huang and Kosal2008; Rachna & Agrawal, Reference Rachna and Agrawal2018; Royal Society, Reference Society2012). Some such studies are more descriptive and others are more systematic, depending on the researcher and the scholarly discipline, ranging from political science and international relations to public policy and science and technology studies. Many, but not all, consider neurotechnologies in the context of chemical and biological weapons and their respective international legal bodies and biosecurity policy (Dando, Reference Dando and Rappert2007; DiEuliis & Giordano, Reference DiEuliis and Giordano2017; Nixdorff et al., Reference Nixdorff, Borisova, Komisarenko and Dando2018).

In addition to the earlier discussion on the theoretical approaches to the relationships between technology and conflict more generally, there are specific theoretical questions that apply to the realm of neuroscience in the context of military technology, strategic decision-making, and conflict. How advances in the cognitive neurosciences may undermine rational actor theory, a core component of nuclear deterrence theory, has been theorized (Stein, Reference Stein, Paul and Morgan2009). Other work has considered how scientists and neuroscientists, the very people whose research is in the spotlight, understand and view the security risks and potential consequences of such research and its implications for international security and governance (Kosal & Huang, Reference Kosal and Huang2015). This work adds to that systematic body of literature in the social sciences.

#### Collapse of deterrence ensures global nuclear war

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Despite the continuity in the basic nature of deterrence, significant geopolitical, doctrinal and technological developments now demand that we again adapt our deterrence goals, means and applications to a new strategic landscape. During the Cold War, US nuclear deterrence strategies had to adapt to the relatively slow changes and enduring continuities of a bipolar strategic environment, and thereafter to the dramatic systemic transformation brought on by the collapse of the Soviet Union and Warsaw Pact. A basic task now is to understand how a third and dramatically different new strategic environment must again reshape the character of our deterrence strategy—its necessary means and application, particularly including the role of nuclear weapons.

Effective deterrence and extended deterrence for US allies requires that US deterrence capabilities be sufficiently credible, as perceived by diverse adversaries, to cause them to decide against the provocations we have identified as unacceptable, now and in the future. Doing so now demands that we be capable of adapting our deterrence strategies and capabilities to shifting circumstances, including future adversaries and contexts that are not now obvious. This is a task of uncertain dimensions and unpredictable demands.

The rapid pace of technological innovation and proliferation has magnified the scope of change and uncertainty in the emerging threat environment. Adversaries and potential adversaries are improving familiar capabilities and acquiring new and unprecedented instruments of coercion and warfare. Some appear willing to employ or abide by the employment of weapons that have, until recently, been deemed outside supposedly global norms, such as chemical weapons. Improvements in ballistic and cruise missiles, missile defenses, anti-access and area denial measures, hypersonic, cyber and space weapons have or will open new domains for threat and warfare, and, correspondingly, pose new challenges for US deterrence strategies.

This new strategic environment is very different from that of the Cold War or the immediate postCold War period. As we consider how to adapt deterrence to the realities of this period we first need to understand the necessary deterrence roles for our nuclear weapons given the emerging spectrum of adversaries and potential adversaries who are pursuing external goals that threaten us, our allies and the existing post-Cold War order in general. Effective nuclear deterrence is increasingly important in this new strategic environment characterized by severe, coercive nuclear threats against us and our allies, and the increasing prospect for adversary employment of nuclear weapons, and possibly other WMD.

#### Scenario 3 – Totalitarianism –

#### Unmanaged BCIs cause collapse into global totalitarianism

**Rafferty 21** (Jack Rafferty, Co-Founder & Director at LEEP, London, England, United Kingdom. Journal of Futures Studies, "Brain Computer Interfaces: A New Existential Risk Factor", December 2021, https://jfsdigital.org/articles-and-essays/2021-2/vol-26-no-2-december-2021/brain-computer-interfaces-a-new-existential-risk-factor/, accessed on 6/22/2022)//gideon

This paper identifies a new existential risk factor that has not been recognised in prior literature: Brain-Computer Interfaces (BCIs). We illustrate how BCI technology could significantly raise the existential risk from global totalitarianism in the near future. In particular this is achieved not just by expansion of surveillance, but the expansion of brain stimulation. At present, this risk factor has been entirely unnoticed. We suggest that given the high likelihood of its impact, and the possible magnitude of such an impact, it deserves more attention, more research, and more discussion. Brain-Computer Interfaces (BCIs) are technologies that allow the brain to interface directly with an external device. In particular, BCIs have been developed to read mental and emotional content from neural activity and have been developed to intentionally stimulate or inhibit certain kinds of brain activity. At present BCIs are used primarily for therapeutic purposes, but their potential use case is much wider. Though this sounds somewhat like science fiction, the current state of the technology is much more advanced than most realise. In particular, well-corroborated research prototypes already exist (Guenther et al, 2009; Moses et al, 2019); a number of companies, including Facebook and Neuralink, are working to commercialise this technology over the coming decades (Constine, 2017; Musk, 2019); and there is widespread agreement among BCI researchers (86% agreement) that this technology is not just theoretically feasible, but will be on market in the near future (Evers & Sigman, 2013; Merrill & Chuang, 2018; Nijboer et al, 2011). The risks this technology poses however, have been almost entirely neglected. This paper outlines how the development and widespread deployment of BCIs could significantly raise the likelihood of long term global totalitarianism. We suggest two main methods of impact. Firstly, BCIs allow for an unparalleled expansion of surveillance, as they enable states (or other actors) to surveil even the mental contents of their subjects. Secondly, BCIs make it easier than ever for totalitarian dictatorships to police dissent by using brain stimulation to punish dissenting thoughts, or even make certain kinds of dissenting thought a physical impossibility. Global existential risks are risks that threaten the premature extinction of earth originating life (Bostrom, 2012) or that threaten “the permanent and drastic reduction of its potential for desirable future development” (Cotton-Barratt & Ord, 2015). As such, while some existential risks pose the danger of extinction, some do not. Nuclear war is an example of an existential risk that poses a risk of human extinction. However, irreversible global totalitarianism is often considered an existential risk too, because even without posing any extinction risk, it has the capacity to irreversibly destroy or permanently lessen a great level of humanity’s potential (Ord, 2020). A risk factor is typically not an existential risk, but is something that makes an existential risk more likely. Often this means increasing the probability that a certain event might occur or increasing the likelihood that a catastrophic event becomes existential. For example, relating to risk of extinction from nuclear war, a risk factor might increase the likelihood that a nuclear war begins. Alternatively, a risk factor might instead increase the likelihood that a nuclear war is catastrophic enough that it leads to extinction or unrecoverable collapse. Both would be valid risk factors. A practical example of a risk factor is international conflict. While international conflict could have very negative impacts, by itself it would not be considered an existential risk, because conventional war offers little chance of extinction or of permanently curtailing our long-term potential. However, higher levels of conflict between great powers might drastically raise the odds of a nuclear war and thus increase the odds of an existential catastrophe. As such, high levels of international conflict could be considered a risk factor for nuclear war. While risks and risk factors are often separate categories, this is not universal – the categories are not mutually exclusive. For example, Torres (2016) argues that climate change could be both an existential risk in itself, as runaway global warming could make the earth physically uninhabitable and threaten extinction, but could also be a risk factor that might increase the likelihood of other kinds of existential risks. For example, increased climate change might increase global instability, make international cooperation less viable, and compromise the conditions necessary to address other existential risks. Designing, building, and launching solutions to risks such as an asteroid strike would be far more difficult in a world preoccupied with other survival issues. A security factor is the opposite of a risk factor. It is something that reduces the chance that an existential risk occurs. For example, good international governance may be a security factor that lessens the chance of nuclear war. Just as action to avoid existential risk is crucial, dealing with risk factors can be as important or in some cases even more important than dealing with the risks themselves (Ord, 2020). For example, if the chance of a particular existential risk occurring is 10%, but a risk factor brings this chance up to 90%, it may end up being more cost effective to address the risk factor before addressing the risk itself. This is not always the case, but there can be strong justification for working on alleviating existential risk factors when it is cost effective to do so. This paper seeks to identify and outline the danger and likelihood of a new and unnoticed existential risk factor. A brain-computer interface (or BCI), is an interface between a brain and an external device. Certain forms of BCIs already exist; the term refers to a range of technologies, used for a number of purposes. At present, the most well known commercial uses of BCIs include recovering lost senses, as with cochlear implants used to restore hearing and retinal implants to restore sight (Anupama et al, 2012). However, BCIs have a vastly broader set of uses that already exist as either in-use medical technologies or as well corroborated research prototypes. This section outlines a few of these uses to give an idea of the current and near term scope of the technology. For the purposes of our explanation, there are two broad functions of BCIs. The first kind of BCIs are able to read neural activity, record it, interpret it, send it, and use it for a variety of purposes. The second kind of BCIs are able to write to the brain. They are able to influence and modify brain activity, stimulating or suppressing various responses by using skull mounted micro-electrodes, or by using less invasive transcranial electrical stimulation. These two types could be combined and used together, though for clarity we will refer to them as type 1 and type 2 BCIs to differentiate function. Type 1 BCIs are able to read neural data, but also report and send this data for a number of purposes. These have already been used to translate speech from neural patterns in real time (Allison et al, 2007; Guenther et al, 2009; Moses et al, 2019), and to detect positive and negative emotional states from neural patterns (Wu et al, 2017). It is expected that near term BCIs of this kind will be able to detect intentional deception, detect even subconscious recognition, and detect more precise and complex thought content (Bellman et al, 2018; Bunce et al, 2005; Evers and Sigman, 2013; Roelfsema, Denys & Klink, 2018). There are many practical uses of recording and interpreting neural data. So far, BCIs have been used in primates to allow them to control prosthetic limbs and smart devices with thought, by sending mental commands directly to the relevant device (Carmena et al, 2003; Ifft, 2013; Moore, 2003). These same techniques have also been used to assist people who are paraplegic or quadriplegic by providing them with a neural shunt that records messages from the brain and sends these messages directly down to where the muscles are activated, allowing patients to use previously disabled limbs (Moore, 2003). Many companies also have the long term goal of allowing users to mentally transmit messages to other BCI users, allowing silent communication with only a thought (Kotchetkov et al, 2010). The uses of type 2 BCIs are even more varied. Many uses are therapeutic. Deep brain stimulation for example, has used neural stimulation to treat various disabilities and conditions, including Parkinson’s disease (Deuschl et al, 2005; Glannon, 2009; Perlmutter, 2006). Similar techniques have been used to alleviate disorders such as OCD (Abelson et al., 2005; Greenberg, 2006), and have been suggested as potential future treatments for conditions like Alzheimer’s and depression (Laxton et al., 2013; Mayberg et al., 2005), and even to restore function in those with motor disability after a stroke (Gulati et al, 2015). Through deep brain stimulation, control of physical pain responses is also a possibility. Such techniques have been used to alleviate chronic pain (Bittar et al, 2005a; Kumar et al, 1997), treat phantom limb syndrome (Bittar et al, 2005b), augment memory (Suthana, 2012; Hamani et al., 2008), and more. Just as BCIs can currently suppress pain, pain responses can also be stimulated for a variety of purposes, from interrogation to incentivisation to punishment. Similarly, BCIs are already able to artificially stimulate or suppress emotional reactions (Delgado, 1969; Roelfsema et al., 2018). These are just a few of the corroborated functions of BCIs. In future, it has been suggested that BCIs could be used as a possible treatment for cravings and addictions, and as a way to alter internal drives and rewards systems (Mazzoleni & Previdi, 2015; Halpern, 2008). “Consider eating a chocolate cake. While eating, we feed data to our cognitive apparatus. These data provide the enjoyment of the cake. The enjoyment isn’t in the cake per se, but in our neural experience of it. Decoupling our sensory desire from the underlying survival purpose [nutrition]will soon be within our reach.” – Moran Cerf, Professor at Northwestern University, Employee at Neuralink. The potential uses of BCIs are well corroborated. The primary difficulties at present include scaling down costs, size, and invasiveness, and scaling up precision to allow BCIs to target more neurons, more specifically. At present, significant research and development is being done on BCIs to address these issues, to expand their capabilities, and to make BCIs orders of magnitude cheaper, more precise, less invasive, and more accessible to the broader population. Companies currently working on developing cheap, publicly accessible advanced BCIs include Facebook (Constine, 2017), Kernel (Kernel, 2020; Statt, 2017), Paradromics and Cortera (Regalado, 2017), and Neuralink (Musk, 2019). In addition to this, DARPA, the research arm of the US military, is funding significant research in this direction (DARPA, 2019; Kotchetkov et al, 2010), as is the Chinese government (Munyon, 2018; Tucker, 2018). In short, with so many well funded companies and governments working on this problem, it is likely that these barriers will quickly fall. To reinforce this, market trends for BCIs speak of strong expected growth. The global BCI market was valued at $1.36 billion in 2019 but is projected to reach $3.85 billion by 2027, growing by 283% in just eight years (Gaul, 2020). The likelihood of development of X-risk relevant BCIs within this century is relatively high. As a point of clarification, this paper does not argue that all BCIs act as an existential risk factor. It seems incredibly unlikely that cochlear implants have any impact on the likelihood of any existential risk. However, we do argue that certain kinds of more advanced BCI may be extremely dangerous and may drastically raise the risk of long-lasting global totalitarianism. The current literature on global existential risk from BCIs is scarce. The vast majority of the literature on risk from BCI has focused on impacts at a very low scale. Such low-scale risks that have been considered include surgical risk from operations, possible health related side effects such as altered sleep quality, risk of accidental personality changes, and the possibility of downstream mental health impacts or other unknown effects from BCI use (Burwell et al., 2017). Potential threats to individual privacy have also been identified – specifically, the risk of BCIs extracting information directly from the brains of users (Klein et al, 2015). At a higher scale, Caplan (2008) successfully identified ‘brain scanning technology’ as a factor that may impact existential risk at some point in the next thousand years by assisting with the maintenance of dictatorships. However, Caplan focuses only on risk within the next millennium, and does not consider the high potential for this to occur in a far shorter time frame; in particular, within the next hundred years. He also only briefly mentions brain scanning as a technology and does not consider the risk from brain scanning technology being present and active in all citizens at all times. Such widespread use is a stated goal of multiple current BCI companies. Finally, Caplan does not consider the full depth of the impact of BCIs – only mentioning the capacity of brain scanning to increase the depth of surveillance, while ignoring the existential risk posed by the widespread use of brain stimulation. A final risk identified in prior literature is cybersecurity, though prior literature has primarily focused on the threat to individuals. Specifically, the risk has been discussed in relation to vulnerabilities in information security, financial security, physical safety, and physical control (Bernal et al, 2019a). BCIs, just like computers, are vulnerable to manipulation by malicious agents. BCIs and brain scanning offer an unprecedented level of personal information, passwords, as well as data about a user’s thoughts, experience, memories and attitudes, and thus offer an attractive terrain for attackers. It is likely that security flaws will be used by malicious actors to assist with cybercrime. Further previously identified risks here include risk of identity theft, password hacking, blackmail, and even compromising the physical integrity of targets who rely on BCIs as a medical device (Ienca, 2016; Bernal et al, 2019b). The use of deep brain stimulation for coercion or control of BCI users is also a possible source of risk (Demetriades et al, 2010). Corroborated possibilities here include control of movement, evoking emotions, evoking pain or distress, evoking desires, and impacting memories and thinking processes – and these are just the earliest discovered capabilities (Delgado, 1969). However, past papers have exclusively focused on risk to individuals; that individuals may be sabotaged, surveilled, robbed, harmed, or controlled. Past research has not yet explored the risk to humanity as a whole. This paper seeks to take the first steps to fill that gap and outlines the risks that BCIs provide at a broader, global scale, addressing the risk they pose to the future of all of humanity. Dissent from within is one of the major vulnerabilities of totalitarian dictatorships. BCIs offer dictators a powerful tool to counteract this weakness. Increases in abilities for surveillance would make it easier to identify and root out dissent or root out skeptics who might betray the party, and thus would make it easier to maintain totalitarian control. While conventional surveillance may allow for a high level of monitoring, such as tracking of citizens’ behaviour and actions, it provides no way for a dictator to peer inside the minds of their subjects. Because of this, the difficulty of identifying the attitudes of careful defectors remains high. BCIs constitute an unprecedented threat here. Surveillance through already existing methods may fail to expose some threats to a totalitarian regime, such as party members who carefully hide their skepticism. But BCI based surveillance would have no such flaw. The level of intrusion here is potentially quite severe. With the advancement of BCIs, it is highly likely that in the near future we will see a rapid expansion in the ability to observe the contents of another’s mind. Some researchers claim that advanced BCIs will have access to more information about the intentions, attitudes, and desires of a subject than those very subjects do themselves, suggesting that even subconscious attitudes and recognition, as well as intentional deception and hidden intentions will be detectable by BCIs (Bunce et al, 2005; Evers and Sigman, 2013). Already, BCIs are able to detect unconscious recognition of objects that a subject has seen but cannot consciously remember seeing (Bellman et al, 2018). Others have even suggested that by more precisely recording the activity of a larger number of neurons, future BCIs will be able to reveal not just perceptions and words, but emotions, thoughts, attitudes, intentions, and abstract ideas like recognition of people or concepts (Roelfsema et al., 2018). Attitudes towards ideas, people, or organisations could be discovered by correlating emotions to their associated thought content, and dictatorships could use this to discover attitudes towards the state, political figures, or even ideas. This would allow detection of dissent without fail and allow a dictator to quell rebellion before a rebellious thought is even shared. Some might hope for BCIs that do not have this level of access, but accessing and recording mental states is a fundamental and unavoidable feature of many BCIs. In order to achieve their desired functions, many BCIs need a clear way to read neural data. Without significant neural data they simply cannot function – it is impossible to translate neural data to exert some function if one does not have access to that neural data. Brain stimulators and BCIs are specifically designed to allow this kind of access; it is crucial for the effective functioning of the device (Ienca, 2015). It is of course possible that BCIs made by some companies will be exclusively targeted to certain sections of the brain, for example, only targeting areas associated with speech, and not targeting other areas associated with emotions or thought. This is conceivable, though it is not clear that all companies and countries would do the same. Furthermore, the utility gained by expanding to other areas of the brain beyond the speech centre means it is highly doubtful the technology will remain restrained indefinitely. It is likely that BCIs will be created by companies, which have strong financial incentive to record the neural states of users, if only to gain more information with which to improve their own technology. This information could be requisitioned by governments, as is frequently done to tech companies at present – even in democratic countries. Further exacerbating this problem, privacy laws have a history of struggling to keep pace with technological advancements. In more authoritarian countries, neural data might be transmitted directly to state records, and the preservation of privacy may not be attempted at all. In essence, BCIs allow an easy and accurate way to detect thoughtcrime. For the first time, it will be possible for states to surveil the minds of its citizens. Deep surveillance of this kind would increase the likelihood that totalitarian dictatorships would last indefinitely. In addition to recording neural activity, there is an even greater threat that has not been considered as an existential risk factor in any prior literature. In addition to reading brain activity, BCIs are able to intentionally influence the brain. In particular, future BCIs will be able to rewire pleasure and pain responses and allow us to intentionally stimulate or inhibit emotional responses en masse. Where this is done consensually and is desired, this may be of some benefit. However, nothing about this technology guarantees consent. In addition to being able to identify dissident elements more effectively than ever (due to increased surveillance), BCIs will also powerfully increase the ability of states to control their subjects, and their ability to maintain that control indefinitely. In such a situation, identification of dissidents would no longer be necessary, as a state could guarantee that dissident thought would be a physical impossibility. Finely honed BCIs can already trigger, and associate, certain emotions or stimuli with certain concepts (Roelfsema et al., 2018). This could be used to mandate desirable emotions towards some ideas or make undesirable emotions literally impossible. Though this possibility has been discussed in literature for its therapeutic uses, such as triggering stimulation in order to respond to negative obsessive thoughts (nullifying negative emotions caused by such thoughts) there is huge potential for misuse. A malicious controller could stimulate loyalty or affection in response to some ideas, or even for specific organisations and people; and could stimulate hatred in response to others. It could also inhibit certain emotions, so that citizens would be physically unable to feel anger at the state. The ability to trigger and suppress emotional content with BCIs has already existed for years (Delgado, 1969). Combined with complex and detailed reading of thought content, this is a highly dangerous tool. Some might argue that dissident action may be possible even with an outside agent controlling one’s emotional affect. This is highly debatable, but even without any control of this emotional content, the risk from BCIs is still extreme. BCIs could condition subjects to reinforce certain behaviour (Tsai et al, 2009), or could be used to stimulate aversion to inhibit undesired behaviour (Lammel et al, 2012), or stimulate the pain or fear response (Delgado, 1969) and cause intense and unending pain in response to certain thoughts or actions – or even in response to a lack of cooperation. Even without controlling emotional affect, the state could punish dissident thoughts in real time, and make considering resistance a practical impossibility. This is a powerful advantage for totalitarian states, and a strong reason for authoritarian states to become more totalitarian. In addition to surveillance, it creates a way to police the population and gain full cooperation from citizens in a way that (once established in all citizens) could not be resisted. Machine learning programs scanning state databases of neural activity could detect thought patterns towards the state that are deemed negative and punish them in real time. Or, if the state is more efficient, it could simply stimulate the brains of subjects to enforce habits, increase loyalty, decrease a subject’s anger, or increase their passivity (Lammel, 2012; Tsai et al, 2009). At worst, the brain could be re-incentivised, with errant emotions turned off at the source, so that dissenting attitudes are unable to ever form. Even high level dissent or threat of coup would be virtually impossible in a totalitarian state of this kind. Its long term internal security would be assured. BCIs also offer an easy way to interrogate dissidents and guarantee their cooperation in helping to find other dissident camps – which might be otherwise impossible. In past resistances, certain dissidents have been considered near-impossible to completely wipe out due to features of terrain making it impossible to locate them in a cost effective way. If the government were able to access and forcibly apply BCIs, resistance would be a dramatically weaker obstacle. Dissenters might normally lie or not cooperate, but with BCIs, they simply need to be implanted and rewired. Then they would be as loyal and cooperative as any other, and could actively lead the state to their previous allies. Even unconstrained defectors could not be fully trusted as they may one day be controlled by the state. Another issue for the long term survival of totalitarian dictatorships is coups or overthrows from within, as citizens or party officials are often tempted by different conditions in other states. With BCIs, the loyalty of regular citizens and even party officials could be assured. In current dictatorships, wiping out dissidents (particularly nonviolent dissidents) often has a significant social cost that can delegitimise and destabilise regimes (Sharp, 1973). A dictatorship whose citizens are all implanted with BCIs would not pay this social cost. At present, when dictators crack down it can cause riots and resistance, which can cause dictatorships to fall. With BCIs, governments will not need to appease their citizens at all to maintain loyalty. They need only turn up the dial. In this section we explore some global strategic implications of BCIs. In particular, that BCIs allow totalitarian regimes to be stable over the long term, even without requiring global totalitarianism. We also argue that BCIs make authoritarian regimes more likely to become totalitarian in the first place, and that BCIs create a strategic equilibrium that inclines us towards a world where all countries become totalitarian. Totalitarian states may fail for a few reasons. Conquest by external enemies is a danger, and since totalitarian states tend to stagnate more than more innovative liberal states, this may be a danger that grows over time. Internal dangers occur too; citizens may choose to rebel after comparing their lives to more prosperous countries in the outside world. Violent and nonviolent resistances have been able to overthrow even harsh authoritarian regimes (Chenoweth, 2011), and at least one totalitarian state has been overthrown by popular uprising (specifically, the Socialist Republic of Romania). It has been suggested that the presence of successful liberal countries may tempt defection among the members of authoritarian and totalitarian countries. Maintaining the morale of citizens and the inner elite is a primary issue. Orwell (1945) and Caplan (2008) both propose that global totalitarianism would allow a totalitarian state to escape these risks of rebellion, as there would be no better condition for subjects to be tempted by or to compare their lives to. However, with BCIs, global totalitarianism would no longer be necessary; BCIs can disarm these issues. Not only is identification of dissent easier; the capacity for dissent can be entirely removed such that it never even begins. Loyalty and high morale can be guaranteed and biochemically enforced. Typically, it is hard to maintain commitment to totalitarian ideologies when free societies deliver higher levels of wealth and happiness with lower levels of brutality and oppression. BCIs could neutralise this problem, making temptation physically impossible, loyalty guaranteed, and regimes internally stable forever. In addition to this internal stability, regimes could also be stable to external threats through the development of nuclear weapons, which powerfully discourage war and provide security from foreign nations. Being safe from both internal and external threats would have significant impacts on the lifespan of a totalitarian country. In addition to increasing the longevity of dictatorships, BCIs also increase the likelihood that totalitarian systems will form. In particular, this is because conventional dictatorships will now have a far more powerful incentive to become totalitarian, as BCIs would make it cheap, easy, and most importantly, incredibly advantageous to do so. As established above, there is significant survival value in being able to identify and remove all opportunities for internal dissent and make rebellion literally ‘unthinkable’. If the misuse of BCIs would vastly improve the odds of survival for both a dictator and their government, then there is powerful reason for dictators to transition to BCI reinforced totalitarianism. Survival would be a powerful reason to descend to totalitarianism. It will be cheaper and easier to surveil and to police citizens than ever before, and the benefits to dictators of doing so will be large. Therefore, BCIs may increase not just the longevity of totalitarian states, but also the likelihood that they occur in the first place. Finally, and most importantly, BCIs create a worrying strategic environment that may incline all countries to eventually become totalitarian, and may incline totalitarianism to entrench itself globally. With BCIs to stabilise themselves from internal resistance and nuclear weapons to stave off invasion, totalitarian countries would almost never fall. They would be secure from internal threats, and secure from external ones. Meanwhile, democratic countries that do not brainwash their citizens could be secure externally but might still at some point degenerate to a more authoritarian form of government. Democratic governments have rarely lasted more than a few centuries in history, and have often temporarily slid into dictatorship or authoritarianism. At present, democracies can descend to dictatorship, and dictatorships can have revolutions and rise to democracy. With BCIs however, democracies can still collapse, but dictatorships are able to last forever. This is a dangerous equilibrium, as it means that free countries will still eventually fall, as they do at present, but when they do, they will not be able to climb back out. Democracies could still collapse to dictatorship, but dictatorships could never rise from that state. In a world where democracies are mortal but dictatorships live forever, the global system is inevitably inclined towards totalitarianism. Over time, one by one, individual democratic powers would fall to authoritarianism and use BCIs to establish irreversible, immortal totalitarian dictatorships in their own regions. The former-democracy would then be able to maintain a stable, BCI-reinforced authoritarian state indefinitely. In a world where a) countries that preserve mental freedom might possibly degenerate into such totalitarian countries, b) totalitarian dictatorships are immortal, and c) there is no available territory for new free countries to be founded, it creates an equilibrium whereby countries will steadily converge upon becoming dictatorships. A free country might not be free forever, and might at some point collapse into dictatorship, and then reinforce itself with BCIs. However, once a BCI reinforced dictatorship is established, it is likely to last indefinitely. Eventually, every free country would fall. And fallen countries would remain fallen forever. This provides a clear path into a multi-polar global totalitarian order. At present, this is not a major concern, as dictatorships (even totalitarian dictatorships) can be overthrown. Thus the likelihood of all countries falling to totalitarianism one by one, without having countries rise back to democracy, is very low. We suggest that BCIs make the path to a global multi-polar totalitarian system much more likely. The timeframe for such a shift is hard to predict. However, if BCI reinforced totalitarianism is already entrenched in a greater number of countries, then the problem may be drastically harder to stop, and the overall risk will be higher. This offers an unusual circumstance in regard to existential risks. With more time, it is likely that more countries will fall, and the more totalitarian countries there are, the harder this problem will be to solve. As such, this is a problem that may be easier to address earlier than later. There may be less of a risk from BCI use if there is a strong ability to prevent technological proliferation to despotic governments. This is conceivable. However, the level of success over the last 100 years at preventing proliferation depends heavily on features of individual technologies. With many weapons that we seek to limit access to, such as nuclear weapons, proliferation is not stopped by restricting knowledge (which is typically very difficult) but by restricting access to materials like enriched uranium. It seems like there is no significant materials shortage for BCI technology, as current BCIs do not require any fundamentally rare or unique materials. Furthermore, it is easier to prevent proliferation of technologies used by governments and militaries than it is to prevent proliferation of technologies used by civilians. Because BCIs are currently being planned as a widespread commercial technology, available to civilians, other countries are likely to gain access to them and have the opportunity to reverse engineer them. With this in mind, anti-proliferation methods would need to focus on preventing spread of knowledge about the development or security of BCIs – an incredibly difficult task for consumer products.

#### That outweighs all other existential risks

**Global Priorities Project 17** (Global Priorities Project, a collaboration of the Centre for Effective Altruism and the Future of Humanity Institute, part of the University of Oxford. "Existential Risk – Diplomacy and Governance", 1/23/17, https://www.fhi.ox.ac.uk/wp-content/uploads/Existential-Risks-2017-01-23.pdf, accessed on 6/22/2022)//gideon

During the twentieth century, citizens of several nations lived for a time under extremely brutal and oppressive regimes.47 Between them, these states killed more than one hundred million people, and sought total control over their citizens. Previous totalitarian states have not been particularly durable chiefly due to the problem of ensuring orderly transition between leaders, and to external competition from other more liberal and successful states. However, there is a non-negligible chance that the world will come to be dominated by one or a handful of totalitarian states. If this were to happen, external competition would no longer threaten the durability of such states to the same extent. Moreover, improvements in certain forms of technology may make it easier for totalitarian states to maintain control, for example by making surveillance much easier. Global totalitarianism could exacerbate other existential risks by reducing the quality of governance. In addition, a long future under a particularly brutal global totalitarian state could arguably be worse than complete extinction.

#### The plan allows the US and NATO to recover first-mover status – that is key to ensure China doesn’t set standards for BCI

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This research focuses on analyzing one emerging technology that has been identified as having security significance: the commercial and military adoption of brain-computer interfaces (BCIs), a nascent neurotechnology, by the United States and China. These two nations are the focus because they are among the largest spenders on brain projects, and they are increasingly seen as peer economic and military competitors, with particular recent emphasis on technological competitiveness between the two (Dobbins et al., Reference Dobbins, Shatz and Wyne2018; Ferchen, Reference Ferchen2020; Lewis, Reference Lewis2018; O’Rourke, Reference O’Rourke2020; Rasser, Reference Rasser2020; Wray, Reference Wray2020). The 2018 U.S. National Defense Strategy highlighted “long-term, strategic competition” with China as a top priority in context of great power competition (Campbell & Ratner, Reference Campbell and Ratner2018; Colby & Mitchell, Reference Colby and Mitchell2020 Jones, Reference Jones2020; Tellis, Reference Tellis, Tellis, Szalwinski and Wills2020; Wu, Reference Wu2020). This competition will naturally include vying for “technological advantage,” especially with emerging technologies like those enabled by the brain projects to avoid technological surprise (U.S. Department of Defense 2018). Future work may consider other nations.

Adoption of truly emerging technologies, like neurotechnologies, in both the commercial and military sectors is likely to have important implications for the strategic competition between nations, making them important case studies for predicting neurotechnology adoption likelihood. In economics, the advantages and disadvantages of being a “first mover” or a “fast follower” in new markets have been discussed (Kerin et al., Reference Kerin, Varadarajan and Peterson1992; Wunker, Reference Wunker2012). Most of these studies highlight very large advantages for first movers in emerging industries, while also acknowledging that fast followers occasionally benefit by learning from any missteps that a first mover makes or by capitalizing on the high development costs that first movers incur. This terminology has also been applied to nations’ strategies toward emerging technologies. Notably, the U.S. National Security Commission on Artificial Intelligence highlighted in its 2021 report “the first-mover advantage of developing and deploying technologies like microelectronics, biotechnology, and quantum computing” (National Security Commission on Artificial Intelligence, 2021). Being a first mover would enable a nation’s private industry to capitalize on a growing market for neurotechnologies. It may also allow that first-mover nation to play a lead role in setting the ethical and legal norms internationally for these devices. Therefore, being able to anticipate which nation is most likely to be a first mover and see widespread technology development and dissemination is crucial to understanding the national and international security landscape. Additionally, the pursuit of new capabilities, including first acquisition and deployment, has been studied as part of the arms race literature (Evangelista, Reference Evangelista1989; Gray, Reference Gray1974; Hundley, Reference Hundley1999).

#### NATO BCI standards are key to interoperability and standardization across the board

Emmanuel et al. 19 (Peter Emanuel, the Senior Research Scientist for Bioengineering at the U.S. Army Combat Capabilities Development Command Chemical Biological Center. In this role he advises Army leadership on emerging technologies in synthetic biology and bioengineering and exploitation of these new fields for applications that support national defense, Scott Walper, Diane DiEuliis, Natalie Klein, James Petro, James Giordano. U.S. Army Combat Capabilities Development Command Chemical Biological Center, "Cyborg Soldier 2050: Human/Machine Fusion and the Implications for the Future of the DOD", October 2019, https://apps.dtic.mil/sti/pdfs/AD1083010.pdf, accessed on 6/21/2022)//gideon

The pace of development in cyborg technologies is expected to accelerate over the next 10–15 years, driven by commercial medical applications. Adoption of these maturing technologies by global defense forces with commensurate protection of proprietary and classified technologies is deemed likely. Adoption of new and potentially sensitive technologies can have implications for interoperability of military forces. The DOD requirement to maintain interoperability with allied partners within NATO and other allied partnership frameworks would suggest that efforts to align cyborg assets with existing or newly developed doctrine should be undertaken.

The study group recommended that U.S. leadership use current allied forums (e.g., NATO) to discuss impacts to interoperability with allied partners as we approach the year 2050. This will help in the development of policies and practices that will maximize interoperability of forces.

Interoperability of military units in a tactical sense is not the only hurdle that must be overcome when bringing together populations from different countries. The policies of countries are dependent upon the shared social norms and beliefs of the population, and these are not guaranteed to align on the issue of human/machine enhancement technologies.23 Given that the measured attitudes from the Pew Research Center’s study on cyborg technologies indicated clear alignment to religious commitment, allies with a strong history of religiosity may be more reluctant to accept foreign cyborg soldiers operating on a shared military base within their borders. Judging from current postures and practices of key strategic competitors,24–26 the study group postulated that it is unlikely that the global community will establish consistent and harmonized approaches to integrating human/machine enhanced warfighters. This lack of agreement will present challenges to the deployment of these assets in the years leading up to 2050. A robust multinational dialogue that identifies acceptable legal, moral, philosophical, and ethical frameworks for the use of these technologies in national defense may prepare the global community for these eventualities.

#### Enhancing security cooperation over cognitive warfare prevents perception of eroding leadership

**Kosal and Putney 02/08** (Margaret Kosal and Joy Putney, Associate Professor in the Sam Nunn School of International Affairs at Georgia Institute of Technology, where she also directs the Sam Nunn Security Program., PhD in Quantitative Biosciences from the School of Biological Sciences at Georgia Institute of Technology and was a National Science Foundation Graduate Research Fellow. Sam Nunn Security Program Fellow through the Sam Nunn School of International Affairs at GT, focusing on the national security and policy issues surrounding dual-use neurotechnologies like brain-machine interfaces. Cambridge University Press, "Neurotechnology and international security", 02/08/2022, https://www.cambridge.org/core/journals/politics-and-the-life-sciences/article/neurotechnology-and-international-security-predicting-commercial-and-military-adoption-of-braincomputer-interface-bci-in-the-us-and-china/29155A74DBB0FDE5CB0CBA4D3DF6AF0C, accessed on 6/18/2022)//gideon

For strategists and scholars of revolution in military affairs, which focuses on emerging technologies and posits that military technological transformations and the accompanying organizational and doctrinal adaptations can lead to new forms of warfare, the nexus between technology and military affairs bears directly on the propensity for conflict and outcomes of war, as well as the efficacy of security cooperation and coercive statecraft (Bernstein & Libicki, Reference Bernstein and Libicki1998; Blank, Reference Blank1984; Cohen, Reference Cohen1996; Herspring, Reference Herspring1987; Krepinevich, Reference Krepinevich1994; Mahnken, Reference Mahnken2010; McKitrick et al., Reference McKitrick, Blackwell, Littlepage, Kraus, Blanchfield, Hill, Schneider and Grinter1995; Nofi, Reference Nofi2006). These discussions underpin the concept of network-centric warfare, operations that link combatants and military platforms to each other in order to facilitate information sharing as a result of the progress in information technologies (Arquilla, Reference Arquilla2002).

In the late twentieth century, one predominant model for understanding the conditions under which conflict and cooperation are likely and how technology can contribute to increasing or decreasing instability in the international system was the offense-defense model (Jervis, Reference Jervis1978). This theory asserts that more complete information on the intentions of rivals allows both sides to manage a spiraling arms race. Awareness of aggression allows for coalition building and diplomatic action in order to preemptively quell belligerence. An advantage of defensive technology over offensive technology is that it lowers the cost/benefit equation of the attacker and, in the words of Clausewitz (Reference Clausewitz and Greene2013), “tame[s] the elementary impetuosity of War.” Offensive ascendency, conversely, creates a sense of urgency for states to develop greater offensive capabilities and seek out alliances, further increasing tensions. Emerging technologies, such as nanotechnologically enabled meta-materials, biotechnology, and neurotechnology, may problematize offense-defense theory by challenging the distinction between offensive and defensive weapons (Kosal & Stayton, Reference Kosal, Stayton and Kosal2019). This work does not seek to resolve that issue but furthers the scholarly debate about how emerging technologies affect international security.

Another area of scholarly work has considered and problematized the way emerging technologies may challenge existing laws, including the law of armed conflict, international environmental law, and arms control treaties, and need to govern the introduction, implementation, and use of emerging technologies as a means or method of warfare (Leins, Reference Leins2021; Nasu & McLaughlin, Reference Nasu and McLaughlin2014).

### Advantage—Cohesion

#### Advantage ­­­\_\_\_ is Cohesion—

#### Cognitive warfare strategies are being deployed by adversaries now – getting the alliance on the same page is crucial to avoid escalation

Reding and Wells 22 (May 4th, 2022 | Dale Reding and Bryan Wells | Dale Reding is CORA Chief Scientist. Defence R&D Canada - Centre for Operational Research and Analysis (CORA). Bryan Wells appointee from North Atlantic Council as UK NATO Chief Scientist | “Cognitive Warfare: NATO, COVID-19 and the Impact of Emerging and Disruptive Technologies” | DOA: 6/22/2022 | SAoki)

Conclusion

COVID-19 has been a tragedy for the world. Compounding this has been the scourge of misinformation and its weaponised form, disinformation. The COVID-19 crisis has brought together two of the most significant trends in emerging and disruptive military technologies: biotechnologies that underlie the mRNA vaccines that may ultimately reign in the virus and cognitive warfare with disinformation as the weapon of choice. Disinformation campaigns are hardly new and have long been a staple of geopolitical conflict. Nevertheless, the precision, breadth, volume, automation and audacity of such attacks are unprecedented. Exploiting the situation, some states, social groups and individuals with malice and forethought sought to conduct cognitive warfare on entire populations, using the opportunities presented by COVID-19 to seek political or social advantage. These have had, and will continue to have, severe consequences for Alliance nations and the health of its citizens. Ultimately, as we have discussed in this chapter, the NATO alliance has faced these issues through the active use of S&T and a focus on facts, concrete actions, and trust-building. Nevertheless, it is a well understood psychological phenomenon that facts do not always win an argument. While arguably a successful strategy, the lingering effects of these attacks suggest that the struggle is far from over. In the end, whether it is at the strategic or tactical level, conflict is a decidedly human activity. The most effective way to overcome an opponent is to impact their thoughts and beliefs, thereby turning them against themselves. Continued research into disinformation and its impact on societies will help develop new battle plans to counter these attacks. Further, the success and increasing development of more sophisticated attacks suggest that cognitive warfare will become even more important for the Alliance as potentially the sixth operational domain for NATO.

#### Emerging tech plagues the geopolitical landscape with unpredictable threats---lack of a unified NATO vision leaves the alliance susceptible to unconventional war

Perkins & Nordmann 12 (Dana Perkins and Brian Nordmann | “Emerging Technologies: Biosecurity and Consequence Management Implications” | DOI: 10.1007/978-94-007-2488-4\_2 | DOA: 6/22/2022 | SAoki)

The geopolitical landscape of the twenty-first century offers more complex, dynamic, and unpredictable global challenges than those encountered in the previous century. Despite the unparalleled level of military/technological dominance that the United States and NATO Allies; the evolving asymmetric, kinetic, and unconventional threats from non-aligned terrorist groups continue to evolve and escalate. Adversaries and terrorist groups have demonstrated a strong will and interest to wage unconventional war against Western targets despite their limited technological capabilities and lack of sophistication in conducting such operations. In fact, the unsophisticated conformations of CBRNE threats pose more technical challenges in both point and stand-off detection. The rapid advances in both science and technology coupled with universal internet access have inspired both non-state and state-sponsored actors to new levels of creativity in the development of novel and non-traditional threat agents. It is apparent that asymmetric threats have changed the traditional nature of the battlefi eld. Accompanying the evolution of asymmetric threats is the relative ease of their transport and engagement; thus broadening the potential battlefi eld and virtually eliminating the generally accepted premise of homeland as a safe haven from catastrophic, man-made disasters. Finally, the terrorist toolkit includes direct attacks against persons, economic infrastructure, and the environment in pursuit of their own personal and political agendas. Furthermore, drinking water distribution systems are vulnerable to intentional and/or inadvertent contamination. Such contamination can be accomplished with classic and non-traditional chemical agents, toxic industrial chemicals (TICs), and/or toxic industrial materials (TIMs). Conventional methods employed to sense/detect such contaminants use commercialoff the shelf (COTS) systems and broad-spectrum analytical instruments with interpretive algorithms to detect and characterize toxic contaminants. The current vi Preface threat environment requires detection of complex contaminant signatures in addition to recycled pharmaceuticals present in water supplies. Hence it is critical to seek revolutionary solution pathways to such challenges, such as using advanced sciences convergence (ASC) involving inter/Trans disciplinary fi elds. It is well known that materials approaching nanoscale dimensions exhibit characteristics with numerous unique and previously unexploited applications. Advances in synthesis and characterization methods allow the means to study, understand, control, and even manipulate the transitional characteristics between isolated atoms and molecules and bulk materials. Technological advances arise from the potential of nanoscale materials to exhibit properties that are attributable to their small size, physical characteristics, and chemical composition. Recently, functional and architectural innovations in nanoscale materials have initiated applications in chemical and biological sensing; environmental pollution sensing, monitoring, mitigation and remediation; nano-biotechnology; plamonics; and in-vivo analysis of cellular processes. A nanotechnology-based sensor platform enables direct electrical detection of chemical and biological agents in a label-free, highly multiplexed format over a broad dynamic range. Advances made over the last few years provide new opportunities for scientifi c and technological developments in nanostructures and nanosystems with new architectures and improved functionality. The fi eld is very active and rapidly developing, and covers a wide range of disciplines. The advancement of molecular biology and its application in environmental microbiology has represented signifi cant advancement in the ability to rapidly detect waterborne microbial pathogens. Molecular methods, coupled with high-throughput parallel process may provide a greater range of microorganism detection. The advances in of new technologies, viz. biosensors, biochips, lab-on-chip, e-tongue, plasmonics, etc. have brought in new and promising approaches. The ASI focus was also to summarize recent methodologies in sensing/detecting contaminants fl ow in water distribution system with the objectives that appropriate remediation strategies are exercised before its entry in residential/commercial/industrial distribution. Furthermore, decentralized sensing plays a crucial role from an international security standpoint. The ASI aimed to address several important and relevant issues related to enhancing security using advanced technological solutions. Several invited lectures, focused seminar sessions, and student presentations addressed a range of issues such as technological advances in chemical-biological sensors using nanomaterials; advanced sciences convergences for international defense and security, and waterbased contaminants sensing/detection and mitigation. The ASI was attended by participants from 23 countries thus exemplifying the international vision of NATO Peace for Security endeavours. The ASI provided an international forum for the exploration of many key scientifi c and technological advancements employing nanostructured and advanced materials. Despite of initial organizational issues, the NATO ASI was well organized and received by the participants. To maximize global participation, the organizing committee focused on a promotional strategy that yielded a wide range of NATO and partner countries representation and most importantly, a wide range of participation from multiple scientifi c disciplines.

#### **Current alliance developments are uncoordinated which undermines cohesion**

Friedl et. al. 09 (Karl E. Friedl, Pang Shek, David M. Lam, René Nevola, Yantsislav Yanakiev, Marion Trousselard, Marten Nieuwenhuizen, Wolfgang Krause, Bernd De Graaf, Erik Fosse, Ron Verkerk, " Human Performance Enhancement for NATO Military Operations (Science, Technology and Ethics) ", No Publication, https://apps.dtic.mil/sti/pdfs/ADA562561.pdf, 8-2009, Accessed 6-22-2022)//ILake-SG

The symposium objective was to explore the theoretical possibilities and bioethical issues associated with human performance enhancement and optimization in NATO operations. The symposium findings were: Performance enhancement technology is generally not mature enough for human operational test and experimentation. Performance optimization technology is available and the efficacy and health consequences of such manipulations must continually be evaluated. Bioethical deliberations concerning Human Performance Enhancement in military settings are reactive to experimentation. Proactive policies for research and application of enhancement technologies are required. Valid potential operational scenarios were not well articulated. Absent these scenarios, conversations about performance enhancement defaulted to science fiction-like scenarios. Cooperative research in military medical operational performance is insufficient. Synergies across NATO partners are not exploited. As such, interoperability resulting from collaboration and “buy-in” of best practices in sustaining an international force is not leveraged. Researchers appear to have limited understanding of performance requirements of deployed service members and the operational realities of commanders. Research questions were generally not proactive or directly relevant to current or future operations. There is limited integration and management of knowledge related to health and performance research. This may be hampering development of NATO-relevant programmatic research.

#### Its try-or-die for cohesion over cognitive warfare – the Human is the new domain of competition by adversaries

Cluzel 20 (Francois du Cluzel | Innovation Project Manager at NATO ACT Innovation Hub | “Cognitive Warfare” | <https://www.innovationhub-act.org/sites/default/files/2021-01/20210122_CW%20Final.pdf> | DOA: 6/18/2022 | SAoki)

\*CW = Cognitive Warfare

As written in the Warfighting 2040 Paper, the nature of warfare has changed. The majority of current conflicts remain below the threshold of the traditionally accepted definition of warfare, but new forms of warfare have emerged such as Cognitive Warfare (CW), while the human mind is now being considered as a new domain of war. With the increasing role of technology and information overload, individual cognitive abilities will no longer be sufficient to ensure an informed and timely decision-making, leading to the new concept of Cognitive Warfare, which has become a recurring term in military terminology in recent years. Cognitive Warfare causes an insidious challenge. It disrupts the ordinary understandings and reactions to events in a gradual and subtle way, but with significant harmful effects over time. Cognitive warfare has universal reach, from the individual to states and multinational organisations. It feeds on the techniques of disinformation and propaganda aimed at psychologically exhausting the receptors of information. Everyone contributes to it, to varying degrees, consciously or sub consciously and it provides invaluable knowledge on society, especially open societies, such as those in the West. This knowledge can then be easily weaponised. It offers NATO’s adversaries a means of bypassing the traditional battlefield with significant strategic results, which may be utilised to radically transform Western societies. The instruments of information warfare, along with the addition of “neuro-weapons” adds to future technological perspectives, suggesting that the cognitive field will be one of tomorrow’s battlefields. This perspective is further strengthened in by the rapid advances of NBICs (Nanotechnology, Biotechnology, Information Technology and Cognitive Sciences) and the understanding of the brain. NATO’s adversaries are already investing heavily in these new technologies. NATO needs to anticipate advances in these technologies by raising the awareness on the true potential of CW. Whatever the nature and object of warfare, it always comes down to a clash of human wills, and therefore what defines victory will be the ability to impose a desired behaviour on a chosen audience. Actions undertaken in the five domains - air, land, sea, space and cyber - are all executed in order to have an effect on the human domain. It is therefore time for NATO to recognise the renewed importance of the sixth operational domain, namely the Human Domain.

#### Failure to achieve standards for CW risks nuclear miscalc – extinction

ACA 22 (March | Arms Control Association | Long in the Making: The Russian invasion of Ukraine | <https://www.armscontrol.org/taxonomy/term/84/3?page=1> | DOA: 6/26/2022 | SAoki)

Today, renewed great-power competition is being intensified by technological advancements that allow for the real-time relay of information that requires decisions be made within seconds. Human beings are embedded much more intricately into the military technological systems logic, as operator and functional element, in the pursuit of speed and optimization. In order to function within a highly scientific, technologically sophisticated conflict environment, those involved in the action chain, including operators and fighters, are themselves in need of a tune-up. Indeed, military human enhancement is one of the new frontiers in emerging weapons technology, as advanced militaries across the globe are planning to enhance and augment the capabilities of their war-fighting forces. This development is shifting the parameters of decision-making, including nuclear decision-making. What, for example, might have happened if Petrov had been more intricately woven into the computer system that reported the erroneous satellite signal, perhaps via an implantable neural interface to facilitate speedier human-machine communication for more efficient decision-making? Notwithstanding its operational and strategic importance, human augmentation is not typically discussed in nuclear policy. This oversight needs redress as ministries of defense begin to focus on human enhancement as the “missing part” of the human-machine teaming puzzle.[1](https://www.armscontrol.org/taxonomy/term/84/3?page=1#endnote01) **Definition and History of Human Augmentation** Human augmentation is a vast field with many linkages to other areas of study. There is no commonly agreed definition, and it is known by many names, which are often used interchangeably. “Augmentation” usually refers to the transformation of capabilities to include a new or additional capability, but “enhancement” refers to the fortification of existing capabilities. Both concepts can be broadly defined as “the application of science and technologies to temporarily or permanently improve human performance.”[2](https://www.armscontrol.org/taxonomy/term/84/3?page=1#endnote02) As with all emerging technologies, human enhancement technologies exemplify aspects of continuity and change. The development of physically and mentally resilient soldiers has a long history, involving techniques and technologies that work toward fortifying the human body and mind with the objective of extending capacities and limiting vulnerabilities in war. Such technological transformations begin with straightforward tools such as a soldier’s armor, the crossbow, the machine gun, the rocket launcher, and a range of natural and synthetic substances with pharmacological effects. Roman and Greek legionnaires strengthened their bodies with leather and bronze and their resolve with wine, beer, rum, and brandy. Opioids and amphetamines have long been used in battle to gain a greater edge in fighting.[3](https://www.armscontrol.org/taxonomy/term/84/3?page=1#endnote03) Pain relievers and other synthetic drugs are instrumental in alleviating pain and facilitating healing. Meanwhile, propaganda, systematic training, and enemy dehumanization are used to augment or suppress the war-fighter’s emotions. Human augmentation programs today extend much further into the development of the soldier as fighter, as well as the solider as operator, through various modes of scientific-technological inscriptions, shaping bodies toward greater operational efficiency and effectiveness. As human and machine become increasingly entwined, the concept of the “super soldier,” where human tissue and technological circuitry fuse for maximum performance, is taking shape. In May 2021, the UK Ministry of Defence and the German Bundeswehr co-published a report that conceptualizes “the person as a platform” and heralds the “coming of the Biotech age.”[4](https://www.armscontrol.org/taxonomy/term/84/3?page=1#endnote04) Half a year earlier, China and France published reports indicating their readiness to augment military personnel physically, cognitively, psychologically, and pharmacologically.[5](https://www.armscontrol.org/taxonomy/term/84/3?page=1#endnote05),[6](https://www.armscontrol.org/taxonomy/term/84/3?page=1#endnote06) In the United States, the Defense Advanced Projects Research Agency has been investing in neurotechnology since the 1970s and today is expanding the frontiers of the field, with a focus on neural interface technology.[7](https://www.armscontrol.org/taxonomy/term/84/3?page=1#endnote07) Current trends in military human enhancement focus on external enhancements such as augmented reality, exoskeletons, wearables, and biosensors and internal augmentations through pharmacological supplements. Implantable chips for a medical or curative purpose are already on the horizon.[8](https://www.armscontrol.org/taxonomy/term/84/3?page=1#endnote08) Directly enhancing human capabilities, however, is only half of the equation. The other half is that human augmentation will become increasingly relevant to security and defense because it is the binding agent between humans and machines.[9](https://www.armscontrol.org/taxonomy/term/84/3?page=1#endnote09) Beyond these external and internal enhancements, there is considerable interest in developing technologies that facilitate smoother and more functional teaming between the human and computational systems through so-called neural interface technologies. The importance of effective integration of humans and machines is widely acknowledged, but has been primarily viewed from a technocentric perspective. Many of the existing solutions are technology focused, such as “building trust into the system” by making artificial intelligence (AI) more transparent, explainable, and reliable. Although this is necessary for cultivating trust in human-machine teams, it does not account for the human element in the teaming equation. Proponents of human augmentation argue that it is the necessary adjustment for a world in which future wars will be won by those who can most effectively integrate the capabilities of personnel and machines at the appropriate time, place, and location.[10](https://www.armscontrol.org/taxonomy/term/84/3?page=1#endnote10) As militaries increasingly incorporate automated and autonomous processes into their operations, brain-interface technologies could serve as a crucial element in future human-machine teaming.[11](https://www.armscontrol.org/taxonomy/term/84/3?page=1#endnote11) Brain-interface technologies offer methods and systems for providing a direct communication pathway between an enhanced, or wired, brain and an external device.[12](https://www.armscontrol.org/taxonomy/term/84/3?page=1#endnote12) In other words, they enable the transfer of data between the human brain and the digital world via a neural implant. This has implications for all spheres of military operations. What might this mean for the future of nuclear decision-making? **Human Augmentation and Nuclear Stability** The United States is a good case study for understanding how human augmentation might intersect with nuclear decision-making, given that it is more transparent about its nuclear decision-making protocols than other states possessing nuclear weapons. There is a clear sequence of events involved in the short period from considering a nuclear strike to the decision to launch.[13](https://www.armscontrol.org/taxonomy/term/84/3?page=1#endnote13) When the president decides that a launch is an option, they convene a brief conference of high-ranking advisers, including members of the military, such as the officer in charge of the war room. Whatever the president decides, the Pentagon must implement. For a strike decision, the next step is to authenticate the order, then the encoded order goes out via an encrypted message. Once the launch message has been received by the submarine and ICBM crews, the sealed authentication system codes are retrieved and compared with the transmitted codes in a further authentication step before launch. The missile launch then is prepared. If launched from a silo, it takes five ICBM crew members to turn their keys simultaneously for a successful launch. This entire process from decision to ICBM launch can be completed within five minutes, 15 minutes if the launch is executed from a submarine. This is already a quick decision process with very little room for mediation, deliberation, or error. With human augmentation, the timelines would be compressed even further. To understand the relevance of human augmentation to nuclear decision-making, three scenarios, each positioned at different points in the decision-making process, are illustrative and reflect a military context in which nuclear weapons interact with a brain-computer interface. Such an interface could detect when certain areas of the brain are cognitively activated (e.g., by certain thoughts) and transmit this signal, thereby enabling brain-controlled action or communication. The scenarios focus on the incorporation of a brain-computer interface into nuclear decision-making because of their potential to accelerate communications. The ability of an interface to compress temporal timelines enables us to probe the boundaries of the question “What is the value of a few seconds?” The first scenario involves the advisory and decision chain. Assuming the above decision chain, the president, upon learning of a potential threat and considering the need to give a nuclear launch command, could shorten the deliberation time frame of their human advisers by transferring data directly to military participants via a brain-computer interface. In addition, the senior military commander could be plugged into an AI system that can compute many possible scenarios and give recommendations through the brain-computer interface in real time. The upshot of human enhancement in this scenario might be that the military adviser has more data available through the interface, but critically, there is no guarantee of the quality or accuracy of this data. Moreover, with civilian and military advisers partaking in the advisory conference, there is a risk of the same algorithmic bias that is evident in human-machine teaming with AI systems. This refers to the tendency of humans to give uncritical priority to decisions that are ascertained with the help of technology, also called automation bias. This may make an advisory team superfluous and weaken the quality of advice in a critical situation. The mandate to act faster based on technologically derived advice could prevail and shorten the deescalation window. In the second scenario, involving the executive chain, the launch crew is assumed to be partially or wholly networked through brain-computer interfaces. Perhaps the transmission of the launch codes takes place directly through computational networks, shortening the time between receiving the order, authenticating the codes, and executing the order. The submarine and ICBM crews executing the order by coordinated action are networked to facilitate the launch. In addition to the obvious vulnerabilities that any network inevitably produces, such as information and network security compromises, this would have the consequence of accelerating action. Any errors may be overlooked or not acted on in time. Particularly concerning is the possibility that a given action could rest on flawed initial inputs or skewed calculations, which would greatly increase the risk of unwarranted escalation. Finally, there is the Petrov example, or the predecision phase. As suggested above, the decision chain does not really begin with the president’s decision to launch but with the input that the president receives from those in the military chain of command. If Petrov, the Russian duty officer whose job was to register apparent enemy missile launches, had been operating with a brain-computer interface in place and received the information transmitted directly to his brain and the brains of other military personnel, would there have been the impetus or indeed the opportunity to question the information from the system? Would he have had enough time to understand the context, draw on his experience, and make a considered judgment; or might he have felt compelled to uncritically execute the recommendations made by the system, which may well be indistinguishable in his mind to his own judgments? In all three scenarios, the human is less able to exercise important human judgment at critical nuclear flashpoints. Algorithmic bias, increased system fog, lack of overall situational awareness, cognitive overload, and an accelerated action chain are consequences of intricate human-machine teaming through interfaces. This blurring of boundaries could obscure where machine input starts and human judgment ends. It could reduce the scope for cognitive input from the human and increase the extent to which algorithmic decisions prevail without serious oversight. Human experience and foresight based on noncomputational parameters are likely to be bracketed considerably. Is that wise in a nuclear context? As military operations prioritize speed and networked connectivity, slotting the human into a computer interface in the nuclear context may significantly exacerbate nuclear instability.[14](https://www.armscontrol.org/taxonomy/term/84/3?page=1#endnote14)

#### The plan’s collaboration over cognitive warfare reverses lack of cohesion

Cluzel 20 (Francois du Cluzel | Innovation Project Manager at NATO ACT Innovation Hub | “Cognitive Warfare” | <https://www.innovationhub-act.org/sites/default/files/2021-01/20210122_CW%20Final.pdf> | DOA: 6/18/2022 | SAoki)

Recommendations for NATO The need for cooperation While the objective of Cognitive Warfare is to harm societies and not only the military, this type of warfare resembles to “shadow wars” and requires a whole-of-government approach to warfare. As previously stated, the modern concept of war is not about weapons but about influence. To shape perceptions and control the narrative during this type of war, battle will have to be fought in the cognitive domain with a whole-of-government approach at the national level. This will require improved coordination between the use of force and the other levers of power across government. This could mean changes to how defence is resourced, equipped, and organised in order to offer military options below the threshold of armed conflict and improve the military contribution to resilience. For NATO, the development of actions in the cognitive domain also requires a sustained cooperation between Allies in order to ensure an overall coherence, to build credibility and to allow a concerted defense. Within the military, expertise on anthropology, ethnography, history, psychology among other areas will be more than ever required to cooperate with the military, in order to derive qualitative insights from quantitative data, as an example. In other words, if the declaration of a new field of combat consecrates the new importance of humans, it is more about rethinking the interaction between the hard sciences and the social sciences. The rise of cognitive technologies has endowed human with superior analysis and accuracy. In order to deliver timely and robust decisions, it will not be a question of relying solely on human cognitive capacities but of cross engineering systems with social sciences (sociology, anthropology, criminology, political science...) in order to face complex and multifaceted situations. The modelisation of human dynamics as part of what is known as Computational Social Science will allow the use of knowledge from social sciences and relating to the behaviour of social entities, whether enemies or allies. By mapping the human environment, strategists and key military leaders will be provided reliable information to decide on the right strategy. Definition of the Human Domain Thus defined by NATO’s major adversaries, the mastery of the field of perceptions is an abstract space where understanding of oneself (strengths and weaknesses), of the other (adversary, enemy, human environment), psychological dimension, intelligence collection, search for ascendancy (influence, taking and conservation of the initiative) and capacity to reduce the will of the adversary are mixed. Within the context of multi-domain operations, the human domain is arguably the most important domain, but it is often the most overlooked. Recent wars have shown the inability to achieve the strategic goals (e.g. in Afghanistan) but also to understand foreign and complex human environments. Cognitive warfare was forced upon the Western liberal democracies by challenging international actors who have strategised to avoid the military confrontation, thus blurring the line between peace and war by targeting the weakest element: humans. CW which includes the increasing use of NBICs for military purposes may provide a sure way of military dominance in a near future. “Military power is of course one essential segment of security. But global security refers to a broad range of threats, risks, policy responses that span political, economic, societal, health (including cognitive health!) and environmental dimensions, none of these being covered by your current domains of operations! Some international actors already use weapons that precisely target these dimensions, while keeping their traditional kinetic arsenal in reserve as long as they possibly can. NATO, if it wishes to survive, has to embrace this continuum and claim as its responsibility, together with its allies to, seamlessly, achieve superiority all across it.”58 Raising awareness among Allies While advances in technology have always resulted in changes in military organisations and doctrines, the rapid advancements in technology, in particular in brain science and NBIC, should force NATO to take action and give a greater consideration to the emergence of the threats that represents Cognitive Warfare. Not all NATO nations have recognised this changing character of conflicts. Declaring the Human as sixth domain of operations is a way to raise awareness among the NATO Nations. NATO should consider further integrating Human situational awareness in the traditional situation awareness processes of the Alliance. Anticipating the trends There is evidence that adversaries have already understood the potential of developing human-related technologies. Declaring the Human Domain as a sixth domain of operations has the potential to reveal possible vulnerabilities, which could otherwise amplify rapidly. It is not too late to face the problem and help keep the dominance in the field of cognition. The Human Domain of operations could tentatively be defined as “the sphere of interest in which strategies and operations can be designed and implemented that, by targeting the cognitive capacities of individuals and/or communities with a set of specific tools and techniques, in particular digital ones, will influence their perception and tamper with their reasoning capacities, hence gaining control of their decision making, perception and behaviour levers in order to achieve desired effects.” Delays in declaring the Human Domain as a domain of operations may lead to fight the last war. Given that the process of declaring a new domain of operations is a lengthy process and given the sensitivity of the topic, NATO needs to be fast in focusing on political/military responses while capacity/threats of our opponents are still low. Finally, ethical problems should be raised. Since there is no agreed international legal framework in the field of neurosciences, NATO may play a role in pushing to establish an international legal framework that meets the NATO Nations’ ethical standards. Accelerating information sharing Accelerated information sharing among Alliance members may help faster integration of interoperability, to assure coherence across multi-domain operations. Information sharing may also assist some nations in catching up in this area. In particular, surveillance of ongoing international activities in brain science, and their potential dual-use in military and intelligence operations should be undertaken and shared between Allies along with identification and quantification of current and near-term risks and threats posed by such enterprises. Establishing DOTMLPFI components upstream The first step is to define the “human domain” in military doctrine and use the definition to conduct a full spectrum of capability development analysis, optimising the military for the most likely 21st century contingencies. Since the Human Domain complements the five others, each capability development should include the specificities of modern threats, including those related to cognitive warfare and, more generally, the sixth domain of operations. The Human Domain is not an end in itself but a means to achieve our strategic objectives and to respond to a type of conflict that the military is not accustomed to dealing with. Dedication of resources for developing and sustaining NATO Nations capabilities to prevent escalation of future risk and threat by: 1) continued surveillance; 2) organisational and systemic preparedness; 3) coherence in any/all entities necessary to remain apace with, and/or ahead of tactical and strategic competitors’ and adversary’s capabilities in this space. Impact on Warfare Development By essence, defining a new domain of operations and all the capabilities and concepts that go along with it, is part of ACT’s mission. Innovation Hub - Nov 2020 Page 34 of 45 ACT should lead a further in-depth study with a focus on: • Advancements on brain science initiatives that may be developed and used for nonkinetic and kinetic engagements. • Different ethical systems that govern neuroscientific research and development. This will mandate a rigorous, more granular, and dialectical approach to negotiate and resolve issues and domains of ethical dissonance in multi- and international biosecurity discourses. • Ongoing review and evaluation of national intellectual property laws, both in relation to international law(s), and in scrutiny of potential commercial veiling of dual-use enterprises. • Identification and quantification of current and near-term risks and threats posed by such enterprise(s) • Better recognizing the use of social and human sciences in relation with “hard” sciences to better understand the human environment (internal and external) • Include the cognitive dimension in every NATO exercises by leveraging new tools and techniques such as immersive technologies Along with those studies, anticipating the first response (such as the creation of a new NATO COE or rethink and adapt the structure by strengthening branches as required) and defining a common agreed taxonomy (Cognitive Dominance/Superiority/Cognitive Center of Gravity etc…) will be key tasks for ACT to help NATO keep the military edge. Innovation Hub - Nov 2020 Page 35 of 45 Conclusion Failing to thwart the cognitive efforts of NATO's opponents would condemn Western liberal societies to lose the next war without a fight. If NATO fails to build a sustainable and proactive basis for progress in the cognitive domain, it may have no other option than kinetic conflict. Kinetic capabilities may dictate a tactical or operational outcome, but victory in the long run will remain solely dependent on the ability to influence, affect, change or impact the cognitive domain. Because the factors that affect the cognitive domain can be involved in all aspects of human society through the areas of will, concept, psychology and thinking among other, so that particular kind of warfare penetrates into all fields of society. It can be foreseen that the future information warfare will start from the cognitive domain first, to seize the political and diplomatic strategic initiative, but it will also end in the cognitive realm. Preparing for high-intensity warfare remains highly relevant, but international actors providing NATO with specific strategic security challenges have strategised to avoid confronting NATO in kinetic conflicts and chose an indirect form of warfare. Information plays a key role in this indirect form of warfare but the advent of cognitive warfare is different from simple Information Warfare: it is a war through information, the real target being the human mind, and beyond the human per se. Moreover, progresses in NBIC make it possible to extend propaganda and influencing strategies. The sophistication of NBIC-fueled hybrid attacks today represent an unprecedented level of threat inasmuch they target the most vital infrastructure everyone relies on: the human mind . 59 Cognitive warfare may well be the missing element that allows the transition from military victory on the battlefield to lasting political success. The human domain might well be the decisive domain, wherein multi-domain operations achieve the commander's effect. The five first domains can give tactical and operational victories; only the human domain can achieve the final and full victory. "Recognising the human domain and generating concepts and capabilities to gain advantage therein would be a disruptive innovation.”60

#### That’s key to effective interoperability and alliance coordination

Reding & Eaton ’20 [D.F., writing for the NATO Science & Technology Organization; J.; writing for the NATO Science & Technology Organization; March 2020; "Science & Technology Trends 2020-2040"; NATO S&T Organization; https://www.nato.int/nato\_static\_fl2014/assets/pdf/2020/4/pdf/190422-ST\_Tech\_Trends\_Report\_2020-2040.pdf; Accessed 6-22-2022; RL]

Advances in materials, information systems and the human sciences are setting the stage to significantly enhance human capabilities, pushing the physiological, cognitive and social human performance frontiers. R&D in these areas is enabled by rapid parallel developments in RAS, AI, BDAA, miniaturisation and innovative materials/manufacturing. As a result, BHET developments are moving at a breathtaking rate, driven by research breakthroughs (e.g. the discovery of CRISPR/Cas9 for gene editing [395]), substantial national investments and increasing commercial interest. The limits on development are around the need for baseline research, as well as ethical, legal and policy concerns. In particular, there are serious issues around the use of genetic engineering; the release of personal bio-data; use of pharmacological enhancements; and, ethical testing of new therapeutics and countermeasures. Figure G.1: Bioinformatics. Bioinformatics, and the related field of computational biology is concerned with the storage, retrieval, organisation and analysis of biological data, and in particular that associated with humans or human activity. The processing of such large volumes of data available for exploitation and assessment (often in real-time) has enabled a much greater understanding of biological, biochemical, physiological, cognitive and social behaviours. In turn, this has supported new technological developments in medicine, genetics and biology. Especially over the last 15 years, bioinformatics has transformed the biological sciences to the point where: “It might be that a new, “theoretical biology” is emerging, where models and their predictions can now be assessed by experimental biology, in analogy to the interplay between theoretical and experimental physics. This moment might have come faster than expected. The merging of computation into the fabric of biosciences and biomedicine by 2020 ...will possibly necessitate a redefinition of computational biology as a distinct discipline in the not-so-distant future.” [396]. Developments in biosensors (especially cheap and widely available ones) have significantly contributed to this data explosion. Biosensors are devices that measure biological (immunological, pressure, thermal, etc.) or biochemical processes and convert them into an electrical signal. These are widely used today and come in many forms. They may be employed for many purposes, such as nano-sensors embedded in smart clothing for detection of CBRN agents; treatment monitoring (e.g. diabetes); silicon photonic biosensors (e.g. fibre Bragg gratings [397]); rapidly applied tattoos to monitor physiological or cognitive stress [398]; and in support of biomedical research [399]. Human physiological monitoring technologies are already commercially available and more advanced sensor packages will mature in the midterm. Advances and technological convergence in material, information and human sciences are allowing new cheaper, smaller and more robust biosensors to be developed. S&T development in bioinformatics and biosensors, as they related to NATO capabilities, will be predominately around their novel use, application of new analytical methods (e.g. AI, quantum 96 Chapter G. Biotechnology & Human Enhancement biology [400], new sensors (in vivo / ex vivo) and the identification of new biomarkers). This continued development will support predictive combat casualty care and diagnostics; operational readiness (e.g. over-training, nutritional deficiencies, immunocompetence, cardiac health and muscular-skeletal injury); and assessment of CBRN exposure. Figure G.2: The Future Soldier (CREDIT: USARMY/DARPA). State-of-the-art sensors are typically designed for optimal detection only. As an example, terrorism threats and military conflicts have motivated research in novel sensors for detecting explosives and chemical warfare agents (CWAs). The focus of today’s research on (bio)sensors goes far beyond the optimisation of the sensing material; it includes the ability to make decisions and act – smart sensing. Research in this area includes the application of [401]: sensor material designs employing carbon nanotubes, polymer nanowires, and porous silicon; machine learning, and DNA-based molecular computing for smart biosensor function; and, bioelectronics and neuroelectronics, such as nerve cell microelectrode arrays for creating novel transducers and physiological biosensors. Enhanced bioinformatics and biosensors will improve monitoring and bio-situational awareness through the application of advanced data collection and predictive analytics. Leveraging such techniques will support improved military health, operational readiness and training, through predictive and pre-emptive responses to environmental or individual issues [202]. Human augmentation, human enhancement or soldier systems are broadly understood to mean technologies used to improve human form or to function beyond what is necessary to restore or sustain health. Concerning BHET relevant to NATO, we take these to cover the range of human domains - physiological, cognitive & social, and the use of robotic exoskeletons, smart textiles, drugs, and seamless man-machine interfaces. The development of new human augmentation technologies (physical, pharmacological, neurological or social) has the potential to change the capabilities of the individual soldier, sailor or aviator significantly [402, 403, 404, 405, 406] and create integrated human-machine symbiotes of unparalleled capabilities. Examples of such augmentation across a variety of sensory modalities are [402]: • Ocular enhancements to imaging, sight, and situational awareness through implants, glasses or contact lens. These visual enhancements will support team data sharing; enhanced target identification; man-machine teaming; and, expansion of vision beyond the visible spectrum [407]: • Restoration and programmed muscular control through an optogenetic bodysuit sensor web; • Auditory enhancement for communication and protection; and, • Direct neural enhancement of the human brain for two-way data transfer. The first three of these technologies are expected to be widely available within the next 20 years. The last, direct neural enhancement, is potentially the most disruptive but is also unlikely to be widely available before 2050, putting it outside the scope of this study. Nevertheless, the development of direct neural-silica connections supporting bi-directional data transfer and mesh networks are a real possibility. Given recent advances in understanding the brain’s neurological components and cognitive architecture, 97 neuroelectronic components that can efficiently implement brain-like algorithms and interface directly with biological wetware offer possibilities for new technological capabilities that could significantly impact both the civilian and military domains. Very high speed, very low power neuromorphic electronic components that feature non-von Neumann architectures and analogue-like processors offer the possibility of autonomous systems and heterogeneous computer architectures that incorporate these devices. Such systems would be able to perform tasks that the brain excels at but which currently thwart classical computers, such as extensive heterogeneous data analysis and visual scene processing. Interfacing these devices with biological systems will offer new treatment methods for neurological diseases and improved interface mechanisms between the brain and electronic devices for better control of artificial limbs. In the near term, significant changes in advancing heads-up displays over the past five years will be refined to offer: • Improvements in the power efficiency of micro-displays; • Advancements in optical fabrication techniques for free-form optical surfaces; and • Integration and proliferation of smartphones and wireless data links. The broad deployment of exoskeletons in commercial sectors will probably remain quite limited for the short term, due to their high cost (more than $25,000 per suit). Nevertheless, “it’s clear that the era of the exoskeleton has begun” [408] in areas such as logistics (e.g. warehouses), construction and manufacturing (e.g. cars and aviation) to ease worker burden, improve efficiency and reduce injuries. It is predicted that by 2025 the exoskeleton market will be 1.8 billion USD, up from 68 million USD in 2014 [409]. The US Army and others are moving forward quickly with development and exploring the operational effectiveness of exoskeletons in theatre [410, 411]. Figure G.3: Future Gear. Other methods of human augmentation include the development of new physiological and pharmacological cognitive (PCE) enhancements, with attendant reproducibility, medical, ethical, legal and policy considerations (e.g. [412, 413]). Direct peripheral nerve stimulation and other non-invasive methods may also be used to increase synaptic plasticity for improved cognitive performance and learning [202], supporting rapid and practical training of military personnel in complex multi-faceted tasks. Ethical, legal, and policy issues arise around the entire spectrum of human enhancement technologies, but especially with pharmacological enhancements. As noted by [414]: “Militaries have long sought to enhance the physical and cognitive performance of warfighters directly, and indeed some human performance enhancement drugs are widely used across the US military today, such as caffeine. Existing technologies have demonstrated the ability to improve individual physical and cognitive performance above baseline levels and in key areas central to military competition: strength, focus, attention, learning, and resistance to fatigue. Many of these technologies are already being used in civilian settings, in licit or illicit contexts.” Mixed reality, is another example of human augmentation, blending the real and virtual worlds to create new digital or manufactured realities, where physical and digital objects co-exist and interact in real-time. Applications include heads up or head-mounted displays for pilots and soldiers for real-time situational awareness, digital cockpits/windows, realistic training environments or providing hands-free job performance aids. Augmented Reality and Virtual Reality are subsets of Mixed Reality. Computer 98 Chapter G. Biotechnology & Human Enhancement simulation models are often used to deliver these experiences. Recent attempts at large-scale commercial product releases for head-worn, see-through, virtual displays have reopened interest in the use of head or body-worn virtual displays. Figure G.4: Visual Enhancement. Reference [402] notes that these technologies will rapidly mature over the next 20 year and be primarily driven by the commercial market. This bio-economy is already at the earliest stages of development (e.g. Google glasses [415]), while the pharmaceutical industry is one of the world’s most significant contributing over 200M euro to the EU economy alone. The social domain is an essential element of human existence, and technology has provided social enhancement technologies in the form of social networks and media. A social network is a network of social interactions and personal relations. Social media is a set of mediums that can be used for social networking. Social media and networks have helped reshape the social, economic and political world over the last 15 years [416, 417], with over 3.5 billion daily users (45% of the world’s population). Social media has been embraced widely and quickly, and it has gained tremendous power to affect the perceptions and behaviours of individuals and societies. As such, it has become critical for the defence, security and safety of the Alliance, and it is the prime human-terrain for operations in the cyber/information domain. The amount and variety of social media (whether text, audio, photographic or video in nature) is immense and growing at an astounding rate. Although social media is a product of the Internet era and most notably the 21st Century, the research on social networks predates the internet by a wide margin. One of the first major social networking studies in the 20th Century resulted in the Six Degrees of Separation (SDS) Theory, first proposed by Frigyes Karinthy in 1929. In 2008, well after the advent of the internet, Microsoft conducted a study demonstrating that the average e-mail chain length was 6.6 hops. However, in 2016, researchers at Facebook reported that social networking had reduced the chain length to three and a half degrees of separation. As such, social media and social networks may be best understood as a means for human social augmentation, and they have been highly successful at it. Figure G.5: Social Augmentation and Enhancement. The growth of the global information network presents significant challenges in understanding dynamic information flows within the network, and the associated velocity, variety and veracity challenges. Understanding the dynamics and spread of information, whether, by individuals, groups, societies or states, within social networks is essential to our understanding of weaponised information and the role this plays in hybrid warfare [418]. Understanding how this dynamic may be exploited is of considerable commercial (e.g. Google, Facebook, Amazon, etc.) and military interest [26, 202]. The development of new Medical countermeasures and more generally Biomedical Technologies pulls together and applies parallel developments in bioinformatics, biosensors, human augmentation and synthetic biology. For example, applied research in casualty care and neural interfaces will help to support evidence-based medicine, operational readiness, increased immunocompetence, disease/biothreat forecasting & detection, patient-centric medicine, rapid development of CBRN countermeasures, improve rehabilitation through new neural interfaces & AI-enabled robotic prosthetic limb technology, and provide new diagnostic and treatment options for mTBI (mild traumatic brain injury) and PSTD (post-traumatic 99 stress disorder) [202]. Figure G.6: Casualty Care. Combat casualty care may also be significantly enhanced through the use of improved bioinformatics and biosensors, remote monitoring, molecular & cellular biology, AI for rapid diagnostics, bioinformatics, surgical techniques & tools, novel materials to improve rapid identification, and treatment of tissue damage and infection. These technologies have the potential to reduce significantly mortality and morbidity resulting from injuries on the battlefield, improve the efficacy of follow-on care and enhance rehabilitation efforts. Fundamental research is also ongoing in understanding the dynamics of complex biological systems, such as the human biome. Research is focused on understanding complex dynamical biological systems-of-systems and developing mechanisms for assessment and optimal control [202]. Synthetic biology involves the precise genetic manipulation and engineering of organisms for scientific research and the development of unique characteristics and capabilities not seen in nature. Furthermore, synthetic biological processes can yield new organic molecules, novel materials that cannot be manufactured directly or even new bio-manufacturing paradigms. Synthetic biology builds upon a human tradition of genetic manipulation (e.g. crop breeding, domestication, etc.). Still, it has begun to evolve very rapidly due to the confluence of molecular biology, systems engineering, information science and other emergent technical fields. The complex convergence of several fundamental technical domains such as molecular biology, systems engineering, etc. precludes a concise and comprehensive characterisation of all relevant and enabling science and technology involved in the field of synthetic biology. Synthetic biology is not a single technology but rather an integrated environment of synergistic technologies (e.g. CRISPR/Cas9 [419]) involved in the manipulation of DNA sequences and exploitation of the resulting complex molecules. The latter involves specialised bio and chemical engineering for scaling biological processes to produce meaningful quantities of new organisms and their products. The former includes the involvement of data and information sciences to architect new molecules. The technologies involved in synthetic biology are globally becoming more advanced and refined as both public and private sector investment are increasingly applied to this field in pursuit of both economic and national security objectives. Figure G.7: DNA. Biological engineering is a developing area of research that holds significant promise. The goal of biological engineering is the design and construction of multi-cellular biological systems or systems-of-systems, including the use of AI and genetic design. The goal is to create biological materials with engineered properties. Developments in this area include AI optimised xenobots (i.e specialised bio-robots) for nano-scale manufacturing [420, 421] and living bio-sensors (e.g. persistent living aquatic or terrestrial sensors, or CBRN monitoring) [202]. The scope and magnitude of the future contributions that synthetic biology will make to civil and national security sectors are currently quite speculative; however, there is little doubt that this technology domain will have substantive impacts wherever it is applied or exploited. Examples of practical applications of synthetic biology are the development of new macro-phages [422], plants, insects [423], viruses constructed batteries [104] and xeno-bots for nano-scale manufacturing [420, 421]. Nevertheless, there remain many technical barriers to be overcome in order to realise its full hypothesised potential as well 100 Chapter G. Biotechnology & Human Enhancement as many ethical and institutional challenges to be mitigated. The broad global awareness and proliferation of the underlying enabling technologies for synthetic biology largely preclude its comprehensive control; potential adversaries and economic competitors can be expected to have few, if any barriers, to its exploitation for their national or organisational objectives. Biotechnology, nanotechnology and genomics are advancing rapidly in the short to midterm. These advances are mostly driven by the private sector but can easily be transferred to the military sector where appropriate. MILITARY IMPLICATIONS BLUE BHET are expected to create disruption in: 1. Readiness: Use of biomarkers (phenotypic and genetic) for predictive diagnostics will enable predeployment identification of medical issues or weaknesses (e.g. muscular-skeletal, psychological, immunological, physiological or nutritional). Improved diagnosis and novel countermeasures will result in increased occupational readiness and effectiveness for forces in high-risk high-threat environments. Human state monitoring in real-time to near real-time will allow individual and team performance to be optimised. 2. Operations: Wearable biomedical systems that provide the ability to monitor soldier health continuously could provide knowledge of the inception and progress of injury over time. Knowledge of the health status of soldiers on the battlefield could be of great benefit for BLUE forces in providing essential information needed for force condition status assessment. Forces, leveraging bioinformatics, sensors and enhancement technologies, should be able to operate in smaller groups, which has implications on affordability (i.e. a smaller number of soldiers, sailors or aviators can achieve similar results). Virtual reality and ultimately, neural interfaces will support significant improvements in situational awareness and operations of autonomous systems. Heads up displays, currently used in aviation and to a lesser extent in automobiles, could also find uses in dismounted soldier systems. Heads-up, eyes-out targeting could be achieved by overlaying targeting symbols on top of real-world targets. Mixed reality could be used to assist planners and mission rehearsal. Immersive visualisation of rapidly generated accurate 3D representations of the physical environment (terrain + buildings + infrastructure) from open source and military data and observations could provide staff with a realistic feel for the terrain before being exposed to it in real life. Mixed Reality setups are already used to provide practical, cost-effective training environments. Advances in computer networking, processing and analytics will see such setups used in the battlefield as well as expensive labs. Neurological interfaces will increase response times, situational awareness and the effectiveness of man-machine teaming. 3. Medical Countermeasures and Care: Use of biomarkers, biosensors (in vivo & in vitro) [424] and microarrays (microfluidic devices integrating computing chips with living cells and tissue) will allow rapid (pre-symptomatic) diagnosis and response to synthetic or natural pathogens, chemicals, as well as real-time monitoring of treatment options. Use of biomarkers, novel pharmaceuticals, gene therapy and bio-engineering (e.g. robotics, prosthesis, neural interfaces, etc.) will dramatically increase the effectiveness of combat casualty care and rehabilitation, especially in such areas as post-traumatic stress disorder (PTSD), environmental exposure and mild-traumatic brain injury (mTBI). 4. Performance: Rapid advances in material, computer and human sciences, as well as convergence between these fields, is setting the stage to enhance human capabilities and push the human performance frontiers significantly. Optimising the performance of each individual, be it in the cognitive, physical or resilience domains, in addition to improving team cohesiveness and effectiveness, will enable Alliance forces to make better decisions faster, and can produce actions better tuned to 101 the needs of the situation. Current and future advances in physiological and psychological state monitoring will maximise overall human performance and readiness through specific user group algorithm applications. Benefits include better leadership assessment of force status; increased training program adaptation and effectiveness through real-time performance metrics; and increased health and safety monitoring as well as injury protection. Bioinformatics and biosensors, along with increased use of personalised and virtualised training, will improve training effectiveness. Muscular-skeletal augmentation (e.g. exoskeletons) will increase load carrying capacity during operations, reduce debilitating injuries and increase combat performance. 5. Social Networks: Social media supports military activities in six key ways [26]: intelligence collection; (geo-) targeting; cyber operations; command and control; defense; and, psychological warfare (inform and influence). Fusing social media (as part of OSINT (open-source intelligence)) with other data, and integrating social network operations into broader operational and strategic actions will be a critical success factor in countering hybrid and memetic warfare operations. RED BHET threats will increase driven, in no small measure by, the democratisation of associated technologies. Significant Alliance ethical, legal and policy are not shared by a peer or near-peer strategic threats. However, more worrisome perhaps, will be their use by security threats (both criminal and otherwise) or the use of non-sanctioned enhancements by individuals. With globalisation and the increased pace of scientific discoveries, there is a high likelihood that an adversary force will have access to the knowledge necessary to create similar capabilities. The implications on the battlefield are that RED would have a significant performance advantage if such a force is not constrained by the same ethical considerations in implementing these new technologies. In particular: 1. Synthetic Biology: New pathogens, novel biological agents or chemical agents, with explicitly engineered and targeted effects (e.g. increased virulence, physical, neurological or physiological impact, genetic susceptibility, etc.), will potentially increase casualties, reduce combat effectiveness and present a strategic challenge to Alliance societies as a whole. The impact of unknown biological agents will challenge the capacity of medical and logistics systems to cope, while countermeasures themselves may present significant health and safety challenges. 2. Designer Pharmaceuticals: Criminal and non-state actors will increasingly have the ability to develop low cost targeted pharmacological agents. These may be used to explicitly to disrupt Alliance operations or destabilise alliance societies through targeted psycho-social effects. 3. Super-Soldiers: BHET will enable pharmacologically, neurologically and physiologically enhanced opponents. In combination with more effective partnering with autonomous and semiautonomous systems, these will significantly challenge Alliance forces, force structure and effectiveness. Interoperability Alliance interoperability will be challenged by differing legal, policy, training, operational effectiveness and ethical standards amongst the nations driven by BHET. Development of standards for personal biosensors, the handling of bio-data, the sharing of medical countermeasures, man-machine interfaces (including neurological) and bio-mechanical systems will be critical enablers of effective alliance BHET enabled operations and capabilities.

#### NATO cohesion checks numerous existential crises.

Gallagher ’19 [Mike and Colin Dueck; January 2019; Representative for Wisconsin’s Eighth District in the U.S. House of Representatives; Professor in the Schar School of Policy and Government at George Mason University; National Review, “The Conservative Case for NATO,” <https://www.nationalreview.com/2019/01/nato-western-military-alliance-bolsters-american-interests/>]

The conservative case for NATO is not that it strengthens liberal world order. Rather, the conservative case for NATO is that it bolsters American national interests. In an age of great-power competition, as identified by the Trump administration, America’s Western alliance provides the U.S. with some dramatic comparative advantages. The United States, Canada, and their European allies have a number of common interests and common challenges with regard to Beijing, Moscow, terrorism, cyberattacks, migration, nuclear weapons, and military readiness. NATO is the one formal alliance that allows for cooperation on these matters. It is also the only alliance that embodies America’s civilizational ties with Europe — a point forcefully made by President Trump when he visited Poland in 2017. Properly understood, NATO helps keeps America’s strategic competitors at bay, pushing back on Russian and Chinese influence. In all of these ways, the U.S. alliance system in Europe is a bit like oxygen. You may take it for granted, but you’ll miss it when it’s gone.

#### Only the plan solves – failure to engage the alliance ensures vulnerabilities that can be exploited by CW

Cluzel 20 (Francois du Cluzel | Innovation Project Manager at NATO ACT Innovation Hub | “Cognitive Warfare” | <https://www.innovationhub-act.org/sites/default/files/2021-01/20210122_CW%20Final.pdf> | DOA: 6/18/2022 | SAoki)

Cognitive warfare pursues the objective of undermining trust (public trust in electoral processes, trust in institutions, allies, politicians…). , therefore the individual becomes the 5 weapon, while the goal is not to attack what individuals think but rather the way they think .6 It has the potential to unravel the entire social contract that underpins societies. It is natural to trust the senses, to believe what is seen and read. But the democratisation of automated tools and techniques using AI, no longer requiring a technological background, enables anyone to distort information and to further undermine trust in open societies. The use of fake news, deep fakes, Trojan horses, and digital avatars will create new suspicions which anyone can exploit. It is easier and cheaper for adversaries to undermine trust in our own systems than to attack our power grids, factories or military compounds. Hence, it is likely that in the near future there will be more attacks, from a growing and much more diverse number of potential players with a greater risk for escalation or miscalculation. The characteristics of cyberspace (lack of regulation, difficulties and associated risks of attribution of attacks in particular) mean that new actors, either state or non-state, are to be expected . 7 As the example of COVID-19 shows, the massive amount of texts on the subject, including deliberately biased texts (example is the Lancet study on chloroquine) created an information and knowledge overload which, in turn, generates both a loss of credibility and a need for closure. Therefore the ability for humans to question, normally, any data/information presented is hampered, with a tendency to fall back on biases to the detriment of unfettered decision-making. It applies to trust among individuals as well as groups, political alliances and societies. “Trust, in particular among allies, is a targeted vulnerability. As any international institution does, NATO relies on trust between its partners. Trust is based not only on respecting some explicit and tangible agreements, but also on ‘invisible contracts,’ on sharing values, which is not easy when such a proportion of allied nations have been fighting each other for centuries. This has left wounds and scars creating a cognitive/information landscape that our adversaries study with great care. Their objective is to identify the ‘Cognitive Centers of Gravity’ of the Alliance, which they will target with ‘info-weapons’.

#### Additionally, divergent standards policies on biotechnical enhancements creates vulnerability to biowarfare – only the plan solves

Gailatsi et al. [Stephanie; scientist for the Risk and Decision Science Team at the U.S. Army Corps of Engineers; Miriam Pollock; U.S. Army Engineer Research and Development Center (ERDC); Benjamin D. Trump; Research Social Scientist, US Army Corps of Engineers; Kaitlin Volk; Research Biologist, U.S. Army Corps of Engineers; Igor Linkov; Risk and Decision Science Focus Area Lead with the US Army Engineer Research and Development Center, and Adjunct Professor with Carnegie Mellon University; July 2019; "Promoting Effective Biosecurity Governance: Using Tripwires to Anticipate and Ameliorate Potentially Harmful Development Trends"; Springer, NATO Emerging Security Challenges Division; https://link.springer.com/content/pdf/10.1007%2F978-94-024-2086-9.pdf; Accessed 6-22-2022; RL]

The increasingly globalized, distributed, and dispersed nature of synthetic biology products and research worsens challenges arising from differing practices of biosecurity governance globally. Advanced biological research is no longer overwhelmingly dominated by Europe and the US, and this may introduce different approaches to or priorities for biosecurity. For instance, Russia’s Federal Research Programme for Genetic Technologies Development for 2019–2027 intends to “implement a comprehensive solution to the task of the accelerated development of genetic technologies, including genetic editing; to establish scientifc and technological groundwork for medicine, agriculture and industry; to improve the system of preventing biological emergencies and monitoring in this area.” Similarly, Saudi Arabia is funding research related to the development of microbial cell factories to produce fuels and chemicals. Meanwhile, the Singaporean government is investing considerable resources into the funding of life and environmental sciences research at Nanyang Technological University, the National University of Singapore, and the Agency for Science, Technology and Research (A\*STAR). The Chinese Academy of Sciences is establishing an Institute of Synthetic Biology, which is tasked with the dual responsibilities of fostering roadmaps for the future development of Chinese synthetic biology while also establishing safety and security norms for researchers at Chinese institutions. There are no top-down efforts beyond existing mechanisms like the BWC or the CWC to B. D. Trump et al. 223 standardize global governance and usage of synthetic biology, and bottom-up efforts are not coordinated in their reach or messaging. Relative newcomers to synthetic biology development may possess differing tolerances and constructions of risk than more established technology developers. The implications, though vast, can be grouped into two general areas. One includes diverging safety and security practices at various points of an international supply chain that forms the backbone of an increasingly globalized economy. Another includes the potential for small-scale experiments or national biosecurity policies to escape a given actor’s control and spill across political boundaries. While one country may find the environmental risk of a particular synthetic biology application acceptable, its spread across borders into another country may disrupt those local ecologies (i.e., crashing or hardening a particular species through genetic engineering) or expose vulnerable human populations to irreversible consequences without options for amelioration. The nature of certain synthetic biology applications (i.e. gene drives) makes it impossible for risk averse countries to wholly quarantine themselves from exposure to harms resulting from another country’s decisions. This is also an issue of equity because risk-tolerant countries will reap the rewards when beneficial technologies emerge, but risk-averse countries may be forced to bear their neighbors’ risks without any means to capture potential rewards. An environment of competing and incongruent risk architectures causes individual states, organizations, or industries to arrive at differing definitions of security threats or acceptable levels of loss in pursuit of a technology’s intended gains. For a technology as uncertain as synthetic biology, this policy divergence may set governments, companies, and other research organizations down vastly differing policy paths, and impede consensus in assessing the minutiae of technical risk concerns or assessment protocols, or ensuring security for anyone.

#### Use of bioweapons causes laundry list of impacts

Joseph P. Dudley & Michael H. Woodford July 1 2002 [Bioweapons, Biodiversity, and Ecocide: Potential Effects of Biological Weapons on Biological Diversity: Bioweapon disease outbreaks could cause the extinction of endangered wildlife species, the erosion of genetic diversity in domesticated plants and animals, the destruction of traditional human livelihoods, and the extirpation of indigenous cultures, BioScience, Volume 52, Issue 7, July 2002, Pages 583–592, [https://doi.org/10.1641/0006-3568(2002)052[0583:BBAEPE]2.0.CO;2](https://doi.org/10.1641/0006-3568(2002)052%5B0583:BBAEPE%5D2.0.CO;2)] // WA

Zoonotic and epizootic disease organisms known to have been cultivated and tested in bioweapon research programs include Bacillus anthracis (anthrax), Yersinia pestis(plague), Brucella abortus (brucellosis), Clostridium botulinum, Apthovirus (FMD), Burkholderia mallei (glanders), morbilliviruses (measles, canine distemper, rinderpest), Staphylococcus, Francisella tularensis (tularemia), rabies virus, Venezuelan equine encephalomyelitis virus, and several virulent hemorrhagic fever viruses (Ebola, Marburg, Lassa fever, Rift Valley fever) (OTA 1993, Kortepeter et al. 2001, CNS 2002). Plant bioweapons cultured and tested for disrupting agriculture and food production have included fungal diseases (Fusarium spp., Tilletia spp.), viral diseases, and even insect pests (e.g., Colorado potato beetle, Leptinotarsa decemlineata). The former USSR sponsored extensive research on possible bioweapons applications of a variety of fungal diseases of important food crops (wheat stem rust, rice blast), viral and bacterial diseases of domesticated livestock (e.g., anthrax, tularemia, malignant catarrhal fever), and insect disease vectors (mosquitoes, ticks, fleas) (Bozheyeva et al. 1999). The Soviet bioweapons program tested plant and livestock bioweapon diseases for potential deployment, with the goal of disrupting food production and food processing infrastructures and damaging the agricultural sector of national economies (Alibek and Handelman 2000). Soviet scientists reportedly used newly developed genetic engineering techniques to create vaccine-subverting and antibiotic-resistant strains of anthrax, plague, tularemia, and smallpox for attacks against military forces and civilian populations (Bozheyeva et al. 1999, Alibek and Handelman 2000). Most, perhaps even all, of the cultivated and potentially weaponized diseases identified by the Office International des Epizooties as possible major threats to livestock and wildlife species (FMD, rinderpest, Newcastle disease, African swine fever, sheep pox, and Rift Valley fever; OIE 2001) were experimentally tested for bioweapons applications under the Soviet bioweapons research and development program (Bozheyeva et al. 1999, Kortepeter et al. 2001) Countries believed to have active biowarfare research programs during recent years include some former USSR states (i.e., Russia, Kazakstan), Syria, Iraq, Iran, Libya, North Korea, Israel, Egypt, Taiwan, China, South Africa, Libya, Cuba, Romania, Bulgaria, Pakistan, India, United Kingdom, France, Germany, the Netherlands, Norway, Sweden, and the United States (Leitenberg 2000). Several major international terrorist organizations, including but not restricted to the Al Qaeda network, are believed to have the financial resources and political contacts needed to access state-of-the-art bioweapon disease cultures and production technologies. Aum Shinrikyo, a Japanese terrorist group that used sarin gas for a terrorist attack on the Tokyo subway system, was also involved in developing terrorist bioweapons employing anthrax spores, botulism toxin, Q fever, and Ebola virus (Christopher et al. 1997). Recent advances in molecular biology and genetic engineering have opened the way for a potential Pandora's box scenario, in which the unforeseen proliferation of a bioweapon organism could severely affect human and animal populations at regional, continental, or even global levels. Recent gene-transfer experiments with viral interleukin4 and viral diseases of the house mouse (Mus musculus) have demonstrated that even carefully controlled and monitored genetic engineering experiments may produce entirely unanticipated results, generating viruses or organisms with unwanted, deleterious, and sometimes extremely dangerous properties (Jackson et al. 2001). Threats to biodiversity and endangered species There is a growing but still insufficient scientific recognition of the importance of disease control for the conservation of biodiversity and endangered species populations (Daszak et al. 2000). Organisms that are relatively benign in their natural hosts can cause fatal diseases in other species. Cross-species infections with human herpes simplex Type 1 may be fatal for New World marmosets (Callithrixspp.), and an apparently benign herpes virus of African elephants (Loxodonta africana) causes a fatal systemic disease in Asian elephants (Elephas maximus) (Richman et al. 1999). Saprolegnia ferox, a common oomycete disease of hatchery-reared fishes, has been implicated as a factor in disease-related population declines of amphibians in northwestern North America (Kiesecker et al. 2001). Avian malaria and avian pox have been implicated in the extinctions of native bird species in Hawaii, and MacPhee and Marx (1997) suggest that diseases introduced through humans and human commensals may have been a factor in prehistoric mass extinctions of wildlife species in Madagascar and North America. The use of biological weapons against livestock populations or agricultural crops could have potentially disastrous spillover effects on wild species of plants and animals (Brown 1999, Daszak et al. 2000). Many of the currently available bioweapon pathogens are broad-spectrum diseases that are capable of causing high levels of mortality or morbidity among wild and domesticated species of animals, as well as human beings (figure 1). Three of the four genetically modified pathogens created specifically for bioweapon attacks against human populations are zoonotic diseases whose release into the environment may pose both direct and indirect threats to wildlife populations (i.e., anthrax, plague, tularemia; Alibek and Handelman 2000). Virulent strains of natural disease pathogens known to have been cultured and tested for bioweapon attacks against domesticated livestock (e.g., rinderpest, FMD, brucellosis) could have potentially devastating effects on naive and susceptible populations of susceptible wild ungulates. The Great African Rinderpest epizootic of a century ago provides a useful model for predicting the potential effects of the proliferation of highly virulent and contagious bioweapon diseases on susceptible wildlife and livestock species. Rinderpest virus was introduced into Africa in 1887 through cattle imported to Abyssinia (now Ethiopia) from India to provision European colonial armies. The subsequent epidemic outbreak of rinderpest that began in 1889 swept from the Horn of Africa to the southern cape in less than a decade, exhibiting an effective average dispersal rate of approximately 3 km per day during an era predating automobiles and aircraft. The rinderpest panzootic proliferated rapidly among native African cattle breeds and susceptible wild ungulate species, killing an estimated 90% to 95% of the cattle, African buffalo (Syncerus caffer), and wildebeest (Connochaetes taurinus) in East Africa within 3 years of its first appearance in the region (Daszak et al. 2000). Cattle populations were devastated and African buffalo extirpated from most of their range in southern and eastern Africa. The African buffalo, formerly the most characteristic and abundant ungulate of the African plains, was reduced to a few small, scattered relict herds (Sinclair 1979). Despite intensive control efforts over the past century, rinderpest is still enzootic within East Africa, with periodic outbreaks occurring among livestock and wildlife populations in the region (Dobson 1994). The importance of buffalo as a food resource for African hunter–gatherer societies was surpassed, however, by the immense importance of domesticated cattle to pastoral and agricultural societies of eastern and southern Africa. Cattle have served for centuries, and in some instances perhaps millennia, as the principal source of food, wealth, and motive energy for the Nilotic and Bantu peoples of eastern and southern Africa. The rinderpest epidemic effectively dispossessed indigenous African peoples of food resources, traditional livelihoods, and wealth and property in ways that were potentially more disruptive to traditional cultural milieus than the physical displacement from traditional territories and the political and economic subjugation of African peoples by European colonial administrations. Milk and meat from cattle provide critically important sources of essential dietary protein in African pastoral and agrarian societies (Holtzman 2001), while the cattle themselves were (and still are throughout much of the continent) important for the cultivation and fertilization of food crops and as the principal real property assets of families living under communal or open land-tenure systems. The Nilotic pastoral peoples of eastern Africa who depended entirely or primarily on the blood and milk of cattle for nutrition and subsistence were devastated by the rinderpest epidemic of the 1890s; an estimated two-thirds of the Masai people of eastern Africa starved to death during a single two-year period following the destruction of their herds by rinderpest (Sinclair 1979). Traditional cattle-raising and farming societies, such as the Sukuma and Samburu peoples of eastern Africa and the Ndebele and Zulu peoples of southern Africa, were also severely affected by the rinderpest epidemic. The immediate social and economic effects of the 1889–1899 rinderpest epidemic on the Bantu and Nilotic peoples of eastern and southern Africa closely parallel the effects of the extirpation of the Plains bison (Bison bison) on Native American peoples in the Great Plains region of North America from 1870 to 1885. In evolutionary and ecological terms, however, the impacts of the great rinderpest epidemic on African ungulate faunas may have been surpassed by the effects of the chestnut blight fungus (Cryphonectria parasitica, formerly Endothia parasitica) on the temperate deciduous forest biome of eastern North America. The American chestnut (C. dentata), once the dominant and most abundant tree species of eastern North American forests, has been extirpated throughout its range by the chestnut blight. Before disappearance, the American chestnut was an important timber and fuelwood tree that provided an abundant and high-quality food resource for wildlife, livestock, and human populations throughout much of eastern North America. Chestnut blight was first recorded in New York City in 1904, presumably having been introduced along with Japanese chestnut trees (C. crenata) imported as nursery stock. The chestnut blight spread at a rate estimated at between 20–50 miles per year, reducing the American chestnut to a state of virtual extinction throughout its range by 1950. Current efforts to save the American chestnut from extinction focus on biological control of the disease itself through a virulence-attenuating virus and hybridization and backcrossing with a blight-resistant related species, the Chinese chestnut (C. mollissima). The American elm (Ulmus americana) is another characteristic and formerly common tree of eastern North American landscapes that has also been driven to virtual extinction by an introduced fungal pathogen, the Dutch elm disease Ophiostoma (Ceratocystis) ulmi. A century later, New York City is the apparent entry site for an emerging and potentially fatal disease of humans and animals, the West Nile virus (WNV). The establishment and spread of WNV in North America after its appearance in 1999 is perhaps the best available modern example of the potential dispersal capabilities of bioweapon diseases within and among human and animal populations. The dispersion of WNV illustrates the immense (and in some cases possibly insurmountable) difficulties in identifying and controlling cryptic and potentially lethal zoonotic diseases. WNV is a mosquito-transmitted disease of birds and mammals, including humans, which causes high rates of mortality in some host species (Rappole et al. 2000). Although WNV is primarily a disease of birds, mammals are common secondary but dead-end hosts for this virus. WNV infections have been reported from numerous species of both wild and domesticated mammals (e.g., humans, horses, cats, bats, chipmunks, skunks, squirrels, domestic rabbits, and raccoons). West Nile virus has become firmly established in eastern North America during the past 3 years, and it appears probable that migrating birds may ultimately spread the disease throughout the Americas and the Caribbean. As of March 2002, WNV has been confirmed in 27 states in the eastern United States, as well as in Ontario (Canada) and the Cayman Islands (ERAP 2002). The history of bovine tuberculosis and rinderpest in Africa and brucellosis in North America shows that exotic diseases may be difficult or impossible to eradicate once they have been introduced and have become established in wild species within new localities. In the case of anthrax, the risk of subsequent disease outbreaks within contaminated areas may continue for decades and even centuries after the total eradication of hosts and vectors: Viable, infectious anthrax bacilli have been cultured from animal bones buried for 150 to 200 years in archeological sites (de Vos 1990, Dixon et al. 1999). Bioweapon diseases may spread faster and prove much more difficult to suppress and eradicate than the historical examples cited above might indicate, given the exceptional virulence and environmental resilience of cultured bioweapon disease strains (Alibek and Handelman 2000). Bioweapon threats to biodiversity Efforts to control human disease epidemics resulting from plague and tularemia bioweapon attacks will need to take into account the eradication of potential animal reservoirs and insect vectors once initial outbreaks among human populations have been contained (Alibek and Handelman 2000). As potential disease reservoirs, rare or endangered species populations within affected areas may be subject to eradication as well. Thus, endangered species now restricted to a few relict and isolated populations within highly urbanized landscapes (e.g., Stephen's Kangagroo Rat, Dipodomys stephensi) could be at high risk for extinction under such circumstances. It is worth noting in this context that an extraordinarily high number of endangered and threatened species (including D. stephensi) are now largely or entirely restricted to habitats located in and around US military installations and military training ranges, which could be potential targets of bioweapons attacks; more than 220 federally listed threatened or endangered species have been confirmed as residents or migrants on US military lands. Although military lands represent only about 3% of all US federal lands, they contain disproportionately high percentages of habitat for endangered species of plants and animals (Leslie et al. 1996). Wild plant and animal species that are naturally rare and species that have been severely depleted in numbers from overharvesting or habitat degradation are particularly susceptible to extinction by introduced diseases (Dobson and May 1986). Diseases to which humans and human commensals have developed immunity or high levels of resistance may cause catastrophic mortality in naive and susceptible wildlife populations. Small absolute population sizes, inbreeding depression, and exposure to exotic disease organisms are a potential recipe for the extinction of endangered and threatened wildlife species (Singer et al. 2001). There needs to be much wider recognition by scientists and the public of the danger that diseases of domesticated animals and humans pose for wildlife and endangered species populations, and of the pivotal role of human interventions in fostering the introduction and establishment of exotic diseases of plants and animals to new areas (Dudley 1993, Daszak et al. 2000). Bioweapon applications are only the most extreme example of the larger invasive species problems associated with the introductions of exotic diseases and organisms to new areas as the result of deliberate or inadvertent human activities. The potentially devastating harm of even localized disease outbreaks on endangered species is illustrated by the effects of canine distemper on the North American black-footed ferret (Mustela nigripes), the Caspian seal (Phoca caspica), and the African wild dog (Lycaon pictus). Canine distemper is a common viral disease of domesticated dogs that can spill over into wildlife populations, with appalling results on susceptible species of wild carnivores. Disturbingly, canine distemper is also a disease that has been cultured and tested in bioweapon laboratories (Kortepeter et al. 2001). During the past decade, canine distemper outbreaks resulted in the extinction of the last known wild population of the North American black-footed ferret and the African wild dog population of the Serengeti National Park in Tanzania (Daszak et al. 2000). Habitat loss and persecution, exacerbated by the effects of canine distemper on ferrets and sylvatic plague on prey populations (prairie dogs), caused the decline and ultimate extinction of black-footed ferrets from their formerly vast range within the Great Plains region of North America. Similarly, persecution and predator-control operations have reduced the once widely distributed African wild dog to a few small and scattered populations that are now gravely threatened by spillover infections of canine distemper and rabies from domestic dog populations (Ginsberg et al. 1995). An outbreak of distemper in the Serengeti region of Tanzania during the early 1990s caused the extirpation of the resident wild dog population and the death of approximately one-third of the Serengeti's resident lion population. The small resident population of endangered cheetah (Acinonyx jubatus) could have been driven to the verge of extinction in the Serengeti had they experienced rates of distemper morbidity and mortality comparable to that observed among African wild dogs and lions at this site (Kelly 2001). Livestock breed conservation is important for the retention of the genetic raw material for morphological and physiological adaptations that may provide enhanced resistance to insects, parasites, and disease and to the effects of climate, altitude, solar radiation, and other key environmental factors. Worldwide, there are approximately 4000 recognized breeds and local breed varieties of the principal domesticated livestock species (ass, cattle, water buffalo, pig, horse, sheep, goats). This once great array of local and endemic livestock breeds has been drastically eroded over the past century (Ruane 2000). At least 700 of the surviving local and traditional breeds of these seven livestock species, including 350 breeds in Europe alone, are in imminent danger of disappearance because of the global emphasis on a few highly cosmopolitan commercial breeds. Most remaining local livestock breeds have critically small population sizes and highly localized distributions, restricted in some instances to only one or two farms located within a single village or township (Ruane 2000). Local breeds often consist of highly inbred lines that may be susceptible to extinction as the result of even an extremely localized disease outbreak (Ruane 2000, Toro et al. 2000). News reports in March 2001 indicated that at least one of England's relict endemic sheep breeds had been condemned to extinction through sanitary slaughter as a consequence of the recent FMD outbreak. In view of the potential effects of sanitary slaughter on the maintenance of genetic diversity within rare livestock breeds, the European Union and British government have now established policies for exempting rare breeds from prohibitions on disease vaccination and precautionary sanitary slaughter under certain circumstances (DEFRA 2002). Some diseases that cause high rates of morbidity and mortality in humans or domesticated animals may occur in wildlife species without manifesting clinical signs of disease infection (e.g., hantaviruses, Trypanosma spp.). Control measures for zoonotic diseases may result in concerted efforts to eradicate any and all wildlife species that may be potential reservoirs, intermediate hosts, or vectors for disease transmission to humans or domesticated animals. Containment of plague and tularemia disease outbreaks resulting from bioweapon attacks will necessitate the control or eradication of rodent populations within affected areas to prevent the subsequent transmission of the disease from infected rodents to humans (Alibek and Handelman 2000). Populations of many wildlife species are already routinely subject to stringent control or local extirpation in many areas to control the transmission of endemic diseases to domesticated animals, in some instances without any supporting evidence to validate the clinical efficacy of such efforts. In the United States, programs to control brucellosis in cattle populations have resulted in the culling or attempted eradication of populations of bison (Bison bison), elk (Cervus canadensis), and whitetail deer (Odocoileus virginiana). Other examples of such control programs include the routine culling of wild boar (Sus scrofa) populations in several European countries to control the transmission of classical swine fever to domesticated swine. Rabies control programs target populations of red fox (Vulpes vulpes) in Europe and North America, jackals (Canis mesomelas) in eastern and southern Africa, raccoons (Procyon lotor) in southern and eastern North America. In Central and South America, vampire bats (Desmodus rotundus) and other bat species are killed in large numbers to reduce rabies infections among humans and livestock. Veterinary quarantine and control programs for wild animals have been successfully constrained or curtailed in some areas by strong public opposition, however. For example, efforts currently under way to reduce the incidence of Lyme disease among humans by the large-scale culling of whitetail deer populations in the eastern United States have been blocked in many localities as the result of political lobbying and legal challenges by animal rights organizations (e.g., Animal Protection Institute 1997). Conflict and contagion Breakdowns in medical and veterinary support systems during wars and civil conflicts have resulted in epidemic outbreaks of diseases within and among human, livestock, and wildlife populations (Lawrence et al. 1980, Kobuch et al. 1990). Recent outbreaks of several lethal epizootic diseases (monkeypox, Marburg fever, plague) in Central Africa have been linked to increased human consumption of species of wild animals (e.g., squirrels and rodents) as the result of wartime food shortages, coupled with the disappearance of preferred bushmeat species (primates, duikers) caused by overharvesting for the bushmeat trade (Fenner 1993, IRIN 1997, Dudley et al. 2002). The Iran–Iraq war and the Gulf war precipitated rinderpest epizootics among livestock populations in that region, which may have been caused or aggravated by war-related displacements of pastoralists and their flocks (Roeder 1999). Disruption of government veterinary services during the civil war in Southern Rhodesia is believed to have contributed to epidemic outbreaks of anthrax and rabies among wild and domesticated animals in that country, now named Zimbabwe. Anthrax mortality among humans and livestock reached epidemic proportions in 1979 and 1980 and continued to proliferate for more than 4 years following the end of the civil war in 1980 (Lawrence et al. 1980, Kobuch et al. 1990). Control and containment of the disease may have been hindered by internal ethnic and political conflicts in the Matabeleland region during the early postwar era (1980–1984). Anthrax ultimately spread through six of Zimbabwe's eight provinces, with more than 10,000 recorded human cases before effective control of the disease was finally reestablished in 1987 (Pugh and Davies 1990). Although anthrax is endemic to the Matabeleland region of Zimbabwe, where the outbreak first appeared and proliferated, widely publicized speculation has it that the 1979–1987 anthrax epidemic may have been linked to covert operations of the apartheid South African Defense Force, the Rhodesian Central Intelligence Organization, or rival guerrilla factions (Carus 2001). However, there seems to be little evidence to support allegations of the use of weaponized anthrax against human populations in Zimbabwe, as the vast majority of documented cases involved secondary cutaneous infections resulting from apparent contact with diseased cattle (Kobuch et al. 1990, Pugh and Davies 1990). This interpretation appears to be supported by the subsequent resurgence of human anthrax in Zimbabwe in recent years (Mwenye et al. 1996), with nearly 1000 documented human cases and at least 11 deaths recorded in 2000 and 2001 (ISID 2001). Economic distress and the disruption of anthrax vaccination programs and veterinary services as the result of internal political turmoil appear to be important factors behind the current anthrax outbreak in Zimbabwe, as was apparently the case during the 1979–1987 outbreak as well. Deteriorating economic conditions and food shortages seem to be driving villagers to risk disease or death from infections acquired through butchering diseased cattle for the consumption or sale of meat and hides (ISID 2001). Technologies and threats The threat of attacks with biological weapons has increased greatly since the ratification of the Biological and Toxin Weapons Convention in 1975. Although recent advances in biotechnology have augmented the potential economic value of the genetic diversity of organisms by enabling the transfer of genes between even unrelated species (Perrings et al. 1995), they have also increased the threat of their elimination through the use of genetically modified disease organisms as weapons of mass destruction. The breakup of the Soviet bioweapons program and the dispersal of its scientists and technicians may have heightened, rather than lowered, the global proliferation of bioweapons technologies (Bozheyeva et al. 1999). The basic techniques for culturing many bioweapon organisms are relatively simple, and microbrewery and pharmaceutical equipment, easily adaptable for bioweapons production, is readily available through domestic and international commercial markets (OTA 1993). The cost of developing small-scale but nonetheless sophisticated bioweapons facilities and arsenals is in the range of $10,000 to $100,000, an amount easily affordable for affluent and technologically sophisticated domestic terrorist groups like the Aum Shinrikyo or well-funded international organizations such as Al Qaeda, Hamas, and Hezbollah (USCNS/21 1999). Nevertheless, specialized technicians and state-of-the-art research facilities are not necessary for the production and deployment of many highly dangerous bioweapons organisms for clandestine, economically targeted assaults on agricultural crops or livestock populations (OTA 1993). Bioweapon cultures, diseased animals, or infectious materials could be easily introduced into international cargo transportation networks for shipment to the United States or elsewhere, with virtually no risk of identification or interception (Flynn 2000). The spillover of weaponized livestock diseases into susceptible wildlife populations could amplify and exacerbate the effects of initial attacks and create situations in which disease containment and control could become extremely difficult and total eradication virtually impossible (Daszak et al. 2000). There appears to be increasing interest on the part of international terrorist groups in bioweapons technologies and applications. There is evidence that bioweapon research facilities have been established in countries such as Iraq, Iran, Syria, and Libya that are known to have (or have had) cooperative or supportive relationships with international terrorist organizations. Nonetheless, we predict that runaway disease epidemics resulting from terrorist uses of bioweapons will most likely arise from accidental or inadvertent releases of virulent, broad-spectrum disease agents in developing countries, as the result of improper handling or inadequate containment within production and storage facilities incidental and accidental deployments of disease agents in transit inadvertent releases resulting from the disruption or destruction of bioweapon production or storage facilities (e.g., a cruise missile attack on an alleged chemical weapons production facility) Economic impacts The recent outbreak of FMD in Britain demonstrates that even countries with a well-organized and technologically sophisticated veterinary services infrastructure are susceptible to introductions (whether deliberate or inadvertent) of highly infectious pathogenic agents into their livestock populations. The economic consequences of a disease epidemic affecting livestock are severe for any country, whether industrialized or developing. For example, the total costs of containment and eradication of the 1997 FMD outbreak in Taiwan approached $15 billion. Direct and indirect losses to the British economy associated with the 2001 FMD outbreak are expected to be $12 billion to $14 billion (OIE 2001). Losses in meat and livestock export revenue amounted to approximately $14 million per week. Estimated losses to the tourism industry because of restrictions on travel in affected areas were estimated at around $350 million per week in March 2001, or 25 times (2,500%) higher than concurrent direct losses in the agricultural export sector. Total economic losses to the national tourism industry during the peak of the FMD epidemic in March 2001 were estimated at more than $4 billion and are still rising (Dudley and Woodford 2002). The potential for catastrophic social and economic consequences from bioweapon disease epidemics is proportionally higher in developing countries, where doctors, veterinarians, antibiotics, and medical or veterinarian treatment and quarantine facilities are in short supply. Technical and logistical capabilities for countering the impacts of disease threats from bioweapons and emerging infectious diseases may be handicapped by the ongoing proliferation of drug-resistant disease strains of important diseases such as tuberculosis (Mycobacterium tuberculosis) and malaria (Plasmodium spp.). Improper use and inappropriate uses of antibiotics to suppress diseases and infections in both humans and animals are contributing to the emergence of drug-resistant strains of many important human and animal pathogens. The current widespread use of antibiotics in livestock feeds, now banned only in the European Union, may have serious epidemiological consequences (McDonald et al. 2001). Nearly half of all antibiotics used in the United States are dispensed in animal feeds, despite growing scientific concern over that practice (Gorbach 2001). Incomplete treatment regimens, inappropriate clinical applications, adulterated medicines, and both inadvertent and deliberate subtherapeutic uses of antibiotics are resulting in the evolution—through human selection—of highly resistant and highly virulent strains of disease organisms. In effect, the current situation represents an ongoing, essentially uncontrolled field experiment in the cultivation and proliferation of antibiotic-resistant microbe populations. This problem may well be aggravated by fear of exposure to bioterrorist attacks—witness the panic-inspired purchases and consumption of antibiotics by American citizens after the anthrax attacks during September and November 2001. Subsequent events proved that such concerns were not entirely unwarranted—5 of the 21 people known to have contracted anthrax as the result of exposure to contaminated mail subsequently died as the result of undiagnosed or tardily diagnosed pulmonary anthrax infections.

### Advantage—Land Warfare

#### Advantage \_\_ is Land Warfare –

#### We are on the brink of a complete technological revolution outstripping the destructive potential of nuclear weapons - constant technological innovation is key to maintaining the balance of power

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Emerging innovations within today’s most cutting-edge science and technology (S&T) areas are cited as carrying the potential to revolutionize governmental structures, economies, and life as we know it; others have argued that such technologies will yield doomsday scenarios and that military applications of such technologies have even greater potential than nuclear weapons to radically change the balance of power.2 Those S&T areas include artificial intelligence and robotics; hypersonics; additive manufacturing (aka 3D printing); meta-materials (nanotechnological materials that enable stealth/invisibility across multiple parts of the spectrum); directed energy weapons; energy generation, storage, and transmissions; the cognitive neurotechnologies (for brain-computer interface); biotechnology, including systems biology; and the intersection of each with information and communications technologies (ICTs).

When NATO conducted its first strategic review since the dissolution of the Soviet Union, almost a decade ago, it observed:

Less predictable is the possibility that research breakthroughs will transform the technological battlefield. Allies and partners should be alert for potentially disruptive developments in such dynamic areas as information and communications technology, cognitive and biological sciences, robotics, and nanotechnology [emphasis added]…The most destructive periods of history tend to be those when the means of aggression have gained the upper hand in the art of waging war.3

#### In particular, development of cognitive enhancements for land warfare by adversaries is occurring at a rapid pace which allows them to challenge US military superiority

Aronhime & Cocron ’21 [Lawrence; Associate Teaching Professor; Alexander; Lecturer, Johns Hopkins University Whiting School of Engineering; 2-26-2021; "NATO Review"; NATO Review; <https://www.nato.int/docu/review/articles/2021/02/26/cognitive-biotechnology-opportunities-and-considerations-for-the-nato-alliance/index.html>; Accessed 6-18-2022; RL]

Advances in biophysical, biochemical and behavioural technologies are beginning to turn science fiction into reality. These developments offer exciting possibilities, while also raising issues with regard to ethics and responsible use.

The Alliance faces a range of significant opportunities in emerging and disruptive technologies. The field of Cognitive Biotechnology (CBT) is an emerging domain with wide ranging implications for Alliance members’ economic and military competitiveness. And, as was discussed in the case of Artificial Intelligence, developments in this field will require both a dynamic adoption of new technologies and a focus on their responsible governance.

CBT is the ability for technology to enhance and improve human thinking, sensing, coordinating, and acting upon the physical and societal environment. With CBT, our effectiveness—normally constrained by the limits of human physiology – can now be extended and augmented by biophysical, biochemical, or bioengineered means.

The field is in its infancy, but its implications are vast. For instance, in the last decade scientists have accurately melded brain signals with machine interfaces to create mind-controlled prosthetics. More recently they have made this flow of information bi-directional, creating prosthetics that can now feel sensation and send these feelings back to the brain.

If humans can actuate (i.e. put into motion or action) machines, and these machines can in turn actuate humans, then we have moved beyond the confines of our own physiology. Moreover, if these machines are mobile and can interact with our minds at a distance, then we have extended our reach beyond our own physical limits.

Conversely, our inner minds are no longer off limits either: while emerging brain-computer interfaces allow us to train and direct computers, computers are increasingly able to peer into our minds and to train and enhance us. Or, to put it another way, while we have been working to improve and enhance our machines, we now realise that our machines can enhance, improve – and possibly control – us.

Cognitive Biotechnology aims to enhance and improve human thinking, sensing, coordinating, and acting upon the physical and societal environment.

When considering the wide-ranging uses of CBT, it helps to distinguish among three broad application areas, which can be called “the 3 R’s” – Recover, Raise, and Replace.

Recover includes the repair or rehabilitation of cognitive and biological impairments that prevent the mind and body from functioning effectively. The goal is to return abilities back to baseline functionality. Applications include helping injured soldiers recover their physical capabilities; healing traumatic brain injury; treating post-traumatic stress disorder (PTSD); recovering or (in cases of traumatic stress) suppressing memories; and restoring decision-making and executive functions.

Raise includes the augmentation and enhancement of cognitive and physiological function past an individual’s natural baseline, thereby effecting dramatic changes in operational effectiveness, preparedness, and training. Applications include sensory enhancement (such as seeing farther or hearing more acutely); faster information processing; quicker and more effective decision-making; more efficient learning and language acquisition; and greater physical exertion and endurance. What is true for individual capabilities could similarly be true for groups. CBT could be used to raise unit capabilities through distributed intelligence – that is, all members of the unit see and know what each individual member sees and knows, thus reducing the “fog of war” and improving rapid decision-making, as well as enabling more rapid acquisition and assimilation of new fighting techniques and technologies.

Replace includes the enhancement (and possibly substitution) of mental and physical functions past the bounds of human potential. Sensory connections could be replaced with computer interfaces, making human capabilities independent of their five natural senses. Verbal communication could be replaced by computer-aided telepathy or data downloads. Physical action could be replaced by remote robots or “loyal wingman” drones directed by the mind of the operator. This is perhaps the most futuristic form of enhancement, with most research and development nascent in nature. It is important to note that this form of enhancement does not completely remove human interaction, or else it would be simply another form of automation; it is really about the merger of human biology and mechanical actuation.

These distinctions may prove helpful in setting priorities for further research, investment in technological development, and adoption for operational use. And they could also help in setting principles of responsible use, considering the three categories’ differing levels of technical risk and ethical uncertainty.

The current state and future potential of CBT

Cognitive Biotechnologies are at present focused on three main areas of research: biophysical, biochemical and behavioural. The future direction of these technologies is difficult to predict, particularly as many are still emerging. But they have the potential to significantly disrupt existing assumptions about the evolution of civil society, the economy, and military affairs. It is therefore in the interest of the Alliance to closely monitor the rise of those technologies and applications that are most likely to affect or disrupt current defence constructs and doctrine. Moreover, it will be important to direct early-stage investment into those areas that are particularly promising for the Alliance, or to those which will most likely impact its competitiveness.

Biophysical technologies

Advances in the biophysical area centre on brain computer interfaces (BCI), which can be directly inserted into the human body or via transcranial direct-current stimulation (tDCS). tDCS is a form of neuromodulation that uses constant, direct currents delivered via electrodes on the head, and can be worn or removed at will. While BCI was originally developed to provide assistive technologies (such as prosthetic arms and mentally controlled wheelchairs), recent developments in bi-directionality have allowed for enhanced sensing, for example, bionic eyes or other enhancements to situational awareness. Further applications of these technologies could lead to mental control of aircraft or ground vehicle systems; mind-guided drones or missiles; or the mechanisation of soldiers via exoskeletons and advanced sensors.

Exoskeletons can improve a soldier’s physical capabilities, allowing them to run faster, lift heavier objects and relieve strain on the body.

At the same time, tDCS applications have been shown to regulate the human brain itself, affecting the brain’s executive functions, learning mechanisms, memory, language processing, sensory perception, and motor functions. Current work with tDCS focuses on recovery from PTSD and treatment of mental ailments like obsessive compulsive disorder. But the technology also provides for the possibility of raising soldiers’ cognitive and physical capabilities: to analyse scenarios more easily and quickly; to retain and retrieve memories with greater acuity; to modulate perceptions of pain; to improve psychological self-protection; and to embed muscle memory and motor skills more quickly. Another controversial aspect of tDCS is the potential to look inside the mind of the user, to display and play back past memories on an external monitor, or even to insert synthetic memories and images into the mind.

Biochemical technologies

Biochemical research has focused on enhancements to human physiology and cognitive function via drugs, genetic modification and biological derivatives. Combinations of nootropic compounds, both natural and synthetic, have been shown to rebalance and optimise neurochemistry for improved brain and nervous system function and efficiency. These have the potential for raising alertness and attention; speeding up reaction times; enhancing endurance and mental resilience; reducing apprehension and fear; and improving group dynamics and coordination. Recovery aspects include the treatment of depression, PTSD, memory loss, and dementia.

Behavioural technologies

Behavioural research is focused on the modification and improvement of cognitive and motor function through learning algorithms, virtual reality and biofeedback methods. Virtual reality environments have already demonstrated their use in the training of pilots, tank crews and infantry. Mental acuity can be enhanced by training and gamification algorithms. Behaviour and personal habits can be altered by reinforcement learning methods. Applications focus on both improvement and recovery, with recent advances in the treatment of PTSD and behavioural disorders.

A demonstration of a combat simulator, a form of PTSD treatment, is conducted at Walter Reed National Military Medical Center in Bethesda, Maryland, United States.

The integration of real-time cognitive and physiological user data (e.g., measures of attention, heart rate, etc.) opens a new vista for raising physical and cognitive performance. Motivational stimuli can be delivered back to the user based on his current physiological and mental state via machine learning-derived algorithms. The future of a personal coach on an intelligent FitBit that motivates and guides you to peak performance may not be too far away. The aggregation of anonymised data from individual performance outcomes into big datasets could further improve these algorithms. The result may be a FitBit that knows you better than you know yourself.

Ethical issues and responsible use

There are several ethical considerations for CBT that may transcend even AI in their complexity. First is the issue of personal agency. If CBT is able to motivate, enable, and even control human decision making and action, where does individual responsibility end? Are soldiers responsible for their actions when under the influence of advanced CBT, and under what conditions?

Relatedly, how does the Alliance ensure that there is sufficient consent for the use of CBT for individuals tasked to use the technology? These technologies can be invasive, both physiologically and mentally, and have the potential to cause harm, particularly as we do not fully understand their unintended cognitive and biological consequences.

In addition, significant privacy concerns will be raised once these technologies can enter our minds and see our most private thoughts and memories. What are the limits of such searches? And what are the protections for physiological and cognitive data, and who may store and control their dissemination or cause their deletion? More generally, what protections will we have against the potential of mind control, cognitive erasure, and reprogramming?

The Alliance’s success with CBT will depend upon well-designed principles and practices relating to these ethical considerations, since the adoption and integration of these technologies will be based on the consent and acceptance of Allied governments and their societies at large. As in the case of AI, the Alliance and member governments will need to develop principles of responsible use, addressing such issues as privacy, consent, lawfulness, responsibility and governability.

#### However, squo biotechnical interoperability concerns will undermine the alliance now – only the plan’s increased standardization, funding, and sharing solve gaps in the allied arsenal – allows to overmatch in land warfare to sustain allied defense capabilities

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**Despite such complicated relation between ICT and the military, NATO armies have to exploit the possible advantages of technologies** – particularly but not only new and disruptive ones. **The pace of innovation in artificial intelligence, robotics, nano- and bio-technologies, unmanned systems, materials, quantum computing as well as post-quantum, is going to change the contemporary battlefield, in manners that are still hard to grasp and fully understand**. On top of that, a leap forward is needed for soldiers’ individual weapons when it comes to range and lethality: lighter and more effective and lethal weapons and ammunition currently are among the main solutions designed to regain overmatch over adversary (Russian and Chinese) small arms214 and soldiers. **The US Army is running a major initiative for the development of a new family of infantry weapons through the Next Generation Squad Weapons programme**.215 As mentioned before, the concrete risk is to suffer tragic shocks on the battlefield when it is too late to discover that the balance in terms of mobility, protection and lethality is not satisfactory. **The superiority enjoyed by Allies has been eroded on a number of fields by near-peer competitors such as Russia and China, and this applies to the land warfare too**.216 This is indeed the real requirement driving next generation soldier systems efforts in the NATO camp: to re-gain or actually establish overmatch capability against the most advanced and best equipped soldiers.

The related investments on novel individual weapons, body armours made of new materials, helmets and googles fit for augmented reality, cognitive radios, enhanced multi-spectral sensors enabled by modular integration, data fusion and human-machine interface, batteries and/or portable wearable fuel cells (hydrogen or methanol feed),217 are all steps of a path to be undertaken not only by the US but also by European countries. **The US Army explicitly aims to regain the close combat tactical overmatch**, i.e. the ability of a squad sized unit (around 10 soldiers) to impose its will on similar sized opponent under all conditions and operational environments.218 Similar requirements are shared by NATO and Western armies alike.

Europeans are compounded by their security interests to deter and defend to the East, to militarily intervene in the South and South East of Europe where the operational theatres become less and less permissive because of aggressive regional and extra-regional powers219 and to stand united with the US and NATO on a global geopolitical competition vis-à-vis China. **Such an international security environment has important, direct implications for the European armies**. For instance, the British Army is particularly worried of Russian electronic warfare (EW),220 while French Army can still fight in asymmetric conflicts like in the Sahel, but must have a battle-hardened Army ready for joint operations even in the harshest conflicts and facing the toughest clashes, up to a major confrontation, and be capable of winning.221 **For instance the rapid deployment of Russian Army forces of about 90-100,000 soldiers with heavy armour and artillery at the Ukrainian border deeply worried French Army circles, both in terms of quality and quantity**. In Italy, the Army is committed to implementing NATO’s strategic perspectives on the modernisation of military forces, which should be credible, agile, aware, networked and resilient.222

**Moreover, the demographic trends in the West, and particularly Europe, point towards an ageing and either stable or declining population, whereby the pool for Army’s recruitment of high-quality human resources** – **in both physical and cognitive terms** – **will be increasingly limited**223 despite the enrolment of female soldiers. Other sociological trends further challenge the Army’s ability to recruit and retain skilled forces. This in turn will require investments on unmanned systems: **the individual soldier will not soon be replaced by robots completely, but almost certainly these will work together more closely over time**224 **starting ISTAR but also loads carrying and logistic support**225 – for **instance in the US and Germany there are plans for a future introduction of exoskeletons**. **Working together necessitates secure C3 architecture bearing in mind that all future systems will have to take in higher consideration the effectiveness of counter systems to be fielded by nearpeer adversaries**.

10.5 The way ahead: A renewed System of Systems approach

European armies, including the Italian one, can better walk through the challenging path towards next generation soldier’s equipment by adopting a renewed System of Systems approach. **The SoS concept is not new, but it needs to be renovated**. Its original formulation in the military domain was rather top-down, striving for a seamless integration of devices and capabilities to achieve better performances through a holistic approach. Because of the aforementioned Army’s difficulties and difficult relation between ICT and the military, the SoS approach experienced a hard reality check over the 2010s, alongside with net-centric and network enabled capabilities concepts. **The SoS principle is still valid, even more thanks to progresses on sensors, robotics, computing, big data and AI, and it is being pursued both by the Anglo-Saxon allies and by France’s “collaborative combat”**.226 Yet a pragmatic adjustment is necessary to renew this approach and make it fir for current and future land warfare.

From an Italian perspective **the dismounted soldier is per se the first SoS since** he/ she **operationally integrates all the wearable devices including helmet, weapon, radio, goggles, nano or micro UAV, etc.**227 As such, **the soldier should be entrusted with an appropriate degree of autonomy and sustainability, compatible with** his/ her **war-fighting tasks**. **That means tailoring the amount of information to be received according to human being’s cognitive capacity, as well as the loads to** his/ her **physical might**. In other words, it is always necessary to make the dismounted soldier equipment “a misura d’uomo”:228 similarly to the Italian approach featuring the soldier as centre of gravity,229 or to what the French doctrine currently defines “à hauteur d’homme”.230 Bottom line is that technology has to reduce the workload and risks for soldiers and increase its combat effectiveness, while the humanmachine interface has to be improved, designed and developed accordingly to support decision-making with a human-in-the-loop.

**Against this backdrop, the squad has to be considered the second, crucial SoS**. Such formation level seems to be more appropriate for a division of labour and therefore an allocation of technologies and information among commander, gunner, communication officer, etc. This has important implications for instance when it comes to unmanned air or ground vehicles. Most of the UxS will be employed at a higher functional level such as platoon and above, but several ones are becoming smaller and smaller, therefore suitable in theory for squad and even single soldier employment.231 The fact they can be used by the dismounted soldier does not mean they should be used at this level: a pragmatic SoS approach should rather look at the most appropriate formation’s levels, such as squad and platoon, for this and other technologies. **Notably, the US Army’s approach to modernisation at the infantry soldier level is shaped by a continued commitment to a common squad size and design across its considerable variety of formations, vehicles, and mission profiles**.232

The same SoS approach to soldier and squad should apply, mutatis mutandis, to the platoon and then to the higher echelons to be considered as further system of systems, raising the level at which the squad is required to integrate into the larger formations. For instance, the platoon is particularly important from the Italian Army’s perspective. In this context, the Army vehicles support should evolve to ensure better support to soldiers in terms of C3, energy, firepower and shelter. In other words, a renewed SoS approach should be implemented more bottom up than top down, and the intrinsic horizontal character of the net should be balanced by the necessary vertical hierarchy which makes the military effective and resilient in a conflict. The ICT advancements leads the military towards a compression of both levels and timing of decision-making, but the related adaptation should be managed by avoiding micromanagement and at the same time safeguarding the unity of command. To restate the obvious, proper education and training of military officials will be crucial to make the best of current and future technologies in military operations.

10.6 Near-peer adversaries and Multi Domain Operations

Against this backdrop, a further challenge comes by the ongoing shift from asymmetric to near-peer conflict scenarios. Indeed, opponents like Russia and China are able to influence and/or disrupt Western C3 infrastructures and/or infostructures through a combination of cyber, EW and kinetic attacks. Therefore, units at various levels – from dismounted soldiers up to brigades – have to be able to operate even with a degraded network of communications, sensors and effectors. For example, the US Army is looking at a navigation system incorporating simultaneous localisation and mapping technology, and therefore capable of operating in a GPS-denied environment. To a certain extent, the near-peer threat in turn does question the very same benefits of the SoS approach in a scenario where the various systems, or subsystems, cannot be connected anymore in a secure way.

Here comes the long shadow of cyber warfare. Given the nature of the threat and the classification of relevant information, the cyber threat to NATO military operations is extremely hard to assess. The emphasis put over the last decade by the Atlantic Alliance and individual allies on cyber defence hits towards a very high risk of intrusion into allied networks. This in turn calls for a leap forward in the reflection on offensive cyber operations by NATO members, or at least advanced defence, in order to accompany the development of ICT capabilities for Western armies which are secure by design. Encryption technology will be key in this regard. The more the dismounted soldier relies on wireless connection to weapon, augmented reality goggles, networks of sensors, robotics and alike, the more the stove-piping of land warfare from cyber warfare is a recipe for disaster. Once again, this is particularly challenging for European countries like Italy which do not master the fundamentals of the cyber domain as the US or – increasingly – China do.

The concept of Multi Domain Operations could help NATO militaries to factor in the new operational domains, cyber and space, in the joint planning and conduct of military operations, as well as in the defence planning, capability development and defence industrial policy. **Recently conceived in the US, is it founding its way in both NATO and national level debates**.233 From the Italian Army it is also understood as a way for commanders to generate effects across other domains to gain an operational advantage, for instance against anti-access/area denial (A2/ AD) capabilities of a near-peer competitor.234

However, an old saying reminds that “Not all that is gold does glitter”: after the disillusions brought by the implementation of concepts like revolution in military affairs and network enabled capabilities, MDO should be taken cum grano salis at least with regards to certain extreme aspects. For example, despite Israel seems to move towards this direction with Tsayad and Fire Weaver,235 the idea that an operation command can autonomously and immediately call firepower from sea and air domains, as well as cyber-attacks and satellite jamming, without going for a politico-military process at strategic level, rises pros and cons, as well as a number of unintended and dangerous consequences. Military history shows that Napoleon won a number of land battles also thanks to the integration of infantry, artillery and cavalry under a single chain of command – the modern Army – while granting a relatively autonomous role of the armées commanders. And a greater reliance on the lower level commanders capability to carry out their assigned operation without relying on the flow of information, direction and support by higher echelons is mandatory, re-discovering the German concept of Auftragstaktik – where the emphasis is on the mission’s outcome rather than orders.236 For European militaries still somehow struggling to overcome the single services’ resistance to an effective joint approach,237 probably the best solution is a pragmatic, bottom up path to make the best of available technological improvements, from the dismounted soldier up to various echelons.

10.7 The NATO and EU dimensions: Opportunities for Italy

A final, crucial point regards both NATO and EU roles. **Within the transatlantic Alliance, the dismounted soldier equipment is likely to see an increased technological and operational divide between the “haves” and “haves not” of next generation technology, as for technologies like big data and AI whereby the US lead the technological race and fragmented European allies lags behind**,238 **with negative implications in terms of both military interoperability and political cohesion.** **Here NATO has an important role to play as standard-setting organisation is ultimately aimed at enhancing the interoperability and operational effectiveness of its members’ military forces**.239 For instance, **NATO could have a key role in the definition of standards for the calibres of dismounted soldier’s weapons, a process that could turn out to be particularly important regarding the future replacement of the 5.56 cartridges used by several allies**. **NATO has also a role to play when it comes to data sharing, because this has huge implications for both allied operations and the creation of datasets to develop military applications of AI**. This is particularly true for European countries, thus EU too should contribute to this sharing of data from its missions and operations, as well as work to change those regulations (i.e. on data treatment) which often have a negative impact in this regard.

Within the European Union, efforts have been undertaken first within the EDA, which listed Ground Combat Capabilities among the top priorities of its Capability Development Plan, and then through the PADR project GOSSRA. Through the former, an industrial consortium240 performed an analysis of the trends deemed likely to characterise the future dismounted soldier equipment – especially in terms of operational and technological capabilities – resulting in a comprehensive document providing an architecture for standardisation. The European Commission has further invested in this field through the EDIDP calls and currently with the EDF 2021 round of calls for the development of innovative military personal protective equipment, BLOS military systems, and applications for the enhancement of soldiers’ force protection and mobility.241 The soldier equipment issue will most likely be included in the subsequent annual work programmes through the EDF.

In the land sector market access barriers are relatively low in terms of investments, also considering the need by all European armies to provide individual equipment kit to thousands of dismounted soldiers and the EDTIB fragmentation in this sector. **This in turn encourages the protection and promotion of national solutions, even if this increase costs and complexity, and delivers sub-optimal results which are not marketable abroad and thus not sustainable in the long term**. This situation should be overcome through intra-EU cooperation: despite the considerable organisational challenges, collaborative activities would lead to significant benefits for European armies in terms of standardisation, operational commonality, risk sharing on new technologies, economies of scale, common MROU and logistics and, above all, technological leaps forward to face near-peer competitors and remain interoperable with the US and within NATO. Such a step forward in intraEU cooperation in turn would increase the efficiency and competitiveness of the EDTIB’s land sector. **Bottom line is that both military and industrial cooperation in Europe in mandatory to pursue really advanced technologies in a cost-effective manner, and deploy them incrementally by the start of the next decade to achieve greater combat effectiveness**.

#### **Failure to achieve overmatch guarantees nuclear war – Russia and China will employ biotechnically engineered super soldiers to overcome Western defenses**

Kroenig 21 (Kroenig, Matthew. "Will Emerging Technology Cause Nuclear War?: Bringing Geopolitics Back In." Strategic Studies Quarterly, vol. 15, no. 4, winter 2021, pp. 59+. Gale Academic OneFile, link.gale.com/apps/doc/A689824415/AONE?u=umuser&sid=bookmark-AONE&xid=b3494609. Accessed 22 June 2022.)

Biotechnology could be exploited to produce "super soldiers." China has genetically engineered beagles with three times the muscle mass of a typical canine, a technology that could possibly be applied to humans. (49) Exoskeletons could provide soldiers with superhuman strength, and brain implants promise superior cognitive performance. China employed exo-skeletons in combat in its 2020 border conflict with India. (50) It is not yet clear how these new technologies, when combined with novel operational concepts, will affect the future of warfare, but it is likely they will. A future state may, for example, be able to use additive manufacturing to produce masses of inexpensive drones directed by new AI algorithms to swarm and overwhelm adversaries. (51) The attack might be preceded by cyber and counterspace attacks that blind an adversary and disrupt its command and control. Following a successful advance, the country could then employ directed-energy weapons, autonomous mines, and other advanced defenses to lock in territorial gains and thwart enemy attempts to roll back its aggression. It is possible that the first state to hone these technologies and devise effective operational concepts will have a military edge over its opponents. Novel Applications How will states use such a newfound advantage? Technology rarely fundamentally changes the nature or objectives of states. More often, states use technology to advance preexisting geopolitical aims. Moreover, enhanced power can result in greater ambition. Given the geopolitical landscape described, it is likely the United States and its Allies and partners at the core of the international system will behave differently with new military technologies than will revisionist powers, such as Russia and China. The spread of new technology to the United States and its Allies and partners would likely serve, on balance, to reinforce the existing sources of stability in the prevailing international system. At the end of the Cold War, the United States and its Allies and partners achieved a technological-military advantage over its great power rivals, with the US using its unipolar position to deepen and expand a rules- based system. They also employed their military dominance to counter perceived threats from rogue states and terrorist networks. The United States, its Allies, and partners did not, however, engage in military aggression against great power, nuclear- armed rivals or their allies. In the future, these status quo powers are apt to use military advantages to reinforce their position in the international system and to deter attacks against Allies and partners in Europe and the Indo- Pacific. These states might also employ military power to deal with threats posed by terrorist networks or by regional revisionist powers such as Iran and North Korea. But it is extremely difficult to imagine scenarios in which Washington or its Allies or partners would use newfound military advantages provided by emerging technology to conduct an armed attack against Russia or China. Similarly, Moscow and Beijing would likely use any newfound military strength to advance their preexisting geopolitical aims. Given their very different positions in the international system, however, these states are likely to employ new military technologies in ways that are destabilizing. These states have made clear their dissatisfaction with the existing international system and their desire to revise it. Both countries have ongoing border disputes with multiple neighboring countries. If Moscow developed new military technologies and operational concepts that shifted the balance of power in its favor, it would likely use this advantage to pursue revisionist aims. If Moscow acquired a newfound ability to more easily invade and occupy territory in Eastern Europe, for example (or if Putin believed Russia had such a capability), it is more likely Russia would be tempted to engage in aggression. Likewise, if China acquired an enhanced ability through new technology to invade and occupy Taiwan or contested islands in the East or South China Seas, Beijing's leaders might also find this opportunity tempting. If new technology enhances either power's anti- access, area- denial network, then its leaders may be more confident in their ability to achieve a fait accompli attack against a neighbor and then block a US- led liberation. These are precisely the types of shifts in the balance of power that can lead to war. As mentioned previously, the predominant scholarly theory on the causes of war--the bargaining model--maintains that imperfect information on the balance of power and the balance of resolve and credible commitment problems result in international conflict. (52) New technology can exacerbate these causal mechanisms by increasing uncertainty about, or causing rapid shifts in, the balance of power. Indeed as noted above, new military technology and the development of new operational concepts have shifted the balance of power and resulted in military conflict throughout history. Some may argue emerging military technology is more likely to result in a new tech arms race than in conflict. This is possible. But Moscow and Beijing may come to believe (correctly or not) that new technology provides them a usable military advantage over the United States and its Allies and partners. In so doing, they may underestimate Washington. If Moscow or Beijing attacked a vulnerable US Ally or partner in their near abroad, therefore, there would be a risk of major war with the potential for nuclear escalation. The United States has formal treaty commitments with several frontline states as well as an ambiguous defense obligation to Taiwan. If Russia or China were to attack these states, it is likely, or at least possible, that the United States would come to the defense of the victims. While many question the wisdom or credibility of America's global commitments, it would be difficult for the United States to simply back down. Abandoning a treaty ally could cause fears that America's global commitments would unravel. Any US president, therefore, would feel great pressure to come to an Ally's defense and expel Russian or Chinese forces. Once the United States and Russia or China are at war, there would be a risk of nuclear escalation. As noted previously, experts assess the greatest risk of nuclear war today does not come from a bolt- out- of- the- blue strike but from nuclear escalation in a regional, conventional conflict. (53) Russian leaders may believe it is in their interest to use nuclear weapons early in a conflict with the United States and NATO. (54) Russia possesses a large and diverse arsenal, including thousands of nonstrategic nuclear weapons, to support this nuclear strategy. In the 2018 Nuclear Posture Review, Washington indicates it could retaliate against any Russian nuclear "de- escalation" strikes with limited nuclear strikes of its own using low- yield nuclear weapons. (55) The purpose of US strategy is to deter Russian strikes. If deterrence fails, however, there is a clear pathway to nuclear war between the United States and Russia. As Henry Kissinger pointed out decades ago, there is no guarantee that, once begun, a limited nuclear war stays limited. (56) There are similar risks of nuclear escalation in the event of a US- China conflict. China has traditionally possessed a relaxed nuclear posture with a small "lean and effective" deterrent and a formal "no first use" policy. But China is relying more on its strategic forces. It is projected to double--if not triple or quadruple--the size of its nuclear arsenal in the coming decade. (57) Chinese experts have acknowledged there is a narrow range of contingencies in which China might use nuclear weapons first. (58) As in the case of Russia, the US Nuclear Posture Review recognizes the possibility of limited Chinese nuclear attacks and also holds out the potential of a limited US reprisal with low- yield nuclear weapons as a deterrent. (59) If the nuclear threshold is breached in a conflict between the United States and China, the risk of nuclear exchange is real. In short, if a coming revolution in military affairs provides a real or perceived battlefield advantage for Russia or China, such a development raises the likelihood of armed aggression against US regional allies, major power war, and an increased risk of nuclear escalation.

#### First mover advantage matters – maintaining US/NATO biotechnological lead is key to avoid dissolution of hegemony and aggressive adversarial use

Malet 15 (October 30th, 2015 | David Malet | Political Scientist researching and teaching about international security, transnational militancy, and US national security and foreign policy | “Captain America in International Relations: the Biotech Revolution in Military Affairs” | <https://doi.org/10.1080/14702436.2015.1113665> | DOA: 6/22/2022 | SAoki)

Human enhancement Efforts to field augmented troops represent new approaches to the use of biotechnology in warfare, a qualitative shift away from traditional but uncertain bacteriological weapons to entirely new strategies for assuring battlefield dominance. As proponents of this biotech approach envision it, “futuristic, ‘superhuman’ capabilities of individual soldiers could enable small units to operate for extended periods of time, carry the fight to remote locales, and endure harsh extremes of climate” (Committee 2001, p. 7). Moreno (2006, p. 114) argues that “The first state (or nonstate) actor to build a better soldier will have taken an enormous leap in the arms race.” Although seemingly fantastic, billions of dollars have already been spent on several programs directed toward fielding various types of “Augments.” As with biotechnologies to increase survivability, introducing mechanically or biologically augmented living soldiers offers multiple benefits for states with the capacity to do so. It also raises a host of political and ethical questions without clear answers. Certainly, there would be tactical advantages for militaries whose personnel are able to operate more effectively than their adversaries under difficult conditions. And the boon of losing fewer servicemen to injury, and being able to return those who are injured to the front lines more quickly, is evident. But there are also broader potential national and international political impacts. Democratic governments, which endeavor to avoid costly or risky wars, (Gartner and Segura 1998, Reiter and Stamm 2002) might be tempted to exert their power as their Defence Studies 325 conventional force advantages grow, and as the costs of providing for disabled veterans diminish. Duncan (2012) writes about the ethics of augmentation when everyone else is doing it. Parents might balk initially at the idea of using technology to increase their children’s cognitive performances, but not if it means that they fall behind their augmented classmates. Citizens might hesitate to vote for presidential candidates with neural implants to enhance their reflexes and decision-making capabilities during a crisis. But at some point, the question becomes “Would you vote for a commander in chief who wasn’t equipped with such a device?” This hypothetical involving heads of state is about as far as most of the ethicist approaches make toward questions of international security. But it raises the question, and particularly if rival hegemons are dispatching Augments with advanced bioweapons and biomedicines to the battlefield, what country with the capability to do so could justify sending its soldiers into harm’s way without the best advantages possible? The edited volume Human Enhancement presents opposing arguments over biopolitics between enthusiastic “transhumanists” and skeptical “bioconservatives” (Bostrom and Savulescu in Savulescu and Bostrom 2009, p. 1). Yet, for all of the discussion about practical issues and debates over social and ethical considerations ranging over hundreds of pages, there is no consideration that enhanced soldiers are at least as likely as enhanced athletes, and national security is not cited among the social obligations that transhumanists claim justify even heritable germline modifications. Fukuyama (2004, pp. 42–43) noted that because “The new procedures and technologies emerging from research laboratories and hospitals … can as easily be used to ‘enhance’ the species as to ease or ameliorate illness…. The first victim of transhumanism might be equality,” an implication even more troubling at the international level when considering what this might do to the already yawning resource gap between the richest and poorest countries. George Annas contended that: Ultimately it almost seems inevitable that genetic engineering would move homo sapiens into two separable species: the standard-issue human beings would be seen by the new, genetically enhanced neo-humans as heathens who can properly be slaughtered and subjugated. It is this genocidal potential that makes species-altering genetic engineering a potential weapon of mass destruction and the unaccountable genetic engineer a potential bioterrorist. (Juengst, in Savulescu and Bostrom 2009, p. 48) Major powers with both conventional and asymmetric biotechnological edges over rivals may similarly be open to the use of force to maintain their positions if they are secure in the knowledge that they are well beyond the capabilities of opponents to match them. **The advent of nuclear weapons is credited with reducing the number of interstate wars, with the effect of entrenching the hegemony of the technologically advanced states that wield them**. RMA advances gave the United States a lopsided advantage in its early post-Cold War interventions (zero combat deaths during nearly three months of NATO missions during the Kosovo War), and its initial easy success in toppling Saddam Hussein from power in Iraq led, temporarily, to rapprochement efforts by “rogue” regimes Iran and Libya to avoid the same fate. **While advanced equipment is responsible for these successes, biotech now offers the opportunity to enhance the performance of the combatants themselves**. 326 D. Malet [DARPA] is engaged in the development of designer drugs that will increase cognitive functioning, including attention span and alertness after periods of sleep deprivation. Another area for future research is “neural prostheses” that will enable commanders to monitor the vital signs of soldiers in the field or even to permit the control of UAVs directly by pilots in remote locations. (Huang and Kosal 2008) “In 2002, DARPA launched the Augmented Cognition (or AugCog) initiative, a project dedicated to developing a headband that monitors brain activity.” With sensory input controlled remotely, subjects doubled their recall and improved working memory by 500% (The Economist 2010). Research on reducing the amount of sleep that soldiers and pilots require to function effectively has become a global enterprise, with countries including France, Canada, Singapore, and Taiwan establishing military research units in this area. In the language of these projects, fatigue and even sleep are described as operational weaknesses preventing humans from taking full advantage of their equipment, weaknesses that intervention can ameliorate. Some major powers have already begun the attempt: during the Iraq War, the British Ministry of Defense had purchased 24,000 tablets of one of the most promising drugs, modafinil, and the United States and France both began to routinely supply it to pilots. The use of stimulants by militaries is so widely entrenched, with amphetamines in regular prescribed use for decades (Saletan 2013), that Bostrom and Savulescu (in Savulescu and Bostrom 2009, p. 2) question whether the use of modafinil is qualitatively different from “a good cup of tea.” But the premise of reducing or eliminating the need for sleep as a component of troop health is a recent development. Additionally, DARPA has provided congressional testimony about its Continuous Assistance Program that would “make the individual warfighter stronger, more alert, more endurant, and better able to heal … prevent fatigue and enable soldiers to stay awake, alert, and effective for up to seven days straight without suffering any deleterious mental or physical effects and without using any of the current generation of stimulants.” Potential approaches include the use of transcranial magnetic and electrical stimulation to activate brain pathways and to enhance learning (Moreno 2006, pp. 11, 118). Lab mice that have been altered as embryos with extra copies of a memory-related gene “learn more quickly and remember things longer than normal mice … and the improvement was passed on to offspring” (Sandel, in Savulescu and Bostrom 2009, p. 74). In the meantime, the military relies on more conventional stimulants, and the results might give pause to planners considering more radical medical interventions. B-1 bomber pilots who operate 19-h flights between the Persian Gulf and United States take Dexedrine, an amphetamine known as speed or “go pills.” One such pilot, who subsequently went drinking with buddies before attacking them in a fit of paranoid delusions in which he seemed to believe he was in the television series 24, was acquitted by a court-martial after military psychiatrists concluded that he suffered from a “substanceinduced delirium” (Murphy 2012). American pilots who killed Canadian soldiers in a 2003 friendly fire incident in Afghanistan had also been on Dexedrine during 30-h missions (Moreno 2006, p. 115). Another DARPA neural program with battlefield applications is Silent Talk, which would develop the capability to communicate without speaking by recognizing the neural signals for specific words. Linked devices would permit troops in the field to recognize the signals for the “intended speech” of at least 100 words commonly used by troops in combat operations (Warwick 2009). Beyond the advantages of silent Defence Studies 327 communication and preventing hostile forces from intercepting messages, such technology would effectively produce electronic telepathy and have a tremendous commercial sector potential for hands-free communication. While Augments would be able to receive more situational information on the battlefield through neural devices, processing it effectively is another matter. Technologies developed through the AugCog and Enabling Stress Resistance projects might alert commanders that individuals are suffering mental or physical exhaustion. Another approach would be to “develop quantitative and integrative neuroscience-based approaches for measuring, tracking, and accelerating skill acquisition and learning while producing a twofold increase in progression in an individual’s progress through stages of task learning.” **Reminiscent of the neural training uploads for particular weapons systems and martial arts in the science fiction Matrix films, results would be achieved through the “development of neurally based techniques for maintenance of acquired skills [and on] preferential brain network activation**” (DARPA, “Accelerated Learning” 2010). Another program with the goal of “enhancing combat performance” studies the influences of biological clocks on soldier health (DARPA, “Biochronicity” 2013). Other biotechnologies would provide physical enhancements to Augments. The field of biomimetics seeks to mimic useful naturally occurring characteristics in living organisms. For example, ants and spiders can lift loads dozens of times their own weight, and horses can withstand freezing temperatures without thick hair. “Understanding how horses and other animals overcome drastic changes in their environment would be extremely useful. As a measure of the importance of biomimesis, the Army has declared biomimetics one of its Strategic Research Objectives (primary focus areas for basic research)” (Committee 2001, pp.14–15). Already, researchers have developed synthetic genes that repair damaged muscles and improve healthy ones in mice (Sandel, in Savulescu and Bostrom 2009, p. 73). Another project at least at the prototype stage for humans utilizes an electrically charged under suit “focusing on the soft tissues that connect and interface with the skeletal system.” The goal of Warrior Web is “augmenting the work of Soldiers’ own muscles to significantly boost endurance, carrying capacity, and warfighter effectiveness” (DARPA, “Warrior Web” 2013, DARPA, “Warrior Web Prototype Takes Its First Steps” 2013).

#### Now is key to avoid failure on the battlefield

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**The purpose of military technology development is to increase soldier effectiveness**; it started with stones and spears and today includes a sophistication that exceeds the capacity of any single person’s ability to create or decipher. An important point is that humans employ the technology and are responsible for its use, even for an autonomously operated weapon system. A corollary of this principle is that systems should be designed to work with the human (i.e., “humanized technology”); the human should not have to be selected or modified to fit the technology. In order to design human centric systems, engineers and other materiel developers need predictive models from the biomedical research commu- nity that help define human performance limits and tolerances.16 **Materiel developed without proper consideration for the human operator leads to systems that may actually impair human per- formance and require expensive retrofit or redesign**.17 **If done properly, Soldier-centric systems** “**support the creation of more competitive and agile soldiers and military formations**.”18 Colonel Robert Carter, **the US Army’s senior uniformed physiologist**, **has highlighted the decisive advantage of AI technologies in modern multi-domain operations, noting that** “the willingness of soldiers to fight with traditional weapon systems may not afford the Army the strategic advantage.”18 As defined in Table 1, human performance enhancement can be divided into two primary categories: (1) aug- mentation of human capabilities with assistive technologies, and (2) modification of human biology to expand human capabilities.

**Augmented performance involves primarily external systems, including wearable systems such as a powered exoskeleton**,19 **inward- and outward-looking monitors and decision support tools**,20 **and functional fiber suits that moderate temperature, water loss and chemical exposures** (e.g., “Stillsuit” concept from science fiction21). It also includes training systems using virtual reality along with real time physiological monitoring to provide biofeedback to develop enhanced mental and physiological self- regulation capabilities; the same technologies can be used to adapt information to the physiological status of the individual opera- tor (e.g., “augmented cognition”).22 Teams may train and operate with shared systems drawing on wearable sensors and effectors (e.g., “brain net”, a mentalized internet).23 **Major components of a Matrix-like science fiction concept have been demonstrated for a capability to artificially sense and activate muscles to bend the body to dodge bullets**.24,25

The military human performance research community plays a vital role in helping to make machines and AI more human-centric, built on the basis of an understanding of human biology.26,27 If the human is the primary weapon system and all technology is to sup- port the soldier, then augmentation technologies should be built around human capabilities, biological tolerances, and humanized to perform in a way that is consistent with human neurobiology.26–28 In the midst of this current robotics and information technology era, there is a greater need than ever before for human per- formance research that will solve problems to optimize human, human-AI, and human-robot teams.13 **Advances in bioinformat- ics and the continuous expansion of computing power support the development of ever more sophisticated, integrated and general- izable models**. **These efforts lead to a comprehensive model of the soldier phenome that accurately predicts health and performance outcomes for many possible conditions**. **For example, a model of cognitive multitasking helps combat developers consider how many remote drones a human operator can effectively manage**.29 A separate metabolic model of the effects of prolonged exhaus- tive exercise on brain and behaviour provides a mission planning tool.30 As the models expand and combine, the effect of physical work and other metabolic stressors on a soldier’s decision making capabilities can be predicted and workload redistributed within man-machine teams to maintain effectiveness. These predictive simulations might be running in real time on a digital twin model of the individual soldier that includes personalized information such as the individual’s characteristic physiology, behaviour, and neurophysiological resilience.31 Biophysical modelling has already been demonstrated to directly enhance human performance. For example, AI-based decision support provided from thermal models combined with wearable physiological monitors provides real- time march pacing, optimized for mission requirements.32 Early models of the integration of physiology and cognitive outcomes are emerging from clinical medicine such as metabolic derangements in diabetes and neurodegenerative diseases33,34 and the social sci- ences have evolved modelling tools designed around theoretical concepts of human behaviour such as Adaptive Control of Thought – Rational.35

The second category of performance enhancement involves biotechnologies that actually modify human biology to achieve extraordinary individual performance (Table 1). **These involve drugs and genetic engineering such as myostatin inhibitors or alterations in genes that code for myostatin to create mas- sively muscled individuals; drugs and synthetic microbiota that alter mood and cognition and delay fatigue; and surgical mod- ifications including sculpting the cornea to alter visual acuity**. This strategy of trying to improve human biology by making humans more machine-like, with around-the-clock performance capacity, greater load carriage ability, or savant-like memory and computing capacity has been strikingly unsuccessful in previous bold initiatives like the Defense Advanced Research Projects Agency-sponsored continuous assisted program (CAP) and metabolic dominance program.41 **Biological** (“skin-in”) **per- formance enhancement requires additional levels of rigor beyond certification of augmentation technologies** (“skin-out”) **because of the unpredictable risks to both human health and performance**. Bioethical considerations add another essential layer, but even an unethical enemy would be foolish to rush headlong into trying to improve biology. **Armies have long contemplated creation of bio- logically modified super soldiers, and some key lessons have been learned**42,43 (Table 2). New medical technology opportunities such as genetic engineering and drugs developed for muscle disease treatments should not immediately provoke knee jerk responses to create larger humans just because we can. Before heading down this road, biomedical developers must consider why trying to improve human biology might be useful, necessary, or sound. **Based on mili- tary technology trends, the ideal soldier of the future is probably not a better “human pack mule” but rather a physiologically optimized, smart, agile, and stress resistant teammate** (Table 2).

There are nevertheless potential advantages in biotechnolog- ical enhancement of healthy humans; some of the promising approaches are actually focused on preventing decrements in performance that otherwise occur in extreme conditions.44 For example, the drug acetazolamide has an approved use for theprevention of acute mountain sickness, encountered when unac- climated soldiers ascend rapidly to altitude to confront an opponent.45,46 This represents a significant performance enhancer in mountain warfare. Another path to performance enhancement might have come from defining the biological underpinnings of exceptional performers. In this case, the physiology of Quechua and Sherpa high altitude dwellers does not readily lend itself to a simple technological manipulation to recreate the same toler- ance for high altitude exposure.47 Rather than attempting to create genetic “human llamas”, the pragmatic choice for an Army is to sim- ply identify and recruit adapted individuals and/or use the proven drug intervention.

**Emerging technologies may greatly expand soldier capabilities but there are risks associated with overdependence, including fail- ure to sustain the technology-supported skills and capabilities**. **While personal electronics are enormously empowering tools, sol- diers must also be trained for the sudden loss of these capabilities in isolated or electronic warfare environments**. The disadvantage would be further magnified in a fight against a technology-poor opponent that has always trained to operate in power and com- munications deprived environments (e.g., wayfinding skills).48 **Real-time physiological status monitoring** (RT-PSM) **can provide intelligence on the performance of our own soldiers but this can also fail, be blocked, or hacked. RT-PSM may be useful in training individual and group performance, but in operational environments such technology is simply a distraction unless it pro- vides vital actionable information**.20 Physiologically aware virtual agents may provide a trusted coach or advisor capability including machine assessment of soldier mental status and team perfor- mance, redistributing cognitive workload or modifying information presentation within teams, but it remains to be discovered how this synthetic social structure will affect human mental resilience and team dynamics.49,50 The trust component is critical to soldier cooperation with their virtual teammates and another key research theme of its own. Load carriage and speed of movement may be enhanced with assistive technologies such as exoskeleton pow- ered boots, speeding a small unit over rough terrain; however, there may be risks of disuse atrophy of musculoskeletal elements associated with overreliance on an exoskeleton system. Also, syn- thetic interactions with machines may reveal hitherto unknown aspects of social biology essential to optimal functioning including that of isolated individuals and teams.51 **In the training environ- ment and in mission preparation, new technologies are already being exploited for stressful and realistic exposures in a safe vir- tual reality environment**,52 **but we need to understand the risks of stressful exposures which can serve to sensitize some individuals to future stress or “stress inoculate” others, and also ensure that artificially trained skills translate correctly to real world applica- tions**.

#### Only investments in biotechnology solves – anything less erodes deterrence

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The Biotech Revolution in Military Affairs There have been numerous studies of the impacts of a wide array of emergent technologies by hegemonic actors or aspirants (For a preliminary list . However, there has been little examination of what the adoption of biotechnology by the leading military powers has meant or is likely to mean. The United States Office of Technology Assessment defines biotechnology as “any technique that uses a living organism, or parts of organisms, to make or modify products, to improve plants or animals, or to develop microorganisms for specific uses.” Other definitions include material patterned after living organisms but not necessarily using them as components (biomimetics). The conventional wisdom on biotechnology has held that coming decades will see Western nations increasingly vulnerable to ever-more sophisticated biological weapons attacks by non-state actors and rogue states. As recombinant genetic technology proliferates, a greater number of actors will possess genetic engineering capabilities that will enhance the lethality and durability of their biological weapons. Proponents of this perspective note that the overwhelming technological advantage in conventional forces enjoyed by the United States creates the incentive for competitors to develop effective asymmetric responses, and that the affordability, accessibility, and relatively easy preparation of biological weapons make them a likely means of doing so. In this view, the superior conventional capabilities of the US military not only fail to deter the proliferation of biological weapons, but encourage their development. Western states will face an increasing number of biologically armed opponents, and will remain on the defensive. The priority for military biotech research is therefore the development of protective equipment and vaccines, antibiotics and antivirals (Department of Defense 1998). However, this scenario requires the presumption that military applications of biotechnology will simply be a secular progression from the bacteriological warfare that has existed throughout history. Even when analysts have factored in the vast possibilities of genetic engineering, it has usually only been to the extent that they can breed deadlier pathogens, and that the growing availability of technology means that it may be used by a broader spectrum of actors. Conventional wisdom therefore predicts an unstable future for the international system, a Hobbesian world in which the weakest have power to kill the strongest. Rather than rogue states and non-state terrorists, it is the most powerful and resource-laden actors in the international system that will enjoy the advantages of “biological warfare” in the twenty-first century as they continuously integrate emergent biotechnologies into their military and national defense infrastructures and extend their dominance. This process will closely resemble the Revolution in Military Affairs (RMA) that occurred during the last 30 years of the twentieth century as the United States adapted its forces to exploit advances in new information technologies. The RMA, first described by the Soviet military intelligence in the 1970s and then witnessed by the world during the unexpectedly uneven 1991 Gulf War, occurred because the United States employed its competitive advantage in integrated computer systems. Rather than a single transformative device, like the atomic bomb, the steady accretion of advanced technologies augmenting existing equipment came to inform doctrine and strategies. The term asymmetric warfare is meant to describe efforts by weaker participants in military confrontations to frustrate the advantages of the stronger power by guerilla tactics or other unconventional methods not envisioned in force planning (Mack 1975). However, high technology also offers asymmetric advantages to the best-equipped actors, and American military planners sought to use the advances of the RMA to field forces that no state competitor could match. Their goals included “dominant maneuver” capability on the battlefield in bringing dispersed resources to bear against targets, “precision engagement” capability delivered by smart weapons, and “full dimension force protection” against all anticipated threats (Rizwan 2000). The ultimate expression of this vision would be a fighter comparable to a “Jedi knight” from the Star Wars films: a super-empowered solider, dressed in a protective stealth cloak and commanding an Defence Studies 321 Downloaded by [University of California, San Diego] at 23:56 08 March 2016 armed companion drone, able to perform solo missions and to transmit data back to headquarters (Hundley and Gritton 1994). Coincidentally or not, this is precisely how Darth Maul was depicted in 1999’s The Phantom Menace. Military planners likewise foresee similar advantages conferred by developments across the various biotech fields. In coming decades, biotechnology is forecast to bring advances such as “rugged computers” made from biological components that will provide situational awareness to individual soldiers on the battlefield, camouflaged materials and lightweight armor incorporating the properties of living organisms, and ingested biological markers to distinguish friendlies, which would be of particular use in counterinsurgency (Purdue University 2001). From the perspective of those involved in force planning, the anticipated future is not one of vulnerability but unassailability

### Plan/Solvency

#### Thus, the plan – The United States federal government should substantially increase its funding, information sharing, and technology transfers on neuroscience and technology with the North Atlantic Treaty Organization in the area of cognitive biotechnology.

#### The plan solves NATO’s gaps in neuroS/T weaponization – a whole-of-alliance approach is key – unilateral or partial approaches result in massive capability gaps that undermine security

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**In sum, it is not a question of whether neuroS/T will be utilized in military, intelligence, and political operations, but rather when, how, to what extent, and perhaps most importantly, whether or not the US and its allies will be prepared to address, meet, counter, or prevent these risks and threats**. In this light (and based upon the information presented in this report), **it is and will be increasingly important to address the complex issues generated by the brain sciences’ influence upon global biosecurity and the near-term future scope and conduct of both non-kinetic and kinetic military and intelligence operations** (DeFranco et al., 2019). Thus, if the US and its international allies seek to retain a leading role in the global balance(s) of power, it will be essential to establish and sustain an iterative stake in the funding, guidance, and oversight of brain sciences in national security, intelligence, and defense operations. This is particular important given the recent opinion statement and recommendation(s) of the Task-Force on Dual-Use Neuroscience of the European Union Human Brain Project (EU-HBP), which advocated that any/all R&D projects, outcomes, techniques, and tools conducted under the auspices and support of the HBP not be utilized in/for military and/or intelligence (or other forms of security and defense) initiatives or operations (Evers et al., 2017). While noteworthy for its pacifist stance and advocacy, the unavailability of these state-of-the-art developments to the collaborative US-NATO mission (and the publication/dissemination of these studies and methods in the international scientific literature) essentially create an opportunity for competing nations to usurp and exploit such developments for use in their own military, intelligence, and political programs, projects, and operations. **Therefore, the following steps are recommended**: • recognition that brain science can and will be developed and used for non-kinetic and kinetic WINS engagements; • acknowledgement that other countries may employ different ethical systems to govern neuroscientific research and development. This will mandate a rigorous, more granular, and dialectical approach to negotiate and resolve issues and domains of ethical dissonance in multinational/international biosecurity discourses; • ongoing review and evaluation of national intellectual property laws, both in relation to international law(s) and in scrutiny of potential commercial veiling of dual-use enterprises; • ongoing surveillance of international activities in brain science and their dual- and direct-use in military and intelligence operations; • identification and quantification of current and near-term risks and threats posed by such enterprise(s); • **assessment of extant capabilities and gaps in US** (**and its allies’**) **infrastructure and function(s) relevant to maintaining a stance of biosecurity preparedness, readiness, and response**; • **proactive bridging or de-limiting of gaps in biosecurity infrastructure and function so as to establish and sustain readily active resources, mechanisms, and policies to mitigate existing and near-term threats**; • **dedication of resources for developing and sustaining US** (**and allied nations’**) **capabilities to prevent escalation of future risk and threat by** (1) **continued surveillance**, (2) **organizational and systemic preparedness, and** (3) **conjoinment of any/all entities necessary to remain apace with and/or ahead of tactical and strategic competitors’ and adversaries’ capabilities in this space**; and • a US program (or network of programs) to: o coordinate governmental, academic, and industrial sectors to study and evaluate current and near-future risks and threats; o establish (titular US government and allied) institutes/centers specifically dedicated to these pursuits, so as to obviate burden of participation/responsibility from any/all academic and other scientific institutions that are operating within/under current guidelines proscribing dual- or direct-use/involvement with military/defense initiatives; o defend US and allied interests from these threats; and o develop methods to exploit competitors’ gaps and weaknesses in these domains so as to maintain a favorable balance of power (in and across socio-economic, political, and military domains) in global engagements. **Development and coordination of a whole-of-nation** (versus merely whole-of-government or military) **approach to mobilize the organizations, resources, and personnel required to meet global competitors and potential adversaries’ synergistic triple helix capabilities for advancing neuroS/T that is viable and valuable in military and intelligence operations**.

#### The plan’s multilateral approach ensures that key players of the alliances are involved, resources are adequately shared, and effective development of biotechnologies can take place without losing the alliance’s technological edge over adversaries

NATO ’21, NATO Parliamentary Assembly, “In virtual visit to France, NATO Parliamentarians discuss space security, biotech advances and NATO S&T cooperation”, NATO-PA, 7/4/21, https://www.nato-pa.int/news/virtual-visit-france-nato-parliamentarians-discuss-space-security-biotech-advances-and-nato-st

Possible security risks emanating from the rapid advance of biotechnology were also on the agenda of the visit. Ambassador Yann Hwang, Permanent Representative of France to the Conference on Disarmament in Geneva, noted that it is no surprise that biotechnology and the possible menace of bioweapons is at the forefront of thinking for many parliamentarians today. Much like in the domain of space, he emphasised that, “**We can see that norms allow us to accomplish a great deal. The question, then, is to operationalise these frameworks, which is not currently the case**.” Ambassador Hwang thus **called for greater attention regarding the potentially positive role played by the Biological Weapons Convention** (BWC) **in ensuring that biotechnologies are used for peaceful purposes only**.

Elisande Nexon, Senior Research Fellow at the French Foundation for Strategic Research (FRS), noted that the international community has witnessed how biotechnology can help address healthcare issues in the context of COVID-19. Similar impacts, she argued, could be seen in areas like agriculture, environmental industries, or the materials industry. **Still, she said, the stakes are high, as there are a variety of risks inherent in biotechnology, including laboratory leaks, environmental spill over effects and ethical issues**.

**Both experts cautioned against a blanket approach to the banning of certain biotechnologies or the prevention of their development as a whole**. An appropriate approach would instead be to focus on legislation and multilateral cooperation\*\*,\*\* the Committee was informed. Ms **Nexon emphasised that** “we need to promote international cooperation and information exchange,” adding that difficulties exist because, “there are significant differences between states – whether national interests, regulations, views on [human rights], and financial resources.” **The promotion of information exchanges, emphasis on improved transparency, and a general effort to raise awareness with the public of potential risks inherent in biotechnologies are all valid lines of action**, she argued. To that end, NATO Allies should “train, regulate and encourage scientists to adhere to these approaches, and to evaluate risks and threats regularly with academia and scientists. **It is important that we are able to recognise whether** [**an incident related to biotechnology**] **was accidental or deliberate, and whether we can attribute responsibility to a human actor** […].”

Finally, the delegation also learned of the importance of cooperation in the field of S&T, and in particular the role of the Collaboration Support Office (CSO) in NATO's Science and Technology Organisation (STO). John-Mikal STØRDAL, CSO Director, emphasised that “**collaborative Science and Technology within NATO has enabled the Alliance to produce the most advanced and efficient defence systems the world has ever seen**.” **He warned that there is a real possibility that NATO could lose its technological edge but stressed that the work of the Assembly’s Science and Technology Committee has had a positive impact in raising awareness of this possibility**, citing the 2018 NATO PA report, Maintaining the Edge and Enhancing Alliance Agility. “Today, emerging and disruptive technologies are firmly placed on the agenda for NATO 2030, as was clear in the last Summit Communique,” he said.

The CSO Director also identified three areas where NATO Parliamentarians can continue to make a difference: “We are at the threshold of technological change beyond anything we’ve experienced before”, he said, “and **NATO Allies need increased investment in S&T related R&D** (**not only military R&D**) **at the national level to stay ahead of this change**.” **He also called upon NATO to engage with national representatives on the NATO Science and Technology Board to discuss how to gain the most from the Science and Technology Organisation and the Collaborative Programme of Work**. Third, he stressed how important it is “to inspire and motivate our young people to study STEM – Science, Technology, Engineering, and Mathematics – disciplines. This is the only way to have the highest quality scientists and engineers available to the NATO STO Network and to improve the age and gender balance in these fields.

#### Cognitive biotechnology is key – its being integrated into the alliances at all levels from soldiers to surveillance, but sustained support is necessary

Alonso Bernal et al ’21, \*Johns Hopkins University, \*\*Cameron Carter, \*\*\*Melanie Kemp, \*\*\*\*Ujwal Arunkumar Taranath, \*\*\*\*\*Klinzman Vaz, “Cognitive Biotechnology: Altering the Human Experience”, Johns Hopkins University, NATO, 2021, https://www.innovationhub-act.org/sites/default/files/2021-01/Cog\_Bio%20Paper.docx.pdf

It’s interesting to think back to the times when we thought the advanced sci-fi technology that we saw in movies were too far-fetched to become reality. However, now we live these scientific advancements. From landing on the moon, to live video calling, and even Marty McFly’s self-lacing shoes, we are now left to question what further progress will be made and what kind of impact they will have [42]. **NATO and the military serve many functions, and the benefits to be gained when it comes to technological advancements are endless, especially in the field of cognitive enhancements**. In order to understand what the needs of further developments in this space are, we first sought to investigate what products and research already exist – both with and without direct military applications. We completed primary market research by examining current research and technologies, then categorized each based on 1) the core faculties of cognition it affects and 2) the method(s) of enhancement it utilizes. From here, we curated our own categorization, the RAR framework, to analyze what exists, realize what still needs to be developed, separate these into use cases, and recommend what further actions should be taken to actualize these developments. The following are some subjective interesting fields of study we’ve identified in the RAR framework. We posit that NATO could partner with organizations such as the Johns Hopkins Applied Physics Laboratory, Johns Hopkins Hospital, and Harvard’s Department of Psychology in order to lead and develop the relevant technologies and fields of study. Regardless of the direction, **it is our belief that NATO can pilot these advancements in a direction that will be beneficial to the alliance and even to humankind itself**. Recover **Brain-computer interface methods have been rapidly developing technologies for controlling machines and prosthetics with the brain's help**. The current research into artificial sensory feedback and brain-mapping have immense potential in terms of recovery opportunities. **NATO could leverage these technologies to explore options on secondary assets such as retired veterans and injured soldiers. The extraction of crucial information through memory restoration will yield dividends in all sorts of combat and command scenarios**. BCI technologies also have the potential to one day transfer one's muscle memory and skills to another human being or computer. The collaboration of BCI and dTMS will certainly have crucial applications for recovering cognitive abilities in human beings. Augment Education and learning as disciplines have remained relatively stagnant through the centuries. However, as we begin to learn more about the human mind and cognition, the discussion about how we learn and understand information is being brought up and questioned once again. **There are already companies developing memory and attention improvement technology and methods**. The aim being to reach a state of “hyper learning.” As the information space and big data continue their rapid growth, the future is going to require ways to understand and synthesize this information quickly and effectively in order to better educate and advise students, leaders, and professionals. **Education of the future may be seen simply as information transfer**. This field has already shown increased attention in recent years and appears to be on a steep trajectory that will have significant implications not only in the academic world, but the military and civilian worlds as well. Replace As we look beyond automating human capabilities, we seek ways to replace our own cognitive abilities with computers to maximize our efforts beyond human potential. **Brain-computer interface could be used towards development of cyborgs, human activity using machines, providing injured soldiers with computational mechanical prosthetics, or even using machines to control human interactions. Ideas of replacing human speech such as "conceptual telepathy,” where two people can communicate electronically by thinking at each other instead of writing or speaking, have promising applications in almost every aspect of human life** [35]. New Opportunities **Subversion and subterfuge have been the operational code of conduct for warfare and terrorism in the last few decades**. The recent machine learning breakthroughs could produce much in terms of potential for this field. For example, the idea of identifying, categorizing, and reading micro-expressions in the face invisible to the naked eye will prove invaluable in efforts to combat insidious threats. Imagine being able to sit across from a terrorist and listing out words, only for a program to tell you detailed conclusions about their operations from the terrorist’s uncontrollable micro-twitches. Imagine zooming in on a masked soldier in Ukraine and being able to tell through micro-expressions whether they were Russian soldiers or insurgents. **Investment into face scanning algorithms, and a direction as to what these algorithms are searching for, will revolutionize how nations deal with espionage and terrorist threats**.

## 2AC – Case – Top Level Ext

### 2AC – Regulations Add-On

#### Biotech revolution coming now but needs a regulatory framework

Zhang and Sun 22 (June 15th, 2022 | Ya-Feng Zhang School of Public Policy and Management, University of Chinese Academy of Sciences, Beijing 101408, China and School of Intellectual Property, University of Chinese Academy of Sciences, Beijing 101408, China. Tara Qian Sun School of Public Policy and Management, University of Chinese Academy of Sciences, Beijing 101408, China | “The Interaction of Biotechnology and Institution: A Stakeholder Perspective” | <https://doi.org/10.3390/su14127314> |DOA: 6/22/2022 | SAoki)

As an enabling technology [1], biotechnology can be applied broadly, which is very important for the economy, society, and environment [2]. Particularly, the discoveries, invention, and application of biotechnologies are leading to the emergence of the bioeconomy [3–5]. Nevertheless, recent biotechnologies have increasingly generated practical issues and regulatory challenges [6–8]. The misuse of biotechnology could be harmful to the environment or biodiversity, and concerns have been raised concerning the uncertainty of people’s health, ethical issues, biosecurity, etc. [9]. At the end of 2018, the Chinese scientist Jian-Kui He claimed that he had helped create the world’s first genome-edited babies using the CRISPR–Cas9 tool, and this raised global discussion [10–12]. At present, it is not clear what will happen to the two genome-edited babies, but what is known is that the scientist was sentenced to prison for 3 years [13]. Generally, the development of biotechnology and bioeconomy require the establishment and improvement of a regulatory framework [3]. In addition to practice, the development of biotechnology has received broad interest among researchers [6,9,14,15]. Prior studies have noted the importance of biotechnologyrelated institutions in various aspects [9,16–19], particularly in promoting the development of biotechnology [20]. However, together with the development of biotechnology, the related institutions also change dynamically. Although biotechnology potentially generates great benefits, the cost implications under certain circumstances might be massive, leading to public controversies and the need for intervention by institutions [9]. The relationship, particularly the interaction mechanism between biotechnology and institutions, is underexplored. Therefore, we ask the following research question: What is the interaction mechanism between biotechnology development and its institutions? To answer our research question, we select China as a research context. China, as an emerging developing nation, with the aim of overtaking the curve, has achieved some improvements in the field of biotechnology [14]. In those years, China has paid considerableattention to the development of the biotechnology industry [21]. In 2001, the biotechnology industry was listed as a high-tech industry in the 10th Five-Year Plan of High-tech Industry Development. In the Mid-Long Term S&T Development Plan (2006–2020), biotechnology is listed as the first of the eight types of cutting-edge technologies. The development of biotechnology in China has been very rapid in recent years. In accordance with the latest statistics by the OECD (key biotechnology indicators, available online: https://www.oecd. org/sti/emerging-tech/keybiotechnologyindicators.htm (accessed on 10 March 2022)), in 2018, China accounted for 8.2% of biotechnology patents from the IP5 patent families (the five largest IP offices in the world, including the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the National Intellectual Property Administration of the People’s Republic of China (CNIPA), and the United States Patent and Trademark Office (USPTO)) only after the US (37.6%) and Japan (12.3%), while the percentage was only 0.8% in 2001. However, the institution that regulates and promotes the development of biotechnology is not established at first, and experiences a process to improve. This situation provides a proper foundation to examine our research question in China’s context.

#### Regulated biotechnology key to solve for every disease, put the plans specific research are key to solve, otherwise it goes unregulated which causes their impacts

Savulescu and Singer 19 (Julian Savulescu, Uehiro Chair in Practical Ethics, Director, Oxford Uehiro Centre for Practical Ethics, University of Oxford, Visiting Professor in Biomedical Ethics, Murdoch Children's Research Institute Peter Singer, AC, Ira W. DeCamp Professor of Bioethics, University Center for Human Values, Princeton University, Laureate Professor, School of Historical and Philosophical Studies, University of Melbourne Bioethics. 2019;33:221–222. wileyonlinelibrary.com/journal/bioe)

Ethics is the study of what we ought to do; science is the study of how the world works. Ethics is essential to scientific research in defining the concepts we use (such as the concept of ‘medical need’), deciding which questions are worth addressing, and what we may do to sentient beings in research. The central importance of ethics to science is exquisitely illustrated by the recent gene editing of two healthy embryos by the Chinese bio‐ physicist He Jiankui, resulting in the birth of baby girls born in November 2018, Lulu and Nana. A second pregnancy is underway with a different couple. To make the babies resistant to human immunodeficiency virus (HIV), He edited out a gene (CCR5) that produces a protein which allows HIV to enter cells. One girl has both copies of the gene modified (and may be resistant to HIV), while the other has only one (making her still susceptible to HIV).1 He Jiankui invited couples to take part in this experiment where the father was HIV positive and the mother HIV negative. He offered free in vitro fertilization (IVF) with sperm washing to avoid transmission of HIV. He also offered medical insurance, expenses and treatment capped at 280,000 RMB/CNY, equivalent to around $40,000. The package in‐ cludes health insurance for the baby for an unspecified period. Medical expenses and compensation arising from any harm caused by the re‐ search were capped at 50,000 RMB/CNY ($7000 USD).2 He says this was from his own pocket.3 Although the parents were offered the choice of having either gene‐edited or ‐unedited embryos transferred, it is not clear whether they understood that editing was not necessary to protect their child from HIV, nor what pressure they felt under. There has been valid criticism of the process of obtaining informed consent.4 The information was complex and probably unintelligible to lay people. The most basic ethical constraint on research involving humans is that it should not expose participants to unreasonable risk.5 Risks should be the minimum necessary to answer the scientific question, and the expected benefits should be proportionate to expected harms.6 While the Declaration of Helsinki states that research in‐ volving incompetent participants must be ‘minimal risk and minimal burden’,7 this is most plausibly interpreted as minimal overall risk or burden, where expected benefits match or outweigh expected harms. After all, children are exposed to trials of new toxic chemo‐ therapeutic agents with significant risks. In deciding whether a risk is reasonable, it is important to eval‐ uate not only the probability of achieving a benefit, but also the ex‐ tent of the benefit in question. A greater expected benefit is worth greater risk than a smaller expected benefit. Avoiding HIV is cer‐ tainly a benefit, but the probability that Lulu and Nana would have contracted HIV is low. In contrast, the unknown effects of the edit‐ ing could cost them a normal life. Given our ignorance of the full ramifications of changing a gene, what could justify taking the risk of a gene‐editing trial in humans? The answer is, if the embryo had a catastrophic single gene disorder. Several genetic disorders, such as BRAT 1, JAM3 and PHGDH, are lethal in the neonatal period, so for embryos with them, gene editing is potentially life‐saving.8 There is a risk of off‐target mutations, but the expected harm of such mutations is arguably no worse than the fate of the unedited embryos. The geneticist George Church has defended He's research on the grounds that HIV is a public health problem for which there is no cure or vaccine.9 Church is right to the extent that there is no prob‐ lem in principle with editing out the CCR5 gene in the future. What he fails to take into account, however, is that Lulu and Nana are being used, at great risk, and without proportionate benefit, when there are more ethical experimental designs that would meet the need for greater knowledge of the effects of editing genes. At the conference at which He presented his experiment, George Daley, the Dean of Harvard Medical School, indicated that Huntington's disease or Tay–Sachs disease might be suitable targets for gene editing.10 It is not clear whether Daley is endorsing these as first‐in‐human trials. Huntington's disease is very different to Tay– Sachs disease. Babies with Tay–Sachs disina ease die in the first few years of life; people with Huntington's disease have around 40 good years. Hence Tay–Sachs disease is a better candidate for early trials, as babies with that condition have less to lose. This mirrors the ratio‐ nale for experimenting with gene therapy on babies with a lethal form of ornithine transcarbamylase (OTC) deficiency rather than on adults with a mild form, such as Jesse Gelsinger who lost his life in a badly designed gene therapy trial in 1999.11 He Jiankui's trial was unethical, not because it involved gene ed‐ iting, but because it failed to conform to the basic values and princi‐ ples that govern all research involving human participants. Further into the future, if gene editing can be done without off‐ target mutations, it could be used to address genetic dispositions to common diseases, such as diabetes or cardiovascular disease. These involve tens or hundreds of genes. In principle, gene editing could be used to modify many genes accurately. Gene editing has been suc‐ cessfully employed to remove 62 porcine endogenous retroviruses from a kidney cell line.12 It is notable that the first human gene‐edited babies were en‐ hanced to have resistance to a disease, not to treat an existing disease. In future, perhaps gene editing will be used to engineer super‐resistance to infectious threats. At the Second International Summit on Human Genome Editing, where He revealed his research, the National Academies of Science, Engineering and Medicine called for a ‘translational pathway to human germ line gene editing’. In our view, to be ethically justifiable, such a ‘translational pathway’ should be: catastrophic single gene disorders (like Tay–Sachs disease), then severe single gene disorders (like Huntington's disease), then reduction in the genetic contribu‐ tion to common diseases (like diabetes and cardiovascular disease), then enhanced immunity and perhaps even delaying ageing.

#### Regulation of biotechnology is good

Xue et al. 21 (December 15th, 2021 | Yang Xue, Hanzhi Yu, and Geng Qin | “Towards Good Governance on Dual-Use Biotechnology for Global Sustainable Development” | <https://doi.org/10.3390/su132414056> | DOA: 6/22/2022 | SAoki)

Under the framework of the above-mentioned principles and objectives, the experimentalist governance model requires that grassroot practitioner should be provided with the power to act in accordance with local conditions. We believe that in view of the characteristics of dual-use biotechnology risks, different countries need to promote three aspects of work according to their actual conditions. First, it is important to seek a dynamic balance between “hard law” and “soft law”. Facing the dual-use risk of biotechnology, countries need to find a dynamic balance between “hard law” and “soft law”. Soft law consists of democratic, open, universal and normative rules through the participation of stakeholders to regulate the social relations in biosafety governance, including its guidelines, codes, standards, and norms. It is therefore necessary to protect social and public interests, encourage scientific and technological research and industrial innovation, and ensure that the development of dual-use biotechnology is in accordance with the law and regulations. Due to the difficulty to meeting the demands for legal adjustment of new social contradictions caused by the dual-use risk of biotechnology by simply creating high legislative costs alone, and existence of complicated biological safety risks, no country has a panoramic understanding of the possible consequences of such risks, and some hidden dangers of such risks are far from being fully exposed. It will be increasingly difficult to supervise biotechnology as it gains momentum, as it is necessary to keep up with biotechnology through soft law, improving governance efficiency through “easily adjustable and easily controlled” mechanisms, and forming a policy reserve of national governance rules. Noticeably, integrating hard and soft law to create a prevention network needs a dynamic adjustment mechanism [54]. The most valuable, promising results of dual-use biotechnology are often produced in the early stage of research. Therefore, application of soft law, such as a code of conduct and professional rules, should initiallypredominate. As new technologies are being industrialized, regulation through hard law should be strengthened. Second, to develop a dynamic consultant mechanism with multi-stakeholders in accordance with specific national conditions, the governance of emerging technologies should be the final outcome of interactions of socio-political management under the collective consultation of social actors [55]. This interactive mechanism should balance and coordinate the views and propositions between scientists and other stakeholders, thus deepening trust and integration. At the same time, biotechnologist can be encouraged to discuss issues such as social risk, which will be an important part of their scientific research activities in the future [56]. When such interactions produce a mutual understanding and shared vision, these biologists will form an “autonomous network” in which several entities and regulatory agencies will pool their social resources, intellectual expertise and interests [57]. With the advancement of dual-use biotechnology, this autonomous network must have the capability of dynamic learning and adaptive capacity. Multi-level organizations, including government regulatory departments, scientific research institutions, and industrial associations should carry out popularize science to improve the public understanding of dual-use biotechnology, enhancing enthusiasm for participating in and supervising the development of dual-use biotechnology. These activities can build public confidence in dual-use biotechnology and create a social environment more conducive to its sustained and healthy development. In short, government supervision should mobilize social forces, promote the orderly participation in the governance of the dual-use risk of biotechnology so that those social forces will jointly assume responsibility, formulate the rules, minimize risks and share in the outcome. Third, to implement dynamic supervision of hierarchical management and risk assessment according to actual needs, each country should engage in hierarchical management and provide dynamic supervision mechanism for risk assessment. The idea of implementing hierarchical management of risks in the field of biosafety has become a common choice of major countries throughout the world yet have different characteristics. The “Biosafety Law of the People’s Republic of China” of 2020, emphasizes that “the state implements classified management on biotechnology research and development activities,” and that biotechnology research and development activities should be classified into high-, mediumand low-risk categories according to the amount of harm these activities may cause to public health, industry, agriculture, and the environment [58]. The “Dual-Use Research of Concern” (DURC), conducted by the National Science Advisory Board for Biosecurity (NSABB), focuses on 15 hazardous biological agents or toxins and seven types of partial dual-use research [2]. Furthermore, according to a country’s own situation, it is necessary to develop risk assessment models by means of scenario analysis for policy makers to formulate and revise the laws and regulations [59,60]. In 2012, Bansak and Tucker proposed a 3 × 3 matrix model for risk assessment of dual-use biotechnology based on two key variables: abuse risk and controllability (Table 1). They then divided the abuse risk variables into four types: availability, vulnerability, potential hazard, and potential abuse crisis. The abuse risk can be high, medium, or low. Countries can modify the key variables of the model as needed.

### 2AC – Bio-Revolution Ext

#### **Bio-revolution advancements risk extinction from a laundry list of factors**

Xue et al. 21 (Xue, Yang, Hanzhi Yu, and Geng Qin. 2021. "Towards Good Governance on Dual-Use Biotechnology for Global Sustainable Development" Sustainability 13, no. 24: 14056. https://doi.org/10.3390/su132414056)\*added [unseen] nihara

Abstract: Dual-use biotechnology faces the risks of availability, novel biological agents, knowledge, normative, and other dual-use risks. If left unchecked, these may destroy human living conditions and social order. Despite the benefits of dual-use technology, good governance is needed to mitigate its risks. The predicaments facing all governments in managing the dual-use risks of biotechnology deserve special attention. On the one hand, the information asymmetry risk of dual-use biotechnology prevents the traditional self-governance model in the field of biotechnology from playing its role. On the other hand, top-down public regulation often lags behind technological iteration due to the difficulty of predicting the human-made risks of dual-use biotechnology. Therefore, we argue that governance of the dual-use risks of biotechnology should avoid the traditional bottom-up or top-down modes. We suggest the governance for dual-use biotechnology could be improved if the four-stage experimentalist governance model is followed. The first stage is to achieve consensus on a broad governance framework with open-ended principles. The second stage is for countries to take action based on local conditions and the open-ended framework. The third stage is to establish a dynamic consultation mechanism for transnational information sharing and action review. The fourth and final stage is to evaluate and revise the global governance framework. New dual-use biotechnology, represented by gene editing, synthetic biology, and gene driving, has brought great benefits to human health and welfare, but may also be used for the development of biological weapons or bioterrorism. The international community recognizes the potential social and economic benefits of dual-use biotechnology, but it is difficult to prevent this technology from being misused or abused. What are the risks of dual-use biotechnology? What are the difficulties and challenges in the current risk management system, and can they be resolved? This paper explores these questions to deepen our understanding of the risks of dual-use biotechnology and countermeasures so that such technology can benefit sustainable development of humanity. Keywords: risks of dual-use biotechnology; double predicament; experimentalist governance model 1. Dual-Use Risks of Biotechnology and Countermeasures 1.1. Definition of “Dual-Use Biotechnology” In the military field, “dual-use” biotechnology refers to both civilian and military technology [1]. In the civilian field, it refers to a legitimate scientific purpose that yields information or technologies that may be misused to pose a threat to public health or other aspects of national security [2]. Dual-use biotechnology has benefits (such as promoting scientific progress or improving public health) but also has the potential for malicious abuse or misuse (such as bioterrorism). At present, internationally recognized dual-use biotechnology consists of technology used for acquiring new types of biological or molecular materials (combinatorial chemistry and high throughput screening, DNA shuffling, and directed evolution), directed design technologies (protein engineering, virus genome synthesis, standardization in synthetic biology), technologies for manipulating biological systems (development of psychoactive drugs, synthesis of peptide bioregulators, immune regulation, personal genomics, RNA interference, transcranial magnetic stimulation), and technologies for the packaging and delivery (chemical micro-processing equipment, gene therapy, aerosol vaccine). Tucker lists three characteristics of dual-use: (1) its technical attributes, including availability, abuse susceptibility and potential harm caused by abuse; (2) its controllability, including concretization (the materialization of technology), maturity, convergence, development speed and international diffusion; and (3) the reducibility to the state, institutional, individual, product and knowledge levels [3]. However, due to its ubiquity, it is difficult to manage the risks of all dual-use biotechnologies. Therefore, NSABB has adopted a strategy of determining a limited scope of knowledge, products or technologies produced by life science research that is most likely to be misused to threaten national biosafety. This part of research is referred to as “dual-use research concerns”, and encompasses 15 key biological agents or toxins and seven types of dual-use research [4]. 1.2. Four Types of Risks of Dual-Use Biotechnology Tucker [3] categorized four abusable risks of dual-use biotechnology in his book Innovation, Dual-use and Safety: Managing the Risks of Emerging Biological and Chemical Technologies. These risks are availability, novel biological agent, knowledge, and normative. 1.2.1. Accessibility Risks Accessibility is the difficulty in obtaining dual-use biotechnology. It is the first step of the intentional misuse of biotechnology, including obtaining hardware, software, and intangible information that can be applied to such technology for non-state actors to carry out bioterrorism activities. In the field of dual-use biotechnology, non-state actors can include ethnic separatists, transnational criminal organizations, terrorist organizations, cults, biohackers, and others who engage in covert behavior, have more freedom to conduct research, and are more difficult to supervise than state actors. At the Eighth Review Conference of the Convention on the Prohibition of Biological Weapons, the U.S. government announced that bioterrorism plots had been foiled by Kenya and Morocco. In addition, more than 15 criminal cases in the past ten years have involved the use of biological weapons in the U.S. There is therefore increasing concern over non-state actors using dual-use biotechnology to carry out bioterrorist attacks [5]. There are three accessibility risks of dual-use biotechnology. One is the disclosure of key technical information, such as key gene sequences of highly pathogenic pathogens that can be easily obtained from academic conferences, journals and public databases. In 2011, scientists from the United States and the Netherlands published academic papers on the transmission ability of highly pathogenic H5N1 influenza virus in mammalian cells, in which the methods of modifying the virus so as to enhance its transmission ability were made public [6]. This event that triggered global concern about the dual-use risk of biotechnology [7]. In addition, it is now easier than ever to obtain key experimental materials. In light of the industrialization of biotechnology, biotechnology enterprises can provide technical services and related reagents, including the detailed steps of entire experiments. Anyone can readily order laboratory equipment, consumables and substitutes online, and each year these become less expensive, so it is not difficult to set up a simple biology laboratory [8]. Finally, there are more ways than ever to obtain technology. More methods of communication have emerged outside of traditional channels in recent years, including the International Genetic Engineering Machine Competition (iGEM) and other international biology academic competitions, as well as online forums such as DIY biology. 1.2.2. Novel Biological Agent Risks Novel agent risks are the identification or development of new biological agents or toxins with the assistance of dual-use biotechnology. These risks also encompass “gain of function” research into pathogenic viruses, including combinatorial chemistry, high-throughput screening, DNA shuffling, directed evolution or protein engineering [3]. For example, gene editing technology, represented by CRISPER-Cas9, can greatly change the biological traits of pathogens, animals and plants, and even humans in a short time. Gene synthesis technology can artificially resurrect extinct pathogenic viruses, so that bacteria and viruses with higher pathogenicity can be synthesized, the receptors of which may have unprecedented biological characteristics [9]. In 2018, Canadian scientists obtained overlapping gene fragments through mail order, splicing them to synthesize a horse pox virus which was similar to the smallpox virus [10]. These artificially synthesized viruses are more capable of infecting, spreading, killing, and escaping than natural viruses, so it is more difficult to trace their origins. In addition, RNA interference and personal genomics, realized by gene driving technology, may not only be used as crowd-specific weapons to reduce human reproductive capacity and change the number of specific human populations, but also be used to manufacture insect weapons for transnational transmission of dengue fever, Zika, and other diseases. 1.2.3. Knowledge Risks Knowledge risks reflect the fact that as human understanding of life science at the molecular and system levels deepens, research may be abused to attack knowledge loopholes. For example, the study of immune regulation is intended to improve human immunity to infectious diseases. However, a specific pathogen can be modified through engineering to bypass acquired or innate immune barriers, while importing immunosuppressants and biological weapons into specific populations to achieve the double purpose of reducing immunity and causing disease [11]. In addition, dual-use biotechnology can be used to subvert traditional weapons and equipment and attack the weaknesses in national defense military facilities. For example, at the Eighth Review Conference of the States Parties to the United Nations Biological Weapons Convention (BWC), the U.S. military revealed that it had been able to use gene synthesis technology to produce material damage factors aimed at non-living substances. Such non-traditional weapons can attack “rubber and metal parts, fuel, food and equipment”, accelerate the corrosion of rubber and metal parts of weapons, and destroy military fuel, supplies, instruments and equipment [5]. In theory, gene drive technology could be used to reduce human reproductive capacity and alter the size of specific human populations [12]. In recent years, biological scientists in the United States, Europe, and other developed countries have repeatedly called for appropriate biosafety precautions to minimize the uncertain risks of gene drive technologies to the environment, plants and animals, and human health [13]. 1.2.4. Normative Risks Normative risks use dual-use biotechnology to destroy the framework of international biosafety governance conventions, including the Biological Weapons Convention (BWC). For example, new neuropeptide biological agents that can influence and manipulate specific wills or emotions have been manufactured. These agents can induce visual or auditory hallucinations, and cause disability or even extreme hysteria during interrogation, violating the human rights of detainees and breaking international humanitarian law. Normative risks also concern the self-regulation of scientists. In 2018, He Jiankui of China’s Southern University of Science and Technology created the world’s first gene-edited infant, in violation of the international regulation that “gene-edited early human embryos (within 14 days of age) and germ cells should not be used for pregnancy.” Normative risks also involve the application of dual-use biotechnology to existing international ethical principles and norms. He Jiankui violated the Helsinki Declaration, the International Ethical Guidelines for Biomedical Research Involving Human Subjects, and other international ethics, and principles and common views designed to “respect and protect subjects, maximize subject benefit and avoid subject injury as much as possible” [14]. 1.3. National Responses to Dual-Use Risks of Biotechnology From the perspective of global practice and international experience, the rules of governance towards dual-use risks of biotechnology consist of hard and soft laws. “Hard laws” are conventions, laws and regulations that are enforced using national coercive power. “Soft laws” are democratic, open, universal and normative rules formulated and recognized through extensive participation and joint consultation of all social parties, including codes of conduct and professional self-discipline. Hard and soft rules are not mutually exclusive. For example, the effectiveness of voluntary standards and guidelines can be strengthened through the enforcement of criminal law or tort law so as to punish harm caused by accidental or intentional abuse [15]. By the end of the 20th century, all countries had begun to pay attention to the four risks caused by dual-use biotechnology. In “Biotechnology, Weapons, and Humanity” (1999), the British Medical Association, for the first time in its history, expressed concern about the malicious abuse of genetic engineering, biotechnology and other emerging technologies, and suggested that social supervision should be strengthened and moral standards be established within the sciences to prevent the exacerbation of potential risks. In 2002, the Chinese government promulgated the “Regulations on Export Control of Dual-use Biological Products and Related Equipment and Technologies” to restrict the export of dual-use biological products and related equipment and technologies, to prevent them from being used to manufacture biological weapons [16]. In 2003, the National Academy of Sciences of the United States released a report, “Biotechnology Research in the Era of Terrorism” (the Fink Report), a pioneering document of the research into national security risks in the field of life science. The Fink Report identified seven types of biological experiments with dual-use risks, including microbiology and molecular biology experiments, which require safety inspections before project approval and funding [17]. To this end, the U.S. government set up a federal advisory committee under the National Biosafety Scientific Advisory Committee, which took charge of formulating policies and recommendations on dual-use research concerns (DURC) in life science research [2]. In 2004, the World Health Organization (WHO) announced that “every major new technology can be used not only for peaceful purposes, but also for hostile purposes. To tackle the common security challenges to all mankind, we should put the protection of biotechnology from being maliciously used above the security interests of all countries.” In 2009, the European Union passed Regulation No. 428/2009, which listed the controlled goods subject to export restrictions and licenses, including dual-use biological materials and production equipment [18]. In the same year, the Federation of American Societies for Experimental Biology (FASEB) warned that “scientists who educate their research on potential dual-use shall pay more attention to taking necessary safety control measures” [19]. Since 2011, countries have paid more attention to the dual-use of biotechnology. After the research results on genetic modification of H5N1, the highly pathogenic avian influenza virus published in “Nature” in September 2011 triggered global controversy. The United States issued several regulatory policies concerning dual-use biotechnology, including the “Regulatory Policy on Dual-use Life Science Research of the U.S. Government” (2012) by the National Science Advisory Board for Biosecurity (NSABB), and the “Regulatory Policy of Dual-Purpose Research Institutions in Life Sciences of the U.S. Government” (2013) by Office of Science and Technology Policy (OSTP) [20]. In 2014, NSABB halted research on the Gain of Function of highly pathogenic avian influenza H5N1, severe acute respiratory syndrome (SARS) and middle east respiratory syndrome (MERS) viruses, and required all independent and federal research institutions to strictly abide by the “Dual-use Research of Concern” (DURC) from 24 September 2015, and established a special entity review body, the IRE. In 2015, the U.S. government established the “Institutional Regulatory Policy Concerning Dual-use Research in Life Sciences” [21]. In 2018, the U.S. government issued a “National Biodefense Strategy,” and the National Academy of Sciences of the United States released the report “Biodefense in the Age of Synthetic Biology”, which emphasized the imminent threat of synthetic biotechnology being used as a virus weapon for terrorist activities by biohackers [22]. In 2017, the Chinese government issued “Safety Management Measures for Biotechnology Research and Development” to impose special control measures for biotechnology research and development activities with high risks of causing serious diseases in humans or animals [23]. While strengthening supervision at home, some countries have begun to mitigate the dual-use risks of biotechnology on international governance platforms. In 2016, the United States and Britain submitted Working Papers No. 10, No. 14, and No. 17 to the General Assembly at the Eighth Review Conference of the States Parties to the BWC. Germany submitted ‘Control Measures of Dual-use Materials’ at the preparatory meeting, which emphasized that the dual-use of new biotechnology poses a greater threat of large-scale epidemics and bioterrorism [24–27]. The management of dual-use risks of biotechnology was put on the international agenda and became a hot topic in the field of international arms control. To counter the possible abuse and misuse of biotechnology, Working Paper No. 30, jointly submitted by the Chinese and Pakistani governments, proposed the formulation of a model code of conduct for biological scientists. It would be binding upon all biological scientists worldwide when conducting biological research. In this important meeting, the state parties agreed to “encourage the promotion of a culture of responsibility amongst relevant national professionals and the voluntary development, adoption and promulgation of codes of conduct” [28]. At the international level, UN Security Council Resolution 1540 has been passed as the principled framework, BWC has been adopted as the basic norm, and international export control standards have been established by informal associations, including Australia Group and similar organizations. These conventions and standards have been adopted by the international community, and have been enshrined in laws, regulations and operational mechanisms, including China’s “Regulations on Export Control of Dual-use Biological Products and Related Equipment and Technologies”, the U.S. “Regulations on Export Administration”, and Australia Group’s “Guiding Principles on Export Control of Biosensitive Items”. 2. Double Predicament: Challenge of Governing Dual-Use Biotechnology Although the public now has a clearer understanding of the risks posed by dual-use biotechnology, and the international community has made great efforts to mitigate those risks, disputes over safety and ethics are still common in formulating governance policies worldwide. In the field of stem cell research, the Japanese government revised its “Treatment Policy for Specific Embryos” in 2019, which approved research on cultivating human organs for transplantation in animals by implanting human stem cells into animal embryos. At the same time, it lifted restrictions on the termination of humananimal chimeric embryos within 14 days and restrictions on implanting those embryos into surrogate uteruses [29]. Such embryos may develop into human-animal chimeras, raising ethical disputes over the blurring of boundaries between human and non-human animals. The cause of the governance disputes is that dual-use biotechnology entails human-made risks that are difficult to control in addition to information asymmetry risks. As a result, the traditional self-governance of the biotechnology industry is placed in a predicament where it is difficult for governance models to keep up with the development of emerging technologies. 2.1. Predicament 1: The Information Asymmetry Risk of Dual-Use Biotechnology Keeps the Traditional Self-Governance Model in the Field of Biotechnology from Playing Its Role In contrast to the field of nuclear technology, in the biological sciences, the autonomy of stakeholders is important [30]. The biotechnology industry has a long tradition of self-governance, and there are many historical success stories. However, the information asymmetry risk of dual-use biotechnology has caused problems for the traditional model of industry self-governance. Dual-use risks of biotechnology show obvious characteristics of information asymmetry. Since the research and development environment and application scenario of dual-use biotechnology are concealed, anonymous and opaque, the public may not be able to ac-quire enough information about the dual-use risk of biotechnology. The two hidden risks of information asymmetry are as follows. The research of scientists who have mastered dual-use biotechnology cannot be monitored effectively by the institutions with which they are affiliated. This could pose risks to national biosafety and public safety. Moreover, is difficult to supervise the application of dual-use biotechnology in the early stages of disease diagnosis and treatment, as well as drug research and development. In response to these information asymmetry risks, professionals in the life sciences have always emphasized enhancing professional internal supervision mechanisms, but this may worsen information asymmetry. Researchers concerned with dual-use biotechnology acquire their professional skills in a closed environment, at scientific conferences, under the guidance of risk or ethics expert committees, and peer review of papers submitted for publication. All of these have formed an enclosed internal supervision mechanism for research, training and practice. These monitoring mechanisms determine that the identification and judgment of dual-use risks of biotechnology depend on the expert group from within the system, which may have some negative effects. For example, the internal standards and operational mechanisms within the scientific community may exclude the concerns, doubts and interventions of the government and the public. Even the judicial system, as a third party with traditional punitive capability, should rely on the judgment standards and operational systems established by the life science community in resolving legal disputes caused by the misuse of dual-use biotechnology. Furthermore, biotechnology implementers who tend to be self-governing within the industry will resort to information asymmetry to deliberately resist the design of the public power system, which exacerbates the dual-use risks of biotechnology. Some biological scientists reject the top-down public power supervision system, which is most obvious in the field of synthetic biology research. Some technical experts in this field believe that supervision by public authorities can’t keep up with the pace of technological change, and that the bottom-up industry self-regulation is superior to the traditional “hard law” in terms of time cost, and will be less likely to be resisted by practitioners [31]. However, bottom-up industry self-regulation, or other self-regulation modes, have failed to regulate the malicious abuse of the synthetic technology of known pathogenic viruses. It is also difficult for such self-regulation models to accommodate the greater risks caused by the creation of synthetic organisms based on standardized component methods. In addition, excessive reliance on industry self-regulation will easily lead to the public’s misunderstanding of biotechnology development. Thus, the public may tend to believe that biotechnology development will undermine social consensus on biotechnology development and restrict the sustained and rapid progress of biotechnology if scientists assume certain technological risks after taking internal decisions to lift restrictions in some areas of research without having arrived and an informed consensus with the public. The public can do nothing except express doubt in the technology once such risks arise. The He Jiankui incident of 2018 was an international controversy for two reasons. He violated institutional and international research regulations when he applied CRISPERCas9 gene editing technology to editing human embryos, and he conducted his experiments while claiming to be working on a cure for AIDS. As the public expects diseases to be cured and people to live longer, the internal private domain in life sciences will contradict public opinions on safety risk management and control. In a larger sense, different stakeholders have different understandings of and demands for the risks of dual-use biotechnology among biological scientists, social science experts, industries, media and the public. 2.2. Predicament 2: Top-Down Public Regulation often Lags behind Technological Iteration Due to Difficulty in the Prediction of Human-Made Risks of Dual-Use Biotechnology It is difficult to predict the human-made risks of dual-use biotechnology before it has been used. According to Giddens, scientific and technological risk is a kind of “man-made risk” [32], and technology is neither good nor evil in itself. People use technology for good or evil purposes. Compared with the risk of public health and safety, the risk of biotechnological dual-use depends more on the intention and ability of its users. Therefore, the cause of biotechnology dual-use risk is stakeholders’ behavior out of control under the comprehensive influence of both the internal and external environment. While human beings are innovating dual-use biotechnology, they are endeavoring to modify the rules that should apply to it. However, since the human-made risks of dual-use biotechnology cannot be predicted, since it is easy to find loopholes in rules and policies, and since traditional “hard law” and other governance rules are slow to adjust, governance innovation cannot keep up with technology. The hope is that once governance rules are established, they will be able to keep pace with technological changes by establishing a system of adaptive governance for continuous technology evaluation. With the development of dual-use biotechnology and the deepening understanding of its risks, these methods usually require a cycle of data collection, evaluation and rule modification [33]. In other words, new scientific discoveries and knowledge in other fields must be applied to the iterative decision-making of the dual-use risk of biotechnology [34]. However, such governance innovation ideas tend to challenge the scientific formulation of risk governance. In summary, the risk of information asymmetry of dual-use biotechnology has placed the traditional biotechnology industry self-governance model in trouble; at the same time, the difficulty of predicting the human-made risks of dual-use biotechnology leads to public regulation lagging behind technical iteration. The result is failed governance of dual-use risks of biotechnology. In the 1920s, Ogburn observed that as technology advanced, people’s habits, thoughts and social arrangements fell behind, resulting in the decisive influence of technology on society [35]. The social reality since World War II has demonstrated that social harmony exists only in the minds of idealists. In contrast, heterogeneity is a basic feature of modern society. On this premise, the predicament of the management of dual-use risk of biotechnology reflects a failure in the checks and balances of the social governance structure. The risk governance rules cannot cover the ~~blind~~ [unseen] spots of non-state actors and all biotechnology R and D and application scenarios. It is difficult for the system design mechanism to balance and coordinate the viewpoints and propositions in the life sciences and social sciences, in addition to finding a consensus among all parties. The balance between technology iteration and governance rules, and between private subjects’ demands and social consensus is consequently lost.

### 2AC – BCI Impact Ext

#### BCI is 10 times more likely to be an existential risk than nuclear war

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This section will offer a conservative fermi estimate of the existential risk from BCI in the next 100 years. We use the same framework used by Toby Ord to assess other existential risks (2020). The following sections (3.2 to 3.6) will unpack and justify the estimates taken in this section.

Ord outlines two methods of being conservative with risks. One method is to underrate our assumptions such that we don’t overestimate the likelihood of a risk. Another way is overrating likelihood such that we don’t accidentally act in a negative way. When guiding action, the second approach is far more useful, as it is more prudent and more likely to avoid catastrophic failure. However, to make the strongest case possible, in this paper I will be using the second approach; and will show that even with our most conservative, lower-bound assumptions, the risk from BCI is significant. In fact, our risk estimate would need to be almost an order of magnitude lower (~10X) to be on par with the probability Ord assigns to existential risk from nuclear war in the next 100 years

#### BCIs are an impact multiplier for AI – allows superintelligence to literally control our bodies

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The article falls in four parts: The first part presents some basic concepts and definitions of cyborg technologies and neuroweapons as part of an emerging neuroscientific security discourse. The second part of the article sets the general framework and context of multi-domain warfare in which these technologies are shaped and applied as military capabilities. The third part introduces the concepts of 'collaborative risk mediation' and 'composite intentionality' stressing the mutual entanglement and 'interference' of human and artificial intelligence in the emerging domain of neurospace. In the last part of the article, we address the urgent need of governing principles and guidelines, including the legal and ethical aspects of cyborg warfare. Thus, we call for interdisciplinary discussion of the emergent frontiers and practices of neurospace and the negotiation of neuroethical standards in the international security community. At the center of these discussions, we pose the question of 'meaningful human control' and responsibility in networked military command.

The Neuroscientific Security Discourse and the Realm of the Cyborg Warrior

As a first step in our inquiry, we need to distinguish between neurotechnology, which is used to detect, affect, and target human brain activity (e.g.: improve, repair, degrade or manipulate cognitive skills), on the one hand, and AI, which is used in computers, sensors, and robotic systems, on the other hand. A 'neural network' is a specific form of AI, consisting of a set of algorithms resembling the working human brain. A 'neuron' in a neural network is a mathematical function that collects and classifies information according to a specific architecture (Chen 2019). Neurocognitive or cyborg networks, on the other hand, are hybrid systems of human and artificial intelligence, i.e. brain-computer networks that integrate the cognitive advantages of humans and computers. For many years, the two sciences, the science of the human brain and the science of AI, have developed side by side, mutually inspiring and informing each other. Now, the scientific exploration of neurotechnology and AI is rapidly converging and accelerating the development of neural feedback systems that allow a two-way communication stream between the human brain and the computer. The convergence of AI and neurotechnology and the implications of integrating, not just combining or 'teaming' human and machine cognition,[4] is the focus of our interest. Humans and computers work together everywhere. This is not new. However, until recently they have done so as separate entities. This separation is beginning to erode, as ubiquitous AI and neurotechnological advances have made the distinction between human and machine cognition unclear and in some cases even obsolete. When we refer to 'cyborg and neurocognitive weapons systems', and not just one or the other, it is precisely because we want to stress this increasing interference of human and non-human cognition, which goes way beyond - and has to be distinguished from - other hybrid technologies such as bionic limbs and advanced hearing or visual aids.

For this same reason, it is important not to confuse the notion of the cyborg warrior with the concept of the 'centaur warfighter' (Scharre 2018: 321), which is often used as a metaphor for human-machine teaming. The two concepts are closely related, but not synonymous. This distinction can be expressed as the difference between integration and automation of machine intelligence, perception, and reasoning. Whereas centaur human-machine teaming consists of humans plus machines, with machines performing clearly demarcated automated functions, the cyborg warrior functions as a neurally enhanced and integrated system architecture,[5] merging human and machine cognition. Centaur human-machine teaming does not necessarily imply cognitive or sensory enhancement of the human operator. Human and machine cognition is not neurally integrated. Instead, humans and machines perform different role-specific tasks that are largely based on predetermined decision models where the machine's role is conditioned by one or more rule sets (Murray & Yanagi 2015: 17).

As opposed to centaur human-machine teaming, cyborgs have no preprogrammed role specifications but adapt continuously to shifting situations and demands in the operational environment. According to Kline and Clynes (1961), such systems can be regarded as 'cybernetic organisms' (i.e. cyborgs) in that they entail both natural and artificial systems that are functional, portable, and/or biologically integrated (Wurzman & Giordano 2015: 90). As such, cybernetic and cyborg systems can be seen as "sophisticated distributed human-machine networks, such as integrated software or robotic augmentations to human-controlled activity, that would fuse and coordinate the distinct cognitive advantages of humans and computers" (Wurzman & Giordano 2015: 90). Consequently, cyborg technologies used in a networked risk environment will "reflect a combination of autonomous initiative and original problem solving by both human and machine. This means shared agency and responsibility in military decisions" (Murray & Yanagi 2015: 17).

The attribution of shared agency and responsibility to humans and machines is central to the definition of cyborg and neurocognitive weapons systems and demarcates a shift from automated decision support to collaborative information and risk management, with human and machine intelligence mediating and co-shaping the perception, organization, and distribution of risk. The advantage of such systems is increased flexibility and accountability insuring human judgment and responsibility over engagements while simultaneously leveraging the precision and speed of AI. This becomes particularly urgent when cyborg technologies are used as offensive weapons systems (Murray & Yanagi 2015: 17).

#### Innumerable bad actors trigger extinction – overarching regulations must stop security risks at their source

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In the light of the above, it becomes clear that Malevolent Cyborgization (MC) could be desirable for a wide range of stakeholders with a heterogeneous set of goals. There is even an overlapping between possible entities, which could be interested in MC and those eligible for MAI as described by Pistono and Yampolskiy. In the following, we first take up the exemplary stakeholders for MAI mentioned in their paper and indicate which motives could justify them likewise as stakeholders for MC showing the parallels between those two phenomena. Thereafter, we introduce additional global effects specific to MC and differing from the MAI scenario.

Military: As already mentioned in the introduction, the military could maliciously employ cyborg soldiers similarly as MAIs “to achieve dominance” through intellectual, strategical or/and possibly physical superiority.

Governments: Through cyborgization, governments could acquire intellectual superiority with the same intentions as for the MAI case: “to establish hegemony, control people, or take down other governments”. Note that these goals can also be reached through a forced cyborgization of inferior quality carried out by governments on people with the aim to subjugate them (e.g. a kind of digital lobotomy suppressing the functionality of the frontal cortex, body hijacking or an automatic red-out of personal information using BCI data could be possible).

Corporations: The authors state the following motives for the MAI case: “trying to achieve monopoly, destroying the competition through illegal means.” As cyborgs with enhanced intelligence could be able to process considerably more information than non-enhanced humans, the transparency on the market may suffer of it allowing them to take over and build monopolies in different fields, which is again similar to the MAI goals.

Villains: Following Pistono and Yampolskiy, possible goals why a MAI could be desirable for villains are: “trying to take over the world and using AI as a dominance tool”. In the case of MC, the same goals would be valid except that Cyborgization will be used primarily as means rather than AI. (But obviously, cyborgs of all the eligible entities could also merge with AI, which would represent an extremely risky scenario. We will analyze this matter later in the next section).

Black Hats: Through their enhanced cognition/intelligence, cyborgs could have an enhanced ability to detect security holes at their disposal and could for instance develop better heuristics for password-guessing. They might therefore, likewise black hats with a MAI, secretly attempt “to steal information, resources or destroy cyberinfrastructure targets”.

Doomsday Cults: The goal of “attempting to bring the end of the world by any means” using a MAI can obviously also build a basis for cyborgs involved in doomsday cults.

Depressed: Depressed cyborgs could hand over the liability for their live or death to their artificial part e.g. by setting a self-destruction mode stopping vital functions in the brain. They could thereby reach the goal to commit suicide such as depressed people using MAI to be able to “commit suicide by AI”.

\*Malicious individuals: As described in the introduction, \*malicious individuals could be interested in cyborgization to be able to manipulate and control others. Moreover, \*malicious individuals could wish to historically gain notoriety with regard to their wrongdoings. The aim to “trying to add their name to history books in any way possible” seems to not only be a possible motivation for MAI, but also for MC.

Criminals: According to the authors, criminals could attempt “to develop proxy systems to avoid risk and responsibility”. The same is possible in the MC scenario. A malevolent cyborg could for instance wirelessly establish a connection to proxy systems to commit crimes at other places. \*They could conceal the fact \*they are a cyborg so that nobody would suspect \*them of being involved in crimes.

AI Risk Deniers: For the case of MC, it would be appropriate to instead address “Cyborgization Risk Deniers”. This stakeholder could let people believe that cyborgization is not more than a Science Fiction scenario and leave non-enhanced humans in ignorance yielding an even greater disparity between cyborgs and the regular humans.

AI Safety Researchers: For the MAI scenario, the authors state “AI Safety Researchers, if unethical, might attempt to justify funding and secure jobs by purposefully developing problematic AI.” If in the future a discipline like “Cyborg Safety” existed, malicious people working in this field could deliberately develop unsafe cyborg systems e.g. such that than can easily be exploited, so that they can ensure their occupation over and over again.

#### Unregulated BCIs cause global upheaval – hierarchies cause conflict, the concept of humanity is destroyed, and a genocide of people who can’t afford enhancement

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After having pointed out the similarities between the entities which could be interested in the usage of MAI on the one hand and MC on the other hand, as well as having clarified the conformity of the achievable unethical objectives in both scenarios, we will now allude to some additional societal impacts that can be specifically caused by MC (and not necessarily by MAI) through the phenomenon of the human mind transcending its biological boundaries:

New hierarchy in \*humankind: Cyborgization could lead to a hierarchy of enhancement forming an open-ended continuum ranging from completely non-enhanced humans to cyborg versions 1.0, 2.0 and so forth, even if performed with positive or neutral intentions toward humans. This development follows from the common practice of software updates and hardware tuning. Over time, the biological part of the cyborgs is furthermore going to be surpassed by the non-biological part getting faster with exponential pace. Like in many other cases, the quality of the “products” people can afford would depend on their financial status and a lot of people might irreversibly stay behind. This circumstances could lead to social unrest and conflicts. This background provides a strategical basis for every conceivable kind of MC.

Global identity crisis: Cyborgization could initiate an unforeseen social transformation shaking the notion of “human being”, “identity” and “self” for the questions could be: “At what time does someone stop to be a human?”, “Does the self include the machine part?”, “What happens if the non-biological part starts to prevail – does the cyborg become a machine?”. Psychological studies actually demonstrated, that human self-perception is extremely flexible (Clark 2004). Likewise, the first officially recognized cyborg (the expression cyborg is here used in a broader sense) Neil Harbisson, which is equipped with an eyeborg stated (Jeffries 2014): “I don’t feel like I’m using technology, or wearing technology. I feel like I am technology. I don’t think of my antenna as a device - it’s a body part.” The additional perception through the eyeborg fully integrated the functionality of his brain leading to a seamless unity. This gives an indication that future cyborgs might extend the limits of “identity” and “self” in addition to the higher level of intelligence. This could lead to a strong sense of alienation between non-enhanced humans and cyborgs raising tensions and providing a fertile ground for MC.

Evolutionary upheaval: A world of work with extremely productive and superintelligent cyborgs could piece by piece make less enhanced humans superfluous. MC could at a certain point introduce the extinction of those people leading to a disaster for humanity. Equally, cyborgization could lead to an evolutionary advantage and some could consider it as the next step in evolution. In this case cyborgs would supersede non-enhanced humans in the long run and this process might be accelerated by means of MC. The historian Yuval Noah Harari claimed: “I think it is likely in the next 200 years or so homo sapiens will upgrade themselves into some idea of a divine being, either through biological manipulation or genetic engineering of by the creation of cyborgs, part organic part non-organic. [..] It will be the greatest evolution in biology since the appearance of life. Nothing really has changed in four billion years biologically speaking. But we will be as different from today’s humans as chimps are now from us” (Knapton 2015). But he also addressed the increasing gap between poor and rich in this future, which could lead to a dying out of the poor, while the rich could live forever.

### 2AC – BCI Impact Ext – Adversarial Use

#### China will use BCIs for brain control, violating basic human privacy and dignity.

Corr 21 (Anders Corr, "The Ethical Risks of China's 'Brain Control' Tech", theepochtimes, https://www.theepochtimes.com/the-ethical-risks-of-chinas-brain-control-tech\_4167051.html, 12-23-2021, Accessed 6-22-2022)//ILake-SG

The Ethical Risks of ‘Brain Control’ Technologies The combination of the Chinese military’s research into “brain control” and the regime’s genocidal “brainwashing” should be taken more seriously by ethicists and government officials in the United States, Europe, and among Asian allies. According to bioethicists Marcello Ienca (University of Basel in Switzerland) and Pim Haselager (Radboud University Nijmegen in the Netherlands), brain-control interfaces can be used to “hack the brain” in a way that violates the individual’s privacy and agency. Ienca is currently at the École Polytechnique Fédérale de Lausanne. BCIs provide a brain-machine interface, either through direct implantation of electrodes in brain tissue, or through more temporary wearable technology that keeps the electrodes outside the intact skull, according to the Ienca-Haselager paper, which is peer-reviewed and appeared in the April 2016 issue of Ethics and Information Technology. BCI is designed to assist patients who suffer from neurological diseases that impair sensory-motor functions. BCIs can help them, for example, communicate to a robotic arm that provides the patient with increased control of their environment. BCIs are also being researched by the U.S. Defense Advanced Research Projects Agency (DARPA) for military applications, such as more rapid and efficient human operational control over a fighter drone. But Ienca and Haselager cautioned in the paper, “Hacking the brain: brain–computer interfacing technology and the ethics of neurosecurity,” that the ethical risks of BCI technologies are underexplored relative to their rapid development. “Neurocrime” and “brain-hacking,” the researchers argued, including “illicit access to and manipulation of neural information and computation,” are a major risk to the individual’s “neurosecurity” such as individual privacy and agency. At risk are the most basic qualities of individuality, including consciousness, volition, perception, thinking, self-identification, judgment, language, and memory. Ienca and Haselager argued that “misusing neural devices for cybercriminal purposes may not only threaten the physical security of the users but also influence their behavior and alter their self-identification as persons.” Ienca and Haselager identified not only BCIs as “particularly critical” given the potentiality of neurocrime and the function of BCIs for “reading of brain activity,” but also devices known as “neural stimulators.” This latter category of machine-brain interface includes devices for “deep brain stimulation (DBS) and transcranial direct-current stimulators (tDCS).” Ienca and Haselager rightly highlighted the risks of brain readers and stimulators, and argued that “ethical safeguards against these risks should be considered early in design and regulation.” Ethical safeguards, regulation, and emerging international law will be particularly the case as Beijing disregards ethical standards in its attempt to increase its control of the individual within the expanding boundaries of what the CCP considers to be “Greater China.”

#### **Authoritarian regimes have immense incentive to misuse BCIs.**

Rafferty 21 (Expansion Of, "Brain Computer Interfaces: A New Existential Risk Factor \* Journal of Futures Studies", Journal of Futures Studies, https://jfsdigital.org/articles-and-essays/2021-2/vol-26-no-2-december-2021/brain-computer-interfaces-a-new-existential-risk-factor/, 12-2-2021, Accessed 6-22-2022)//ILake-SG

Dissent from within is one of the major vulnerabilities of totalitarian dictatorships. BCIs offer dictators a powerful tool to counteract this weakness. Increases in abilities for surveillance would make it easier to identify and root out dissent or root out skeptics who might betray the party, and thus would make it easier to maintain totalitarian control. While conventional surveillance may allow for a high level of monitoring, such as tracking of citizens’ behaviour and actions, it provides no way for a dictator to peer inside the minds of their subjects. Because of this, the difficulty of identifying the attitudes of careful defectors remains high. BCIs constitute an unprecedented threat here. Surveillance through already existing methods may fail to expose some threats to a totalitarian regime, such as party members who carefully hide their skepticism. But BCI based surveillance would have no such flaw. The level of intrusion here is potentially quite severe. With the advancement of BCIs, it is highly likely that in the near future we will see a rapid expansion in the ability to observe the contents of another’s mind. Some researchers claim that advanced BCIs will have access to more information about the intentions, attitudes, and desires of a subject than those very subjects do themselves, suggesting that even subconscious attitudes and recognition, as well as intentional deception and hidden intentions will be detectable by BCIs (Bunce et al, 2005; Evers and Sigman, 2013). Already, BCIs are able to detect unconscious recognition of objects that a subject has seen but cannot consciously remember seeing (Bellman et al, 2018). Others have even suggested that by more precisely recording the activity of a larger number of neurons, future BCIs will be able to reveal not just perceptions and words, but emotions, thoughts, attitudes, intentions, and abstract ideas like recognition of people or concepts (Roelfsema et al., 2018). Attitudes towards ideas, people, or organisations could be discovered by correlating emotions to their associated thought content, and dictatorships could use this to discover attitudes towards the state, political figures, or even ideas. This would allow detection of dissent without fail and allow a dictator to quell rebellion before a rebellious thought is even shared. Some might hope for BCIs that do not have this level of access, but accessing and recording mental states is a fundamental and unavoidable feature of many BCIs. In order to achieve their desired functions, many BCIs need a clear way to read neural data. Without significant neural data they simply cannot function – it is impossible to translate neural data to exert some function if one does not have access to that neural data. Brain stimulators and BCIs are specifically designed to allow this kind of access; it is crucial for the effective functioning of the device (Ienca, 2015). It is of course possible that BCIs made by some companies will be exclusively targeted to certain sections of the brain, for example, only targeting areas associated with speech, and not targeting other areas associated with emotions or thought. This is conceivable, though it is not clear that all companies and countries would do the same. Furthermore, the utility gained by expanding to other areas of the brain beyond the speech centre means it is highly doubtful the technology will remain restrained indefinitely. It is likely that BCIs will be created by companies, which have strong financial incentive to record the neural states of users, if only to gain more information with which to improve their own technology. This information could be requisitioned by governments, as is frequently done to tech companies at present – even in democratic countries. Further exacerbating this problem, privacy laws have a history of struggling to keep pace with technological advancements. In more authoritarian countries, neural data might be transmitted directly to state records, and the preservation of privacy may not be attempted at all. In essence, BCIs allow an easy and accurate way to detect thoughtcrime. For the first time, it will be possible for states to surveil the minds of its citizens. Deep surveillance of this kind would increase the likelihood that totalitarian dictatorships would last indefinitely.

### 2AC – Bioweapons Impact Ext

#### Bioweapons outweigh nuclear war

Malet 15 (October 30th, 2015 | David Malet | Political Scientist researching and teaching about international security, transnational militancy, and US national security and foreign policy | “Captain America in International Relations: the Biotech Revolution in Military Affairs” | <https://doi.org/10.1080/14702436.2015.1113665> | DOA: 6/22/2022 | SAoki)

Direct effect weapons The United States military is currently developing “a set of design and synthesis processes that will enable the specification of a desired function, and be able to rapidly synthesize a protein that performs the function.” Rather than modifying existing proteins, this biotechnology would allow the creation of new proteins based on specific performance objectives (DARPA, “Protein Design Processes” 1998). The field of genetic protein decoding and engineering of this kind is known as proteomics (Committee 2001, p. 15). Understanding the functions of proteins is key to opening entirely new frontiers in medicine – and warfare. Already, researchers have destroyed targeted cancer cells by using engineered nanoparticles to deliver genes only to the tumor and not to healthy neighboring tissue. Once the genes were inserted, they stimulated the production of a protein that selectively destroys the cancer (BBC News 2009). However, proteomics also opens a different avenue of potential development in biotechnological attacks in shifting away from infectious agents to targeting human bioregulators, natural substances in the body that control automatic processes such as blood pressure and immune responses. Alibek (1999) claimed that the Soviet Union pursued this research into “direct effect weapons” in the 1980s to circumvent the BWC. The result would not actually be an illness, but the turning of the body against itself through disruption, and projects along these lines have at least been considered (Huang and Kosal 2008, p. 9, Preston 2009, pp. 313–314). Interfering with some of the body’s neurotransmitters, for example, could cause memory loss, panic disorder, or depression (Dando, in Pearson et al. 2007, pp. 133–134). NATO has listed “chemical technologies that could act on the central nervous system” as “technologies of interest” (Pearson, in Pearson et al. 2007, p. 89). Defence Studies 333 Chinese researchers Guo and Yang (2005) directly addressed the security applications of such efforts in proteomics, arguing: Direct-effect weapons … can cause destruction that is both more powerful and more civilized than that caused by conventional killing methods like gunpowder or nuclear weapons … A military attack, therefore, might wound an enemy’s genes, proteins, cells, tissues, and organs, causing more damage than conventional weapons could. However, such devastating, nonlethal effects will require us to pacify the enemy through postwar reconstruction efforts and hatred control … [W]e could create a microbullet out of a 1 micron tungsten or gold ion, on whose surface plasmid DNA or naked DNA could be precipitated, and deliver the bullet via a gunpowder explosion, electron transmission, or high-pressured gas to penetrate the body surface. We could then release DNA molecules to integrate with the host’s cells through blood circulation and cause disease or injury by controlling genes. Around the same time, an American biodefense expert added that: If one can disrupt unit loyalty through fear or another emotion, the army would cease to exist as a fighting force. Claustrophobia would make soldiers tear off their protective face mask. Fear, thirst, accelerated heart rate, hypermotility of the gut – these would be the desired peptide effects. Delivery would be accomplished using engineered pathogens, and their primary role in biowarfare would be as delivery systems for direct effect weapons rather than the transmission of infectious disease (Moreno 2006, pp. 178–179).

#### Bioweapons are becoming more accessible and the threat of them is getting worse. Current regulations do not solve and many countries circumvent. We need action fast.

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In June 2018, German police arrested a Tunisian man in Cologne for trying to build a biological weapon using the deadly toxin, ricin.1 In October 2018, researchers flagged a US agricultural program funded by DARPA (Defense Advanced Research Projects Agency) as a potential mask for a bioweapons project.2 At the same time, Russia also claimed that the US had tested biological weapons in Georgia killing over 70 people.3 Further, suspect packages were sent to select targets in the United States in October 2018;4 these packages in addition to being mail bombs also carried a white powder reprising concerns of the anthrax attacks from 2001 which led to the death of 5 people. There has been no incident of biological agents being used as a weapon of mass destruction in the recent past. Yet as the above examples show, there have been attempts to explore and create technologies that could be weaponised by both state and non-state actors. The threat was made apparent by James Clapper, US Director of National Intelligence, who added gene editing in their annual worldwide threat assessment report in 2016.5 Since then, there has been a wider recognition that the advances in technologies and improved access to science have lowered the barriers to creating designer bioweapons. Gene editing using the recently discovered CRISPR/Cas system allows precise editing at a relatively cheaper rate without any high-cost expert training. It is important to note that before gene editing if any bioterrorist wanted to use a pathogen, he/she would have to obtain the pathogen from a restricted source. In many cases of bioweapons use, such as the one in Oregon where followers of Osho Rajneeshee, intentionally poisoned civilians using Salmonella, these pathogens are obtained from scientific laboratories which hold these microbes for research purposes. 7 Over the past many decades, the instillation of Good Lab Practices and Biosafety standards have prevented the accidental release of these agents for malicious purposes. However, with the advances in gene editing techniques, bioterrorists could now use a relatively harmless biological agent and convert it into a more harmful agent. For instance, the currently available vaccines that protect against measles render the pathogen ineffective in causing the disease. However, the measles pathogen can be genetically edited such that it is no longer resistant to the vaccine. The resulting pathogen could easily wreak havoc even among a vaccinated population. Other synthetic biology techniques could also be used to create pathogens without the necessity of getting any organic backbone. In 2002, scientists claimed the creation of the entire polio virus from scratch and the genome sequence was put in the public domain. 8 While such an endeavour needs scientific expertise and infrastructure, the public revelation of the methodology and genetic sequence certainly lowers the barriers to anyone attempting to design a similar agent. Another development has been the availability of large data sets of scientific knowledge and the AI (Artificial Intelligence)-driven processing powers that can help identify combinations of genes to specifically tailor a bioweapon against a target. Furthermore, as the scientific community shifts towards a more open access policy to make science freely available, the same knowledge could be easily available as well as accessible by terrorists. There are 3 fundamental ways in which these technologies - either alone or in combination -could change the face of biowarfare: Creation of bioweapons that do not impact self forces: This is exemplified by the vaccine-resistant measles case mentioned earlier. New diseases that one’s own forces are protected against can be designed for warfare. Creation of agricultural pests: Similar methodologies can be used to engineer bio-agents against agricultural targets, crippling the economy of the enemy nation or starving their population. Creation of tailored weapons: Using advanced genetic knowledge, bioweapons capable of targeting single individuals or ethnic groups may be created. The use of a bioweapon of this variety may go unnoticed as an intentional attack and state parties may prefer such a weapon to avert large-scale conflict with an enemy state. The renewed attention towards biological weapons and the relative ease to procure and stock them as compared with traditional weapons of mass destruction may also entice non-state actors into acquiring and using bioweapons. In the context of this changing scenario of bioweapons use, existing regulations helmed by the Biological Weapons Convention (BWC) are severely inadequate in restraining the proliferation of these new technologies. Current Status of Biological Weapons Convention The BWC, which have been in effect since 1975 has been repeatedly criticised for its ambiguous language and more importantly, for the lack of a verification mechanism that can be invoked to check if signatory nations are complying with its mandate. The Convention prevents the creation, use, stockpiling or exchange of any bioweapon; however, its very definition of “bioweapon” is ambiguous. It allows the stocking of pathogenic agents in small quantities that can be used for peaceful purposes. Scientists, for example, hold small repositories of pathogenic agents to research better diagnostic or therapeutic interventions. However, unlike nuclear or chemical weapons, small repositories of biological agents can be easily scaled up for malicious purposes. This makes identifying the intention behind holding biological agents in any quantity difficult and defeats the purpose of the Convention. The BWC’s repeated attempts to introduce an effective verification mechanism have failed and as many as 12 countries including Iraq, Iran, Libya, China, Russia, and North Korea, who are parties to the Convention, are often alleged to have an ongoing bioweapons programme.9 An incident in Russia revealed that they held on to their exploration bioweapons programme much after ratifying their commitment to the BWC.10 Notably, Israel is not a signatory to the Convention stoking fears that the nation may be experimenting with bioweapons.11 The 2018 BWC Meeting of Experts held in Geneva in August also noted the implications of gene editing advances to the areas of biowarfare and the need for its regulation. 12 China and Pakistan proposed a voluntary model code of conduct for scientists engaged in using biotechnology. France and India proposed the formation of a database where aid requirements could be matched with specific offers of assistance. But more pertinently, the December BWC review conference brought to notice the dismal funding situation of the BWC but did not reach a consensus on adopting any of the measures suggested by the Experts meeting. 13 Yet there has not been a significant incident post World War II where bioweapons have been used as a weapon of mass destruction. This success may not be a fall out of the BWC but could be attributed to the nature of bioweapons: they are difficult to control, unreliable and cannot distinguish between self and non-self forces. Further, there was fear of usurpation of the technology by non-state actors. However, with the advent of new technologies discussed earlier, many of these limitations have now been removed. As a consequence, the threat of a bioweapons attack has become very real and India needs to take steps to protect itself from such an attack. Policy recommendations for India14 India’s weak primary healthcare system (as stated in a report where the country ranks 145 among 195 countries in healthcare access),15 conducive environment16 and hostile relations with neighbouring countries leave India vulnerable to a biological attack. Such an attack might aim at decreasing productivity in India by affecting its people or hampering agriculture or other natural resources such as water. India needs to develop a strong biodefense programme to shield itself against any bio- attack. A primary focus has to be on creating grassroot-level infrastructure and linkages to implement real-time surveillance mechanisms that can rapidly detect a biological outbreak and trigger a swift response from the appropriate authorities. This holds true for both human and agricultural attacks. Improved point-of-care diagnostics will aid in real-time surveillance. A staggered chain of protocols, including quarantine, personal protection equipment for healthcare workers, sample collection and delivery should occur in response to an infectious outbreak – particularly for those cases where a disease cannot be easily identified. In many cases, an antibody or specific DNA based tests are used for diagnosis. However, the sequencing of the entire DNA would help identify if the agent has been tampered with using artificial agents. Though this is not always reliable, treating unusual cases as a likely bioweapons attack and documenting genome sequences of the biological agent would provide a repository that could lend useful information for future use. The adoption of biosafety standards in all academic and private laboratories and its enforcement through the instillation of penalties for violations will reduce accidental leakages of biological agents from authorised laboratories. The inclusion of ethics in school and college level curriculum, as well as orientation of new hires in laboratories, is essential to educate about the responsibility of the individual researcher with respect to the biological material they are using. Leader at the Biological Weapons Convention India needs to take a leadership position at the BWC and facilitate the inclusion of the following: A scientific advisory board: Unlike the Chemical Weapons Convention, the BWC does not have a scientific advisory board to advise on new trends in biotechnology and ways to counter the new age bioweapons. The formation of such a board would aid the Convention to make pragmatic decisions to prevent the proliferation of bioweapons. Funding issues: Lack of funding and infrastructure has long ailed the BWC. The implementation support unit of BWC consists of 3 individuals and is sorely under-staffed. 17 India could work with other countries in ensuring the BWC has enough funds to carry out its designated roles. An alternative to the verification mechanism: While verification is deemed a political non-starter at the BWC, India could partner with other countries for creating a more co-operative mechanism that could be used to transfer important technology for vaccine production or improved vaccine manufacture. India could also push for transforming the voluntary system for reporting on national activities to a mandatory reporting. The current voluntary confidence-building measures require member parties to voluntarily exchange information on vaccine production plants, biodefence programs, and unusual disease outbreaks. However, this system has seen low active participation; from 1987 to 1995, only 70 of the then 139 member states of the BWC submitted data declarations, and only 11 took part in all rounds of the information exchange.18 In addition to mandatory reporting, penalties can be put in for parties who are not compliant with the confidence building measures dictated by the BWC. This will help India to gain access to technologies that could improve India’s primary health care response. Treaties with Other Nations Within and outside the BWC, India needs to forge strategic partnerships with countries who can share their expertise on biosecurity. India needs to embark on a public engagement dialogue to educate its population about the threat of infectious outbreaks and how to respond in case of any outbreak. An unusual outbreak can easily cause panic amongst people and may aid in spreading the disease as people move away from the epicentre of the attack. The threat of a bioweapons attack is swiftly being recognised by countries worldwide and India also needs to step up its biodefense programmes. While new technologies may lower barriers of acquiring biological weapons, the renewed attention the topic is getting may itself be sufficient to get non-state actors interested in experimenting with such weapons. Improved access to scientific knowledge, easier control over biological material and reduced cost of creating designer pathogens could entice state and non-state actors to experiment with biological weapons. The current regulatory architecture led by the Biological Weapons Convention may be inadequate to contain this threat and needs to be revisited. India, in particular, needs to focus on national and international measures that can be taken to curtail the threat of bioweapons. A networked primary healthcare system, strong collaboration with other countries and public engagement are central to protecting India from an infectious outbreak – may it be intentional or natural.

#### Biological warfare creates a laundry list of impacts, from BioD loss to extinction, as well as loss of traditional cultures for many people

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Biological weapons are considered the most dangerous of all known weapons of mass destruction. They are used to deliberately cause epidemics among humans; destroy the environmental components, including water, air, and soil; and target crops and livestock. Examples of diseases used in biological warfare include anthrax, smallpox, plague, cholera, and avian flu. In addition to the catastrophic effects of biological warfare on the biodiversity and the environment, their danger lies in their low cost and rapid spread, as well as their easy preparation, transport, and use. Unlike nuclear and chemical bombs, biological bombs are without odor or color and therefore cannot be detected. Additionally, bioweapons are dangerous because of their effects on untargeted organisms in a military attack, and the clinical symptoms they create may be difficult to distinguish from normal diseases. Bioweapon pathogens remain in nature for several years and are able to survive in harsh environmental conditions. Bioweapons spread germs that contaminate air, food, water, and the environment, causing epidemiological diseases for different living organisms. Air: A wide variety of germs can contaminate air and are used in biological warfare. Fungi are the most common, and they travel by air over long distances to infect healthy plants. Food: Food contamination is also one of the most powerful methods used to carry out biological warfare attacks. Disease is transmitted either directly to humans through contaminated food or drink or indirectly by hosts. Water: Water can spread a number of lethal infectious agents as well. For example, one gram of Clostridium tetani poison is able to kill eight million people within six hours. Diseases are one of the main drivers of extinction in endangered species; therefore, disease control is fundamental to preserve biodiversity. Despite the presence of vaccines and drugs for most bioweapons, they may not be available in adequate quantities to cope with an epidemiological disease outbreak. Biological attacks pose a threat to naturally rare wild plants and animals and to species whose natural habitats have been degraded by human activities. Furthermore, diseases that humans, domestic animals, and domestic plants have been able to develop immunity to can be fatal in wild animals and plants. Bioweapons are not only having direct effects on the genetic biodiversity of indigenous species but also are having direct and indirect catastrophic effects on vital plant and animal communities. Conservation of livestock breeds is essential to maintaining genetic diversity, which in turn is vital to increasing the ability of living organisms to adapt to environmental changes. The danger of bioweapons regarding animal biodiversity is summarized in three main points: 1. The direct impact of diseases on wild species Some deadly diseases in humans or domestic animals can infect wild animals. For instance, an epidemic destructive impact on endangered species is reflected in the effects of Canine distemper, a natural viral disease that infects wild dogs and wild animals belonging to the same group. Canine distemper was also developed in bioweapon laboratories. Over the past decade, the spread of this disease has resulted in habitat loss and in the extinction of a large number of wild species in North America. Additionally, it led to the elimination of about one-third of the lion population in Tanzania and had serious impacts on the endangered leopard population. 2. Invasive species The history of rinderpest in Africa provides a model for predicting the potential effects of lethal diseases on wild species and livestock. In 1887, European colonial armies introduced the rinderpest virus to Africa through imported cattle, which led to a rinderpest outbreak among domestic cattle breeds and wild species, killing an estimated 90–95% of African cattle and buffaloes within three years. To control the epidemic, African herds and buffaloes have been destroyed in most parts of Africa. Despite efforts to combat rinderpest over the past century, the disease is still strong, and its outbreak in the region occurs frequently. 3. Elimination of animal species, hosts, and vectors Threatened species may be destroyed in areas that have been subjected to biological attacks with the aim of eradicating the disease. For example, in the United States, programs to control brucellosis in livestock have resulted in killing large numbers of wild animals, including the Bison and the white tailed deer. Microbes can be used in crop destruction. For instance, “Rice blast” is a disease affecting rice and therefore leads to crop destruction and genetic changes in the plant. The discussion about controlling destructive bioweapons is growing, as they pose a vast danger to both humanity and the environment alike. Any failure to prevent biological attacks can lead to the deterioration of genetic diversity in animals and plants, the extinction of endangered species, and the destruction of human livelihoods and traditional cultures. Biotechnology has increased the economical value of genetic diversity of living organisms; hence, it has increased the risk of eliminating genetic diversity through the use of GMO bioweapons. Most of all, the environment will be the silent victim of this war. It is not easy to put an end to the biological arms race, so global efforts must be consolidated to combat these threats. Countries must strengthen their ability to detect early attacks. Biologists and economists need to communicate with decision makers to convince them of the importance of developing defense systems to face bioweapons and limit their environmental and socioeconomical effects. Certainly, it is necessary to raise awareness regarding the dangers of biological warfare. Interdisciplinary and international efforts are required to increase the surveillance, monitoring, and identification of pathogens and to better understand the dynamics of disease transmission within human, plant, and animal populations. This will greatly enhance our ability to combat the effects of bioweapons and emerging diseases on biodiversity.

#### Russia is not complying with the BWC and is on the bioweapon offensive – US military leadership is key

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In 1990, the U.S. political and military leadership was significantly challenged by the possibility that Iraq, having the fourth largest offensive chemical and biological weapons program in the world at the time, might use those unconventional weapons against U.S. forces and its allies massing in Saudi Arabia. For all practical purposes, there was no real capability to rapidly detect and identify the deliberate release of anthrax spores or other biological weapons, and the U.S. military did not have sufficient vaccines or therapeutics for such an event. Due to this severe neglect to biological defense, former Secretary of State James Baker gave a formal letter to the Iraqi foreign minister stating that Iraq would “pay a terrible price” if it used chemical or biological weapons against the U.S.-led coalition.1 Had Saddam Hussein decided to use biological weapons, it could have caused thousands of casualties. Fortunately for U.S. forces, he did not have a significant biological weapons capability and there was no use of those weapons. Despite dark predictions of both nation-states and violent extremist organizations planning biological attacks against the nation, there has been no test of the U.S. military’s biodefense capability. A “biological taboo” resulting from decades of arms control discussions has held, despite the lack of a verification regime behind the Biological Weapons Convention (BWC).2 Concerns about Iraq’s biological weapons capability in 2003 evaporated a year later, with nothing substantive to find. Despite concerns about a domestic terrorist biological incident following the anthrax attacks in 2001, there has never been a mass casualty attack caused by biological organisms in the United States since then. The Nation’s recent public health challenges in addressing the 2019 coronavirus pandemic (COVID-19) have caused questions as to whether the U.S. military is sufficiently prepared for an adversary that might be emboldened to use biological weapons against U.S. national security interests. Despite the lack of any biological attacks or even threat of attacks over the past twenty years, the potential impact of a large-scale use of a contagious disease concerns enough people to call for new national strategies and improved response capabilities for biological threats. Current strategies aim to mitigate natural disease, to regulate biological research associated with the more hazardous biological diseases, and to improve the U.S. public health system to better respond to biological threats.3 Yet despite the development of four national strategies for national biodefense over the past twenty years, the U.S. government has not significantly advanced its capabilities for protecting against and responding to biological threats, defined as including natural diseases, deliberate biological releases, and laboratory accidents. Despite the high-level attention to this threat, assessments of the Nation’s capability to prepare for deliberate biological threats have not, however, been positive. Unclassified assessments from the State Department and the Department of Defense (DOD) suggest that China and Russia could have a biological weapons capability, as could North Korea and Iran.4 The lack of any actual use of biological weapons against the United States has perhaps diminished the concern that potential weaknesses exist. In the event of a future conflict with great powers, there is the chance that biological warfare could emerge as a significant threat, perhaps in a form unrecognized from Cold War experiences. Prior to attempting the implementation of yet another strategy to counter biological threats, the Army needs to establish the context of how adversaries would deliberately use biological threats against U.S. national security interests. Once a rational appreciation of the threat is developed, one can then create a defense strategy that directly addresses deliberate biological releases. Importantly, such a strategy needs to be resourced and implemented to address the future challenges of a deliberate biological release, understanding that natural infectious diseases pose a competing priority. Counter to the hypothesis that the pandemic outbreak has revealed potential vulnerabilities to biological weapons, COVID-19 has not in fact acted like a biological weapon. As a result, the lessons that apply from this contemporary crisis toward a biological weapons attack are few. A pandemic outbreak, affecting the general population over a year’s time, requires a different approach than military forces protecting themselves from a focused deliberate biological attack. COVID-19 is not lethal enough and does not incapacitate people quickly enough to qualify as a potential weapon, despite the more than 750,000 deaths caused over twenty-four months across the United States.5 A biological disease that does not significantly impact young, healthy people and that is easily countered by a national vaccine program is not prime material for a weapon system. COVID-19 may have slowed down economic activities, but it is not an existential threat to the U.S. government. Despite the potential impact on national security, pandemic diseases are best addressed separately from biological defense concepts. The U.S. military does anticipate the potential use of biological weapons in combat operations. In that light, the Department of Defense has a counter-weapons of mass destruction (WMD) strategy and chemical, biological, radiological, and nuclear (CBRN) defense concept to guide its efforts to prevent, protect against, and respond to adversaries using biological weapons.6 The ratification of the BWC has significantly reduced the number of potential adversaries that might use traditional biological warfare (BW) agents, allowing one to focus on particular actors and military scenarios. The traditional biological warfare agents such as anthrax, pneumatic plague, smallpox, and tularemia are still potent candidates for future warfare. However, the employment of said weapons may look very different than envisioned during the Cold War. North Korea may be the exception to this statement, as it is unclear how that nation would use unconventional weapons, but its operational concept for warfare appears to be based in an industrial age, massed firepower approach, similar to what NATO might have anticipated in the 1970s.7 China and Iran are assessed as not complying with the BWC, and Russia and North Korea are believed to have retained offensive biological weapons programs.8 While we can understand the biological warfare model that North Korea might employ, this does not necessarily apply to Russia’s and China’s concepts of employment for biological weapons. The Cold War model of using massive amounts of biological agents against troop concentrations, major population centers, and large military sites such as air bases and seaports requires large-scale production, storage, and testing capability. As Russia and China have modernized their nuclear and conventional forces, they have also changed their approach toward military confrontations with the United States and partner nations. While preparing for the possibility of total war, both countries have focused on conducting regional operations against U.S. allies using methods that fall below the threshold of open conflict.9 Their nuclear arsenals cast a coercive shadow over regional operations that allow those nations to aggressively push and attain their political objectives. As a result, a clandestine biological weapons program can offer them a capability to perform single, small-scale chemical or biological weapons attacks on focused targets (facilities or individuals) while claiming to be compliant with the BWC.10 The former Soviet Union had a massive biological warfare program, unmatched by any historical measure. Despite extensive documentation of this program, the Russian Federation has not fully acknowledged the former Soviet Union BW program. The State Department has gone so far as to designate specific Russian government facilities as “acting contrary to the national security or foreign policy interests of the United States” through their association as military defense facilities associated with a BW research program.11 These are not recent concerns. Analysts will point out that in 2012, then Prime Minister Vladimir Putin talked about creating “weapon systems that use different physical principles … (beam, geophysical, wave, genetic, psychophysical and other types of weapons).”12 However, it is unclear that this attributed quote referred to a return to developing biological weapons to support military conflict. In 2019, Putin directed a budget of 220 billion rubles (or $3.3 billion) toward the development of genetic technologies that could support a wide range of applications (biomedical, agricultural, or biodefense).13 At the same time, the Russian government has claimed that the United States is building offensive BW laboratories in countries surrounding Russia through the Biological Threat Reduction Program. For instance, the “Lugar Center for Public Health Research” in Tbilisi, Georgia, was funded by U.S. defense funds, but its intent is to promote health security against natural infectious disease outbreaks.14 In response to U.S. government accusations of China’s role in the COVID-19 outbreak, Chinese government officials have recently echoed the same claims that the U.S. government has created biological weapons near their borders.15 This type of disinformation campaign falls squarely in the “gray zone” set of tools. Both China and Russia have ignored international efforts to prevent the proliferation of unconventional weapons technology and materials. China’s position as one of the leaders of the global bioeconomy increases its potential for realized or latent advanced biological warfare capabilities. Beijing appears committed to becoming a leader in biotechnology, which holds the promise of myriad public health applications. Yet, many biotechnology applications are dual-use, capable of delivering both public health benefits and advances in biological warfare capabilities. As one top U.S. expert noted, China “is pursuing a very aggressive strategy to become the world leader in biotechnology.”16 Sustained public and private investment in synthetic biology technologies needed for DNA sequencing and synthesis as well as gene editing have enabled China to develop a wide array of dual-use biotechnologies in the field of synthetic biology. Many experts anticipate that synthetic biology advances will enable the development of “new and novel biomaterials” to include advanced bioweapons.17 As a 2020 Brookings Institution study noted, “The determination of China’s one-party state to become a leading player in biotechnology is reflected by the rapid growth in investment in the sector. Some estimates claim that collectively, China’s central, local, and provincial governments have invested over $100 billion in life sciences research and development.”18 China’s sustained and sizeable government investment in domestic biotechnology has created an industrial base capable of developing and manufacturing a range of extant and novel biological warfare agents. And while the possibility of developing novel biological warfare agents is present, it is more probable that China wants to use its biotechnology lead to produce superior commercial pharmaceuticals and to enhance its military forces. There is always speculation that advances in the life sciences will drive an evolution in biological weapons, making them more lethal, more environmentally hardy, more targeted toward specific populations, or more able to confound contemporary detection systems. This belief used to be rooted in the 1970s rise of biotechnology, and then it was 1990s genetics driving the concerns. Today, it is the promise (and dangers) of synthetic biology. And while it is true that one could always improve characteristics of certain biological weapons, there are significant drawbacks as to such an approach.19 Assuming that an adversary might develop altered biological weapons to be more operationally relevant, this would still be a violation of treaty (if it were China or Russia) and international norms. Modifying a biological organism to enhance its resistance to antibiotics might in turn reduce other desired characteristics, such as its lethality or dissemination qualities. Any use of a genetically modified organism would run the risk of direct attribution to a particular source. Western military forces lack the capability to detect the deliberate use of biological weapons until after exposure. In addition, U.S. forces lack vaccines for a number of traditional biological warfare agents, let alone engineered diseases.20 Any nation with an advanced industrial capability can easily develop biological agents that can damage or destroy crops or livestock, in addition to targeting humans. There is no need for an overly sophisticated engineered biological warfare agent à la the latest James Bond movie, No Time to Die. And even if military forces had tactical biological detectors that could identify all biological warfare agents in a timely enough fashion to put on protective masks, traditional biological weapons would still be an effective strategic weapon against a civilian populace, its livestock, or cropland. There is no possibility that the United States and its Western allies can make biological weapons obsolete.21 At the same time, we do not need to overexaggerate the threat of biological weapons as some Hollywood scripts portray them. There are several options that could be explored. The traditional approach has been to develop chemical and biological defense as a combined operational concept. Both chemical and biological warfare agents use similar delivery systems and target the human body’s physiological response to hazards. Under the larger construct of countering WMD threats, the U.S. government can engage in arms control negotiations to limit biological weapons use, use preemptive strikes to target a nation’s WMD capability, and respond to its use with protective equipment that limits the impedance of combat operations. None of these options are singular to biological threats. A second option is to task the medical community to identify and respond to both biological warfare attacks and natural disease outbreaks while limiting reliance on biological detectors and technical experts. The U.S. Air Force, for instance, endorses a biological defense concept that is separate from chemical defense and that relies on the medical community for initial detection and identification.22 This is a very specific focus on biological threats that includes a conscious decision to limit investments in people and equipment in response to a lower probability of deliberate biological attacks. The Air Force concept is a subset of its counter WMD operations, as the Army’s CBRN defense efforts are. The U.S. Army recently released a biological defense strategy that calls for the “synchronized implementation” of both biological warfare defense and infectious natural diseases across the Army.23 Interestingly, the office responsible for implementing this strategy is the U.S. Army Nuclear and Countering Weapons of Mass Destruction Agency, not the Army’s chemical-biological defense specialists and not the Army’s medical experts who respectively own those areas of expertise. It is not immediately clear as to whether this strategy calls for the development of a stand-alone biological defense concept that combines capabilities for both infectious natural diseases and deliberate biological releases, or just a single agency that manages two very different concepts (counter-WMD and force health protection) that have a common scientific origin. The strategy details four “lines of effort” that include developing and managing talent and facilities that address biological threats; maintaining a biological common operating picture and awareness of biological defense forensics; building a readiness posture that includes protection, response, and training for biological defense capabilities; and directing modernization efforts for biological defense concepts and doctrine. Will this new governance structure fundamentally change how the Army does biological defense? Given policy and budget direction, probably not. This is not the first time a military agency has suggested moving all biodefense activities into a portfolio for medical countermeasures for infectious diseases. There is an almost instinctual movement toward putting medical experts in charge of developing capabilities for countering all biological threats; however, that does not work for two reasons. First, given a collection of biological threats—whether natural, deliberate, or accidental—medical leaders will always consider infectious natural diseases the most important concerns because of the large numbers of service members and their dependents who get sick from natural diseases. And there are a lot of infectious natural diseases to address. In 1990, the U.S. military found itself without adequate vaccines for anthrax and botulin toxin when it was preparing to face an Iraqi military force that had an active chemical and biological weapons program. This was due to a deliberate decision to deprioritize research and development for biological warfare agents and focus instead on countermeasures for natural diseases such as chikungunya virus and diarrheal diseases. Second, while the response to biological threats has often had a common core, the prevention and protection against biological threats certainly does not. While one can try to deter adversaries from using biological weapons, Mother Nature cannot be deterred. Protecting military forces from biological weapons during combat operations requires a completely different approach than protecting a military base’s population from natural diseases. This requires a level of nuance to understand that a single biodefense concept cannot protect fundamentally different populations with different requirements and facing fundamentally different biological threats. There is a reason why there are different budgets and authorities for dealing with biological warfare agents, natural biological diseases, and biological research laboratory accidents. The primary purposes of any strategy document are to identify a specific mission or program, to identify policy objectives that should drive discrete programs, and to offer a plan to achieve those objectives. In the military, this is called “ends, ways, and means.” Ideally, a strategy will also aid decision makers in moving resources toward those goals that require funding to achieve those objectives. So, the problem with a biological defense strategy that aims to address all biological threats—whether at the Army, the DOD, or national level—is that there are multiple agencies with budget elements who are already directed to address specific biological threats. I will argue that at least five biological threat sectors require consideration in any biological defense strategy: disease prevention as a function of public health, bioterrorism response as a function of homeland security, military biodefense as a function as countering WMD, biosurety as a function of laboratory practices, and biosecurity and biosafety as a function of agricultural and food industries. None of these are new security concerns. Each has a dedicated government agency that focuses on a distinct threat using a congressionally approved budget. Because each biological threat sector already has a lead agency and agenda to pursue, the question comes as to what a centralized biological defense strategy would change or impact the direction of federal government or military biodefense programs. Public health efforts addressing infectious biological diseases, to include aspects of disease prevention in the military’s force health protection program, have been around for more than one hundred years. One of the challenges in the U.S. public health program is that it is federalized, meaning that states and local jurisdictions implement public health programs while the federal government provides research and funding for specific purposes. The Centers for Disease Control and Prevention (CDC) and the National Institutes of Health represent the largest government agencies in this area, putting tens of billions of dollars against infectious disease research, surveillance, and response. Within the military, the Army’s Medical Research Institute for Infectious Diseases has a research and development program for infectious diseases to address potential biological threats to service members in U.S. and overseas theaters. Top threats include tuberculosis, measles, influenza, pneumonia, and malaria. Bioterrorism response is a little more nebulous, since we have not seen a terrorist group successfully use a biological hazard to cause mass casualties in the United States since 1984. However, following the 2001 Amerithrax incidents, the concern that they might has thrown a few billion dollars a year toward the Department of Homeland Security and Department of Health and Human Services to develop response plans for the possibility.24 The DOD needs to consider biological terrorism within its installation force protection plans, but for the most part, it is not an integral part of that effort due to the very low probability of such an incident. The DOD does have a massive CBRN Response Enterprise that would assist states and cities in any federal response to a biological terrorist incident. The top (realistic) biological threats usually include salmonella, ricin, botulinum toxin, sewage, and tainted body fluids. Military biodefense has focused on protecting U.S. forces from biological warfare agents developed by adversarial nation-states for the purpose of combat operations. We have always envisioned biological weapons attacks as large-area coverage, mass casualty events on the battlefield. Because of technical challenges, military biodefense capabilities were largely lacking during the 1991 Persian Gulf conflict, leading to a crash program in the mid-1990s to develop biological detectors and medical countermeasures for the services. Biological detection and vaccines were more readily available in 2003 as U.S. forces prepared for possible Iraqi biological weapons use. There is a central program office that manages all DOD biological defense programs, receiving maybe a half billion dollars a year for funding. Their top threats include anthrax, pneumonic plague, smallpox, tularemia, and brucellosis. The DOD’s Biological Threat Reduction Program, which is more of an effort to secure other nations’ laboratories and hospitals than biodefense, accounts for less than a $300 million in annual funding over the past decade.25 Biosurety addresses the security and safety of laboratory research labs both across the United States and within the U.S. military. Unlike traditional biodefense efforts, biosurety is more about keeping biologicals safe from humans, as opposed to the other way around. The threat includes both the possibility that a researcher on the inside might deliberately or accidentally release a dangerous biological organism, or that an outsider might try to break in and steal them. There is also the danger of natural disasters or externally derived accidents to consider. The U.S. Army has had biosurety failures that resulted in CDC shutdowns at its Dugway Proving Ground (in 2015 due to anthrax shipments) and Fort Detrick laboratories (in 2019 due to unsafe laboratory practices). While the CDC has some oversight role for a small set of select agents and toxins, in general, the CDC can only provide suggestions on how the U.S. research and development community should implement good business practices. This area is not well funded (maybe $500 million/year) or overseen from the federal level. The top threats for biosurety are too varied for listing, but in general, accidents are largely limited to individual researchers and not the general community surrounding a biological research lab. Biosecurity and biosafety challenges within the agricultural and food industries have been of two parts. First, many facilities have significantly large amounts of livestock or crops to protect against the introduction of any foreign disease that might wipe out their livelihood. In addition, foreign pests or animals could displace or eliminate native animals and crops. Second, there is the challenge of regulating food products as they are moved from the farm to the table, as the saying goes. Federal regulations aim to ensure that agricultural products used in meal production are both safe and accurately labeled. Both the Food and Drug Administration and U.S. Department of Agriculture have responsibilities to oversee this area, in addition to the Customs and Border Patrol. There is not a significant DOD equity in this area other than ensuring that meals prepared for the field are safe and free of contamination. Because Congress is very interested in ensuring that the public has safe food and a variety of different foods, this area gets funded between $3 billion and $4 billion a year. Its biological threats of concern include foot-and-mouth disease, swine flu, avian flu, wheat rust, and invasive species such as Asian carp, zebra mussels, cane toads, and brown marmorated stink bugs. This is just the tip of the challenge of trying to address all biological threats—natural, deliberate, and accidental—under one Army, DOD, or national strategy. There are more complex discussions as to what would constitute a national biosurveillance effort—surprisingly, this would not be solely focused on infectious biological diseases to humans, but also include diseases affecting animals and plants, as well as chemical or radiological hazards to any biological organism. There is the challenge of addressing the impact of future technologies such as “gain-of-function” and synthetic biology. Even after we identify all of the potential issues that surround “biological threats,” there is the question of who ought to lead the effort. The public health community claims that if it were better funded, it could address all natural disease outbreaks as well as respond to biological terrorism. The national security community feels that it needs to have a larger voice in this effort, given that these are foreign threats that impact the armed forces and other U.S. national security interests. And given the national security community’s funding and ability to quickly form new project offices, they could very well dominate the discussion, which could result in different priorities than what the public health community sees as important. Concluding Thoughts The military’s primary concern should be on deliberate biological threats, but there is no question that it has been distracted by COVID-19 and the general topic of natural disease outbreaks. If the DOD’s Chemical-Biological Defense Program decides to move from working on countermeasures to biological warfare agents and focus instead on “threat-agnostic” systems that address all biological threats, the military will not get necessary detectors, protective ensembles, medical vaccines, or decontaminants for biological warfare agents due to the larger number and greater impact of natural infectious diseases. This is, in essence, what happened in the 1980s; because the military medical community was focused on research and development for infectious diseases and not biological warfare agents, U.S. forces were unprepared for biological warfare in 1990.26 Military concepts of future war assure us that biological and nuclear warfare are expected threats to U.S. forces.27 In the case of a conflict with North Korea, it may not look that different than Cold War concepts of massive, large-coverage attacks on U.S. military bases. In the case of China and Russia, it is less clear what the future of biological war will be. As technology such as drone swarms, artificial intelligence, and synthetic biology continue to mature, the shape of biological warfare threats will evolve. One can assume that the traditional biological warfare agents will still be viable candidates, or possibly enhancements on their natural forms. Terrorist use of biological hazards may be limited to crude toxins and improvised delivery systems—still a threat to installation force protection measures, but not necessarily a mass casualty event. This future operating environment requires us to focus on enhancing the survivability of critical infrastructure—in particular, command and control, power projection, and logistics bases—and the resiliency of military operations while impacted by biological weapons. The only way to succeed in moving forward in a future biological defense posture is not, then, to dilute the Army’s efforts by trying to manage the development of defensive capabilities for all natural disease outbreaks and deliberate biological attacks under a single general construct. There needs to be a laser-sharp focus on both pandemic preparedness and biological defense during combat operations. In addition, the DOD needs to ensure that its biological research and development laboratories have the best practices in place to avoid future shutdowns due to biosurety challenges. This is not an either/or discussion nor is it the time to radically revise how military forces accomplish biological defense. Instead, Army leaders need to engage in these discussions, despite the complicated technical nature of the topic, and ensure that future operations can be maintained despite the threat of biological weapons use.

### 2AC – Genetic Warfare Ext

#### **Gene weapons are real and will be used in the future**

Malet 15 (October 30th, 2015 | David Malet | Political Scientist researching and teaching about international security, transnational militancy, and US national security and foreign policy | “Captain America in International Relations: the Biotech Revolution in Military Affairs” | <https://doi.org/10.1080/14702436.2015.1113665> | DOA: 6/22/2022 | SAoki)

Genetic weapons Until the end of the twentieth century, bioweapons meant pathogens (and possibly animal delivery systems). The biotech revolution, and particularly the ability to sequence and translate entire genomes, has altered that equation. Some state militaries, notably China’s, are already publicly expressing an interest in attacking targets by reordering their bodily functions through what is known in more benign applications as gene therapy. Planners in the United States also note that: The long term implications of genomics will present the Army with opportunities and challenges even in the next decade … The Army can, however, promote development of new products and processes that will be consistent with or specific to its missions and needs. This will require that the Army be fully aware of the synergistic effects of biological tools. (Committee 2001, p. 15) “The goal of gene therapy is to effect a change in the genetic makeup of an individual by introducing new information designed to replace or repair a faulty gene.” This is accomplished by using the same principle employed since the first smallpox vaccination: the use of a harnessed, crippled virus to serve as a “Trojan horse” vector, in this case bearing replacement or supplemental genes to alter cell functioning. Somatic cell therapy affects only the cells of the individual receiving it, and for reasons of ethics and technical feasibility, most therapeutic research has been of this type. But there is also the technique of germline cell therapy, which might “lead to a heritable change that could repair problems for all future generations” (Block, in Drell et al. 1999, pp. 60–62). Although American military planners are bullish on the potential for gene therapy to improve the lots of wounded servicemen in the near future, the technologies are not yet universally acclaimed nor even accepted. The United States Department of Energy (2009) noted that the FDA “has not yet [as of 2014] approved any human gene therapy product for sale. Current gene therapy is experimental and has not proven very successful in clinical trials. Little progress has been made since the first gene therapy clinical trial began in 1990.” This reaction stems in part from the death and illness of several children who had received gene therapies to treat life-threatening chronic conditions. At the same time, however, researchers elsewhere announced that gene therapy safely and successfully restored partial sight to congenitally blind test subjects. The results were accomplished by inserting healthy copies of a missing gene into patient retina cells via a vector manufactured by a private American company called Targeted Genetics (University College of London 2008). Vector-delivered gene therapies remain an emerging biotechnology, but cases such as these demonstrate both that vectors can be used to create significant physical alterations in targets, and that these changes can be deadly. The discovery that viruses can be carried airborne for considerable distances even after the droplets of fluid constituting their transmission media have fallen to the ground provides further evidence that vectors might soon be used to deliver genetic therapies – or maladies – to wide target populations (The Medical News 2007). With the genetic maps of entire organisms now available – the full genome for the plague bacterium was decoded in 2001 – it is inevitable that researchers will develop the means to rewrite specified segments of targeted genes (Preston 2009, p. 296).

#### US-NATO development of deterrent solves

DiEuliis 19 (Diane DiEuliis | a Senior Research fellow at National Defense University. Her research areas focus on emerging biological technologies, biodefense, and preparedness for biothreats. Specific topic areas under this broad research portfolio include dual-use life sciences research, synthetic biology, the US bioeconomy, disaster recovery, and behavioral, cognitive, and social science as it relates to important aspects of deterrence. Dr. DiEuliis currently has several research grants in progress, and teaches in foundational professional military education. | “Key National Security Questions for the Future of Synthetic Biology” | <https://www.jstor.org/stable/45289832> | DOA: 6/23/2022 | SAoki)

Much recent concern relating to synthetic biology has been focused on implications for traditional bioweapons. Bioweapons programs developed by the United States and the Soviet Union during the Cold War shaped the backbone of biodefense frameworks that exist today. Those programs focused on manipulation of the most naturally occurring lethal pathogens, many of which now comprise the U.S. "Select Agent" list that rigorously controls laboratory use, and the international "Australia" list that guides export controls. However, the ability to acquire dangerous pathogenic organisms is no longer relegated to isolating them from nature, or stealing them from laboratories. Gene synthesis tools allow pathogens to be recreated "from scratch," based on their known genomic sequences, and DNAs are commercially available from a growing number of gene synthesis companies around the world. Reconstruction of viruses such as polio,5 1918 flu,6 and most recently horsepox7 are proof of principle. Cold War era bioweaponeers wanted to alter pathogens to make them deadlier, to spread more easily, or to evade diagnosis and treatment. While this kind of manipulation of pathogenic organisms remains challenging, the tools of today's biotechnology could be used to achieve these goals with fewer technical challenges. The versatile genome editor, CRISPR, is a good example of a programmable, inexpensive tool that could rewrite genetic code to alter pathogens in ways that prior weapons programs aspired to. There is also a possibility of creating novel bioweapons, which do not currently exist on any lists and would be hard to prevent, detect, and treat. Further, while growing pathogens to scale, storing them stably, and delivering them to target populations proved to be the most challenging aspects of bioweapon development, the tools of today's biotechnology might make these steps more achievable. The convergence of other technologies - such as nanotechnology and gene therapy - could enable the development of new delivery methods.As industry becomes more adept at the biological creation of chemicals, there is greater overlap of biological and chemical weapons. The world has seen degradation of norms against chemical weapons use quite recently, and it is not a stretch to worry that bad actors may use biological methods to create drugs or chemical toxins. For example, the fermentation process for opioids from yeast8 and marine conotoxins from E. coli 9 have already been described in the literature. Of course, biothreats to humans are only one component of the risk; threats to plants, the environment, and materiel are also in play. The recent National Academies' studies explored the arena of potential biothreats to DOD s warfighters. They concluded that while existing frameworks for biodefense are still viable and important to maintain, the widened scope of threat necessitates expansion of preparedness and response capabilities beyond list-based paradigms. While these potential enablers of biothreats cannot and should not be minimized, this is in some sense familiar territory: public health and animal health infrastructures will still serve as strong primary defenses. Approaches to cast a wider net can include focusing on the pathways through which agents cause harm, rather than a list of the agents themselves.10 Within the familiar territory of public health, the tools of synthetic biology could be game-changing in combating biothreats.11 For example, next-generation sequencing and digital screening tools might be used to identify novel or engineered agents,12 and synthetic genes and circuits could be used to develop rapid diagnostics tools. Synthetic biology could enable the design of novel countermeasures, such as the use of CRISPR to fight antibiotic resistance.13 Platforms that speed such countermeasure development are in fact already underway.14 Finally, synthetic biology offers the means to manufacture high-value compounds that have heretofore only been available through traditional chemistry, or through harvesting from plants or other organisms. This innovation may mitigate resource scarcity that would be problematic in an outbreak. In light of these clear advantages, risk-benefit analyses will be critical for assessing the role of emerging biotechnology in the future. Based on these considerations, key questions for policymakers and national security specialists include:

■ What frameworks should be used in the United States and elsewhere to assess the risks and benefits of emerging biotechnology, including synthetic biology? The National Academies risk framework, along with others, could be considered in international policy venues such as the Biological Weapons Convention.15

■ Given the widening threat space caused by synthetic biology, how should international governance be shaped if list-based security paradigms can no longer encompass the threat ? List-based biosecurity currently touches every component of biodefense.

■ What would compel bad actors to harness these emerging capabilities to create and use bioweapons ?

Whether bad actors will adopt the capabilities of synthetic biology to create and use biological or chemical weapons may largely depend upon their goals. The ability to act asymmetrically or covertly may be compelling - as may be the ability to cause fear and social instability, if not widespread lethality. Better analysis of actor intent could foster the development of stronger deterrents by the United States and allies

### 2AC – Precision Pathogens Ext

#### China is becoming technologically dominant–developing capabilities for pathogenic warfare to target specific groups.

Kania 19 (Kania, Elsa. “China's Military Biotech Frontier: CRISPR, Military-Civil Fusion, and the New Revolution in Military Affairs.” Jamestown, 25 Oct. 2019, https://jamestown.org/program/chinas-military-biotech-frontier-crispr-military-civil-fusion-and-the-new-revolution-in-military-affairs/. )

Introduction China’s national strategy of military-civil fusion (军民融合, junmin ronghe) has highlighted biology as a priority. [1] It is hardly surprising that the People’s Republic of China (PRC) is looking to leverage synergies among defense, scientific, and commercial developments in biological interdisciplinary (生物交叉, shengwu jiaocha) technologies. Chinese military scientists and strategists have consistently emphasized that biotechnology could become a “new strategic commanding heights of the future Revolution in Military Affairs” (军事革命, junshi geming) (PLA Daily, October 2015). Certainly, the PRC is not alone in recognizing the potential of biotechnology on the future battlefield, but the ways in which Chinese research is seeking to integrate developments among industry, academic institutions, and military-oriented programs—including through research collaborations and the procurement of dual-purpose commercial technologies—may prove striking. In particular, China is at the forefront of today’s breakthroughs in CRISPR-Cas, a new technique for gene editing that has demonstrated unique potential and precision despite its current limitations. [2] The Biological Revolution in Military Affairs Chinese military officers and scientists anticipate that current advances will contribute to an ongoing transformation in the character of conflict. Indeed, senior officers and academics in the Chinese People’s Liberation Army (PLA) have not only highlighted concerns about “national biological security (and) defense” (国家生物安全防御, guojia shengwu anquan fangyu) in response to the threats of infectious diseases, but also emphasized the importance of exploring the military potential and even offensive applications of biotechnology (China News Network, February 15, 2012; Ministry of Science and Technology, April 18). [3] For instance, Senior Colonel Guo Jiwei (郭继卫) of the PLA’s Third Military Medical University co-authored War for Biological Dominance (制生权战争, Zhishengquan Zhanzheng), which examined the impact of biotechnology on the Revolution in Military Affairs. [4] The concept zhishengquan (制生权), which might be translated variously as “biological dominance” or “command/superiority in biology,” is starting to become more prevalent in PLA writings on future warfare of varying degrees of authoritativeness. [5] Notably, Major General He Fuchu (贺福初), former president of the Academy of Military Medical Sciences (AMMS) and now vice president of the Academy of Military Sciences, has long been a prominent proponent of the militarization of biotechnology (PLA Daily, October 6, 2015). Maj. Gen. He has anticipated that “Modern biotechnology and its integration with information, nano(technology), and the cognitive, etc. domains will have revolutionary influences upon weapons and equipment, the combat spaces, the forms of warfare, and military theories” (Reference News, August 24, 2017). Consequently, pursuant to this new “Revolution in Military Affairs,” success on the future battlefield will require achieving “biological dominance,” and this “biological frontier” (生物疆域, shengwu jiangyu) of warfare will emerge as a new domain for new methods of confrontation. In the course of this transformation, the progress of such techniques as brain-machine interfaces could render human-machine integration (人机一体化, renji yitihua) a reality for future combat platforms. For instance, AMMS researchers have engaged with a commercial enterprise known as Cogrowth (酷成长, ku chengzhang) that specializes in the development of a line of products involving electroencephalograms (EEG) for brain-computer interfaces, which is exploring leveraging artificial intelligence to interpret bio-signals (Economics Daily, December 25, 2017; Sina, December 28, 2017). Chinese military researchers have closely examined American initiatives and international advancements, which have seemed to inform and inspire the direction of developments underway in China today. For instance, DARPA’s launch of the Biological Technologies Office has drawn attention, and PLA scholars have also examined exotic accounts Russia’s “zombie gun” (僵尸枪, jiangshi qiang), based on electromagnetic radiation, and referenced supposed Israeli programs to target Arabs with genetic weapons (Sohu, 2012). [6] The salience of these concerns about foreign programs and the tragedy of China’s own history does not appear to have resulted in restraint against considering the potential operational advantages of such offensive applications. [7] For instance, although writings about “genetic weapons” should not be interpreted as official doctrine or formal concepts of operations, it is noteworthy to see striking parallels in themes repeated by a number of PLA scholars and scientists from influential institutions. Certain discussions about the future of “military struggle in the domain of biology” are troubling. For instance, seemingly authoritative textbooks have included references to the possibility of “specific ethnic genetic attacks” (特定种族基因攻击, teding zhongzu jiyin gongji), while other military experts characterize the notion of a “ethic bionation” as erroneous (China News, July 19, 2018). [8] According to Gen. Zhang Shibo (张仕波), former president of the PLA’s National Defense University, today’s biotech advances unlock the possibility to create new synthetic pathogens that are “more toxic, more contagious, and more resistant.” [9] “Obviously, genetic weapons possess many advantages over traditional biological weapons,” as one researcher from the Academy of Military Medical Sciences has argued (China Military Network, November 10, 2017). In particular, the weaponization of CRISPR is expected to prove more lethal and more precise in ways that could cause major changes in the dynamics of future warfare, despite the risks that would be inherent in its employment and the current limitations of this nascent technology. In the long term, genetic weapons are anticipated to have more of a “strategic deterrent function,” and the AMMS researcher has warned that “willful abuse of genetic weapons will bring unpredictable disasters to all mankind” (China Military Network, November 10, 2017). Such theories and speculation about future capabilities could become actual possibilities for the PLA pursuant to academic and commercial research that is currently underway.

#### China has developed the technology pathogenic warfare

Cyranoski 17 (Cyranoski, David. “Inside the Chinese Lab Poised to Study World's Most Dangerous Pathogens.” Nature News, Nature Publishing Group, 23 Feb. 2017,https://www.nature.com/articles/nature.2017.21487.)

A laboratory in Wuhan is on the cusp of being cleared to work with the world’s most dangerous pathogens. The move is part of a plan to build between five and seven biosafety level-4 (BSL-4) labs across the Chinese mainland by 2025, and has generated much excitement, as well as some concerns. Some scientists outside China worry about pathogens escaping, and the addition of a biological dimension to geopolitical tensions between China and other nations. But Chinese microbiologists are celebrating their entrance to the elite cadre empowered to wrestle with the world’s greatest biological threats. “It will offer more opportunities for Chinese researchers, and our contribution on the BSL‑4-level pathogens will benefit the world,” says George Gao, director of the Chinese Academy of Sciences Key Laboratory of Pathogenic Microbiology and Immunology in Beijing. There are already two BSL-4 labs in Taiwan, but the National Bio-safety Laboratory, Wuhan, would be the first on the Chinese mainland. The lab was certified as meeting the standards and criteria of BSL-4 by the China National Accreditation Service for Conformity Assessment (CNAS) in January. The CNAS examined the lab’s infrastructure, equipment and management, says a CNAS representative, paving the way for the Ministry of Health to give its approval. A representative from the ministry says it will move slowly and cautiously; if the assessment goes smoothly, it could approve the laboratory by the end of June. BSL-4 is the highest level of biocontainment: its criteria include filtering air and treating water and waste before they leave the laboratory, and stipulating that researchers change clothes and shower before and after using lab facilities. Such labs are often controversial. The first BSL-4 lab in Japan was built in 1981, but operated with lower-risk pathogens until 2015, when safety concerns were finally overcome. The expansion of BSL-4-lab networks in the United States and Europe over the past 15 years — with more than a dozen now in operation or under construction in each region — also met with resistance, including questions about the need for so many facilities. Viruses don’t know borders. The Wuhan lab cost 300 million yuan (US$44 million), and to allay safety concerns it was built far above the flood plain and with the capacity to withstand a magnitude-7 earthquake, although the area has no history of strong earthquakes. It will focus on the control of emerging diseases, store purified viruses and act as a World Health Organization ‘reference laboratory’ linked to similar labs around the world. “It will be a key node in the global biosafety-lab network,” says lab director Yuan Zhiming. The Chinese Academy of Sciences approved the construction of a BSL-4 laboratory in 2003, and the epidemic of SARS (severe acute respiratory syndrome) around the same time lent the project momentum. The lab was designed and constructed with French assistance as part of a 2004 cooperative agreement on the prevention and control of emerging infectious diseases. But the complexity of the project, China’s lack of experience, difficulty in maintaining funding and long government approval procedures meant that construction wasn’t finished until the end of 2014. The lab’s first project will be to study the BSL-3 pathogen that causes Crimean–Congo haemorrhagic fever: a deadly tick-borne virus that affects livestock across the world, including in northwest China, and that can jump to people. Future plans include studying the pathogen that causes SARS, which also doesn’t require a BSL-4 lab, before moving on to Ebola and the West African Lassa virus, which do. Some one million Chinese people work in Africa; the country needs to be ready for any eventuality, says Yuan. “Viruses don’t know borders.” Gao travelled to Sierra Leone during the recent Ebola outbreak, allowing his team to report the speed with which the virus mutated into new strains1. The Wuhan lab will give his group a chance to study how such viruses cause disease, and to develop treatments based on antibodies and small molecules, he says. The central monitor room at China’s National Bio-safety Laboratory. Credit: Muyi Xiao for Nature The opportunities for international collaboration, meanwhile, will aid the genetic analysis and epidemiology of emergent diseases. “The world is facing more new emerging viruses, and we need more contribution from China,” says Gao. In particular, the emergence of zoonotic viruses — those that jump to humans from animals, such as SARS or Ebola — is a concern, says Bruno Lina, director of the VirPath virology lab in Lyon, France. Many staff from the Wuhan lab have been training at a BSL-4 lab in Lyon, which some scientists find reassuring. And the facility has already carried out a test-run using a low-risk virus. But worries surround the Chinese lab, too. The SARS virus has escaped from high-level containment facilities in Beijing multiple times, notes Richard Ebright, a molecular biologist at Rutgers University in Piscataway, New Jersey. Tim Trevan, founder of CHROME Biosafety and Biosecurity Consulting in Damascus, Maryland, says that an open culture is important to keeping BSL-4 labs safe, and he questions how easy this will be in China, where society emphasizes hierarchy. “Diversity of viewpoint, flat structures where everyone feels free to speak up and openness of information are important,” he says.

### 2AC – Land Warfare Ext

#### Beneficial biotech enhancements are essential for US military superiority

Buchner 13 (Christina M. Buchner | “BIOLOGICALLY FIT: USING BIOTECHNOLOGY TO CREATE A BETTER SOLDIER” | <https://apps.dtic.mil/sti/pdfs/ADA620341.pdf> | DOA: 6/26/2022 | SAoki)

This thesis examines the promised performance enhancement capabilities that biotechnology has to offer and their benefits to the individual soldier and DoD **war fighting capabilities**. Whether restructured to fight states or prolonged insurgencies, biotechnology may increase soldier capabilities in individual command and control, mobility, lethality, sustainability and survivability, while decreasing their vulnerability on the battlefield. This would allow the U.S. to **maintain military superiority** and therefore facilitate Washington’s **national security objectives**.

#### Emerging tech is key to US military supremacy – unipolarity is not guaranteed

**Breedlove and Kosal 19** (Phillip Breedlove and Margaret Kosal, a retired four-star general in the United States Air Force who served as the commander of U.S. European Command, as well as the 17th Supreme Allied Commander Europe of NATO Allied Command Operations, Associate Professor in the Sam Nunn School of International Affairs at Georgia Institute of Technology, where she also directs the Sam Nunn Security Program. Her research explores the relationships among technology, strategy, and governance. Hoover Institution, "Emerging Technologies and National Security: Russia, NATO, & the European Theater", 2/25/2019, https://www.hoover.org/research/emerging-technologies-and-national-security-russia-nato-european-theater, accessed on 6/18/2022)//gideon

Dominance in both conventional and sophisticated military operations has been enabled in the United States by a technological advantage in precision, speed, stealth, and tactical intelligence, surveillance, and reconnaissance as compared to adversaries. Equally innovative and more revolutionary capabilities will be required in order to ensure dominance and security in the 21st Century—when adversaries span from peer competitor nation-states to disperse insurgencies and lone-wolf non-state actors.

In 2006, the Defense Science Board (DSB) was charged with looking back to the Cold War and the technologies and concurrent capabilities—precision, speed, stealth, and tactical ISR —that gave the U.S. a technological advantage over adversaries and identifying equivalent technological capabilities for the 21st Century.5 They concluded that technological superiority is a strategic differentiator for the United States. As a result of evolving conditions, the U.S. cannot assume that it will stay ahead of its adversaries by simply spending more on research, development, and procurement. The DSB report also concluded that the global environment in which the DoD operates had fundamentally changed, and that the DoD no longer leads most technology development. Globalization of technology has leveled the playing field internationally, and the U.S. faces more complex security challenges than at any time in its past. Additionally, adversaries are increasing their ability to adopt and adapt technology more rapidly than the DoD. The changing global environment requires the DoD to carefully evaluate, shape its programs in response, and be willing to take risks.

Scientific and technological innovations have been the backbone of American economic, military, and political power since the advent of the industrial revolution. Federal support for research and development was invigorated by the arguments and evidence put forth in Vannevar Bush’s now-famous report to the President in July 1945.6 At that time, the revolutionary power and security implications of research-driven development of the atomic bomb was palpable to American policymakers, the civilian leadership in the Department of War, and the armed forces. Advances in federally-sponsored technology made the United States and its armed forces the most technologically advanced in the world.

What are the roles and significance of emerging technologies and how should the national security community respond to the promise and perils of emerging technologies? How will these nascent scientific and technological developments impact local, regional, and international security, stability, and cooperation? What are the most likely sources of technological surprise with the largest threat capacity, and how can the national security community better identify them sooner? Emerging technologies present regional security challenges and may exacerbate (or mitigate) the geo-political, military, energy, and economic challenges in the future to a state or region and the potential impacts on U.S. interests and national security. Deep strategic and practical understanding of the significance of emerging technology and its diffusion as well as extending thinking concerning how science, technology, and inter- and intra-national social relations interact to shape and facilitate management of the changing global security landscape is a pressing need for the 21st Century.

### 2AC – Say Yes

#### There is broad support for US S&T advances

**Breedlove and Kosal 19** (Phillip Breedlove and Margaret Kosal, a retired four-star general in the United States Air Force who served as the commander of U.S. European Command, as well as the 17th Supreme Allied Commander Europe of NATO Allied Command Operations, Associate Professor in the Sam Nunn School of International Affairs at Georgia Institute of Technology, where she also directs the Sam Nunn Security Program. Her research explores the relationships among technology, strategy, and governance. Hoover Institution, "Emerging Technologies and National Security: Russia, NATO, & the European Theater", 2/25/2019, https://www.hoover.org/research/emerging-technologies-and-national-security-russia-nato-european-theater, accessed on 6/18/2022)//gideon

Science and technology is a strategic asset for American diplomacy and for asserting national power. It is our most valued “soft power” asset. The latest data from the Pew Global Attitudes Project survey from March 2013 shows that more than anything “U.S. science and tech advances” are viewed positively, e.g., ranging from 61% positive in Argentina to 85% in Kenya & Senegal.154 This should be an area to leverage for diplomacy and U.S. influence. If one analyzes the data specifically among “Middle-East/Conflict Area,” (Egypt, Pakistan, Turkey, and Uzbekistan), it’s even more dramatic: “Tech/Science Advances” are cited by 86% as a “reason for liking the U.S.” More than anything else. It’s 73% cited across all Islamic states surveyed, i.e., Egypt, Pakistan, Turkey, Uzbekistan, Bangladesh, and Indonesia. In South East Asia, 82% of those surveyed looked to America’s leadership in science and technology. To pre-emptively counter the criticism that one sometimes encounters: it’s not about ‘other countries liking us;’ it’s about leveraging what is most effective, efficient, and likely to be enable paths forward.

## 2AC – Case – Adversaries Ext

### 2AC – China Regulation Bad – Biotech

#### China regulations are deceiving and self serving

Araz 22 (Araz, S. Sevan Araz is a research intern with the Technology Policy Program at the Center for Strategic and International Studies in Washington, DC (2022, June 2). China adopts biotechnology regulation, amid authoritarianism concerns. China Adopts Biotechnology Regulation, Amid Authoritarianism Concerns | Center for Strategic and International Studies. Retrieved June 23, 2022, from <https://www.csis.org/blogs/technology-policy-blog/china-adopts-biotechnology-regulation-amid-authoritarianism-concerns>)

Aiming to advance the ethical reckoning precipitated by the CRISPR-baby scandal, Beijing also launched the National Science and Technology Ethics Committee in July 2019. The committee is tasked with crafting uniform ethical standards for emerging technologies. To date, its primary focus areas are artificial intelligence and biomedicine. The enduring COVID-19 crisis has also animated Chinese biosafety concerns—and resolve. While addressing a session of the powerful Central Comprehensive Deepening Reform Commission in February 2020, Chinese President Xi Jinping pushed for the rapid crafting of biosafety legislation and the establishment of biosecurity governance frameworks. Xi also harped on incorporating biosecurity tenets into China’s national security strategy. Despite mounting a regulatory embrace, Beijing’s flagrant violation of bioethics casts doubt on its sincerity. As states navigate the fallout of the COVID-19 pandemic, global biotechnology norms are set to be the subject of greater discourse—and rivalry. Precedent suggests China may seek to set standards that are in its own national interest. Yet Beijing’s margin to influence emerging norms should be scrutinized and curtailed as a rebuke of its harrowing strand of biotech-driven authoritarianism.

### 2AC – Yes Cognitive Warfare

#### Innovation of Cognitive Warfare is being integrated into every function of digital information, yet lacks ethical doctrines for effective regulation of [non-]state actors

Claverie & Cluzel 21 (Bernard Claverie & François du Cluzel | “The Cognitive Warfare Concept” | <https://www.innovationhub-act.org/sites/default/files/2022-02/CW%20article%20Claverie%20du%20Cluzel%20final_0.pdf> | DOA: 6/23/2022 | SAoki)

---it’s inev, just a matter of how we can deal with it

Cognitive Warfare is all around us. Cognitive Warfare is already being used, with more or less success and not necessarily under that name, by a number of state and non-state players, institutions or companies, including terrorist organizations, aggressive religious movements, etc. These actors include specialized and highlycompetent units working for digital intelligence services, as well as industry agencies and companies engaged in competition with others or in the more routine area of marketing and manipulation of potential clients. In all these cases, the object is to dominate, establish one’s superiority, or even conquer and destroy. Today these practices have reached such a level that political leaders can no longer ignore their importance. The term « Cognitive Warfare » has been used with that meaning in the United States since 2017, to describe in particular the modes of action available to a state or influence group seeking to “manipulate an enemy or its citizenry’s cognition mechanisms in order to weaken, penetrate, influence or even subjugate or destroy it”. While that broad mission has always formed a part of the art of war, here we have a new discipline that requires further elucidation. It is the combination of the newer cyber techniques associated with information warfare and the human components of soft power, along with the manipulation aspects of psychological operations (or PSYOPS). They usually involve a biased presentation of a reality, usually digitally altered, intended to favour one’s own interests. New communication tools now offer infinite possibilities, opening the way to new methods and new objectives. This increased complexity should encourage potential victims to develop a constant posture of resilience, even if in most cases, victims usually realize they were attacked too late. This approach to Cognitive Warfare has caught the eye of armed forces across the world and includes both strategic and operational aspects, some of which are more developed than others. It is not currently covered by established ethical considerations and doctrines. Cognitive Warfare expanded considerably with the arrival of digital strategic decision-making assistants, new operational domains and the invasion of big data and analytics, in the realm of information, wargaming and the conduct of operations. It is now spreading to all areas where digital information is used, including the quiet implementation of offensive and defensive uses, cognitive attrition, and defensive measures intended to protect target populations. It is a mix of well-thought out attack processes as well as counter and preventative measures.

### 2AC – Yes Russia/China Biowar – Disinfo

#### China and Russia are both spreading disinformation about biowarfare

David Bandurski 3-11-22 David Bandurski is the Co-Director of the China Media Project, a research program in partnership with the Journalism & Media Studies Center at the University of Hong Kong (<https://www.brookings.edu/techstream/china-and-russia-are-joining-forces-to-spread-disinformation/>, [China and Russia are joining forces to spread disinformation](https://www.brookings.edu/techstream/china-and-russia-are-joining-forces-to-spread-disinformation/))

When Chinese leader Xi Jinping met with Russian President Vladimir Putin on the sidelines of the Beijing Winter Olympics last month, the two leaders [signaled](https://www.fmprc.gov.cn/mfa_eng/zxxx_662805/202202/t20220204_10638923.html) to the world that their relationship had entered a new era. In [a joint statement](http://en.kremlin.ru/supplement/5770), the two men spoke of reshaping the international order, and a crucial aspect of this strategy centers on information. In the aftermath of Russia’s invasion of Ukraine, the full scope of their ambitions on this front, taking shape over many years, is coming into view. The deepening relationship between China and Russia is driven in part by a shared narrative that the United States and the European Union are constraining their interests and that they are using information and technology to exert leverage over their adversaries. Putin and the Chinese Communist Party have cracked down on free expression, independent media, and internet freedoms largely to counter what both perceive as the risk posed to their respective regimes by alternative sources of information reaching domestic audiences—and to legitimize these methods internationally. Though Russian and Chinese interests diverge in important ways, they are increasingly collaborating on the narratives being supplied to domestic audiences, feeding similar disinformation and propaganda to a citizenry increasingly cut off from the global web. In the aftermath of Russia’s invasion of Ukraine, Beijing has on the one hand avoided fully backing the incursion while on the other amplifying Kremlin propaganda on the issue. This week, for example, China’s foreign ministry [repeated](https://www.fmprc.gov.cn/mfa_eng/xwfw_665399/s2510_665401/2511_665403/202203/t20220309_10649938.html) [false Russian claims](https://www.bloomberg.com/news/articles/2022-03-08/china-pushes-russia-conspiracy-theory-about-u-s-labs-in-ukraine) about the presence of U.S. biological weapons in Ukraine. Against the backdrop of last month’s joint statement from Xi and Putin, this collaboration should be seen as part of a broader project to reshape the global information landscape to favor the Kremlin and Beijing’s authoritarian political projects.

### --- China/Russia Cognitive Biotechnology

#### Russia and China are doing cognitive biotech

**Giordano 21** (James Giordano, PhD, MPhil, is Professor in the Departments of Neurology and Biochemistry; Chief of the Neuroethics Studies Program; Director of the Cyber-SMART Center’s Program in Biotechnology, Biosecurity and Ethics; Co-director of the Program in Brain Science and Global Law and Policy; and Chair of the Subprogram in Military Medical Ethics at Georgetown University. "Emerging Neuroscience and Technology (NeuroS/T): Currentand Near-Term Risks and Threats to NATO Biosecurity", 3/2021, https://www.innovationhub-act.org/sites/default/files/2021-03/NATO%20NeuroST%20Report%20FINAL.pdf, accessed on 7/2/2022)//gideon

Table 1. Representative Competitive Research Programs in NeuroS/T for Military/Intelligence Applications: China and Russia

|  |  |  |
| --- | --- | --- |
| Russia | • Russian Foundation for Advanced Research Projects o Laboratory of Neurotechnology Perception and Recognition with focus areas • Russian Academy of the Sciences o Institute of Higher Nervous Activity • 30th Central Scientific Research Institute, Ministry of Defense • State Research Center of Virology and Biotechnology (VECTOR) | • Neurotechnology • Integrated Biosystems • Memory, perception and recognition • Public health and safety • Neurotrauma |
| China | • National Natural Science Foundation of China • Ministry of Science and Technology (MOST) • Institute of Neuroscience (ION) of the Chinese Academy of the Sciences (CAS) • Chinese Society for Neuroscience • Second Military Medical University • Third Military Medical University • Fourth Military Medical University in Xi’an o Institute of Neurosciences • Zhujiang Hospital, Institute of Neuromedicine Partners • Beijing Society for Neuroscience • Neuroscience Research Institute, Peking University • IDG/McGovern Institute for Brain Research at Peking University • Beijing Normal University, National Key Laboratory of Cognitive Neuroscience and Learning • East China Normal University –School of Psychology and Cognitive Science • The Translational Neuroscience Center of West China Hospital of Sichuan University | “Bio-chips” and biotechnology • Trauma • Neurodegeneration • Tumor biology • Pain and analgesia • Drug abuse and addiction |

### 2AC – Yes Russia Biowarfare – Ukraine

#### Russia is incentivized to start biological warfare

Ben Connable 5-15-22 Ben Connable is a nonresident senior fellow at the Atlantic Council and adjunct professor of security studies at Georgetown University. (Will Putin use chemical weapons in Ukraine?, <https://www.atlanticcouncil.org/blogs/ukrainealert/will-putin-use-chemical-weapons-in-ukraine/>) // WA

With Russia’s war in Ukraine foundering, there are increasing fears that Vladimir Putin might unleash chemical or biological weapons on Ukrainian soldiers and civilians. How realistic is this scenario? Putin knows there is a special terror associated with chemical and biological weapons. Ukrainians have good reason to fear their use: the effects are awful. But delivering chem-bio weapons is difficult and dangerous even for well-trained professional soldiers. There is little to suggest Russian troops would be successful. Chemical [weapons](https://www.opcw.org/our-work/what-chemical-weapon) like nerve, blistering, and choking agents are designed to kill or maim victims. For example, Russia used Novichok nerve agent in an attempt to murder political opponents in [Salisbury](https://www.bbc.com/news/uk-58635137) in 2018. [Biological](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1326439/) agents like ricin and botulism are deadly or incapacitating toxins or diseases. For example, shortly after the 9/11 attacks, an unknown assailant sent weaponized [anthrax](https://www.justice.gov/archive/amerithrax/docs/amx-investigative-summary.pdf) through the US mail in an unsuccessful effort to kill members of Congress. I experienced the fear of chemical attack firsthand while examining suspicious unexploded shells during the 1991 Gulf War, and while invading Saddam Hussein’s Iraq in 2003. I never quite knew if my chemical suit or mask were fitted just right, or if a tiny gap had opened up that might have exposed me to unspeakable suffering. Luckily I experienced nothing but false alarms. But even those unfounded fears were sobering. Others have not been so lucky. Saddam [used](https://www.jstor.org/stable/4330124) poison gas to kill thousands of Iranian troops in the Iran-Iraq War. He also deployed chemical weapons to murder thousands of his own people. More [recently](https://www.hrw.org/news/2019/06/03/russia/syria-flurry-prohibited-weapons-attacks), Syrian civilians experienced deadly chemical attacks launched by their own Russian-backed government. Russia almost certainly [retains](https://news.harvard.edu/gazette/story/2022/03/harvard-analyst-assesses-chemical-weapon-threat-posed-by-russia/) a sizable [store](https://www.washingtonpost.com/national-security/2022/03/19/russia-chemical-weapons-ukraine/) of chemical and biological weapons. Moscow’s [commitments](https://www.govinfo.gov/content/pkg/GAOREPORTS-NSIAD-94-136/html/GAOREPORTS-NSIAD-94-136.htm) to destroy the last vestiges of its Soviet-era stockpiles are no more believable than any random story on Russian state media. But having these terrifying weapons and putting them to effective use are two different matters. I see at least three reasons why the use of chemical or biological weapons in Ukraine could go badly wrong for the Russians. There is little doubt that direct attribution would be unavoidable for any Russian chemical weapon attack in Ukraine. Experts on chem-bio weapons and Russian tactics [assume](https://www.nbcnews.com/politics/national-security/us-warns-russia-use-chemical-weapons-false-flag-operation-ukraine-rcna19391) the Russians would try to use a [false flag](https://www.bbc.com/news/world-60434579) operation to deny responsibility for their attack. They might attempt to make it look like the Ukrainians attacked their own civilians in an effort to discredit Russia, or they might even try to pin the blame on NATO. This could still be an effective tactic for the Russian domestic audience, but the days of gaslighting Western leaders and reporters are over. Advanced Western surveillance, detection, and forensics will not allow Russia’s armed forces to secretly deploy chem-bio weapons. Russia’s [failure](https://news.un.org/en/story/2021/03/1086012) to cover up even its most highly classified assassination [attempts](https://www.theguardian.com/world/2020/jun/23/skripal-salisbury-poisoning-decline-of-russia-spy-agencies-gru) suggest it would fail even more spectacularly to cover up much larger battlefield attacks. The chance of grave errors in chemical weapon delivery would be very high. Delivering chem-bio weapons is a complicated task best left to well-trained and practiced professionals. It is highly unlikely that Putin’s air, ground, or missile forces have [retained](https://www.cia.gov/readingroom/docs/DOC_0000284028.pdf) the [skills](https://www.archives.gov/files/declassification/iscap/2012-071-doc-1-part-1.pdf) necessary to ensure safe and effective delivery of these deadly weapons from storage to target. First, they must transport the weapons without mishap. Some containers, bombs, and shells are so old that their often caustic payloads may be leaking. Next, they have to prepare the weapons for delivery by airplane, missile, or artillery strike. This involves careful handling by soldiers trussed up in head-to-toe protective gear, a fraught prospect even under ideal conditions. Even before they launch their attacks, Russian soldiers would be at high risk of catastrophic failure. It is important to note that Russian ground forces are not prepared to capitalize on chem-bio attacks. Launching these weapons can cause terror, injury, and death. But chem-bio attacks are not magical. They will not kill everyone they affect, and weaponized gasses cannot seize or hold territory. Simply firing these weapons into civilian areas like Kharkiv or Kyiv is likely to harden rather than weaken Ukrainian and Western resolve. Chemical weapons are used most effectively to soften up targets for follow-on ground attack. [Troops](https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN32065-ATP_3-11.74-000-WEB-1.pdf) wearing protective gear must push [forward](https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_11.pdf) into the contaminated zone riding in protected vehicles supported by decontamination trucks while carrying lots and lots of extra protective supplies. Given the present state of Russian forces in Ukraine and the probable lack of advanced chem-bio training, this would be all but impossible. If the Russians try to push their own troops into a chem-bio environment they are likely to suffer much the same fate as their victims. The Russian military can certainly attack Ukraine with chemical and biological weapons. But they probably cannot do so effectively or without significant risk to their own forces. Russia will be caught out and, in keeping with its overall strategic failure in Ukraine, achieve little more than increasing international opprobrium and isolation. Putin would be wise to leave his chemical and biological weapons safely tucked away in cold storage or, better yet, to destroy them as promised.

### 2AC – Yes NATO Biotechnology – Cognitive Warfare

#### NATO-allied cooperation is key to maintain a technical edge in CW – renewed focus on current projects solves

Claverie & Cluzel 21 (Bernard Claverie & François du Cluzel | “The Cognitive Warfare Concept” | <https://www.innovationhub-act.org/sites/default/files/2022-02/CW%20article%20Claverie%20du%20Cluzel%20final_0.pdf> | DOA: 6/23/2022 | SAoki)

NBIC is a scientific project bringing together four heretofore distinct domains: nanotechnology (nano-robot technology, nano-sensors, nanostructures, energy...), biotechnology (bio-genomic technology, CRISPR-Cas9, neuropharmacology...), information technology (computer science, microelectronics...) and cognitive technology (cognitive science and neuropsychology). The project was formalized with the encouragement of the US Defence Department in 2002 and subsequently taken up by major international institutions and a number of nations, to bring together future technologies. Figure 3: Convergent technologies as defined by the US DOD in the Roco and Bainbridge Report (2012). The object is to encourage the development of tools and adapt or improve humans through an anthropo-technical approach to develop a hybridized man-system to meet health, security, defence objectives and prepare them for specific bioenvironments (space, sea, deserts, etc.). Today, this project has led to the partial convergence of domains, mostly through pairing information technology and health nanotechnologies, new chemical cognition enhancers, embedded electronics, etc. Ultimately, the goal is that it will lead to an augmented human operator (or even a hybrid one), injected with amplifying substances or nanotechnologies, providing informational resilience and superiority. A number of enhanced soldier projects are already underway. Information, of course, can imply cyber threats and information distortion or manipulation. And a connected brain, in particular a soldier’s connected brain, will lead to offensive and defence forms of ‘cognitive warfare’. Many writers have already imagined what threats might emerge. Most of them remain science-fiction, but some projects are benefiting from real resources, programmed and in some cases tested, with for instance neurocomputing implants and perception augmenting technical hybrids (vision and hearing), or even genomic modifications. Beyond traditional and existing threats associated with cognitive warfare as used by allied or competing nations, or those that might be developed by unofficial entities (such as terrorists or entities seeking cultural or religious domination), we need to think about the future of NBIC, and how it might influence human cognition, by distracting, saturating or even taking over and modifying objectives. We should also mention the issue of these implants’ obsolescence and their exploitation. Conclusion The cyber world is now all-encompassing, ever-present and no decision or action can be executed without the tools it provides. This obviously affects the cognition of those who use them and will impact individuals and groups, at all levels, both psychologically, with human consequences, and technically when human errors impact systems. This is a fast-growing domain and new paths are constantly pushing back the limits of our knowledge and what potential uses might be developed. It is imperative we try to anticipate threats born of future technologies and learn more about those being developed today. These threats are increasingly common and their consequences, more often than not, will have global repercussions, requiring NATO and its member Nations to think about cognitive warfare’s varied dimensions. To anticipate them will mean acquiring the means to go beyond a reactive posture. If militaries remain reactive, it will lead to losing the technological initiative that is so vital to military strategy today.

### 2AC – Yes US Biotechology – Military

#### The DOD’s Biotech program has invested millions of dollars into R&D.

DOD ’21 [U.S. Department of Defense; an executive branch department of the federal government charged with coordinating and supervising all agencies and functions of the government directly related to national security and the United States Armed Forces; 5-7-2021; "Department of Defense Announces FY21 BOOST Program Awardees"; DOD; https://www.defense.gov/News/Releases/Release/Article/2600172/department-of-defense-announces-fy21-boost-program-awardees/; Accessed 6-26-2022; RL]

The Department of Defense’s (DOD) Biotech Optimized for Operational Solutions and Tactics (BOOST) Program has awarded $5 million in total to five selected technology development proposals for Fiscal Year 2021 (FY21). The Directorate of Defense Research and Engineering for Research and Technology (DDRE(R&T)) in the Office of the Under Secretary of Defense for Research and Engineering (OUSD(R&E)) oversees the BOOST Program.

“I am pleased that DDRE(R&T) is able to provide guidance and support to advance biotechnology research and technology development across the Department through the BOOST Program,” said Dr. JihFen Lei, Principal Deputy and Acting Director of Defense Research and Engineering for Research and Technology. “In order to maintain our Nation’s technological advantage, it is critical that DOD provides resources to bridge the gap between research and product development to accelerate the Modernization Priorities.”

BOOST aims to connect Military Service and Defense Agency biotechnologists with industry researchers and developers in order to accelerate the fielding of viable biotechnology products for our Warfighters. The review committee, composed of OUSD(R&E) senior leaders, selected the following five proposals as FY21 awardees:

BLISS (BOOSTED Linear Sensing System) – submitted by Lenny Tender, Naval Research Laboratory

Biomanufacture of 1,2,4‐Butanetriol, a Critical Energetic Precursor – submitted by Henry Gibbons, U.S. Army Combat Capabilities Development Command (CCDC) – Chemical Biological Center

Demonstration of Electrospun Biosynthetic Spider Silk Fibers for Advanced Materials – submitted by Joseph Estevez, Naval Air Warfare Center Weapons Division – China Lake

Biomanufacturing of Melanin‐Based Ablative Composites for Thermal Protection – submitted by Zheng Wang, Naval Research Laboratory

Biotechnology Enabled Rapid Water Quality Monitoring for Warfighter Hydration – submitted by Michael Wiederoder, CCDC – Soldier Center

To participate in the selection process, DOD laboratories or agencies submit biotechnology development proposals that meet specific criteria. Proposals must include a demonstration of innovative biotechnology in a military environment and a viable technology transition path that engages relevant stakeholders. The overall aim is to deliver new capabilities in a biotechnology modernization application area.

“Biotechnology will fundamentally change the future battlefield and Warfighter capabilities,” said Dr. Stephanie Rogers, Acting Principal Director for Biotechnology in the Directorate of Defense Research and Engineering for Modernization, OUSD(R&E)). “To realize this potential, we must anticipate and generate significant progress and advancements in biotechnology. The BOOST Program plays an integral part in supporting these advancements.”

#### Biotech transition now toward combat ops in US

Malet 15 (October 30th, 2015 | David Malet | Political Scientist researching and teaching about international security, transnational militancy, and US national security and foreign policy | “Captain America in International Relations: the Biotech Revolution in Military Affairs” | <https://doi.org/10.1080/14702436.2015.1113665> | DOA: 6/22/2022 | SAoki)

Defense R&D While some military (or potentially military) applications of biotechnology are indeed products of the private sector, it is no state secret that militaries actively sponsor their own biotech research and development programs. The United States Department of Defense in particular is open about the large number of such projects that it oversees. And while most of these are described as intended for troop protection, many are clearly intended to enhance combat operations. As with pathogen stockpiles maintained ostensibly for defensive research, it is only the intent of the wielder that determines whether or not they are offensive. And as the 2001 anthrax case illustrates, even projects officially intended for defensive purposes may be misapplied. Much of the biotech research is conducted under the auspices of the Pentagon’s DARPA rather than legacy programs remaining from the era of bacteriological weapons stockpiles. Established in 1958 as a response to the launch of the first Sputnik satellite by the Soviet Union the year before, DARPA was intended to promote “high-risk – high-payoff” R&D in areas beyond the immediate envisioned needs of military planners. The Agency’s singular most influential project has undoubtedly been a communications system that came to be known as DARPANET before penetrating – and transforming – the commercial sector as the internet (Van Atta 2008, pp. 20, 23, 27). While a reported 90% of its projects fail to come to fruition, high-profile DARPA research that has had a significant impact on United States military capability includes Saturn rockets, ground radar, stealth fighters, Predator missiles, and drones. The agency’s budget of $3 billion is small compared to intelligence agencies, but it supports an “open culture” promoting “radical innovation” praised by participant scientists, most of whom are university researchers (Moreno 2006, pp. 12–13, Basken 2013). In 2014, DARPA announced the creation of a new Biological Technologies Division, built from existing research units and new programs, intended to ensure that biotechnology is not merely an aspect of various research programs, but that “biology takes its place among the core sciences that represent the future of defense technology.” The new division’s primary goals include to “restore and maintain warfighter abilities,” and “to enhance global-scale stability” (DARPA 2014). Similarly, the Pentagon Office of Net Assessment (ONA), which envisions potential future strategic environments and challenges, has also promoted biotech R&D as a defense priority. In 2002, the ONA recommended revising Federal regulations to allow experimental biotechnologies to be brought to the battlefield more readily. It also called for facilitating a greater partnership with private sector researchers by restricting anti-trust laws to permit quicker product development (Armstrong and Warner 2003). In biotech in particular, the military has an advantage over the private sector because it does not have to go through the lengthy and rigorous clinical testing and approval process for medical devices and treatments (Wheelis, in Pearson et al. 2007, p. 4).

### 2AC – Yes China Biotechnology

#### China will lead international cognitive biotech development in the squo – creates soft power that subsumes American hard power

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As described in the Five-Year Plans (FYPs) and other national strategies, China has identified and acknowledged the technical, economic, medical, military, and political value of the brain sciences, and has initiated efforts to expand its current neuroS/T programs. China utilizes broader strategic planning horizons than other nations and attempts to combine efforts from government, academic, and commercial sectors (i.e., the “triple helix”) to accomplish cooperation and centralization of national agendas. This coordination enables research projects and objectives to be used for a range of applications and outcomes (e.g., medical, social, military). As noted by Moo Ming Poo, director of China’s Brain Project, China’s growing aging population is contributing to an increasing incidence and prevalence of dementia and other neurological diseases. In their most recent FYP, China addressed economic and productivity concerns fostered by this aging population, with a call to develop medical approaches for neurological disorders and to expand research infrastructure in neuroS/T. This growing academic environment has been leveraged to attract and solicit multi-national collaboration. In this way, China is affecting international neuroS/T through (1) research tourism; (2) control of intellectual property; (3) medical tourism; and (4) influence in global scientific thought. While these strategies are not exclusive to neuroS/T; they may be more opportunistic in the brain sciences because the field is new, expanding rapidly, and its markets are growing, and being defined by both share- and stake-holder interests. Research tourism involves strategically recruiting renowned, experienced scientists (mostly from Western countries), as well as junior scientists to contribute to and promote the growth, innovation, and prestige of Chinese scientific and technological enterprises. This is apparent by two primary efforts. First, initiatives such as the Thousand Talents Program (launched in 2008) and other programs (e.g., Hundred Person Program, Spring Light Program, Youth Thousand Talents Program, etc.) aim to attract foreign researchers, nurture and sustain domestic talent, and bring back Chinese scientists who have studied or worked abroad. Further, China’s ethical research guidelines are, in some domains, somewhat more permissive than those in the West (e.g., unrestricted human and/or non-human primate experimentation), and the director of China’s Brain Project, Mu-Ming Poo, has stated that this capability to engage research that may not be (ethically) viable elsewhere may (and should) explicitly attract international scientists to conduct research in China. Second, China continues to engage with leading international brain research institutions to foster greater cooperation. These cooperative and collective research efforts enable China to achieve a more even “playing field” in the brain sciences. China leverages intellectual property (IP) policy and law to advance (and veil) neuroS/T and other biotechnologies in several ways. First, via exploitation of their patent process by creating a “patent thicket”. The Chinese patent system focuses on the end-utility of a product (e.g., a specific neurological function in a device), rather than emphasizing the initial innovative idea in contrast to the U.S. system. This enables Chinese companies and/or institutions to copy or outrightly usurp foreign patents and products. Moreover, Chinese patent laws allow international research products and ideas to be used in China “for the benefit of public health,” or for “a major technological advancement.” Second, the aforementioned coordination of brain science institutions and the corporate sector establishes compulsory licensing under Chinese IP and patent laws. This strategy (i.e., “lawfare”) allows Chinese academic and corporate enterprises to have economic and legal support, while reciprocally enabling China to direct national research agendas and directives through these international neuroS/T collaborations. China enforces its patent and IP rights worldwide, which can create market saturation of significant and innovative products, and could create international dependence upon Chinese neuroS/T. Further, Chinese companies have been heavily investing in knowledge industries, including artificial intelligence enterprises, and academic book and journal partnerships. For example, TenCent established a partnership with Springer Nature to engage in various educational products. This will allow a significant stake in future narratives and dissemination of scientific and technological discoveries. Medical tourism is explicit or implicit attraction and solicitation of international individuals or groups to seek interventions that are either only available, or more affordable in a particular locale. Certainly, China has a presence in this market, and at present, available procedures range from the relatively sublime, such as using deep brain stimulation to treat drug addiction, to the seemingly “science-fictional”, such as the recently proposed body-to-head transplant to be conducted at Harbin Medical University in collaboration with Italian neurosurgeon Sergio Canavero. China can advance and develop areas of neuroS/T in ways that other countries cannot or will not, through homogenizing a strong integrated “bench to bedside” capability and use of non-Western ethical guidelines. China may specifically target treatments for diseases that may have a high global impact, and/or could offer procedures that are not available in other countries (for either socio-political or ethical reasons). Such medical tourism could create an international dependence on Chinese markets as individuals become reliant on products and services available only in China, in addition to those that are “made in China” for ubiquitous use elsewhere. China’s growing biomedical industry, ongoing striving for innovation, and expanding manufacturing capabilities have positioned their pharmaceutical and technology companies to prominence in world markets. Such positioning – and the somewhat permissive ethics that enable particular aspects and types of experimentation – may be seductive to international scientists to engage research, and/or commercial biomedical production within China’s sovereign borders. Through these tactics of economic infiltration and saturation, China can create power hierarchies that induce strategically latent “bio-political” effects that influence real and perceived positional dominance of global markets.

### 2AC – Yes China Biotechnology – Land Warfare

#### Chinese biotechnology poses national security risks to the US

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Clinical and genetic data of U.S. citizens obtained by Chinese biotechnology companies through their partnerships with U.S. institutions could pose national security risks, according to a newly published congressional report. The risks stem from the “dual use of biotechnology information,” the U.S.–China Economic and Security Review Commission (USCC) said in a report published Feb. 14. For instance, genetic and medical analyses used in the biotech industry to develop tailored treatments for patients “could be used for malicious purposes in the hands of a foreign state government, such as China.” In a hypothetical situation, foreign states such as China could possibly blackmail individuals with the threat of exposing their embarrassing medical information, according to the report. In another situation, the foreign state could use information on health conditions, such as allergies, to conduct a targeted attack against diplomats, politicians, high-ranking federal officials, or military leaders, to “induce an allergic reaction or fatal injury.” Much like health records, genetic data could also be exploited as research about the links between genetic traits and personality traits becomes more advanced in the future. For instance, foreign intelligence officials, knowing in advance which individuals have genetic markers such as loyalty and susceptibility to flattery, would be able to know how to exploit or blackmail those persons. China’s biotech industry has grown rapidly in the last decade, according to the report, with the market now estimated at 30 billion to 40 billion yuan ($4.7 billion to $6.2 billion), compared to the U.S. biotech market at $118 billion. “As a major element of China’s biotechnology growth, Chinese biotech companies are utilizing U.S. firms to acquire technologies and data that bolster their current capabilities through a variety of channels,” the report stated. Some of these channels included foreign direct investment, mergers and acquisitions, venture capital, corporate and academic partnerships, and recruitment of U.S.-trained foreign and Chinese-born researchers. The report also warned, “China’s biotech industry may have also benefited from illicit extraction of overseas technology through espionage or the theft of trade secrets.” One confirmed example was the case of Zhang Weiqiang, a Chinese national living in Manhattan, Kansas, who was sentenced in April 2018 to 10 years in prison for stealing samples of genetically engineered rice seeds from his employer Kansas-based Ventria Bioscience. Zhang intended to transfer the samples to a crop research institute in China. Zhang’s case was one of 11 cases that occurred between from 2001 to 2017 involving Chinese espionage and trade secret theft in the United States identified by the report. BGI One example of China getting its hands on U.S. data is highlighted in the report: via BGI Group, a private genome sequencing center based in the southern Chinese city of Shenzhen, with subsidiaries including BGI Genomics, which is listed on the Shenzhen Stock Exchange, and a research institute. BGI was previously known as the Beijing Genomics Institute. In 2011, BGI and University of California Davis announced a collaboration in which the Chinese company would set up a genetic sequencing facility at the university’s Sacramento campus. That same year, BGI and the Children’s Hospital of Philadelphia also established a collaborative genome center. In 2013, BGI acquired U.S. sequencing company Complete Genomics for $117.6 billion, according to the report. “By collecting data across many efforts [partnerships with U.S. entities], BGI may be amassing a database of genomic and healthcare data on US persons that is greater than that achieved through any single research endeavor,” the report stated. While BGI is a private company, the company has definite ties to the Chinese Communist Party. In January 2018, China’s state-run media Xinhua reported that Du Yutao, the Party secretary of BGI’s research institute, spoke of the importance of learning and putting into action of “the spirit behind the 19th National Congress,” referring to the Party’s once-in-five-years leadership transition event. In China, companies and organizations are required to establish Party organizations to ensure they toe the Party line. Du had spoken at the institute’s Party committee meeting designed to discuss Chinese leader Xi Jinping’s speech at the 19th National Congress held in October 2017. BGI has also received state support, including a ten-year, $1.5 billion loan from China Development Bank in 2010. According to Chinese search engine Baidu, Du was selected as a provincial representative from southern China’s Guangdong Province to attend the 19th National Congress. The USCC report also warned that the Chinese regime has laws in place that require private companies to give up data at any time. Two laws passed in 2015, National Security Law, Counter-Terrorism Law, and the Cybersecurity Law in 2016, were largely aimed at internet and telecommunications companies, but “their broad scope of does not preclude their application to a wider range of companies such as those harboring genomic or other personal data,” the USCC report said. China’s State Policies Biotech is among several tech sectors the Chinese regime has named as a “Strategic Emerging Industry” in economic plans such as “Made in China 2025” and the 13th Five-Year Plan. China unveiled “Made in China” in May 2015 as a blueprint for transforming China into a high-tech powerhouse by 2025. Less than a year later, in March 2016, Beijing released its latest Five-Year Plan, which sets out to strengthen the implementation of Made in China 2025 from 2016 to 2020. The USCC report identified several Chinese state-run tech R&D programs to boost the country’s biotech sector, including the “863” and “973” programs, with the former dating back to 1986 and the latter in 1997. According to the report, Beijing poured $630 million into funding the 973 program in 2013. Biotech has also been a focus of Beijing’s talent programs in the past few years, the report stated, listing several national level programs such as the Hundred Talents Program and Thousand Talents Program. Regional governments in China also run hundreds of similar programs. “Out of the estimated 2,629 current recruits in the Thousand Talents program as of June 2018, 44 percent specialize in life sciences or medicine,” the report stated, citing figures from a U.S. congressional hearing. The report pointed out that the dangers lie in China’s fundamentally different political system: “China is a Leninist-style one-party state based on rule-by-law not rule-of-law. China’s economic ambitions and intentions present challenges for more liberal economies.” The report recommended that the United States adopt policies to mitigate “against economic and security risks posed by China’s statist approach to innovation without stifling US innovation.”

#### **China is investing heavily in biotechnical enhancements of soldiers – will use it to challenge US superiority**

Malet 15 (October 30th, 2015 | David Malet | Political Scientist researching and teaching about international security, transnational militancy, and US national security and foreign policy | “Captain America in International Relations: the Biotech Revolution in Military Affairs” | <https://doi.org/10.1080/14702436.2015.1113665> | DOA: 6/22/2022 | SAoki)

The international balance of power With the emergence of advanced biotechnologies, many of which already exist or are being developed for expressly military purposes, the United States holds the potential for achieving a decisive advantage in power projection capabilities beyond the reach of its current adversaries and most of its likely potential competitors. Besides the United States, other actors are expanding their biotech R&D sectors, notably the emerging great powers China and India, where force planners must consider the usage of bioweapons in Asian theaters of combat in both classical and modern times (Clunan et al. 2008). China is developing its military capabilities to become a regional power at the least, and advanced biotechnologies could play a role in this effort. “As the Chinese military expands its power projection capabilities, it will concentrate on creating asymmetrical advantages in the face of superior US conventional technology” (NTI 2003). Chinese military medical researchers have written a number of articles proposing the use of proteomic weapons to engage in non-lethal “precision injury” attacks that could be healed upon enemy surrender as evidence of hegemonic “mercifulness.” Despite the evident offensive strategic potential of such research – one such article is titled “The Command of Biotechnology and Merciful Conquest” – there is still evidence of the constraints of international norms against biowarfare. Indeed, the author claims that biotech warfare approaches “abide by the Biological and Toxin Weapons Convention more effectively, and strike a blow on the traditional bioweapons, therefore welcoming new military progresses and reforms, and changing the notions and civilization level of war” (Guo 2006, pp. 1152–1154). India, with its reliance on the Green revolution to attempt to achieve food sufficiency, has spent the last two decades encouraging the development of agricultural biotechnologies. Many of these advances were facilitated using extensive knowledge of genetic engineering, which in turn provided information on the de novo synthesis of biological agents. Whether such synthesis has actually been done is uncertain. India has made substantial efforts to prepare its military force for a biological attack. In December of 1998, India began to train its medical personnel to deal with the eventualities of such an attack. (NTI 2009) India’s equivalent of DARPA, the Defense Research & Development Organization operates a network of 52 laboratories whose research includes life sciences for military purposes. These include the Defense Institute of High-Altitude Research and the Defense Food Research Laboratory (Department of Biotechnology, Government of India 2013, p. 20). Its reported products parallel those investigated by its American counterparts, including treatments to combat altitude sickness, transgenic crops, and protective polymers for uniforms, although products are frequently described in terms of their commercial rather than strategic potentials (Defense Research & Development Organization 2015). One widely cited potential threat to international security from biotechnology is that, as more actors become involved in research into militarized biotechnology, the threat of dissemination to non-state actors increases through the increased availability of production equipment and available data. Maurer (in Maurer 2009, p. 86) notes that commercially available micronizers are sold that can produce 1–10 μm particles, and in their advertising material, the “companies boast that they can be operated by ‘anyone … in their garage.’” And non-state actors with interests in such technologies have been quite busy utilizing such machinery in the past decade, with individuals referred to as “garage hackers” operating autonomously with small pieces of equipment and biological material that can be purchased from suppliers over the internet (United States House of Representatives 2005, p. 30). Still, because such proliferation occurs over time, and because research by defense establishments will continue during this period, including in biodefense, the most sophisticated uses of biotech will remain in the arsenals of advanced state actors just as they do with conventional armaments today, despite the proliferation of surplus conventional arms. Rather than being the “poor man’s nuclear weapon,” twenty-first-century biotechnology will actually provide a decided asymmetrical advantage to major powers that will complement their superiority in conventional forces. Technologically advanced states will be far more likely to be able to counter classical “germ warfare” like anthrax attacks by rogue states and non-state groups than will be actors bereft of a biotech industry to mount defenses against vectors that introduce engineered viruses, or proteomic weapons that disrupt human bioregulators.

#### China is forging ahead in cognitive biotechnology

Ramanujam 19 (Ramanujam, Kanchana. “China's Military Pursuit of Bio-Technology.” China's Military Pursuit of Bio-Technology | Manohar Parrikar Institute for Defence Studies and Analyses, Dec. 2019, https://idsa.in/cbwmagazine/china-military-pursuit-of-bio-technology#footnote4\_i77u376.)

Developments in science and technology (S&T) impact both the character and nature of warfare profoundly. New innovations are turning out to be disruptive and any military which takes the lead in absorbing the same would have a significant, perhaps decisive, edge over others. The Chinese Defence White Papers reiterate the importance of powerful and modern armed forces in achieving the ‘Chinese Dream’. True to this, China has taken giant steps towards modernising and transforming its armed forces. It has moved from Civil-Military Integration to Military-Civil Fusion so as to exploit the latest developments in S&T for advancing its military capabilities. In fact, President Xi Jinping heads the Central Commission for Military-Civil Fusion Development established in 2017. In Shenzhen, the Central Military Commission Science and Technology Commission has established the National Defense Science and Technology Innovation Rapid Response Group to ‘promote the integration of military and civilian development in the field of science and technology and to use advanced commercial technology to serve the military.’1 The second round of military reforms China implemented, helped in syncing the doctrine-writing done by the Academy of Military Science (AMS) with the new, S&T-driven capabilities. Such is the emphasis on S&T that Chinese Communist Party committees have been planted into more than 35 Chinese technological companies to ensure oversight!2 He Fuchu of the Academy of Military Medical Sciences (AMMS), Beijing, sees bio-crossing technologies as tools which will make ‘biological weaponization’ possible and indeed, as the battlefield has continued to expand in the inanimate realm from the land to the sky, sea, space, networks, etc., the animate realm consisting of human cells and cognitive abilities (the neuropsychiatric system) would become the next frontier for the battlefield to cross.3 This is exactly the thought that is guiding the Chinese pursuit of ‘zhishenquan’ or ‘command and superiority in the bio-domain’ as they expect “a series of biological revolutions with ‘smart’ as the core.”4 In fact, way back in 2010, Guo Jiwei of the then Third Military Medical University (Army Medical University post the military reforms in 2017) co-authored a book titled ‘War for Biological Dominance’ examining the military impact of Biotechnology.5 Bio-crossing technologies, especially Biotechnology, are being pursued so that China can ‘seize the initiative’ in this field.6 Is the People’s Liberation Army (PLA) involved in research pertaining to the enhancement of human cognitive abilities through gene-editing, use of drugs, etc.? In 2011, the AMMS unveiled Night Eagle, a drug it claimed would help its troops remain awake for up to 72 hours with minimum cognitive degradation.7 A company by the name Cogrowth is using artificial intelligence (AI) to interpret brain signals, which may, in future, be the basis for weapons being controlled by the power of thought!8 Furthermore, in 2015, He Fuchu of the AMMS, postulated that advances in biotechnology could lead to the creation of ‘cerebrum control’ weapons.

#### Chinese innovation in biotech threatens the US

Ellis 18 (Ellis, Shannon. “Biotech Booms in China.” Nature News, Nature Publishing Group, 17 Jan. 2018, https://www.nature.com/articles/d41586-018-00542-3. )

Timing can make a big difference in a career. Is it worthwhile to stay longer in a comfortable job or is it the right moment to strike out for a new challenge? Similarly, timing can make all the difference when deciding to enter a developing market like China. Just a decade ago, when China-born scientists with overseas experience began returning to the country, lured by their homeland’s fast growth and growing financial means, they found a drug industry dominated by generics. Undeterred, they got busy building the infrastructure for an industry capable of drug discovery and development, buoyed by substantial government support and a thriving economy. Part of Career guide: China Today, biotech specialists arriving in China find an industry at a turning point, with many key elements in place for innovation: a university system churning out doctorates and strong basic research, substantial financial backing from both the private and public sectors, regulations that are becoming globally harmonized and a vibrant group of entrepreneurial leaders with ambitions for China and abroad. They also find a country facing significant unmet medical needs — particularly in cancer, neurology and diabetes — and a rapidly ageing population. Although China is the world’s second largest pharmaceutical market after the United States, some of the most effective modern medicines are not on sale. For example, of the 42 cancer drugs approved globally in the past five years, only four are available in China. But this is set to change. Recent regulatory changes will bring imported drugs to China more quickly, and local biotechs are racing to develop domestic — and, they hope, global — blockbuster drugs. For academics and entrepreneurs, it is an ideal time to build on the biotech investments of the past, says Lan Huang, chief executive of New York-based BeyondSpring Pharmaceuticals, which is running drug trials in China. A hunger for science It only took two visits to Shanghai’s Zhangjiang Hi-Tech Park to convince Greg Scott to set up a life-science consulting business there, amid a hotbed of drug research and development (R&D) companies. He founded ChinaBio in 2007, and encourages others to consider a move to China. “Do it! It is a great experience,” he says. “If I was helping someone plan their career, China has to be a part of it as the number one drug market outside the United States.” It is not just entrepreneurs and multinational drug company employees; many academic and staff scientists also find working in China a stimulating career move. Ray Stevens, a chemist renowned for determining the crystal structures of the body’s receptors, which are important for identifying drug targets, can recall the exact moment he decided to trade sunny California for Shanghai, uprooting his school-age children and wife. Like many academics, he had visited China several times, but it was not until 2009, after delivering a talk on membrane proteins to colleagues in the neighbouring city of Suzhou, that he decided to make the move. “One of the big attractions was the energy and excitement the students had for science. It won me over,” Stevens says. After he had finished his talk, “a group of students came up to the podium to ask questions. They kept asking questions as I made my way to the bathroom and even followed me in. I was amazed; they were so hungry. It was the moment I decided to spend my sabbatical in China”. In 2011, Stevens moved to China as a visiting professor. Just a year later, the president of ShanghaiTech University, Mianheng Jiang, came calling, offering the chance to set up his own institute. He now runs the iHuman Institute at ShanghaiTech, is a member of China’s Thousand Talents Plan and was in 2017 awarded a Magnolia Prize, an accolade given to foreigners who have contributed significantly to Shanghai’s development. He has also co-founded a biotech company, RuiYi, in Shanghai. Building biotech The passion for science that Stevens discovered did not spring up accidentally. It has been fostered by government support for biotechnology that has intensified over the past decade, creating a force attracting scientists and the entrepreneurially inclined to China. Of the 2 million returnees to China over the past 6 years, it is estimated 250,000 work in the life sciences. And, although many scientists making the move were born and raised in China and have a decade or more experience working in the West, non-Chinese speakers such as Stevens and Scott are coming and thriving here, too. The push for innovation comes from the highest levels of government, with the biotech industry receiving special attention in not just one but three of the government’s latest five-year plans: the strategic blueprints that determine the country’s economic goals for the forthcoming half-decade. The latest plan, China’s thirteenth, stipulates that the biotechnology sector should exceed 4% of gross domestic product by 2020 and that there should be 10 to 20 life-science parks for biomedicine with an output surpassing 10 billion yuan (US$1.5 billion). China has more than 100 life-science parks dotted across the country; run by local governments, these hubs lure companies with tax breaks and subsidies. It is estimated that more than $100 billion has already been invested in the life-sciences sector by state, provincial or local governments in an effort to hit the five-year-plan targets.China gains a strategic advantage and is closing the gap

#### Biotech has become a strategic sector for China–they are slowly closing the gap

Lebedenko 22 (Svitlana Lebendenko, “The Rise of Sino-Russian Biotech Cooperation.” Foreign Policy Research Institute, 25 May 2022, https://www.fpri.org/article/2022/05/the-rise-of-sino-russian-biotech-cooperation/.)

The People’s Republic of China’s rise as a global innovation power is rooted in the development of a sovereign innovation infrastructure, one that allows China to compete in high-technology races with the United States. This process is complemented by an intensifying science and technology partnership with the Russian Federation. By decoupling from China and Russia, the United States and its allies are pushing China and Russia closer to each other. The paper discusses recent examples of Sino-Russian biotechnology cooperation projects, offering an early account of the emerging integration of two distinct but complementary innovation infrastructures. Introduction The People’s Republic of China’s emergence as a global power is rooted in the rapid development of a sovereign innovation infrastructure, one that allows China to compete in high-technology races with the United States. China’s build-up of its innovation infrastructure is complemented by another process: an intensifying cooperation with the Russian Federation in security, trade, energy supplies, artificial intelligence, 5G, space research, and biotechnology. Moscow and Beijing have a complicated history of interactions. Previously, China and the Soviet Union were isolated from the world market of technology, and after the Sino-Soviet relationship worsened, they were also isolated from each other. However, today, in light of deteriorating relations with the United States, strategic alignment emerges. The U.S. and the European Union’s decoupling from business with China and imposing economic sanctions on Russia push the two countries to examine the potential of their strategic cooperation more closely.[1] Innovation Infrastructure China and Russia are very different in terms of their innovation performance. China has an ascending trajectory and has already advanced to self-sufficient manufacturing of “sophisticated intermediate goods.”[2] It is well integrated into global innovation networks, while Russia is not. Since the break-up of the Soviet Union, Russia has been sliding down a descending trajectory.[3] It became a natural resource exporter heavily dependent on imports of foreign technology. Regardless of these differences, Beijing and Moscow are actively developing a joint innovation infrastructure. The two countries declared 2020 and 2021 the “Cross Years of Russian and Chinese scientific, technical, and innovation cooperation.”[4] China demonstrated its ability in launching and managing large-scale projects and leads in Sino-Russian partnerships. Most of the infrastructure projects take place under the auspices of the Belt and Road Initiative.[5] For example, one of its institutes is Russia-China Investment Fund, a private equity fund established jointly by the Russian Direct Investment Fund and China Investment Corporation, which equally committed USD 2 billion.[6] Lomonosov Moscow State University (left) and Tsinghua University Campus (right). (Adobe Stock) The purpose of building this type of infrastructure is to accelerate Sino-Russian partnerships in science and technology and facilitate technology transfer. In 2020, the two countries announced the construction of the first Sino-Russian Innovation Complex, a joint venture of Tus-Holdings, Russian Direct Investment Fund, Tsinghua University, and Lomonosov Moscow State University. The purpose of this Innovation Complex is to prepare for future joint research and development centers, university labs for basic research, and science parks. This project followed the establishment in 2016 of the first Sino-Russian university founded by Beijing Institute of Technology, Shenzhen Municipal People’s Government, and Lomonosov Moscow State University.[7] The new university’s mission is to “to nurture talents for the Belt and Road Initiative.”[8] Few joint research centers, for instance, in computational mathematics and cybernetics, were launched, and there are plans to open other centers in chemistry and materials, biology, and space science.[9] In addition, the Russia-China Investment Fund, in partnership with Tus-Holdings, supports the construction of the Sino-Russian High-Tech Innovation Park at the Skolkovo Innovation Centre. According to the press release, “Tus-Holdings is considering the possibility to create a network of innovation facilities in Russia by building new technology parks in other areas of the country.”[10] Another science and technology park within Lomonosov Moscow State University is anticipated and is expected to “become a platform for innovative cooperation between scientific and technological workers and scientific and technological enterprises of the two countries.”[11] These projects are recent, and at the moment, it is unclear whether they would be successful in spurring actual innovation in the near future. What is clear, though, is that their proliferation in the last few years signals the commitment to closer and long-term integration of the Russian and Chinese innovation systems. Such integration is incremental and might take decades. In the words of Tus-Holdings Chairman Jiwu Wang, the company’s vision is “an ecosystem of innovative cooperation in science and technology between China and Russia . . . and deepening economic integration between the two countries” [emphasis added].[12] (sputnikvaccine.com) Biotechnology Chinese-Russian technological alignment has been particularly apparent in the sector of biotechnology. Broadly, biotechnology refers to the manipulation of living organisms or their compounds to produce new products or services. Biotechnology is perceived to be “a key strategic technology for industrial growth” and is distinguished from other technological sectors for its capacity to alter the means of production across a variety of industrial sectors.[13] Examples of the sectors include pharmaceuticals, agriculture, and food processing, and extend to dual-use technologies. Biotechnology is a strategic sector for China. The Made in China 2025 Initiative sets the goal of manufacturing high-tech products, including innovative medicines.[14] The plan introduced targets for Chinese pharmaceutical firms to advance in biotechnology innovation and increase exports.[15] About half of all industrial parks in China focus on the development of pharmaceuticals.[16] By 2018, China established 111 biotechnology science parks.[17] Although China still lags behind the U.S. in biotechnology innovation, analysts concede that it is rapidly progressing and closing this gap.[18] So far, China’s efforts have concentrated on creating the necessary infrastructure for biotechnology development. In turn, Russia has rich natural resources, but over 80% of biotech products are imported, and Russia’s share in the global market of biotech products is below 0.1%.[19] Russian biotech is a sector that experienced massive brain drain after the break-up of the Soviet Union, with many scientists leaving for Western countries and Israel.[20] The persistent challenge for the Russian biotechnology industry, including the biopharmaceutical industry, is its critical dependency on imports. Between 1992 and 2014, the production of substances (active pharmaceutical ingredients) decreased by a factor of 20.[21] According to the Ministry of Industrial Policy of Russia, in 2015, the country imported 95% of active pharmaceutical ingredients required to produce finished pharmaceuticals.[22] In 2018, the share of foreign medicines on the Russian market constituted 70.2% by value and 39.4% by volume. In 2019, foreign medicines generated USD 19.6 billion in income, which was about 70% of the Russian pharmaceutical market.[23] By some accounts, this sum is larger than what Russia earns from its arms export.[24] Pharmaceutical imports exceed exports by 14 times.[25] By all formal indicators in life-science research and biotechnology, such as gross domestic product (GDP) expenditure on R&D, patents, and journal publications, Russia lags behind the United States, China, France, South Korea, Japan, Germany, and India.[26]

#### China is closing the gap–they intend to take over the sector

Adrien 19 (Claudia Adrien is a reporter for Channel Futures where she covers breaking news. Prior to Informa, she wrote about biosecurity and infectious disease for a national publication. She holds a degree in journalism from the University of Florida and resides in Tampa. “Chinese Biotechnology Dominates U.S. Senate Hearing on Biological Threats.” Homeland Preparedness News, 21 Nov. 2019, https://homelandprepnews.com/countermeasures/40093-chinese-biotechnology-dominates-u-s-senate-hearing-on-biological-threats/.)

China is rapidly gaining on the United States when it comes to creating technology that mitigates disease threats and developing pharmaceuticals faster, and it’s a phenomenon driven by a philosophy that the state, military, and the private sector are one in the same. That was the testimony of Tara J. O’Toole, senior fellow and executive vice president at In-Q-Tel, before the U.S. Senate Armed Services Subcommittee on Emerging Threats and Capabilities. The hearing, Biological Threats to U.S. National Security, examined everything from China’s push to develop biotechnology infrastructure to luring research scientists away from the United States to work in China. “China has said repeatedly and forcefully, and they’re backing up their words with actions, that they intend to own the biorevolution,” O’Toole said. “And they are building the infrastructure, the talent pipeline, the regulatory system, and the financial system they need to do that.” China is partly accomplishing this by combining its internet giants, such as Alibaba, with its biotech companies. The combined strength of these companies’ research focuses on the industrialization of artificial intelligence in which China is “institutionalizing it” whereas the United States is only “experimenting with it,” O’Toole added. China’s goal is to make biotechnology 5 percent of the country’s GDP by 2020. China has changed regulations for its own version of the Food and Drug Administration to be more like that of the United States in order to more easily market to the world. The country has created a talent pipeline that incentivizes its own students to go into the life sciences and bioengineering. China also has at least 20 programs intended to bring scientific talent from the rest of the world. There are good reasons China is going after the biorevolution: it has the highest incidences of cancer on earth and the population is aging. It also must find an affordable way to deliver health care to a rising middle class.

### 2AC – Yes China BCIs

#### China is ahead in BCI development – low trust, authority, and cohesion hurt U.S. efforts, but R&D can solve

**Putney 21** (Joy Putney, a doctoral candidate in the Quantitative Biosciences Program in the School of Biological Science at Georgia Institute of Technology and a 2020-2021 Sam Nunn Security Fellow. The Cipher Brief, "Neurotechnology for National Defense: the U.S. and China", 7/1/2021, https://www.thecipherbrief.com/column\_article/neurotechnology-for-national-defense-the-u-s-and-china, accessed on 7/2/2022)//gideon

Bottom Line Up Front: China is better poised to capitalize on disruptive neurotechnologies like brain-computer interfaces (BCI) for both civilian and military usage, so the U.S. must be prepared for the deployment of these capabilities in future operating environments.

In the past decade, seven international actors have launched “Brain Projects” or “Brain Initiatives,” including the United States and China. The U.S. BRAIN Initiative started in 2013 under the Obama administration, and includes plans for $6 billion USD of funding through the year 2025. The China Brain Project was announced three years later in 2016, along with the country’s Thirteenth Five-Year Plan with estimated funding of $1 billion USD through the year 2030.

These brain initiatives which involve stakeholders from government, academia, military, and industry and direct hundreds of millions of dollars to specific research goals, can be viewed as cohesive articulations of a national strategy for neuroscience research. The outcomes of these initiatives will not only further our understanding of the brain but will also enable new neurotechnologies that will have far-reaching implications for society, public health, and national security.

The United States and China are among the largest spenders in their brain projects and are peer economic and military competitors. The U.S.’ National Defense Strategy in 2018 highlighted long-term, strategic competition with China as a top focus. This competition will naturally include vying for technological advantage, especially with emerging technologies like those enabled by the brain projects, to avoid technological surprise. Here, the specific focus on brain-computer interfaces within the broader category of neurotechnologies is due to their potential for high adoption by healthy people for both civilian and military purposes. Additionally, these devices have profound ethical concerns involving data privacy and individual autonomy. Likely for these reasons, the US Congressional Research Service identified brain-computer interfaces as an emerging dual-use technology that should be considered for export controls.

China has a clearer articulation of their intent to use brain-computer interfaces (BCIs) for both civilian and military purposes. The goals of the brain initiatives in each of these nations are an articulation of national strategy for neuroscience research and technology development, and the U.S. BRAIN Initiative and China Brain Project contrast strongly in their aims. The China Brain Project’s stated goals place a higher emphasis on brain-machine technologies like BCI than the U.S. BRAIN Initiative. The U.S. BRAIN Initiative’s seven major goals only relate to understanding the brain and improving treatment of brain disorders and focus on developing technologies that enable basic research and clinical applications. The China Brain Project’s structure is envisioned as “one body two wings”, with a core body of understanding the brain, with an equal emphasis on the applications—the two wings—of treating brain disorders and developing brain-machine intelligence technologies. In contrast to the U.S. BRAIN Initiative, the China Brain Project puts an equal emphasis on clinical and non-clinical applications of brain research, and specifically emphasizes integrating brain and machine intelligence.

The China Brain Project’s goals also more strongly align with the military rhetoric of the PLA than the U.S. BRAIN Initiative’s goals do with the U.S. military’s active neurotechnology research initiatives. The U.S. DoD has extensively funded neuroscience research, but with divergent aims from the U.S. BRAIN Initiative. DARPA has several ongoing programs developing neurotechnologies, like the Next-Generation Nonsurgical Neurotechnology (N3) program, which seeks to develop non-invasive BCIs with the ability to both read and write brain activity for use by healthy military service members, and the Neural Engineering Systems Design (NESD) program, which seeks to develop BCIs to restore vision and hearing to injured service members. Other neurotechnology development programs have been funded by the U.S. Air Force, the U.S. Army, and the U.S. Navy. A comprehensive study from the U.S. Army’s Combat Capabilities Development Command (DEVCOM) highlighted four neurotechnology applications for future operating environments, including visual and auditory augmentation, wearable exoskeletons with programmed muscular control, direct control of weapon systems through BCIs, and brain-to-brain communication between service members. While both the U.S. DoD and the U.S. BRAIN Initiative have funded clinical applications of BCI, the DoD’s emphasis on civilian and military use cases for BCI is not reflected in the US BRAIN Initiative’s goals.

In contrast, the PLA’s rhetoric and the China Brain Project’s goals are more cohesive, driven likely in part by the nation’s overarching strategy of military-civil fusion. The Director of the Central Military Commission Science and Technology Commission (CMC S&TC) in China stated in 2017 that “ The combination of artificial intelligence and human intelligence can achieve the optimum, and human-machine hybrid intelligence will be the highest form of future intelligence. In strikingly similar language, Dr. Mu-Ming Poo, one of the lead scientists of the China Brain Project, has written on how he believes a better understanding of the brain will revolutionize artificial intelligence (AI) technologies and how he expects China to accelerate “development of next generation AI with human-like intelligence and brain-machine interface technology.” Greater alignment between the national strategy for neuroscience research as articulated by the brain initiatives and defense emphasis on neurotechnology development will likely enable quicker BCI adoption for military usage in China.

China has fewer sociocultural barriers to BCI adoption for civilian and military usage than the U.S. One of the potential barriers identified by policy experts to the military usage of BCI in the U.S. was distrust of service members. This is reflected in the broader civilian population, where in a 2016 Pew Research survey on human enhancements, 69% of U.S. respondents said they are worried by the idea of BCI technologies and 66% claimed they would not want to use BCI technologies to enhance their brain. Cross-cultural surveys on attitudes towards BCI have not been conducted, so it is difficult to make direct, specific comparisons between U.S. and Chinese citizen’s attitudes towards BCI. However, a cross-cultural study on U.S. and Chinese attitudes towards big data technologies has been conducted; while this 2017 survey does not address BCI technologies directly, BCI technologies are like big data technologies in that they will utilize machine learning and large sampling of potentially individualizable data. U.S. respondents were less likely than Chinese respondents to approve of technologies that involved data collection from individuals. U.S. responders were also strongly averse to the use of big data analytics by the government, where Chinese respondents were mostly favorable to government usage. U.S. respondents were only more favorable of big data analytics usage than their Chinese counterparts when data could be anonymized and used by businesses to improve performance. Data privacy and anonymity were more important to U.S. respondents. BCI technologies by necessity collect data from individuals and can even affect brain activity, so these technologies have features that will make them less appealing for adoption in the U.S.

Additionally, China, due to its government structure, can mandate the usage of BCI technologies both in the civilian and military sectors. There are already media reports of mandatory BCI usage by companies in China where there have not been similar reports in the United States. Both the U.S. and China have seen non-invasive EEG headsets that can read brain activity used in school settings, usually in pilot studies for devices designed to measure focus and attention. However, Chinese state-owned companies that run power plants and train operations have reported usage of this same kind of headset to monitor workers’ attention or sleep/awake status. This application is also advertised by companies operating in the U.S., but no reports exist of it being mandatory to use. While the efficacy of these headsets is likely low due to difficulties interpreting brain activity collected via EEG, this signals that Chinese state companies are more likely to use these types of devices to monitor workers.

The U.S. must prepare now to mitigate the adverse effects of disruptive dual-use neurotechnologies. Neurotechnologies have incredible potential to improve quality of life for people suffering from sensory, motor, or other clinical deficits. Yet they also have the potential to fundamentally disrupt social systems and future operating environments. Both the U.S. and its peer competitor, China, have funded research for BCIs and have stated goals for their usage in future operating environments. While the U.S. likely has greater funding for neuroscience research through the U.S. BRAIN Initiative and a more robust R&D system with greater public-private partnerships, China has fewer barriers to BCI adoption due to its sociocultural climate, government structure, and a more cohesive national strategy for neuroscience research. Additionally, the U.S.’s general R&D advantage is eroding, with China looking to compete with the U.S. on R&D within the next decade.

Many ethical and legal quandaries arise due to human enhancement through BCIs, since these technologies involve the collection and modification of very personal data—an individual’s brain activity. It is important now for the U.S. to consider the ethical, legal, and social implications (ELSI) of BCI usage and take the lead in establishing norms for their usage both in civilian and military contexts. Additionally, the U.S. can capitalize on its current R&D lead for developing BCIs if they can lower sociocultural barriers to adoption. One suggested method for addressing distrust for BCIs is through positive media portrayals of BCI usage. Regardless, the U.S. must be prepared for BCIs to be utilized in future operating environments by peer competitors and for BCIs to be potential disruptors in civilian contexts.

#### China has far fewer barriers to BCI development than the U.S.

**Putney 21** (Joy Putney, "Neurotechnology for National Defense: the U.S. and China", Cipher Brief, https://www.thecipherbrief.com/column\_article/neurotechnology-for-national-defense-the-u-s-and-china, 7-1-21, Accessed 6-22-2022)//ILake-SG

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#### China’s internal development goals are more consolidated and military-focused, enabling faster development.

**Putney 21** (Joy Putney, "Neurotechnology for National Defense: the U.S. and China", Cipher Brief, https://www.thecipherbrief.com/column\_article/neurotechnology-for-national-defense-the-u-s-and-china, 7-1-21, Accessed 6-22-2022)//ILake-SG

China has a clearer articulation of their intent to use brain-computer interfaces (BCIs) for both civilian and military purposes. The goals of the brain initiatives in each of these nations are an articulation of national strategy for neuroscience research and technology development, and the U.S. BRAIN Initiative and China Brain Project contrast strongly in their aims. The China Brain Project’s stated goals place a higher emphasis on brain-machine technologies like BCI than the U.S. BRAIN Initiative. The U.S. BRAIN Initiative’s seven major goals only relate to understanding the brain and improving treatment of brain disorders and focus on developing technologies that enable basic research and clinical applications. The China Brain Project’s structure is envisioned as “one body two wings”, with a core body of understanding the brain, with an equal emphasis on the applications—the two wings—of treating brain disorders and developing brain-machine intelligence technologies. In contrast to the U.S. BRAIN Initiative, the China Brain Project puts an equal emphasis on clinical and non-clinical applications of brain research, and specifically emphasizes integrating brain and machine intelligence. The China Brain Project’s goals also more strongly align with the military rhetoric of the PLA than the U.S. BRAIN Initiative’s goals do with the U.S. military’s active neurotechnology research initiatives. The U.S. DoD has extensively funded neuroscience research, but with divergent aims from the U.S. BRAIN Initiative. DARPA has several ongoing programs developing neurotechnologies, like the Next-Generation Nonsurgical Neurotechnology (N3) program, which seeks to develop non-invasive BCIs with the ability to both read and write brain activity for use by healthy military service members, and the Neural Engineering Systems Design (NESD) program, which seeks to develop BCIs to restore vision and hearing to injured service members. Other neurotechnology development programs have been funded by the U.S. Air Force, the U.S. Army, and the U.S. Navy. A comprehensive study from the U.S. Army’s Combat Capabilities Development Command (DEVCOM) highlighted four neurotechnology applications for future operating environments, including visual and auditory augmentation, wearable exoskeletons with programmed muscular control, direct control of weapon systems through BCIs, and brain-to-brain communication between service members. While both the U.S. DoD and the U.S. BRAIN Initiative have funded clinical applications of BCI, the DoD’s emphasis on civilian and military use cases for BCI is not reflected in the US BRAIN Initiative’s goals. In contrast, the PLA’s rhetoric and the China Brain Project’s goals are more cohesive, driven likely in part by the nation’s overarching strategy of military-civil fusion. The Director of the Central Military Commission Science and Technology Commission (CMC S&TC) in China stated in 2017 that “ The combination of artificial intelligence and human intelligence can achieve the optimum, and human-machine hybrid intelligence will be the highest form of future intelligence. In strikingly similar language, Dr. Mu-Ming Poo, one of the lead scientists of the China Brain Project, has written on how he believes a better understanding of the brain will revolutionize artificial intelligence (AI) technologies and how he expects China to accelerate “development of next generation AI with human-like intelligence and brain-machine interface technology.” Greater alignment between the national strategy for neuroscience research as articulated by the brain initiatives and defense emphasis on neurotechnology development will likely enable quicker BCI adoption for military usage in China.

### 2AC – Yes Russia Biotechnology

#### Russia is prioritizing and developing biotechnology in multiple sectors and can lead in biotechnology

Nikolai Ravin & Anna Grebenyuk 2017 [“The Long-Term Development of Russian Biotech Sector.” Foresight (Cambridge), vol. 19, no. 5, Bradford: Emerald Publishing Limited, pp. 491–500, doi:10.1108/FS-06-2016-0024. // WA]

Biotechnologies are one of the fastest growing “horizontal” technological directions that form the basis for future economic transformations. New achievements in promising areas of biotech are in high demand because they can help to guarantee food supplies, sustain the supply of resources, increase life spans and improve health. The crisis of traditional technologies (including environmental and energy-related ones) provides new opportunities for this area’s development. According to OECD estimates, in 2030, biotechnologies may be used for 35 per cent of chemical industry production, 50 per cent of agricultural production and 80 per cent of pharmaceuticals (OECD, 2010). The development pathways in this area should be determined by achievements in the fields of systemic, structural and synthetic biology; genomics; proteomics; and cellular technologies. In Russia, more than 80 per cent of biotechnological products are imported, which is why the development of the bioeconomy is an essential factor for the modernization of the economy in the country. In addition, Russia has a significant potential for introducing biotechnology into the industry. For example, in 2010, the world market for bioenzymes amounted to $2.8bn, at the same time in Russia in 2013, it was only $0.18bn. New institutional and organizational changes taking place abroad lead to an accelerated development of this area (e.g. permission for gene editing of human embryo or widespread distribution of genetically modified organisms [GMOs]) (National Academies of Sciences, Engineering, and Medicine, 2016;). In the event that the effective state policy in the field of biotechnology is not implemented, a lag from the advanced countries may become unattainable. Without effective state support, Russia can forever fall behind the leading countries. In this regard, it is so important to select key biotech areas taking into account the available potential. At present, even the most developed countries cannot conduct research and development (R&D) over the whole range of scientific and technological fields. Therefore, the priority areas where Russia can take competitive positions should be identified. The process of priority setting should include an understanding of the key areas of biotechnology development and the grand challenges that will form the future shape of this sector and an analysis of available resources including R&D capacity for particular thematic areas. To define strategic directions for Russia’s social, economic, scientific and technological development in 2011-2013, a large-scale foresight study (Russia 2030: Science and Technology Foresight) was undertaken (Ministry of Education and Science of the Russian Federation; National Research University Higher School of Economics, 2016). This article delves into its results in the area of biotechnology as one of the seven priority areas of science and technology (S&T) development. Methodology This study represents the results of the third cycle of the national foresight project. The first cycle was conducted in 2007-2008 and based on results of a large-scale Delphi survey. Over time, the procedure of prognosis projects in Russia has become more complicated and involved more advanced methods. The third national foresight cycle integrated two approaches: technology push (new knowledge and technologies drive the launch of new products) and market pull (needs of society prompt S&T development). According to these principles, on the one hand, grand challenges that have the potential to dramatically transform the future face of the economy, science and S&T sphere were identified. These grand challenges were specified for particular priority areas, including biotechnology. In turn, thematic trends determine the demand for innovative products in the future. According to these results, a list of promising markets, products and services was created. On the other hand, the future technological supply was analyzed. Hereby, for every priority area, a list of thematic fields, promising research areas and R&D topics was formed. In addition, the selected areas were assessed according to the Russian R&D level in comparison with the world. Also, centers of excellence in Russia and abroad were identified. The methodology of the project combines both qualitative and quantitative methods: expert panels, horizon scanning, bibliometric and patent analysis, weak signals and wild cards, SWOT analysis and stakeholder mapping. More than 2,000 experts from science, government and business were involved in the work, including foreign specialists. They took part in different types of expert activities: discussions, surveys, interviews, etc. The objective foundation of the study was formed on the basis of bibliometric and patent analysis and a review of more than 200 sources. Further, the received results were used in the strategic decision-making process. For example, a list of advanced R&D areas formed the basis for the state program “R&D development” (The Russian Government, 2012) and other strategic documents. Global trends in the development of biotechnologies Until now, most of the biotechnological developments have been carried out for biomedical and biopharmaceutical products (drugs, biocompatible materials, biochips, diagnostic agents, etc). and to a lesser extent for the food and agricultural sectors. Therefore, until now, medicine and pharmaceuticals have been the main drivers in this area. However, new technologies in this area can have a multiplicative effect and be successfully used in other industrial sectors. A number of socioeconomic, scientific and technological trends determine the structure and operational principles of the national biotechnological industry (Mikova and Sokolova, 2014). For several sectors, modernization is possible only in the case of a transition to biotechnological methods and products (e.g. the agro-food sector, the forestry sector and the biomedical sector). According to the methodology of the project based on literature analysis and expert studies, there were selected trends that form the future of the biotech sector within or outside Russia. These trends were evaluated according to their impact on Russia (strong/low and positive/negative) and expected period of maximum effect (Figure 1). New biotechnological products with advanced and new properties will help to respond to the main global socioeconomic challenges that mankind will face in the long and short term: population growth, aging, food shortages, environmental degradation, climate change, the depletion of hydrocarbon natural resources and others. The technological drivers are not limited to progress in biology but also include developments in nanotechnology and information and communication technology. Population growth causes increased demand for food, pressure on the agricultural sector and growing rates of fertile soil contamination and erosion. All these problems can be addressed using biotechnological solutions. Along with that, high-income consumers will request organic and functional food. New bioproducts will help address the challenge of hidden hunger (deficiency of vitamins and minerals), which includes an unbalanced diet and a lack of essential vitamins and minerals. In the short and long term, pervasive changes in the energy sector are expected. The depletion of cheap supplies of hydrocarbons and the tightening of ecological requirements will give an impetus to the development of renewable power generation. Moreover, biogeotechnological methods to increase oil recovery and remove unwanted admixtures from extracted minerals will be in demand (Siegert et al., 2014). One of the most important global challenges is the environmental degradation in many regions of the world. The increasing human-induced burden on natural ecosystems is associated with the emission of greenhouse and other harmful gases into the atmosphere, land and water pollution and the depletion of sources of drinking water and stocks of raw materials. The development of biotechnologies will help to solve this problem, according to conception of a circular economy, which involves the restoration of natural resources (Pearce and Turner, 1989). A strong impetus for progress in biotechnology will provide for the development of other scientific and technological areas. New technologies to store, process and transfer big data and supercomputing can be useful for genome, transcriptome and proteome analysis, in metabolic engineering and bio-engineering. The convergence of information and communications technology, biotechnologies and nanotechnologies will have a significant impact on the agricultural sector (Yashveer et al., 2014) and will lead to development of “smart” agriculture (diagnostic agents, biosensors to gauge growth, optimizing biodevices, biorobots, etc.). The adoption of new technologies will raise the efficiency of use of agricultural land, prevent erosion and the leaching of nutrients, maintain soil structure and, as a whole, reduce the negative impact on the environment. Thus, biotechnological development can help to find answers for the following major global challenges: population growth and food shortages; crisis in traditional sectors: substitution of chemical processes with biotechnological ones; dependence on fossil fuels: development of renewable bioenergy will contribute to the diversification of the energy sector and reduce dependence on hydrocarbons; depletion of non-renewable resources; and destruction of natural ecosystems as a result of human activity: biotechnology can reduce the negative anthropogenic impact and promote ecosystem restoration through the means of bioremediation. All these global trends form windows of opportunity for the accelerated development of biotechnologies. Many of them are significant for the development of the Russian biotech sector, while some are not so important (e.g. population growth, deficiency of fresh water and depletion of fossil natural resources). In any case, all these trends and challenges should be taken into account if Russia wants to participate in global value chains. In parallel, the Russian biotech sector faces a number of limitations and weaknesses specific to the country: the critical lag in R&D and undeveloped production facilities; low demand for practical developments in biotechnology; a powerful lobby for the oil and gas sector; insufficient investment by businesses in biotechnological industry infrastructure; high barriers to entry on domestic and global biotechnology product markets; an ambiguous social attitude toward the use of GMOs; and critical dependence on the technological import in some sectors using biotechnology production (Streltsova, 2014) (feed, enzymes, biomedical products and others). In addition, nonmedical biotechnologies have relatively recently become a national priority in Russia (Technological Platform Bioindustry and Bioresources, 2015). In many respects, it is connected with the significant reserves of gas and oil, less attention to the environment than in developed countries and huge areas of arable lands that promote extensive agriculture. However, the availability of separate competitive scientific teams, a broad resource base and large areas of arable land and forests are the windows of opportunities for the development of this area in Russia. Progress in biotechnology sector Biotechnology covers genetic engineering, cellular methods and technologies for the creation and use of genetically modified biological objects for production intensification or the creation of new kinds of products for various purposes. Modern biotechnological processes are based on recombinant DNA techniques, as well as on the use of immobilized enzymes, cells or cell organelles. In Russia, in the near future, biotechnologies will be most in demand in the following markets: industrial bioproducts, biotechnological agricultural products, biofuel and bioenergy, food industry, biological environmental protection systems, biotechnological systems and products for the forestry sector and aquaculture (Technological Platform Bioindustry and Bioresources, 2015). In the light of progress in the field of biotechnology, the innovative products with radical effects will be in demand on global markets. Products with completely new properties or a multifold increase in technical and economic properties should be developed to tackle the challenges identified above. The most promising applications of biotechnologies on these markets are given below. Russia has the potential for the development of the biotech sector, although the level of R&D in the majority of areas is lagging behind that in the USA and leading EU countries. However, there are several advanced applied research areas where efforts can be focused. According to results of the study, the following thematic areas of applied research have been identified: industrial biotechnologies; energy biotechnologies; agricultural biotechnologies; food biotechnologies; and environmental, forestry biotechnologies, aquabioculture. Below these areas are described in more detail. Industrial biotechnology Biotechnologies can successfully substitute traditional chemical technologies and processes to produce biomaterials and organic synthesis products with unique properties, including new ones that do not exist in nature (National Research Council, (2015). Replacing chemical production with biotechnological production will create high-purity organic substances, including optically pure organic compounds for the synthesis of drugs, and reduce the cost of its production. New types of biomaterials owing to their special characteristics will have a wide range of applications. Some of them (e.g. bioplastics) will have valuable properties such as biodegradation, and this, in turn, will give impetus to the development of new biodegradable materials for medical and industrial applications. The other way to produce biologically active compounds is the targeted modification of the producing organism’s biosynthetic pathways using metabolic engineering techniques (Heux et al., 2015). These technologies help to intensify the production of amino acids, vitamins, antibiotics, enzymes, recombinant proteins and other products and are more efficient than traditional ones (e.g. random mutagenesis) (Weber et al., 2015). The most in-demand industrial bioproducts for long and short term are fodder additives (essential amino acids, vitamins, protein), enzymes, bioplastics, biopolymers and others. The industrial biotech sector covers technologies for the production of industrial, agricultural and medical products, both traditional (biologically active compounds, recombinant proteins, forage, etc). and new ones (biopolymers, organic synthesis products, biodegradable plastics, etc.), using biosynthetic and biocatalytic processes, processes to obtain biomaterials, organic synthesis products from renewable raw materials (primary lignocellulose biomass and agricultural byproducts) and new technologies for the production, isolation and purification of bioproducts and others (National Research Council, 2015). The area of enzyme production for industrial and agricultural applications, which are now mostly supplied by foreign producers, will drive the development of the industrial biotech area in the near future. The development of biotechnologies for the raw material sector, such as microbial-enhanced oil recovery or metal bioleaching, is also in demand by the industry right now. Bioenergy The wide use of biofuels (including motor fuels) can transform existing energy markets. New bioenergy technologies will help to save non-renewable hydrocarbons, significantly expand the resource base of the economy, reduce greenhouse gas emissions and, as a result, reduce the negative impact of energy on the planet’s climate (Kilbane, 2016). The main directions of bioenergy’s technological development are concerned with the improvement in energy efficiency, the biotransformation of carbon dioxide into motor fuel, the reduction of biofuel costs, the expansion of the supply base for its production and the improvement of quality (stability, environmental cleanliness) (Hegde et al., 2015). As Russia has practically unlimited natural oil and gas resources, the development of the bioenergy sector will be initially driven primary by global biofuel markets. Bioenergy development requires new technologies, including the conversion of lignocellulosic materials and agricultural waste into biofuels; environmentally friendly biomass gasification technology and power generation units based on them; new methods of producing high-quality motor fuels from CO2 without photosynthesis; effective technologies of biogas production, including highly efficient microorganisms; new technologies of production of liquid motor fuels, including jet fuel, and components from vegetable raw materials; new technologies of biomass processing into high-quality solid fuel; and others. All these techniques are aimed at reducing production costs and increasing the energy output ratio of biodiesel and bioethanol. Agriculture Another sector where new promising biotechnologies can be implemented in the near future is agriculture. The Russian sector will continue to be an expensive one and lose in competitiveness to other countries without the development and introduction of biotechnological innovations. New varieties of crops and breeds of livestock animals can be produced by using molecular marker-assistant selection, doubled haploids technology, genetic engineering, genome editing and other methods (Hartung and Schiemann, 2014). Next-generation varieties and hybrids will be notable for high nutritional quality, high productivity (a larger size of fruit, reducing ripening time, etc). and resistance to diseases and unfavorable weather conditions (Yashveer et al., 2014; Rossi et al., 2015). New genomic technologies will bring new and better breeds of farm animals (e.g. those with the desired level of meat fatness) with rapid growth, which will contribute to the rational use of feed. The development of agrobiotechnologies will be also focused on advanced methods for managing genetic resources of agricultural plants, animals and microorganisms. The other promising direction includes innovative biological techniques to protect plants and increase their productivity and veterinary drugs. Agricultural biotechnologies are aimed at increasing the efficiency of this sector and reducing crop losses (Yashveer et al., 2014). Here R&D will concentrate on the development of genetic markers for selection, symbiotic plant–microbial systems for plant protection and growth stimulation, cloning techniques to replicate outstanding farm animal genotypes, plant genetic engineering and a methodology for the targeted modification of genomes (“genome editing”), the creation of new breeds and others. The development of the seed production industry within Russia is one of the highest priorities. Scientific interests in the veterinary field will be focused on the analysis of genomes of dangerous disease agents, studying the evolution and channels for the spread of infectious agents and identifying and studying mechanisms of resistance to pathogens. This knowledge can be used in new technologies for producing new preventive and therapeutic preparations based on research of the molecular mechanisms of pathogenicity and immune response and developing new test systems for high-performance detection of pathogens and recombinant vaccines against animal infectious diseases. Food industry The growing market of organic products will affect not only the agricultural sector but also the food industry. The demand for “natural” food now prevails over the demand for genetically modified food in Russia. The uptake of transgenic products is limited owing to the ambiguous attitude of society and the state, primarily because of the lack of objective information about its impact on human health and the environment in the long term. A similar situation occurs with the cultivation of test-tube meat (Verbeke et al., 2015). This technology currently has a lot of limitations; however, in the future, it has the potential to transform the sector of animal husbandry and increase the output of finished meat products. Development in this area may give a serious impetus for the creation of food and industrial crops with improved or new properties and often at a lower cost. As a result, one can expect a significant growth in agricultural production. Plants and animals, including agricultural ones, can be used also as biofactories to produce recombinant proteins for industrial (enzymes, biopolymers, etc). and medical (vaccines, antibodies, enzymes) use (Buyel, 2015). This technology is characterized by higher effectiveness and fewer costs than traditional ones based on using cell cultures from microorganisms or animals. The production of recombinant proteins in plants using viral systems, as well as in the milk of transgenic animals, can be noted as one of the most promising developments. The most important competitive advantage of Russian immunobiological drugs for veterinary practice is the use of local strains of pathogenic microorganisms. It can provide higher specificity for these products for their use in the Russian Federation and neighboring countries. Safety evaluation systems for new and traditional food sources, ingredients, food processing technologies, functional food stuffs, baby food, diet and medical food, low allergenicity food and biologically active additives will be in demand in the food industry in the short and long term. Food biotechnologies will be developed in the following areas: the integrated safety evaluation of products; food protein technologies, including the targeted production of protein compositions with specified properties and the deep conversion of by-products and waste from processing vegetable and animal raw materials; biotechnological approaches to the production of probiotics, prebiotics, synbiotics, enzymes and food ingredients; and technologies for processing food raw materials and waste. Environmental, forestry biotechnologies, aquabioculture The use of biotechnologies for environmental applications is focused on the creation of pollution monitoring systems, the restoration of ecosystems using live organisms – bioremediators and protecting materials and technological objects from biocorrosion. The methods of cleaning up oil spills are most in demand. Today, bioremediation has been successfully used to protect soil and groundwater and land reclamation. In the short and long term, scientists will focus their efforts on the development of new verified techniques for bio-testing and bioindication with increased sensitivity and selectivity to detect environmental pollution; biotechnologies for the purification of water, soil and air; and environmentally safe biocides for protection of process facilities from organisms-decomposers. Currently, not all technologies are commercially effective, but the dynamics of the process suggest that over the next 10-15 years, they will be introduced into mass production. As in the USA and EU (Häggman et al., 2013), forestry biotechnologies will be concentrated on the creation of new varieties of arboreal plants with improved properties (texture of timber, resistance to pathogens, growth rate, etc.), microbiological protection of forests from pests and pathogens and promising biotechnological processes for the integrated processing of lignocellulose biomass and its individual components. At the moment, the elimination of waste from woodworking enterprises in Russia is practically undeveloped, as significant investments are required for these purposes. There is a lack of capacities for deep biotechnological processing of wood and equipment and technologies for these purposes are missing. This sphere requires close attention from the state. R&D in aquabioculture will be focused on the identification of new biologically active substances from marine organisms, cultivating cell lines of marine organisms, the producers of biologically active compounds and molecular selection of the objects for industrial aquaculture to make highly productive breeds (Reen et al., 2015). These technologies correspond to the trend of the intensive development of recirculating aquaculture systems. In the future, algae can become a perspective source of biomass and be heavily used in the energy sector. The development of the above-mentioned areas of applied research needs new methodological approaches that can form the scientific and methodological basis for biotechnology research. Progress in this direction can be provided by new genomic and post-genomic technologies, system, synthetic and structural biology, bioengineering and bioinformatics. The research agenda should concentrate on bioinformatics techniques to analyze genome, transcriptome and proteome data; the study of the structure of macromolecules and their components and modeling their structures in silico; metabolic engineering of microbial cells and the development of models to create a synthetic cell; and other promising techniques. Conclusion Russia has access to unique natural resources, including an unlimited supply of many types of renewable raw materials and huge reserves of fresh water and fertile land, and therefore, it has good potential for biotechnological development and integration into the global economy in this sphere. To ensure the long-term social development and sustainability of the national economy, Russia should take a leading position and create a competitive sector of the bioeconomy, which along with the nanoindustry and information technologies should be the basis upon which the Russian economy is modernized. At present, Russia’s share in the global market of biotechnology products is by far less than 0.1 per cent, and for some segments, this share is near 0. That is why there is a strong need for the development of the biotechnology industry in the country and a need to enhance R&D activity in this area. The concentration of available resources of the government and businesses on the development of the biotechnological sector could help in the search for answers to the challenges that Russia faces today or will face tomorrow. It will help to pick up on the current level of research activities, improve the quality of personnel training, make this area the engine of the economy and carry out the so-called new industrialization of the country, building a new, high-tech device industry. The realization of the identified R&D priorities will require the development of a detailed action plan, including the development of biotechnological infrastructure, the large-scale launching of the bioindustry in regions, the preservation and development of bioresource potential and the improvement of the legal, economic, informational and organizational bases.

### --- Russia Cognitive Biotech

#### Russia has a strong motive to further develop neurological and psychophysical bio-weaponry

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Two events converged in 2012 that led us to conduct the project whose findings are reported here. The basis for the first event was laid on February 19, 2012, when the newspaper Rossiiskaya Gazeta published a long article authored by Prime Minister Vladimir Vladimirovich Putin titled “A Smart Defense Against New Threats.”1 The article included the following passage: What is the future preparing for us? . . . In the more distant future, weapons systems based on new physical principles (beam, geophysical, wave, genetic, psychophysical and other technology) will be developed. All this will, in ad- dition to nuclear weapons, provide entirely new instruments for achieving political and strategic goals. Such hi-tech weapons systems will be compara- ble in effect to nuclear weapons but will be more “acceptable” in terms of po- litical and military ideology.2 As expected by most Russians and external commentators, on March 4, 2012, Putin won the presidential election for the second time. On March 22, 2012, he convened a ministerial meeting “on the tasks he set in his articles as a presidential candidate.” Employing carefully vetted lan- guage, the future ministers took turns explaining what their ministries would do to operationalize Putin’s electoral platform. In particular, the minister of defense, Anatoly Serdyukov, explained to Putin how his Min- istry of Defense (MOD) would match the contents of the aforementioned Rossiiskaya Gazeta article. He stated: “Mr. Putin, we have thoroughly studied your article and prepared a plan for implementing the tasks set there for the Defence Ministry.”3 Serdyukov promised to implement twenty-eight tasks. Of these, the fourth task was: “The development of weapons based on new physical principles: radiation, geophysical wave, genetic, psychophysical, etc.”4 Commentators in Russia and abroad immediately picked up on Serdyukov’s statement, some of whom remarked that it was difficult to con- ceive of any “genetic” weapon that would not violate the Biological and Toxin Weapons Convention (BWC).5 These commentators were right to be alarmed, given that the MOD’s encyclopedia defines “genetic weapons” as “a type of weapon able to damage the genetic (hereditary) apparatus of peo- ple. It is assumed/expected that some viruses can/may serve as the active principle,” and lists no other examples.6 Rather than clarify what it had meant by this announcement, the Russian government simply edited out the disquieting paragraph from the public transcript of the meeting.7 The second event occurred just three months after Putin was inaugu- rated president on May 7, 2012. In August 2012, the US Department of State’s yearly compliance report was issued and, like its predecessors, it expressed concerns about Russia’s possible noncompliance with the BWC.8 As in the 2011 compliance report, the Department of State averred that: “Available information during the reporting period indicated Russian enti- ties have remained engaged in dual-use, biological activities. It is unclear that these activities were conducted for purposes inconsistent with the BWC. It also remains unclear whether Russia has fulfilled its BWC obli- gations in regard to the items specified in Article I of the Convention that it inherited.”9 And as in previous reports, the Department of State noted that: “Although Russia had inherited the past offensive program of biological research and development from the Soviet Union, Russia’s annual BWC confidence-building measure declarations since 1992 have not satisfactorily documented whether this program was completely destroyed or diverted to peaceful purposes in accordance with Article II of the BWC.”10 Where all prior compliance reports had stated that the US government had engaged Russia through bilateral and multilateral discussions over these BWC com- pliance issues, this one was different. The 2012 report’s section on Russia’s compliance with the BWC concluded with the observation: “during the reporting period, no discussions took place regarding Russia’s compliance with the BWC.”11 To us this meant that the Putin and Obama administra- tions had stopped all bilateral diplomatic efforts to address BWC-related issues the very year that Putin and his minister of defense appeared to have promised to develop genetic weapons. Our intent was to investigate as much as open sources and interviews would allow the Putin administration’s views on biosciences and biotech- nology for civilian and military purposes, as well as what activities it had launched in support of these fields. Given the extensive legacy of the Soviet offensive biological warfare (BW) program and the well-resourced nature of the Russian biodefense system of the Putin and Medvedev administra- tions, the reactivation of an illicit Russian BW program would mostly be a question of motivation. It would require the acquisition of little to no new capabilities or facilities that might be detected through open-source research. We therefore had no illusion that our investigation would unearth a Russian BW program even if such a program had been launched. Rather, our objective was to discover and document the dual-use activ- ities alluded to in the Department of State report, and in doing so move the discussion over Russian compliance concerns to the public sphere, where issues could be at least partly evaluated on the basis of evidence rather than wholly on the basis of trust in either US or Russian official statements. We were concerned by our discovery of a buildup and modernization of the Russian biodefense establishment under the Putin administration that had gone publicly unreported in English-language sources, including in Depart- ment of State compliance reports. We sought to draw attention to this development and to highlight specific activities of concern. Concerns left to fester with no diplomatic recourse can rapidly devolve into paranoia. Russia is home to some of the world’s brightest civilian experts on dangerous infectious disease. It is in the world’s interest that their already underused research be openly applied to benefit the public health sector. If US-Russian relations on BWC issues continue to deterio- rate, their research instead risks languishing because of the twin effects of Russian publication controls and travel restrictions, and a US unwillingness to fund research and invest in joint ventures. For that reason, while we focus on Russian activities that we deem are of concern, we also propose certain steps that Russia could realistically take to improve transparency or decrease diplomatic brinksmanship without losing face. In addition, we devote a considerable number of pages to analyzing the state of Russia’s civilian life sciences research and commercial biotechnology sectors, with an emphasis on specific programs that have in the past involved coopera- tion or co-publication with the West. Our hope is that the findings reported here will help the US govern- ment to reengage with their Russian counterparts on BWC-related compli- ance issues without having to reveal US intelligence sources and methods. We also wish to foster greater interest on the part of BWC States Parties generally, as well as nongovernmental organizations (NGOs) and the public at large in BW involved in interdiction efforts, because their renewed engagement and pressure on this topic is a necessary precondition for diplo- matic progress on the current issue and more generally for the BWC’s effective functioning in the future. At the same time, doctrinal pronouncements tend to be vague by design, and dual-use activities by definition lack a unique plausible expla- nation. We wanted our readers to be able to view the same evidence as we have discovered and derive value from our work regardless of whether they agreed with our interpretations. We therefore took a facts-heavy approach when reporting what we had found in the hopes that this work’s numerous lists, figures, charts, and translated quotes will at a minimum serve as a useful reference for anyone interested in BW-related security in general as well as those who follow Russian developments.

#### Russia is making strides in cognitive technology and biotechnology

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RUSSIAN RESPONSES TO THE TECHNOLOGICAL CHALLENGE Despite these limitations, Russia has been pursuing a tailored innovation strategy that derives from closely monitoring the United States and China’s technological priority areas and evaluating their long-term consequences for Russia. To counter the United States’ so-called “third offset strategy,” which focuses on investment in state-of-the-art military technologies to project force in contested environments, Russia employs a contemporary version of the United States’ first offset strategy, emphasizing the widespread nuclearization of the military. This means prioritizing the development of a wide array of both strategic and tactical nuclear capabilities as well as related delivery systems and supporting infrastructure. This old tool has been accompanied by doctrinal revisions that have elevated the role of nuclear weapons, including in Russia’s innovation strategy. Russia began to counter numerous U.S. and Chinese technological initiatives using similar indigenous programs, although more narrowly focused and smaller in scale. In October 2012, Russia established the Advanced Research Foundation (Фонд перспективных исследований, FPI) which is roughly analogous to the U.S. Defense Advanced Research Project Agency (DARPA). The FPI focuses on high payoff technologies, including for the defense sector, such as hypersonic vehicles, AI, unmanned underwater vehicles (UUVs), cognitive technologies, and directed energy weapons. Over the last decade, the programs pursued by the FPI have gradually expanded in key areas—primarily directed energy weapons, rail guns, hypersonic vehicles, and UUVs—have progressed to advanced stages. To counter the United States’ so-called “third offset strategy,” which focuses on investment in state-of-the-art military technologies to project force in contested environments, Russia employs a contemporary version of the United States’ first offset strategy, emphasizing the widespread nuclearization of the military. To enhance military research and development (R&D) as well as science and technology, the Russian Ministry of Defense launched the ERA Technopolis (Технополис ЭРА), a sort of military Silicon Valley created by Vladimir Putin’s 2018 decree. Its priority fields include AI, small spacecraft, robotics, automated control and IT systems, computer science and computer engineering, pattern recognition, information security, energy sufficiency, nanotechnology, and bioengineering. In recent years, Russia has made the most visible technological progress in hypersonic technology, AI, and autonomous systems.

### 2AC – Yes Russia/China Genetic Modification

#### Large evidence of human modification is apparent in China and Russia

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ARE U.S. ADVERSARIES ENHANCING HUMANS FOR WAR? Former U.S. Deputy Secretary of Defense Bob Work has made it clear that our adversaries "are pursuing enhanced human operations, and [that] it scares the crap out of us."[32] He has also stated that "[a]ltering human beings from the inside to more effectively fight in combat presents ethical dilemmas for American scientists and military planners."[33] Indeed, the U.S. may never want to pursue some types of human enhancement. But it nevertheless must be prepared to deal with adversaries who have no similar compunctions about moving ahead in this realm. Russia is a case in point. One need look no further than the country's civilian sector to see how lax the Russian government truly is about human enhancement initiatives. The use of performance-enhancing drugs by Russian Olympic athletes before and during the 2012 Games was well-known, state sanctioned and institutionally abetted by the Russian government.[34] The implications are ominous; concrete evidence of human enhancement in the Russian military is not readily available, but if the Kremlin is covertly providing performance-enhancing drugs to the country's athletes it is reasonable to conclude that it is doing far more for its warfighters. There is more overt evidence of human enhancement in China. Genetic enhancements are known to have been conducted on dogs and, as mentioned above, Chinese scientists have already experimented with gene editing on human embryos for health applications. Reportedly in their efforts to combat human diseases including Parkinson's and muscular dystrophy, researchers in China have successfully suppressed the myostatin gene, which regulates muscle growth in both dogs and humans. In experiments with the embryos of two beagles, the dogs were born with significantly increased muscle mass.[35] As a thought experiment, imagine that an adversary finds a way to engineer soldiers with increased cognitive abilities that provide them with a material advantage on the battlefield. If the U.S. were to ignore such developments, by the time this new generation of soldiers demonstrated its true prowess as adults, we could find ourselves two decades behind the development curve.[36] PREPARING FOR AN ENHANCED FUTURE The potential for human enhancement is immeasurable. However, ethical considerations will need to be weighed when the U.S. military evaluates which forms of enhancements to pursue. The Department of Defense has demonstrated a propensity to fund research that enhances humans through exoskeletons and human machine interfaces, and it should continue to fund such worthy initiatives. However, the hesitancy now visible within the U.S. military to pursue some of the more low-tech forms of biological human enhancements is less advisable. A concerted effort should be made to pursue research on subjects such as performance-enhancing drugs, cognitive enhancements and bio-technology that hold the potential to increase the operational effectiveness of the military. As for genetic modification, the U.S. military has wisely steered clear of eugenics to date. However, some of America's adversaries might not prove to be so scrupulous. As a result, the U.S. military needs to begin planning now to counter such initiatives. If it does not, we may wake up two decades hence wholly unprepared for the battlefield of the future.

### 2AC – Yes China Genetic Modification

#### China seeks biowarfare dominance through genetic engineering now---only US focus on international efforts can check back against deployment of gene edited pathogens and modified super soldiers to alleviate international tensions---otherwise, escalation ensures extinction

Koonz 20 (05/26/2022 | Katherine Koonz | ‘Deepening the Cut: How China’s Genetic Warfare is Affecting International Relations’ | <https://othjournal.com/2020/05/26/deepening-the-cut-how-chinas-genetic-warfare-is-affecting-international-relations/> | DOA: 7/6/2022 | SAoki)

---international coop key

---US key

---warrants for China incentive to deploy militarized gene weaponry

Warfare is a rapidly changing front, evolving as technology grows. It has seen many advancements throughout history, ranging from ground combat, the use of long-range firearms, the introduction of airpower, and the development of long-range missiles. Most weapons, when designed and constructed, aim to limit daily human activity and infiltrates the state economic and governmental elements. The effect of a modern bioweapon containing a deadly disease is enough to eradicate security measures and disarm entire regions. However, what would happen if scientists were able to meld technology with naturally occurring biological agents and tweak a granular detail in a human’s molecular composition to prevent disease? Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) is a gene-editing technology that has demonstrated the capability to perform molecular modification. CRISPR-Cas9 acts as a pair of genetic scissors, coded to enter a specific area of an organism’s deoxyribonucleic acid (DNA) and adds, removes, or changes genes. When different genes are present, an organism’s traits can express altered reactions to the environment. This may appear to be a useful apparatus: something to assist in limb growth, prevent HIV, increase brain development, or slow tumor growth. However, while researchers look at these ideas, a genetic ‘ gorilla looms in the background. Gene editing of humans and animals could take place to improve physical and mental performance, yet it poses immense risks to human and international security. This research pursues increased resistance to certain diseases, while at the same time, edits to genes contained in harmful viruses could make them more dangerous. With these developments, human and state security are called into question, as is the condition of international relations. Historical Context of Biological Warfare Biological warfare itself is not a new concept. As early as 1155, weaponized poisons killed enemies and civilians. The development of biological weapons took a new path in World War I from the German Army. Attacks at this point were considered small-scale, with the use of smallpox and glanders to infect people and animals. Undetectable by the naked eye and deadly, these weapons sparked a security dilemma between countries and created a race to develop and test biological weapons. As there were no peace treaties or disarmament efforts in effect—World War I ended prior to the 1925 United Nations Conference prohibiting the use of chemical and biological weapons in war—countries were left unchecked to begin experiments. In 1939, Japan acquired a strain of yellow fever virus from the Rockefeller Institute and used it as a weapon against China. Though this example of biological warfare was singular to WWII, it still poses a significant stressor to international relations between Japan and China. The lasting effect weighs heavily on international relations with Eastern nations today as trade deals and information exchange tests the trust between participating countries. The US started its development of biological weapons around 1941 to counter Japanese efforts. Domestic research studied the effects of different microbes on volunteers, animals, and unsuspecting civilians. Studies took place in crowded areas, like subway stations in New York City and boats off the coasts of Virginia and San Francisco. Researchers tested non-lethal viruses at approximately 200 different sites where people commonly traveled. Though these kinds of tests violate today’s Institutional Review Board processes, no such rules or oversight of research existed during World War II and the post-war period. This testing and development make biological warfare highly questionable, considering its relation to human security and history. There is a thin line delineating between testing and abuse. Without a well-defined boundary between the two, the effects of biological weapons include mass deaths, sickness, and decreases in resources to threatened populations. This seemingly invisible armament poses a significant threat as most responses are reactive when it comes to combating diseases or other biological events. Any country releasing a biological weapon will automatically have an advantage over the target population. OTH, Emerging Security Environment, Multi-Domain Operations Perceptions labeling biological weapons as the poor man’s nuclear bomb and protests against the Vietnam War led the Nixon Administration to end the biological warfare development program in 1969. Efforts turned to the American nuclear arsenal rather than weaponizing botulinum toxin and Staphylococcus enterotoxin B. American efforts to end biological research led to the Biological and Toxin Weapons Convention (BTWC) of 1972 which revamped the protocols of the 1925 Geneva ruling on biological and chemical weapons. Under the BTWC, participating states must provide annual reports detailing activities relating to biological research, development, laboratory and research centers, and vaccine production. A final resolution, adopted in 2006, established an Implemental Support Unit to provide states assistance in participation and adherence to the BTWC. The intent behind the BTWC was to create greater transparency concerning biological developments. Unsurprisingly, the Soviet Union began its own biological trials after signing the BTWC with the installment of their program Biopreparat in 1970. Knowing the nature of Biopreparat was in violation of the BTWC, the program was hidden behind a façade of civilian biotechnology and pharmaceutical developments located in biological weapons facilities formerly used by the Ministry of Defense and new facilities dispersed in closed cities across the Soviet Union. From the 1970s onward, the Soviet Union collected anthrax, smallpox, plague, and fever viruses to produce drug-resistant strains. From its inception to its 1989 public exposure, defectors from the program provided staggering amounts of information regarding Russian activities and the growing bioweapon arsenal. However, the true extent of Biopreparat far surpassed the expectations of Western intelligence agencies when revelations came to light after the collapse of the USSR. Contemporary Biological Warfare Concerns Biological warfare has centered on viruses, bacteria, and other pathogens to disrupt the neuropathways of humans and animals. However, the editing of such organisms down to a specific gene has opened a new realm of possibilities. Recent advances in technology and an expansion of access to these technologies has shifted biological warfare towards a new direction with alarming implications. Chinese research and experimentation with gene-editing software place them at the forefront of biological knowledge and technology development. As one of the cheapest gene editing technologies, CRISPR-Cas9 is an easy tool to utilize across a myriad of experiments and simplifies integration into studies of human capability. The technology allows an individual an easy path to reconstruct a pathogen or other deadly biological component (e.g., Spanish Flu or Ebola viruses). The tools and techniques are relatively easy to obtain, though Chinese mastery of the method has quickly surpassed that of other nations. In their “Thirteenth Five-Year Plan” released in 2016, the People’s Liberation Army (PLA) outlined the importance of civilian-military fusion with genetic research at the forefront of that symbiotic relationship. This relationship marked an immense step for China’s biological development, with scientists advancing research in human-performance enhancement. This access gained by China and the PLA is worrisome as these same scientists now have the liberty to extend beyond current external factors and advance inwards to the biological composition of an organism. The capabilities of CRISPR-Cas9 have tremendous potential for Chinese military deterrence, which would also affect international relations with countries all over the globe, possibly triggering a second arms race towards biological weapons. More troublesome are China’s recent developmental expansions beyond their own borders. The National Genebank used to collect and maintain the most extensive library of human genes in the world has been identified as an internal security tool and is utilized to develop China’s resources. China maintains partnerships with companies and universities all over the world—including the US, specifically the University of California – Davis and the Children’s Hospital of Philadelphia—and have given China access to an unfathomable amount of information. This amassed data threatens both human and state security because as more information is collected, the resources China can tap into increase. As Eric Croddy argues in The Nonproliferation Review, China sees the US as a hegemonic power, using that power to keep other countries at a disadvantage, even in such areas considering bio-warfare. As a result, the two countries have remained tense concerning diplomatic and militaristic matters. Access to information like this exceeds what China has previously sought: binary personal identifying information. Never have they requested physical, living information, to include blood samples, facial scans, and fingerprints. With China’s drive to obtain biological dominance, much like countries today strive for land, air, sea, and space superiority, it becomes imperative the US can respond effectively. This response must include resources to combat further human infection, economic decline, and decreases in defense capabilities. China instituted new regulations to curb the abuse of this research. Gene editing became a part of fundamental human rights—including embryonic rights—as a last-minute addition to their 2019 protocol. On paper, the inclusion of gene editing with human and embryonic rights ensures an individuals’ physical well-being, dignity, freedom, and privacy. Additional drafted regulations require granted approval before any experiments are made on genomes. Other procedures calling for authorization from China’s National Health Commission include gene modification (beyond CRISPR), stem-cell technologies, mitochondrial replacement, and other proposals with unpredictable and possibly dangerous outcomes. Proposed punishments for disregarding this regulation and the respective national laws could include cancellation of future grant applications, blacklisting, and criminal charges. However, actual enforcement is questionable, as much of the research is state-sponsored by the PLA. Additionally, China has a rough past when it comes to human rights behaviors and treatment. Just as the West was unaware of the scope of the Soviet Biopreparat apparatus, it is nearly impossible to understand the full extent of Chinese biological development. Ambiguity is one of the most striking dilemmas of biowarfare development. When combining human factors with state and international elements, any assault to Chinese structures holds deadly consequences to foreign governments and economies. China’s behavior towards external sources has thus far been amicable in its acquisition of genetic information from its international research partners. However, China has forced the collection of additional data from its indigenous Uighur population, creating a genetic version of Mao Zedong’s Hundred Flowers Movement. History demonstrates the extent of harm provoked by forced compliance; not only is the collection a violation of the individual, but it also attacks their community. As China continues in their unyielding pursuit of information power and dominance, the effect of it all remains largely unknown. Biological warfare through the process of gene editing is no longer like chemical warfare. It is a newly developing field and contains immense possibilities where a biological, gene-edited weapon could pose a massive threat to vast numbers of people. However, what sets gene editing apart from any other weapon is that only the individual who physically used CRISPR to edit specific genes knows the extent those genes were affected; they are the sole keeper of the new genetic code. This makes it incredibly difficult for the targeted population to produce a viable vaccine to counter whatever effect the edit caused, posing a 21st century Enigma machine to countries around the world. That scenario calls to question the overarching security of nations around the world. Such “invisible battlefields” have the potential to become more and more prominent and add to the confusion of international conflict and the community’s position on gene editing. A country would lose all warfighting capabilities from exposure to an undetectable enemy before they could find a solution. China is the leading developer and researcher of biowarfare, and their technologies are outstripping that of other global powers. Left unchecked, China poses an incredible threat to the current balance of power with newly developed genetic weapons. Technological advances have enabled China’s experiments to search out new, evolving ideas. Chinese researchers revealed that they edited the genes of some police dogs by removing the gene connected to myostatin production. Myostatin inhibits myogenesis, which is muscle growth and differentiation. Once the gene is modified or deleted, muscles reproduce and build at a much faster rate than typical, which is ideal for hunting, running, and high-intensity tasks. These dogs can then breed future litters that lack the same myostatin gene. Because dogs share similar anatomy to humans, the effects could be analyzed and applied to human gene modification. With this kind of technological advancement and a willingness to use it in a military context, geneticists could create a new breed of soldier. American relations with China remain complex. International efforts to control and reduce arms have not addressed Chinese developments in genetics. The National Biodefense Strategy fails to address US biological response capabilities, nor is there any mention of gene editing itself. There are also minimal resources for what steps America would take defensively or offensively should a genetic war take place. Given the pace of today’s biowarfare development, Chinese research has outpaced all counter-biological strategies. While the issues of biological-genetic warfare present a new field of study, American defense officials have done little to prepare for a worst-case scenario. The US focus must temper Chinese efforts that currently expand technologies associated with biological warfare and gene editing. Rather than be reactionary, the US must engage with other countries and join efforts to enforce the standards of the BTWC. The US is at a disadvantage and will remain so unless it is able and willing to match China’s development. The Nixon administration’s closure of biological research programs also led to the atrophy of any American ability to keep pace with advancements in genetic warfare. Disarmament treaties and research bans are unlikely to sway Chinese efforts to advance the field. Moreover, while biological warfare held little sway in twentieth century political and military reactions, today’s efforts require more careful attention in the implementation of these advances. Greater international involvement is a must, especially from the BTWC signatory states. Without international resolve, gene-edited bioweapons will undoubtedly transition into multiple combat platforms. The US needs to garner the support of other countries to ensure China remains within an acceptable realm of genetic research. The international community must establish clear limits to gene editing and genetic modification. The rapid development of technology in today’s combat environments negatively affects international relations. If genetic engineering is introduced into humans and placed in combat, tensions will undoubtedly escalate. Technological advances are unavoidable in today’s national and global stages; thus, the US and other countries must respond effectively.

#### China has unethical genome editing capabilities–calls into questions to what lengths it will go

Ayanoğlu 20 (Ayanoğlu, Fatma Betül, et al. “Bioethical Issues in Genome Editing by CRISPR-Cas9 Technology.” Turkish Journal of Biology = Turk Biyoloji Dergisi, The Scientific and Technological Research Council of Turkey, 2 Apr. 2020, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7129066/#:~:text=Germline%20genome%20editing%20leads%20to,the%20human%20species%20(eugenics).)

Genome editing technologies have led to fundamental changes in genetic science. Among them, CRISPR-Cas9 technology particularly stands out due to its advantages such as easy handling, high accuracy, and low cost. It has made a quick introduction in fields related to humans, animals, and the environment, while raising difficult questions, applications, concerns, and bioethical issues to be discussed. Most concerns stem from the use of CRISPR-Cas9 to genetically alter human germline cells and embryos (called germline genome editing). Germline genome editing leads to serial bioethical issues, such as the occurrence of undesirable changes in the genome, from whom and how informed consent is obtained, and the breeding of the human species (eugenics). However, the bioethical issues that CRISPR-Cas9 technology could cause in the environment, agriculture and livestock should also not be forgotten. In order for CRISPR-Cas9 to be used safely in all areas and to solve potential issues, worldwide legislation should be prepared, taking into account the opinions of both life and social scientists, policy makers, and all other stakeholders of the sectors, and CRISPR-Cas9 applications should be implemented according to such legislations. However, these controls should not restrict scientific freedom. Here, various applications of CRISPR-Cas9 technology, especially in medicine and agriculture, are described and ethical issues related to genome editing using CRISPR-Cas9 technology are discussed. The social and bioethical concerns in relation to human beings, other organisms, and the environment are addressed. Keywords: Genome editing, CRISPR-Cas9 technology, bioethical issues, bioethics Go to: 1. Introduction For many years, molecular biologists have sought ways to use cellular repair mechanisms to manipulate DNA through genome editing. In this way, they would have the power to change the genome by correcting a mutation or introducing a new function (Rodriguez, 2016). For this purpose, genome editing technologies were developed (Memi et al., 2018). In recent years, clustered regularly interspaced short palindromic repeats technology (CRISPR-Cas9) has become the most preferred method of gene editing. This technology has advantages such as high accuracy, easy handling, and relatively low cost compared to previous technologies, such as zinc-finger nuclease (ZFN) and transcription activator-like effector nuclease (TALEN). Thanks to these benefits, CRISPR-Cas9 technology can be easily applied in any molecular biology laboratory. Genome editing technologies are used in the formation of human disease models in experimental animals and for the understanding of basic gene functions. They also have great therapeutic potential for future treatment of untreated diseases such as certain cancers, genetic disorders, and HIV/AIDS. Today, genome editing in somatic cells is one of the promising areas of therapeutic development (Otieno, 2015). However, various bioethical issues have arisen due to the potential impact of these technologies on the safety of food stocks and clinical applications (Hundleby and Harwood, 2018; Hirch et al., 2019). This review discusses the challenges, possible consequences, and bioethical issues of CRISPR-Cas9 in detail. Go to: 2. Biology and function of CRISPR-Cas9 technology Genome editing technologies often work by creating fractures in chromosomal DNA. ZFN, TALEN, and CRISPR-Cas9 are all based solely on nucleases (Kim and Kim, 2014; Roh et al., 2018). The strength of these technologies stems from the ability to create fractures in the desired region of a specific target sequence as determined by the researcher. This allows researchers to modify the genome in practice in any region (Memi et al., 2018). The creation of changes in the genome depends mainly on the DNA repair capacity of the cells (Lau et al., 2018). All cells have two basic mechanisms for the repair of double chain breaks on DNA. One of them is nonhomologous end joining (NHEJ) and the other is the homologous dependent repair (HDR) mechanism. In NHEJ, the ends of the fractures are quickly connected directly to each other, regardless of the sequence homology, while HDR requires homology to repair the damaged DNA site. In order to achieve homology, the undamaged sister chromatid is used as a template and DNA damage is repaired (Urnov, 2018). CRISPR-Cas9 is a naturally occurring defense system in prokaryotic organisms that provides resistance to foreign genetic elements such as plasmids and bacteriophages (Barrangau et al., 2007; Marraffini and Sontheimer, 2008). When the virus or plasmid enters a bacterial cell, CRISPR-Cas9 allows the addition of short viral DNA molecules to the CRISPR site. CRISPR sequences (CRISPRs) are short DNA repeats of viral or plasmid origin found in the genomes of bacteria and are defined as clustered regularly interspaced short palindromic repeats. Cas genes (CRISPR-related) are genes that encode nuclease or helicase proteins associated with CRISPR repeat sequences that have the function of cutting or dissolving DNA (Jansen et al., 2002). Cas9, a member of the Cas gene family, was isolated from Streptococcus pyogenes and is an endonuclease capable of cutting DNA from two active cut regions at both ends of the DNA double helix (Doudna and Charpentier, 2014; Rodriguez, 2016). The CRISPR-Cas system recognizes the DNA of the invading virus or bacterium and directs the Cas protein to destroy foreign DNA (Otieno, 2015). In the following years, it was discovered that the CRISPR-Cas system can be programmed to find and cut specific target DNA regions, thereby providing genome editing (Jinek et al., 2012; Hsu et al., 2013). As a result of understanding that the human genome can be edited by CRISPR-Cas9, it became clear that genome editing could also be used for therapeutic purposes, and a new era in genetic engineering began (Lau et al., 2018; Roh et al., 2018). Go to: 3. Application areas 3.1. Animal models CRISPR-Cas9 can be used to create animal models to mimic human diseases and to understand disease development by mutating or silencing genes. A mouse model has been developed to determine the harmful effects of mutations in cancer by making mutations that cause the loss of function in tumor suppressor genes or give functions to protooncogenes (Chin, 2015). Conventional genetically modified (GM) mouse models are produced by gene targeting in embryonic stem cells or transgenesis, which are time-consuming and highly expensive. With CRISPR-Cas9, GM mice can be efficiently produced in a much shorter time (Mei et al., 2016). It can be applied to nonhuman primates such as monkeys. Nonhuman primates are more similar to humans in anatomical, physiological, and genetic terms than rodents (Zhang et al., 2014). Therefore, they are more suitable models than rodents in understanding human biology and disease development (Xin et al., 2016). The first successful application of CRISPR-Cas9 in nonhuman primates, from which a knockout monkey was produced, was realized in 2014 (Niu et al., 2014). However, genome sequences of many nonhuman primates are not yet fully identified. This makes it difficult to design selected single-guide RNAs (sgRNAs) (Gou and Li, 2015; Lou et al., 2016). Therefore, the application of CRISPR-Cas9 in nonhuman primates is still at an early stage. 3.2. Genome editing in specific tissues Researchers have been able to modify the genomes of specific tissues such as liver and brain tissues using hydrodynamic injection and adeno-associated virus (AAV) (Rodriguez et al., 2014; Senis et al., 2014). In a study, CRISPR-Cas9 has been successfully and effectively applied to the mammalian nervous system. A mixture of green fluorescent protein (GFP)-labeled AAV-spCas9 and AAV-spGuide plasmids was transferred in vivo to the hippocampal toothed brain folds of adult male mice (Swiech et al., 2015). It is thought that the number of such applications will grow in the fields of cancer and neuroscience in the following years (Mei et al., 2016). 3.3. Multiple gene mutations CRISPR-Cas9 can be used to generate mutants for target genes. In the first such study by Li et al., six sgRNAs targeting Cas9 mRNA and six different genomic regions encoding the Tet1, Tet2, and Tet3 genes were transferred to the cytoplasm of rat embryos (Li et al., 2013). Findings showed that all three Tet genes carried the desired mutations in 59% of newborn rat pups. Successful results were also reported in studies with zebrafish embryos and Arabidopsis as well (Ota et al., 2014; Wang et al., 2015). 3.4. Epigenome studies Epigenome studies can be performed in two different ways: genome or epigenome editing (Chen et al., 2014; Huisman et al., 2015). In genome editing, nuclease is used to modify the DNA sequence, whereas in epigenome editing, an effector domain is used and the DNA sequence is not changed. This function is achieved by catalytic inactivation of the Cas9-associated effector domain by replacing the Cas9 protein. Altered effector proteins are used to activate or suppress transcription (Lau and Davie, 2016). In epigenome editing, the epigenome can be modified by changing the proteins that maintain and protect the epigenome. Suppression of DNA methylation as a result of degradation of catalytic domains that accelerate the loss of spherical DNA methylation in human cells and lead to cell death is a good example of epigenome studies using CRISPR-Cas9 (Liao et al., 2015). Another application is the editing of long nonencoded RNAs (lncRNAs) and enhancer RNAs (eRNAs) that can control gene expression and epigenome processes. In a study, eRNA-expression factors and IncRNA-expression enhancers were suppressed by stimulating deletion mutations in a lymphoma cell line using CRISPR-Cas9 (Pefanis et al., 2015). It is predicted that CRISPR-Cas9 may allow different levels of epigenome modification and facilitate further changes to humans (Liao et al., 2015; Mei et al., 2016). 3.5. Treatment of diseases CRISPR-Cas9 can be applied to cells in vivo or ex vivo. In the in vivo approach, CRISPR-Cas9 is directly transferred to cells in the body using either viral or nonviral methods. In the ex vivo approach, first the cells are removed from the body; then CRISPR is applied to the cells and they are transferred back to the body (Roh et al., 2018). This approach has great potential to develop tissue-based therapies (Rath et al., 2015). Using CRISPR-Cas9, the mutation in the dystrophin protein responsible for the most common form of Duchenne muscular dystrophy was successfully removed (Amoasii et al., 2018; Duchêne et al., 2018; Koo et al., 2018; Long et al., 2018). There are studies to prevent and treat AIDS by inhibiting the entry of HIV into the cell or by removing the HIV genome integrated into the host genome using CRISPR-Cas9 (Saayman et al., 2015). Induced pluripotent stem cells (iPSCs) were successfully produced from cystic fibrosis patients with confirmed F508 deletion in the cystic fibrosis transmembrane regulator (CFTR) gene by CRISPR-Cas9 (Firth et al., 2015). There are also studies for cataracts (Wu et al., 2015; Yang et al., 2016) and Parkinson’s disease (Yang et al., 2016). However, recent studies have shown that CRISPR-Cas9 activates the type 1 interferon (INF) pathway, causing a type 1 INF-mediated immune response (Kim et al., 2018; Charleswort et al., 2019). These findings currently limit the use of CRISPR-Cas9 in treatment. 3.6. Industrial uses CRISPR was first used for commercial purposes to make bacterial cultures used in cheese and yogurt production resistant to viral infections (van Erp et al., 2015). One of the applications in agriculture is to produce GM crops (Hundleby and Harwood, 2019). There are attempts to increase the yield in the livestock industry (van Erp et al., 2015). It can be used to control invasive pest species to reverse pesticide and herbicide resistance in insects and weeds or to prevent disease spread (Esvelt et al., 2014). Researchers have succeeded in preventing the spread of genes protecting mosquitoes from harmful malaria parasites (Gantz et al., 2015) and making female mosquitoes infertile in the laboratory (Hammond et al., 2016). Vaccine development is another significant area of interest. The smallpox virus vector (VACV) is used in the eradication and vaccination of smallpox. Using CRISPR-Cas9, the efficiency of marker-free VACV vectors has been increased (Yuan et al., 2015). Another example is the hepatitis B vaccine. In order to prevent viral gene expression and replication, specific regions of the hepatitis B genome were targeted and cut by CRISPR-Cas9 (Ramanan et al., 2015). 3.7. RNA editing Single-stranded RNA (ssRNA) sequences can also be edited by CRISPR-Cas9. In RNA editing, CRISPR-Cas9 consists of a DNA oligonucleotide presenting the PAM (protospacer adjacent motif) region (PAMmer), ssRNA, guide RNA (gRNA), and Cas9 protein. PAMmer acts as a PAM region specifically recognized by Cas9 and directs Cas9 to bind and cut the target ssRNA. 5’-Elongated PAMmers containing bases paired with different ssRNAs and immediately in front of PAM are required for specific binding of target ssRNAs. Since RNA molecules have different functions than DNA, CRISPR-Cas9 can offer a much more flexible application than other genome editing methods (Mei et al., 2016). 3.8. Military applications One of the lesser-discussed application areas of CRISPR-Cas9 technology is its use for military purposes. As is known, a substantial portion of genome editing studies are supported by the defense ministries of the countries. These studies are commonly focused on increasing the tolerance of soldiers against biological or chemical warfare. This technology has the potential to influence human performance optimization (Greene and Master, 2018). Studies are usually concentrated on discovering different genes that can be harnessed from other species (Gracheva et al., 2010) and identifying new genes that can be associated with posttraumatic stress disorder, which is frequently experienced by soldiers (Cornelis et al., 2010). In a study by Zou et al. (2015), researchers developed dog embryos with higher muscle mass using CRISPR-Cas9. Another interesting study showed that the CMG2 gene, known to cause low sensitivity to anthrax toxin when expressed in small amounts, could be silenced by this technology (Arévalo et al., 2014). However, it should be noted that far more research needs to be conducted for using CRISPR technology in humans as a defense tool against biological and chemical weapons (Greene and Master, 2018). 3.9. DNA replacement in human embryos (germline genome therapy) The most controversial usage of CRISPR-Cas9 is the modification of human embryo DNA, or, in other words, its use for germline genome therapy. In 2015, a group of Chinese researchers led by Junjiu Huang applied CRISPR-Cas9 to remove a mutation that causes β-thalassemia, which is a fatal blood disease, from the human β-globulin (HBB) gene in the germline of human embryos. In this research, six abnormal embryos not suitable for in vitro fertilization were used. The mutation could be corrected in only one of the embryos. Although the mutation could be corrected in two other embryos, nontarget effects occurred in other genes. In the other three embryos, the mutation could not be corrected. It has been reported that this technique is not ready for clinical use because of nontarget effects on different genes (Roh et al., 2018; Carroll, 2019). Modifications that occur in germline cells can be transferred to future generations. Scientists think that they can extract genes that cause diseases in the population using CRISPR-Cas9 (Cai et al., 2018; Memi et al., 2018). Go to: 4. Bioethical issues The fact that CRISPR-Cas9 is among the important discoveries of the 21st century is widely accepted in the scientific community and related industries. However, the rapid rise of CRISPR-Cas9 has led to new bioethical, social, and legal issues in medicine, agriculture, livestock, and the environment. Possible risks and bioethical issues related to CRISPR-Cas9 are summarized in the Table.

### 2AC – China Revisionist

#### China is revisionist

**Brands 4/14** (Hal Brands, the Henry A. Kissinger distinguished professor of global affairs at Johns Hopkins University’s School of Advanced International Studies. Foreign Policy, "The Dangers of China's Decline as a Great Power", 4/14/2022, https://foreignpolicy.com/2022/04/14/china-decline-dangers/, accessed on 6/22/2022)//gideon

Decline is a tricky concept. The term makes us think of a country that is falling like a rock—one whose power and capabilities are dropping across the board. But a country can be in relative decline vis-à-vis a fast-growing adversary even if its own power is still increasing. It can be surging forward in some areas, such as military might, even as its underlying economic strength starts to wither. And decline doesn’t always lead a country to scale back its objectives—the sense of urgency it creates can cause ambitious powers to grab what they can before the clock runs out. Xi Jinping’s China is about to give the world an education in the nuances of decline. Since the onset of its economic reforms in the 1970s, China has long defied predictions that it would soon stumble or collapse. Its spectacular growth challenged prevailing views about the sources of national success in the modern world. In some ways, China is still soaring: Its military power grows more formidable every year. When Xi declares that “the East is rising and the West is declining,” he gives voice to this sense that China is a country on the make. Yet military power is often a lagging indicator of a country’s trajectory: It takes time to turn money into military muscle, and massive buildups often persist even after a country’s economic fortunes begin to flag. And today, for reasons including demographic disaster and the lingering effects of the COVID-19 pandemic, China is facing the end of the stunning economic growth that made it possible for Xi to assert that the “great rejuvenation of the Chinese nation” was at hand. The China of the 2020s will be a country whose coercive capabilities are more intimidating than ever as its economic dynamism fades. That could be the worst possible combination for the world. Any country that rises as impressively as China is bound to make fools of some prophets of decline along the way. In recent decades, Beijing has repeatedly confounded those who predicted it was about to hit the wall. In the aftermath of Mao Zedong’s death, some Western observers were skeptical that China—a country that U.S. diplomat George Kennan once called a “vast poorhouse”—could put together the policies necessary for sustained growth. After the Tiananmen Square massacre in 1989, it was common to wonder whether the resulting political crackdown would stifle the country’s prosperity. Through the early 2000s, social scientists and U.S. officials predicted that China could be rich or autocratic—but not both. A few prominent analysts made careers for themselves by heralding China’s collapse. It hasn’t happened—yet. From 1978 to the onset of the global financial crisis three decades later, China’s constant-dollar GDP grew by a factor of 17, without the Chinese Communist Party (CCP) losing control. That growth enabled the decades-long military buildup and sprawling economic influence that made China a force to be feared on the global stage. As Tufts University’s Michael Beckley and I argue in our forthcoming book, Danger Zone: The Coming Conflict With China, this economic miracle required good luck and good policy. China seemed to have hit the demographic jackpot in the 1980s and 1990s; the unlikely combination of warfare and famine in the 1930s and 1940s, a regime-sponsored baby boom after the CCP took power, and then the institution of the one-child policy in 1980 left the country with a huge working-age population unencumbered by lots of young or old dependents. China was nearly self-sufficient in food, water, and other resources. And it had the fortuitous timing to start its reforms as globalization went into overdrive, making it easier to integrate the country into complex supply chains and thereby make China the workshop of the world. Good policies were also crucial. Mao’s one-man rule and economic illiteracy had condemned China to serial, self-created disasters. Once he died, Deng Xiaoping and his successors moved toward a “socialist market economy.” They opened China to trade and investment, overhauled the tax and regulatory systems, shrank bloated state-owned enterprises, and encouraged private business. Accompanying political reforms limited the power of China’s rulers and enlarged the space for nonideological competence within the regime. The CCP relaxed its grip enough to permit economic spontaneity—and reaped the benefits in the form of prosperity that reinforced its political control. China’s ascendance shook the world intellectually as well as geopolitically: It undermined post-Cold War Western beliefs that prosperity would lead inevitably to political liberalization, that democracies produced higher rates of growth than autocracies, and that tyranny was incompatible with sound economic management. As China became a global heavyweight, a new orthodoxy solidified—that a hegemonic transition was approaching as Beijing surpassed the United States. One dissenter was the political scientist David Shambaugh. In 2015, Shambaugh argued that China was suffering from a deep internal malaise and that Xi’s increasingly repressive rule was a sign of insecurity, not confidence. “[F]or all the Western views of it as an unstoppable juggernaut,” he wrote, China’s economy “is stuck in a series of systemic traps from which there is no easy exit.” Shambaugh struck a discordant note at a time when Beijing was tightening its control of the South China Sea and spreading its influence across multiple continents. He also happened to be right. Not least of the oddities surrounding contemporary China is that much of the world deemed its ascent inevitable just as its prospects started to dim. This may sound absurd, given all the hype surrounding China’s rise. After all, that country is supposedly destined, as the Harvard University political scientist Graham Allison (channeling legendary Singaporean Prime Minister Lee Kuan Yew) has written, to become “the biggest player in the history of the world.” It’s true that China does boast many apparent advantages. It has an enormous domestic market and is the leading trade partner of roughly 130 countries around the world. It is making concerted investments in artificial intelligence (AI), semiconductors, and other critical technologies. If the United States doesn’t up its game, a national commission chaired by former Google CEO Eric Schmidt warned in 2021, China could become the premier “AI superpower.” But look closer, and China’s trajectory starts to seem more tenuous. For one thing, many of China’s technological achievements are narrower and less impressive than they first appear. For example, Beijing has made great strides in AI applications focused on surveillance (no surprise there), but the United States still leads significantly across the wider expanse of AI subfields and uses. Despite vast state subsidies, China’s Semiconductor Manufacturing International Corp. is years behind in the creation of cutting-edge semiconductors that make up the foundation of advanced economies in the information age. Just this year, Peking University published a candid assessment—which the CCP then predictably censored—of China’s progress in science and technology. The verdict was that China is “following [the United States] in most fields, running side by side in a few, and leading in very few.” And while China’s other strengths are not illusory, neither can they hide a reality that Beckley and I discussed last year: The magic that made China’s economic miracle is unmistakably fizzling. The country’s resource abundance is old news: Overuse devastated much of China’s arable land; industrialization and pollution left the country with severe water scarcity. More damaging still, China’s abundance of human resources is also a thing of the past. The one-child policy was a devil’s bargain that is now causing demographic implosion. China’s total population is set to peak by 2028 (or perhaps as soon as this year, by some estimates) and then plummet by as much as half by century’s end. Its working population crested in 2015; it will fall by 70 million between 2020 and 2035 and even faster after that. China will soon combine an enormous geriatric population with a rapidly shrinking workforce. It will experience one of the worst peacetime demographic crunches on record, a formula for stagnation at best and catastrophic economic contraction at worst. Making matters worse, the era of enlightened economic policy is over. The reform agenda has been stalled for more than a decade because further liberalization—necessary to make the leap to a more innovative, knowledge-based economy—would threaten the privileges of entrenched elites. If anything, Xi has thrown the country into reverse. Politically, he is taking China into neototalitarianism through pervasive repression and indoctrination. And economically, his policies have a decidedly retrograde feel. Xi’s agenda has featured a preference for state-owned enterprises at the expense of the more vibrant private sector; the imposition of severe, politically motivated restrictions on wide swaths of the economy; attacks on the autonomy of relatively technocratic institutions such as the central bank; and the empowerment of political minders in companies of nearly all sizes. China’s leaders may talk about the need to transition to a high-tech, services-based economy, but Xi’s policies are stifling the competence, creativity, and spontaneity necessary to make that shift. It all constitutes a “great leap backward”—a reversion to pre-Deng-era policies that condemned China to stagnation. There is also the question of what Xi’s consolidation of power means for the country’s long-term resilience. As the political theorist Francis Fukuyama has written, for nearly 40 years after Mao’s death China avoided the “bad emperor” problem—the worst pathologies that accompany authoritarian rule—by imposing term limits on its rulers and making them more accountable to other CCP elites. Yet Xi has systematically disassembled this system by purging rivals, sidelining potential successors, and entrenching himself in power. By doing so, he is enabling China to move faster and more decisively. But he is also leaving the country vulnerable to impulsive or unwise decision-making—a perpetual problem of one-man rule—and creating the potential for terrible instability when his reign finally ends. Xi’s centralization of authority, while seemingly impressive, is setting the country up for a fall. Finally, it doesn’t help that a more assertive China is now facing more international resistance. Trade barriers against Chinese companies and products proliferated in the decade after the global financial crisis. Washington has waged a technological cold war against Huawei, seeking to deprive that Chinese firm of high-end semiconductors and keep it out of the world’s 5G networks. Dozens of countries are more carefully scrutinizing their economic, financial, and technological ties with Beijing; the Japanese government is offering to pay companies to reduce their China exposure. China is still central to the global economy, but the days when the United States and other powerful countries eagerly abetted its ascent are over. Indeed, Xi’s effort to cultivate the domestic market is an implicit admission that China, which rose on the strength of an export-focused economy, now confronts a very different world. China’s predicament has been thrown into relief, ironically, by COVID-19. Early on, the pandemic seemed to herald an epochal global shift. Prominent U.S. analysts saw it as a “Suez moment,” the terminal crisis of the U.S. empire. Xi touted his regime’s success in containing COVID-19 at home (albeit after allowing it to escape to the world) as an advertisement for Chinese authoritarianism. Two years later, it’s clear that COVID-19 was a turning point but not in the way that Xi hoped. The pandemic hypercharged global anti-China sentiment, after Beijing concealed the initial outbreak and then exploited the resulting chaos to bully nations from Australia to Germany and the United Kingdom. It thereby encouraged a host of efforts—through multilateral institutions such as the Quadrilateral Security Dialogue, AUKUS, and the G-7, as well as the United States’ bilateral alliances in the Pacific—to counter Chinese power. “A Cold War mentality” had reemerged, a spokesperson for China’s foreign ministry complained, as the United States and its friends pursued “anti-China encirclement.” COVID-19 also confirmed how patchy China’s rise had been: The country’s biotechnology sector couldn’t produce anything like the revolutionary vaccines that democratic innovation economies in the United States and Europe churned out. Even China’s heavy-handed success in containing COVID-19 at home became a trap: The combination of “zero-COVID” policies, low levels of natural immunity, and vaccines that proved weak or worthless against highly contagious variants condemned the country to recurring lockdowns of major cities, with all the accompanying disruptions. Even before COVID-19, in fact, China’s economic vital signs were worrying. The government claimed a growth rate of 6 percent, but Chinese insiders and academic research indicate that the true number is considerably lower—and even that growth is inflated by the relentless injection of capital into a less and less efficient economy. As a result, overall debt grew eightfold between 2008 and the end of 2020, reaching 335 percent of GDP. In other countries, this combination of slumping productivity and growing debt usually presages sharp crises that turn into lasting economic quagmires. Xi’s Chinese dream involves catching up to the United States. In reality, his country is slowing down. China is not, however, slowing down in all areas at once. This isn’t unusual: The Soviet Union hit the apex of its military power in the 1980s, when its economy was in a death spiral. In the early 20th century, Britain ruled a global empire at a time when its economic supremacy had already slipped away. Today, China is stagnating economically, but its drive for world power is accelerating. Chinese leaders and propaganda organs now openly tout the country’s designs: In the coming decades, the official state news agency Xinhua proclaimed, China will “re-ascend to the top of the world.” Beijing is creating new international organizations and co-opting others. Its marquee projects, namely the Belt and Road Initiative and the Digital Silk Road, aim to project economic and political influence across Eurasia and beyond. China also fashions itself as an ideological role model for other countries: Its style of governance, Xi has said, offers a “new option for other countries and nations that want to speed up their development while preserving their independence.” Most notably, China is building and wielding the tools of geopolitical coercion. Countries such as Australia, Lithuania, Norway, and South Korea have felt China’s economic bite after they opposed its policies or criticized its internal practices. Chinese military spending—having already grown tenfold in real terms between 1990 and 2016—continues to rise, funding a dramatic expansion of the capabilities needed to conquer Taiwan, overawe Beijing’s neighbors, and perhaps even take on the United States in the Western Pacific. What the United States will face in this decade is a China whose ability to batter its enemies and challenge the global order is growing, even as leaner economic times loom ahead. The statistics are simply astounding: Beijing put as many ships to sea from 2014 to 2018 as were in the navies of Britain, Germany, India, Spain, and Taiwan combined. And having long avoided a nuclear arms race with Washington, Beijing is now sprinting forward and could be the United States’ nuclear peer by the 2030s. Threats to use force against enemies have also become ubiquitous: Anyone who obstructs China’s plans, Xi warned in 2021, will “have their heads bashed bloody against the Great Wall of Steel.” It is sometimes hard to believe that such a country is running out of gas. But perhaps China’s strategic urgency is increasing because its economic outlook has turned grim. China’s “hide and bide” strategy—the approach it followed for a generation under Deng and after—was one of patient confidence. If time was on a rising Beijing’s side, then it made sense to gradually build the country’s power and delay confrontation with the United States. Today, China’s strategic mindset is darker and more insistent. In many areas, Xi acknowledges, “the West is strong, and the East is weak.” China must race to make itself “invincible” so that “nobody can beat us or choke us to death.” What the United States will face in this decade, then, is a China whose ability to batter its enemies and challenge the global order is growing, even as leaner economic times loom ahead. This China is unlikely to be benign or peaceful. History has seen many once ascendant countries lash out violently rather than accept a disappointing future as a second-tier power. This fear is what led Germany to take the risks that helped ignite World War I. It prompted Japan to undertake the expansionist rampage that helped bring on World War II. Xi has grand ambitions, from capturing Taiwan to establishing China’s primacy in Asia and, eventually, the world. If he loses faith that the patient accumulation of economic power will bring Beijing these rewards, he may become more inclined to take risks and use China’s coercive tools to secure them instead. This means that the task of dealing with China could prove quite ticklish in the years ahead. The United States can’t simply rest easy, confident that a peaking China will fade away. Instead, it will have to rapidly firm up its defenses in places where an impatient Beijing might lunge for advantage, such as the Western Pacific. The United States and its allies will have to join forces to prevent China from weaponizing its still considerable economic and technological leverage to fracture the anti-Beijing coalitions now taking shape. And they will have to ensure, through multilateral control measures as well as investments in their own capabilities, that the democratic world maintains its edge in semiconductors and other critical technologies that will shape the future balance of economic and military power. Yet Washington and its friends will also have to do all this while keeping channels of communication open and not unnecessarily provoking an anxious China that may lash out as its predicament worsens. After all, power and pessimism can make a deadly mix. The hardest sort of China to handle may be one that is strong and weak.

#### China’s is aiming for global dominance–revisionist tendencies

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Can we pay the Chinese Communist Party the compliment of acknowledging that it means what it says and knows what it wants? That may be the key to understanding Beijing’s strategic ambitions in the coming decades. A long-standing trope in the U.S. debate on that subject is that China itself doesn’t know what it seeks to achieve, that its leaders haven’t yet worked out how far Beijing’s influence should reach. Yet there is a growing body of evidence, assembled and interpreted by talented China experts, that the Chinese government is indeed aiming for global power and perhaps global primacy over the next generation — that it seeks to upend the American-led international system and create at least a competing, quasi-world order of its own. It doesn’t take unparalleled powers of deduction to reach this conclusion. Top Chinese officials and members of the country’s foreign policy community are becoming increasingly explicit in saying so themselves. President Xi Jinping more than hinted at this goal in his landmark address to the 19th Party Congress in October 2017. That speech represents one of the most authoritative statements of the party’s policy and aims; it reflects Xi’s understanding of what China has accomplished under Communist rule and how it must advance in the future. Xi declared that China “has stood up, grown rich, and is becoming strong,” and that it was now “blazing a new trail for other developing countries” and offering “Chinese wisdom and a Chinese approach to solving the problems facing mankind.” By 2049, Xi promised, China would “become a global leader in terms of composite national strength and international influence” and would build a “stable international order” in which China’s “national rejuvenation” could be fully achieved. This was the statement of a leader who sees his country not just participating in global affairs but setting the terms, and it testifies to two core themes in China’s foreign policy discourse. The first is a deeply skeptical view of the existing international system. Chinese leaders recognize that the global trade regime has been indispensable to the country’s economic and military rise. Yet when they look at the key features of the world Washington and its allies have made, they see mostly threats. In their view, American alliances do not preserve peace and stability; they stunt China’s potential and prevent Asian nations from giving Beijing its due. Seen through that lens, promoting democracy and human rights is neither moral nor benign, but propaganda supporting a dangerous doctrine that threatens to delegitimize the Communist government and energize its domestic enemies. U.S.-led international institutions appear as tools for imposing America’s will on weaker states. The Communist Party recognizes that the liberal international order has brought benefits, writes Nadege Rolland, a senior fellow at the National Bureau of Asian Research, but “the party abhors and dreads” the principles on which it is based. The second theme is that the international order must change — not a little, but a lot — for China to become fully prosperous and secure. Chinese leaders have, understandably, been somewhat opaque in describing the world they want, but the outlines are becoming easier to discern. If one studies the statements of Xi and other top officials, China expert Liza Tobin concludes, what emerges is a vision in which “a global network of partnerships centered on China would replace the U.S. system of treaty alliances” and the world would view Chinese authoritarianism as preferable to Western democracy. Based on a similar analysis, Rolland agrees that China has “a yearning for partial hegemony,” a loose dominance over large swaths of the global south. When it comes to global governance, still other examinations show, Beijing wants a system in which international institutions buttress rather than batter repressive regimes. Meanwhile, Chinese strategists and academics are talking openly about building a “new China-centric global economic order.” There is little indication, in any of this, that Beijing’s strategic horizon is limited to the Western Pacific or even Asia. Xi’s invocation of a “community with a shared future for humanity” indicates a global tableau for Chinese influence. One hardly has to read between the lines to understand that this agenda will require fundamentally resetting the current geopolitical balance. As Xi remarked several years ago, China must work resolutely toward “a future where we will win the initiative and have the dominant position.” Of course, there’s not need to take literally everything national leaders say, or even everything that makes it into official speeches. In Beijing’s case, however, Chinese leaders are actually saying less than what the country is doing. Whether it is the naval shipbuilding program that is churning out vessels at astonishing rate[s]; the drive to control existing international organizations and build new ones; the projection of military power in the Arctic, the Indian Ocean and points beyond; the quest to dominate the world’s high-tech industries; the ever-more systematic efforts to support authoritarian regimes and weaken democratic institutions; or the Belt and Road Initiative that encompasses multiple continents, China is hardly acting like a country that lacks a grand geopolitical design. As with so many aspects of the U.S.-China competition, there is a Cold War parallel. During the 1970s, some leading American Sovietologists insisted that Moscow was becoming a satisfied, status quo power. Yet that claim required ignoring what Soviet leaders said about detente and peaceful coexistence — that it was a way of ensuring the triumph of socialism without war — as well as their efforts to build military superiority and positions of strength in the Third World. The warning signs were evident then, as they are today.

### 2AC – Russia Revisionist

#### Russia is a real revisionist threat that seeks expansionism – Crimea, Georgia, and Ukraine all prove.

Andrei P. Tsygankov 2021 [The Revisionist Moment: Russia, Trump, and Global Transition, Problems of Post-Communism, 68:6, 457-467, DOI: 10.1080/10758216.2020.1788397] //WA

Russia’s interventions in Ukraine and Syria reflected the Kremlin’s insistence on the principles of a multipolar balance of power and cultural/civilizational diversity in international relations. In Syria, Russia also defended the principle of sovereignty and noninterference by outside powers without the government’s authorization. In upholding these principles Moscow sought to demonstrate what Russia’s president Vladimir Putin defined as “geopolitical relevance.” Russia took its assertive foreign policy to a new level by demonstrat- ing the ability to project power across continents. The new Concept of Foreign Policy signed by Putin on November 30, 2016, stressed the importance of defending the country’s cultural distinctiveness in the context of new international challenges and attempts by the United States to preserve global dominance. The document posited Russia’s “right for a tough response to unfriendly actions including by strength- ening national defense and implementing symmetric and asymmetric measures” (Concept of Foreign Policy of the Russian Federation 2016). Since then, Russia has sought to demonstrate its power in several other areas including nuclear, cyber, and covert military capabilities.1 It has also interfered in elections in several European countries and the United States, prompting a new Western debate on Russia’s intentions and capabilities.2 As Russia’s assertiveness has reached new heights, scholars have frequently discussed it as indicative of the country’s revisionism. Like assertiveness, revisionism is a response to perceived disrespect of Russia’s interests and values by for- eign/Western powers. The difference between assertiveness and revisionism is one of degree. While assertiveness is lim- ited to rhetorical and localized resistance to established inter- national rules, revisionism is associated with stretching and even breaking global rules in the interest of pushing toward a new international order.3 Russia’s use of force in Georgia in August 2008 was an example of stretching international rules, including those established following the end of the Cold War. By intervening in Georgia, Russia challenged the principle of national sover- eignty and undermined the United States’ hegemonic mono- poly on the international use of force. However, the Kremlin was also responding to Tbilisi’s attack on Russian peace- keepers and civilians. Having completed a military operation, the Kremlin negotiated a ceasefire and withdrew from Georgian territory, leaving it to the Georgian people to decide their political future. At the same time, Russia recognized the independence of Abkhazia and South Ossetia, extending sup- port to territories that were under Georgian jurisdiction but not formally annexing them. Russia was also not alone in acting in such a manner: precedents for rule stretching already existed. For example, as Yugoslavia disintegrated, its territories’ declarations of independence were increasingly recognized by outside powers. In particular, Kosovo declared independence from Serbia on February 17, 2008, which was before Russia’s 2008 actions with respect to Georgia. Recognition of Kosovo would breach the sovereignty princi- ple. The decision to recognize Kosovo generated opposition from Russia, China, and India, but was supported by the United States, Britain, and France. As the latter three have been among the guarantors of the post–Cold War system, with the United States serving as the hegemon, their support opened the path for Kosovo to gain further international recognition within the United Nations. The Crimea annexation in March 2014 was the next stage of Russia’s revisionism that could be viewed as an example of breaking international rules, in particular the principles of national sovereignty. Although the Crimean referendum was indicative of the residents’ desire to join Russia, it was con- ducted under conditions of international crisis, Russia’s mili- tary presence, and without international consent.4 Since 2014 the Kremlin has been pressing for not simply Russia-sensitive Western policies but a new international order built on dif- ferent rules and a balance of power. No other power, includ- ing the United States, had previously increased its territory at the expense of others by breaking international rules in achieving its foreign policy objectives. However, on March 25, 2019, the United States recognized the Golan Heights as part of Israel. In the absence of any referendum or United Nations recognition, the United States called the annexation “not necessarily illegal” and subject to a judicial resolution by the Israeli courts. Russia’s revisionism is puzzling to both realist and liberal theorists of international relations. Realists correctly identify the West’s policies as a key source of Russia’s revisionism (Mearsheimer 2014), yet they remain puzzled by the Kremlin’s readiness to increase its dependence on China. Realists view such a course as unsustainable in the medium- term perspective and assume that Russia will rebuild its ties with the United States, even under the U.S. framework of preserved international unipolarity and global leadership.5 Liberals too are puzzled by Russia’s revisionism. They have long argued that Russia remains economically and politically vulnerable and is in no position to challenge America’s global leadership. Even with Barack Obama out of power, the view that Russia is a declining autocratic power with unsustainable international behavior remains dominant in Washington’s liberal policy circles (Gunitsky and Tsygankov 2018). In explaining Russia’s international behavior, this paper makes several related arguments. First, I argue that revision- ism is systemic and cannot be attributed solely to Russia’s great power ambitions. Since the late 2000s, revisionism has been stimulated by the declining role of the United States in the international system and a global transition toward a new international order. Donald Trump’s lack of interest in pre- serving the United States’ global leadership and ties with allies, while not being the cause, has been an important con- tributing factor to facilitating world order transition. Second, I show that Russia’s domestic support for revisio- nist foreign policy is not uniformly shared across the political spectrum. Different Russian groups view revisionism differ- ently and demonstrate diverse attitudes with respect to their preferred world order and foreign policy. While some Russian elites support continued disruption of the U.S.-centered inter- national order, others warn about Russia’s vulnerabilities and insist on demonstrating not only Russia’s power capabilities but also the potential for cooperation with the United States. Because of Western pressures and Russia’s self-perception of being a great power, the former group enjoys a position of relative dominance and support by the Kremlin. While displaying differences with respect to foreign policy preferences and justifying their support on different grounds, elites and the general public have remained generally sympa- thetic with the Kremlin’s actions abroad. All remain in agree- ment that Russia must protect its great power status and do so by way of engaging the United States in meaningful interna- tional relations and by observing relevant international trea- ties. In particular, Moscow has proposed to view the global COVID-19 crisis as an opportunity to form a new, universally shared world order. Putin reenergized his contacts with Trump by discussing the possibility of holding a new inter- national summit and negotiating a new agreement with OPEC to stabilize oil prices (Frolov 2020). I argue that Russia’s domestic attitudes are best understood in terms of the country’s nationally shared belief in being a great power and its attempts to gain recognition of that status by the outside world—first and foremost the West. Scholars have argued that, at least since Yevgeny Primakov’s appointment as foreign minister (1996–1998), Russian foreign policy has demonstrated a considerable degree of continuity based on a commitment to the preservation of great power status (Gorenburg 2019). That commitment remains in place, even as the country has been negatively affected by economic decline and the proliferation of the coronavirus.6

#### It is dangerous to ignore the way Russia is behaving – we need to stop it

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When the Soviet Union collapsed, competition between the United States and Russia also ended, temporarily. Under the guidance of President Boris Yeltsin, the new leadership in Russia aspired to consolidate democracy and capitalism at home and championed integration into the liberal international order. Although the results of both agendas were mixed throughout the 1990s, ideological competition played little to no role in shaping Russia’s relations with “the West,”1 in general, and the United States, in particular. Times have changed under President Vladimir Putin. Gradually over the last two decades and increasingly since 2014, when Putin annexed Crimea and intervened in eastern Ukraine, Russia and the United States, as well as Russia and the West, have clashed. Many politicians and analysts now compare the current level of confrontation to the Cold War.2 At the Munich Security Conference in 2016, Prime Minister Dmitry Medvedev referenced the Cuban missile crisis as a similar moment in bilateral tensions: “Speaking bluntly, we are rapidly rolling into a period of a new cold war. . . . I am sometimes confused: is this 2016 or 1962?”3 Echoing Medvedev, Ernest Moniz and Sam Nunn wrote, “Not since the 1962 Cuban missile crisis has the risk of a U.S.-Russian confrontation been as high as it is today.”4 In April 2018, President Donald Trump declared on Twitter: “Our relationship with Russia is worse now than it has ever been, and that includes the Cold War.”5 What happened? How did the United States and Russia move from cooperative ties, strategic partnerships, shared domestic goals, and international norms a few decades ago to a new era of conflict in U.S.-Russian relations and Russia’s relationship with the West more generally? One explanation—perhaps most widely held—is that cooperation was an interregnum driven by Russian weakness. After Russia’s recovery from the dissolution of the Soviet Union, normal great power competition has returned.6 The Soviet Union annexed territory, intervened militarily to prop up regimes, and even tried to influence elections in Western democracies. Upon regaining these capabilities, a rising Russia is “destined” to clash with the incumbent global superpower, just as China is currently doing as well.7 Russia’s negative reaction to U.S. unipolarity was inevitable, determined by the structure of the international system. For thousands of years, great powers have risen, fallen, and clashed. There is nothing new or peculiar about current clashes between Russia and the United States or between Russia and the West more generally, according to this perspective. A second explanation of Russia’s increasing confrontation with the West focuses on historical and cultural continuities in Russian international behavior. Whether Committee for State Security (KGB) agents, democrats, Communist Party general secretaries, or tsars sit in the Kremlin, Russian international conduct has remained largely consistent.8 Well before the Bolsheviks seized power in 1917, Russian tsars annexed territory, intervened militarily to assist allies, and meddled in the domestic affairs of foes.9 Russia, today, is acting like Russia has always acted, or so this argument contends. The Gorbachev and Yeltsin years were an aberration. Russia is back on its historical equilibrium path. Both of these explanations allow no role for the agency of individual leaders and their ideas in the analysis. This article advances an alternative explanation that focuses on individuals, ideas, and domestic institutions as important factors shaping Russian international behavior. Russia was not destined to return to a confrontational relationship with the United States or the West because of the balance of power in the international system or historical and cultural determinants. Rather, President Putin chose this path. Despite consciously invoking realist rhetoric and historic traditions to justify his international behavior, Putin has demonstrated agency in the making of Russian foreign policy. Individuals matter.10 A different Russian leader could have chosen a different path.11 Second, and closely related, ideas matter. If all leaders acted rationally and in the same way, it would be impossible to identify the unique causal impact of individual leaders in shaping foreign policy.12 In the case of Russia, if Putin had defined his foreign policy agenda always through a realist lens, his individual impact on Russian foreign policy would be difficult to distinguish from realist theory explanations. Putin’s behavior, however, has not always correlated with realist predictions. A second argument advanced in this article is that leaders have a menu of ideas from which to choose in seeking to explain the world and then act in it. Realist ideas offer one, but not the only, option. International factors, domestic institutions, and bureaucratic politics shape, but do not determine, individual decisions and actions. Different choices made by individuals regarding analytical frameworks produce variation in foreign policy outcomes even when other factors—the international balance of power, historical legacies, or regime type—are held constant. Putin selected a unique trajectory for Russian foreign policy because of a set of particular ideas that he developed about the nature of Russia, the United States, and international relations more broadly.13 He embraced and propagated illiberal, conservative nationalism to advance his definition of national interests. Putin also developed a particular theory about U.S. foreign policy, which he defines as hostile to Russian national interests and antithetical to Russian orthodox values.14 Some analysts have labeled this set of ideas “Putinism,”15 while others see Putin as part of a broader transnational ideological movement in support of autocracy.16 In either instance, Putin’s ideas play a causal role in the conduct of Russian foreign policy. Had Putin embraced a different theory of international politics or a different ideological framework—realism, liberalism, or even communism—Russia under his leadership would have behaved differently on the global stage. Regarding the three cases examined in this article, Putin’s decisions to intervene in Ukraine in 2014, Syria in 2015, and the United States in 2016 reflect the triumph of his illiberal ideas over other analytic frameworks (i.e., realism or liberalism) in shaping Russian foreign policy. Different from a powerful state intervening in other states solely to maximize power, Putinism divides the world along ideological lines. These ideas both encourage certain interventions, including the cases discussed in this article, and constrain intervention in support of perceived liberal projects, including Libya in 2011 and Syria in 2012, that might have produced gains in Russian power and prestige.17 Third, institutions matter. The Russian system of government became increasingly autocratic during Putin’s two decades of rule, giving Putin more autonomy and more influence over Russian foreign policy. A more democratic system would have placed greater constraints on Putin’s individual foreign policy decisions.18 Of course, power matters, too.19 Without the capabilities to annex territory, conduct air strikes, or steal digital property, Putin could not have intervened in Ukraine in 2014, Syria in 2015, or the United States in 2016. A narrow focus on Russian power or the global balance of power, however, cannot fully explain these interventions. As Elizabeth Saunders argues, “Theories relying on relatively stable or slow-changing factors such as the structure of the international system or regime type cannot fully account for changes in a state’s intervention choice over time. Moving the level of analysis to individual leaders can help to address this variation.”20 New Russian capabilities did not make these Russian interventions inevitable. Other options were available.21 A different Russian leader, with different ideas, ruling in a different political system could have chosen to use Russian power in a different way.22 Only by adding domestic-level and individual-level variables—leaders, ideas, and institutions—can a comprehensive explanation of Russian foreign policy be developed. The argument advanced in this article is not that Putin and his illiberal ideas always shape Russian foreign policy behavior on every issue in ways inconsistent with realist and liberal theories or ideologies. Nevertheless, interventions in the domestic affairs of other countries offer a good test of this argument, given that such actions are rare and often costly.23 This argument parallels many accounts of U.S. foreign policy in which realism explains some, but not all, international behavior.24 Realist scholars have invoked the causal impact of liberal ideas—“the hell of good intentions” or “liberal dreams”—to explain U.S. foreign policy departures from realist predictions, especially regarding interventions in other states.25 This article makes the same theoretical move, tracing the impact of Putin’s illiberal ideas to understand specific Russian foreign policy actions that depart from realist predictions. Explaining scientifically the causal relationship between individuals, ideas, and institutions, on the one hand, and Russian foreign policy, on the other, is challenging. To ignore the domestic determinants of contemporary Russian behavior in the world, however, is to oversimplify and distort the drivers of current tensions in U.S.-Russian relations: a danger for theorists and policymakers alike.

### 2AC – Russia Bad – Human Rights

#### Russia’s invasion of Ukraine exposes their lack of respect for human rights

Laura Kelly 4-13-22 Staff Writer for the Hill [‘Credible evidence’ found that Russia violated global human rights in Ukraine, https://thehill.com/policy/international/3266132-credible-evidence-found-that-russia-violated-global-human-rights-in-ukraine/]//WA

Russia’s assault on Ukraine has included “clear patterns” of international humanitarian law violations, an investigative team sanctioned by the Organization for Security and Cooperation in Europe (OSCE) said on Wednesday. The OSCE report also found “credible evidence” of violations of fundamental human rights in areas of Ukraine that were largely under Russian control. The report found evidence of torture, killings and inhuman and degrading treatment of people. It said it had found some evidence of bad behavior by Ukrainian forces, including with how it has treated prisoners of war, but said “violations committed by the Russian Federation, however, are by far larger in nature and scale.” President [Biden](https://thehill.com/people/biden/) on Tuesday said Russian President [Vladimir Putin](https://thehill.com/people/vladimir-putin/) had committed genocide in Ukraine, echoing a charge made by Ukrainian President Volodymyr Zelensky. The OSCE report marks one of the first published investigations into atrocities occurring in Ukraine. The document will be available to judicial bodies aiming to prosecute violators of international humanitarian law. The report found that Russia had deliberately struck a maternity hospital in Mariupol on March 9, offering no warning. It labeled it a “clear violation” of international humanitarian law and a war crime. The report also cites a March 16 attack on a drama theater in Mariupol where up to 1,300 people had been seeking shelter. Both sides of the theater were clearly marked “children” to discourage an attack. Three hundred people were killed in the strike. U.S. Ambassador to the OSCE Michael Carpenter in a Wednesday statement said the report “documents the catalog of inhumanity perpetrated by Russia’s forces in Ukraine.” He also raised concern that “Russia’s atrocities continue even after this report’s conclusion.” The OSCE is made up of 68 nations, including European countries, Russia and participating states like the U.S. A majority of the body voted on March 3 to launch an independent investigation under the auspices of the “Moscow Mechanism,” a measure established in 1991 to investigate and document allegations of humanitarian law violations and war crimes taking place in member states. The report notes that Russia’s representative to the OSCE rejected participating in the investigation, calling the Moscow Mechanism “largely outdated and redundant,” the investigators wrote. The report only covers a period of three weeks, between March 15 and April 5, and does not include atrocities discovered in cities and towns surrounding Kyiv after the retreat of Russian forces, including evidence of extrajudicial killings, torture and rape. The report also does not include an alleged Russian attack on a train station in Kramatorsk on April 8, where an estimated 57 civilians were killed as they were trying to flee the city. Carpenter, in his remarks, raised concern over new allegations that Russia may have or is preparing to deploy chemical weapons as part of its assault. “We must now urgently gather the evidence to ensure there is accountability for what could well be another war crime in Ukraine,” the ambassador said. The U.S. has not confirmed allegations by Ukrainian forces in Mariupol that Russia has deployed chemical weapons but said it has received credible reports and is looking into whether Russian forces used tear gas with chemical agents to cause strong symptoms and incapacitate Ukrainian forces.

### 2AC – Russia Bad – Fascism

#### Russia is a fascist regime – who would’ve known!

Taras Kuzio 4-17-22 Taras Kuzio is a Research Fellow at the Henry Jackson Society and author of the recently published “Russian Nationalism and the Russian-Ukrainian War.” [How Putin’s Russia embraced fascism while preaching anti-fascism, https://www.atlanticcouncil.org/blogs/ukrainealert/how-putins-russia-embraced-fascism-while-preaching-anti-fascism/]//WA

When Vladimir Putin first came to power at the turn of the millennium, one of the main challenges he faced was the need to repair battered Russian national pride following a decade of post-Soviet turbulence marked by economic collapse and endless revelations of Soviet-era crimes against humanity. Putin’s solution was disarmingly simple but brilliantly effective. He set out to revive Russian patriotism by building a modern national identity around the Soviet Union’s role in the defeat of Nazi Germany. While WWII had always played a prominent role in shaping the national psyche, under Putin it would ascend to new heights as the defining moment in Russian history. Far from being ashamed of their Soviet past, Russians were now told that they could be proud of belonging to a “victor nation.” Instead of dwelling on the millions of innocent victims murdered during the Stalin era, they should honor the righteous heroics of the Soviet war effort. This veneration of the Soviet WWII experience proved hugely popular with the Russian public. Over the past two decades, it has evolved into a quasi-religious cult complete with its own lexicon, rituals, monuments, and holy days. In 2020, it even received its very own [cathedral](https://www.theguardian.com/world/2020/oct/20/orthodox-cathedral-of-the-armed-force-russian-national-identity-military-disneyland). As with any religion, heresy is not tolerated. Deviations from the officially approved narratives of the victor nation are subject to criminal prosecution and blasphemy is dealt with ruthlessly. In Putin’s Russia, there is no greater crime than to question the sanctity of the Soviet victory over Nazi Germany. The kleptocratic Putin regime has used this [victory cult](https://www.atlanticcouncil.org/blogs/ukrainealert/putins-russia-has-weaponized-world-war-ii/) to establish the illusion of an ideological commitment to fighting fascism. In line with this anti-fascist posturing, opponents of the current Russian authorities are routinely branded as fascists and Nazis. These vague but emotive labels have been attached to a dizzying array of adversaries ranging from domestic dissidents to recalcitrant neighbors. Nowhere is modern Russia’s fixation with “phantom fascists” more immediately apparent than in Kremlin policy toward Ukraine. For years, Moscow has equated Ukrainian national identity with fascism while depicting Russian aggression in Ukraine as a continuation of the struggle against Nazi Germany. The Kremlin’s absurd claims ignore the inconvenient reality that today’s Ukraine is a vibrant democracy with a popularly elected Jewish president and a far-right fringe that consistently fails to secure more than 2% in national elections. Instead, Russian audiences are encouraged to regard the present invasion of Ukraine as an anti-fascist crusade to rid the world of Hitler’s heirs. Moscow’s efforts to portray the war in Ukraine as a battle against Nazism have been widely mocked and comprehensively rejected by the international community. These anti-fascist pretensions are rendered even more ridiculous by the country’s own steady descent under Putin into full-blown fascism. Indeed, the current war in Ukraine has led many to conclude that modern Russia is following in the footsteps of the fascist dictatorships it claims to oppose. Defining whether a regime qualifies as fascist is no easy matter. Indeed, as far back as 1944, George Orwell was complaining that the word “fascism” had become “[almost entirely meaningless](https://www.orwell.ru/library/articles/As_I_Please/english/efasc)” and was simply used as a synonym for “bully.” Nevertheless, most definitions of fascism would indicate a dictatorial system of government marked by nationalism, militarism, xenophobia, revisionism and expansionism. Putin’s Russia unquestionably ticks all of these boxes. Russia completed its transition from authoritarianism to [dictatorship](https://www.economist.com/leaders/2022/03/12/the-stalinisation-of-russia) following constitutional changes adopted in 2020 via a sham referendum that allowed Putin to remain in power until 2036. This confirmed his status as president for life and extinguished any lingering hopes regarding the possibility of Russia’s future democratic evolution. Since 2020, political opposition, independent media, and all forms of public protest have been subjected to new levels of suppression in Russia and ruthlessly crushed. This process has accelerated in recent months as the Kremlin has sought to silence domestic opposition to the war in Ukraine. Draconian censorship laws have introduced criminal responsibility for any deviations from the official government narrative of a “special military operation” to “de-Nazify” Ukraine. Meanwhile, Putin’s speeches to justify the invasion have increasingly echoed the rhetoric of twentieth century fascist regimes. This has included calls for the purification of the nation and vicious denunciations of national [traitors](https://www.economist.com/europe/2022/03/19/russian-propagandists-turn-on-pro-western-traitors). Throughout his reign, Putin has consistently mobilized toxic nationalism as a key building block of his dictatorship. This process began in the early days of Putin’s presidency when he brought back the Soviet national anthem. It has continued to gain momentum ever since. Following Ukraine’s 2004 Orange Revolution, the Kremlin embraced conservative nationalism as a safeguard against any similar pro-democracy uprisings inside Russia. This led to the formation of groups such as “Nashi,” a virulently nationalistic pro-Kremlin youth group that was widely compared to the Hitler Youth. In addition to the aforementioned victory cult surrounding WWII, Putin has also elevated the role of the Russian Orthodox Church in national life and promoted the idea of Russia as a “[distinct civilization](https://www.themoscowtimes.com/2020/05/25/putin-and-the-distinct-russian-civilization-a70370).” The rampant nationalism of the Putin era has been accompanied by growing militarism fostered by everything from films and TV serials to public holidays and the national curriculum for Russian schoolchildren. The militaristic mood in the country has reflected the realities of Putin’s foreign policy, with Russia at war for much of his reign. Prior to the current full-scale invasion of Ukraine, the country had waged a series of wars in Chechnya, Georgia, eastern Ukraine and Syria. This [militarism](https://www.economist.com/briefing/2022/03/26/the-new-russian-cult-of-war) is now being further fanned in Russia by the use of the letter “Z” which has emerged as a symbol of Putin’s war in Ukraine after being used to identify vehicles within the invasion force. Russians are being encouraged to display Z’s wherever possible to [show their support](https://www.theguardian.com/world/2022/mar/07/why-has-the-letter-z-become-the-symbol-of-war-for-russia) for the war, with many commentators comparing the increasingly ubiquitous letter to the Nazi Swastika. Efforts to generate popular support for the war effort appear to be working. A recent survey conducted by Russia’s only independent pollster, the Levada Center, found that [81%](https://www.levada.ru/2022/03/31/konflikt-s-ukrainoj/) of Russians back the invasion. These findings are confirmed by a steady flow of videos and posts on social media in support of the war. At the same time, Russian anti-war protests have failed to gather any momentum and have instead remained underwhelming. As Putin’s Russia has moved closer to traditional definitions of fascism, the regime has increasingly embraced xenophobic narratives designed to dehumanize Ukrainians as the country’s most significant national enemy. Indeed, an essay published by Putin himself in [July 2021](http://en.kremlin.ru/events/president/news/66181) denying Ukraine’s right to exist and claiming Russians and Ukrainians are “one people” merely put into writing the racist beliefs he has long held and espoused. In addition to depicting Ukrainians as Nazis and extremists, Russian propaganda has long rejected the legitimacy of Ukraine as an independent state and dismissed the entire concept of a separate Ukrainian national identity as a foreign plot meant to divide and weaken Russia. This anti-Ukrainian rhetoric has escalated alarmingly in recent months. On the eve of the current war, Putin [condemned Ukraine](https://www.theguardian.com/world/2022/feb/25/its-not-rational-putins-bizarre-speech-wrecks-his-once-pragmatic-image) as an intolerable “anti-Russia” run by “neo-Nazis and drug addicts” and accused Kyiv of occupying historically Russian lands. With Moscow now facing unexpected military setbacks and suffering painful battlefield losses, [openly genocidal threats](https://twitter.com/JuliaDavisNews/status/1514811357178212362) directed at Ukraine have become an everyday feature of Russia’s Kremlin-controlled mainstream media. Putin’s revanchist foreign policy goals closely fit the fascism template and directly echo the revisionist agenda pursued by Adolf Hitler almost a century earlier. Like the Nazi leader before him, Putin has openly expressed his desire to challenge what he sees as the unjust verdict of a lost war. While Hitler sought to undo the Treaty of Versailles, Putin’s objective has been to reverse the outcome of the Cold War. Both dictators have framed their expansionist policies as sacred missions to rescue ethnic kinsfolk from artificial separation and foreign oppression. Putin refers to the breakup of the USSR as “the disintegration of historical Russia” and seeks to reunite what he regards as Russia’s rightful inheritance. First and foremost, this means reconquering Ukraine. The Russian ruler has sought to justify his aggressive foreign policy by claiming that large parts of today’s Ukraine were erroneously attached to the country by Vladimir Lenin during the early years of the Soviet Union. In other words, the current invasion is merely the latest and most extreme expression of Putin’s long-stated expansionist aims. The disastrous results of Russia’s descent into fascism are now clear for all to see. In addition to transforming Russia into a dictatorship, Putin has unleashed a war of annihilation in neighboring Ukraine that both US President [Joe Biden](https://edition.cnn.com/2022/04/12/politics/biden-iowa-genocide/index.html) and his predecessor [Donald Trump](https://thehill.com/blogs/blog-briefing-room/3267118-trump-joins-biden-in-calling-russias-war-on-ukraine-genocide/) have condemned as genocide. Russian war crimes in Ukraine have stunned global audiences but the atrocities we are now witnessing should really come as no surprise. On the contrary, they are the logical consequence of a dictatorial regime that has enthusiastically embraced nationalism, militarism, expansionism, and anti-Ukrainian xenophobia for many years in plain sight. The international community must now urgently respond to the grave threat posed by Russian fascism before it is too late. This means dramatically escalating sanctions while providing Ukraine with the weapons it needs to defend itself. Vladimir Putin pretends to be “de-Nazifying” democratic Ukraine, but it is clearly Russia itself that requires “de-Nazification.”

## 2AC – AT: Case Turns

### 2AC – AT: Overmatch Turn

#### Overmatch now is crucial – their evidence is outdated and doesn’t assume new adversarial aggression – harmonization of advanced equipment effectively deters Russia in Ukraine

SSD Soldier Systems Daily ’22, Soldier Systems Daily is the premier daily web publication covering the tactical industry, “The Time Is Now For Next Generation Squad Weapons”, Soldier Systems, 2/23/22, https://soldiersystems.net/2022/02/23/the-time-is-now-for-next-generation-squad-weapons/

**Over four years ago, then Army Chief of Staff GEN Mark Milley told Congress that the US Army needed a new family of squad weapons which would provide overmatch for their small arms**. The resulting program, Next Generation Squad Weapons is ready to deliver on that requirement. **Base on events earlier this week in Ukraine, this program must move forward, with all speed**.

Any day now, the US Army may announce the winner to provide replacements for up to 120,000 of the M4 carbines and M249 Squad automatic weapons currently wielded by close combat forces. The Marine Corps is monitoring the program to consider making similar changes. This program doesn’t just concern weapons, but also the ammunition a Soldier fires. The Army specified a performance spec based around a government provided 6.8mm projectile which is similar to 270 WSM.

The contest is now down to two very different candidates. One is a low risk option; SIG SAUER’s weapons consist of a rifle and belt-fed machine gun which fire a hybrid-cased cartridge. Alternatively, True Velocity’s option\* is a bullpup design with box-fed rifle and automatic rifle firing a composite-cased cartridge.

Both SIG and TV are ready to move forward, having announced commercial variants of both their ammunition and weapons. At this point, we are approaching COTS.

It’s time to stop the delays and announce the winner. The Army has already selected a Fire Control solution from Vortex Optics as well as let a contract to Winchester which operates the Lake City Army Ammunition Plant and will produce whichever type of 6.8mm cartridge is selected. **The pieces are falling into place**.

Procured using an Other Transaction Agreement, there is a lot of flexibility on how this moves forward, but it must. **At this point, the ball is truly in the Army’s court**. Even after the award, there’s still a lot work to be done but the sooner it begins the better. **Not only does moving forward with this program get us on the way to achieving small arms overmatch, but** it sends a serious message to Russia that US forces are equipping themselves with weapons to defeat their ground forces in combat, regardless of their personal armor. This may give Russia pause in their stated goal to restore the former republics of the USSR to Russian control. **It will assuredly weigh on the psyche of their troops**. Either is a psychological win.

#### Failure to pursue overmatch risks the Ukrainian missile war spreading broadly across Europe and Chinese takeover of Taiwan – deterrence is crucial

MDAA ’22, Missile Defense Advocacy Alliance is the only organization in existence whose primary mission is to educate the American public about missile defense issues and to recruit, organize, and mobilize proponents to advocate for the critical need of missile defense., “Overmatch in Ukraine”, MDAA, 1/28/22, https://missiledefenseadvocacy.org/alert/overmatch-in-ukraine/

**A DOD assessment team recently returned from Ukraine and reported that it had found Kyiv’s current missile defenses are inadequate to defend against the advanced threat posed by Russia**. Ukraine is relying on a limited number of Soviet-era S-300V missile defense systems to counter what Ukrainian military assessments have reported as an estimated 36 Russian Iskander missile systems have been placed near their border. In addition, Russian S-400 air defense batteries provide an additional defensive layer to shield their offensive Iskander batteries from Ukrainian strike efforts. **Russia is overmatching and dominating Ukrainian missile defense and strike efforts**.

The Iskander is especially effective in its ability to evade missile defense systems with decoys and a maneuverable reentry vehicle (MaRV). The Iskander-M is a short-range ballistic missile that can be equipped with tactical nuclear weapons and became fully operational and integrated into the Russian military in 2006. With a range of 310 miles, the 9M723 ballistic missiles launched from Iskander batteries have the range to strike a multitude of targets throughout Europe and have been deployed in Kaliningrad since 2018. The Iskander-K, Russia’s cruise missile battery, is capable of delivering the short-range 9M728 missile, as well as the long-range 9M729 which has a range of up to 3,400 miles. **In addition to nuclear payloads, the Iskander can deliver missiles that deploy conventional payloads, cluster warheads, fuel-air explosives, bunker-busters, and electromagnetic pulse (EMP) effectors**.

This overmatch in Ukraine is indicative of the challenges that NATO faces more broadly. **Advanced air defense capabilities will be essential if NATO is to maintain control of the skies**. Bordering Ukraine are NATO allies Poland, Romania, Slovakia, and Hungary. Slovakia, who participates in the multinational ground-based air defense Tobruq Legacy exercises, fields the S300PMU long-range SAM system, the 2K12 Kub 2M tracking medium-range surface-to-air missile system, and several 9K38 Igla2s, a man-portable infrared homing surface-to-air missile system. While Slovakia recently purchased Israeli multi-mission radar (MMR), the same radar used for Israel’s Iron Dome missile defense system, the core of its air defense technology relies on systems designed decades ago by the Soviet Union and has limited capacity to defend against the advanced Russian missile threat. Hungary’s air defense capabilities are more advanced than Slovakia’s, especially following the 2020 purchase of the National Advanced Surface-to-Air Missile System-3 (NASAMS-3), yet full replacement of the Soviet-era 2K12 Kub 2M is not expected to be complete until 2025. Poland has made several purchases over the past decade to improve its aging air and missile defense systems that rely on S-200, SA-3 Goa, SA-6 Gainful, and SA-8 Gecko surface-to-air missiles systems. Poland is expected to begin receiving two Patriot PAC-3’s by 2022 and has recently agreed to work with the United Kingdom to develop a new Short-Range Air Defense system (SHORAD) codenamed, “Narew”. Poland is also home to the Aegis Ashore site #2, though it is behind the original European phased adaptive approach timeline and not operational at this time it was designed and deployed to defeat Iranian Ballistic Missiles from Iran. Romania possesses the SA-2Guideline, S-200, and MIM-23 Hawk air defense systems for short and medium-range air defense. Romania is also home to a US Aegis Ashore site that too is designed and deployed to defeat Iranian Ballistic Missiles from Iran and received its first of seven Patriot batteries in 2020.

**NATO’s commitment to the stability of Europe is being tested, called out, and demands cohesion and missile defense integration**. NATO-wide integrated missile defense systems on the border states of Ukraine will have to contain a Ukraine Missile war and ensure it will not spread to NATO.

**The United States and its allies must be 100 percent committed and prepared to unequivocally punish President Putin in response to a Russian invasion, utilizing severe economic and diplomatic tools to the maximum to ensure that Russia is completely ostracized from the international community**. Given NATO’s political inability to make a significant impact in the military realm in Ukraine, every NATO member has to unify to strengthen and exceed that punishment to Russia through every possible channel. This is the deterrent that will be measured by Russia and China for further expansion into Europe and takeover of Taiwan.​

#### Failure to deter either scenario goes nuclear – outweighs the turn

STACIE L. PETTYJOHN and BECCA WASSER ’22, \*is a senior fellow and director of the defense program at the Center for a New American Security., \*\*is a fellow in the defense program and co-lead of The Gaming Lab at the Center for a New American Security., “A Fight Over Taiwan Could Go Nuclear”, Foreign Affairs, 5/20/22, https://www.foreignaffairs.com/articles/china/2022-05-20/fight-over-taiwan-could-go-nuclear

Russia’s invasion of Ukraine has raised the specter of nuclear war, as Russian President Vladimir Putin has placed his nuclear forces at an elevated state of alert and has warned that any effort by outside parties to interfere in the war would result in “consequences you have never seen.” **Such saber-rattling has understandably made headlines and drawn notice in Washington**. **But if China attempted to forcibly invade Taiwan and the United States came to Taipei’s aid, the threat of escalation could outstrip even the current nerve-wracking situation in Europe**.

A recent war game, conducted by the Center for a New American Security in conjunction with the NBC program “Meet the Press,” demonstrated just how quickly such a conflict could escalate. The game posited a fictional crisis set in 2027, with the aim of examining how the United States and China might act under a certain set of conditions. The game demonstrated that China’s military modernization and expansion of its nuclear arsenal—not to mention the importance Beijing places on unification with Taiwan—mean that, in the real world, a fight between China and the United States could very well go nuclear.

**Beijing views Taiwan as a breakaway republic**. If the Chinese Communist Party decides to invade the island, its leaders may not be able to accept failure without seriously harming the regime’s legitimacy. **Thus, the CCP might be willing to take significant risks to ensure that the conflict ends on terms that it finds acceptable**. **That would mean convincing the United States and its allies that the costs of defending Taiwan are so high that it is not worth contesting the invasion**. While China has several ways to achieve that goal, **from Beijing’s perspective, using nuclear weapons may be the most effective means to keep the United States out of the conflict**.

GEARING FOR BATTLE

**China is several decades into transforming its People’s Liberation Army (PLA) into what the Chinese President Xi Jinping has called a “world-class military” that could defeat any third party that comes to Taiwan’s defense**. China’s warfighting strategy, known as “anti-access/area denial,” rests on being able to project conventional military power out several thousand miles in order to prevent the American military, in particular, from effectively countering a Chinese attack on Taiwan. **Meanwhile, a growing nuclear arsenal provides Beijing with coercive leverage as well as potentially new warfighting capabilities, which could increase the risks of war and escalation**.

China has historically possessed only a few hundred ground-based nuclear weapons. But last year, nuclear scholars at the James Martin Center for Nonproliferation Studies and the Federation of American Scientists identified three missile silo fields under construction in the Xinjiang region. The Financial Times reported that China might have carried out tests of hypersonic gliders as a part of an orbital bombardment system that could evade missile defenses and deliver nuclear weapons to targets in the continental United States. The U.S. Department of Defense projects that by 2030, China will have around 1,000 deliverable warheads—more than triple the number it currently possesses. Based on these projections, Chinese leaders may believe that as early as five years from now the PLA will have made enough conventional and nuclear gains that it could fight and win a war to unify with Taiwan.

Our recent war game—in which members of Congress, former government officials, and subject matter experts assumed the roles of senior national security decision makers in China and the United States—illustrated that a U.S.-Chinese war could escalate quickly. For one thing, it showed that both countries would face operational incentives to strike military forces on the other’s territory. In the game, such strikes were intended to be calibrated to avoid escalation; both sides tried to walk a fine line by attacking only military targets. But such attacks crossed red lines for both countries, and produced a tit-for-tat cycle of attacks that broadened the scope and intensity of the conflict.

For instance, in the simulation, China launched a preemptive attack against key U.S. bases in the Indo-Pacific region. The attacks targeted Guam, in particular, because it is a forward operating base critical to U.S. military operations in Asia, and because since it is a territory, and not a U.S. state, the Chinese team viewed striking it as less escalatory than attacking other possible targets. In response, the United States targeted Chinese military ships in ports and surrounding facilities, but refrained from other attacks on the Chinese mainland. Nevertheless, both sides perceived these strikes as attacks on their home territory, crossing an important threshold. Instead of mirror-imaging their own concerns about attacks on their territory, each side justified the initial blows as military necessities that were limited in nature and would be seen by the other as such. Responses to the initial strikes only escalated things further as the U.S. team responded to China’s moves by hitting targets in mainland China, and the Chinese team responded to Washington’s strikes by attacking sites in Hawaii.

A NEW ERA

**One particularly alarming finding from the war game is that China found it necessary to threaten to go nuclear from the start in order to ward off outside support for Taiwan**. **This threat was repeated throughout the game, particularly after mainland China had been attacked**. At times, efforts to erode Washington’s will so that it would back down from the fight received greater attention by the China team than the invasion of Taiwan itself. But China had difficulty convincing the United States that its nuclear threats were credible. In real life, China’s significant and recent changes to its nuclear posture and readiness may impact other nations’ views, as its nuclear threats may not be viewed as credible given its stated doctrine of no first use, its smaller but burgeoning nuclear arsenal, and lack of experience making nuclear threats. **This may push China to preemptively detonate a nuclear weapon to reinforce the credibility of its warning**.

**China might also resort to a demonstration of its nuclear might because of constraints on its long-range conventional strike capabilities**. Five years from now, the PLA still will have a very limited ability to launch conventional attacks beyond locations in the “second island chain” in the Pacific; namely, Guam and Palau. Unable to strike the U.S. homeland with conventional weapons, China would struggle to impose costs on the American people. Up until a certain point in the game, the U.S. team felt its larger nuclear arsenal was sufficient to deter escalation and did not fully appreciate the seriousness of China’s threats. As a result, China felt it needed to escalate significantly to send a message that the U.S. homeland could be at risk if Washington did not back down. Despite China’s stated “no-first use” nuclear policy, the war game resulted in Beijing detonating a nuclear weapon off the coast of Hawaii as a demonstration. The attack caused relatively little destruction, as the electromagnetic pulse only damaged the electronics of ships in the immediate vicinity but did not directly impact the U.S. state. The war game ended before the U.S. team could respond, but it is likely that the first use of a nuclear weapon since World War II would have provoked a response.

The most likely paths to nuclear escalation in a fight between the United States and China are different from those that were most likely during the Cold War. The Soviet Union and the United States feared a massive, bolt-from-the-blue nuclear attack, which would precipitate a full-scale strategic exchange. In a confrontation over Taiwan, however, Beijing could employ nuclear weapons in a more limited way to signal resolve or to improve its chances of winning on the battlefield. **It is unclear how a war would proceed after that kind of limited nuclear use and whether the United States could de-escalate the situation while still achieving its objectives**.

AN OUNCE OF PREVENTION

**The clear lesson from the war game is that the United States needs to strengthen its conventional capabilities in the Indo-Pacific to ensure that China never views an invasion of Taiwan as a prudent tactical move**. **To do so, the United States will need to commit to maintaining its conventional military superiority by expanding its stockpiles of long-range munitions and investing in undersea capabilities**. **Washington must also be able to conduct offensive operations inside the first and second island chains even while under attack.** This will require access to new bases to distribute U.S. forces, enhance their survivability, and ensure that they can effectively defend Taiwan in the face of China’s attacks.

Moreover, the United States needs to develop an integrated network of partners willing to contribute to Taiwan’s defense. **Allies are an asymmetric advantage: the United States has them, and China does not**. **The United States should deepen strategic and operational planning with key partners to send a strong signal of resolve to China**. As part of these planning efforts, the United States and its allies will need to develop war-winning military strategies that do not cross Chinese red-lines. The game highlighted just how difficult this task may be; what it did not highlight is the complexity of developing military strategies that integrate the strategic objectives and military capacities of multiple nations.

Moving forward, military planners in the United States and in Washington’s allies and partners must grapple with the fact that, in a conflict over Taiwan, China would consider all conventional and nuclear options to be on the table. **And the United States is running out of time to strengthen deterrence and keep China from believing an invasion of Taiwan could be successful**. The biggest risk is that Washington and its friends choose not to seize the moment and act: a year or two from now, it might already be too late.

## 2AC – AT: T – Biotechnology

### 2AC – AT: T – Biotechnology

#### Cognitive enhancements are core concerns of biotech – we’ll insert the tables/charts in this card too

Kewal K. Jain ’13, MD, FRACS, FFPM, Jain PharmaBiotech, Basel, Switzerland, “Applications of Biotechnology in Neurology”, Humana Press, January 2013, https://link.springer.com/content/pdf/10.1007/978-1-62703-272-8.pdf

**The term “neurobiotechnology” as used in this book refers to the application of biotechnologies in neurology**. Technologies have been applied in medicine and neurology throughout the history of medicine, e.g. electroconvulsive therapy. The broad term neurotechnology covers many of the devices used in neurosurgical procedures and the term “biomedical engineering” refers to the construction of devices such as operating microscopes and lasers as tools for surgery.

Biotechnology, which implies processing of materials by biological agents to provide goods and services, has been used since World War I and one example was brewing of beer. In the pharmaceutical industry, biotechnology has been used for application of biological organisms in industrial manufacture of de fined products which are mostly proteins. Introduction of term genetic engineering in 1932 opened the way for application of biotechnology in life sciences although practical tools used in modern molecular biology had been developed at that time. Synthesis of human insulin in 1978 started the field of biotechnology-based drugs as part of biopharmaceutical industry, which has expanded from a few drugs in the 1980s to 131 FDA-approved biotech (protein/peptide) drugs and 900 are in development including 44 for neurological disorders.

**Biotechnologies relevant to human health are shown in Table 1.1 and will be described in later chapters**. **Historical landmarks in the development of biotechnologies for human health are shown in Table 1.2** . Recombinant DNA is an important method that is used to make alterations to an organism’s genome, usually causing it to over- or under-express a certain gene of interest, or express a mutated form of it. The results of these experiments can provide information on that gene’s role in the organism’s body.

**[TABLE 1.1]**

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**Molecular Neurology**

The term “molecular neurology” has been increasingly used during the past decade as a further stage in the evolution of classical neurology, which was based on clinical features of neurological disorders supplemented with diagnostic imaging of the nervous system, eletrophysiological studies and neuropathology. Information obtained from application of new technologies to study of the nervous system has enabled elucidation of the pathomechanism of the disease as well as targeting therapy at molecular level. **Genetics, genomics and gene therapy are examples of some of the topics covered when dealing with diseases of the nervous system**. However, there has been no systematic description of the biotechnologies and their application in neurology.

**Molecular Neuroscience**

Molecular neuroscience is easier to de fine as a branch of neuroscience that examines the biology of the nervous system with molecular biology techniques. **Biotechnologies have been used for the study of basic neuroscienses such as molecular neurophysiology, molecular neuroanatomy, etc**. Detailed descriptions are given in several books that focus on methods and protocols used in neuroscience research, which is done predominantly in animal models. The focus of this book is on technologies that are relevant for clinical neurology. **Applications of biotechnologies that are relevant to clinical neurology along with relevant basic sciences will be described in the following chapters**.

**[TABLE 1.2]**

Text

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Relationships of Biotechnologies to Neurology

**Various relationships of biotechnologies to neurology are shown in Fig. 1.1** .

**[Fig. 1.1]**

Diagram

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### 1AR – AT: T – Biotechnology

#### Neurotechnology is just one of the biotechnical advancements of the Fourth Industrial Revolution

Klaus Schwab ’18, is founder and executive chairman of the World Economic Forum, “The Fourth Industrial Revolution”, Britannica, First Edited 5/25/18, https://www.britannica.com/topic/The-Fourth-Industrial-Revolution-2119734#ref1255192

Like the First Industrial Revolution’s steam-powered factories, the Second Industrial Revolution’s application of science to mass production and manufacturing, and the Third Industrial Revolution’s start into digitization, the Fourth Industrial Revolution’s technologies, such as artificial intelligence, genome editing, augmented reality, robotics, and 3-D printing, are rapidly changing the way humans create, exchange, and distribute value. As occurred in the previous revolutions, this will profoundly transform institutions, industries, and individuals. More importantly, this revolution will be guided by the choices that people make today: the world in 50 to 100 years from now will owe a lot of its character to how we think about, invest in, and deploy these powerful new technologies.

It’s important to appreciate that the Fourth Industrial Revolution involves a systemic change across many sectors and aspects of human life: the crosscutting impacts of emerging technologies are even more important than the exciting capabilities they represent. **Our ability to edit the building blocks of life has recently been massively expanded by low-cost gene sequencing and techniques such as CRISPR; artificial intelligence is augmenting processes and skill in every industry;** neurotechnology is making unprecedented strides in how we can use and influence the brain as the last frontier of human biology**; automation is disrupting century-old transport and manufacturing paradigms; and technologies such as blockchain and smart materials are redefining and blurring the boundary between the digital and physical worlds**.

#### Neurotechnologies are biological augmentations to the brain – that *is* biotechnology

Irene Jarchum ’19, Associate Editor of Nature Biotechnology, “Focus on neurotechnologies”, Nature Biotechnology, Vol. 37, 9/4/19, https://www.nature.com/articles/s41587-019-0261-5.pdf

Neurotechnologies have come far in just a few years, and we can expect them to provide new approaches to shed light on brain function and contribute novel therapeutic interventions. In basic neuroscience, a diversity of molecular approaches are enabling researchers to track and manipulate the activity of specific neuronal populations in the brain and peripheral nervous systems of freely moving mice, and single-cell ‘omics’ is allowing profound characterization of brain cells, which will provide a finer understanding of neuroanatomy and function in health and disease. In animal models, a range of exciting electrical, chemical and optical tools continue to emerge, serving as fundamental tools for neuroscientists and informing study design in humans (see Review by Frank et al.).

In the clinic, although surgical and small-molecule approaches traditionally have provided treatments for neurological and psychiatric disorders, these remain blunt therapeutic instruments, often accompanied by considerable side effects in return for limited efficacy. Today, electrode arrays allowing the recording and stimulation of neurons with a high degree of precision are being engineered to be flexible and soft, injected into deep-brain structures with a syringe, and connected to decoders and actuators. This is opening new opportunities for restoring lost function by allowing control of robotic arms in quadriplegia patients. Deep brain stimulation, meanwhile, is an effective treatment for common movement disorders, including Parkinson’s disease, but is not without side effects. Although next-generation electrodes provide spatial and temporal control, which could enable precise stimulation, an incomplete understanding of underlying disease processes prevents clinicians from taking advantage of these engineering feats (see Review by Cagnan et al.).

Insights into brain function are emerging from electrodes temporarily implanted into patients that report on electrical signals from the cortex. **Biocompatible tissue-like electronics report on brain function from deep structures and are poised to provide long-term readouts of brain activity as well as a therapeutic avenue for chronic disease** (see Perspective by Patel and Lieber).

A vast number of patients could benefit from precision therapies for psychiatric and neurological diseases, and an improved mechanistic understanding of brain connectivity and function is key to support their development and application (see Editorial). **Brain–computer interfaces best exemplify the type of strategies that are likely to become more broadly used in the coming years**—**implanted devices record brain signals, which are decoded using complex algorithms and translated into actions using prosthetics** (see News Feature by Smalley). Brain–machine interfaces have been successfully piloted in a couple of dozen individuals, and the field is pushing on towards safer and better systems (see Patent Table).

### 1AR – AT: T – Biotechnology – Human Enhancement/Performance Optimization

#### HPE/HPO of soldiers falls under biotechnology

Cdr Dr. Christian Haggenmiller ‘21, German Institute for Defence and Strategic Studies, “Human Performance Optimization and Enhancement”, Multinational Capability Development Campaign (MCDC), 3/22/21, https://gids-hamburg.de/wp-content/uploads/2021/04/2021-03-22\_MCDC\_HPEO\_Project\_Report\_final-1.pdf **\*HPE/HPO = Human Performance Enhancement/Optimization**

In the previous paragraphs the terms HPA, HPO, HPE, HPR and HPD were introduced and will now be summarized in short and concise definitions. Common to all terms is that they consider a change in a human’s performance in both the positive/increasing and negative/decreasing directions. The relation between defined terms is shown in the diagram in Error! Reference source not found. We have chosen the term Human Performance Modification as an umbrella term that includes all other terms. HPA covers both HPO and HPE, which are positive developments of performance, and therefore shown in green. HPR, which has no intersection with HPA, is also positive in performance development, and thus shown in green. HPD, however, does not intersect with the other terms and has negative performance development, hence represented by red color. • **Human Performance Modification: Active and passive change of an individual’s level of performance. While Human Performance Modification usually focuses on optimization and enhancement, we include both Human Performance Degradation and Human Performance Restoration**. • **Human Performance Augmentation: HPA is the application of science and technologies to temporarily or permanently improve human performance**. This field can be further divided into Human Performance Optimization and Human Performance Enhancement. • **Human Performance Optimization: The process of applying existing and emerging science and technology to individuals allowing them to reach their biological potential**. • **Human Performance Enhancement: The process of applying existing and emerging science and technology to individuals allowing them to exceed the biological potential of the individual**. • Human Performance Restoration. Return to baseline when performance has degraded below baseline. The focus here is on restoration from degradation caused by illness, injury, exhaustion, side effects, violence, or coercion. • Human Performance Degradation. Decrease in performance below previous levels resulting from four principal sources. It can be explained by factors such as reduced biophysical skills or capacity through [1] fatigue, exhaustion; [2] diseases, injuries; [3]system safety issues, degraded system functionality of prior optimization or enhancement; or [4] actions by hostile externally based technologies, platforms or systems. The possible process to achieve HPA relies on interventions such as adapted training, appropriate diets, pharmacology, implants, prostheses, and genetic modifications. Use of equipment, even if it is not intrusive in the body, may require a cognitive modification. Hence, some nations may consider that equipment is part of HPA while others may consider equipment as out of scope. The view in this note is that equipment is closely linked to the body and thus part of HPM. In the course of an individual’s life, values such as the current physiological performance level (baseline) or the biological potential change, sometimes considerably. Figure 2 shows a standardized representation of lifetime in which the definitions of the different performance types have been inserted. We recognize that group or unit performance relies not only on the individual reaching the minimal standard needed for task performance but also on appropriate assessment and selection of the individual for the task and engaged leadership. How this can be applied in the military context will be discussed in chapter 11 – HPM Assessment of Future Scenarios.

## 2AC – AT: T – Security Cooperation

### 2AC – AT: T – Security Cooperation

#### All of the aff’s actions fall under security cooperation – they are all actions geared towards increasing effectiveness of the alliance

The Joint Chiefs of Staff JCS ’17, is the body of the most senior uniformed leaders within the United States Department of Defense, that advises the president of the United States, the secretary of defense, the Homeland Security Council and the National Security Council on military matters, “Security Cooperation”, Joint Publication 3-20, 5/23/17, https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3\_20\_20172305.pdf

The basic nature of war has not changed, but the character of conflict has evolved to include increasingly transregional, multi-domain, and multi-functional (TMM) threats. **Security cooperation (SC) activities are as likely to be conducted as an element of contingency operations as they are in a combatant command’s (CCMD’s) daily operations.** TMM challenges will cut across multiple CCMDs, across land, maritime, air, space, and cyberspace. The strategic environment is fluid, with changing alliances, partnerships, and national and transnational threats that rapidly emerge, disaggregate, and reemerge. These factors will demand efficient planning efforts and the sound application of intelligence in concert with the other joint functions to address the uncertainty and ambiguity of future strategic and operational environments (OEs) and will significantly affect how the joint force conducts SC. SC strengthens and expands the existing network of US allies and partners, which improves the overall warfighting effectiveness of the joint force and enables more effective multinational operations.

a. **SC provides ways and means to help achieve national security and foreign policy objectives**. Department of Defense (DOD) strategic guidance emphasizes the importance of defense relationships with allies and partner nations (PNs) to advance national security objectives, promote stability, prevent conflicts, and reduce the risk of having to employ US military forces in a conflict. **SC activities, many of which are shaping activities within the geographic combatant commanders’** (GCCs’) **theater campaign plans** (TCPs), **are deemed essential to achieving national security and foreign policy objectives**. Accordingly, **Department of Defense Directive (DODD) 5132.03, DOD Policy and Responsibilities Relating to Security Cooperation,** requires SC activities to be planned, programmed, budgeted, and executed with the same high degree of attention and efficiency as other DOD activities.

b. SC encompasses all DOD interactions, programs, and activities with foreign security forces (FSF) and their institutions to build relationships that help promote US interests; enable PNs to provide the US access to territory, infrastructure, information, and resources; and/or to build and apply their capacity and capabilities consistent with US defense objectives. **It includes, but is not limited to, military engagements with foreign defense and security establishments** (including those governmental organizations that primarily perform disaster or emergency response functions), **DOD-administered security assistance (SA) programs,** combined exercises, international armaments cooperation, and information sharing and collaboration. Rather than a hierarchical relationship, SC, in its numerous forms, has an overarching functional relationship with all other associated programs, activities, and operations.

c. SC activities are the products of strategic guidance and certain PN requirements determined through collaboration among the combatant commanders (CCDRs), their components, the Military Departments (MILDEPs), and applicable chiefs of missions (COMs). **The Under Secretary of Defense for Policy (USD[P]) disseminates the Secretary of Defense’s** (SecDef’s) **SC guidance, which has been coordinated with the Department of State** (**DOS**). **USD(P) also leads the review of GCCs’ TCPs, including their countryspecific security cooperation sections** (CSCSs)/**country plans, to ensure that they are aligned with policy, objectives, and priorities, and are resource-informed**. SC programs and activities are integrated into the TCPs and executed through the CCMDs, Services/special operations forces (SOF), and the security cooperation organizations (SCOs), and with the Defense Security Cooperation Agency (DSCA) providing certain management, accounting expertise, and delegated oversight. SC activities are coordinated with DOS and other applicable interagency partners at the department level and through their country team members. SC planning is discussed in detail in Chapter III, “Security Cooperation Planning.”

2. Security Cooperation Purposes

a. As summarized above, SC helps develop partnerships that encourage and enable PNs to act in support of aligned US strategic objectives. SC activities often complement other United States Government (USG) foreign assistance to provide stability, help mitigate drivers of conflict, and assure key partners and allies. **Effective execution of SC enables PNs to carry out missions in lieu of, or alongside, US forces**. Additionally, SC supports US military campaign and contingency plans with necessary access, critical infrastructure, and PN support; and enables the achievement of strategic objectives, such as deterring adversaries, preventing conflict, and enhancing the stability and security of PNs. **SC also benefits the US military through theater and sociocultural orientation that improves readiness for training and advising FSF**.

b. SC resource investments in programs and activities are driven by scoped and prioritized campaign objectives and guidance in SecDef’s Guidance for Employment of the Force (GEF), the Joint Strategic Campaign Plan (JSCP), and certain objectives in each COM integrated country strategy (ICS). Those objectives are consolidated in the TCP and the CSCSs/country plans nested within the TCP. The TCP and CSCSs/country plans implement that strategic guidance and articulate the desired PN roles in one or more of three categories.

(1) Apply Capacity and Capabilities. **As our national policy acknowledges, the US will rarely conduct unilateral military operations**. Capability refers to the PN’s ability to execute a given task while capacity refers to the PN’s ability to self-sustain and selfreplicate a given capability. Building partner capacity and capabilities through SC requires a long-term mutual commitment to improve PN capacity and capabilities in support of US strategic objectives. For example, the PN:

(a) Joins a US-backed multinational force. (b) Deploys a peacekeeping force to support a United Nations (UN) or another international organization mission. (c) Builds counterterrorism (CT) capacity to counter local and transnational terrorist networks. (d) Conducts personnel recovery (PR) or foreign disaster relief (FDR) with regional neighbors to include chemical, biological, radiological, and nuclear (CBRN) incident response activities. (e) Counters the ability of transnational criminal organizations and their associated networks to conduct illicit activities through the country. (f) Pursues mutually beneficial objectives and/or increased interoperability with the US and multinational forces (e.g., increase capacity for ballistic missile defense, develop undersea warfare capability, or expand irregular warfare capabilities). (g) Supports US countering weapons of mass destruction (CWMD) efforts.

(2) Provide Access. National security requires the US to maintain operational access across the globe. Operational access promotes flexibility in the US defense posture, provides freedom of movement, and supports freedom of action during military operations. Access also facilitates other means of support to include information/intelligence sharing and technology. SC activities promote the PN’s willingness to provide various types of military access that supports US strategic requirements in a theater. **For example, the PN**:

(a) Provides a forward basing agreement, including access, permissions, and overflight to sovereign territory, airspace, territorial waters, bases, and facilities (e.g., a secure port or airfield) to include enabling host nation (HN) reception and onward movement distribution processes. (b) **Shares information on internal security challenges**. (c) Provides permission for entry of US forces through a defense cooperation agreement, diplomatic note, or status of forces agreement with USG. (d) **Shares resources and technology via DOD international armaments cooperation programs**. (e) **Supplies intelligence in support of US intelligence requirements**. (f) **Provides access to a training facility for US military forces**. (g) Coordinates the use of HN electrical power, fuels, and other sources of energy in support of US SC activities and joint operations. (h) Signs an acquisition and cross-servicing agreement (ACSA) to enable logistics process integration and interoperability.

### 1AR – AT: T – Security Cooperation – Interoperability

#### Interoperability is not just employment of new tech into training operations – it spans the whole production process

Cdr Dr. Christian Haggenmiller ‘21, German Institute for Defence and Strategic Studies, “Human Performance Optimization and Enhancement”, Multinational Capability Development Campaign (MCDC), 3/22/21, https://gids-hamburg.de/wp-content/uploads/2021/04/2021-03-22\_MCDC\_HPEO\_Project\_Report\_final-1.pdf **\*HPE/HPO = Human Performance Enhancement/Optimization**

The nature of HPA may entail clear risk of silo effect with respect to technological development and operational use. **One purpose of the MCDC collaboration is to work for interoperability, which means, among other things, developing common concepts**. **Interoperability does not manifest by itself; on the contrary, targeted activities are needed on several levels**. Figure 4 illustrates in a nutshell how national and international activities take place in parallel as the technology readiness level increases. Each step up in the pyramid requires an active measure to maintain the opportunity for interoperability at the next level. The interoperability concept with respect to human augmentation relies on recognition of the content associated with each step and definition of activities that must take place. **This involves anything from making an inventory of where we are technically, where our interest and focus lie, as well as recognizing differences in use, legislation, and acceptance between nations**. Although Figure 4 is based on a bottom up perspective, the outcome does not end with utilization. In practicality, both utilization and threat generate need for further development and the sequence starts all over. In the context of HPA, there are many different opportunities and possible directions for interoperability. Starting at the lowest level and working the way upwards: • Questions for the first level are “what is the next thing and what should we concentrate on?”. The lowest level pertains to common understanding based on shared knowledge and assessments of emerging technologies and future potential for HPA utilization. The effort is facilitated by established common definitions such as stated in section 3 of this note. • The second level deals with those “hard” requirements that are a prerequisite for realization of interoperability and have to be built into the systems. Typically, this level stresses the need for common interfaces that enable compatibility, such as physical and electrical standards. This need has been addressed by multiple NATO efforts, EDA and other initiatives. For instance, specific programs have been looking at standardization of soldier systems (STASS, GOSSRA) which has many parallels to the wearables that are in discussion for HPA. Standards and recommendations developed within MCDC could support interoperability. • The third level focuses on “how to do things”. For instance, the versatility in MCDC participating organizations and defense forces with respect to materiel, education and training means that it is difficult to compare results and experiences. The goal is to identify common metrics and tools for assessment of augmentation effect. Part of that is to share methods and work towards building a larger common body of knowledge. • The highest level deals with “how well does it actually work and what are the issues?”. At this stage, there are experiences from operational usage and the goal is to share lessons learned and define best practices. **Interoperability on this level depends on established agreements and policies between the participating organizations**. This project has initiated work aimed at identifying the various forms of interoperability that apply to HPA development and use. An important part of the continuing effort is to determine the level of ambition per technology area and application. There is also a need for a way to manage and administer the body of knowledge that is being built up over time.

#### Interoperability over HPE/HPO is a form of biotechnical collaboration

Cdr Dr. Christian Haggenmiller ‘21, German Institute for Defence and Strategic Studies, “Human Performance Optimization and Enhancement”, Multinational Capability Development Campaign (MCDC), 3/22/21, https://gids-hamburg.de/wp-content/uploads/2021/04/2021-03-22\_MCDC\_HPEO\_Project\_Report\_final-1.pdf **\*HPE/HPO = Human Performance Enhancement/Optimization**

Optimization programs follow a holistic approach which includes body, mind, social, and ethical performance. Successful HPO programs depend on many factors, including biological, physical, psychological, cultural, and social ones, all of which interact. Well-planned HPO programs will give service personnel knowledge, skills, and access to emerging technologies to improve and preserve the capabilities needed to execute mission essential tasks. **A personalized approach to performance optimization should be emphasized when improving enhanced operational readiness of soldiers**. There is a wide range of programs with major focus on HPO, although some HPE programs are being established. Unfortunately, information on these projects was not available or detailed enough to draw conclusion about the “must have capabilities”. It is assumed that many programs contain sensible information, which prevent them from being shared in the large MCDC community. Most technologies in use (fielded) can be found in the HPO realm, while HPE technologies are still immature or restricted in use. The technologies described will find applications in different areas where the timeframe for realization will depend on numerous factors. For instance, the expectation is that the largest potential will be found in a combination of techniques. Although biological and genetic engineering are not part of current military programs, there should be awareness of new aspects and developments. We nee d to understand what may be feasible in the future. Programs with focus on wearable biosensors and physiological status monitoring are already part of many research projects run by the various participators in MCDC. The analysis of collected biodata is both a data quality problem and a big data problem that today requires bespoke systems. Further development is warranted to find sensor (monitoring) systems that are sufficient for military requirements in the field with respect to signal transduction, artefacts, built-in quality assessment, and security. The history part of this note touched on the detrimental consequences that can arise when interventions are used in an improper manner. At the same time, it is important to seize the potential of already present as well as emerging remedies. Thus, effects and side effects of performance enhancing drugs must be studied to get the answers to the questions what, when and how much/long stimulants can be used to enhance service personnel performance without harming the individual. Interoperability relies on common understanding and standards, information flow, interaction principles, strategies, system safety and logistics – aspects that are necessary for efficient collaboration. For example, different views and legislation regarding the use of potent drugs may generate an interoperability issue. **It is therefore necessary to use and develop concepts that are inclusive but at the same time as diverse as deemed necessary**. According to our survey, there are no multinational initiatives that aim to increase the interoperability of combined or joint operations. **Instead, the focus clearly is on isolated individual/small units**.

### 1AR – AT: T – Security Cooperation – Soldier Enhancement Definitions

#### Soldier enhancements range from strengthening skills to tech implants to genetic modification to improving equipment used

Gérard de Boisboissel ‘19, Research Engineer at CREC Saint-Cyr., “DEFINITION AND CHARACTERIZATION OF SOLDIER PERFORMANCE ENHANCEMENT”, Enhancing soldiers A EUROPEAN ETHICAL APPROACH Enriched proceedings of the international symposium held on October 16, 2019 in Paris, <https://www.euroisme.eu/images/Documents/OtherPublications/Le-soldat-augmente-19-06-2020-web-VFinal.pdf> \*edited for gendered language

IN its book published with the Revue Défense Nationale at the end of 2017, still accessible online under the link http://www.defnat.com/e-RDN/ cahiers-de-la-RDN.php, the CREC Saint-Cyr gives us a definition of the enhancement of the combatant under the terms: “Enhancing a soldier is the action of rendering him/her [them] more efficient during military operations by strengthening or optimizing intellectual skills (mental, psychological, cognitive to assist in decision making help or perception) and/or physical abilities (to last), or by letting the soldier acquire new ones (like seeing at night); • **Using technological equipment worn by the soldier to enhance performance**; • Using non-therapeutic substances or using static dynamic implants (nanomaterials, prostheses) or applying suitable gene therapeutic treatment; • For short or long-term use that can even be irreversible provided its effects are controlled. **By efficiency we mean operational efficiency. In other words, an individual’s capacity to achieve results in fulfilling a mission. This definition is intentionally broad in scope and unrestrictive to encompass enhanced performance derived from different techniques**.”1

#### Soldier enhancements are focused on improving military effectiveness

Gérard de Boisboissel ‘19, Research Engineer at CREC Saint-Cyr., “DEFINITION AND CHARACTERIZATION OF SOLDIER PERFORMANCE ENHANCEMENT”, Enhancing soldiers A EUROPEAN ETHICAL APPROACH Enriched proceedings of the international symposium held on October 16, 2019 in Paris, <https://www.euroisme.eu/images/Documents/OtherPublications/Le-soldat-augmente-19-06-2020-web-VFinal.pdf> \*edited for gendered language

The purpose of the enhancements, as we, the CREC Saint-Cyr, have circumscribed them, is first and foremost one of military effectiveness. They focus on the fighter’s abilities and performance. In the end, they must make it possible for the latter to: 1. A better efficiency in his combatant function as indicated above. 2. To remain alert, to resist sleep, to resist fatigue and stress, i.e. to last physically and mentally. 3. To return to normal after a period of aggression or intense activity of the body. 4. To give oneself courage. 5. A decision aid, or a better acuity in decision making, to avoid errors of choice in complex environments or situations. 6. **Even better associating the soldier with** ~~his~~ **[their] weapon system, such as with brain control, or by using neurofeedback techniques**2 **allowing the control of** ~~his~~ **brain activity**. **Who are the enhancements for? They are intended**: a) first and foremost for each combatant to remain operational, to reduce danger, to improve and then to maintain over time his reflexes and automatisms as a combatant in order to survive; b) for the basic combat unit that is the group, so that it carries out its mission and does not endanger others (avoid deterioration of collective know-how, maintain the pace of the manoeuvre, remain attentive to the requirement for internal liaison); c) for the leader, to enable [them] ~~him or her~~ to discern in complexity (i.e. to deploy genuine situational intelligence); to decide in uncertainty (i.e. to have a real strength of character enabling ~~him or her~~ to accept calculated risks); and also to act in adversity (to federate energies, encourage collective action and decide in conscience), these three axes forming the three major pedagogical axes of the training of cadets of Saint-Cyr Military Academy.

## 2AC – AT: CPs

### 2AC – DOD Key – Top Level

#### The DoD’s expertise and government oversight are key to combating national security threats affecting biotechnology.

Carlson ’21 [Rob; managing director at Bioeconomy Capital, an early-stage venture capital firm; 9-14-2021; "Beyond Biological Defense: Maintaining the U.S. Biotechnology Advantage"; War on the Rocks; https://warontherocks.com/2021/09/beyond-biological-defense-maintaining-the-u-s-biotechnology-advantage/; Accessed 6-23-2022; RL]

Stephanie Rogers, the Defense Department’s acting principal director for biotechnology, recently declared that “the nation that leads the world in biotechnology will accrue enduring economic, societal, and defense gains.” Unfortunately, this awareness has yet to be reflected in government policy. Biotechnology security is national security — for the United States and for China. The Department of Defense should recognize biotechnology’s role as a foundational technology and make biotechnology development and supply chain security a priority.

Maintaining America’s Biotechnology Advantage

Biotechnology in the United States is a significant contributor to the economy. By one estimate, in 2017, U.S. biotechnology revenues exceeded $400 billion, or 2 percent of gross domestic product, substantially surpassing better-measured sectors such as mining. Bioeconomy revenues have grown at an average rate of 10 percent annually for two decades. Notably, U.S. biotechnology revenues alone were approximately equal to worldwide semiconductor revenues for 2017. Biotechnology now supplies critical medicines, and, as more than 90 percent of the corn and soy grown in the United States is genetically modified, biotechnology feeds the armed forces. Industrial biotechnology is responsible for upward of 20 percent of chemicals produced in the United States, suggesting a similar proportion of chemicals used in the military are also biologically derived. And these impressive figures may still be significant underestimates: Using a different methodology, the U.S. National Academy of Sciences recently concluded that the biotechnology industry contributes 5 to 7 percent of U.S. gross domestic product. Biotechnology, therefore, may already constitute an even larger share of the military supply chain.

As biotechnology continues to mature, its contribution to physical and economic security will become even more significant. Tools are now being deployed that enable the engineering and biomanufacturing of materials that will eventually not only displace petrochemicals but also surpass them in production scale and performance. Over the next ten to twenty years, biological production could soon supply up to 60 percent of physical inputs across the global economy, and biotechnology could have a “direct economic impact of up to $4 trillion a year.”

While the United States is arguably still leading in biotechnology, it risks losing this lead to China. In China, biotechnology is a national development and a security matter. China’s Innovation Driven Development Strategy emphasizes biotechnology’s essential role in the country’s economic development, while the Military-Civil Fusion Development Strategy seeks to ensure that biotechnology research is also oriented toward the country’s military and broader security goals. Chinese biotechnology revenues are reported to be of a similar size to those in the United States, although they are subject to even lesser clarity in reporting.

While China continues its licit and illicit acquisition efforts targeting the U.S. biotechnology sector, it is also shifting its attention to domestic innovation. In time, this will provide the People’s Liberation Army with new capabilities and increase both America’s and the Pentagon’s reliance on Chinese biotechnology products.

Recommendations

As early as 1958, the Department of Commerce was tracking the economic contribution of semiconductors, even though they made up less than 0.1 percent of the gross domestic product. Yet, today, the U.S. government has made no equivalent effort to track the much more significant role of biotechnology.

This ~~illiteracy~~ [lack of tracking] is a national security issue. American and Chinese bioeconomies are in competition, and Beijing asserts that it is investing with the intent to take, and to then maintain, the lead. To sustain America’s advantage, the U.S. Department of Defense should better understand its reliance on biotechnology and increase investment in it accordingly. The Pentagon’s recent investment in the BioIndustrial Manufacturing and Design Ecosystem is a notable step in the right direction. However, the seven-year budget for this project is approximately the cost of a single F-35A. For an investment that could impact the entire defense supply chain, this is inadequate.

We recommend the following plan of action for the Department of Defense to take its place alongside the Departments of Commerce and State in the broader interagency effort to secure America’s biotechnology advantage.

First, in close coordination with the Department of Commerce, the Department of Defense should make a systematic effort to better understand the role of biotechnology in the economy, supply chains, and manufacturing. This, in turn, should inform additional oversight and regulatory controls.

The responsibility to understand, prepare for, and respond to biotechnology threats is balkanized, spread across at least nine departments and agencies. Vulnerabilities in the bioeconomy will affect the Department of Defense in terms of readiness, soldier health, and the ability to fulfill missions. Addressing those vulnerabilities begins with a sustained, comprehensive effort to understand the role of biotechnology in industry today, as well as how that industry contributes to defense supply chains, and how military acquisition policy shapes biotechnology. To that end, the Pentagon should work with the Department of Commerce to create domestic reporting codes for biotechnology revenues and employment for the quarterly and annual economic census, and further incorporate those codes into the North American Industrial Classification System. Institutionalizing the gathering of these data is the first step toward sustainable policymaking and rational spending.

The Department of Commerce should then consider adding import/export controls on biotechnology, while avoiding overly broad restrictions that suffocate innovation. Protecting foundational technologies using the Foreign Investment Risk Review Modernization Act and Export Control Reform Act will be critical for securing biotechnology. However, biotechnology competition is not exclusive to commercial activities. The Pentagon should assess critical vulnerabilities and dependencies to assist the other agencies in bringing China’s foreign biotechnology access in line with standards in other major markets.

The Department of Defense has been asked to document and secure supply chains critical to defense applications and to the overall U.S. economy. This should also apply to biotechnology. Current Pentagon efforts to expand domestic biological manufacturing capabilities are an important start, but a broader effort is needed. An empowered deputy national security adviser could help oversee the relationship between the Pentagon and the National Economic Council to promote and secure the military’s broader technology needs.

Second, the Department of Defense should better study the accomplishments and intent of China, especially the Chinese military, in developing biotechnology as a strategic technology.

Once the Department of Defense better understands critical U.S. biotechnology dependencies on China, it can begin the work of reducing them. This requires an interagency examination to identify cross-cutting resources, develop mitigation strategies, formulate best practices to bolster innovation, and expand outreach to allies and partners to reduce systemic gaps China could exploit. Partnership with industry and allies will allow the U.S. government to understand and counter Beijing’s efforts to distort commercial activity in its favor.

To this end, the Department of Defense should mirror the National Security Council’s effort by creating an emerging technology portfolio within Office of the Under Secretary of Defense-Policy. While other technology offices in the Department of Defense are internally focused, an entity in this office that concentrates externally on foundational technology competition is required. Such an office may be able to address uncertainties in assessments of Chinese biotechnology revenues and capabilities.

Finally, in coordination with the Department of State, the Department of Defense should identify opportunities for dialogue with the People’s Liberation Army about biotechnology-related security issues.

It is time to include biotechnology in the dialogue mechanisms that compose bilateral U.S. defense relations with the People’s Liberation Army. This dialogue should prioritize the ethics of biotechnology in the context of future conflicts, the escalatory risks this technology creates, and the possibility of cooperation where the interests of the two nations intersect. Both sides should work toward a common understanding related to ethics, policies, and standards when operationalizing biotechnology. This will help avoid miscalculation and promote strategic stability.

Unlike the U.S. government, Chinese leadership has a carefully considered position on the importance of biosafety and “biological problems” in national security. While these problems are understood to encompass traditional weapons concerns, they also extend to the health of the entire natural world in the context of ever-expanding applications of biotechnology. This position might provide an opportunity for constructive engagement at a time when tensions are rising.

Conclusion

The Pentagon needs to expand its approach to biotechnology beyond biodefense. If China maintains biological warfare aspirations, by all means address those. But defense planners should also address China’s broader approach to biotechnology and its integrated approach to civil-military fusion.

Securing biotechnology secures the nation. Maintaining the U.S. lead in biotechnology is critical to the nation’s economic and military resilience in war, peace, and the gray zone short of conflict. This requires better biotechnology collaboration — within the U.S. government, with allies and partners, and even, where possible, with competitors.

#### The DoD’s access to and standards on critical resources make it a leader in global biotechnology supply chains.

Dieuliis et al. ’20 [Diane; PhD, Senior Research Fellow; Patrick Terrell; Deputy Director, both at the National Defense University, US Department of Defense Fort Lesley J. McNair; Peter Emanuel; PhD, Senior Research Scientist for Bioengineering Combat Capabilities Development, Command Chemical Biological Center, US Department of Defense, US Army; 4-17-2020; "Breaching the Department of Defense's Biotech Bottleneck"; Health Security; https://www.liebertpub.com/doi/abs/10.1089/hs.2019.0150; Accessed 6-23-2022; RL]

Unlike a commercial company or an academic research hub, the DoD is motivated by a mission to project power on a global scale. Its obligations to maintain a warfighting force structure, to protect its military industrial infrastructure, and to sustain a persistent situational awareness of global events carries with it unique motivators and priorities. Few would argue that the converging fields of artificial intelligence, automation, and synthetic biology are creating opportunities that will fundamentally change the battlefield of the future. The convergence of these fields is creating what has been termed the fourth industrial revolution— namely, the biological revolution. In order for the United States to harness the value proposition offered by the fourth industrial revolution, it needs to resolve 2 challenges: ensuring a reliable, robust, and secure domestic supply of materials and goods, and addressing the inherent incompatibility between traditional DoD acquisition processes and the commercial biotechnology landscape.

Supply of Materials

Historically, the United States has been a leader in advances in the biological sciences, and the ability to meaningfully engineer biology is driving rapid innovation in biotechnology and growing a robust industrial US bioeconomy. Other countries are aggressively investing in similar capabilities, with the goal of dominating this fourth industrial revolution. Maintaining competitiveness and ensuring the security of the domestic bioeconomy is thus vital to maintaining the economic health of the United States. As well, the bioeconomy has important implications for the US defense industrial base, which has been steadily declining in recent decades.10 The 2017 National Security Strategy delineates the importance of a stable and reliable industrial supply chain: A healthy defense industrial base is a critical element of U.S. power and the National Security Innovation Base. The ability of the military to surge in response to an emergency depends on our Nation’s ability to produce needed parts and systems, healthy and secure supply chains, and a skilled U.S. workforce.11 In response, the White House issued Presidential Executive Order 13806 on ‘‘Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States.’’12 Last year, a report in response to the executive order13 highlighted specific concerns that were echoed by the Pentagon’s own annual study of domestic defense capabilities, which stated, ‘‘long-term trends continue to threaten the health of the industrial base, limit innovation, and reduce U.S. competitiveness in the global markets.’’14

These studies emphasize the current reality that construction and resupply of many fielded defense systems are vulnerable to sole source suppliers in Asia and Europe, and existing domestic suppliers are fragile or nonexistent. Defense leadership must accept that biomanufacturing represents an untapped and affordable alternative to bolster domestic capacity. Today’s technology can minimize reliance on expensive petrochemical production and provide a flexible bio-based alternative if the defense enterprise can mobilize to invest in and craft the proper coalitions. Creation of reliable, robust, and secure domestic supply chains could be supported in a number of ways.

The DoD should continue with efforts to establish a Manufacturing Innovation Institute under the MANTECH office in the Office of the Secretary of Defense (OSD). This effort is the cornerstone of the associate director for biotechnology and is part of an overall modernization strategy to build a defense biotechnology ecosystem. That biotechnology ecosystem will focus on pursuing breakthrough technical capabilities, building a domestic core capacity, securing the related data as a strategic operational resource, and shaping a biotechnology-capable manufacturing and acquisition process.

Through the efforts of the Office of the Deputy Assistant Secretary of Defense for Industrial Policy, which seeks to ensure secure, resilient, and innovative industrial capabilities on which the DoD can rely in an era of great power competition, the DoD is bolstering efforts to ensure the secure supply of critical chemicals used in DoD systems. A focused effort from this office to use authorities granted to it under its Title III program would contribute to sustaining defense bioeconomy initiatives and support policy outlined in Executive Order 13806, 2019 NDAA language, and upcoming legislation.15

The DoD should continue its support for the development of standards and measurement tools to break bottlenecks in scale-up production and commercialization. These areas have become prominent risks for advancement of the US bioeconomy.16 Standards and measurements are necessary components of approaches and best practices that lead to the consolidation of successful industry platforms that can perform at scale. Not only are standards required for the physical cellular components of the scale-up process, but standard ways of depicting and describing engineered constructs in computational language are needed; just as a common language is used to represent electronic circuits, a similar standard will need to be developed for engineered biological circuits. The DoD is already taking a lead on the potential development of manufacturing standards,17 which will go far to advancing the US bioeconomy writ large—namely, reducing the risk taken on by industry.

Finally, serious vulnerabilities regarding the security of the US bioeconomy exist in the area of protecting innovations and securing supply chains from adversaries such as China. Not only were these issues highlighted in the White House report, but they have also been demonstrated, from the level of academic research misconduct,18 through industrial espionage.19 Through the DoD contractor certification process, best practices should be developed by the US bioeconomic industrial base—not only to ensure secure supply chains, but also to ensure secure intellectual property and corporate surety protections on many levels (financial, physical, cyber, and personnel/insider threats).

### 2AC – DOD Key – Biotech Weapon Oversight

#### DoD oversees biotech weapon advancement

DiEuliis et al 19 (January 1st, 2019 | Diane DiEuliis, Andrew D. Ellington, Gigi Kwik Gronvall, Michael J. Imperiale | “Does biotechnology pose new catastrophic risks?” | <https://jhu.pure.elsevier.com/en/publications/does-biotechnology-pose-new-catastrophic-risks> | DOA: 6/22/2022 | SAoki)

Biodefense and Synthetic Biology In 2016, the Department of Defense, in conjunction with other agencies charged with protecting the USA against attack, commissioned a study from the NASEM to advise them on the vulnerabilities posed by advances in biotechnology. The study report was published in May 2018 (National Academies of Sciences, Engineering, and Medicine 2018). DoD asked the committee to develop a framework to guide an assessment of the security concerns related to advances in synthetic biology, to assess the levels of concern warranted for such advances, and to identify options that could help mitigate those concerns (National Academies of Sciences, Engineering, and Medicine 2018). The framework developed by the committee is a qualitative tool that posits four major factors to consider in assessing any given threat: (1) ease of use of the technology; (2) capability of actors; (3) potential to weaponize; and (4) mitigation capabilities. For each attribute, a series of considerations and questions were presented to assist in the analysis. The three main conclusions of the National Academies study may be summarized as follows: (1) Synthetic biology expands what is possible for misuse, and biotechnology is advancing rapidly; (2) some malicious applications may not seem possible now, but are only limited by specific technical bottlenecks and barriers, which could be overcome with further biotechnology progress; and (3) the framework described in the report is a useful tool for analyzing and prioritizing potential biosecurity concerns, particularly in the light of new biotechnology advances which may raise biosecurity concerns. The committee applied its framework to twelve potential concerning capabilities that it deemed to be enabled by synthetic biology tools—e.g., making a known virus more virulent, disrupting the human immune system, making a known pathogenic bacteria from synthesized components, or creating an entirely novel pathogen. For each, the committee assessed the four factors regarding the ease of use of the technology, the capability of actors, the potential to weaponize, and potential for mitigation capabilities as they relate to those capabilities, and determined how each of the capabilities ranked relative to each other with respect to how much concern the committee had. Rather than attempting to predict when new capabilities might come about, which would make the report a static document which would be immediately outdated, the committee noted a series of bottlenecks and barriers that exist currently. The committee explained how types of advances in technology and/or knowledge might allow those bottlenecks and barriers to be overcome, which would increase the likelihood of a potential threat. The committee suggested that DoD, the sponsor of the study, as well as other organizations responsible for biodefense, should monitor advances in the field with an eye toward these advances that directly affect the bottlenecks and barriers, as those could allow new types of threats for which defenses would need to be prepared. Does Biotechnology Pose New Catastrophic Risks? 109 The following sections focus on a handful of capabilities which are similar or identical to those included in the NASEM study, relating them more generally to global catastrophic risk.

#### Synthetic biotech lacks necessary framework for key regulating steps against dual-use---competition creates unique ground that necessitates DOD strategy

DiEuliis 19 (Diane DiEuliis | a Senior Research fellow at National Defense University. Her research areas focus on emerging biological technologies, biodefense, and preparedness for biothreats. Specific topic areas under this broad research portfolio include dual-use life sciences research, synthetic biology, the US bioeconomy, disaster recovery, and behavioral, cognitive, and social science as it relates to important aspects of deterrence. Dr. DiEuliis currently has several research grants in progress, and teaches in foundational professional military education. | “Key National Security Questions for the Future of Synthetic Biology” | <https://www.jstor.org/stable/45289832> | DOA: 6/23/2022 | SAoki)

BIO-INSPIRED DEFENSE APPLICATIONS: IN SEARCH OF STRATEGY AND SECURITY Over the last several years, the DOD has tried to create nimbler ways of acquiring emerging technologies - not only to address mission needs, but also to keep pace and maintain parity with our adversaries worldwide. To enable rapid funding and attract innovators not traditionally engaged with DOD challenges, the Defense Innovation Unit (DIU)26 was created in Silicon Valley, with a second innovation hub created specifically to benefit from proximity to biotechnology companies in Boston.27 Another hub in Tampa, SOFWERX, is intended to create new acquisition models for innovations that benefit special operators.28 These efforts have produced some promising contracts for drones, cyber technology, machine learning, and an exciting warfighter exoskeleton. However, biotechnology prototypes have yet to emerge from these incubators.29 An Army Futures Command is launching soon in Austin, TX, but as of this writing, it does not include biotechnology as one of its "futures" technologies.30 That noted, the DOD has developed a promising internal program devoted to synthetic biology across its service laboratories - the Applied Research for the Advancement of Science and Technology Priorities Program on Synthetic Biology for Military Environments, or ARAR31 A USD 45 million investment over three years is intended to explore novel organisms for metabolic engineering, and to grow biotechnology expertise within the DOD research and development labs. Expertise is also supported by the Open Campus exchange program, whereby military scientists can be embedded at cutting-edge synthetic biological institutions and companies, such as MIT, Gingko Bioworks, and CalTech. The ARAP hopes to develop new biologically-based sensors, materials, and biotechnological solutions for warfighters - such as transparent armor, responsive camouflage, conductive nanomaterials, biofuels, and optimized, engineered human microbiomes. The program has been successful, but as it approaches its third and final year, next steps are unclear, given the lack of a strategic framework for how DOD will adopt biotechnology writ large. As noted at the 2018 Global Bioeconomy meeting, almost fifiy countries were pursuing a national bioeconomy at the beginning of the year, and many are forming strategies and implementation plans to harness the benefits.32 In China, the governments push for biotechnological innovation spans both civilian and military arenas, with biotech featured in their most recent five-year plan. It stipulates the biotechnology sector goal as exceeding 4 percent of gross domestic product by 2020, with an output surpassing CNY 10 billion (USD 1.5 billion). Thus far, the Chinese government investment in biotech already exceeds USD 100 billion,33 incuding investment in U.S. companies.34 It is estimated that the Chinese contribute 43 percent of U.S. biotechnology venture capital, with the intent to assume global control of the industry.35 In the United Kingdom, a Synthetic Biology Leadership Council (SBLC) was founded to steer the progress of emerging biotechnology, beginning with a roadmap developed in 2012 that helped to build needed infrastructure.36 It was followed by a more comprehensive strategy in 2016, entitled "Biodesign for the Bioeconomy."37 The strategy focuses on goals such as accelerating industrialization and commercialization, creating an expert workforce, and developing a supportive business environment. More importantly, the SBLC maintains a governance group tasked with making risk-benefit assessments of technologies, forming relevant regulations and policies, and monitoring public attitudes and international trends.38Still, neither the DOD nor the broader U.S. government has a biotechnology or synthetic biology strategy in place today. In 2012, a bioeconomy blueprint was written to encourage advancement of a U.S. bioeconomy, which by design did not include biosecurity considerations, so as not to diminish enthusiasm for a promising component of the U.S. economy.39 This document encouraged unfettered innovation as the industry was developing, but it is already outdated as security concerns have steadily grown. An updated U.S. bioeconomy strategy could support biotechnology innovation across all sectors, and incorporate codes of conduct and norms, encouraging promising developments while addressing potential security concerns. It could ensure transparency, build public trust, and potentially offer guidance on responsible conduct for research and industry as the field evolves. It could also allow for coordinated government investments, avoid redundancies, and create standards needed to advance the field. Compelling models for success exist: for example, the National Nanotechnology Initiative supports the societal benefits of nanotechnology research and development across twenty U.S. departments and independent agencies.40 One might dispute the usefulness of a directive national strategy, given the already substantial investment of American venture capital in synthetic biology, and the benefits of an open field for unimpeded innovation. Still, reaffirming biotechnology as a national priority could, in the least, ensure continued U.S. competitiveness in the growing international bioeconomy. More urgent is a DOD-specific strategy for synthetic biology. Distinct from its role in space or missile technologies, DOD is not driving biotechnology innovation, and furthermore, DOD has not fully assessed its biotechnology needs. Outside of traditional force health protections and the development of medical countermeasures, what advantages over adversaries could biotechnology provide? What unique DOD challenges and problems are best met with biotechnological solutions versus other emerging technologies? These questions have yet to be addressed as the industry races forward. There may be an appetite amongst synthetic biology companies to partner with DOD, but without a clear understanding of DOD s needs, companies are unlikely to reallocate time and effort away from purely commercial pursuits. DOD also needs a strategic plan for acquiring biotechnology. Since World War II, the defense industrial base has steadily hollowed out, with fewer companies able to provide increasingly DOD-centric goods.41 The DOD is plagued with aging facilities, the import of single-source supplies from overseas, and burdensome supply chains.42 There are so many critical single points of failure for some components that the Chairman of the Joint Chiefs of Staff, General Joseph Dunford, warned the U.S. Senate that such a "brittle" industrial base may fail the United States in international crises.43 These shortcomings will hamper the adoption of new, useful biotechnologies. For example, body armor created from spider silk could provide lightweight flexibility and durability for warfighter armor, but spiders cannot produce silk at commercial grade or scale. The bioengineering of silk worms to spin "dragon silk" is a promising advance, and might provide a solution to DOD's body armor production.44 However, silk worms subsist on mulberry leaves, and require over 6,000 acres of mulberry trees to produce at scale. The current plan is to utilize farming cooperatives in Vietnam, relying upon international contracts, embassy approvals, a burdensome supply chain, and a potential single-source point of failure - thereby perpetuating the challenges of the defense-industrial base.45 A different problem is exemplified by resveratrol resin, engineered from a natural chemical found in red grapes. It could be used to make lighter drones, flame-resistant engine casings, or high performance jet fuel, but bio-based materials will not be incorporated into military products if they are not considered in acquisition requirements. The chairman's concerns about the industrial base has spurred two evaluative studies focused on identifying problems and their potential solutions - one by the Eisenhower School at National Defense University,46 and another by the Trump administration in response to an executive order. The latter report described the uncertainty of federal spending, unintended consequences of U.S. government acquisition behavior, and the loss of skills in the domestic workforce as "unprecedented" challenges facing DOD manufacturing.47 These same challenges discourage synthetic biology companies from working with DOD. Still, the adoption of biotechnologies is not without risk. As we create and innovate with bio-based materials and sensors, each new system must be assessed for ways they can be attacked or compromised. Under what conditions should dragon silk armor replace Kevlar? What are the chinks in dragon-silk armor that an adversary could take advantage of? The same is true of coatings, sensors, and other materials: they may have uniqueweaknesses that should be weighed against their benefits. Finally, the use of synthetic biology to enhance the performance of warfighters must be carefully considered - including the potential for adversaries to use biotechnology to enhance their own or others' warfighters.48 A DOD strategy could work to meet these challenges, and prioritize goals for its synthetic biology programs. It could help DOD strike a balance between absorbing successful commercial products "off the shelf," versus setting requirements for biotechnology products and building them from the bottom up. Both approaches still need a plan for the technologies' incorporation into the force. As the ARAP has already created a locus of expertise, it could provide a logical hub to steer biotechnology within DOD. The ARAP has forged collaborative partnerships with DARPA, DIU, the Chemical and Biological Defense Program, external academic centers, and a wide range of synthetic biology industrial leaders. The ARAP could pivot in its final year to charting a strategic path forward across DOD for the development and implementation of emerging biotechnology, while assessing its risks and vulnerabilities. Creating a "Community of Interest" could be a distinct advantage in getting biotechnology to the battlefield. Regardless of strategic approach, some key questions should be considered: ■ What specific challenges and solutions does each biotechnology offer DOD? \* What risk-benefit frameworks should be used to assess the benefits of novel biological materials, sensors, or human elements and their potential vulnerabilities? m How should technology innovation hubs best be utilized to encourage biotechnology advances? \* What industry partnerships and innovative acquisition models should DOD use to adopt biotechnology? \* How should the possibility of human enhancement, or human degradation by adversaries, be ethically assessed?

### 2AC – DOD Key – Biotech Dual Use

#### Biotech is dual-use---DOD strategic planning key

DiEuliis 19 (Diane DiEuliis | a Senior Research fellow at National Defense University. Her research areas focus on emerging biological technologies, biodefense, and preparedness for biothreats. Specific topic areas under this broad research portfolio include dual-use life sciences research, synthetic biology, the US bioeconomy, disaster recovery, and behavioral, cognitive, and social science as it relates to important aspects of deterrence. Dr. DiEuliis currently has several research grants in progress, and teaches in foundational professional military education. | “Key National Security Questions for the Future of Synthetic Biology” | <https://www.jstor.org/stable/45289832> | DOA: 6/23/2022 | SAoki)

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The rapidly advancing tools of biotechnology, particularly synthetic biology, hold great promise for improving life on the planet and finding solutions to global challenges in the sectors of energy, agriculture, medicine, and environmental sustainability. However, evolving synthetic biology capabilities can also be used for harm. The focus to date has been on how these capabilities could transform the traditional biothreat space, but they are also enabling a growing global bioeconomy, which represents a new security risk landscape that needs to be understood. As biotechnology platforms and tools are adopted for critical needs, their security vulnerabilities should be assessed - as should the ways in which they could be adopted for purposeful harm. This paper provides a discussion of how the biotechnology landscape is changing, and asks leading questions in hopes of generating useful dialogue for forming risk-benefit assessments here and abroad. It also advocates for strategic planning on behalf of the United States and the U.S. Department of Defense (DOD) to leverage the benefits of emerging biotechnology, while minimizing its risk.

### 2AC – DOD Key – Brain-Computer Interface

#### The plan ensures future DoD effectiveness in the face of ALL emerging technologies – it’s the only viable actor to ensure ethical development, industry application, and export regulations

**Binnendijk et al. 20** (\*Anika Binnendijk, \*\*Timothy Marler, and \*\*\*Elizabeth Bartels, \*PhD, a political scientist at the RAND Corporation, where she currently focuses on national security decision-making, European defense, gray zone challenges, future defense technologies, and national resilience, the State Department’s Office of Policy Planning, where she was responsible for advising the secretary of state on policy questions related to Russia, Ukraine, Turkey, the Caucasus, and NATO, she served for a rotation as director for Russia at the National Security Council. \*\*Ph.D, senior research engineer at the RAND corporation and a professor at the Pardee RAND Graduate School. Cofounder and colead for the RAND Biological Technologies Emerging Challenges. \*\*\*Ph.D. in policy analysis, the codirector of the RAND Center for Gaming and an associate policy researcher, as well as a professor of policy analysis at the Pardee RAND Graduate School. She is a specialist in national security policy analysis gaming, and her work explores a wide range of strategic and operational concerns. Rand Corporation, "Brain-Computer Interfaces: U.S. Military Applications and Implications", 2020, https://www.rand.org/pubs/research\_reports/RR2996.html, accessed on 7/1/2022)//gideon

Recommendations

Moving forward, we recommend that the U.S. government conduct additional national security gaming to further assess the operational risks and benefits of BCI technology in combat, including provisions for additional domains and contingencies. Beyond operational risks, the government will need to address a potential lack of trust in BCI technologies, which is an issue that emerged during the game as a potential impediment to adoption by the armed services. This, in turn, requires special attention to how BCI is deployed as it matures. Our review of current technological progress highlighted work done in academic and private-sector laboratories, and the U.S. government should seek to leverage work in both, especially as the commercial sector increasingly dominates technology R&D. Developing and deploying BCI technologies in the national security sector will require institutional adaptation to operators at each stage of the process. Next, we offer some concluding suggestions on each of these points.

Expand Analyses to Illuminate Operational Relevance and Vulnerabilities Over the coming decades, it will be critical that operational needs and risks, rather than just technical opportunities, drive BCI development. To help support this need, we developed a systematic approach to evaluating the potential operational applications of BCI and other over-the-horizon military technologies. During the TTX testing, pairing of operational experience with technological expertise yielded rigorous and fruitful discussions, and this process should be replicated on a larger scale. These approaches could supplement existing internal exercises, such as the Marine Corps Advanced Naval Technology Exercise, to explore the practical utility of BCI and other prospective technologies to future warfighters. By incorporating a disruptive and creative Red team of RAND experts, the game also highlighted potential new areas of operational vulnerability, as well as initial ideas to mitigate them. As the U.S. government seeks to build resilience from early phases of BCI development, similar methods could help to unearth the full range of adversary threats. Beyond BCI, the approaches developed in this pilot project are scalable and could be applied to a variety of emerging technologies.

Address the Trust Deficit One major theme to emerge from the study was that cultural barriers to BCI, particularly among infantry service members, are likely to be high, and this is a common theme with many new and emerging technologies. These barriers can be mitigated with the following steps. As BCI capabilities are integrated into the force, they may initially be more readily accepted among service members who already rely heavily on machine technologies, and who experience greater requirements for direct interaction with computers or machines. During the R&D process in the coming decades, noninvasive measures are less likely to encounter cultural resistance. They may also be easier to reverse and control. Similarly, work on medical or therapeutic applications may offer near-term benefit for today’s wounded warriors and is likely to encounter the least cultural resistance. Unsurprisingly, service members are more likely to trust capabilities that have been appropriately vetted and tested before use. Thus, once BCI capabilities are further developed, robust testing for failure in noncombat scenarios, including training and data processing and analysis, before introducing them into combat will help to strengthen trust and reduce the potential for unanticipated risk.

Collaborate and Anticipate Research for this project highlighted multiple examples in which DoD seed funding for BCI laboratory research yielded successes. Significant future advances may take place in the private sector, and the U.S. government should seek to leverage private-sector R&D when possible. If carefully pursued, private-sector advances may also improve trust gaps within the military: As the U.S. public begins to use BCI, there may be less skepticism about its use in a national security setting. As private-sector technology advances and begins to be applied to the military sphere, International Traffic in Arms Regulations, Export Administration Regulations, and other restrictions should be considered with respect to BCI. BCI intellectual property should be carefully monitored by DoD and the Department of Commerce during these early periods of development. As emerging technology accelerates, it becomes increasingly important to consider integrated systems and how different technologies depend on one other. BCI could prove an important tool for integrating human-machine systems, whether by enhancing big data analysis, accelerating accurate decisionmaking, or improving the control of exoskeleton, drone swarms, or semiautonomous systems. However, there is a risk that the research could occur in isolation without consideration of additional and related emerging technologies. Thus, current development efforts should make provisions for the eventual availability of BCI, even if its applications are currently still in the basic-research phase.

Plan Ahead for BCI Institutional Implications As the U.S. government prepares to incorporate BCI technologies into future military capabilities, appropriate institutional planning will help to ensure a smooth rollout and execution. It is important to consider ethical and policy issues before emerging technologies mature and are disseminated. During the research phase, it will be important to continue to integrate ethical, legal, and societal considerations into research funding. DARPA currently requires that research teams conduct ethical analysis for many grants surrounding BCI. Rigorous internal analysis should continue beyond basic research throughout the development, design, and application of new BCI technologies for defense and national security use. The U.S. government should continue to implement National Academy of Sciences ethical recommendations in development and implementation, particularly regarding (1) questions of consent that are specific to service members, (2) potential health implications for invasive BCI, (3) considerations surrounding enhanced human performance, and (4) potential risks to privacy. As BCI technologies are disseminated across national security institutions, services will want to identify clear oversight mechanisms for BCI development and application. Given the broad range of potential applications for BCI, there is significant risk of stovepiping with related R&D. A department-wide oversight mechanism, potentially residing in the Office of the Secretary of Defense or the Joint Staff, should track and review BCI developments for senior DoD approval. Once BCI is integrated into services, individual services might consider coordinated arbitration mechanisms outside the chain of command to allow service members and their commanding officers to discuss or object to unethical or harmful uses of BCI technology. Finally, DoD may need to plan for a range of additional warfighter and veteran care needs after the incorporation of BCI technologies. BCI carries the potential for new dimensions of care requirements, potentially including BCI withdrawal, brain injuries, posttraumatic stress disorder, and ongoing care for invasive devices through Veterans Affairs.

#### The DoD MUST lead BCI development - anything else fails at ethical regulations, decks interoperability, and risks cyber vulnerabilities in military BCIs – solves all military readiness

**Hitchens 20** (Theresa Hitchens, the Space and Air Force reporter at Breaking Defense. The former Defense News editor was a senior research associate at the University of Maryland’s Center for International and Security Studies at Maryland (CISSM). Before that, she spent six years in Geneva, Switzerland as director of the United Nations Institute for Disarmament Research (UNIDIR). Breaking Defense, "DoD Needs New Policies, Ethics For Brain-Computer Links (Jacked-In Troops?) - Breaking Defense", 8/27/2020, https://breakingdefense.com/2020/08/dod-needs-new-policies-ethics-for-brain-computer-links-jacked-in-troops/, accessed on 7/1/2022)//gideon

In cyberpunk fiction, people routinely “jack in” to cyberspace — linking their electrode-enhanced brains, or “wetware”, directly to computers. That future is getting closer, the RAND Corp. says, with “brain-computer interface (BCI)” technology poised to begin moving from labs to operational military applications. “In general, with emerging technology there is always a struggle to predict the future — and that’s just not possible. BCI is not just science fiction; it has viable practical applications, but there is much more work that needs to be completed before it becomes mainstream and commercial,” Tim Marler, one of the co-authors of the study, Brain-Computer Interfaces: U.S. Military Applications and Implications, An Initial Assessment, told Breaking D in an interview. Marler and study co-authors Anika Binnendijk and Elizabeth Bartels say that while the emergence of BCI comes with a whole host of potential benefits for military operations, it also opens up huge technical, ethical and legal risks. “It’s good to put attention on this emerging subject, since what’s been science fiction is now becoming reality,” Patrick Lin, a philosophy professor at California Polytechnic State University, and a member of the Center for a New American Security’s Task Force on AI and National Security, said in an email. “The ethics of brain-computer interfaces is a huge subject, given the nature of the technology and its potential,” he added. “It’s not just a merger of hardware and wetware, but also the collision of technology ethics and traditional bioethics that hasn’t been handled well so far by industry or regulators.”The RAND study is based on the “premise that human-machine teaming will play a major role in future combat and that BCI may provide a competitive advantage in future warfare.” BCI could enable seamless human-machine teaming; increased speed of decision-making for command and control of a hyperconnected battlefield; enhanced human endurance during combat; and improved medical care for wounded vets, says the study, released today. In particular, it could help forward human-machine teaming by helping humans: “Digest and synthesize large amounts of data from an extensive network of humans and machines; Make decisions more rapidly due to advances in AI, enhanced connectivity, and autonomous weaponry; Oversee a greater number and types of robotics, including swarms.” seminal cyberpunk novel Neuromancer by William Gibson predicted in 1984, BCI could even allow humans to directly connect to the Internet — in effect becoming another node in the Internet of Things (IoT). “DoD believes IoT can contribute to improved readiness by allowing one to monitor the status of materiel and weapons systems in real time, and it is thus becoming pervasive. IoT has tactical applications, including giving warfighters access to sensors and data, and BCI could enhance this ability,” the study says. Risks from the use of BCI are monumental. Technical risks could range from the ability to jam human-machine networks; to enemies hacking into the “jacked in” brains of US soldiers via cyber attacks causing confusion or even physical harm. “As with many new technological developments, BCI may create new military operational vulnerabilities, new areas of ethical and legal risk, and potentially profound implications for existing military organizational structures,” the study says. Potential vulnerabilities could include “the potential for new points of failure, adversary access to new information, and new areas of exposure to harm or avenues of influence of service members,” the study explains. Institutional risks include “challenges surrounding a deficit of trust in BCI technologies, as well as the potential erosion of unit cohesion, unit leadership, and other critical interpersonal military relationships.” Ethical questions are myriad. In extremis, to use another example from science fiction, militaries or intelligence agencies could create ‘mind controlled’ suicide bombers. But more routine ethical challenges are also serious, the study says, such as how can DoD ensure against any long-term mental or physical side effects from such technology? Who is accountable is something goes wrong? Another issue is what happens when an BCI-enhanced warfighter retires? Does the technology, asks Jonathan Moreno, a professor of bioethics at the University of Pennsylvania, have to be removed after a soldier retires or leaves the service? How might that affect veterans? “To what extent should the military be worried about removing something, taking something away, when you are no longer the force?” he asked. “Do Super Soldiers ever die, or just fade away?” The RAND study sums up: “BCI can likely be useful for future military operations, even in the most difficult test case: infantry ground force combat. This utility may become particularly pronounced once technology for military applications of AI and robotics develops further, and once adversaries have access to these capabilities. Nonetheless, the application of BCI would support ongoing DoD technological initiatives, including human-machine collaboration for improved decision-making, assisted-human operations, and advanced manned and unmanned combat teaming. Of course, as with most significant technological advances, there are potential risks. BCI falls subject to the capability-vulnerability paradox, with counterweighted benefits and risks, and, as development efforts and eventual acquisition efforts progress, requirements will need to account for such risks.” RAND recommends that the Pentagon move forward now to develop a research and development strategy that integrates ethical considerations up-front. The study recommends: “Assess the operational risks and benefits of BCI technology in combat. “Address a potential lack of trust in BCI technologies prior to adoption by the armed services. “Work with academic and private-sector laboratories to leverage private-sector advances in BCI and improve trust gaps within the military. “Plan for institutional implications and address new ethical and policy issues at each stage of the process, from research and development, to operational application, to veteran care.” As Breaking D readers know, the Air Force in particular is enthusiastic about human-machine teaming whereby piloted aircraft and AI-driven drones are seamlessly linked for air combat operations. Development projects include Air Force acquisition czar Will Roper’s high-priority Next-Generation Air Dominance (NGAD) effort to rethink a sixth-generation fighter, and the Skyborg program to develop an artificial intelligence-base brain for “loyal wingman” drone being managed by Air Force Research Laboratory. DARPA and the Army also have funded research at University of Delaware’s Human-Oriented Robotics and Control laboratory to enable a user to control a swarm of drones. According to RAND, the lab’s “researchers suggest the technology could be used practically in the military within five to ten years. Applications also include delivery of medical help, search and rescue, and exploration, all in remote or inaccessible environments.” Up to now work by the military services has largely focused on the machine aspect, rather than on the human one. This includes on the question of ethics. As Breaking D readers know, DoD’s Defense Innovation Advisory Board in October 2019 put out a report listing five ethical principles applying to military AI research. And just last month, as Kelsey reported, the Intelligence Community issued a similar set of principles for ethical AI development. DARPA, on the other hand, has been increasingly focused on the human side of manned-machine teaming, as well as other potential uses for BCI. As Sydney wrote way back in 2017, the Biological Technologies Office is exploring whether a weapon system could respond to a human’s brain cells forming the intention to control it. In probably the most famous DARPA experiment so far, in 2015 a quadriplegic woman flew an F-35 in a simulator using only her brain. As the RAND study notes, DARPA is also a key player in the 2013 National Institutes of Health (NIH) initiative started by the Obama Administration called Brain Research through Advancing Innovative Neurotechnologies (BRAIN). BRAIN, designed to improve understanding of the human brain, also includes the National Science Foundation, the Food and Drug Administration (FDA), and the Intelligence Advanced Research Projects Agency (IARPA), as well as foundations, institutes, universities, and biotech industries. Related to BRAIN is Neural Engineering System Design (NESD), which “aims to develop an implantable neural interface able to provide unprecedented signal resolution and data-transfer bandwidth between the brain and the digital world.” This DARPA program has two sub-projects: “Towards a High-Resolution, Implantable Neural Interface,” and “Bridging the Bio-Electronic Divide.” The planned budget for NESD is NESD is $88.469 million, DARPA spokesperson Jared Adams told Breaking D today “DARPA is committed to exploring the ethical, legal, and societal implications of potential, future human applications of Brain-Computer Interface (BCI) technologies,” he added. The RAND study was based in large part on a July 2018 tabletop exercise involving military warfighters and neuroscientists. “We found that our initial discussions on BCI technologies were overly abstract. So we projected forward to consider what these breakthroughs in the laboratory setting might tangibly mean for the future warfighter. With this notional “toolbox,” we could then have a more grounded analysis of the potential risks and benefits of the future technology,” Binnendijk told Breaking D. The exercises and research led RAND to focus on several areas where BCI tools could be useful for military applications: Human-machine decision-making “involves transferring data to the human brain from sensor input and from the brain to machines. … This kind of tool allows a warfighter to digest more information faster, to be used, for example, with theater assessment or risk and threat assessment. Warfighters ultimately can increase over- all reaction time, thus collapsing the OODA loop.” Human-machine direct system control “involves allowing warfighters to control systems with their thoughts wirelessly, as well as to supervise semiautonomous and AI systems, including robots, drones, drone swarms, or jets. … This, in turn, provides the warfighter increased situational awareness and again helps collapse the OODA loop.” Human-to-human communication and management “entails wirelessly transmitting commands or basic ideas among warfighters and commanders, lightening the load of communications systems. It could facilitate immediate and silent communication of plans or tactics on the battlefield, or improve communication with headquarters to enhance commanders’ awareness of in-theater conditions.” Monitoring performance “would enable awareness of group or individual emotional, cognitive, and physical states. … thus detecting when a person is fatigued, paying attention, has high or low cognitive workload, or is significantly stressed.” Enhancement of cognitive and physical performance “includes improving a warfighter’s cognitive and physical states on the battlefield.” Cognitively, it could “yield enhanced focus, alertness for rapid and improved situational awareness and decisionmaking.” Physically, it could enhance the senses, such as hearing; enable pain mitigation; or improve strength “through more efficient integration with mechanical exoskeletons, which are natural extensions of the work on prosthetics.” Training via BCI “could improve operator learning and memory processing, allowing warfighters to retain more information.”

#### BCIs are solely DOD jurisdiction

**Munyon 18** (Charles Munyon, a neurosurgeon at the Department of Neurosurgery, Lewis Katz School of Medicine, Temple University Hospital who graduated from the Perelman School of Medicine At University of Pennsylvania in 2007. Frontiers Media S.A., "Neuroethics of Non-primary Brain Computer Interface: Focus on Potential Military Applications", 10/23/2018, https://www.frontiersin.org/articles/10.3389/fnins.2018.00696/full#B5, accessed on 6/21/2022)//gideon

The field of neuroethics has had to adapt rapidly in the face of accelerating technological advancement; a particularly striking example is the realm of Brain-Computer Interface (BCI). A significant source of funding for the development of new BCI technologies has been the United States Department of Defense, and while the predominant focus has been restoration of lost function for those wounded in battle, there is also significant interest in augmentation of function to increase survivability, coordination, and lethality of US combat forces. While restoration of primary motor and sensory function (primary BCI) has been the main focus of research, there has been marked progress in interface with areas of the brain subserving memory and association. Non-Primary BCI has a different subset of potential applications, each of which also carries its own ethical considerations. Given the amount of BCI research funding coming from the Department of Defense, it is particularly important that potential military applications be examined from a neuroethical standpoint.

Military imperatives have driven medical advances and allowed for rapid implementation and evaluation of new practices (Beekley et al., 2007; Haider et al., 2015). Many of these advances can then be applied to civilian practices, yielding additional dividends on the often considerable investment underpinning their development. The development of resuscitative endovascular balloon occlusion of the aorta, for example, shows how dedication of the military’s resources to rapidly solving an urgent problem (in this case battlefield fatalities due to non-compressible thoracic or pelvic bleeding) can significantly accelerate the development and deployment of new technologies for wartime and peacetime applications (Rasmussen and Eliason, 2017). The field of neuroprosthetics and brain computer interface (BCI) is another area where a significant funding pool has come from Department of Defense sources, in particular the Defense Advanced Research Projects Agency (DARPA) (Miranda et al., 2015). This presents an area of significant opportunity for national defense and also human neuroscience; it also raises several potential ethical issues that should be explored before the technology has already transitioned to the domain of military application.

#### The DoD is leading development now – it’s the only way to mitigate vulnerabilities in other DoD programs

**Binnendijk et al. 20** (Anika Binnendijk, Timothy Marler, and Elizabeth Bartels, a political scientist at the RAND Corporation, where she currently focuses on national security decision-making, European defense, gray zone challenges, future defense technologies, and national resilience, the State Department’s Office of Policy Planning, where she was responsible for advising the secretary of state on policy questions related to Russia, Ukraine, Turkey, the Caucasus, and NATO, she served for a rotation as director for Russia at the National Security Council, PhD from Tufts University. Rand Corporation, "Brain-Computer Interfaces: U.S. Military Applications and Implications", 2020, https://www.rand.org/pubs/research\_reports/RR2996.html, accessed on 6/23/2022)//gideon

The U.S. Department of Defense (DoD) has invested in the development of technologies that allow the human brain to communicate directly with machines, including the development of implantable neural interfaces able to transfer data between the human brain and the digital world. This technology, known as brain-computer interface (BCI), may eventually be used to monitor a soldier's cognitive workload, control a drone swarm, or link with a prosthetic, among other examples. Further technological advances could support human-machine decisionmaking, human-to-human communication, system control, performance enhancement and monitoring, and training. However, numerous policy, safety, legal, and ethical issues should be evaluated before the technology is widely deployed. With this report, the authors developed a methodology for studying potential applications for emerging technology. This included developing a national security game to explore the use of BCI in combat scenarios; convening experts in military operations, human performance, and neurology to explore how the technology might affect military tactics, which aspects may be most beneficial, and which aspects might present risks; and offering recommendations to policymakers. The research assessed current and potential BCI applications for the military to ensure that the technology responds to actual needs, practical realities, and legal and ethical considerations. Despite valid concerns, BCI can likely be useful for future military operations. The application of BCI would support ongoing DoD technological initiatives, including human-machine collaboration for improved decisionmaking, assisted-human operations, and advanced manned and unmanned combat teaming. BCI falls subject to the capability-vulnerability paradox, with counterweighted benefits and risks. Precautions will need to be taken to mitigate vulnerabilities to DoD operations and institutions and to reduce potential ethical and legal risks associated with DoD's development and adoption of BCI technologies.

#### The DoD is key to BCI funding and defense against cognitive biotech

**Munyon 18** (Charles Munyon, a neurosurgeon at the Department of Neurosurgery, Lewis Katz School of Medicine, Temple University Hospital who graduated from the Perelman School of Medicine At University of Pennsylvania in 2007. Frontiers Media S.A., "Neuroethics of Non-primary Brain Computer Interface: Focus on Potential Military Applications", 10/23/2018, https://www.frontiersin.org/articles/10.3389/fnins.2018.00696/full#B5, accessed on 6/21/2022)//gideon

As Brain Computer Interface becomes less invasive and more sophisticated, applications have already started to expand outside of the medical sphere and into the realm of consumer technology. Potential military applications also continue to advance, and in an environment where research funding is increasingly harder to obtain, the Department of Defense can be an important source of support. The fundamental mission of the Department of Defense differs significantly from that of the National Institutes of Health, however, and these differences should prompt additional scrutiny from both basic and translational researchers. In this paper, I propose an ethical framework to facilitate discussion, beginning with the classification of a technology into one of three domains: restorative, augmentative, or disruptive. Consideration should be given as to whether the technology has applications across domains: for example, restorative NpBCI for patients with PTSD could also potentially augment warfighters’ capabilities to modulate their response to stressful stimuli on the battlefield; this phase of analysis should consider how difficult it would be to repurpose the technology, and thus how likely it would be that it would be used outside of its intended scope. Finally, the analysis should include the likely risks to patient physical health, emotional well-being, and bodily autonomy. These considerations will be predominantly related to the invasiveness of the technology, but as discussed previously, will also be concerned with alterations in normal emotional, or cognitive function. Within the domain of disruptive BCI, where some disruption of autonomy is a given, a significant conversation will need to be held regarding what kinds of interventions would or would not be acceptable, under what circumstances, and what mechanisms might be available for monitoring appropriate use.

The framework proposed here is obviously not exhaustive, but is intended to provoke discussion in a way that could help ensure that the pace of technological advancement does not too far outstrip our ethical consensus, particular in the domain of National Security, where ethical considerations can differ substantially from those of civilian medical research. Such discussion could help ensure that medical researchers and physicians maintain a seat at the table regarding application of the technology that they help develop, and could also spark new ideas for innovations.

### 2AC – DOD Key – China

#### An improvement in DoD awareness of current biotechnology is crucial in sustaining advantageous U.S. defense, especially b/c of China.

**Carlson 21** (Robert Carlson, " Beyond Biological Defense: Biotech in U.S. National Security and Great Power Competition", <https://www.ida.org/-/media/feature/publications/b/be/beyond-biological-defense-biotech-in-us-national-security-and-great-power-competition/p-22700.ashx>, August 2021, Accessed 6-26-22)//ILake-SG \*\*note: PRC means People’s Republic of China

U.S. forces, and indeed the nation, have access to the safest, most technologically advanced, most effective vaccines ever created. It is a remarkable feat that DOD’s mission can continue in the midst of a global pandemic—made possible because the democratic government and biotechnology industry of the United States prevailed. U.S. and PRC bioeconomies are indeed in a competition of systems, and U.S. strength is in its values. However, to secure the role of biotechnology in DOD, the rate of growth of the U.S. bioeconomy must increase more quickly than that of China, and the United States will need to protect its investments. We recommend the following plan of action. 1. Improve the situational awareness of the U.S. government—and in particular of DOD— around the role of biotechnology in the economy, supply chains, and domestic and foreign manufacturing. The responsibility to understand, prepare for, and respond to threats to biotechnology is balkanized, spread across at least nine Departments and Agencies within the Executive Branch, demonstrating the broad scope of the problem.37 Specific vulnerabilities in the bioeconomy affect biotechnology security, and these vulnerabilities will affect DOD in readiness, health, and the ability to fulfill missions. Addressing those vulnerabilities must begin with a sustained, comprehensive effort to understand the role of biotechnology in industry today, how that industry contributes to DOD supply chains, and how DOD acquisitions influence economic development and employment around the United States. To that end, DOD should work with the Department of Commerce to create domestic reporting codes for biotechnology revenues and employment for the quarterly and annual economic census and then push to include those codes in the North American Industrial Classification System (NAICS) as soon as possible.38 Institutionalizing the gathering of these data via the NAICS, which is how the rest of the economy is quantified, is the first step towards sustainable policymaking and rational spending. The Department of Commerce should consider adding import/export controls on biotechnology, while avoiding overly broad restrictions that suffocate innovation. Solidifying the place of biotechnology as a foundational technology protected by the Foreign Investment Risk Review Modernization Act (FIRRMA) and Export Control Reform Act (ECRA) will be critical for securing biotechnology.39 However, biotechnology competition is not exclusive to commercial activities. It is a crucial feature in sustaining an advantage in U.S. defense. DOD should audit critical defense innovation base vulnerabilities by dependencies to assist the other agencies in bringing China’s foreign biotech access in line with standards in other major markets. The drumbeat is accelerating, calling DOD to document and secure supply chains critical to defense applications and to the overall U.S. economy. 40,41 Securing DOD supply chains, which includes a recognition of their inputs from biotechnology and the origins of the materials feeding those supply chains, will buttress the strength of the U.S. military in its mission sets and keep readiness levels high. Current DOD efforts to expand domestic biological manufacturing capabilities are a needed start42, but these focused programs also serve to emphasize the larger strategic need to understand and invest in the broader bioeconomy. Enhance the relationship between DOD and the National Economic Council to promote DOD’s economic and commercial interests and security considerations, which might be accomplished via an empowered deputy national security adviser.

### 2AC – DOD Key – Ethics

#### Military needs to ‘bear the weight’ of the aff---alternatives stifle capability and undermine future oversight

Buchner 13 (Christina M. Buchner | “BIOLOGICALLY FIT: USING BIOTECHNOLOGY TO CREATE A BETTER SOLDIER” | <https://apps.dtic.mil/sti/pdfs/ADA620341.pdf> | DOA: 6/26/2022 | SAoki)

One of the long-term goals of biotechnology is the ability to **manipulate** the human genome. This science promises unlimited capabilities that extend beyond the realm of medicine. Whether aimed to protect an individual from exposure to infectious disease or **enhance the soldier** by increasing mental acuity and physical abilities, human enhancements will increase the capabilities of the American soldier. While these modifications will potentially benefit the armed forces, the institution will face moral, legal, and **political** implications associated with research that intends to modify human beings. Human enhancement is a contentious subject. Within it lies an assortment of opinions on the capabilities it can provide and positions for or against its continued research. Irrespective of the ongoing debate, the Defense Advanced Research Projects Agency (DARPA) and other research organizations grow closer to ground breaking innovations that could have a **major impact** on the institutional practices of the **DoD**. Therefore, novel concerns in **ethics and policy require** considerable **attention to fill the gap** between the development of appropriate regulation and ongoing scientific advancement. Furthermore, **military mission and requirements must bear weight** in the discussion of ethics and policy. This will both prevent the development of restrictions that may **stifle** the procurement of valuable enhancement capabilities and **ensure** that **military applications are subjected to rigorous oversight.**

### 2AC – DOD Key – Genetics

#### DoD policy is key

Buchner 13 (Christina M. Buchner | “BIOLOGICALLY FIT: USING BIOTECHNOLOGY TO CREATE A BETTER SOLDIER” | <https://apps.dtic.mil/sti/pdfs/ADA620341.pdf> | DOA: 6/26/2022 | SAoki)

This chapter analyzed the concept of enhancement, the military’s operational need for it, and how breakthroughs in genetic engineering could soon create more biologically fit soldiers. Despite the wars in Iraq and Afghanistan drawing to a close, it is only a matter of time before conflict abroad calls for America’s attention. As history shows, the conduct of war **evolves** over time and with radical advancements in technology, the battlefield will become more lethal and complex. Modern advancements in biotechnology, though radical, may someday help the military fill capability gaps by creating a force more physiologically and intellectually fit to survive the rigors of future conflict. Technological capability for such an endeavor is years from existing. Nevertheless, further research to assess the risks and benefits associated with genetically modifying soldiers should undoubtedly continue. **It is up to DoD** to decide the pros and cons of genetic engineering and **establish policy** to determine which methods should be used or prohibited. In the meantime, increasing awareness and quelling public concerns surrounding genetic modification is essential to prevent the disruption of further research and future military application of genetic enhancements. The next chapter will conclude this thesis and provide recommendation for future research.

### 2AC – NATO Key

#### U.S.-NATO cooperation is key manage the rise of biotechnology

AUSA ’21 [Association of the United States Army; private, non-profit organization that serves as the professional association of the United States Army; 7-15-2021; "Cooperation, Readiness Critical to US, NATO Alliance"; AUSA; https://www.ausa.org/news/cooperation-readiness-critical-us-nato-alliance; Accessed 6-26-2022; RL]

The U.S. and NATO must continue to strengthen its partnership as the world enters a “period of potential instability,” America’s top uniformed leader said.

“In my view, the world is entering a period of potential instability as some nations ... and clearly terrorist groups and perhaps some rogue actors are seeking to undermine and challenge the existing international order,” Joint Chiefs Chairman Gen. Mark Milley said. “And they seek to weaken the system of cooperation and collective security that has been in existence for some time.”

Speaking July 15 in a ceremony aboard the USS Kearsarge to celebrate NATO’s newest operational headquarters, Joint Force Command Norfolk in Virginia, Milley emphasized NATO’s role in maintaining security and called it “the most successful military alliance in human history.”

“NATO is still very much a vital and critical part of our regional security framework and indeed our global security framework,” Milley. “In fact, in my view, it's the linchpin that holds together the period of great power peace that we are now enjoying.”

Milley also stressed the importance of maintaining readiness and modernizing for the future, calling them keys to ensuring the U.S. can meet future defense challenges.

“We have to maintain the readiness of the present, we have to modernize for the future,” Milley said. “We are ready right now. Those who think we are not are mistaken, and any adversary that seeks to challenge the United States military resolve will do well to respect this military and our alliance and NATO.”

In particular, Milley stressed that the incorporation of new technology will play a vital role in the military’s readiness capabilities over the next decade and said that technology, like precision munitions, artificial intelligence and biotechnology, will “have a fundamental impact on the conduct of war.”

Should the U.S. military not lean into technological advances, Milley gave a grim warning.

“There's a whole set of technologies that are driving fundamental change, and if we, the United States military, and we, NATO as an alliance, do not adapt and adopt these technologies, if we don't … put the pedal to the metal and do this right over the next 10 or 15 years, we are condemning a future generation to what happened 76 years ago.”

Moving forward, Milley emphasized that continued cooperation will be a key part of maintaining U.S. readiness, adding, “We as an alliance are stronger together than we are individually.”

“We're going to succeed or fail as a nation with our allies and partners, because the United States does not fight wars alone,” Milley said.

#### NATO is key because it considers the ethical concerns behind cognitive biotech, and the US military is key to ensure it

Alonso **Bernal et al**, 2-26-20**21**, "NATO Review," NATO Review, https://www.nato.int/docu/review/articles/2021/02/26/cognitive-biotechnology-opportunities-and-considerations-for-the-nato-alliance/index.html//DS

Advances in biophysical, biochemical and behavioural technologies are beginning to turn science fiction into reality. These developments offer exciting possibilities, while also raising issues with regard to ethics and responsible use. The Alliance faces a range of significant opportunities in emerging and disruptive technologies. The field of Cognitive Biotechnology (CBT) is an emerging domain with wide ranging implications for Alliance members’ economic and military competitiveness. And, as was discussed in the case of Artificial Intelligence, developments in this field will require both a dynamic adoption of new technologies and a focus on their responsible governance. CBT is the ability for technology to enhance and improve human thinking, sensing, coordinating, and acting upon the physical and societal environment. With CBT, our effectiveness—normally constrained by the limits of human physiology – can now be extended and augmented by biophysical, biochemical, or bioengineered means. The field is in its infancy, but its implications are vast. For instance, in the last decade scientists have accurately melded brain signals with machine interfaces to create mind-controlled prosthetics. More recently they have made this flow of information bi-directional, creating prosthetics that can now feel sensation and send these feelings back to the brain. If humans can actuate (i.e. put into motion or action) machines, and these machines can in turn actuate humans, then we have moved beyond the confines of our own physiology. Moreover, if these machines are mobile and can interact with our minds at a distance, then we have extended our reach beyond our own physical limits. Conversely, our inner minds are no longer off limits either: while emerging brain-computer interfaces allow us to train and direct computers, computers are increasingly able to peer into our minds and to train and enhance us. Or, to put it another way, while we have been working to improve and enhance our machines, we now realise that our machines can enhance, improve – and possibly control – us. When considering the wide-ranging uses of CBT, it helps to distinguish among three broad application areas, which can be called “the 3 R’s” – Recover, Raise, and Replace. Recover includes the repair or rehabilitation of cognitive and biological impairments that prevent the mind and body from functioning effectively. The goal is to return abilities back to baseline functionality. Applications include helping injured soldiers recover their physical capabilities; healing traumatic brain injury; treating post-traumatic stress disorder (PTSD); recovering or (in cases of traumatic stress) suppressing memories; and restoring decision-making and executive functions. Raise includes the augmentation and enhancement of cognitive and physiological function past an individual’s natural baseline, thereby effecting dramatic changes in operational effectiveness, preparedness, and training. Applications include sensory enhancement (such as seeing farther or hearing more acutely); faster information processing; quicker and more effective decision-making; more efficient learning and language acquisition; and greater physical exertion and endurance. What is true for individual capabilities could similarly be true for groups. CBT could be used to raise unit capabilities through distributed intelligence – that is, all members of the unit see and know what each individual member sees and knows, thus reducing the “fog of war” and improving rapid decision-making, as well as enabling more rapid acquisition and assimilation of new fighting techniques and technologies. Replace includes the enhancement (and possibly substitution) of mental and physical functions past the bounds of human potential. Sensory connections could be replaced with computer interfaces, making human capabilities independent of their five natural senses. Verbal communication could be replaced by computer-aided telepathy or data downloads. Physical action could be replaced by remote robots or “loyal wingman” drones directed by the mind of the operator. This is perhaps the most futuristic form of enhancement, with most research and development nascent in nature. It is important to note that this form of enhancement does not completely remove human interaction, or else it would be simply another form of automation; it is really about the merger of human biology and mechanical actuation. These distinctions may prove helpful in setting priorities for further research, investment in technological development, and adoption for operational use. And they could also help in setting principles of responsible use, considering the three categories’ differing levels of technical risk and ethical uncertainty. Cognitive Biotechnologies are at present focused on three main areas of research: biophysical, biochemical and behavioural. The future direction of these technologies is difficult to predict, particularly as many are still emerging. But they have the potential to significantly disrupt existing assumptions about the evolution of civil society, the economy, and military affairs. It is therefore in the interest of the Alliance to closely monitor the rise of those technologies and applications that are most likely to affect or disrupt current defence constructs and doctrine. Moreover, it will be important to direct early-stage investment into those areas that are particularly promising for the Alliance, or to those which will most likely impact its competitiveness. Advances in the biophysical area centre on brain computer interfaces (BCI), which can be directly inserted into the human body or via transcranial direct-current stimulation (tDCS). tDCS is a form of neuromodulation that uses constant, direct currents delivered via electrodes on the head, and can be worn or removed at will. While BCI was originally developed to provide assistive technologies (such as prosthetic arms and mentally controlled wheelchairs), recent developments in bi-directionality have allowed for enhanced sensing, for example, bionic eyes or other enhancements to situational awareness. Further applications of these technologies could lead to mental control of aircraft or ground vehicle systems; mind-guided drones or missiles; or the mechanisation of soldiers via exoskeletons and advanced sensors. At the same time, tDCS applications have been shown to regulate the human brain itself, affecting the brain’s executive functions, learning mechanisms, memory, language processing, sensory perception, and motor functions. Current work with tDCS focuses on recovery from PTSD and treatment of mental ailments like obsessive compulsive disorder. But the technology also provides for the possibility of raising soldiers’ cognitive and physical capabilities: to analyse scenarios more easily and quickly; to retain and retrieve memories with greater acuity; to modulate perceptions of pain; to improve psychological self-protection; and to embed muscle memory and motor skills more quickly. Another controversial aspect of tDCS is the potential to look inside the mind of the user, to display and play back past memories on an external monitor, or even to insert synthetic memories and images into the mind. Biochemical research has focused on enhancements to human physiology and cognitive function via drugs, genetic modification and biological derivatives. Combinations of nootropic compounds, both natural and synthetic, have been shown to rebalance and optimise neurochemistry for improved brain and nervous system function and efficiency. These have the potential for raising alertness and attention; speeding up reaction times; enhancing endurance and mental resilience; reducing apprehension and fear; and improving group dynamics and coordination. Recovery aspects include the treatment of depression, PTSD, memory loss, and dementia. Behavioural research is focused on the modification and improvement of cognitive and motor function through learning algorithms, virtual reality and biofeedback methods. Virtual reality environments have already demonstrated their use in the training of pilots, tank crews and infantry. Mental acuity can be enhanced by training and gamification algorithms. Behaviour and personal habits can be altered by reinforcement learning methods. Applications focus on both improvement and recovery, with recent advances in the treatment of PTSD and behavioural disorders. The integration of real-time cognitive and physiological user data (e.g., measures of attention, heart rate, etc.) opens a new vista for raising physical and cognitive performance. Motivational stimuli can be delivered back to the user based on his current physiological and mental state via machine learning-derived algorithms. The future of a personal coach on an intelligent FitBit that motivates and guides you to peak performance may not be too far away. The aggregation of anonymised data from individual performance outcomes into big datasets could further improve these algorithms. The result may be a FitBit that knows you better than you know yourself. There are several ethical considerations for CBT that may transcend even AI in their complexity. First is the issue of personal agency. If CBT is able to motivate, enable, and even control human decision making and action, where does individual responsibility end? Are soldiers responsible for their actions when under the influence of advanced CBT, and under what conditions? Relatedly, how does the Alliance ensure that there is sufficient consent for the use of CBT for individuals tasked to use the technology? These technologies can be invasive, both physiologically and mentally, and have the potential to cause harm, particularly as we do not fully understand their unintended cognitive and biological consequences. In addition, significant privacy concerns will be raised once these technologies can enter our minds and see our most private thoughts and memories. What are the limits of such searches? And what are the protections for physiological and cognitive data, and who may store and control their dissemination or cause their deletion? More generally, what protections will we have against the potential of mind control, cognitive erasure, and reprogramming? The Alliance’s success with CBT will depend upon well-designed principles and practices relating to these ethical considerations, since the adoption and integration of these technologies will be based on the consent and acceptance of Allied governments and their societies at large. As in the case of AI, the Alliance and member governments will need to develop principles of responsible use, addressing such issues as privacy, consent, lawfulness, responsibility and governability.

#### International norms are key

**Kosal and Putney 02/08** (Margaret Kosal and Joy Putney, Associate Professor in the Sam Nunn School of International Affairs at Georgia Institute of Technology, where she also directs the Sam Nunn Security Program., PhD in Quantitative Biosciences from the School of Biological Sciences at Georgia Institute of Technology and was a National Science Foundation Graduate Research Fellow. Sam Nunn Security Program Fellow through the Sam Nunn School of International Affairs at GT, focusing on the national security and policy issues surrounding dual-use neurotechnologies like brain-machine interfaces. Cambridge University Press, "Neurotechnology and international security", 02/08/2022, https://www.cambridge.org/core/journals/politics-and-the-life-sciences/article/neurotechnology-and-international-security-predicting-commercial-and-military-adoption-of-braincomputer-interface-bci-in-the-us-and-china/29155A74DBB0FDE5CB0CBA4D3DF6AF0C, accessed on 6/18/2022)//gideon

The effects described here for the specific relationship between China and the United States reflect the broader reality of the impact of BCIs and neurotechnologies generally on the international security landscape. Early innovators and adopters of BCIs may have the opportunity to set international norms for their use in both civilian and military contexts for human enhancement. BCIs have both offensive and defensive capabilities in military contexts, while also possessing clear clinical and therapeutic uses that will promote social good, complicating their categorization and treatment in the international community. Existing international treaties or conventions on weapons do not cover neurotechnologies, and it is unclear whether existing conventions could neatly and efficiently do so. It will be necessary for both nations and the international community at large to grapple with the ethical, legal, and social implications of BCIs as they begin to see widespread use by civilians and military personnel.

### 2AC – Security Cooperation Key

#### Unpredictable dual-use research bypasses traditional defenses - preventative regulations through security cooperation is key

**Breedlove and Kosal 19** (Phillip Breedlove and Margaret Kosal, a retired four-star general in the United States Air Force who served as the commander of U.S. European Command, as well as the 17th Supreme Allied Commander Europe of NATO Allied Command Operations, Associate Professor in the Sam Nunn School of International Affairs at Georgia Institute of Technology, where she also directs the Sam Nunn Security Program. Her research explores the relationships among technology, strategy, and governance. Hoover Institution, "Emerging Technologies and National Security: Russia, NATO, & the European Theater", 2/25/2019, https://www.hoover.org/research/emerging-technologies-and-national-security-russia-nato-european-theater, accessed on 6/18/2022)//gideon

Communication of those new discoveries is occurring faster than ever, meaning that the unique ownership of a piece of new technology is no longer a sufficient position, if not impossible. The information revolution and globalization themselves have been major drivers. It is widely regarded that recognition of the potential applications of a technology and a sense of purpose in exploiting it are far more important than simply having access to it today. Technological surprise has and will continue to take many forms. A plethora of new technologies are under development for peaceful means but may have unintended security consequences and will certainly require innovative countermeasures. For example, tremendous developments in biotechnology have occurred since the advent of recombinant DNA and tissue culture-based processes in the 1970s. If the potential for biotechnology to affect fundamental security and warfighting doctrines had been more clearly recognized twenty years ago, the situation today could be very different. Defense against biological weapons—from both states and non-state actors—currently presents a threat that is difficult to predict and for which traditional solutions are increasingly less effective and offers an area for strategic foresight to be valuable.

The dual use conundrum applies to all modern technologies. Because of the other characteristics of the changing strategic environment, it is of greater concern. Historically, dual use previously referred to technologies that could be meaningfully used by both the civilian and military sectors. In light of an ever-changing security environment in which the potential for technologies to be misused by both state and non-state actors has become increasingly prevalent, however, a new conceptualization of dual use, in which the same technologies can be used legitimately for human betterment and misused for nefarious purposes, such as terrorism, has emerged. The National Institutes of Health’s Office of Science Policy has promulgated a similar understanding of dual use in its discussions and policies on biosecurity. In keeping with these understandings, this work adopts a similar definition of dual use as research “conducted for legitimate purposes that generates knowledge, information, technologies, and/or products that could be utilized for both benevolent and harmful purposes,”8 i.e., research that can have beneficial impacts as well as unintended deleterious consequences.

Within international security, there is a rich literature exploring the intersection of science, technology, and understanding the outcomes of armed conflict.9 Similarly, for scholars of science and technology studies, the intersection of new technology and weapons application has a rich literature.10 For strategists and scholars of revolution in military affairs (RMA)11 and of fourth and fifth generation warfare (4GW & 5GW),12 the nexus between technology and military affairs is not just speculation but a reality that bears directly on the propensity for conflict and outcomes of war, as well as the efficacy of security cooperation and coercive statecraft. It is a critical variable in international security: military outcomes and technological advances are intricately tied.

### 2AC – US Key

#### Federal funding ensures ethical groundwork for future generations–US key to prevent eugenics

Dohn 18 (Dohn, Michael R. 2018. "Preventing an Era of New Eugenics: an Argument for Federal Funding and Regulation of Gene Editing Research in Human Embryos." Richmond Journal of Law & Technology, vol. 25, no. 2, 2018, pp. 23-26. HeinOnline.)

[30] Regardless of which side of the germline-gene-editing-fence one falls, genomic editing of human embryos is currently happening in several parts of the world. 128 Importantly, an outright ban in the U.S. on gene editing research in human embryos would not only fail to curtail research in other countries, but it may also drive scientists to other parts of the world to perform such research. 129 Moreover, existing research involving human embryos has shown that gene editing technology is nowhere near perfected. 130 As one scholar has noted, "[c]urrent genome editing technology does not have sufficient efficiency and specificity to be reliably safe ... and [off-target] effects will not always be benign or predictable.. , "131 Thus, more research is needed to ensure that if and when this technology becomes commonplace, it is safe and reliable. Rather than promulgate laws to directly regulate the use and application of gene editing techniques themselves, the U.S. government has chosen to address the issue of gene editing research in human embryos at the level of the purse. If gene editing research was endorsed and adequately funded in the U.S., however, it could be tightly controlled to ensure that it is used for appropriate purposes, thereby satisfying proponents of such research while also addressing relevant ethical concerns. IV. FUNDING & REGULATING GENE EDITING IN HUMAN EMBRYOS [31] Congress should enact legislation allowing for federal funding of gene editing research in human embryos. Such legislation should be enacted in concert with additional regulations to ensure that public monies are used appropriately. Funding gene editing research would promote, rather than stifle, innovation, and by providing a proper regulatory framework, Congress can ensure that the safety and ethical concerns associated with this technology are adequately addressed. A. Permitting Federal Funding for Gene Editing Research in Human Embryos [32] A major concern for opponents to gene editing research in human embryos is that the absence of oversight could lead to the misuse of the technology and the creation of designer babies. However, allowing federal funding for gene editing research in human embryos will drive both regulatory and ethical oversight of this field of research. Issuance of federal grants by the NIH requires that recipients "comply with all applicable Federal statutes . . . regulations, and policies. 13 Current compliance regulations are extensive and include a wide-range of oversight activities, such as reporting requirements, public welfare protections, and compliance site visits.I33 Additionally, permitting federal funding for this area of research will ensure that the research remains in the public domain, thus allowing for transparency and public oversight through peer-review of research and sharing of data and research resources. 34 In the absence of public funding for gene editing research, however, "there is a risk that research will move offshore and/or to areas where it is subject to fewer regulations and less oversight and where work is done without transparency." '35 [33] The lack of federal funding for genome editing research in human embryos is also putting the U.S. behind other countries in the quest for knowledge, discovery, and technology. While gene editing in human embryos is not banned in the U.S., the lack of available public funds severely hampers domestic advancement of gene editing technologies.'36 Jennifer Doudna, a leader of the research team holding multiple U.S. patents for CRISPR-Cas9 technology, 3 7 argues that federal funding of basic research "lays the groundwork for future innovation" and "is critical to encourage our scientists to pursue not just the challenges that are relatively easy, or obviously profitable, but the ones that are fiendishly hard-yet crucial." '138

#### Lack of federal funding prohibits the US from being able to remain a leader in the field–must increase funding to prevent research outsourcing

Dohn 18 (Dohn, Michael R. 2018. "Preventing an Era of New Eugenics: an Argument for Federal Funding and Regulation of Gene Editing Research in Human Embryos." Richmond Journal of Law & Technology, vol. 25, no. 2, 2018, pp. 26-28. HeinOnline.)

In addition to promoting innovation, federal funding for gene editing technologies has economic benefits. While some U.S. biotech firms may benefit from the export of the technology to other jurisdictions, the development and improvement of the technology for use in humans is occurring primarily in other countries.139 Thus, the U.S. is deprived of any economic benefits deriving from the development of such technologies on its own soil and is losing an edge in its ability to recruit the best scientists and researchers in this burgeoning field. 140 [34] To be sure, CRISPR-Cas9 research in human embryos is currently being conducted in the U.S.; 141 however, such research is funded only by private organizations. 142 This highlights the notion that restrictive federal funding policies "do not necessarily prevent certain research or the development of new technologies from taking place." 143 However, the amount of private funding for biomedical research is dwarfed by public funding levels: it was estimated that in 2015, federal funding for basic research in life sciences was nearly forty times greater than available private funding in that sector. 144 By removing restrictions on funding for gene editing research in human embryos, it is more than likely that funding levels for research in this field will increase several-fold, thereby promoting the rapid development of this technology within U.S. borders. [35] There are also international security concerns associated with a failure to fund gene editing research. By not fostering the industry's development in the U.S., the technology is driven overseas where it may one day be used to develop military applications. 145 Countries that fund and permit development of the technology in human embryos may be able to "create 'super soldiers' to dominate future battlefields." '46 Gene editing technology is more likely to be used to develop biological weapons focused on ecological and agricultural issues,147 and the threat of "super soldiers," if ever realized, is likely a long way off. However, it remains a concern that needs to be taken seriously and closely monitored, 148 even if it borders on science-fiction. [36] By recognizing that withholding federal funding will not prevent gene editing research in human embryos and will instead drive the industry to other parts of the world, Congress has an opportunity to retain control of this technology's development and ensure that the U.S. remains a leader in this field. Public funding of gene editing research in human embryos will provide economic, military, and social benefits, and by controlling the purse, Congress can maintain tight regulatory control and oversight to ensure that the technology is not used for unethical and socially harmful purposes. B. Essential Criteria for Gene Editing Regulations [37] Currently in the United States, the regulatory framework regarding gene modification in humans is sparse. The only federal law that references heritable genetic modification is the Consolidated Appropriations Act of 2016, which merely restricts federal funding for gene modification research in human embryos. 149 If public funding was made available for gene editing research involving human embryos, Congress would also need to enact legislation providing for the regulation of the industry.

### 2AC – US Key – AT: Privatization

#### Industry botches cognitive biotech – profit incentives reinforce privilege and exclusivity

**Fourneretis 4/1** (Éric Fourneretis, Assistant-professor in philosophy University of Lille. IAI News, "The Dangers of Musk's Neuralink", 4/1/2022, https://iai.tv/articles/the-dangers-of-musks-neuralink-auid-2092, accessed on 6/30/2022)//gideon

Elon Musk is designing an electronic brain implant. The implant could help people with disabilities, improve our cognitive abilities and even lead to a form of digital immortality. But the technology is not without its dangers. The ability for a select few to enhance themselves and not others, could pose an existential threat to our societies, writes Éric Fourneret.

"Neuralink" is a start-up created by Elon Musk in 2016. The company’s main aim is brain implants development by means of electronic chips that are inserted into the brain and equipped with a form of artificial intelligence. This kind of technology focuses on helping persons with disabilities, for example, to communicate or to move. At first glance, "Neuralink" does not seem to present any particular ethical difficulties. Helping persons with disabilities respects the principle of beneficence, in other words, it acts or has qualities of mercy, kindness, generosity, charity, altruism, love, humanity, and promoting the good of others. But Elon Musk clarified his goal: "Over time I think we will probably see a closer merger of biological intelligence and digital intelligence" (World Government Summit in Dubai). And he continued: "Some high bandwidth interface to the brain will be something that helps achieve a symbiosis between human and machine intelligence.” In 2020, Musk indicated that "you could upload, you could basically store your memories as a backup and restore the memories, then ultimately you could potentially download them into a new body or into a robot body".

For a long time, Elon Musk was afraid of the prospect of deep artificial intelligence, also called the "Singularity" – that is, the creation of an intelligent machine with a form of autonomy and a better organizational potential than human abilities. For him, this would be a dangerous situation which is why he supports research to merge human intelligence and artificial intelligence, and thus to avoid that the latter exceed the former. The brain implant development is conceptualized in this context, but we can notice a logical contradiction in Musk’s reasoning, e.g., developing AI to limit its advancement.

It is maybe excessive to consider Musk's thinking in terms of a philosophical system. It is rather a futurist vision of human beings, extrapolated from observable trends today, especially in space exploration, self-driving cars and the current development of AI. But, while Musk's thinking is not a philosophical system, it is nonetheless inspired by different philosophical theories. We can explore at least two of them.

The first dimension is anthropological: it is the idea of human perfectibility. We especially know it through Rousseau’s philosophy, but a version of it can be found in William Godwin’s writing: “By perfectible, it is not meant that he [the human being] is capable of being brought to perfection. But the word seems sufficiently adapted to express the faculty of being continually made better and receiving perpetual improvement; and in this sense, it is here to be understood. The term perfectible, this explained, not only does not imply the capacity of being brought the perfection, but stands in express opposition to it.” Thus, there is no apparent limit to perfectibility. This manner of understanding human perfectibility is typical to Musk’s vision of the human being.

This is an interesting aspect because a lot of people accept this sense of the notion and consider that is one of humanity’s defining features. On the one hand, it is an optimistic notion because it is full of promises for humanity’s future. As if we will always find solutions to overcome vulnerabilities that cause suffering and misfortunes, even if it generally refers to an indeterminate future.

But on the other hand, we know that progress can eventually become a new source of vulnerability. For instance, cars (1885, Tricycle Benz 1), and planes (1903, Wright brothers flight) represented a significant progress before they became a serious problem for living beings. Today they are polluting the earth and are a major threat to biodiversity. For this reason, the notion of human perfectibility can be a source of concern when it is used to justify the achievement of anything technologically possible. It is in this context that "bio-conservatives" denounce the "Neuralink" project as a moral transgression because different essential limits would be erased, limits which constitute what it means to be human. According to "bio-conservatives", the "Neuralink"' brain implant suppresses the frontier between natural/artificial, human/machine, living/no-living. Thus, the merger of human intelligence and artificial intelligence sought by Musk would be as much an artificialization of the human as a humanization of the machine.

If this type of hybridization could seriously help a person with a disability, we could have a positive moral judgment about it. If it is rather a question of access to a type of immortality by suppressing the biological body in favor of a robotic body, we could still contend that such a pursuit depends on each person’s desires, so long as there is no damage for others (minimalist ethics). But in this case how can a competition for more human performances (human being enhancement) be avoided? With the high cost of these neurotechnologies, one can fear that only a small part of the richest population will have access to them. There would be an even bigger physical and social disparity than the one we know currently, and potentially, a hierarchy of value attributed to individuals. In this case, it is not clear that we would look positively upon the Neuralink project, and it is not only a question of its purpose since it would probably not result in a co-evolution between human biology and technology, but in a domination of the latter over the former.

These last ethical elements are important because they highlight a second philosophical dimension of Musk's vision: liberalism.

Neuralink and the Musk's futurist vision of the human being supposes a philosophical theory that we name "liberalism", owed to John Locke in its modern form. We can retain at least two crucial ideas. The first is economic freedom. Everyone has the right to have a property and to use it as they see fit so long as they do not use it to cause damage to others. As a startup, Neuralink is Musk's property. The second idea is intellectual freedom, such as freedom of expression, the right to develop one’s ideas, beliefs and values. In other words, the individual’s responsibility is anchored in individual rights. All these aspects can be found in Neuralink in two dimensions: technological liberalism and moral liberalism.

Neuralink is a startup and as such, it seeks to achieve certain economic objectives to exist. We know AI development is an important growth area and it is understandable that Neuralink also adheres to this mantra of the liberal economy in its project to develop "intelligent" brain implants. More specifically, we can speak of technological liberalism to denote economic goals closely related to technological progress. Nonetheless, this correlation implies significant promises, to not say utopias. Indeed, Musk promises a form of immortality, but delivering on such a promise seem far off. This begs the following question: if the idea of immortality were not so lucrative, would Musk still want to develop a brain computer interface to upload our mind into a robotic body? But maybe it is reasonable to question whether the enhancement project is not more of a marketing strategy, possibly to support the medical aspect.

With Neuralink project, Musk does not claim to want to impose on anyone an "intelligent" device brain implant; neither, if it were even possible, to become immortal. Everyone makes their own decisions and if some individuals wish to receive a brain implant, then no one should discourage or stop them because this would imply constraining individual beliefs and values.

In other words, everyone remains free to do what they want and as long as no one causes intentional damage to another. No one has to dictate to others a particular conception of the Good. In this moral context, Neuralink is in keeping with liberalism in that nobody can claim to know what is best for someone else and in that everyone has sovereign control over their own body.

To conclude, even if we were to adhere to the idea that freedom is about every individual’s right to choose, we must consider, for example, the limited accessibility to neurotechnologies due to their cost. Namely, this could have the effect of favoring already privileged social categories for certain professions (i.e. medicine, sciences, philosophy...), or even for major political professions, such as the professions of higher administration. It would raise serious questions for democracies.

At the same time, we cannot deprive ourselves of the potential benefits of "intelligent" brain implants and their applications to help medical diagnostic and therapeutic gaps in various brain disorders, and also to improve social relations and preserve natural conditions of living beings. For this reason, brain sciences and neurotechnologies are an important field for social, ethical and philosophical reflection. Even though Neuralink is a private initiative, the "tomorrow" that this startup traces requires a form of moral responsibility which need not be only understood as an individual choice: a human community is not a sum of individuals, otherwise (if one were to consider it as such) one runs the risk of condemning the idea of humanity and humanist values). This is the reason why Musk morally cannot avoid the philosophical question – "What is Human?"

#### Industry egregiously mishandles ethics

**Zeitchik 5/3** (Steven Zeitchik, Columbia University and Yeshiva University; reporter for over 10 years; The Arthur F. Burns Prize for Foreign Reporting. The Washington Post, "Why Neuralink, not Twitter, is Elon Musk’s biggest challenge", 5/3/2022, https://www.washingtonpost.com/technology/2022/05/03/elon-musk-neuralink-twitter/, accessed on 6/30/2022)//gideon

Elon Musk’s successful bid of $44 billion to buy Twitter defied Wall Street pundits and social media wisdom. But it wasn’t brain surgery. That will be much more difficult. Viewed against the spotlight-basking Tesla or SpaceX, Musk’s private neurotech start-up Neuralink, which aims to cut small holes in patients’ skulls and insert brain implants in them, often fades into the background. Yet it is the moonshot firm that has prompted some of the entrepreneur’s biggest boasts — and might yield some of his strongest head winds. Stronger, even, than a certain social media firm. “I think he’s ultimately going to have a much harder time with Neuralink than he’ll have with all his other companies, including Twitter,” said Anna Wexler, a close observer of Neuralink and principal investigator of the University of Pennsylvania’s Wexler Lab, which focuses on emerging technology. “Medicine just has so many obstacles you don’t have in other areas, and it’s not clear he recognizes that.” Neurotech is fraught enough that Meta bailed on its long-running investment in a mind-reading device last year, before its first implant. Even as he was cranking the volume on his Twitter interest in April, Musk was touting the epic-ness of his “brain-machine interface,” or BMI — the tantalizing idea of a brain sending instructions directly to a computer. Musk said at Ted2022 that for much of the next decade, Neuralink will produce a medical wonder-tool that can cure paralysis and also “solve a very wide range of brain injuries including severe depression, morbid obesity, sleep, potentially schizophrenia — a lot of things that cause great stress to people.” Yet scientists not only eye-roll such talk as standard Muskian hype but say that it deliberately ignores highly specific challenges not found in any of his other businesses. Wexler and others note that ethical and publicity pitfalls, the slow pace of trials, the scientific uncertainty and even a 14-year-old competitor named Blackrock Neurotech, all of which could ensure that it’s nearly a decade before any Neuralink product is mass-distributed, let alone effectively cures the ills Musk describes. They also look askance at the idea that a tech magnate who’s clashed with agencies such as the Securities and Exchange Commission is going to fit comfortably in the regulation-heavy business of medical treatments. But the story is instructive not only for what it says about a freewheeling executive confronting a safeguard-heavy system but for what happens when a niche corner of science has a light thrown on it by a social media celebrity. All that wattage has created a divide within the neuro community. Is Musk a strange bedfellow they can live with to save people? Or a distraction whose hype will undermine critical research? “The simple truth is, whether academics or entrepreneurs want to accept this, a lot of people would not be talking about neurotech had Elon not made this his focus,” said Marcus Gerhardt, chief executive and co-founder of the Utah-based Blackrock. But, he added, the hype was also dangerous. “If you send a sporadic message, on the spur of the moment, to patients and get their hopes up, it’s irresponsible no matter how you try to turn it.” Ed Niedermeyer, the automotive analyst who wrote a book about Musk and Tesla, said that Neuralink is “a perfect example of what Musk does — make claims that are so extravagant he hopes you won’t spend much time thinking about them.” BMI tech works by “recording” brain signals via electrodes implanted in the brain. That recording then allows an algorithm to combine all the signals and transmit them to a computer — potentially allowing paralyzed people to walk again via a robotic limb, or ALS patients who can’t speak to type instructions for a computer-generated voice. Why Elon Musk's Twitter bid is so polarizing While meaningful signals are generated by 100-200 electrodes (Blackrock’s amount, via the “Utah Array” approach), Neuralink captures 1,024 electrodes per implant, via a breakthrough “sewing” technique. Licensed from University of California at San Francisco research, it involves the stitching together of many electrodes in a polymer thread. (An implant is the diameter of a quarter, but five times thicker.) Neuralink was founded in 2016 but little publicized until a streaming event three years ago. Musk’s current boasts that he could make tetraplegics walk again are in fact a reining in of his promises then; at that presentation, he went far beyond medical uses to pledge that Neuralink’s devices could “achieve a sort of symbiosis with artificial intelligence” and “ultimately help secure humanity’s future as a civilization relative to AI.” Musk has talked less about AI-melding recently (scientists say it is, at best, many decades away). But he has kept the hype machine churning. “Short-term: solve brain/spine injuries. Long-term: human/AI symbiosis,” he tweeted in January 2021. Last April, Neuralink released a viral video that showed a monkey playing Pong with its mind. It set the Internet ablaze with 6 million views and dozens of awed news articles. But publicity coups can come with crisis. In February, Neuralink acknowledged that at least some of its 23 experiment monkeys died, after the animal rights-minded Physicians Committee for Responsible Medicine sent a letter to USDA alleging “apparent egregious violations of the Animal Welfare Act.” The group said the monkeys “had their brains mutilated in shoddy experiments and were left to suffer and die.” Neuralink has denied the charges, saying it is “absolutely committed to working with animals in the most humane and ethical way possible.” The company has also faced staffing challenges. Neuralink’s longtime executive Max Hodak left last year amid reports he was uncomfortable with Musk’s accelerated timelines for new products. Six of the eight original scientists — many from UCSF, including a highly touted researcher named Philip Sabes — have also left the firm. Sabes and Hodak did not reply to requests seeking comment. Requests for comment from both Neuralink and Musk were not returned. Elon Musk as owner is a long-feared reality for Twitter employees FDA approval for implantable medical devices is a deliberate process, aimed at laying down every speed bump before doctors are allowed to surgically implant machines. Musk’s M.O., of course, is to move fast and crack china. The mogul initially said he would start human trials by the end of 2020, then postponed them to 2021. In January, he said he was hiring a director of those trials to begin this year; no such director has yet been announced. Meanwhile, neuroscientists question the company’s prowess as a research center, noting that the MindPong video was essentially executed by researchers nearly 20 years ago. “They are a great engineering company, making smaller, slicker products that are wireless and use Bluetooth and so definitely a step forward,” said one neuroscientist at a top university who spoke on the condition of anonymity so as not to jeopardize future relationships with Musk. “But they are not a research company, and it is testament to how good a publicist he is that much of the country doesn’t realize that.” And while 1,024 electrodes implanted in the brain instead of a couple hundred is an advance, neuroscientists say, it offers no demonstrable edge in human-mobility applications; Blackrock’s decade-old tech can basically do the same thing. That company already has FDA-approved devices implanted in 32 patients in trials around the world. Blackrock also tends to articulate far more measured timelines. “It feels like there are two companies basically doing the same thing. One is doing it the right way and Elon Musk is doing it the wrong way,” said Laura Cabrera, an associate professor of engineering science and mechanics at Pennsylvania State University who follows neurotech companies. She particularly questioned human trials, asking how a company with few formal ties to medical institutions might convince people to let it insert devices into their brains. “I really don’t know where he’ll find subjects,” Cabrera said. “Maybe on Twitter?” Another neuroscientist who spoke on the condition of anonymity so as not to jeopardize relations with Musk worried that bold promises left unmet could also, over time, dampen public and investor interest, and even choke off lifesaving research. Musk has undeniably propelled a wave of capital so far. Neuralink has raised at least $363 million in venture investment, including $100 million from Musk and an undisclosed sum from Google Ventures. Shortly after the MindPong video, Blackrock announced a $10 million venture round, its first, including an infusion from the venture-capital provocateur Peter Thiel. Two months later, Musk, Thiel’s PayPal co-founder, announced Thiel had also invested in Neuralink. This marks a sea change. After the collapse of a groundbreaking company called Cyberkinetics in the late 2000s (Blackrock acquired and is founded on its research), funding for neurotech essentially dried up until Musk came along. “Companies, Neuralink and otherwise, that are playing in this space make me feel very grateful,” said Paul Nuyujukian, director of Stanford University’s Brain Interfacing Laboratory and one of the field’s founding pioneers. “Because it validates everything the academic community has been doing for so many years and paints a picture of the promise of this field for improving medical outcomes for people with significant brain disease.” He said he was troubled, but only slightly, by the kind of far-off speculation offered by people like Musk. “Vision is good. You need to have vision to be able to reach a goal. It’s the making of promises that I think is dangerous because you can mislead the public." “We just need to make sure,” he said, “that, when we’re laying out a vision of where we’re going, we’re also being honest about where we are.”

### 2AC – AT: Ban the Plan CP

#### BCIs are good – they prevent casualties

**Kosal and Putney 02/08** (Margaret Kosal and Joy Putney, Associate Professor in the Sam Nunn School of International Affairs at Georgia Institute of Technology, where she also directs the Sam Nunn Security Program., PhD in Quantitative Biosciences from the School of Biological Sciences at Georgia Institute of Technology and was a National Science Foundation Graduate Research Fellow. Sam Nunn Security Program Fellow through the Sam Nunn School of International Affairs at GT, focusing on the national security and policy issues surrounding dual-use neurotechnologies like brain-machine interfaces. Cambridge University Press, "Neurotechnology and international security", 02/08/2022, https://www.cambridge.org/core/journals/politics-and-the-life-sciences/article/neurotechnology-and-international-security-predicting-commercial-and-military-adoption-of-braincomputer-interface-bci-in-the-us-and-china/29155A74DBB0FDE5CB0CBA4D3DF6AF0C, accessed on 6/18/2022)//gideon

In the mid-2000s, BCIs are already a fully developed, deployable technology used by military personnel. There is a major offensive against a densely populated urban city controlled by insurgents. The goal of the operation is to take control of the city from the insurgents while minimizing civilian casualties. Military units with enhanced personnel lead an assault on the city. Personnel with visual enhancement BCIs discriminate between insurgents and civilians using artificial intelligence (AI) identification that presents an overlayed sensory indicator on their visual field. Other personnel use auditory-enhancement BCIs that allow them to receive real-time translations of the languages being used by insurgents and civilians, providing actionable intelligence. The insurgents left improvised explosive devices and other incendiary traps at key locations in the city. Personnel with BCIs defuse devices using an extremely dexterous arm robot that can be controlled remotely, avoiding the potential for setting off the device near the unit or location detection by the insurgents, while also allowing for simultaneous control of a firearm. Finally, these enhanced units can communicate telepathically with each other via brain-to-brain communication enabled by BCIs, relaying important battlefield information silently. These enhanced units can do reconnaissance, clear deadly devices from the streets, and effectively minimize civilian casualties. This results in fewer personnel casualties during the overall offensive.

#### BCIs are key to health care, entertainment, gaming, and environmental control

**AABME 17** (The Alliance of Advanced BioMedical Engineering, an ASME initiative designed to stimulate biomedical innovation by bringing together and providing resources to the biomedical engineering community. Frost & Sullivan, "Brain-Computer Interface Hold a Promising Future", 2017, https://aabme.asme.org/posts/brain-computer-interface-the-most-investigated-areas-in-health-care-hold-a-promising-future, accessed on 7/7/2022)//gideon

Brain-computer interface (BCI) technology is a growing field, which is estimated to be worth more than $1 billion globally. Frost & Sullivan research indicates that the health care segment occupies the largest share (52%) of this market and is expected to draw the highest demand in coming years. Read about some of the latest advances. Brain-computer interface (BCI) technology is a growing field of interest with medical applications ranging from prevention, detection, and diagnosis to rehabilitation and restoration. A BCI is a combination of hardware and software communications that allow humans to control external devices such as computers through cerebral activity alone. Extensive BCI research is being done to develop devices that aid people with disabilities, particularly those affected by neurological and neuromuscular conditions such as spinal cord injury, brain strokes, and amyotrophic lateral sclerosis. Commonly Used BCI Technologies Electroencephalography (EEG), which records electrical activity directly from the brain through electrodes placed on the scalp, remains the top neuroimaging method for BCI-based products because it is extremely cost-effective and portable. Magnetoencephalography (MEG) and functional magnetic resonance imaging (fMRI) have shown promise in BCI research due to their non-invasive characteristics and good temporal and spatial resolution. MEG uses magnetometers to capture the magnetic fields produced by the brain’s electrical activity; fMRI uses MRI technology to detect changes in the brain’s blood flow. Some of the most promising BCI application areas are explained below. Wheelchair Assistance Disabilities affecting locomotion degrade quality of life and reduce life expectancy. Scientists have been considering invasive and non-invasive approaches to help people who use wheelchairs. The non-invasive approach is preferred because of its ease of use and limited or no discomfort. Paraplegics or those with other locomotor disabilities can drive wheelchairs using EEG-enabled BCI devices. Users can activate three levels of assistance with a BCI-powered wheelchair: obstacle avoidance, collision avoidance and orientation recovery. Laser scanners on the wheelchair enable a degree of autonomy by detecting potential obstacles, allowing the device to accordingly evaluate the situation. The main challenge with these BCI-powered wheelchairs is the lack of accurate, real-time control because of infrequent signals and low information transfer rate. As a result, research continues in the development of invasive devices that are driven by user decisions and overcome the commonly faced low bit rate of non-invasive BCIs. Invasive BCI systems include electrodes that are implanted in the brain. These solutions have yet to evolve completely because current offerings can be painful and require regulatory approval before use. Proof of efficacy requires extensive clinical trials that are costly and time-consuming, which can discourage some manufacturers. The University of Twente in the Netherlands is among the academic institutions exploring the use of BCI systems in wheelchair mobility. Similar research in prosthesis and environment control is continuing at the University of California with the goal of helping paraplegics regain basic brain-controlled motion. Motor Restoration to Treat Several Neurological Disorders Evaluation of brain signals through EEG recording can help treat spinal cord injuries and neurological disorders such as migraines and cluster headaches, and can aid in neuroprosthetics. Restoring the Sense of Touch Researchers from the University of Chicago have developed a BCI solution that could restore the sense of touch for paralyzed patients. The solution consists of a robotic arm that is connected to the user’s brain via BCI technology. This solution is based on biomimetic mapping-based BCIs that aim to capture the natural relationship between cortical activity and volitional arm or hand movement that is then used to control a prosthetic arm or orthosis. The robotic arm provides a sensory feedback based on the patterns recorded in the system transmitted from the electrodes that are implanted in the brain of the user. The FDA is in the process of approving similar devices for human trials. Speech Recognition from Neural Networks Speech recognition technologies are among the most widely adopted across many industries. Researchers from the University of Bremen, Germany, are exploring the development of a BCI solution that can understand neural signals suitable for automatic speech recognition (ASR) to help people with speech impairments. EEG, fMRI, MEG and near infrared spectroscopy are being investigated as enabling technologies. The concept is still in the early stages of research. Research has been demonstrated with epilepsy patients, and the capability of decoding brain signals for ASR accurately was validated. Artificial Neural Networks Using Memristors Researchers from the University of Southampton in the United Kingdom are developing a computational system to mimic the human brain. The low-power, nanoscale memristor device could be integrated into prosthetics and implants to detect neural signals and produce movement. The research is still in its early stages. What’s the Future? The BCI market, which is estimated to be worth more than $1 billion globally, includes health care, entertainment and gaming, neuromarketing and environment control. Frost & Sullivan research indicates that the health care segment occupies the largest share (52%) of this market and is expected to draw the highest demand in coming years. Advancements in prosthetics and implantable electronics are expected to complement BCI developments. Patent filings in the areas of neuroprosthetics, rehabilitation, epilepsy treatment and robotics have been extremely promising in the last five years, but classification of any BCI-based device as medical therapy requires regulatory approval. Manufacturers’ willingness to invest in clinical trials will be crucial for success.

#### No intelligent AI

**Vasilaki 18** (Eleni Vasilaki, Professor of Computational Neuroscience, University of Sheffield. The Conversation, "Worried about AI taking over the world? You may be making some rather unscientific assumptions", 9/24/2018, https://theconversation.com/worried-about-ai-taking-over-the-world-you-may-be-making-some-rather-unscientific-assumptions-103561, accessed on 7/7/2022)//gideon

Should we be afraid of artificial intelligence? For me, this is a simple question with an even simpler, two letter answer: no. But not everyone agrees – many people, including the late physicist Stephen Hawking, have raised concerns that the rise of powerful AI systems could spell the end for humanity. Clearly, your view on whether AI will take over the world will depend on whether you think it can develop intelligent behaviour surpassing that of humans – something referred to as “super intelligence”. So let’s take a look at how likely this is, and why there is much concern about the future of AI. Humans tend to be afraid of what they don’t understand. Fear is often blamed for racism, homophobia and other sources of discrimination. So it’s no wonder it also applies to new technologies – they are often surrounded with a certain mystery. Some technological achievements seem almost unrealistic, clearly surpassing expectations and in some cases human performance. But let us demystify the most popular AI techniques, known collectively as “machine learning”. These allow a machine to learn a task without being programmed with explicit instructions. This may sound spooky but the truth is it is all down to some rather mundane statistics. The machine, which is a program, or rather an algorithm, is designed with the ability to discover relationships within provided data. There are many different methods that allow us to achieve this. For example, we can present to the machine images of handwritten letters (a-z), one by one, and ask it to tell us which letter we show each time in sequence. We have already provided the possible answers – it can only be one of (a-z). The machine at the beginning says a letter at random and we correct it, by providing the right answer. We have also programmed the machine to reconfigure itself so that next time, if presented with the same letter, it is more likely to give us the correct answer for the next one. As a consequence, the machine over time improves its performance and “learns” to recognise the alphabet. In essence, we have programmed the machine to exploit common relationships in the data in order to achieve the specific task. For instance, all versions of “a” look structurally similar, but different to “b”, and the algorithm can exploit this. Interestingly, after the training phase, the machine can apply the obtained knowledge on new letter samples, for example written by a person whose handwriting the machine has never seen before. Humans, however, are good at reading. Perhaps a more interesting example is Google Deepmind’s artificial Go player, which has surpassed every human player in their performance of the game. It clearly learns in a way different to humans – playing a number of games with itself that no human could play in their lifetime. It has been specifically instructed to win and told that the actions it takes determine whether it wins or not. It has also been told the rules of the game. By playing the game again and again it can discover in each situation what is the best action – inventing moves that no human has played before. Now does that make the AI Go player smarter than a human? Certainly not. AI is very specialised to particular type of tasks and it doesn’t display the versatility that humans do. Humans develop an understanding of the world over years that no AI has achieved or seem likely to achieve anytime soon. The fact that AI is dubbed “intelligent” is ultimately down to the fact that it can learn. But even when it comes to learning, it is no match for humans. In fact, toddlers can learn by just watching somebody solving a problem once. An AI, on the other hand, needs tonnes of data and loads of tries to succeed on very specific problems, and it is difficult to generalise its knowledge on tasks very different to those trained upon. So while humans develop breathtaking intelligence rapidly in the first few years of life, the key concepts behind machine learning are not so different from what they were one or two decades ago.

#### No AI Impact

**Pierce 2/17** (Rj Pierce, Reporter and Tech Enthusiast. Tech Times, "Why You Shouldn't Be Scared Of AI Taking Over The World ", 2/17/2022, https://www.techtimes.com/articles/271938/20220217/why-ai-wont-take-over-the-world.htm, accessed on 7/7/2022)//gideon

AI has been the subject of countless popular TV shows and movies over the years-just not in a relatively positive way. In these shows, it always seems like artificial intelligence will decide to completely wipe out humanity and civilization from existence. It's a bleak "prediction," but does it actually have any basis in reality? According to several scientists, the feared dangers of AI aren't much of an existential threat to humanity as a whole. And that depends on one thing: whether it is even possible for us to create artificial intelligence way smarter than we are, writes ScienceAlert. The AI that exists right now is pretty powerful in its own right. It is what's being used for things like self-driving cars, facial recognition software, and even Google recommendations. But the thing with current-gen AI is that it's considered "narrow" or "weak." While this kind of artificial intelligence is already quite good, they're often only capable of doing one thing exceptionally, according to LabRoots. If you try to make them do something else while doing something they're good at, these AIs will fail because they lack the necessary data to perform it. Current-generation artificial intelligence still falls short of tasks that will always require abilities that only humans possess, writes Forbes. For instance, experienced surgeons are still the best choice for performing surgeries, with their fine motor skills and skill at perceiving individual situations. You also can't use an AI to replace HR professionals, because the job will require a deep, intrinsic understanding of human reactions that a machine just doesn't have, no matter how "advanced" it might be. It is these kinds of situations where combining machine and human intelligence still reigns supreme. The human element provides the machine with the necessary context, while the latter is put to work crunching numbers and giving recommendations. In an article by The Conversation, they put this specific argument forward. A machine can always "learn" if it is fed data about the task it's meant to achieve. Sure, it can process information much faster than a human can (and perhaps even come up with solutions no person can ever think of), but it doesn't make the machine smarter than a human at all. Here's one situation where machine learning is still way behind human learning. Take a toddler, for instance. That child can learn how to do a specific task within seconds just by watching somebody do it. A machine can only learn something if it is fed an extremely massive amount of data, which it uses when performing trial-and-error according to Synthesys. At the end of the day, it still falls on the human element of the issue. You should be far more scared of how humans use artificial intelligence, and not the AI itself. This is considering the technology's capability to draw conclusions from whatever data is being fed to it and how it can only focus on one task at a time. In other words, an AI trained to do something good, like identifying climate change tipping points, is not dangerous at all. But a machine which is trained in something bad, like warfare, can be extremely perilous. So don't be scared of robots taking over the world, because people-not the perceived dangers of AI-will still be the most critical aspect of civilization's downfall.

## 2AC – AT: DA – General

### 2AC – Thumpers – Cog Biotech Invest Now

#### **The DoD has already invested in cognitive biotechnology – thumps.**

Alia-Novobilski, 17 (Marisa Alia-Novobilski, "Tri-Service effort leverages synthetic biology expertise to address future warfighter need", Wright-Patterson AFB, https://www.wpafb.af.mil/News/Article-Display/Article/1326042/tri-service-effort-leverages-synthetic-biology-expertise-to-address-future-warf/, 9-27-2017, Accessed 6-26-2022)//ILake-SG

WRIGHT-PATTERSON AIR FORCE BASE, Ohio -- Taking advantage of Department of Defense research laboratory expertise in chemistry, biology, computer science and material science and engineering, a collaborative, $45 million tri-service effort is changing the way the DoD exploits biological systems to meet the unique needs and challenges of defense environments. The Applied Research for the Advancement of Science and Technology Priorities Program on Synthetic Biology for Military Environments, funded by the Office of the Secretary of Defense, unites subject matter experts from the Air Force, Army and Navy. The effort is aimed at creating organic capabilities and infrastructure for the use of synthetic biology in the DoD as a key enabler for future defense technology. Synthetic biology, though well established in industry, is still a relatively new field of application for the DoD. This interdisciplinary field combines the understanding of how genes operate and are organized in cells with engineering principles, to modify organisms for beneficial applications in areas such as performance augmentation, sensor development and materials synthesis, to name a few. “There are consumer products on the market that depend on this technology. We’re trying to grow its use in the DoD,” said Dr. Claretta Sullivan, a research scientist at the Air Force Research Laboratory’s Materials and Manufacturing Directorate, who is also the Tri-Service Program Manager for SBME. “Our team is looking at ways we can reprogram cells that already exist in the environment to create environmentally friendly platforms for generating molecules and materials beneficial for defense needs.” By leveraging the subject matter expertise based in each of the DoD research laboratories, the SBME program seeks to establish a multi-functional, joint capability in synthetic biology, ultimately creating an ecosystem that ensures the U.S. military remains at the forefront in the field as it applies to defense objectives. Nearing the end of the first of three years, the program is already facilitating a higher level of technical awareness and cooperation among the Service Labs. At its end, enduring capabilities and expertise in synthetic biology will be the program’s legacy for years to come. “This provides us with the opportunity to create that cross-cutting infrastructure and ensure there is effective communication between the DoD labs,” said Dr. Rajesh Naik, the SBME lead based at the AFRL’s 711th Human Performance Wing. “We have the smarts within the DoD when it comes to SynBio, but we are now developing the infrastructure and community to exploit the advantages for our needs.” According to Naik, with synthetic biology as a field that is a “mile wide and a mile deep,” the SBME team recognized a need to focus their technical efforts and resources early in the program planning process to best enable success and continued collaboration beyond its end. An Executive Steering Committee with representation from each of the service labs was established to oversee three focused task teams, each of which is led by a different service lab. They are augmented by a technical advisory group comprised of external academic, industrial and federal partners who advocate for the SBME team in the larger community. It’s a complex arrangement, but it is critical to ensuring focused efforts on program priorities. “Keeping the team in close communication is a challenge. We have regular meetings and virtual telecoms nearly every week,” said Sullivan. “The fact that the team members are able to do this is remarkable and reflects their commitment to do good science and the best work possible for the DoD.” The three SBME task teams combine the expertise, capabilities and tools from each of the service labs into a single, focused effort to meet the aim of a task effort. For example, the Navy Laboratory is leading a tri-service task team focused on developing systems biology tools in an open systems architecture, with the goal of creating a set of collaborative tools to enable SBME applications. Another task, led by the Air Force, is working to develop and prototype a cell-based system that is optimized for use in military environments. The Army labs are leading the effort to develop cell-free platforms for testing and delivering the genetic components. The task teams are comprised of members from each of the different service laboratories, which facilitates a larger knowledge base and broader set of tools accessible to the group. A strong focus on standardizing protocols and methodologies pervades all of the task efforts to ensure effective information sharing across the domain. “The program is really beneficial in helping to make sure that different service labs do not replicate the same efforts. We can take advantage of the work that is going on across the labs and within the overall SynBio community,” said Dr. Banahalli Ratna, Naval Research Laboratory. Though this collaborative effort is less than one year old, the members are already seeing the upshots of their efforts. In addition to standardizing protocols and enterprise sharing environments, several scientific publications have resulted from collaborative efforts within the group, and a working demonstration of a complicated, responsive gene network which operates in a simulated environment is expected to be delivered by the end of the effort. Additionally, the Air Force, Army and Navy Research Laboratories will each field a team for the International Genetically Engineered Machine (iGEM) Foundation’s iGEM Competition in Boston, November 2017. This international competition enables high school and college-aged student teams to compete as they address problems using synthetic biology, ultimately evolving the field and contributing to the future of the science in this area. The competition not only augments the scientific field, but adds a healthy dose of fun and competition to the SBME community. "This Tri-service investment is allowing Army, Navy and Air Force to each field their own iGEM teams for the first time. This gives us a healthy dose of fun competition,” said Dr. Peter Emanuel, a senior scientist for biological engineering for the Army. In the end, the SBME program is a unique, dedicated effort committed to advancing the field of synthetic biology by leveraging the expertise embedded in each of the military research laboratories to the benefit of our nation’s warfighters across the spectrum. “The DoD represents the largest research and development effort within the federal sector, and we’re spread out over Air Force, Army and Navy bases that may be hundreds of miles apart. This program has made me more aware of the capabilities in the DoD than ever before--without this awareness, leveraging of capabilities would never be possible,” said Emmanuel.

#### **Both the 2023 National Defense Authorization Act and the DoD are planning on investing in the incorporation of biotechnology into the military – thumps.**

Donnelly 6-7 (John M., "House Armed Services panel aims to bolster biomanufacturing", Roll Call, https://rollcall.com/2022/06/07/house-armed-services-panel-aims-to-bolster-biomanufacturing/, 6-7-2022, Accessed 6-26-2022)//ILake-SG

The House Armed Services Cyber, Innovative Technologies, and Information Systems Subcommittee’s portion of the fiscal 2023 National Defense Authorization Act would seek to foster biotechnology that could improve the U.S. military’s effectiveness. The mark aims to create new biomanufacturing facilities, among other steps, to help transition biotech for potential military use from the experimentation stage all the way into production. “We are hopeful that this will provide a new and much needed capability to transition products successfully proven in the lab to the commercial scale and provide that intermediate step that is currently very difficult for a lot of technologies to bridge,” a subcommittee aide told reporters Tuesday. The legislative text and draft report language from the panel is also replete with provisions designed to encourage innovation and efficiency in the Defense Department’s use of information technology, software, sensors and the like. The subcommittee made the bill and report language public on Tuesday and plans to mark it up on Wednesday. On June 22, the full committee is scheduled to hold its marathon annual markup, which will wrap up all its subcommittees’ marks into one measure, add the full committee's changes and then report it to the House. The Senate Armed Services Committee, meanwhile, plans to mark up its version of the bill next week. The NDAA has become law for 61 years in a row. Biotech push The Innovative Technologies Subcommittee’s mark would require the creation of a new class of biomanufacturing capabilities and facilities under the rubric of the Manufacturing USA Institute, a public-private initiative begun in 2014. The defense-related institute would either be new or would expand an existing one that is focused on biomanufacturing. The measure defines biomanufacturing as “the use of living organisms, cells, tissues, enzymes, or cell-free systems to produce materials and products for non-pharmaceutical applications.” The subcommittee’s mark would encourage biotech research into the creation of materials such as “polymers, coatings, resins, commodity chemicals” and other materials with fragile supply chains. “So instead of your traditional chemical manufacturing — that might have complicated supply chains or might not be environmentally friendly — they're looking at this bioindustrial manufacturing as an alternative way of creating these products,” a subcommittee aide said. The mark also enables research into new chemicals and materials, including carbon neutral cement and carbon negative commodity chemicals, the committee said in a statement. The measure would require the Pentagon to analyze the biotechnology industrial base and recommend ways to enhance its domestic manufacturers. And the panel’s mark would ask the department to look into the feasibility of deploying biomanufacturing plants overseas to ease supply chain concerns.

### 2AC – Thumpers – NATO Cog Biotech Now

#### NATO solves cognitive bitoech in industry – DIANA can regulate EDTs, but it won’t be here until 2025 – the aff is key

**NATO 4/7** (NATO. NATO, "Emerging and disruptive technologies ", 4/7/2022, https://www.nato.int/cps/en/natohq/topics\_184303.htm, accessed on 7/1/2022)//gideon

Technologies such as artificial intelligence (AI), autonomous weapons systems, big data, biotechnologies and quantum technologies are changing the world, and the way NATO operates. These and other emerging and disruptive technologies (EDT) present both risks and opportunities for NATO and Allies. That’s why the Alliance is working with public and private sector partners, academia and civil society to develop and adopt new technologies, strengthen the Allied industrial base and maintain NATO’s technological edge. Emerging and disruptive technologies are increasingly touching all aspects of life – from electronics like phones and computers, to everyday activities like shopping for food in the grocery store and managing money in the bank. These technologies are also having a profound impact on security. Innovative technologies are providing new opportunities for NATO militaries, helping them become more effective, resilient, cost-efficient and sustainable. These technologies, however, also represent new threats from state and non-state actors, both militarily and to civilian society. To embrace these opportunities and at the same time counter these threats, NATO is working with Allies to develop innovative and agile EDT policies that can be implemented through real, meaningful activities. By working more closely with relevant partners in academia and the private sector, NATO aims to maintain its technological edge and military superiority, helping deter aggression and defend Allied countries. Emerging and disruptive technologies are also a key facet of the NATO 2030 initiative, an initiative to strengthen the Alliance militarily, make it stronger politically and adopt a more global approach. NATO 2030 is about making sure that the Alliance remains ready to face tomorrow's challenges. Promoting transatlantic cooperation on critical technologies is a vital component of that work. In February 2021, NATO Defence Ministers endorsed “Foster and Protect: NATO’s Coherent Implementation Strategy on Emerging and Disruptive Technologies.” This is NATO’s overarching strategy to guide its relationship to EDTs and has two main focuses: fostering the development and adoption of dual-use technologies (i.e. technologies that are focused on commercial markets and uses, but may also have defence and security applications) that will strengthen the Alliance’s edge, and creating a forum for Allies to exchange best practices that help protect against threats. NATO’s innovation activities currently focus on nine key areas: The Alliance is developing specific plans for each of these areas, starting with AI and data, which will be implemented by Allies and by NATO’s Innovation Board. In October 2021, NATO Defence Ministers endorsed the first of these strategies, NATO’s Artificial Intelligence (AI) Strategy. The AI Strategy centres around principles of responsible use for AI in defence and their operationalisation. It also outlines how the Alliance will adapt AI capabilities and protect Allied citizens against their use. Defence Innovation Accelerator for the North Atlantic (DIANA) At the 2021 NATO Summit in Brussels, Allied Leaders agreed to launch the Defence Innovation Accelerator for the North Atlantic (DIANA) to foster transatlantic cooperation on critical technologies, promote interoperability and harness civilian innovation by engaging with academia and the private sector. DIANA includes a network of more than 10 Accelerator sites and over 50 Test Centres in innovation hubs across the Alliance. The Accelerator works directly with leading entrepreneurs, from early-stage start-ups to more mature companies, to solve critical problems in defence and security. DIANA will launch competitive Challenge Calls based on critical defence and security problem sets, fostering the most impactful technological solutions developed by the best and brightest entrepreneurs from across the Alliance. Innovators that are accepted into DIANA will gain access to non-dilutive financing (investment capital that does not require them to give up equity or ownership in their company). They will also gain access to a network of top-tier trusted investors, business mentorship and education from DIANA’s expert staff, state-of-the-art testing opportunities, and the possibility for development and adoption contracts with Allies for proposed dual-use technologies. DIANA will begin pilot activities as early as summer 2023. Once fully operational in 2025, it will have the capacity to interact with hundreds of innovators each year across an even wider network of Accelerator sites and Test Centres throughout the Alliance. NATO Innovation Fund NATO Leaders also agreed at the 2021 Brussels Summit to establish a NATO Innovation Fund. The EUR 1 billion venture capital fund will provide strategic investments in start-ups developing dual-use emerging and disruptive technologies in areas that are critical to Allied security. The Fund will be the world’s first multi-sovereign venture capital fund. Many start-ups working on deep technologies (transformational technologies that solve important challenges through the convergence of breakthrough science and engineering) struggle to attract sufficient investment because of lengthy time-to-market timelines and the high capital intensity of their research. The NATO Innovation Fund will tackle this problem by leveraging its unique position as a patient investor with a 15-year run-time better suited to the extended time horizons necessary for deep-tech start-ups. It will focus on early-stage investments (i.e. pre-seed through Series A and follow-on), providing risk capital directly into these start-ups, while also having the ability to invest in other top-tier deep-tech venture capital funds that align with the Fund’s three strategic objectives: All NATO Allies currently have the opportunity to opt-in to the Fund, whose list of participating countries will be finalised at the NATO Summit in Madrid in June. The Fund is scheduled to be up and running shortly thereafter, with its initial investments expected in the first quarter of 2023. NATO Advisory Group on Emerging and Disruptive Technologies The NATO Advisory Group on Emerging and Disruptive Technologies is an independent group that provides external advice to NATO on how it can optimise its innovation efforts. The Group, established in July 2020, consists of 12 experts from the private sector and academia across the Alliance who have led cutting-edge research, developed EDT policy and managed innovation programmes. These experts provide their recommendations to NATO’s Innovation Board. The Group provided four initial recommendations to NATO: improve technology literacy throughout the Organization; establish a network of Innovation Centres; design and facilitate new financing mechanisms for innovation with private sector entities, both small and large; and create innovation partnership initiatives with external EDT stakeholders from industry and academia. In its second annual report, the Group examined three critical, ongoing work-strands aimed at enabling NATO and Allies to adopt new technologies at pace and maintain a technological edge: DIANA, the Innovation Fund and the Human Capital Innovation Policy (which contains recommendations for NATO on how to attract, retain and develop talented employees with technical skills and innovation mindsets). The forthcoming report aims to identify the unique features of NATO endeavours in these domains, suggest metrics of success for each, and outline issues and risks that need to be considered. The Advisory Group will continue to provide concrete short- and long-term recommendations on NATO’s approach to emerging and disruptive technologies. NATO’s Innovation Board NATO’s Innovation Board is chaired by the Deputy Secretary General and brings together high-level civilian and military leadership from across the Alliance. The purpose of the Board is to look at new ideas from outside of the Organization, provoke discussion, foster adoption of best practices and secure cross-NATO support for changes that will help NATO innovate. This includes receiving recommendations from the NATO Advisory Group on Emerging and Disruptive Technologies. Other NATO innovation bodies Other NATO bodies are also invested in the Alliance’s innovation activities, and are driving technological development and adoption across NATO. Allied Command Transformation (ACT) leads capability development for NATO and Allied militaries, and is currently working on a large range of EDT-related projects, including on unmanned autonomous vehicles, military-grade blockchain applications, and artificial intelligence in military decision-making. NATO’s Science and Technology Organization (STO) also supports numerous EDT-related research projects, including on augmentation technologies for improving human performance, autonomous transport and medical systems for casualty evacuation, and space weather environmental modelling. NATO’s Science for Peace and Security Programme (SPS), the Centre for Maritime Research and Experimentation (CMRE), and the NATO Communications and Information Agency (NCIA) are also key nodes in NATO’s innovation ecosystem as the Alliance adapts to and adopts EDTs. NATO’s focus on EDTs is strongly linked to cooperation with partners in the public and private sector, academia and civil society. Given that many defence applications of EDTs are developed by or with the private sector, engagement with industry – especially start-ups – is key.

#### Everything is thumped

**NATO 4/7** (NATO. NATO, "Emerging and disruptive technologies ", 4/7/2022, https://www.nato.int/cps/en/natohq/topics\_184303.htm, accessed on 7/1/2022)//gideon

NATO has been supporting innovation, both in Allied armed forces and in its own capabilities, since it was founded more than 70 years ago. However, the new wave of emerging and disruptive technologies is creating rapid and large-scale changes – not only in everyday life, but also in security and defence. The timeline below lays out recent milestones in the development of NATO’s EDT policies. December 2019 – NATO Leaders agree an Emerging and Disruptive Technology Implementation Roadmap. The purpose of this roadmap is to help structure NATO’s work across key technology areas, and enable Allies to consider these technologies’ implications, for instance for deterrence and defence, and capability development. July 2020 – NATO Secretary General Jens Stoltenberg establishes the Advisory Group on Emerging and Disruptive Technologies. The group consists of 12 external experts from the private sector and academia, from countries across the Alliance. These experts provide advice to NATO’s Innovation Board on the adoption of new technologies. September 2020 – The NATO Advisory Group on Emerging and Disruptive Technologies presents recommendations to NATO’s Innovation Board, including on innovative technologies that NATO should be pursuing as a priority. February 2021 – NATO Defence Ministers endorse NATO’s Coherent Implementation Strategy on Emerging and Disruptive Technologies. March 2021 – The NATO Advisory Group on Emerging and Disruptive Technologies publishes its first annual report, on 2020, providing four key recommendations for NATO: improve technology literacy throughout the Organization; establish a network of Innovation Centres; design and facilitate new financing mechanisms for innovation with private sector entities, both small and large; and create innovation partnership initiatives with external EDT stakeholders from industry and academia. June 2021 – At the 2021 Brussels Summit, NATO Leaders agree to launch the Defence Innovation Accelerator for the North Atlantic (DIANA) and to establish a NATO Innovation Fund. October 2021 – NATO Defence Ministers endorse NATO’s Artificial Intelligence (AI) Strategy. Seventeen Allies sign up to develop the framework for the NATO Innovation Fund, establishing how it will work in practice. An additional four Allies join this process over the following months. April 2022 – NATO Foreign Ministers approve the charter for DIANA, which outlines its mission and strategy; legal authorities; governance; and the regional offices, Accelerator sites and Test Centres that will make up its initial footprint. Twenty-one Allies agree the framework for the NATO Innovation Fund. All NATO Allies currently have the opportunity to opt-in to the Fund, whose list of participating countries will be finalised at the Summit in Madrid in June.

### 2AC – Thumpers – NATO Emerging Tech

#### All DAs are thumped

**NATO 6/30** (NATO. NATO, "NATO launches Innovation Fund", 6/30/2022, https://www.nato.int/cps/en/natohq/news\_197494.htm, accessed on 7/1/2022)//gideon

On Thursday (30 June 2022), at a signing ceremony hosted by NATO Secretary General Jens Stoltenberg, Leaders and Ministers from 22 Allied countries\* launched NATO’s Innovation Fund, the world’s first multi-sovereign venture capital fund. "This fund is unique", the Secretary General said, "with a 15-year timeframe, the NATO Innovation Fund will help bring to life those nascent technologies that have the power to transform our security in the decades to come, strengthening the Alliance’s innovation ecosystem and bolstering the security of our one billion citizens." The Fund will invest 1 billion euros in early-stage start-ups and other venture capital funds developing dual-use emerging technologies of priority to NATO. These include: artificial intelligence; big-data processing; quantum-enabled technologies; autonomy; biotechnology and human enhancement; novel materials; energy; propulsion and space. The Fund will complement NATO’s Defence Innovation Accelerator for the North Atlantic – or DIANA – which will support the development and adaptation of dual-use emerging technologies to critical security and defence challenges. There has also been significant progress for DIANA at the 2022 Madrid Summit where Allies agreed that innovators participating in DIANA’s programs will have access to a network of more than 9 Accelerator Sites and more than 63 Test Centres across Europe and North America. \*Belgium; Bulgaria; Czech Republic; Denmark; Estonia; Germany; Greece; Hungary; Iceland; Italy; Latvia; Lithuania; Luxembourg; Netherlands; Norway; Poland; Portugal; Romania; Slovakia; Spain; Türkiye; United Kingdom.

#### Emerging tech is the only problem - 18 new initiatives solve every other threat to cohesion

**NATO 6/22** (NATO. NATO, "Multinational capability cooperation", 6/22/2022, https://www.nato.int/cps/en/natohq/topics\_163289.htm, accessed on 7/1/2022)//gideon

To carry out its missions and tasks, NATO needs Allies to invest in interoperable, cutting-edge and cost-effective equipment. To that end, NATO plays an important role in helping countries decide how and where to invest in their defence. The Alliance also supports Allies in identifying and developing multinational cooperative projects to deliver the key defence capabilities needed for Alliance security. There are currently 18 projects underway that will deliver improved operational effectiveness, economies of scale and connectivity among NATO Allies and partners. These projects address key capability areas such as air-to-air refuelling, ammunition, maritime unmanned systems, command and control, and training. In addition, countries continue to discuss promising areas for multinational cooperation in order to provide cost-effective security. Command and control Command and control (C2) consists of the leadership and direction given to a military organisation in the accomplishment of its mission. C2 is key in carrying out any NATO operation successfully and makes the operation work smoothly and efficiently. The projects below present examples of how C2 can be handled at a multinational level. Composite Special Operations Component Command (C-SOCC) Special Operations Forces today increasingly operate in a multinational context. This is why having a multinational headquarters for their management is key. NATO Allies Belgium, Denmark and the Netherlands agreed to create a tri-national command – C-SOCC – which, after having become fully operational at the end of 2020, is participating in the NATO Response Force and could also be responsible for supporting multinational missions as well as NATO operations. Regional Special Operations Component Command (R-SOCC) Four Allies – Croatia, Hungary, Slovakia and Slovenia – and NATO partner Austria have agreed to put together, under Hungarian leadership, a regional deployable headquarters to manage Special Operations. Regional NATO Special Operations Forces across the Alliance will provide clear benefits in terms of speed and resilience to respond to arising crises. R-SOCC reached its Initial Operational Capability in May 2021, and Full Operational Capability is expected to be reached by the end of 2024. Command and Control Capability for Surface Based Air and Missile Defence for the Battalion and Brigade Level (SBAMD C2 Layer) The SBAMD C2 Layer project aims to facilitate the potential acquisition and fielding of an air defence management solution to enable a layered surface-based air and missile defence approach. The commonly acquired SBAMD C2 Layer capability will reduce the number of systems currently in use by NATO Allies and therefore increase interoperability and resilience. This HVP involves eight NATO Allies: Denmark, France, Hungary, Italy, Portugal, Spain, the United Kingdom and the United States. Training structures All Allied forces – whether on land, in the air or at sea – need good training to confront a variety of security challenges and to perform their duties. Multinational training enables forces of different Allies to train together, improve coordination and cooperation, and increase their readiness. Multinational Special Aviation Programme (MSAP) Special Operations Forces are a highly valuable and versatile tool for effectively responding to evolving security threats. To further strengthen NATO in this domain, four Allies – Bulgaria, Croatia, Hungary and Slovenia – have decided to create a Multinational Special Aviation Programme (MSAP) dedicated exclusively to training aircrews who will conduct the insertion and extraction of Special Operations Forces. This training facility, stationed in Zadar, Croatia, is being established in a gradual manner, expanding the training opportunities offered over time. The aviation training centre officially opened its doors on 11 December 2019, contributing to NATO's adaptability and readiness. The first group of students graduated from a first training module in October 2020. NATO Flight Training Europe (NFTE) Delivering state-of-the-art pilot training is an increasingly costly and challenging endeavour. For many European Allies, the national pilot requirements needed each year are too small to justify the establishment or maintenance of national flight centres. To overcome this challenge, the NFTE initiative aims to create a network of multinational training facilities for fighter jet, helicopter, fixed wing, and drone pilots across Europe, leveraging already existing structures to the maximum extent possible. The establishment of the NFTE will significantly decrease the current reliance on US training facilities by making European Allies capable of training their own flight crews in a multinational context. As such, the NFTE serves as an excellent example of transatlantic burden-sharing. In the margins of the 2021 NATO Summit in Brussels, 10 Allies – Belgium, the Czech Republic, Greece, Hungary, Italy, Montenegro, North Macedonia, Romania, Spain and Türkiye – signed a Memorandum of Understanding for NFTE, under which the first two training campuses have since been established, namely in the Czech Republic and Italy. High-end acquisition Equipment used in NATO operations and missions differs in size and cost. While some types of equipment are small and affordable, other capabilities may be too big or too expensive for single countries to operate in an economically viable way. Countries are cooperating on several high-end projects that they could not afford individually. Multi Role Tanker Transport Capability (MRTT-C) The MRTT is a multi-function aircraft that can serve to transport cargo, troops and as an aerial refuel tanker. Air-to-air refuelling tankers are especially critical for the projection of air power. As they are a pooled asset, interoperability is essential. The MRTT-C project enables the six participating Allies – Belgium, the Czech Republic, Germany, Luxembourg, the Netherlands and Norway – to collectively acquire Airbus A330 Multi Role Tanker Transport aircraft and establish a multinationally owned and operated fleet of MRTTs. The first aircraft was delivered in June 2020 and the last delivery is scheduled in 2024. For this initiative, NATO and the European Union (EU) joined forces, as both organisations identified shortfalls in air-to-air refuelling and the participating Allies, with the exception of Norway, are also members of the EU. As such, it is an example of the close cooperation between NATO and the EU. Maritime Multi Mission Aircraft (M3A) When it comes to maritime defence and security, it is vital for NATO to provide continuous situational awareness and anti-submarine warfare capabilities. As a shared starting point for future implementation activities, eight NATO Allies – Canada, France, Germany, Greece, Italy, Poland, Spain and Türkiye – created under the Maritime Multi Mission Aircraft project (M3A) a common set of requirements. France and Germany took a first step forward by starting to develop a Maritime Airborne Warfare System (MAWS), which will serve as a maritime situational awareness tool. Maritime Unmanned Systems (MUS) An increasingly important capability to secure NATO's ability to actively respond to threats in the maritime area is unmanned systems. To facilitate multinational cooperation in this area, 16 NATO Allies – Belgium, Bulgaria, Canada, Denmark, France, Germany, Greece, Italy, the Netherlands, Norway, Poland, Portugal, Spain, Türkiye, the United Kingdom and the United States – and NATO partner Australia have joined forces via the MUS initiative to develop tailor-made solutions including, but not limited to, systems for detecting and clearing mines, and tracking submarines. Next Generation Rotorcraft (NGRC) Helicopters – or, more broadly, vertical lift capabilities – are an integral enabler for the operations of Allied forces. Yet, a large percentage of helicopters in service are based on models introduced as far back as the 1960s. To ensure that NATO maintains its technological edge in this area, five Allies – France, Germany, Greece, Italy and the United Kingdom – signed a Letter of Intent in October 2020 to develop and acquire the next generation of medium multi-role helicopters, ready for an in-service date in the 2035-2040 timeframe. The Netherlands joined the NGRC project in June 2022, bringing the number of participating Allies to six. Through NGRC, Allies will benefit from advances not only in airframe and propulsion technology (including hybrid and electric options), but also in the digital infrastructure of the capability, ensuring that helicopters and other vertical lift vehicles will be ready to serve Allied forces for the next decades. Modular Solution for Ground Based Air Defence Capabilities (Modular GBAD) NATO has been working for years to strengthen its air and missile defence capabilities in order to protect its populations, territory and forces against increasingly sophisticated air threats. The Modular GBAD effort includes 15 Allies – Belgium, Denmark, France, Germany, Hungary, Italy, Latvia, the Netherlands, Norway, Poland, Portugal, Slovenia, Spain, the United Kingdom and the United States. It aims to jointly develop and acquire a flexible and scalable GBAD system to counter air threats at very short, short and medium range. The system will be designed around a common Command and Control backbone. Due to its modular nature participants will be able to design tailored GBAD force packages for individual operations. Rapidly Deployable Mobile Counter Rockets, Artillery and Mortar (C-RAM) Effective protection of Allied forces and forward-deployed bases against rockets, artillery and mortar threats is a key requirement to ensure NATO's readiness. The C-RAM initiative launched in October 2020 by four Allies – Germany, Greece, Hungary and the United Kingdom – aims to develop and procure a rapidly deployable capability to detect and destroy incoming rockets, artillery and mortar rounds in the air, before they hit the ground. A particular focus will be on exploring highly innovative solutions to reduce operational cost while increasing resilience of the systems against high-volume attacks. Ammunition Ammunition is an essential part of every military operation. In order to ensure NATO Allies and partner countries are well equipped, four projects have been launched at multinational level. Air Battle Decisive Munitions (ABDM) This project is a multinational framework for acquiring all air battle decisive munitions and aims to increase the flexibility in stockpile management by reducing legal and technical obstacles for sharing and exchanging munitions among the 14 participating Allies – Belgium, the Czech Republic, Denmark, Greece, Hungary, Italy, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, the United Kingdom – and partner country Finland. This is enabling the Alliance to bridge the interoperability gap in this area, which NATO first encountered during its operation in Libya, as well as support the European Allies in reducing dependence on the United States when it comes to air missions. This framework has, so far, already delivered significant cost and time savings to its participants through several rounds of multinational acquisition. Land Battle Decisive Munitions (LBDM) Modelled after its parent project above, the LBDM project creates a multinational framework for acquiring munitions for land domain. It currently gathers 20 Allies and three partner countries – Belgium, Croatia, the Czech Republic, Denmark, Estonia, France, Germany, Italy, Latvia, Lithuania, Montenegro, the Netherlands, North Macedonia, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, the United Kingdom, as well as Austria, Finland and Sweden – making it the largest of the High Visibility Projects. It increases the Alliance's ability to share munitions and work more smoothly in the field. Over time, this initiative will help troops increase their interoperability and effectiveness, harmonise munitions inventories and enable participants to operate seamlessly and effectively together. Maritime Battle Decisive Munitions (MBDM) NATO Allies Belgium, France, Italy, the Netherlands, Poland, Portugal, Spain, and partner country Finland agreed to combine munitions purchases in the maritime domain, including surface-to-air and surface-to-surface missiles, torpedoes and gun shells. The potential establishment of common warehousing solutions could lower costs even further. This effort presents an important first step towards creating European stockpiles of high-quality maritime munitions that meet the Alliance's evolving needs. Multinational Ammunition Warehousing Initiative (MAWI) Ammunition storage is a vital element of NATO's stockpile planning and a key enabler for NATO operations. In the aftermath of the 2021 NATO Summit in Brussels, Allied Defence Ministers from a number of countries started this initiative to define a single operational principle under which the participants can create and operate a wide range of warehousing solutions for Allies and partners. The scalable, expandable and flexible approach gives participating countries the option to adapt the storage solution to their needs while benefitting from significant cost reductions. The MAWI includes 10 Allies – Belgium, Estonia, France, Greece, Italy, the Netherlands, Norway, Slovakia, Slovenia and Spain – as well as the NATO Support and Procurement Agency (NSPA). Chemical, biological, radiological and nuclear (CBRN) defence Chemical, biological, radiological and nuclear (CBRN) agents represent complex threats and distinct challenges to NATO and Allied security. Three multinational projects have been launched to help Allies coordinate training, share information and acquire equipment that will increase the level of preparedness amongst Allied CBRN defence forces. Network of CBRN Defence Facilities (CBRN-DF) In October 2021, nine NATO Allies agreed to establish a framework to connect various CBRN defence facilities within a single architecture. This will help make the capabilities of these centres – which range from live agent training sites to analytical laboratories – more widely available across the Alliance. Participants include Belgium, Greece, Italy, Latvia, the Netherlands, Poland, Spain, the United Kingdom and the United States. CBRN Protection Equipment (CBRN-PE) The CBRN Protection Equipment HVP provides 10 participating NATO Allies – Albania, Belgium, Greece, Hungary, Italy, Latvia, the Netherlands, Spain, the United Kingdom, and the United States – with a framework to jointly procure individual protective gear and collective protection systems for their military units and personnel. This project was agreed in the margins of the NATO Defence Ministers' meeting in October 2021. CBRN Detection and Identification (CBRN-D&I) Similar to the above project for the procurement of protection equipment, the CBRN Detection and Identification HVP provides participating Allies with a framework to jointly develop and procure more advanced solutions for detecting and identifying CBRN agents. This project was agreed in the margins of the October 2021 meeting of NATO Defence Ministers by nine Allies: Albania, Belgium, Greece, Italy, Latvia, the Netherlands, Poland, the United Kingdom, and the United States. Allies are constantly exploring new multinational initiatives to develop, in the most cost-efficient way, the key capabilities the Alliance needs to face today’s security challenges. In the same vein as the Smart Defence initiative launched by then NATO Secretary General Anders Fogh Rasmussen in 2012, multinational capability cooperation is also helping the Alliance develop, acquire and maintain capabilities in a cost-effective and efficient manner. NATO’s High Visibility Projects (HVPs) focus on delivering the most critical capabilities in an accelerated manner by creating political commitments in the form of agreements signed by defence ministers. An initial document, also called a Letter of Intent (LOI) – outlining the general cooperation idea – is signed by the defence ministers involved in the project. It is followed by the signature of a Memorandum of Understanding (MOU), a legally binding document specifying the details of cooperation. The MOUs provide the necessary legal framework for the execution of the implementation phase towards the delivery of the specific capability. The high-level political involvement dramatically increases the prospects of expedient and tangible progress. In the implementation phase of most projects, the NATO Support and Procurement Agency (NSPA) is the intermediary between the countries and industry. This can happen at different levels: NSPA can invite industry to present solutions for Allies and partners to acquire, be involved in the procurement process, or even negotiate on behalf of countries with industry. The Conference of National Armaments Directors (CNAD) – the senior NATO committee that brings together the top national officials responsible for defence procurement in NATO member and partner countries – is also involved in multinational capability cooperation. It is tasked with identifying collaborative opportunities for research, development and production of military equipment and weapons systems, and is responsible for a number of cooperative armaments projects that aim to equip NATO forces with cutting-edge capabilities.

### 2AC – Russia Econ Low

#### Russia’s economy is definitely collapsing – our source: Russia’s central bank governor

Christiaan Hetzner 5-2-22 Christiaan Hetzner is a writer for Fortune covering Europe’s changing business landscape. He’s reported from Germany for the past two decades and is passionate about tracking industry’s intersection with finance and policy as they collectively target a net-zero society. Shaped by his time in Frankfurt covering the collapse of the dotcom stock market bubble for Dow Jones Newswires, he joined Reuters in 2004 before shifting to commentary and features for Automotive News Europe ten years later. Hailing from upstate New York, he is a graduate of Georgetown University. [Russia faces its biggest economic collapse since Putin rose to power, https://fortune.com/2022/05/02/russia-faces-its-biggest-economic-collapse-since-putin-rose-to-power/]//WA

Russia is about to suffer the most severe economic collapse since Vladimir Putin rose to power at the turn of the millennium, as [sanctions imposed](https://fortune.com/2022/05/02/europe-russia-oil-sanctions-cost-of-living-crisis/) on the country after he invaded Ukraine are expected to wreak more damage than any previous crisis the Russian strongman has faced. On April 29, Russian [central bank governor Elvira Nabiullina](https://fortune.com/2022/04/22/russian-official-admits-sanctions-crippling-economy-country-grapples-with-sell-off-mass-shortages-ukraine-covid/) slashed the country's interest rates by three percentage points for the [second time in less than a month](https://www.cbr.ru/eng/press/pr/?file=08042022_114000key_eng.htm), after forecasting a severe recession, soaring prices, and coming labor market upheaval as the country pays the price for its unprovoked war. “Supply is contracting more significantly than demand, which is intensifying inflationary pressure,” [she said](https://www.cbr.ru/eng/press/event/?id=12858). Gross domestic product is expected to nosedive by a minimum of 8% this year, and could even shrink by as much as 10%, the most since 1994, according to the World Bank. Nabiullina dismissed the Russian government's [rosy first-quarter GDP figure](https://interfax.com/newsroom/top-stories/78752/), which showed an expansion of 3.7%, as nothing more than a temporary effect driven by people stocking up on goods before they disappear. As inventories gradually run out, the damage will continue to worsen over the course of the year and peak in the final three months of this year, according to her analysis. The central bank governor singled out the country’s auto industry, with its complex cross-border supply chains, as a prime casualty of the sanctions. “Companies that used foreign raw materials or components are facing problems as they are gradually running out of stocks," she said. No V-shaped recovery next year Like many emerging economies dependent on raw material exports, Russia has had other sharp contractions before: The country's output experienced a 3% decline during the 2020 pandemic and a 7.8% drop in 2009 following the global financial crisis. But even in Nabiullina's more optimistic scenario, she estimates that this year's plunge in GDP following Western sanctions will easily top those, if not blow them out of the water. Making matters worse, Nabiullina predicted the economy would not snap back next year, as it had done previously. Instead, in a best-case scenario, it would stagnate on an annual basis in 2023, and at worse decline by a further 3%. Consumer prices could soar by 18% to 23% this year, with the rate of increase only set to cool significantly from next April, the bank forecasts. On Friday, Russia's [main interest rate](https://www.cbr.ru/eng/press/pr/?file=29042022_133000Key_eng.htm) fell to 14%, although it still remains elevated compared to the 9.5% [just prior to February’s invasion](https://www.cbr.ru/eng/press/pr/?file=11022022_133000Key_eng.htm). But whether the latest cut will help animate people to spend money anytime soon amid the uncertainty over the war is another matter. “People now prefer to save rather than consume,” Nabiullina told reporters.

## 2AC – AT: DA – DOD Tradeoff

### 2AC – AT: Link – BCI

#### It costs 38 million dollars at most – that’s 0.005% of the DoD budget

**DoD 20** (DoD. Office of the Secretary Of Defense, "Department of Defense Fiscal Year (FY) 2021 Budget Estimates", Feb 2020, https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2021/budget\_justification/pdfs/03\_RDT\_and\_E/RDTE\_Vol3\_OSD\_RDTE\_PB21\_Justification\_Book.pdf, accessed on 6/23/2022)//gideon

COST ($ In Millions) Prior Years: 47.891 FY 2020: 42.101 FY 2021 Base: 37.580 FY 2021 OCO: FY 2021 Total: 37.580 FY 2022: 38.676 FY 2023: 39.512 FY 2024: 40.759 FY 2025: 41.761 Cost to Complete: Continuing Total Cost: Continuing The nine Lincoln Laboratory (LL) research areas that comprise the overall research and development portfolio are described below. Four core-technology areas: • Advanced Devices emphasizes the development of devices and subsystems utilizing microelectronic, photonic, biological, and chemical technologies to enable new approaches to Department of Defense (DoD) systems. Efforts include technologies for high power Radio Frequency (RF) devices; multi-function, highly integrated lasers; fast and sensitive imagers; and mechanical microsystems for autonomous systems. • Optical Systems and Technology focuses on developing optical technologies for visible, infrared, and wide band spectroscopic sensing as well as communications systems. The efforts include high energy lasers; scalable focal plane imaging technology; photonic integrated circuits; optical system prototypes; and associated phenomenology measurements. • Information, Computation and Exploitation Sciences develops novel architectures, tools, and techniques for the processing, fusion, interpretation, computation, and exploitation of multi-sensor, multi-intelligence data. Efforts include innovative hardware and software technologies for graph processors and cloud computing; artificial intelligence (AI) and graph algorithms for analytics, including deep learning algorithms; multi-intelligence analytics, including open-source data processing techniques; and human-machine interfacing and automation technologies to enhance warfighter effectiveness and ability to work with advanced computing systems. • Radio Frequency (RF) Systems and Technology focuses on RF technologies to enhance warfighting capabilities in radars, electronic warfare (EW), and communications. Efforts include development of next generation phased arrays; ultra-wideband RF systems; compact RF systems; small satellite RF payload; and advanced algorithms for jammer mitigation and EW. Four emerging-technology areas: • Advanced Materials and Processes emphasizes research in new materials for additive manufacturing and emerging nanoscale materials. Efforts include research in understanding and controlling diamond chemical vapor deposition to support emerging and future applications; novel growth and transfer strategies for low-defect III-V devices; microwave circuits built with 3D printing; programmable shape change materials; and microsystems using metamaterials. • Quantum System Sciences focuses on the development of quantum-based technologies that support sensing, communication, computation, and algorithms using quantum information. Efforts include the demonstration of scalable computation platforms, magnetic field sensing using highly-compact, atomic-like defects in diamond, prototyping revolutionary quantum networking systems and technology, and research into advanced quantum algorithms and their applications. • Biomedical Sciences and Technology supports the development of bio-engineered and biomedical technologies to aid the warfighter. Efforts include brain imaging technologies; relevant research in brain and cognitive sciences including brain-computer interfacing (BCI); engineered biological systems to aid physiology understanding; and technologies to assess physical performance and enhance injury recovery. • Autonomous Systems has the objective of developing mobile, autonomous, robotic platforms, as well as sensors and algorithms that support key capabilities needed for a wide range of DoD applications. Efforts span advanced AI and processing; sensors and communications for unmanned platforms; platform designs and energy systems; human-machine interactions; and verification and validation of autonomous systems.

#### That’s half the cost of a F35 – we have 700 of them

**Insinna 3/9** (Valerie Insinna, covers the air warfare beat for Breaking Defense while also serving as point person for major Pentagon policy and strategy developments. Valerie has extensive national security reporting expertise, having served as the air warfare beat reporter for Defense News for five years. Breaking Defense, "F-35 to get more expensive in next deal, program exec says", 3/9/2022, https://breakingdefense.com/2022/03/f-35-to-get-more-expensive-in-next-deal-program-exec-says/, accessed on 6/23/2022)//gideon

WASHINGTON: Prices for the next batch of Lockheed Martin’s F-35 Joint Strike Fighters will probably be higher than the last, the Pentagon’s F-35 program head said today. However, it’s premature to say that the cost of the F-35A conventional takeoff and landing variant, which is used by the US Air Force and most international customers, will once against come in above the Pentagon’s cost goal of $80 million a copy, Lt. Gen. Eric Fick told reporters at a roundtable. “I think it’s likely that we’ll see costs rise on a tail by tail basis. I think it’s early to say where I think that they’ll end up,” Fick said. For about a year, Lockheed and the Defense Department have been embroiled in negotiations over F-35 Lots 15 through 17, which will roughly include about 400 aircraft for US and international customers. Full rate production for the F-35 is at least another year away The contract for lots 12-14, inked in 2019, included 478 F-35s for the US military and international customers. Under the terms of the agreement, an F-35A will cost $77.9 million in Lot 14, with the F-35B short takeoff and landing variant coming in at $101.3 million and the F-35C carrier variant at $94.4 million during the same period. Those prices are unlikely to stick. Many reasons why MQ-9B SkyGuardian and SeaGuardian are a number one choice for a growing number of nations. Many reasons why MQ-9B SkyGuardian and SeaGuardian are a number one choice for a growing number of nations. Lockheed has made clear that rising inflation and the cost of supplies during the COVID-19 pandemic has led to a price hike for materials that is already driving costs up on the jet. During a January earnings call, Lockheed executives also pointed to oncoming Block 4 upgrades and a potentially smaller order as cost drivers. “It’s proven more difficult than we expected to reach agreement on a cost baseline that incorporates the impacts that we see associated with our customer ordering fewer aircraft in Lots 15-17 than were ordered in the prior buys of 12-14,” John Mollard, Lockheed’s acting chief financial officer, said in January, according to Air Force Magazine. Negotiations between the government and Lockheed seem to be far from over, with Fick saying today that he is “losing confidence that we’ll get it done by the end of this month, which was our which was our revised target.” “We’re trying to figure out how we sort through the headwinds and lead through them to find a place that allows us allows us to get the aircraft we need at a cost that we can afford, while still recognizing some of those challenges that Lockheed faces,” Fick said. During a marathon markup session that started on Wednesday, the House Armed Services Committee approved an amendment that would add $37 billion to the defense topline.

## 2AC – AT: DA – Turkey Russia Relations DA

### 2AC – AT: DA – Top Level

#### Turn–Russian revisionism pushes Turkey towards the West

Dalay 5-20 (Galip Dalay is a CATS Fellow at the Centre for Applied Turkish Studies (CATS) at SWP. (5-20-2022). Deciphering Turkey's geopolitical balancing and anti-westernism in its&nbsp;relations with Russia. Stiftung Wissenschaft und Politik (SWP). Retrieved July 1, 2022, from <https://www.swp-berlin.org/en/publication/deciphering-turkeys-geopolitical-balancing-and-anti-westernism-in-its-relations-with-russia//>BVN SC)

While discontent with the West and anti-Westernism have facilitated cordial and cooperative relations between Moscow and Ankara, Russian geopolitical revisionism has almost invariably pushed Turkey closer to the West. The logic here is straightforward. First, Russian revisionism poses direct security threats to Turkey. Historically, the centre of gravity of Turkish-Russian rivalry has been the Black Sea. From the Turkish perspective, Russia’s actions – from the war in Georgia to annexation of Crimea and the invasion of Ukraine – all decisively tilt the balance of power in this region in Russia’s favour. Although Russia’s policy in each of these cases might have specifics and con­textual nuances, taken together they point to one unmistakable outcome: Russian revisionism in the post-Soviet space and an aspiration to turn the region into a sphere of domination. This will only aggravate the Turkish threat perception vis-à-vis Moscow. Second, the post-Soviet space is also Tur­key’s immediate neighbourhood. If success­ful, the Russian policy will restrict Ankara’s geopolitical room for manoeuvre in this region, and undermine its standing from the Black Sea to the Balkans and the South Caucasus to Central Asia. Additionally, Turk­ish and Western interests are in broad align­ment in these regions, so Moscow’s geo­political revisionism is likely to bring Tur­key and the West relatively closer together.

#### Turkey is turning away from Russia in support of the US–the recent Madrid summit shows Erdogan’s commitment to Western values

Outzen 7-1 (Rich Outzen is a geopolitical consultant and nonresident senior fellow at the Atlantic Council IN TURKEY with thirty-two years of US government service both in uniform and as a civilian. 7-1-22, TURKEYSource, “Experts react: What the NATO summit breakthrough means for Turkey and the Alliance”, <https://www.atlanticcouncil.org/blogs/turkeysource/experts-react-what-the-nato-summit-breakthrough-means-for-turkey-and-the-alliance//BVN> SC)

This week at their Madrid summit, NATO allies formally invited Finland and Sweden to join the Alliance. It was the latest step in a whirlwind process initiated by Russia’s invasion of Ukraine and delayed by Turkey—home to the second-largest military in the Alliance, after the United States—which argued that the Nordic countries did not sufficiently address Turkey’s national-security concerns. After weeks of tough negotiations, Turkey, Finland, and Sweden agreed to a breakthrough trilateral declaration on Tuesday. Atlantic Council IN TURKEY asked experts for their take on the implications of the summit and the trilateral declaration. Jump to an expert reaction Mehmet Fatih Ceylan: A victory for NATO unity and cohesion Ian Brzezinski: Erdogan recognizes NATO brings far more geopolitical value than Russia Rich Outzen: The summit brings Turkey’s security concerns to the fore A victory for NATO unity and cohesion The ongoing Russian aggression in Ukraine since 2014 has entirely changed the security landscape, not only in the Euro-Atlantic area, but globally. It has fundamentally altered threat perceptions beyond the Alliance, leading Finland and Sweden to officially apply for membership in NATO. These two countries have indeed crossed the Rubicon and deserted their neutrality in response to persistent Russian belligerence in the middle of Europe. Their decision to combine their efforts and assets with the Alliance against Russian aggression is natural and legitimate. Hence the need to incorporate Finland and Sweden into the Alliance family. The trilateral memorandum signed among Turkey, Finland, and Sweden on June 28 is a welcome development designed to demonstrate NATO’s solidarity and unity, and further strengthen the Alliance. It is commonplace in NATO to consult on and negotiate over any dispute among allies and would-be allies to find a common ground. That is how NATO plays its role, and at the end a solution accommodating such concerns is found by consensus. It is also true that once new members accede to NATO, they are bound by the decisions previously taken by the Alliance on a wide range of subjects. In NATO there exists a robust set of decisions and practices in fighting terrorism, beginning with the intervention in Afghanistan. Therefore, there is already an agreement comprising all sorts of conceptual work and practices in different geographical theaters on combatting terrorism, developed within NATO and binding on all members. The newly adopted Strategic Concept (SC) clearly identifies Russia and “terrorism, in all its forms and manifestations” as the primary sources of threats in a 360-degree manner and across all three core tasks of NATO: collective deterrence and defense, crisis prevention and management, and cooperative security. Given that terrorism is “the most direct asymmetric threat to the security of our citizens and to international peace and prosperity,” as defined in the SC, it makes sense both for Finland and Sweden to cooperate with Turkey in combatting terrorism as one of the primary sources of threats against Alliance interests. In a nutshell, collective deterrence and defense against actual and potential adversaries, nipping crises in the bud, and expanding the web of networks with partners under challenging circumstances are the main tasks of NATO in the next decade. The main center of gravity for NATO is its solidarity, unity, and cohesion, including all allies and those set to become allies. The summit decisions in their entirety will help NATO to navigate the troubled waters ahead over the long term. —Mehmet Fatih Ceylan is the president of Ankara Policy Center and previously served as permanent representative of Turkey to NATO. Erdogan recognizes NATO brings far more geopolitical value than Russia At their summit in Madrid, NATO leaders decided to “invite Finland and Sweden to become members of NATO, and agreed to sign the accession protocols.” This was an important breakthrough. Until now, Turkey’s President Recep Tayyip Erdogan had held up the protocols on the grounds that the two Nordic nations had embargoed his nation from defense sales and refused to extradite alleged Kurdish terrorists. Consensus was facilitated by a meeting between US President Joe Biden and Erdogan—a bilateral long sought by the Turkish leader—and memorialized via a trilateral Turkey-Sweden-Finland memorandum in which the latter two agreed to lift the embargoes, condemn the Kurdish Workers’ Party (PKK) as a terrorist organization, “address” Turkey’s pending extradition requests, and support Turkey’s involvement in European Union defense initiatives. The breakthrough underscored the influence and leadership of the United States in NATO. There is no way Erdogan would have lifted his veto solely due to European pressure. It also reflects Erdogan’s recognition that NATO brings Turkey far more geopolitical value than Russia, which would savor seeing this Nordic bid for NATO membership fail. Consensus on Finland and Sweden’s applications also demonstrated the Alliance’s unity in the face of Russia’s aggression and the difficulty Moscow still has when it comes to fully peeling Erdogan away from the transatlantic community. Once again, Putin’s strongest relationship in the Black Sea region has proven to be far more transactional than strategic. With that said, Turkey, like all the other NATO allies, still has to ratify these accession protocols. There remains ample opportunity for Erdogan to introduce additional negotiations with the rest of NATO. I am optimistic that Sweden and Finland will become NATO members, but it is still too early to say this round of NATO enlargement is a done deal. —Ian Brzezinski is a senior fellow at the Atlantic Council’s Scowcroft Center for Strategy and Security and previously served as US deputy assistant secretary of defense for Europe and NATO policy. The summit brings Turkey’s security concerns to the fore The summit was a great success for Ankara for three distinct reasons. The first is the content of the trilateral memorandum signed with Sweden and Finland: No arms embargo on Turkey, an affirmed commitment to address Turkish security concerns, no aid to the PKK or (significantly) the Kurdish People’s Defense Units (YPG), the Gulen movement mentioned as a terror concern, collaboration on the defense industry, working groups to follow—it’s hard to see what they missed. Of course, these are statements of principle, and execution or a final commitment will play out over time. But that is as true for Ankara approving accession as it is for the specified cooperation. The second reason is the ringing endorsement from the White House not only for the trilateral memorandum, but for the strengthening of Turkish air power and specifically a commitment to press Congress to approve F-16 fighter jet sales and upgrades. Notably, Sen. Lindsey Graham (R-SC) has already weighed in with a strong endorsement of the deal. The in-person meeting of presidents Biden and Erdogan was notable, too. The third reason is more subtle: the inclusion in the new, slimmed-down Strategic Concept of language on countering terrorism “in all its forms and manifestations.” This language, and the prominence given both terror concerns and the Russian military threat, address Turkish concerns and highlight the value Turkey adds to the Alliance.

#### NATO and Turkey are aligned in the ways that matter

**Ellehuus 19** (Rachel Ellehuus is deputy director and senior fellow with the Europe Program at the Center for Strategic and International Studies in Washington, D.C. “Turkey and NATO: A Relationship Worth Saving.” Turkey and NATO: A Relationship Worth Saving | Center for Strategic and International Studies, 2 Dec. 2019, [www.csis.org/analysis/turkey-and-nato-relationship-worth-saving.//BVN](http://www.csis.org/analysis/turkey-and-nato-relationship-worth-saving.//BVN) SC)

A second area where Turkey’s immediate security concerns intersect with the majority of other NATO members is stability in the Middle East, most immediately in Syria. To be sure, Turkey’s anger over United States’ partnership with the YPG in the fight against the Islamic State—appnd NATO’s anger at Turkey for its unilateral incursion into northern Syria—will make progress difficult. But ultimately, the two sides share a mutual interest in seeing stability and pluralistic governance in Syria. This entails constraining Syrian president Bashar al-Assad; preventing the return of the Islamic State and Europe-based Islamic State fighters; and facilitating the delivery of humanitarian aid, reconstruction, and refugee return. More broadly, both sides also share an interest in limiting Russian and Iranian influence in the region. With the Russian military presence in Armenia, Azerbaijan, and Crimea now supplemented by the Russian naval base at Tartus, airbases at Kobani and Khmeimim, and helicopter base[s] at Qamishli, Turkey is effectively encircled by Russia. It is in this context that German minister of defence Kramp-Karrenbauer’s suggestion of an internationally-controlled security zone along the Turkey-Syria border, possibly NATO-led and backed by the United Nations in loose partnership with Russia, makes sense. It would address a situation that immediately and directly affects the security of Europe and Turkey and demonstrate that the NATO is invested in addressing Turkey’s security concerns. Should NATO and Turkey move to restore some level of trust by taking these first steps, it will be important to avoid unnecessarily escalating tensions. For Turkey, this means abiding by the terms of the Syria ceasefire, not pursuing additional purchases of Russian military equipment, and doing its part to prevent the resurgence of the Islamic State in the region or return of Islamic State foreign fighters to Europe. For the United States and Europe, the trick will be to apply the required sanctions and arms embargoes in a discriminate way. For example, whereas imposing sanctions in accordance with the Countering America’s Adversaries Through Sanctions Act (CAATSA) and withholding delivery of Turkey’s F-35s due to its purchase of the Russian S-400 makes good policy sense, imposing additional blanket sanctions could do more harm than good, affecting the Turkish people more than their leadership and giving Erdogan another opportunity to blame the West for Turkey’s economic problems. A smarter approach might involve going after corrupt actors using the Global Magnitsky Act. Similarly, a total arms embargo by the United States and the European Union will only drive Turkey to procure more Russian or non-NATO interoperable military equipment. Rather, the arms embargoes should be limited along the lines of the most recent House sanctions bill, which includes exemptions for items to be used in NATO-approved operations. Finally, as some of Turkey’s biggest export partners, the European Union and the United States can provide needed carrots along the way to incentivize constructive behavior by Ankara. Measures might include an eventual upgrade of Turkey’s customs union with the European Union or limited visa-free travel to EU countries for Turkish citizens. For the United States, President Trump’s offer of a $100 billion trade deal will also be attractive to Erdogan in Turkey’s struggling economy. To be sure, repairing the trust that has been lost and returning Turkey to the path of Western integration will be a struggle, requiring sustained effort, and a setting aside of egos, on all sides. Yet on this occasion of NATO’s 70th anniversary, Turkey and its NATO allies owe it to one another to pause for a moment and reflect not on their many disagreements but on what brought them together in the first instance and why that still matters.

#### Turkey and NATO have a common interest in stopping enemy encroachment–that serves as a motivator within the alliance

**Congressional Research Service 21** (Congressional Research Service, December-30-2021, accessed on 1-3-2022, Congressional Research Service, "Turkey: Background and U.S. Relations In Brief", <https://sgp.fas.org/crs/mideast/R44000.pdf//BVN> SC)

Turkey’s location near several global hotspots has made the continuing availability of its territory for the stationing and transport of arms, cargo, and personnel valuable for the United States and NATO. In addition to Incirlik Air Base near the southern Turkish city of Adana, other key U.S./NATO sites include an early warning missile defense radar in eastern Turkey and a NATO ground forces command in Izmir (see Figure A-3). From Turkey’s perspective, NATO’s traditional importance has been to mitigate Turkish concerns about encroachment by neighbors, as was the case with the Soviet Union’s aggressive post-World War II posturing. Some similar Turkish concerns—though somewhat less pronounced—may stem from Russia’s ongoing regional involvement in places such as Syria and Ukraine, and may partly motivate recent Turkish military operations to frustrate some Russian objectives in various conflict arenas.86 As a result of growing tensions between Turkey and Western countries, and questions about the safety and utility of Turkish territory for U.S. and NATO assets, some observers have advocated exploring alternative basing arrangements in the region.87 Some reports suggest that expanded or potentially expanded U.S. military presences in places such as Greece, Cyprus, Jordan and Romania might be connected with concerns about Turkey.88 Additionally, Turkish actions in opposition to the interests of other U.S. allies and partners in the Eastern Mediterranean (see “Cyprus, Greece, and Eastern Mediterranean Natural Gas” below)— particularly over the past two years—have led U.S. officials to encourage cooperation among those allies and partners.89 In 2020, the Trump Administration waived restrictions on the U.S. sale of non-lethal defense articles and services to the Republic of Cyprus, effectively ending a U.S. arms embargo that had dated back to 1987, and attracting criticism from Turkish officials.90 Turkey’s influence in the Black Sea littoral region and its relationships with European countries bordering Russia make its actions in this sphere important for U.S. interests. Ongoing Turkish defense cooperation with or arms sales to Ukraine, Poland, Georgia, and Azerbaijan may present opportunities to make renewed common cause between the United States and Turkey to counter Russia.91 Alternatively, Turkey’s interactions with these other countries could possibly check both U.S. and Russian ambitions, or increase regional tensions potentially leading toward conflict.92 A case in point will be how Turkey regulates and controls other countries’ maritime access to and from the Black Sea—a limited privilege granted to Turkey in the Montreux Convention of 1936 (with provisions to give Turkey greater control when at war).93

### 2AC – AT: Impact – Turkish Economy

#### Russia cant help turkeys economy, they’re in a recession of their own

Carbonaro 6/30 (Giulia Carbonaro, US News Reporter, 6/30/22, “Russia's Economy is Collapsing, Data Reveals”, <https://www.newsweek.com/russia-economy-collapsing-data-reveals-1720532>//RM)

If Russia defaulting on its foreign debt for the first time since the Bolshevik revolution wasn't a clear enough sign of the impact Western sanctions are having on the Russian economy, a new report on the country's socio-economic situation leaves no margin for doubt that the Russian economy is gradually collapsing. New statistics on the state of the Russian economy, produced by the country's Federal State Statistics Service, show production has plunged in multiple sectors, from vehicles to domestic appliances, as has retail confidence. Overall, Russia's industrial production index—a monthly economic indicator measuring real output in the manufacturing, mining, electric, and gas industries—dropped by 1.7 percent in May compared to the same month in 2021. That's higher than the decline of 1.6 percent year-on-year reported in April. Mining dropped by 0.8 percentage points in May 2022 compared to May 2021, and manufacturing dropped by 3.2 percentage points. The overall numbers seem quite modest, but they reflect a downward trend that is more obvious in the staggering drops affecting the production of specific products. Above all, car production has suffered, and it's now down by 96.7 percent compared to 2021. Production of trucks plunged by 39.3 percent, that of diesel and gasoline engines by 57 percent, that of diesel locomotives by 63.2 percent and that of freight wagons by 51.8 percent. French automaker Renault, which controls Russia's largest carmaker AvtoVAZ, suspended operations at its Moscow plant in March, under pressure from Ukrainian leaders to act in response to Russia's invasion of Ukraine. Renault later agreed to sell its Russian operations for a nominal payment. Air cargo is down by 86 percent year on year. Other products were also affected. The production of fridges is also down by 58.1 percent compared with 2021 levels, that of washing machines by 59.2 percent, that of AC electric motors by 49.9 percent. TV sets were down by 49.7 percentage points. Production of elevators is down by 34.7 percent and that of excavators was down by 60 percent. Curiously, cigarette production also dropped by 24.5 percent. Graphs show that retail turnover and retail confidence have also gone down compared to one year before and even from the beginning of 2022. Wholesale turnover has also plunged drastically, with consumer demand dropping in what is likely a reflection of lower wages amid high inflation in the country. Even more significantly for the Russian population, pensions have also fallen in real terms, decreasing by 8.2 percentage points year-on-year in May, while salaries dropped by 7.2 percentage points in April compared to a year prior. These data are a clear sign that the Russian economy is suffering, despite the fact that the rouble bounced back after collapsing in late February following the invasion of Ukraine and that the country has held up surprisingly better than expected after Western sanctions were imposed. The drop in industrial production is less than Western economists expected, but the economic contraction of the country is still undeniable. Even the Russian central bank said it expected a fall in GDP of 7.8 percent this year, almost in line with Western predictions but not quite, as Western experts estimate that the country's economy will shrink by 15 percent by the end of the year, according to the Institute of International Finance's (IIF). One piece of unexpected good news for Russia came from the jobs market, with a record-low unemployment rate of 3.9 percent reported in May. And yet, as high inflation continues to cripple wages in Russia, it's unlikely this high employment will turn into higher consumer demand able to turn the tide of Russia's likely incoming recession.

#### Turkey’s economy is low now–either should’ve already triggered the internal link or the link doesn’t overcome

Inman 7/4 (Phillip Inman, Phillip Inman is economics editor of the Observer and an economics writer for the Guardian, 7/4/22, “Turkey hit with soaring prices as inflation nears 80%”, <https://www.theguardian.com/business/2022/jul/04/turkey-hit-with-soaring-prices-as-inflation-reaches-24-year-high-erdogan>/RM)

Turkey’s official inflation rate increased to almost 80% last month – the highest in 24 years – as President Recep Tayyip Erdoğan’s unconventional economic policies continued to drive up the cost of living. The growth in annual prices rose from 73.5% in May to 78.6% in June, according to the Turkish statistics agency. However, opposition parties and economists said recent hikes in oil and gas prices meant the real rate of inflation was almost double the official figure. The minister of treasury and finance, Nureddin Nebati, has attempted to head off criticism of the government’s handling of the economy, saying last week that consumer prices would start dropping by the end of the year. “I promise to you and to the president, we will see a drop in inflation starting in December,” Nebati said. His comments came after the government announced its second increase in the minimum wage in six months, raising pay by 30%. The increase lifted the monthly salary of about 40% of the workforce from $254 (£209) to $328. Erdoğan has claimed that Turkey’s problem is not inflation. “We do not have an inflation problem. We have a cost of living problem,” he said last month. Economists said Turkey’s official data disguised a more disturbing trend of rising prices that had shown no sign of abating. A monthly report release by Turkey’s ENAG group of independent economists showed consumer prices had risen by 175% in June compared with a year earlier. ENAG said prices had risen by 71.4% since the start of 2022. The Istanbul chamber of commerce said inflation in Turkey‘s largest city had reached an annual rate of 94%. “No one actually believes official Turkish data any more,” said Timothy Ash, an economist at BlueBay Asset Management. “There is no expectation of anything like a credible policy response.” The growing dispute over the veracity of Turkey’s official data is expected to be a difficult political issue for Erdoğan’s government ahead of next year’s general election, which is widely viewed as the toughest of his two-decade rule. Kemal Kılıçdaroğlu, the leader of the main opposition party, accused the state statistics agency of “lying”, urging it in a tweet to “stop committing crimes for the benefit of President Erdoğan.” A survey published by the Metropol polling agency on Friday showed 69% of respondents believed the unofficial ENAG figure and just 24% the one reported by the government. Turkey was hit hard by the fallout from the European debt crisis in 2012 and the threat of higher interest rates by the US Federal Reserve in 2013. Its currency tumble ever since. In 2013 the lira was worth 36p, compared with 4.9p on Monday. To arrest the decline, in 2018 Erdoğan embarked on what he called a “new economic model”, which meant setting aside rising inflation and cutting interest rates to boost economic growth. This was done against the advice of his central bank chief and caused the lira to plunge to a record low, pushing up costs in a country that is dependent on imported materials, especially energy. Inflation, which officially stood at 15% at the beginning of 2021, has now reached its highest level since a currency meltdown during the 1998 debt crisis that helped bring Erdoğan to power. Three central bank bosses have been fired by the president since 2018. The Turkish lira has plummeted 20% this year alone.

#### Inflation and Erdogan’s poor leadership makes Turkey econ decline inevitable

Pitel 22 (07/04/2022 | Laura Pitel | ‘Inflation in Turkey nears 80% as prices and wages spiral upwards’ | https://www.ft.com/content/67f14a1b-54f8-4bb4-8861-12002b834a06 | DOA: 7/6/2022 | SAoki)

Turkish inflation reached almost 80 per cent as analysts warned that the country risks getting trapped in a spiral of rising prices and higher wages. Consumer prices rose 78.6 per cent year on year in June, the fastest increase since 1998, as President Recep Tayyip Erdoğan’s unconventional monetary policy and the impact of the war in Ukraine took a heavy toll. The rate was slightly below the consensus forecast of analysts of 80 per cent. Erdoğan, who rejects the widely accepted view among economists that raising interest rates curbs inflation, has ordered the central bank to keep its benchmark borrowing rate far below the level of inflation. As a result, the lira has lost 48 per cent of its value against the dollar over the past 12 months. The plunge in the currency has been a major driver of price rises in a country that is reliant on imports, especially energy. It has been compounded by a surge in the price of energy and other commodities in the wake of Russian president Vladimir Putin’s invasion of Ukraine. The latest inflation data, up from 73.5 per cent in May, come days after Turkish authorities announced a 30 per cent increase in the minimum wage — six months after raising the basic rate of pay 50 per cent. The Wall Street investment bank Goldman Sachs recently increased its year-end inflation forecast for Turkey from 65 per cent to 75 per cent, warning that the latest rise in the minimum wage risked leading to “a price-wage spiral”.

#### Turkey’s economy is booming post-COVID

Butler and Kucukgocmen 22 (02/28/2022 | Daren Butler and Ali Kucukgocmen | ‘Turkey's economy boomed 11% last year, most in a decade’ | <https://www.reuters.com/markets/asia/turkish-economic-growth-surges-11-last-year-expected-2022-02-28/> | DOA: 7/6/2022 | SAoki)

Turkey's economy bounced back from the COVID-19 pandemic to grow 11% last year, its highest rate in a decade, but economists see a sharp slowdown this year as inflation surges following the lira's crash and with the Ukraine crisis set to hit tourism. Gross domestic product grew 9.1% year-on-year in the fourth quarter, just above forecast, expanding 1.5% from the previous quarter on a seasonally and calendar-adjusted basis, the Turkish Statistical Institute said on Monday. President Tayyip Erdogan is implementing an economic plan that prioritises growth, employment, investment and exports driven by a series of unorthodox interest rate cuts which have brought the central bank's policy rate down to 14%

### 2AC – AT: Impact – Turkish Recession

#### Turkish economic effects won’t spill over–no consensus in the literature

Samuelson 18 (Robert J. Samuelson wrote a twice-weekly economics column before he retired in September 2020. Both appeared online, and one usually ran in The Washington Post in print on Mondays. He was a columnist for Newsweek magazine from 1984 to 2011. He began his journalism career as a reporter on The Post business desk, from 1969 to 1973. From 1973 to 1976, he was a freelance writer. He was an economics reporter and columnist for National Journal magazine from 1976 to 1984 — when he joined Newsweek. He grew up in White Plains, N.Y., and attended Harvard College, 8-21-18, “Will Turkey’s economic woes spill over into other countries?”, <https://www.abqjournal.com/1211250/will-turkeys-economic-woes-spill-over-into-other-countries.html//BVN> SC)

WASHINGTON – The pertinent and unanswerable question about Turkey is whether the country’s present economic turmoil is an isolated event, mostly confined to Turkey itself, or whether it portends a larger economic convulsion that shakes markets around the world. Among economists and other experts, there’s no consensus. Some foresee contagion: Turkey’s problems will spread. Others envision a one-country economic blip. Which is it? The answer obviously matters. The global economy already faces obstacles to growth. American interest rates are rising as the Federal Reserve tries to prevent higher inflation. President Trump’s trade wars are threatening. If we now add a slowdown of “emerging market” economies – China, Brazil and similar “middle-income” nations – the global expansion might sputter or halt. Turkey’s experience is relevant. In recent months, its currency, the lira, has collapsed. At the start of 2018, it was trading at roughly 4 lira to the dollar; now that’s about 6 lira to the dollar. This makes it harder for Turkish businesses and consumers to repay debts, which – more than in many other countries – are often made in dollars. To repay these debts, Turkish companies need to earn more lira, which can be sold for dollars. The more lira go to repay dollar debts, the fewer lira are left over to buy other things. Economic growth slows. If debtors can’t raise the dollars to repay their loans, they default. Too many defaults, and growth stops. Turkey’s debt problems are undeniably daunting, notes economist Hung Tran of the Institute of International Finance (IIF), an industry research and advocacy group. Consider: Between now and the end of 2018, Turkey faces debt repayments – principal and interest – of about $120 billion; in 2019, the total is about $200 billion. By comparison, Turkey’s economy – gross domestic product – is about $850 billion. Some of these loans could be rolled over; how many is unclear. Many debts were incurred by banks or private firms, encouraged by easy-money policies. The government pumped up the economy in the wake of a failed military coup in 2016 and in anticipation of a new election. The election was held in June 2018 and won by President Recep Tayyip Erdogan. He was surely helped by the economic stimulus. Last year, Turkey’s GDP grew 7 percent, up from 3.2 percent in 2016. To complicate matters further, Turkey and the Trump administration are feuding over the Turks’ detention of Andrew Brunson, an American pastor accused of anti-state activities. Now comes the reckoning. Many observers believe that what happened in Turkey will stay in Turkey. Its economy is simply too small – about 1.4 percent of global GDP, according to some estimates – to influence the rest of the world. “It’s mainly a Turkish issue,” says economist C. Fred Bergsten of the Peterson Institute. He doesn’t expect large spillover effects, say a slowdown of growth in Europe or capital flight from other “emerging market” countries, such as Brazil or India. Not all economists are so hopeful. Writing in The Hill, Desmond Lachman of the American Enterprise Institute predicts that “Turkey will default on its debt and impose capital controls.” Capital controls are legal restrictions on money movements in and out of a country. He expects contagion – capital flight from heavily indebted countries – that will weaken the global recovery and hurt the U.S. economy. Economist Tran of the IIF thinks that emerging-market countries that have problems similar to Turkey’s – poor policies, maturing debts, sizable current account deficits – are the most vulnerable to capital flight. These include South Africa, Indonesia and Egypt. So far, the evidence is reassuring; the IIF’s most recent survey of capital movements didn’t detect any sizable money surges since the lira’s latest large drop. Crowd psychology could trigger a panic. If investors expect other investors to sell, there could be a stampede for the door. This story isn’t over yet. What’s uncontroversial, at least among many economists, is that Turkey will need to go to the IMF to end the present crisis. The IMF would provide a hefty loan – it’s doubtful anyone else would – and impose “tough austerity policies” designed to improve the economy’s performance, says Jacob Funk Kirkegaard of the Peterson Institute. By their nature, these policies would be unpopular, especially with Erdogan, because they “could weaken (his) hold on power,” as Kirkegaard puts it. It seems likely that he would resent and resist them as long as possible. That could change everything. Stay tuned.

#### Turkish economy resilient–hyperinflation is normal for the economy

Balcells 2-11 (Francesc Balcells is running the Global EM Debt Fund at FIM partners. Formerly at PIMCO for eight years, managing EM hard and local currency debt portfolios, 2-11-22, “Why Turkey’s economic resilience has defied worst fears”, Financial Times, <https://www.ft.com/content/1d8fd6dd-e951-49a1-bffa-b2c361c2d16a//BVN> SC)

The warnings back in 2011-2013 were ominous: “If the Turkish lira breaks through 2 against the dollar, the economy will implode.” Once the 2 was reached, the new implosion target moved to 3, then to 5, and here we are at 13. The economy is still standing. An economy with debt in dollars as high as Turkey’s should seemingly have imploded a long time ago under such currency volatility. The history of emerging markets is littered with balance of payments crises under similar foreign exchange depreciations. There might be several reasons for this resilience. For one, up until earlier this year, the Turkish authorities did what they always had done in the past when confronted with capital outflows and currency weakness: interest rate hikes, if only belatedly and often in an obfuscated manner. This boom-and-bust way of managing the economy kept the system going for quite some time. That time is what gave economic actors the chance to build buffers against an unbalanced economy. Banks, for example, kept balance sheets largely hedged on currency. By virtue of a build-up of dollar deposits and a low level of foreign currency loans made relative to them, banks also had excess dollars. So they kept lending dollars to obtain cheap lira funding, creating in the process another safety mechanism for themselves. But it hasn’t been only banks which have built resilience over time. As dollarisation progressed, households have continued to accumulate dollar assets but no foreign exchange liabilities. This is because banks were forbidden to lend foreign currency to households, making them a lot more resilient to currency risk. This was perhaps the regulators’ greatest foresight. The creditor profile of the country has also changed over time. Fickle portfolio flows have greatly reduced. Foreigners used to own nearly 30 per cent of the local debt market but this number is now less than 5 per cent (a mere $3bn in absolute terms). Meanwhile locals now own almost 50 per cent of the country’s sovereign Eurobonds. This has left Turkey more dependent on different types of external creditor — the syndicated loan market, trade finance, intra-corporate lending, or domestic lenders. These creditors are more patient, more long-term oriented than foreign portfolio investors. The passing of time has also allowed Turkish corporates, the weakest link in the country’s external balance sheet chain, to reduce debt levels somewhat while building a positive net short-term foreign exchange position. The problem, however, remains one of co-ordination. While on paper each economic sector has enough liquidity buffers of its own, they are all “joined at the hip”. One sector drawing on its foreign exchange assets has a ripple effect on the entire system, as those assets will be residing in someone else’s balance sheet. Against that, the country is tentatively turning its persistent current account deficit into a surplus by virtue of the very large lira depreciation which boosts exports and contracts imports. Whether this turn in the current account, if it materialises, is yet another boom-and-bust episode or a structural manifestation of a policy-driven rebalancing of the economy remains unclear. All in all, it’s been a surprisingly resilient journey, though longer than many of us would have anticipated. Turks also have suffered from high inflation and a squeeze in purchasing power in dollars. And the fact that Turkey hasn’t “broken” yet doesn’t mean it still can’t.

#### Turkish economy rebounding again

Anadolu Agency 5-24 (Anadolu Agency is a news agency headquartered in Ankara, Turkey, 5-24-22, “Turkey boasts ‘diversified, resilient’ economy: Moody’s executive”, Daily Sabah, https://www.dailysabah.com/business/economy/turkey-boasts-diversified-resilient-economy-moodys-executive)

Risks aside, Turkey boasts a large, diversified, resilient economy with a solid banking sector, an executive at Moody’s Investors Service, a sister company of the global ratings agency, said Monday. “They (Turkish banks) have had pretty good results. They are solid,” Kathrin Muehlbronner, senior vice president within Moody’s Investors Service Sovereign Risk Group, told Anadolu Agency (AA), citing “stabilizing factors.” “Exporters are benefiting clearly very much from the (Turkish lira’s) depreciation,” she said, praising the country’s “large diversified resilient economy.” She noted that Turkey may benefit from supply chain shifts in the wake of the coronavirus pandemic. “Turkey can benefit massively from a nearshoring of production by European companies and (from its) Customs Union with the EU.” She said prospects for Turkish economic growth are optimistic, adding: “Exports are doing well. Lira depreciation helps. There are clear incentives such as credit stimulus for exporters and investments.” Muehlbronner welcomed steps by the Turkish government to shield the poorest households from inflation. Propelled by rising energy and commodity prices, Turkey’s annual inflation runs at a 20-year high of nearly 70% as of April, according to official data. Consumer prices have been increasing despite tax cuts on basic goods and government subsidies for utility bills to ease the burden on household budgets. After it took a hit from the pandemic like the rest of the world, Muehlbronner said she expects the Turkish tourism sector to have a good season. She underlined that the **Turkish economy may grow faster** than Moody’s forecast of 3% this year. On inflation, Muehlbronner said the upward trend stemmed from the weaker lira, especially through end-2021 and elevated commodity prices. “We think inflation will drop kind of mechanically at the end of the year because of a base effect,” Muehlbronner noted. Listing risks to the Turkish economy, she said high inflation, currency pressure and loose monetary policy create downside risks for the country. The Central Bank of the Republic of Turkey (CBRT) is expected to hold its key policy rate unchanged at 14% for the fifth straight month on Thursday, according to surveys. Inflation has surged since last autumn as the lira weakened after the central bank in September embarked on a 500-basis point-easing cycle. The government’s foreign exchange-protected lira deposits tool, she said, “was certainly a good step to stabilize the currency. And it has reduced dollarization of deposits by around 10 percentage points.” Muehlbronner was referring to the scheme that the government unveiled in December to boost lira deposits by protecting them against exchange rate volatility. Ankara has called on individuals and companies to convert their foreign exchange savings to lira to support the currency. “So, we’re back to the levels of share of deposits and dollars that we had before the latest currency crisis. So that’s certainly a positive step,” Muehlbronner added.

### 2AC – AT: Impact – Ukraine War – Internal Link

#### Non-unique–Turkey is mediating between Russia and Ukraine now

Kirby 22 (Jen Kirby, Foreign and National Security Reporter, April 1, 2022, “What diplomatic solution might end the war in Ukraine?”, <https://www.vox.com/2022/4/1/23002085/peace-talks-ukraine-russia-war-turkey-neutrality>//RM)

The war in Ukraine has ground on for five weeks. For almost as long, Russian and Ukrainian officials have been attempting to negotiate. Those negotiations have yielded few firm results so far, especially as Russia continues to bombard Ukrainian cities. Still, the talking matters. Diplomacy is the only way this war will finally end, and the type of agreement that might end the fighting looks a lot clearer than it did even a month ago. In the early days of the war, the talks made little apparent progress. Ukraine appeared to be demanding an immediate ceasefire, and Russian withdrawal of troops. Russia, however, had pretty different ideas. It laid out some aggressive demands. Among them were: Ukraine’s neutrality and no membership in the North Atlantic Treaty Organization (NATO); so-called “demilitarization and “denazification;” the protection of Russian language within Ukraine; and that Ukraine recognize Crimea as part of Russia and recognize the independence of Donetsk and Luhansk, the two regions in eastern Ukraine that Vladimir Putin had declared as independent on the eve of his full-scale invasion. In recent days, some glimmers of optimism have emerged. Ukraine has put forward serious proposals, which is centered around a commitment to permanent neutrality and an agreement not to seek NATO membership, in exchange for security guarantees. Russia has also reportedly eased up on some of its previous demands, including “denazification” — a likely ruse for regime change — and “demilitarization,” a sign that Ukraine’s battlefield successes so far have pushed the Kremlin to possibly reconsider some of its most maximalist demands. Mevlut Cavusoglu, Turkey’s foreign minister, who is helping to broker the talks, described the discussions earlier in the week as “the most meaningful progress since the start of negotiations.” But these really are just glimmers of progress — and they might not be so long lasting. Russia, this week, promised to “drastically reduce” military activity around Kyiv and Chernihiv, in the name of “mutual trust,” though reports of shelling continued in those areas. Some, including US and NATO officials, have expressed skepticism that Moscow is sincere, and instead using talks to buy time, so it can regroup and refocus its offensive, potentially on areas in eastern and southern Ukraine. Since then, both Russia and Ukraine have downplayed the seriousness of the talks, even as negotiations resumed Friday. And huge gulfs remain. Perhaps the most intractable problem may be the future of the Crimean peninsula, which Russia annexed in 2014, and Donetsk and Luhansk, which Russia and Russia-backed militias control parts of. Ukraine is unlikely to agree to slice up its country. It is also hard to imagine Russia settling for less territory than it controlled the day before its invasion in February 2022. Other issues will emerge, and concessions and proposals may shift depending on developments in the battlefield. The prospect of a quick peace deal between Ukraine and Russia remains unlikely. Perhaps the best case short term is that both sides broker a ceasefire that includes a framework for an agreement, and then work the details out over time. But the war continues.

#### Turn–Russia is currently making advances in Ukraine–NATO tech support solves and throws them off

Dan **Lamothe and** Adela **Suliman**, **06-24-**20**22**, [(Dan Lamothe joined The Washington Post in 2014 to cover the U.S. military. He has written about the Armed Forces for more than 14 years, traveling extensively, embedding with each service and covering combat in Afghanistan numerous times.) "Ukraine retreats from Severodonetsk as Russia advances in the east," Washington Post, https://www.washingtonpost.com/world/2022/06/24/severodonetsk-troop-withdrawal-ukraine-lysychansk/]//DS

Russia claimed control Sunday over the key city of Lysychansk, the last major Ukrainian foothold in the Luhansk region — signaling a potential turning point in Moscow’s campaign to take all of eastern Ukraine. Ukrainian officials said their forces had withdrawn from Lysychansk after fierce fighting to preserve lives from the Russians’ relentless assault. The slow Russian advance across the region it has targeted since the invasion began in February has been facilitated by overwhelming artillery power that has leveled cities and towns and left a trail of wounded and dead prompting comparisons with the devastation of World War I in Europe. Russian Defense Minister Sergei Shoigu said in a statement that Russian troops and pro-Kremlin separatists of the self-declared Luhansk People’s Republic “have established full control” over Lysychansk “and a number of nearby settlements.” The Ukrainian military’s general staff said Sunday that Ukrainian forces were forced to withdraw from Lysychansk after waging a stiff but losing battle. Ukraine had tried to defend Lysychansk for weeks. The military said it decided to withdraw because remaining in the city would bring “fatal consequences,” given the Russian forces’ “overwhelming advantage” in “artillery, aviation, ammunition and personnel.” The decision was “made to save the lives of Ukrainian defenders,” according to a statement posted on Facebook. Ukrainian President Volodymyr Zelensky vowed to return. “If the command of our army withdraws people from certain points of the front where the enemy has the greatest fire superiority, in particular this applies to Lysychansk, it means only one thing: We will return thanks to our tactics, thanks to the increase in the supply of modern weapons,” Zelensky said in his nightly address Sunday. “Ukraine does not give anything up.” The city is a key target in Russia’s battle to capture the Donbas region, the heavily industrialized area bordering Russia that is partly controlled by separatists loyal to Moscow. In 2014, they unilaterally established two independent “republics” in the Donbas region. ‘They’re in hell’: Hail of Russian artillery tests Ukrainian morale Russian President Vladimir Putin cited false claims of Ukrainian “genocide” against Russian-speaking residents there as justification for his invasion. Russia’s latest advances in eastern Ukraine add to creeping doubts among U.S. lawmakers and observers of the war that the Ukrainian government can stop Putin from seizing territory. Optimism sparked by the defeat of his forces in the battle for Kyiv in the spring has faded as Russian artillery hammers Ukrainian forces and civilian targets. As Ukraine war bogs down, U.S. assessments face scrutiny President Biden said last week that U.S. support for Ukraine is unshakable and will continue “as long as it takes” to ensure a Russian defeat. “We continue to fight. Unfortunately, the steel willpower and patriotism are not enough to achieve success — we need the technical resources,” the Ukrainian military’s statement added. Why is Ukraine’s Donbas region a target for Russian forces? Ukrainian troops withdrew just over a week ago from Severodonetsk, a city across the Donets River to the east. Russia’s capture of Lysychansk, if confirmed, would be a major victory that gives its troops clear access to Donetsk, the other region that makes up Donbas. Biden administration officials say Putin’s gains have been uneven and have come at a significant cost, highlighting the steep death toll among Russian troops. But Ukrainian forces also are paying a heavy price, which U.S. military officials rarely acknowledge. Ukraine retreats from Severodonetsk as Russia advances in the east Control over Donbas is the primary goal of Moscow’s military operation in Ukraine, after it failed to capture the capital, Kyiv, and other areas in the initial weeks of the war. Russian troops and their allies have been making steady gains in the east, as officials in Kyiv say they are outgunned and running out of ammunition. Ukrainian Defense Ministry spokesman Yuriy Sak told the BBC earlier Sunday that Ukraine controls other cities in Donetsk and argued that “the battle for the Donbas is not over yet.” Serhiy Haidai, governor of the Luhansk region, said earlier in the day that in attacking Lysychansk, Russian fighters used tactics even more brutal than in Severodonetsk to overcome resistance. Photos showed bombed-out residential buildings in Lysychansk early Sunday, amid a barrage reminiscent of the destruction of Severodonetsk. As recently as Saturday, a Russian-backed politician said Lysychansk was “completely surrounded,” but defense officials in Ukraine said they still had control of the city. Those counterclaims were probably “outdated or erroneous,” according to an analysis from the Washington-based Institute for the Study of War (ISW) think tank. It cited unconfirmed videos showing Russian forces erecting a red “victory” flag in Lysychansk and “casually walking around” its neighborhoods. “Ukrainian forces likely conducted a deliberate withdrawal from Lysychansk, resulting in the Russian seizure of the city on July 2,” it said. As Russia issued its claim of control over Lysychansk on Sunday, Slovyansk, a town about 50 miles west in Donetsk, came under intense shelling that killed at least six people, local officials said. Mayor Vadym Lyakh said in a video on Telegram that “the biggest shelling of Slovyansk recently” had left “a large number of wounded and dead.” Tetyana Ignatchenko, a spokeswoman for the Donetsk region, told Ukrainian public broadcaster Suspilne News that at least six people were killed and 15 were injured in the shelling. She added that missiles hit the town of Kramatorsk, to the south of Slovyansk. In its assessment Saturday, the ISW said Russia was likely to fully take over the Luhansk region “in coming days” and would probably “then prioritize drives on Ukrainian positions in Siversk before turning to Slovyansk and Bakhmut,” in Donetsk. In other developments, Ukraine’s ambassador to Turkey said Sunday that Turkish authorities have detained a Russian-flagged cargo ship loaded with stolen Ukrainian grain. Millions of metric tons of grain await export from Ukraine, blockaded by Russia’s control of Black Sea shipping lanes. The export blockades have resulted in global food shortages and rising prices, which have particularly affected poorer countries. Three people were killed in Russian strikes early Sunday in the Kharkiv region, Ukrainian officials said. Cities across Kharkiv were shelled Saturday and Sunday, according to regional governor Oleh Synyehubov. In one district, Russian forces “burned farm buildings, garages, and shelled open areas,” he added. Russian forces have recently intensified their attacks on Kharkiv, and some Ukrainians worry that Moscow is planning to renew its stalled attempt in March to seize Ukraine’s second-largest city.

### 2AC – AT: Impact – Ukraine War

#### Putin won’t use nuclear weapons–NATO will retaliate if he does

Ullman 2/16 (Harlan Ullman, Harlan Ullman is an Atlantic Council senior advisor and UPI’s Arnaud deBorchgrave Distinguished Columnist, 2/16/22, “Why Putin won’t invade Ukraine”, <https://www.atlanticcouncil.org/blogs/new-atlanticist/why-putin-wont-invade-ukraine/>

In regard to Ukraine, Putin also knows that an armed attack or aggressive use of force will make any chance of his achieving both his priorities even less likely than landing an astronaut on the sun. He also knows that the costs to Russia and to him personally will be high and possibly unaffordable. Sanctions and further isolation will hurt. Going to war, no matter the scope, or using cyber and influence operations to cripple Ukraine, will absolutely foreclose any chance for even part of Putin’s demands being considered by NATO. The Alliance’s response to a major attack will make the actions it took after Russia’s 2014 Crimean annexation appear anemic. It will expand its military capability and the number of forces stationed in Europe—exactly the opposite of Putin’s intent. NATO members will develop and deploy more advanced weapons, including new classes of missiles with low-yield nuclear warheads. NATO badly needs a new strategic framework (here, ironically, Putin is right for the wrong reasons). If war breaks out in Ukraine, the Alliance will certainly move to a new framework incorporating some of the actions mentioned above and announce it during the Madrid summit in June—another outcome Putin won’t like one bit. In an escalation, the West will impose sanctions more strictly and robustly than before. How much this will dent Russia’s economy or Putin’s inner circle is uncertain. But the Nord Stream 2 natural gas pipeline will almost certainly be cancelled, denting Russia’s energy sector. Whatever credibility Putin may have gained will be lost given the “big lie” of his assurances that force would not be used in Ukraine. Of course, Russia will have accused the West of provoking violence requiring an “appropriate response.” If a subsequent occupation of Ukraine were required, even of just a portion of the country, body bags could be flowing back to Russia. And what is Putin’s exit strategy? No such plan following a Russian attack is obvious for Moscow other than a prolonged twenty-first century version of the Cold War, but one in which Moscow uses substantial force resulting in even greater isolation. And that could doom Putin’s rule in a way similar to how Soviet Premier Nikita Khrushchev got fired two years after the October 1962 Cuban Missile Crisis. An advantageous stalemate The billion-ruble question is: How does this crisis end? Speculation over invasion scenarios has ranged from a massive, overwhelming air, sea, and land assault to a mix of cyber, special-forces, and influence-based non-kinetic operations. Should Putin not grasp the predicament he has imposed on himself, a limited move in the Donbas or seizing a land bridge into Crimea would seem to be the lowest-risk and lowest-cost option. He could then judge how NATO chooses to respond and wait. But Putin would almost certainly suffer the same consequences as if he took Kyiv and occupied much of the country. Assuming there is no military action, Putin has two choices. First, he can prolong the crisis and maintain the buildup on the Ukrainian border. That would be expensive and wear down his forces. Staying on constant alert takes a toll on people and pocketbooks. Or Putin could terminate the exercise with Belarus on February 20 as scheduled, draw his troops back from the Ukrainian border, claim victory, and continue to push for negotiations—arguing that as the West wrongly predicted an attack, it continues to fail to recognize Russian security interests and needs. Russia will no doubt continue political and psychological pressure on Ukrainian President Volodymyr Zelenskyy to make concessions, either to accept the Minsk 2 agreement (despite its grant of semi-autonomy to the Donbas) or to suspend any request for NATO membership. And Russian “active measures,” such as disinformation campaigns, will continue to target Ukraine with the aim of eroding Zelenskyy’s standing and NATO solidarity by claiming “hysteria” over an invasion that never occurred. This scenario suits Putin’s interests far better than an uncertain military adventure, which is why he will choose it—and not because of anything uttered from a White House podium, no matter how much credit the administration will take for deterring a war.

#### Russia won’t escalate to nuclear weapons–they lose China if they do

Corera 4/26 (Gordon Corera, Security correspondent, BBC News, April 26, 2022, “Ukraine war: Could Russia use tactical nuclear weapons?”, <https://www.bbc.com/news/world-60664169>)

Putin claims Ukraine is part of Russia, so using nuclear weapons on its territory seems bizarre. Russia itself is close by and "the fallout could cross boundaries", warns Patricia Lewis. The only time nuclear weapons have been used in conflict was by the US at the end of World War Two against Japan. Would Putin want to become the first leader to break the taboo and use them? Some worry he has shown a willingness to do things others thought he would not do, whether invading Ukraine or using nerve agent in Salisbury. Dr Williams says there is a further reason why Russia might not use nuclear weapons - China. "Russia is heavily dependent on Chinese support, but China has a 'no first use' nuclear doctrine. So if Putin did use them, it would be incredibly difficult for China to stand by him. If he used them, he would probably lose China." Could it lead to nuclear war? No one knows quite where the use of tactical nuclear weapons would lead. It could escalate and Putin would not want nuclear war. But miscalculation is always a risk. "They would imagine everyone would capitulate," says Patricia Lewis. "What would happen is that Nato would have to come in and respond." The US says it is monitoring the situation closely. It has an extensive intelligence gathering machine to watch Russian nuclear activity - for instance whether tactical weapons are being moved out of storage, or if there is any change in behaviour at launch sites. So far, they say they have not seen any significant changes. How the US and Nato would respond to any nuclear use is hard to predict. They may not want to escalate the situation further and risk all-out nuclear war but they also might want to draw a line. This might mean a tough conventional rather than nuclear response. But what would Russia then do? "Once you have crossed the nuclear threshold, there is no obvious stopping point," says James Acton. "I don't think anyone can have any confidence of what that world would look like."

### 2AC – AT: UQ – Ukraine Thumper

#### Turkey sides with Ukraine–thumps the link

Cook 3-3 (Steven A. Cook is Eni Enrico Mattei senior fellow for Middle East and Africa studies and director of the International Affairs Fellowship for Tenured International Relations Scholars at the Council on Foreign Relations (CFR). He is an expert on Arab and Turkish politics as well as U.S.-Middle East policy. Cook is the author of False Dawn: Protest, Democracy, and Violence in the New Middle East; The Struggle for Egypt: From Nasser to Tahrir Square, which won the 2012 gold medal from the Washington Institute for Near East Policy; and Ruling but Not Governing: The Military and Political Development in Egypt, Algeria, and Turkey. Oxford University Press is publishing his next book, The End Of Ambition: America’s Past, Present, and Future in the Middle East in 2022, 3/3/2022, “Where Turkey Stands on the Russia-Ukraine War”, Council On Foreign Relations, https://www.cfr.org/in-brief/where-turkey-stands-russia-ukraine-war//BVN SC)

The Turkish government has designated the Russian invasion as a “war,” giving it the right under the 1936 Montreux Convention to close the Bosporus Strait—which leads to the Black Sea—to warships. Although this action applies to any naval vessel, it is clearly aimed at Russia’s fleet in case Moscow seeks to reinforce the firepower it already has there. Turkey’s decision is, at least, an important symbolic one in support of Ukraine. A Russian submarine surfaces in the Bosporus with Istanbul in the background A Russian submarine sails in the Bosporus on its way to the Black Sea. Despite the restrictions on warships in the Bosporus, it seems clear that Turkey—like other countries including Israel—has sought a strategically defensible but morally questionable middle ground. Though Turkey voted for a UN General Assembly resolution condemning Russia, it has not sanctioned Russia or closed its airspace to Russian aircraft. Some observers have been quick to highlight the differences between Turkish policy and the definitive pro-Ukraine approaches of the European Union (EU) and North Atlantic Treaty Organization (NATO), implying that Ankara is trying to have it both ways—remaining rhetorically committed to Ukraine’s independence and offering to mediate the conflict while tilting toward Russia. There is some logic to this, especially after the purchase of the Russian-made air defense system known as the S-400. However, it is less a tilt than a recognition that Turkey’s interests are intertwined with Russia in critical areas, most importantly Syria. There, Turkey wants to prevent the emergence of a Kurdish state and maintain pressure on the People’s Protection Units (YPG), a group linked to the Kurdistan Workers’ Party (PKK), which the United States and Turkey have designated a terrorist organization. To accomplish these goals, Turkish officials have to consider Russian sensibilities, as Moscow is the most important external actor in Syria and can thus complicate Turkey’s military operations there and frustrate its diplomatic efforts. In recent years, Turkey has pursued what can best be described as foreign policy independence. As an important power in the Mediterranean, the Middle East, and the Caucusus, Ankara has sought a multifaceted foreign policy that has, at times, conflicted with its NATO allies. For example, in 2017, Turkey decided to purchase S-400s. This step coincided with a growing dialogue between Ankara and Moscow that included moves to upgrade economic ties and discussions about deepening diplomatic and even military relations. At the same time, Turkey and Russia have found themselves on opposite ends of major regional conflicts, including in Syria, Libya, and Nagorno-Karabakh, a region over which Armenia and Azerbaijan fought a recent war. Even while they were supporting different sides in these places, Turkish President Recep Tayyip Erdogan and Russian President Vladimir Putin maintained a dialogue. What about Ukraine? Turkey has generally supported Ukrainian independence and the country’s territorial integrity. Erdogan denounced Russia’s 2014 annexation of Crimea and has advocated on behalf of Crimean Tatars (a Turkic ethnic group) who have suffered under Russian rule. Turkey sold armed drones to Ukraine ahead of Russia’s most recent invasion, though some reports indicate that only about twelve to twenty were delivered. Still, in whatever number, Turkish Bayraktar TB2 drones are lethal and have been deployed to great effect in Libya, Syria, and Nagorno-Karabakh. How is this war likely to affect Turkey’s interests in the region? Turkey has sought to expand its trade and commercial relations with both Russia and Ukraine. It is also a destination for Russian tourists and an importer of oil and gas. To the extent that this war affects these ties and drives up energy prices, the Turkish economy—which is already experiencing upwards of 50 percent inflation—will feel the repercussions.

#### Even *if* Turkey and Russia are tied together, Russia will never replace NATO in Turkey’s eyes

Bardakçı 21 (Mehmet Bardakçı, 12-6-21, “Is a Strategic Partnership Between Turkey and Russia Feasible at the Expense of Turkey’s Relations with the EU and NATO?”, Comparative Southeast European Studies, https://www.degruyter.com/document/doi/10.1515/soeu-2021-0001/html?lang=en//BVN SC)

The article mainly contends that since the real and expected benefits from the European Union (EU) and NATO were not delivered sufficiently from Turkey’s perspective, Turkey looked for alternatives and collaborated with Russia more intensely in recent years. Turkey’s cooperation with Russia was also facilitated by several global, political, economic, conjectural, security-related, and individual-level factors. Another argument of the study is that despite Turkey’s intensive collaboration with Russia, it is not feasible for Turkey to build a strategic partnership with it in the short- and medium-term at the expense of its relations with NATO and the EU. The main reasons for this are, in addition to the institutional and social shortcomings, geostrategic divergences, Russia’s inadequacy as an economic actor, the pitfalls of an asymmetric relationship with Russia, the security risks posed by Russia, NATO’s continuing importance for Turkey’s security needs, and the incompatibility of Russia’s and Turkey’s political systems. Keywords: EU; NATO; Russia; strategic partnership; Turkish foreign policy Introduction The arrival of the Russian S-400 air defence system in Turkey in July 2019 was welcomed enthusiastically by many in Turkey. This breakthrough event was even described by some in Turkey as the “country’s liberation from the West” (Tol and Taşpınar 2019, 107). Almost a decade ago, the question started to be asked as to whether Turkey was drifting away from the West, especially since it had approached Iran and voted against sanctions on Iran over its nuclear programme in the United Nations Security Council (UNSC) as well as clashed with Israel over the Mavi Marmara incident in 2010. This time, however, this question is more pronounced and the likelihood of a strategic shift became more tangible with the arrival of a weapon system from a country that has been confronting the West recently. Given that Turkey’s relations with the United States and the European Union (EU) have been at a nadir in recent years, many regarded the acquisition of the Russian weapon system as a precursor of Turkey’s withdrawal from the North Atlantic Alliance (North Atlantic Treaty Organisation, NATO) and the EU. In addition to many other factors, Moscow’s and Ankara’s bitter relations with the West are a major reason why the two countries have closed ranks in recent years. A milestone for Moscow’s relationship with the West was its annexation of Crimea in March 2014 while the coup plot against the Justice and Development Party (Adalet ve Kalkınma Partisi, AKP) government in Turkey in July 2016 marked a watershed in Ankara’s relations with the West. Russia had to confront a series of economic sanctions from the West after 2014 while Turkey was deeply disappointed with its Western allies for their slow and reluctant condemnation of the coup attempt. Ankara has even aired doubts that the West might have been behind the coup attempt. These events have helped peak the two countries’ deeply-ingrained sense of distrust towards the West. As one observer put, “Despite their obvious differences and even antagonisms, Russia and Turkey are united by one thing—the fact that they are two great powers connected historically, culturally, and geographically to a Europe that never fully accepted them as one of their own” (Lukyanov, People with Big Ambitions, The Moscow Times, 19 July 2016). A major objective of this article is to unpack the puzzle of whether Russia could replace the EU and NATO as a strategic partner for Turkey. The article contends that in addition to some factors facilitating the Russo–Turkish rapprochement, Turkey searched for alternatives, collaborating with Russia owing to the decline in the real and expected benefits from the EU and NATO from the Turkish perspective. Another major contention of this article is that despite the close collaboration between Moscow and Ankara, in particular after the coup attempt against the Turkish Government in July 2016, it is hard for Turkey to forge a strategic partnership with Russia because of significant divergent geostrategic interests, Russia’s inadequacy as an economic actor, the downsides of an asymmetric relationship with Russia, the security risks posed by Russia, the continuing importance of NATO for Turkey’s security as well as the incompatibility of Turkey’s and Russia’s political systems. Moreover, the absence of a solid social basis and the lack of institutionalization in their relations further make it infeasible for Turkey to switch from the Transatlantic Alliance to Russia. The study is divided into three sections. The first part concerns the motives that brought Moscow and Ankara together, including, first and foremost, their strained relationship with the West, economic interests, conjectural factors such as the Syrian conflict, transformation of the global governance system, and similarity of their political culture based on security and personal harmony between the leaders. The second part draws attention to the limitations in the relationship, and the third part explains why a strategic partnership between Turkey and Ankara and at the expense of Turkey’s partnership with the EU and NATO is not feasible in the foreseeable future. Finally, the conclusion wraps up the article.

### 1AR – AT: UQ – Russian Isolation

#### Russia has become both completely politically and economically isolated

Rochlitz 3/16 (Rochlitz , M. ,Michael Rochlitz is Professor for Economics with a focus on institutional change at Bremen University.(2022, March 16). Russia's slide into international isolation. Zentrum für Osteuropa- und internationale Studien (ZOiS). Retrieved July 1, 2022, from https://www.zois-berlin.de/en/publications/zois-spotlight/russias-slide-into-international-isolation//RM)

On 24 February 2022, Russian president Vladimir Putin ordered a full-scale military invasion of Ukraine. The decision was based on a series of fatally flawed situational assessments, including an overestimation of the fighting abilities of the Russian army, an underestimation of the determination of the Ukrainian army and people, and a faulty evaluation of the West’s willingness to impose serious economic sanctions. The massive sanctions that have since been imposed on Russia’s economy have led to a freeze on half of the central bank’s reserves, a fall in the value of the rouble of more than 40 per cent, and an exodus of most Western companies from Russia. Increasing political repression and a fear of border closures caused several hundred thousand Russians – a significant part of the country’s intellectual elite – to flee abroad. The economic consequences of these developments will be disastrous. At the moment, neither the Russian government nor most Russian people seem to realise the extent of the economic catastrophe that is already sure to happen. In the best scenario, Russia’s economy will shrink by 10 to 20 per cent this year, a somewhat worse decline than during the 2008 financial crisis. But if the war continues, and new war crimes lead to additional sanctions, the economic disaster might be comparable to that caused by the collapse of the Soviet Union in the early 1990s. A self-inflicted catastrophe There are few, if any, politicians in recent history who have inflicted such massive harm on their own country in such a short time as Putin has done in the last 20 days. Three weeks ago, Russia was a middle-income country well integrated into the global economy, with a large part of its population enjoying a standard of living comparable to that of some European states. Russians could choose from a similar range of consumer goods to people elsewhere in the world, occasionally travel abroad for a holiday, and expect to lead a relatively stable and peaceful life. Today, Russia has become an almost completely isolated pariah state. Belarus, Eritrea, North Korea, and Syria were the only countries that voted against a UN resolution condemning the Russian war in Ukraine. According to a list compiled by researchers at Yale University, by 13 March, 350 foreign companies had ceased or curtailed their operations in Russia, with only 34 overseas firms continuing to operate normally. As both Airbus and Boeing are no longer servicing Russian planes, Russia’s airlines were forced to stop international flights and might soon be forced to stop domestic flights as well. Travel within the country will be pushed back to where it was in the early twentieth century. It is unlikely that any of these companies will return to Russia if the current situation continues or deteriorates. As a consequence, the country will be deprived of many of the high-technology and consumer goods it has been importing until now. As Russia produces very few hi-tech goods, this will seriously affect the Russian economy, disrupting supply chains and making the country’s situation similar to that of Iran during the last 30 years. A similarly heavy blow will be the brain drain caused by the recent wave of repression. Most of the hundreds of thousands of people who have fled Russia in recent weeks are highly qualified specialists and researchers who are difficult to replace. The remaining scientists in Russia will be cut off from international networks, as worldwide academic institutions have cut all ties with Russian universities. The consequences for science, research, and innovation in Russia will be devastating. Dark prospects for the future Even in the best possible scenario of immediate peace, it would take several years to repair the damage already caused. Such a scenario would probably require the fall of the Putin regime, and a new government that ends the war and takes responsibility for Russia’s actions, to open up the possibility of bringing the country back into the international community. Even in this highly unlikely scenario, however, Russia’s population will have suffered substantial economic harm, and the horrors already committed in Ukraine will leave deep scars for Ukrainians and Russians alike. In what is unfortunately a more likely scenario, the war will drag on for a considerable time, potentially leading to a complete end of Western oil and gas imports from Russia. Although China might be willing to jump in, Russia will not be able to significantly increase its oil and gas exports in the near future, as the existing infrastructure in the Far East is already operating at full capacity. Moscow will thus have to rely on Chinese loans to import Chinese consumer goods. As a result, Russia might turn into some large-scale version of North Korea: economically dependent on China and with a government that through tight control of travel and information will try to prevent its population from finding out the true reasons for the disaster that has befallen it.

#### Russia is isolated due to the Ukraine war–Turkey relations are impossible

Kim 5/11 (Kim, L. Kim was born in Charleston, Illinois. He earned a bachelor’s degree in geography and foreign languages from Clark University, studied journalism at the University of California at Berkeley and graduated from Central European University in Budapest with a master’s degree in nationalism studies.(2022, May 11). Russia isolated in its postimperial phantasm. Wilson Center. Retrieved July 1, 2022, from https://www.wilsoncenter.org/blog-post/russia-isolated-its-postimperial-phantasm//RM)

From a strategic point of view, Putin’s attack on Ukraine has thrown back Russia to its weakest position since World War II. Ukrainians have shown they are ready to fight and die, and that they will never accept a Russian puppet regime. In a best-case scenario for the Kremlin, Russia ends up controlling swaths of eastern Ukraine, including a land corridor from Russia to Crimea, allowing Russian forces to continue threatening Ukraine’s Black Sea coastline and the country’s center. Yet even this state of play would hardly improve the Kremlin’s hand compared to what it was before the February invasion, when Russia already occupied Crimea and had the Ukrainians tied down in a low-level war in the eastern part of the country. Strategically speaking, the status quo ante was favorable to Russia, since the simmering conflict was draining Ukraine’s scarce resources and hobbling its aspirations to join the EU and NATO. Germany and France, signatories to the stalled Minsk peace process, were uninterested in inflaming tensions with Russia over Ukraine—as was the United States. After taking office, President Biden tried to patch up relations with Moscow so that he could focus on his main foreign policy priority, China. Biden held a summit with Putin, refused to give Ukraine any clearer guidance on NATO membership, and ignored calls to sanction Russia’s Nord Stream 2 pipeline. In the leadup to the attack, Putin, the eternal tactician, may have been under the impression that he was on a roll in Russia’s “near abroad.” In 2020, when mass protests broke out in Belarus, wedged between Poland, the Baltic region, and Russia, Putin offered dictator Alexander Lukashenko financial support and riot police. After a flare-up in a bitter territorial conflict between Armenia and Azerbaijan that same year, the Kremlin inserted itself into the fight by dispatching Russian peacekeepers to the disputed Nagorno-Karabakh region. In January the Kremlin briefly deployed a Russian rapid-reaction force to Kazakhstan to help a friendly regime shore up its authority amid antigovernment demonstrations and violence. Though all are dependent on Russia, none of the beneficiaries of recent Kremlin support has returned the favor by actively backing the war against Ukraine. Russia’s Isolation To varying degrees, Putin’s attack on Ukraine sent shocks through every former Soviet republic as Russia showed itself to be an unpredictable, revanchist power. Russia’s isolation in its own neighborhood has nothing to do with NATO; its lack of true allies is a strategic disaster entirely of Putin’s own making. In light of their history as Soviet vassals, the desire of former Warsaw Pact countries to join NATO was understandable and, in view of what’s happening in Ukraine, completely sensible. On emerging from behind the Iron Curtain three decades ago, these countries didn’t have the luxury to wait and see whether their former overlord would first develop into a peace-loving, democratic neighbor. That the Russian establishment even before Putin was opposed to NATO expansion is also understandable, given Russia’s past domination over Central and Eastern Europe. The irony is that NATO membership for the region’s small, insecure nations made Russia’s western border the most stable it has ever been. Although Putin fulminated about U.S. missile defense installations in Romania and Poland, it was unclear how they were supposed to neutralize Russia’s vast nuclear arsenal, the largest in the world. In fact, before Russia launched its first invasion of Ukraine in 2014, the United States was drawing down its military presence in Europe and attempting to pivot to Asia. The case of Ukraine is the most egregious example of how Russia’s postimperial phantom pains have clouded the Kremlin’s strategic thinking. Ukraine, with its close cultural, linguistic, economic, and religious ties to Russia, should have been a natural ally. While most Ukrainians were proud of their distinct identity, they were generally well-disposed toward Russia and deeply ambivalent about NATO before 2014. The Alliance itself was divided over Ukraine’s membership precisely because of the country’s deep connections to Russia. Even as Putin’s attack on Ukraine eight years ago spurred the United States, Britain, Canada, and Germany to send troops to NATO allies in Eastern Europe, it did not solidify support for Ukrainian membership within the Alliance. When Putin ordered a full-scale invasion in February, Ukraine was not significantly closer to joining NATO than it had been in 2008, when the issue was hotly debated, together with Putin, at the annual NATO summit. What has changed since 2014 is that a majority of Ukrainians support NATO membership and have no doubts that Russia has become their mortal enemy. As for NATO, member states such as the United States and Britain began arming and training the Ukrainian military. Putin’s fears of an increased U.S. presence in Ukraine—and Eastern Europe more broadly—became a self-fulfilling prophesy. The reputational damage to Russia that Putin’s belligerence has caused is staggering. Finland and Sweden are considering NATO membership, and even Switzerland has ended its traditional neutrality and adopted EU sanctions against Russia. Germany, once Russia’s most faithful partner in Western Europe, is determined to stop relying on Siberian natural gas, ending an energy relationship that began during the Cold War. Trust and economic synergies that took decades to build have been sacrificed for Putin’s delusional war. The Kremlin may retort that it has friends in other parts of the world. But even in the United Nations, Russia has been ostracized, with a large majority of countries calling on Moscow to end its offensive in Ukraine. Putin received explicit support only from Belarus, Syria, Eritrea, and North Korea, with China and India abstaining. The isolation of Putin’s Russia is linked to the country’s inability to articulate an attractive message about what it stands for beyond being the self-proclaimed antipode to the United States. At least during the Cold War, the Soviet Union was the bearer of a powerful ideology that found adherents around the world. During his two decades in power, Putin has squandered the possibilities of Russian soft power. With a tiny fraction of Russia’s oil windfall, he could have established a global network of institutes, like Germany’s Goethe-Institut or Spain’s Instituto Cervantes, to tap into widespread interest in Russian culture. Instead he focused on Russian hard power, turning the Soviet Union’s victory in World War II into the regime’s ideological foundation. The untold human sacrifice in World War II was the source of the Soviet Union’s legitimacy as a UN Security Council member and worthy rival to the United States. With his unprovoked war against Ukraine, Putin has surrendered the last piece of moral high ground Russia, as the successor state of the Soviet Union, held as a leading member of the coalition that defeated Hitler. Putin’s savage attack on Ukraine will taint and overshadow the memory of Russian heroism in World War II for generations to come. In May 2005, leaders from more than fifty countries, including the United States and Ukraine, attended the Victory Day celebrations marking the sixtieth anniversary of Nazi Germany’s defeat. The number of foreign guests has since decreased inversely to Putin’s mounting aggression. Last year, only the leader of Tajikistan paid Putin the honor of attending his parade. This May 9, in a striking symbol of Russia’s isolation, no foreign guests came at all.

### 1AR – AT: UQ – Turkey-West Coop Now

#### Turkey is focusing on reconnecting with the West

Bekdil 6/6 (Bekdil, B. E, Burak Ege Bekdil is a Turkey correspondent for Defense News. He has written for Hurriyet Daily News, and worked as Ankara bureau chief for Dow Jones Newswires and CNBC-e television. He is also a fellow at the Middle East Forum and regularly writes for the Middle East Quarterly and Gatestone Institute (2022, June 6). Turkey seeks to repair ties with Western Procurement Club. Defense News. Retrieved July 1, 2022, from https://www.defensenews.com/global/europe/2022/06/06/turkey-seeks-to-repair-ties-with-western-procurement-club//RM)

“Turkey is a NATO ally and will remain one. The war between our two partners Russia and Ukraine has created a new understanding in favor of strengthening procurement ties with our NATO allies,” a presidential aide told Defense News, speaking on condition of anonymity to discuss Ankara’s diplomatic tightrope walk. The war has once again put Turkey in a pivotal broker position within NATO. Ankara has cultivated ties with both Russia and Ukraine that officials hope will provide dividends in future negotiations. Turkey’s approval is also needed to advance Sweden’s and Finland’s respective NATO membership applications, which grew out of their fear that Russia would work to permanently isolate them from the alliance. But there is some history to overcome. In 2020, Turkey paid $2.5 billion for the Russian S-400 air defense system. But fearing further isolation and sanctions from its allies, Turkey decided against making the system operational. In response to the acquisition, the U.S. suspended Turkey’s membership in the multinational consortium that builds the fifth-generation F-35 fighter jet. Turkey’s down payment of $1.5 billion for a first batch of the stealth aircraft, which Ankara never received, remains to be reimbursed. In March of this year, a senior Turkish diplomat who deals with NATO and security affairs told Defense News that the Russo-Ukrainian war has practically killed all potential Turkish-Russian deals related to strategic weapon systems. With Russia off the table as a military supplier, Turkish leaders are back to surveying the Western market. A senior Turkish procurement official said earlier this spring that the Eurofighter Typhoon is one option, involving the sale of about 80 aircraft — a purchase that would give Turkish industry an edge as it builds the country’s indigenous fighter jet in the making, the TF-X. The Typhoon was originally designed as an air superiority fighter. It is manufactured by a consortium made up of Airbus, BAE Systems and Leonardo, which conducts the majority of the aircraft project through a joint holding company, Eurofighter Jagdflugzeug GmbH. The NATO Eurofighter and Tornado Management Agency, representing the U.K., Germany, Italy and Spain, manages the project and is the prime customer. Turkey also has moved to acquire 40 F-16 Block 70 aircraft and upgrade kits for its 80 older F-16s. The Turkish request went to Congress in April. Earlier in May, the Biden administration asked the House of Representatives to approve the upgrade of Turkey’s F-16 fighter jet fleet. A potential deal may include high-tech missiles, radar systems and electronic warfare suites for the planes. In addition, Turkish President Recep Tayyip Erdoğan expressed hope in March that the trilateral talks between Turkey, France and Italy to co-produce the European air and anti-missile defense system SAMP/T, built by Eurosam, would resume after the French elections in April. In similar optimism, Foreign Minister Mevlüt Çavuşoğlu said in late March that Italy and France were thinking “more seriously” now on co-producing the SAMP/T systems in Turkey. Meanwhile, Britain took steps to ease Turkey’s return to the Western procurement system. Turkish Deputy Foreign Minister Faruk Kaymakcı said in February that Britain had lifted a ban on arms sales to Turkey, imposed after a unilateral Turkish offensive in northern Syria in 2019. The ease in trade restrictions was kept secret from the public, and some observers say Canada might follow suit. But most Western restrictions remain in effect. For instance, the Czech Republic, Finland, the Netherlands, Norway, Spain and Sweden imposed full arms embargoes on Turkey since 2019 over its military interventions in Syria. France has placed restrictions on an array of defense and aviation subsystems, and Italy has barred the sale of certain products. Germany has suspended plans to sell engines to power the Altay, Turkey’s first indigenous main battle tank in the making. “Turkey’s careful balancing act between its NATO allies and Russia has generally been recognized in the West, sometimes with much praise. How Turkey will maneuver between clashing Western and Russian interests in the near future will shape Western appetite for Turkey’s return to their procurement system,” said Ozgur Eksi, a defense analyst in Ankara. Some Western diplomats think Erdoğan may try to use Turkey’s veto power in NATO for a reset in procurement ties with the West. He said May 13 that his country is “not favorable” toward Finland and Sweden joining the alliance, indicating Turkey could use its membership to veto moves to admit the two countries. The issue was unresolved at press time. “The Turks appear to be preparing for a tough bargaining process, which may include the transfer of certain weapons system,” said a U.S. diplomat in Ankara. Russia’s aggression in Ukraine prompted Finland and Sweden to reconsider their traditions of military nonalignment. Eksi said that because of the war in Ukraine, Turkey would unlikely consider touching major arms deal with Russia that were previously on the table. “That includes any Turkish intention to buy the Russian-made Su-35 or Su-57 aircraft,” he said. Erdoğan has previously said Turkey was interested in buying the Russian-made fighter jets.

### 2AC – No Link

#### Even *if* Turkey and Russia are tied together, Russia will never replace NATO in Turkey’s eyes

Bardakçı 21 (Mehmet Bardakçı, 12-6-21, “Is a Strategic Partnership Between Turkey and Russia Feasible at the Expense of Turkey’s Relations with the EU and NATO?”, Comparative Southeast European Studies, https://www.degruyter.com/document/doi/10.1515/soeu-2021-0001/html?lang=en//BVN SC)

The article mainly contends that since the real and expected benefits from the European Union (EU) and NATO were not delivered sufficiently from Turkey’s perspective, Turkey looked for alternatives and collaborated with Russia more intensely in recent years. Turkey’s cooperation with Russia was also facilitated by several global, political, economic, conjectural, security-related, and individual-level factors. Another argument of the study is that despite Turkey’s intensive collaboration with Russia, it is not feasible for Turkey to build a strategic partnership with it in the short- and medium-term at the expense of its relations with NATO and the EU. The main reasons for this are, in addition to the institutional and social shortcomings, geostrategic divergences, Russia’s inadequacy as an economic actor, the pitfalls of an asymmetric relationship with Russia, the security risks posed by Russia, NATO’s continuing importance for Turkey’s security needs, and the incompatibility of Russia’s and Turkey’s political systems. Keywords: EU; NATO; Russia; strategic partnership; Turkish foreign policy Introduction The arrival of the Russian S-400 air defence system in Turkey in July 2019 was welcomed enthusiastically by many in Turkey. This breakthrough event was even described by some in Turkey as the “country’s liberation from the West” (Tol and Taşpınar 2019, 107). Almost a decade ago, the question started to be asked as to whether Turkey was drifting away from the West, especially since it had approached Iran and voted against sanctions on Iran over its nuclear programme in the United Nations Security Council (UNSC) as well as clashed with Israel over the Mavi Marmara incident in 2010. This time, however, this question is more pronounced and the likelihood of a strategic shift became more tangible with the arrival of a weapon system from a country that has been confronting the West recently. Given that Turkey’s relations with the United States and the European Union (EU) have been at a nadir in recent years, many regarded the acquisition of the Russian weapon system as a precursor of Turkey’s withdrawal from the North Atlantic Alliance (North Atlantic Treaty Organisation, NATO) and the EU. In addition to many other factors, Moscow’s and Ankara’s bitter relations with the West are a major reason why the two countries have closed ranks in recent years. A milestone for Moscow’s relationship with the West was its annexation of Crimea in March 2014 while the coup plot against the Justice and Development Party (Adalet ve Kalkınma Partisi, AKP) government in Turkey in July 2016 marked a watershed in Ankara’s relations with the West. Russia had to confront a series of economic sanctions from the West after 2014 while Turkey was deeply disappointed with its Western allies for their slow and reluctant condemnation of the coup attempt. Ankara has even aired doubts that the West might have been behind the coup attempt. These events have helped peak the two countries’ deeply-ingrained sense of distrust towards the West. As one observer put, “Despite their obvious differences and even antagonisms, Russia and Turkey are united by one thing—the fact that they are two great powers connected historically, culturally, and geographically to a Europe that never fully accepted them as one of their own” (Lukyanov, People with Big Ambitions, The Moscow Times, 19 July 2016). A major objective of this article is to unpack the puzzle of whether Russia could replace the EU and NATO as a strategic partner for Turkey. The article contends that in addition to some factors facilitating the Russo–Turkish rapprochement, Turkey searched for alternatives, collaborating with Russia owing to the decline in the real and expected benefits from the EU and NATO from the Turkish perspective. Another major contention of this article is that despite the close collaboration between Moscow and Ankara, in particular after the coup attempt against the Turkish Government in July 2016, it is hard for Turkey to forge a strategic partnership with Russia because of significant divergent geostrategic interests, Russia’s inadequacy as an economic actor, the downsides of an asymmetric relationship with Russia, the security risks posed by Russia, the continuing importance of NATO for Turkey’s security as well as the incompatibility of Turkey’s and Russia’s political systems. Moreover, the absence of a solid social basis and the lack of institutionalization in their relations further make it infeasible for Turkey to switch from the Transatlantic Alliance to Russia. The study is divided into three sections. The first part concerns the motives that brought Moscow and Ankara together, including, first and foremost, their strained relationship with the West, economic interests, conjectural factors such as the Syrian conflict, transformation of the global governance system, and similarity of their political culture based on security and personal harmony between the leaders. The second part draws attention to the limitations in the relationship, and the third part explains why a strategic partnership between Turkey and Ankara and at the expense of Turkey’s partnership with the EU and NATO is not feasible in the foreseeable future. Finally, the conclusion wraps up the article.

#### No link–Turkey can work with both sides

Kusa 6/13 (Iliya Kusa, Iliya Kusa is a Kyiv-based author and analyst of international relations with the Ukrainian Institute for the Future. For the past six years he has been writing about Middle East, Ukrainian foreign policy after 2014, and European politics. A special focus of his expertise is dedicated to the Middle East and North Africa, June, 13, 2022, “Turkey’s Goals in the Russia-Ukraine War”, <https://www.wilsoncenter.org/blog-post/turkeys-goals-russia-ukraine-war>//RM)

Of the many countries struggling to find a proper approach to the Russia-Ukraine war, Turkey seems to have landed on the most controversial yet comfortable one. Ankara has managed to preserve its relationship with both Moscow and Kyiv without endangering its own geostrategic calculations in the region while at the same time avoiding joining ranks with Western countries in imposing crippling sanctions on Russia. The role of a key mediator, which President Recep Tayyip Erdoğan was so eager to take on, has allowed Turkey to conveniently position itself in the middle of the fight—and not just in the conflict between Russia and Ukraine but more broadly in the struggle between Russia and the West, and even globally between the West and the numerous non-Western countries that have preferred to strike a more cautious and balanced approach to the war. The overall political and ideological polarization incited by the war in Ukraine has threatened many countries that have worked for years to build a balanced, pragmatic, multivector foreign policy. Now many of them find themselves having to make a hard choice. Western countries under U.S. guidance are urging them to make common cause against Russia, which often means abandoning their balancing act between major powers. As the war has shown, in a highly tense international environment, a posture of neutrality and balancing on the part of countries struggling not to choose sides is not welcome by the conflicting parties, which strive to mobilize support for their own efforts. Turkey in particular has had to carve a path that does not lethally threaten relations with either Russia or the EU. The war in Ukraine has presented Ankara with both opportunities and risks. After the 2015 centralization of political power in the hands of Recep Erdoğan, the president moved his personal ambitions and goals to the forefront of Turkey’s foreign policy. In particular, he has sought to make Turkey a regional Muslim superpower capable of designing and guiding a new “post-Western” security architecture in greater Eurasia and one of the first non-Western powers to shape the new multipolar world order. To preserve this course, Turkey has had to find an appropriate way to deal with the Ukraine challenge. In essence, two global objectives became a priority for Turkey when Russia invaded Ukraine on February 24: to preserve its global and regional positions, which Turkey has managed to consolidate and enhance after 2016; as well as to reinforce Ankara’s influence and amplify earlier achievements to ensure further expansion. Objective 1: Preserving Turkey’s Global and Regional Positions The first global objective is reflected in several developments that became essential in Ankara’s quest to hold its ground. First, the war in Ukraine has threatened Turkey’s pragmatic multipolar approach underpinning its foreign policy. The political coalescence of NATO and EU countries against Russia could not have escaped Turkey’s attention. Nor could Ankara remain on the sidelines and refrain from getting involved, given its close ties with several Western countries and its NATO commitments. On the other hand, Turkey did not want to degrade its relations with Russia by joining the Western-led sanctions, in which Ankara has declined to participate since 2014. For Turkey, Russia has been an important trading partner ($32.5 billion as of 2021), a key source of foreign investment (more than $10 billion), a colossal source of tourists (Russians account for almost 5 million visits, or 1 percent of all foreign tourist visitation), a crucial energy supplier, and an important “frenemy” in several regional playgrounds where Turkey (though not without Russia) has been able to actually accomplish something, such as in Syria, Libya, and Nagorno-Karabakh. Turkey has been able to maintain relations with Russia and the West, thereby sustaining its desired global position, by assuming the role of a key mediator between Russia and Ukraine. This formal role gives Ankara a good reason not to get involved in sanctioning Moscow. Second, the war in Ukraine, with its subsequent social, economic, political, and transnational repercussions, has endangered stability on a number of regional issues that are vital for Turkey’s security, reputation, and international self-reliance. For years, Turkey’s regional policy was built on a situational partnership with Moscow. The possible weakening of Russia as a result of the war in Ukraine could throw the regional balance in the South Caucasus, the Black Sea region, and the Levant into disarray, strengthening, for instance, Iran in Syria—and Iran is one of Turkey’s less preferred competitors. Regional destabilization is not in Ankara’s interests, especially in light of the substantial financial and economic difficulties Turkey has been struggling with since last autumn. Objective 2: Reinforcing Ankara’s Influence The second global objective has to do with furthering Turkey’s political, economic, trade, and geopolitical expansion. By shaping the dynamics of the current crisis, Turkey is trying to “ride the tide” and use it to its advantage. Its tactics to achieve this goal include taking the place of Western companies on the Russian market, accruing tourist and financial flows from Russia, thereby bypassing sanctions, and gaining political ground in regional affairs by taking on a mediation role, forcing the conflicting parties to consult with and through Ankara on issues of war, peace, maritime trade, the demining of the Black Sea, and the restoration of essential Ukrainian wheat exports. In addition, many Russians, fearing Western sanctions, have moved to Turkey, investing millions in the local real estate market and registering businesses there, which is also a lucrative deal for Ankara. (Ankara offers citizenship for a $400,000 investment.) Finally, Turkey sees an opportunity to achieve its long-sought goal of becoming the major gas transit hub for Europe. With the European allies determined more than ever to reduce their dependence on Russian gas imports, Turkey is offering its services and lobbying for realization of a long-discussed new subsea pipeline between Israel and Turkey, one that would allow eastern Mediterranean gas to reach Europe through Turkey. Even more important for Ankara in this context is exploiting the momentum to strengthen its own standing in the world. As Western partners search for support in containing the Russian threat and dealing with an array of war-related consequences, Ankara sees the time is ripe to make the West drop sanctions against the Turkish defense industry and embrace Turkey as an equal partner. It is with this logic in mind that Turkey’s leadership unexpectedly jumped on NATO’s expansion process with bold demands as to what Sweden, Finland, and NATO member states should do to obtain Ankara’s consent. And it is this tactic of getting the most out of concessions from all parties that drove Erdoğan to announce a new military operation in northern Syria against the Western-backed Kurds, thereby endangering the regional positions of both Russia and the United States. All in all, Ankara’s predominant stance on the Russia-Ukraine war is not about Russia or Ukraine at all. It is about ensuring that any future postwar settlement in the region and the world will necessarily include Turkey’s interests, and ideally establish Turkey as a stakeholder in the process. Turkey’s serious economic problems, however, mean these plans may have to be adjusted. The key aspect of the Russia-Ukraine war for Erdoğan and his government remains not so much support for Ukraine or Russia as an opportunity for Erdoğan to strengthen his position on the international stage at the expense of either country’s interests by proactively practicing diplomacy amid the developing crisis.

### 1AR – Link Turn

#### L/T–NATO and Turkey are key to mitigating Middle Eastern conflict

**Cammack & Dunne 18**(Perry Cammack was a nonresident fellow in the Middle East Program at the Carnegie Endowment for International Peace, where he focuses on long-term regional trends and their implications for American foreign policy., Michele Dunne is a nonresident scholar in Carnegie’s Middle East Program, where her research focuses on political and economic change in Arab countries, particularly Egypt, as well as U.S. policy in the Middle East., ND, “Fueling Middle East conflict—or Dousing The Flame”, https://carnegieendowment.org/2018/10/23/fueling-middle-east-conflicts-or-dousing-flames-pub-77548//BVN SC)

In comparison with almost every other geographical region, the Middle East suffers from a lack of both regional dispute resolution mechanisms and diplomatic protocols that might reduce the scope for regional conflict. While the Cold War was defined by the antagonism between NATO and the Warsaw Pact, both sides increasingly felt the need for inclusive institutions and mechanisms to reduce tensions. Every U.S. president during the Cold War, from Dwight D. Eisenhower to George H. W. Bush, met with his Soviet counterpart. During the tensest moments, high-level U.S.-Soviet channels of communications were especially important. Over time, a number of confidence-building institutions and transparency-enhancing measures were created, including the Organization for Security and Cooperation in Europe (OSCE), successive arms control agreements, and later the Treaty on Open Skies, which allows for unarmed surveillance flights over signatory countries to promote military and nuclear weapons openness. In the Middle East, however, the absence of any similar mechanisms or organizations, particularly amid proliferating military conflicts, feeds security dilemmas across multiple vectors, so that steps justified by one state as necessary to its security—military intervention, arms procurement, alliance formation, and so on—are perceived by its rivals as threatening. During the Israeli-Palestinian peace efforts of the 1990s, there were attempts to build mechanisms for regional communication and cooperation. Participants at the 1991 Madrid Conference set up five multilateral working groups to address regional challenges, each involving Israel and a range of Arab states. The centerpiece was the Arms Control and Regional Security (ACRS) working group, which marked the first bid to create a formal multilateral framework for regional security issues. Six ACRS plenary sessions, co-hosted by the United States and Russia, were held and a series of regional confidence-building measures were outlined before the working group slowly broke down by 1995 under the weight of regional animosities and implementation challenges. While all of the working groups have long been defunct, one tangible result survives: the Middle East Desalination Research Center in Oman, created in 1995. The center conducts transboundary water research and development projects, and its membership includes Israel, Jordan, Oman, Palestine, and Qatar as well as several Western nations.

#### L/T–NATO and Turkey are aligned in the Middle East–they can collaborate

**Ellehuus 19** (Rachel Ellehuus is deputy director and senior fellow with the Europe Program at the Center for Strategic and International Studies in Washington, D.C. “Turkey and NATO: A Relationship Worth Saving.” Turkey and NATO: A Relationship Worth Saving | Center for Strategic and International Studies, 2 Dec. 2019, www.csis.org/analysis/turkey-and-nato-relationship-worth-saving.//BVN SC)

A second area where Turkey’s immediate security concerns intersect with the majority of other NATO members is stability in the Middle East, most immediately in Syria. To be sure, Turkey’s anger over United States’ partnership with the YPG in the fight against the Islamic State—appnd NATO’s anger at Turkey for its unilateral incursion into northern Syria—will make progress difficult. But ultimately, the two sides share a mutual interest in seeing stability and pluralistic governance in Syria. This entails constraining Syrian president Bashar al-Assad; preventing the return of the Islamic State and Europe-based Islamic State fighters; and facilitating the delivery of humanitarian aid, reconstruction, and refugee return. More broadly, both sides also share an interest in limiting Russian and Iranian influence in the region. With the Russian military presence in Armenia, Azerbaijan, and Crimea now supplemented by the Russian naval base at Tartus, airbases at Kobani and Khmeimim, and helicopter base[s] at Qamishli, Turkey is effectively encircled by Russia. It is in this context that German minister of defence Kramp-Karrenbauer’s suggestion of an internationally-controlled security zone along the Turkey-Syria border, possibly NATO-led and backed by the United Nations in loose partnership with Russia, makes sense. It would address a situation that immediately and directly affects the security of Europe and Turkey and demonstrate that the NATO is invested in addressing Turkey’s security concerns. Should NATO and Turkey move to restore some level of trust by taking these first steps, it will be important to avoid unnecessarily escalating tensions. For Turkey, this means abiding by the terms of the Syria ceasefire, not pursuing additional purchases of Russian military equipment, and doing its part to prevent the resurgence of the Islamic State in the region or return of Islamic State foreign fighters to Europe. For the United States and Europe, the trick will be to apply the required sanctions and arms embargoes in a discriminate way. For example, whereas imposing sanctions in accordance with the Countering America’s Adversaries Through Sanctions Act (CAATSA) and withholding delivery of Turkey’s F-35s due to its purchase of the Russian S-400 makes good policy sense, imposing additional blanket sanctions could do more harm than good, affecting the Turkish people more than their leadership and giving Erdogan another opportunity to blame the West for Turkey’s economic problems. A smarter approach might involve going after corrupt actors using the Global Magnitsky Act. Similarly, a total arms embargo by the United States and the European Union will only drive Turkey to procure more Russian or non-NATO interoperable military equipment. Rather, the arms embargoes should be limited along the lines of the most recent House sanctions bill, which includes exemptions for items to be used in NATO-approved operations. Finally, as some of Turkey’s biggest export partners, the European Union and the United States can provide needed carrots along the way to incentivize constructive behavior by Ankara. Measures might include an eventual upgrade of Turkey’s customs union with the European Union or limited visa-free travel to EU countries for Turkish citizens. For the United States, President Trump’s offer of a $100 billion trade deal will also be attractive to Erdogan in Turkey’s struggling economy. To be sure, repairing the trust that has been lost and returning Turkey to the path of Western integration will be a struggle, requiring sustained effort, and a setting aside of egos, on all sides. Yet on this occasion of NATO’s 70th anniversary, Turkey and its NATO allies owe it to one another to pause for a moment and reflect not on their many disagreements but on what brought them together in the first instance and why that still matters.

## 2AC – AT: DA – Politics

### 2AC – Link Turn

#### The plan has bipartisan consensus – fears over China unite the parties for investment

Blank et al. 22 (02/24/2022 | Steve Blank | Joe Felter | Raj Shah | ‘The US must harness the power of Silicon Valley to spur military innovation’ | <https://techcrunch.com/2022/02/24/the-us-must-harness-the-power-of-silicon-valley-to-spur-military-innovation/> | DOA: 7/7/2022 | SAoki)

The Department of Defense, other U.S. government agencies and a bipartisan consensus in Congress realize that China is strategically leveraging diplomacy, information and intelligence, its military might and economic strength, and all other instruments of its national power to redefine the future world order. Given China’s stated goals and objectives, we should expect continuity in this assessment in the coming decades. To any dispassionate observer, U.S. responses to China’s aggressive whole-of-government efforts to dominate – especially in the military domain – have been piecemeal and ineffective. The systems (and people) we have in place to respond (requirements, acquisition, budgeting) were designed to optimize lifecycle cost and manage 30-year DOTMLPF processes. Yet, we need the opposite to compete with our strategic rival – speed, urgency, scale, short life cycle, and attributable systems. Existing DoD systems are not designed to effectively tap into a commercial technology ecosystem that’s now driving most of the DoD-relevant advanced tech (AI/ML, autonomy, biotech, quantum, access to space, semiconductors, etc.) We must more aggressively and deliberately harness the vast untapped potential of our world-renowned institutions of higher learning, namely the brilliant, innovative and creative students and faculty that flock to America’s flagship universities. Many among the DoD’s senior military and civilian leaders understand this and have established well-intended innovation initiatives. But the enduring funding and efficacy of such initiatives often hinge on support from visionary individual leaders and are at risk when these key leaders’ tenures end. The result is that our systems, organizations, headcount, and budget can’t scale to meet the challenge of China and other potential rivals. Our adversaries are innovating faster than our traditional systems can respond.

## 2AC – AT: K – Top Level Toolbox

### 2AC – BCIs Inev

#### BCIs and AI are inevitable – they exist in the squo – the only question is regulation

**Nørgaard and Linden-Vørnle 21** (Katrine Nørgaard and Michael Linden-Vørnle, a Chief Adviser at the National Space Institute (DTU Space) which is part of the Technical University of Denmark. Scandinavian Journal of Military Studies, "Cyborgs, Neuroweapons, and Network Command", 2/18/2021, link.gale.com/apps/doc/A652946693/AONE?u=umuser&sid=bookmark-AONE&xid=45fb1427, accessed on 6/23/2022)//gideon

As an example, DARPA has been working on non-invasive brain-computer interfaces that use the human visual system as the input device to a computer system to increase the speed of data processing in visual search mode (NATO STO 2020). In DARPA's Next-Generation Non-Surgical Neurotechnology (N3) Program, the goal is to create reliable neural interfaces without the need for surgery (Emondi, 2020). Instead of invasive brain implants, the brain-computer interface is designed as a wearable, head-mounted device (cap, helmet, or visor) that transmits electrical signals from the brain to the computer and back to the operator in a closed-loop,[8] bidirectional feedback system (see Figure 3). The brain signals are picked up by sensors in the wearable interface, analyzed and translated by AI, and sent back as an output signal to the human operator, for instance as a list of alternative options to engage a target or coordinate data streams from other platforms or networked weapons systems. Ultimately, it is envisioned that adaptive neuro-feedback systems could help to develop and evaluate targeting data, create layered options, enable cross-domain synergy, and exploit opportunities in time-sensitive environments. At this stage of development, these interfaces would primarily be suited for analysts and operators in military reach-back facilities and headquarters that provide a relatively stable and controlled environment. However, a better understanding of closed-loop and adaptive neuro-feedback systems will be necessary to improve systems design and maximize human performance while simultaneously avoiding mental or cognitive overload in operators and intelligence analysts.

#### BCIs are inevitable – it’s a question of regulations

Cluzel 21 (Francois du Cluzel | Innovation Project Manager at NATO ACT Innovation Hub | “Cognitive Warfare” | https://www.innovationhub-act.org/sites/default/files/2021-01/20210122\_CW%20Final.pdf | DOA: 6/18/2022 | gideon)

As our understanding of human cognition advances, so too does our understanding of what “being human” means on a fundamental level. Revolutions in science and technology have already had far reaching consequences in human potential and behavior. Wonderous marvels of prosthetics and genetics have people brazenly asking if the era of “completely human” athletics is over [2]. Groundbreaking gene modification research has others wondering if the time will soon come where the taxonomic genus Homo becomes more crowded than ever expected [3]. Alongside these, however, come darker considerations as well. In the medical space, debates rage about whether CRISPR-Cas9, a cutting edge gene-editing tool, will be the savior of humanity or its doom [4]. The potential to alter humans on a basic level is intoxicating, but it is also rife with worries of designer babies and unforeseen consequences. On the technological front, inside basement laboratories (although tech shops might also be a fitting name) people experiment with metal implants (and their pain thresholds) to gain a glimpse of what it means to be beyond human. An underground market for implants and robotic modification blooms as people see the union between the physical and the digital as “inevitable” [5]. The operations, unregulated to the extent that they occur without the aid of anesthesia, promise an improved breed of human. Inevitably, they also risk the demarcation of the “unimproved” breed of human, with all the connotations this brings. Recent advancements in the sciences of neurology, psychology, and cognition have already highlighted opportunities for the human mind itself to become unrecognizable. Some possibilities loom in the distant future, their exact shape and potential nebulous, while others are already haphazardly accelerating into the hands of everyday people. In order to be ready, we seek to identify, categorize, and determine the dangers and potentials of this upcoming revolution in cognitive biotechnology that promises to alter the human experience itself.

#### BCIs are inevitable

**Llinás and Makarov 3** (Rodolfo Llinás and Valeri Makarov, Neuroscientist and the Thomas and Suzanne Murphy Professor of Neuroscience and Chairman Emeritus of the Department of Physiology & Neuroscience at the NYU School of Medicine, and has published over 800 scientific articles; Neuroscience researcher at the Dept. of Applied Mathematics, Complutense University. Bainbridge, "Visionary Projects: Brain-machine interface via a neurovascular approach", 1/1/2003, https://www.researchgate.net/publication/261559181\_Visionary\_Projects\_Brain-machine\_interface\_via\_a\_neurovascular\_approach, accessed on 6/26/2022)//gideon

We proposed that a novel brain-machine interface is realizable that would allow a robust solution to this important problem. This hardware/software approach allows a direct brain interface and the classification of its functional states using a benign invasive approach. We propose that this approach would be very helpful in human capacity augmentation and will yield significant new information regarding normal and abnormal brain function. Because its development and utilization is inevitable given the extraordinarily attractive feature of being retrievable, in the sense that the recording/stimulating filaments are small enough that the device can be removed without violating the integrity of the brain parenchyma. Because such interfaces will probably be streamlined over the coming years in efforts such as “hypervision” (Llinás and Vorontsov in preparation), two-way direct human communication, and man-machine telepresence (which would allow actuator-based distant manipulation), this approach should be fully examined. Finally, the development of new nanotechnology instrumentation may ultimately be an important tool in preventive medicine and in diagnostic/therapeutic outcome monitoring of physiological parameters.

### 2AC – BCI Trials Now

#### It's try or die - human trials are starting right now

**Cuthbertson 1/22** (Anthony Cuthbertson, journalist. The Independent, "Elon Musk’s brain chip startup prepares for first ever human trials", 1/22/2022, https://www.independent.co.uk/tech/elon-musk-neuralink-human-trials-b1998521.html, accessed on 6/30/2022)//gideon

Neuralink job posting offers candidate ‘an opportunity to change the world’ Elon Musk appears close to beginning the first ever human trials of his brain-computer interface technology. A new job posting for a ‘Clinical Trial Director’ at Neuralink reveals that the neurotech startup is preparing to take its brain chip research to the next stage. Neuralink has already conducted trials on pigs and monkeys, including a successful experiment involving a nine-year-old macaque capable of playing video games using only its mind. The firm eventually hopes to use the technology to allow “human-AI symbiosis”. Early human trials, which Mr Musk said last month will take place in 2022, will likely involve people with paralysis using Neuralink’s interface to gain direct neural control of a computer cursor. The position calls for candidates who are “mission-driven” and “willing and eager to go above and beyond” to achieve the company’s ambitions. “As the Clinical Trial Director, you’ll work closely with some of the most innovative doctors and top engineers, as well as working with Neuralink’s first Clinical Trial participants!” the job listing, first spotted by Bloomberg, states. “You will lead and help build the team responsible for enabling Neuralink’s clinical research activities and developing the regulatory interactions that come with a fast-paced and ever-evolving environment.” In return, Neuralink claims to offer “an opportunity to change the world and work with some of the smartest and the most talented experts from different fields”. The Neuralink device is the size of a coin and can be implanted into the skull The first practical applications of Neuralink’s technology will involve treating people with brain disorders and diseases, according to Mr Musk, who says it will “solve important brain and spine problems with a seamlessly implanted device.” The tech billionaire, who also heads SpaceX and Tesla, claims that the potential for Neuralink’s brain chip beyond that is almost limitless. “You could solve blindness, you could solve paralysis, you could solve hearing,” he said during a company presentation in 2020. “In the future, you’ll be able to save and replay memories. This is increasingly sounding like a Black Mirror episode... Ultimately you could download them into a new body or a robot body.” He has since claimed that the technology will give people “enhanced abilities”, like being able to stream music directly to their brain. Neuralink’s monkey was able to move the virtual paddle of Pong just by thinking about it A 2019 paper written by Neuralink researchers described a brain-computer interface that used an array of “small and flexible electrode ‘threads’”, that are surgically implanted into the brain by a robot. The device itself is “about the size of a coin” and can apparently replace a piece of the skull without causing any lasting damage to the brain. Future versions would feature an all-day battery life and would be able to connect wirelessly to a wearer’s smartphone. The latest job listing is one of 84 postings on Neuralink’s website, which includes roles in robotics, software, animal care and surgery.

#### Trials are starting now – the tech is here – we cannot wait

**Cuthbertson 1/20** (Anthony Cuthbertson, journalist. The Independent, "Brain device records activity in record-breaking detail", 1/20/2022, https://www.independent.co.uk/tech/brain-computer-interface-device-neuralink-b1997020.html, accessed on 6/30/2022)//gideon

Research could lead to breakthroughs in the emerging field of brain-computer interfaces A new array of brain sensors can record electrical signals directly from the surface of the human brain Researchers have built a sensor capable of recording signals from the human brain in record-breaking detail, opening up new possibilities for brain-computer interfaces. A team of engineers and surgeons, led by University of California San Diego professor Shadi Dayeh, used a densely packed grid embedded with thousands of electrocorticography (EC0G) sensors to allow them to read activity from the brain’s cortex in 100 times higher resolution than existing technologies. The thin and flexible array, measuring three-centimetres-by-three-centimetres, offers a highly detailed perspective on specific parts of the brain, which could have profound implications if approved for clinical use. Early applications could include surgeons receiving ultra clear brain signal information, providing better guidance for removing tumours without damaging healthy tissue, as well as surgically treating drug-resistant epilepsy. Longer-term, the brain device could be used as a permanent wireless implant to assist people living with paralysis or other neurodegenerative diseases like Parkinson’s, which can be treated with electrical stimulation. Beyond that, the ECoG technology could be developed for use in the emerging field of brain-computer interfaces, which have a huge range of potential applications – from controlling a computer just by thinking, to streaming music directly to your brain. By uncovering new knowledge about how the brain works, for example, the device could be used to interpret hand motions in new ways utilising brain wave patterns. One of the most high-profile companies working on brain-computer interface technology is Elon Musk’s Neuralink startup, which aims to commence human trials of its chip later this year. Professor Dayeh’s team has already tested the ECoG device on 19 people, who agreed to be part of the research during the “downtime” of their already scheduled brain surgeries. The next step is to conduct a clinical trial of the technology, which will be funded by a $12.25 million grant awarded to the scientists.

### 2AC – Biotechnology Development Good

#### **The development of biotechnology is sustainable and good – regulations check harm inequality**

Sarewitz and Karas 7 (Daniel Sarewitz and Thomas H. Karas, " Policy Implications of Technologies for Cognitive Enhancement", Sandia National Labratories, https://core.ac.uk/download/pdf/71304686.pdf, February 2007, Accessed 6-26-2022)//ILake-SG

Values: Those with this perspective believe in the primacy of individual choice, mediated through the economic marketplace. Responsibility and accountability are primarily vested in the individual, not in the government. Research and innovation are viewed as powerful forces for human good because they are expressions of individual creativity, and because they expand the realm of choice available to individuals. The marketplace is also seen as a powerful catalyst for innovation that, when combined with the potential of human enhancement technologies, could lead to the radical diversification of humanity—and consequent increase in freedom of choice and expression. Economic competition combined with cognitive enhancement competition should push human performance and capabilities to new heights. Economies of scale, and trickle-down of economic benefits, will help to ensure that benefits are not unacceptably concentrated among small groups. Transparency, in the form of easily available information about cognitive enhancement, will facilitate the efficiency and equity-serving behavior of the market. Policies: Needless to say, appropriate policies for advancing this perspective should enable innovation and choice. One place where national government can play a positive role in is ensuring a level playing field for market competition, for example by monitoring the activities of other governments for inappropriate subsidies, and by ensuring that policy tools such as intellectual property (IP) are not used in the private sector as a way of blocking innovation. Governments may also need to protect the level playing field for consumers, so that the already-enhanced do not act, through non-market means, to protect their status by preventing others from becoming enhanced. The government should also create a clearinghouse on product information (including testing and consumer complaints) so that consumers can understand what is known about efficacy, risks, and benefits of particular technologies. Companies, in turn, should be shielded from liability if they withdraw products from the market after problems have been uncovered. Regulation of particular technologies is not out of the question, but only if evidence of harm to humans or the environment becomes clear. Some areas of tension exist within this policy framework. In particular, laissez-faire advocates may differ on how active the role of government ought to be in funding research, in helping to ensure the safety of new technologies, and in providing information to help consumers make wise choices. Interventions such as IP protection, liability limits, and regulation of childhood applications of cognitive enhancement also raise dilemmas about appropriate government action.

### 2AC – Biotechnical Weaponization Inev

#### Biotech innovation is inevitable BUT peacetime regulation is key for abating confusion toward balanced approaches against non-state actors

Gisselsson 22 (22 April 2022 | David Gisselsson | “Next-Generation Biowarfare: Small in Scale, Sensational in Nature?” | <https://doi.org/10.1089/hs.2021.0165> | DOA: 6/23/2022 | SAoki)

Carl von Clausewitz, the father of modern strategic military thinking, used the metaphoric fog of war to characterize the uncertainty and confusion surrounding battle.19Nowhere has this confusion been more prominent than in today’s conflicts, with an increasing use of nonmilitary means of warfare, often difficult to discern from criminal activity, recreational hacking, or accidental events. Attribution—finding out who is behind biological attack—will probably be challenging in the future.20Some of the main reasons attribution will be challenging:The global financial biotech sector is growing rapidly, with many actors, large and small, having complicated ties to each other, to governments, and to academia.While information flows freely online, the trend toward open science makes it mandatory for scientists to deposit more and more data,21,22such as genome sequences in open archives, free for any bad actors to grab.Setting up new technology platforms is becoming less expensive every year, primarily because the costs of ge-nomes equencing, DNAsynthesis, dataanalysis,and datastorage are going down. The capacity to create now lethalstrains of pathogens are currently available at most majoruniversities around the world.More and more sophisticated delivery systems increasethe possibilities for covert action. New possibilitieswithin the fields of nanotechnology and small auton-omous vehicles may broaden the repertoire of vectorsbeyond what is available today.23,24The community of bad actors is increasing in com-plexity and is no longer limited to rogue nation statesbut also includes private security contractors, criminalgroups, and terrorist groups, all of which may act inconcert or in parallel.That accountability and attribution can be made difficultby shifting bioweapons production from the government tothe private sector is well illustrated by the South Africanapartheid-era Project Coast, where several private compa-nies were used as cover for the production of biological andchemical agents.25Today’s global economy, where inter-national biotech companies are becoming increasingly connected with large academic research institutions andwith government agencies, provides near-perfect conditions for actors who want to hide biological weapons develop-ment under the cover of innocent-looking (dual-use) bio-medical research.10Notably, one may have to anticipatethat future antagonists may be a blend of states and non-state actors using biological threats to pursue agendas thatmay not even be political—similar to developments in thefield of cybersecurity where bad actors are often nongov-ernmental and work for profit.Future Biodefense Requires IncreasedCivil–Military SynergyHow should democratic societies best prepare for the bleakfuture outlined in this paper? Further work to improvecompliance to the Biological Weapons Convention bybetter mechanisms for regulation of dual-use technologyis laudable.26However, societies must look beyond tra-ditional means of biodefense such as biosurveillance andstockpiling vaccines, drugs, and personal protective equip-ment. In a future where sophisticated biology will becombined with information warfare, medical intelligencewill be critical27because (1) high-resolution and updatedassessment of the biotechnological capacity among antag-onists will be vital to deny attackers the element of surpriseand (2) we will need frontline research expertise and in-frastructure to produce solid data to counter disinforma-tion. Finally, large-scale datasets on pathogens, such as theirgenome sequences, will prove vital for rapid production ofcountermeasures.As a civilian health professional, I suggest that an up-dated biosecurity strategy for democratic societies shouldinclude at least:Information countermeasures that can defend againstdamaging narratives appearing alongside a biological attack. Considering the inevitable polarity between free-dom of speech and information campaigns, public mes-saging must be carefully performed, preferably leaningheavily on well-validated and updated medical data.Rapid deployment of next-generation sequencingtechnologies to genetically characterize emerging threatsand facilitate attribution.28This requires scalable lo-gistics for rapid and extensive sampling of the popu-lation, where field investigation teams are linked withfirst-class molecular biology facilities.Rapid postmortem investigations of deaths from sus-pected new biological threats. The purpose of this isnot only to sample potential pathogens, but also tocharacterize how new agents injure and kill—knowledgethat is critical for treating victims that are still alive.29Secure data transmission and storage, and computa-tional capacity that can rapidly be scaled up to analyzevast amounts of biological data. This should include arapid and secure system to funnel data to producers ofvaccines and other countermeasures.A closer collaboration among government, the defensesector, healthcare providers, the commercial biotechsector, and medical research institutions. It would beadvantageous to draft plans and financial contracts thatregulate this collaboration in peacetime, to be activatedlater in times of crisis. In the recent launch of the Eu-ropean Health Emergency Preparedness and ResponseAuthority, thecivil–militaryaxisinsuchcollaborationsisstrikingly absent, at least according to open sources.30A constantly updated pool of expert scientists andhealthcare professionals that can be pulled into servicewhen required. This indicates the need for security-cleared civilian experts who are regularly trained tomobilize in times of crisis—essentially a core of aca-demic reservists.Finally, a word of warning: when entering a new era ofincreased preparedness, it is essential to maintain a balancedapproach. A hypervigilance among government agencies to-ward biological threats can be a vulnerability in itself, carryingthe risk that small natural outbreaks of benign pathogens willtrigger massive lockdowns, which hamper other elements ofdefense, prove financially costly, and risk attenuating the re-sponse once a real threat emerges. Finding out fast and withhigh precision what exactly caused a set of suspicious deaths ora disease outbreak before it becomes clickbait and fuels hys-teria will be critical. Ramping up medical intelligence effortsto include frontline methods and top expertise in molecularbiology is thus of paramount importance.

### 2AC – Cognitive Biotech Good

#### Theories that suggest augmentation has negative psychological effects are unfounded.

Bostrom ’05 [Nick; philosopher at the University of Oxford known for his work on existential risk, the anthropic principle, human enhancement ethics, superintelligence risks, and the reversal test; 2005; "Transhumanist Ethics"; https://nickbostrom.com/ethics/transhumanist.pdf; Accessed 7-1-2022; RL]

For example, many commentators worry about the psychological effects of the use of germ-line engineering. The ability to select one’s children’s genes and create “designer babies” will, it is claimed, corrupt parents, who will come to view their children as mere products (Kass 2001). We will then begin to evaluate our offspring according to standards of quality control, and this will undermine the ethical ideal of unconditional acceptance of children, no matter what their abilities and traits. Are we really prepared, asks the objector, to sacrifice on the altar of consumerism even those deep values that are embodied in traditional relationships between child and parents? Is the quest for “perfection” worth this cultural and moral cost? Faced with such criticism, how should a transhumanist respond? Certainly not by dismissing the concerns as irrelevant. Transhumanists no less than other people recognize that the depicted outcome would be bad. We don’t want parents to love and respect their children less. We don’t want social prejudice against people with disabilities to get worse. The psychological and cultural effects of “commodifying” human nature are potentially important. The first thing to emphasize, however, is that these dystopian scenarios are speculations. There is, at least to my knowledge, no solid ground for believing that these alleged consequences would actually happen. What relevant evidence we have, for instance regarding the treatment of children who have been conceived through the use of in vitro fertilization or embryo screening, suggests that the pessimistic prognosis is both alarmist and wrong. Parent will in fact love and respect their children even when artificial means and conscious choice play a part in procreation.

#### Even if there are negative effects of cognitive enhancement, the benefits outweigh.

Bostrom ’05 [Nick; philosopher at the University of Oxford known for his work on existential risk, the anthropic principle, human enhancement ethics, superintelligence risks, and the reversal test; 2005; "Transhumanist Ethics"; https://nickbostrom.com/ethics/transhumanist.pdf; Accessed 7-1-2022; RL]

There will in all likelihood be some negative consequences of human germ-line engineering that we cannot or will not forestall. Needless to say, the mere existence of negative effects is no reason not to proceed. Any major technology (as well as any major social or political reform) has some negative consequences, including some unforeseen negative consequences. And so does, for that matter, the choice to preserve status quo. It is only after a fair comparison of the risks with the likely positive consequences that any conclusion based on a cost-benefit analysis can be reached. In the case of germ-line enhancements, the potential gains are enormous. Only rarely, however, are these potential gains elaborated on at any length, perhaps because they are too obvious to be of much theoretical interest. (By contrast, uncovering subtle and non-trivial ways in which manipulating our genome could undermine deep values is philosophically a lot more challenging.) But if we think about it, we recognize that the promise of genetic enhancements is anything but insignificant. Set aside, for a moment, any worries you might have about possible downsides. Surely, being free from severe 18 genetic diseases is a really good thing. And having a mind that can learn more quickly, or having a robust immune system, is wonderful too. A healthier, wittier, happier humanity may be able to reach new levels culturally as well as in terms of individual lives. To achieve a significant enhancement of human capacities would be to take a step on the transhuman journey to explore some of those modes of being that are not accessible to humans as currently constituted, and perchance to discover and realize important new values. On an even more basic level, there is a great potential for alleviating unnecessary human suffering. Every day that the introduction of effective human genetic enhancement is delayed is a day of lost individual and cultural potential, and a day of torment for millions of sufferers who are being ravaged by diseases that could have been prevented.

#### Cognitive biotech is inevitable – it only has a risk of healing people.

Pew Research ’16 [Pew Research Center Science & Society; a nonpartisan American think tank based in Washington, D.C. It provides information on social issues, public opinion, and demographic trends shaping the United States and the world; 7-26-2016; "Human Enhancement"; Pew Research; https://www.pewresearch.org/science/2016/07/26/human-enhancement-the-scientific-and-ethical-dimensions-of-striving-for-perfection/; Accessed 7-1-2022; RL]

But thanks to recent scientific developments in areas such as biotechnology, information technology and nanotechnology, humanity may be on the cusp of an enhancement revolution. In the next two or three decades, people may have the option to change themselves and their children in ways that, up to now, have existed largely in the minds of science fiction writers and creators of comic book superheroes.

Both advocates for and opponents of human enhancement spin a number of possible scenarios. Some talk about what might be called “humanity plus” – people who are still recognizably human, but much smarter, stronger and healthier. Others speak of “post-humanity,” and predict that dramatic advances in genetic engineering and machine technology may ultimately allow people to become conscious machines – not recognizably human, at least on the outside.

This enhancement revolution, if and when it comes, may well be prompted by ongoing efforts to aid people with disabilities and heal the sick. Indeed, science is already making rapid progress in new restorative and therapeutic technologies that could, in theory, have implications for human enhancement.

It seems that each week or so, the headlines herald a new medical or scientific breakthrough. In the last few years, for instance, researchers have implanted artificial retinas to give blind patients partial sight. Other scientists successfully linked a paralyzed man’s brain to a computer chip, which helped restore partial movement of previously non-responsive limbs. Still others have created synthetic blood substitutes, which could soon be used in human patients.

One of the most important developments in recent years involves a new gene-splicing technique called “clustered regularly interspaced short palindromic repeats.” Known by its acronym, CRISPR, this new method greatly improves scientists’ ability to accurately and efficiently “edit” the human genome, in both embryos and adults.

CRISPR-CAS9 gene editing complex

The new gene-splicing technique “CRISPR” greatly improves scientists’ ability to accurately and efficiently “edit” the human genome. (Credit: Getty Images)

To those who support human enhancement, many of whom call themselves transhumanists, technological breakthroughs like these are springboards not only to healing people but to changing and improving humanity. Up to this point, they say, humans have largely worked to control and shape their exterior environments because they were powerless to do more. But transhumanists predict that a convergence of new technologies will soon allow people to control and fundamentally change their bodies and minds. Instead of leaving a person’s physical well-being to the vagaries of nature, supporters of these technologies contend, science will allow us to take control of our species’ development, making ourselves and future generations stronger, smarter, healthier and happier.

#### Technological progress is exponential – cognitive biotech has the capacity to create exoskeletons, synthetic blood, prevention of HIV in babies, etc.

Pew Research ’16 [Pew Research Center Science & Society; a nonpartisan American think tank based in Washington, D.C. It provides information on social issues, public opinion, and demographic trends shaping the United States and the world; 7-26-2016; "Human Enhancement"; Pew Research; https://www.pewresearch.org/science/2016/07/26/human-enhancement-the-scientific-and-ethical-dimensions-of-striving-for-perfection/; Accessed 7-1-2022; RL] \*\*images omitted

On Feb. 25, 2014, President Barack Obama met with Army officials and engineers at the Pentagon to discuss plans to create a new super armor that would make soldiers much more dangerous and harder to kill. The president joked that “we’re building ‘Iron Man,’” but Obama’s jest contained more than a kernel of truth: The exoskeleton, called the Tactical Assault Light Operator Suit (TALOS), does look vaguely like the fictional Tony Stark’s famous Iron Man suit. The first prototypes already are being built, and if all goes as planned, American soldiers may soon be much stronger and largely impervious to bullets.

A little more than a year later and an ocean away, scientists with the United Kingdom’s National Health Service (NHS) announced that by 2017, they plan to begin giving human subjects synthetic or artificial blood. If the NHS moves ahead with its plans, it would be the first time people receive blood created in a lab. While the ultimate aim of the effort is to stem blood shortages, especially for rare blood types, the success of synthetic blood could lay the foundation for a blood substitute that could be engineered to carry more oxygen or better fight infections.

In April 2016, scientists from the Battelle Memorial Institute in Columbus, Ohio, revealed that they had implanted a chip in the brain of a quadriplegic man. The chip can send signals to a sleeve around the man’s arm, allowing him to pick up a glass of water, swipe a credit card and even play the video game Guitar Hero.

Roughly around the same time, Chinese researchers announced they had attempted to genetically alter 213 embryos to make them HIV resistant. Only four of the embryos were successfully changed and all were ultimately destroyed. Moreover, the scientists from the Guangzhou Medical University who did the work said its purpose was solely to test the feasibility of embryo gene editing, rather than to regularly begin altering embryos. Still, Robert Sparrow of Australia’s Monash University Centre for Human Bioethics said that while editing embryos to prevent HIV has an obvious therapeutic purpose, the experiment more broadly would lead to other things. “Its most plausible use, and most likely use, is the technology of human enhancement,” he said, according to the South China Morning Post.

As these examples show, many of the fantastic technologies that until recently were confined to science fiction have already arrived, at least in their early forms. “We are no longer living in a time when we can say we either want to enhance or we don’t,” says Nicholas Agar, a professor of ethics at Victoria University in Wellington, New Zealand, and author of the book “Humanity’s End: Why We Should Reject Radical Enhancement.” “We are already living in an age of enhancement.”

The road to TALOS, brain chips and synthetic blood has been a long one that has included many stops along the way. Many of these advances come from a convergence of more than one type of technology – from genetics and robotics to nanotechnology and information technology. These technologies are “intermingling and feeding on one another, and they are collectively creating a curve of change unlike anything we humans have ever seen,” journalist Joel Garreau writes in his book “Radical Evolution: The Promise and Peril of Enhancing Our Minds, Our Bodies – and What It Means to Be Human.”

The combination of information technology and nanotechnology offers the prospect of machines that are, to quote the title of Robert Bryce’s recent book on innovation, “Smaller Faster Lighter Denser Cheaper.” And as some futurists such as Ray Kurzweil argue, these developments will occur at an accelerated rate as technologies build on each other. “An analysis of the history of technology shows that technological change is exponential, contrary to the common-sense ‘intuitive linear’ view,” writes Kurzweil, an American computer scientist and inventor whose work has led to the development of everything from checkout scanners at supermarkets to text-reading machines for the blind. “So we won’t experience 100 years of progress in the 21st century – it will be more like 20,000 years of progress (at today’s rate).”

#### Genetic engineering has a wealth of possibilities to improve net health and eliminate maladies.

Pew Research ’16 [Pew Research Center Science & Society; a nonpartisan American think tank based in Washington, D.C. It provides information on social issues, public opinion, and demographic trends shaping the United States and the world; 7-26-2016; "Human Enhancement"; Pew Research; https://www.pewresearch.org/science/2016/07/26/human-enhancement-the-scientific-and-ethical-dimensions-of-striving-for-perfection/; Accessed 7-1-2022; RL] \*\*images omitted

In the field of biotechnology, a big milestone occurred in 1953, when American biologist James Watson and British physicist Francis Crick discovered the molecular structure of DNA – the famed double helix – that is the genetic blueprint for life. Almost 50 years later, in 2003, two international teams of researchers led by American biologists Francis Collins and Craig Venter succeeded in decoding and reading that blueprint by identifying all of the chemical base pairs that make up human DNA.

Finding the blueprint for life, and successfully decoding and reading it, has given researchers an opportunity to alter human physiology at its most fundamental level. Manipulating this genetic code – a process known as genetic engineering – could allow scientists to produce people with stronger muscles, harder bones and faster brains. Theoretically, it also could create people with gills or webbed hands and feet or even wings – and, as Garreau points out in his book, could lead to “an even greater variety of breeds of humans than there is of dogs.”

In recent years, the prospect of advanced genetic engineering has become much more real, largely due to two developments. First, inexpensive and sophisticated gene mapping technology has given scientists an increasingly more sophisticated understanding of the human genome.

The second important development involves the powerful new gene editing technology known as CRISPR. While gene editing itself is not new, CRISPR offers scientists a method that is much faster, cheaper and more accurate. “It’s about 1,000 times cheaper [than existing methods],” says George Church, a geneticist at Harvard Medical School. “It could be a game changer.” CRISPR is so much more efficient and accurate than older gene-editing technology because it uses each cell’s immune system to target and splice out parts of its DNA and replace them with new genetic code.

CRISPR is already dramatically expanding the realm of what is possible in the field of genetic engineering. Indeed, on June 21, 2016, the U.S. government announced that it had approved the first human trials using CRISPR, in this case to strengthen the cancer-fighting properties of the immune systems of patients suffering from melanoma and other deadly cancers. “CRISPR’s power and versatility have opened up new and wide-ranging possibilities across biology and medicine,” says Jennifer Doudna, a researcher at the University of California at Berkeley and a co-inventor of CRISPR.

According to Doudna and others, CRISPR could provide new treatments or even cures to some of today’s most feared diseases – not only cancer, but Alzheimer’s disease, Parkinson’s disease and others.

CRISPR’s power and versatility has opened up new and wide-ranging possibilities across biology and medicine.

An even more intriguing possibility involves making genetic changes at the embryonic stage, also known as germline editing. The logic is simple: alter the gene lines in an embryo’s eight or 16 cell stage (to, say, eliminate the gene for Tay-Sachs disease) and that change will occur in each of the resulting person’s trillions of cells – not to mention in the cells of their descendants. When combined with researchers’ growing understanding of the genetic links to various diseases, CRISPR could conceivably help eliminate a host of maladies in people before they are born.

### 2AC – Cognitive Warfare Regulation Good

#### Only the aff’s regulatory framework provides the middle ground required for sustainable innovation---alternatives cede to neocons OR totalitarian surveillance

Moreno 12 (Jonathan D. Moreno | American philosopher and historian who specializes in the intersection of bioethics, culture, science, and national security, and has published seminal works on the history, sociology and politics of biology and medicine. He is an elected member of the National Academy of Medicine. | “Mind Wars: Brain Science and the Military in the 21st Century” p135-162 | DOA: 6/23/2022 | SAoki)

---most proper response is regulation bcuz we are in shady area

---solves any turns about decking research bcuz regulation comes with funding and incentive, especially since US knows the value of r&d for biotech enhancement (just retag the card)

---only ethical way to frame the future of emerging biotech or else we fall to totalitarianism

In his book Our Posthuman Future, Fukuyama expresses two main worries about the transhumanist goal. First, if we ever succeed in creating beings with far greater abilities than ourselves—through biotechnology or genetics or neuroscience or whatever—political equality will be jeopardized. By tinkering with our essential human nature, the universal essence of humanity will have been changed, and with it the rational basis for thinking of all persons as equal in the political system. Second, the intricate human being created through millions of years of evolutionary selection is carefully balanced between, for example, violence for self-defense and affection for social cohesion, and deliberate interventions are unlikely to achieve creatures with just the right blend of good and bad qualities. Nor can we necessarily discern what those qualities are, as they have to prove themselves in the complexities of social life with its countless variables. I find myself squarely in the middle. I’m not as sanguine about a hyperenhanced future as the transhumanists, nor am I comfortable with their utopianism. As David Hume wisely observed, the future tends to resemble the past. We can expect a range of consequences as we incorporate new technologies and instrumentalities into our lives and bodies. I also have doubts about the metaphysics of the idea that the subjective experience of Building Better Soldiers • 159 personal identity can ever be captured, even by the most comprehensive memory chip. But neoconservatives such as Fukuyama seem to me to harbor an excessively dour view of the technological future. First, I’m not as convinced as he is that the idea of human equality is grounded in a universal concept of essential human nature; my more pragmatic view has it that human equality is a rather squishy moral notion. It feels right to most of us, and we rally around when we need to. Second, there is plenty of room for argument about his view that human evolution has produced a mix of good and bad qualities that can’t be improved upon. Still more fundamentally, I can’t swallow the suggestion that, in a world of ethnic and religious tension, nuclear proliferation, global warming, emerging infections, and terrorism, transhumanism is our biggest problem. Where I do emphatically agree with Fukuyama is that the proper response to transhumanism is not to prohibit research and development of these new technologies but to develop careful monitoring and regulatory systems. Some of this can be accomplished by the scientific community and its organizations. For example, in 2005 a committee that I cochaired recommended guidelines on human embryonic stem cell research. The committee was created by the National Academies, an organization of elected members that is chartered by the federal government to advise it on science, medicine, and engineering issues. Because the Bush administration allowed research funding for only a few human embryonic stem cell lines, scientists weren’t sure what research would be considered appropriate, especially since several states and private companies intended to do work involving this controversial field. Among many other recommendations, our committee concluded that no human embryonic stem cells should be placed into nonhuman primates at any stage of development. Part of the concern is that some of the human cells might turn into brain cells in, say, a rhesus monkey embryo, and they might contribute in an organized way to the monkey’s brain. Although we can’t know if the monkey’s brain would be changed by the human cell contribution, we also can’t be sure it wouldn’t be. Would any resulting creature feel like a human “locked” in a monkey’s body? While highly unlikely, this possibility arguably carries a serious ethical burden. For similar reasons, we also recommended against putting embryonic stem cells from other animals into human embryos. Given the publicity and sensitivity of the embryonic stem cell issue and the prestige of the National Academies, we felt sure our recommendations would be adopted by legitimate research centers and individual scientists. But that voluntary arrangement falls well short of government regulation. Also, with regulation there often comes significant government funding for research, which acts as an important incentive to follow the rules. We have seen how important government funding is in keeping a new area of medical science on track in the case of in vitro fertilization. When the Reagan administration decided to stop funding for IVF research in 1980, the emerging industry was cut loose without public scrutiny. The result was what many consider to be a field that bears a resemblance to the Wild West, with all sorts of practices pursued and claims made and with only limited public scrutiny and modest (and relatively recent) self-regulation. National security research on enhancement technologies will require the close involvement of advisory bodies of people both in government and outside it, with as much transparency as possible and, when transparency must be limited, with whatever security clearances are needed to make full participation possible. While some general principles should be articulated and become part of our regulatory framework, much of the hard work will have to be done on a case-by-case basis. There are some models out there for ethical review in security policy that I will talk about in the last chapter. The ethics of enhancing warfighters’ capabilities with emerging neurotechnologies needs to be moved onto our national policy agenda. In addition to reactive regulatory mechanisms, some thinkers propose proactive measures to mitigate the potential harms of human enhancement. Julian Savulescu and Ingmar Perrson, for example, argue that technological development has always exacerbated the relative ease of causing harm relative to that of benefit, and transhumanism is no exception. Technological development has already made it possible “for small groups, or even single individuals, to kill millions of human beings” with nuclear and biological weapons. Transhuman endeavors like cognitive enhancement may exponentially speed up the feedback loop between scientific discovery and application by making researchers and DIY biopunks smarter and smarter. Short of enacting a totalitarian surveillance state, the authors state that a fundamental improvement of morality is required to avert the destruction of ourselves and the environment. Perhaps transhumanism could be turned back on itself—that is to say, the augmentation of morality could enhance the way we think about enhancement and progress in the first place. But is the biotechnological enhancement of morality even possible?

#### Regulations on biotech are key – averts black market enhancements and mitigates inequalities.

Bostrom & Sandberg ’09 [Nick; philosopher at the University of Oxford known for his work on existential risk, the anthropic principle, human enhancement ethics, superintelligence risks, and the reversal test; Anders; Swedish researcher, science debater, futurist, transhumanist and author. He holds a PhD in computational neuroscience from Stockholm University, and is currently a Senior Research Fellow at the Future of Humanity Institute at the University of Oxford, and a Fellow at Reuben College; 2009; "Cognitive enhancement: methods, ethics, regulatory challenges"; PubMed; https://pubmed.ncbi.nlm.nih.gov/19543814/; Accessed 7-1-2022; RL]

While access to medicine is currently regarded as a human right constrained by cost concerns, it is less clear whether access to all enhancements should or would be regarded as a positive right.6 The case for at least a negative right to cognitive enhancement, based on cognitive liberty, privacy interests, and the important interest of persons to protect and develop their own minds and capacity for autonomy, seems very strong.7 Banning enhancements would create an inducement for black markets as well as limit socially beneficial uses. Legal enhancement would promote development and use, in the long run leading to cheaper and safer enhancements. Yet without public funding, some useful enhancements may be out of the reach of many. Proponents of a positive right to enhancements could argue for their position on grounds of fairness or equality, or on grounds of a public interest in the promotion of the capacities required for autonomous agency. The societal benefits of effective cognitive enhancement may even turn out to be so large and unequivocal that it would be Pareto optimal to subsidize enhancement for the poor just as the state now subsidizes education.

### 2AC – Markets/Military Biotech Good

#### Weaponization of biotechnical enhancements are occurring now – from bio-integration of advanced tech to genetic modification of the body, all levels of warfighting are being impacted – encouraging commercial investments and sharing is the only way to maintain technical edge over adversaries which are more likely to employ soldier modifications for violence

Dr. Diane DiEuliis ’18, is a Senior Research Fellow at the Center for the Study of Weapons of Mass Destruction and leads studies on biosecurity, biodefense and the synthetic biology industry, “BIOTECHNOLOGY FOR THE BATTLEFIELD: IN NEED OF A STRATEGY”, War On the Rocks, 11/27/18, https://warontherocks.com/2018/11/biotechnology-for-the-battlefield-in-need-of-a-strategy/

Biotechnology — a broad term used to describe technological innovation based on biology — has become an increasingly agile platform for developing new types of soldier enhancements. As such, the field offers novel opportunities for improving warfighter survivability on the battlefield. **Despite recent developments, however, the Department of Defense has yet to strategically guide the development of these new technologies at the national level**. Recently, War on the Rocks published an article outlining concerns about the lack of coordinated policy for developing synthetic biology – a branch of biotechnology – while preventing its misuse by adversaries. The article rightly pointed to the need to think strategically about the risk of proliferating synthetic biology capabilities, but this is only one part of the picture. **Current national strategies encourage policymakers to view advances in biology through a narrow lens of risks to national security and the development of countermeasures to protect against those risks, which, while crucial, neglects the promise for using the same science to develop life-saving or other advanced tools for warfighters**. The Pentagon’s current efforts to take advantage of synthetic biology as a platform for defense lack internal cohesion and external direction, and biological innovation faces further challenges given the absence of agile business models to fully harness emerging biotechnologies for the battlefield. Greater coordination between those in the Defense Department whose work relates to biotechnology and improved relationships with the private sector are important first steps toward using this burgeoning area of science not just to mitigate security risks, but also to benefit soldiers on the battlefield.

Defining the Defense Department’s Biotech Needs

**The U.S. military maintained superiority in the area of science and technology for many decades**. **However, as emerging technologies become more accessible, many in the Pentagon became concerned that adversaries might soon challenge or surpass American strengths**. **Synthetic biology**, or the ability to genetically engineer biology, **is an increasingly accessible technological realm**. More broadly, the democratization of biotechnology can enable adversaries to achieve technological parity. **In fact, some global competitors may be poised to achieve superiority**. China, for example, is not only investing heavily in biotechnology capabilities, but has dedicated strategies for harnessing their use in both military and commercial settings. The Defense Department should advance its capabilities in biotechnology not only because it benefits the mission, but because a mastery of the tools in this nascent realm provides the best defense against misuse, or adversaries gaining the edge.

The Pentagon’s Investment in Biotech: A Promising Start

Most technological innovations are driven by the commercial sector, rather than the Defense Department. **This is particularly true of emerging biotechnology**. Recognizing this, the Pentagon has invested in initiatives such as the Defense Innovation Unit (with an arm in Boston, a hotbed for the biotechnology industry) and SOFWERX, to stimulate novel ideas for the battlefield. These centers have become incubators for drones, cyber technology, and an exciting warfighter exoskeleton, but they have yet to produce specific biotechnological prototypes. Disappointingly, the new Army Futures Command to be housed in Austin, Texas, intends to prioritize emerging technologies for a variety of future needs (including long-range precision fires, next generation combat vehicles, future vertical lift platforms, and missile defense capabilities) but the list does not yet specifically include biotechnology.

More encouraging, however, is an internal defense investment in biotechnology capabilities. The Synthetic Biology for Military Environments research program crosses all of the service laboratories (Army, Navy, and Air Force) and is intended to develop new bio-based materials and sensors, and harness advances in warfighter performance through innovations in synthetic biology. **The program is also growing biotechnology expertise by embedding military scientists in academia and at synthetic biology companies**. Thus far, the initiative has achieved successes in identifying new organisms that can be engineered for fuels, materials, and sensors. But the Synthetic Biology for Military Environments program is funded by a one-time investment. As it approaches its third and final year, the next steps for these research discoveries are undecided, and it is unclear whether the initial investments will be renewed.

Towards a Strategy for Biotech Innovation

The uncertainty about the program’s future is consistent with the lack of a holistic, overarching Pentagon strategy for incorporating biotechnology products into deployable tools for the warfighter. This stems from a traditional and instinctive linking of biotechnology to medicines and force health protection. But today, biotechnology’s benefits extend far beyond that area — it can now also deliver materials, sensors, and fuels. The disparate components of biotechnology can also be seen in the way the Defense Department siloes this field of science — many different agencies touch different parts of the proverbial elephant that is biotechnology. There are high-risk research and development programs funded by DARPA, mid-range services research in a wide range of fields, and medical countermeasures development managed by the Chemical and Biological Defense Program. The Defense Health Agency, responsible for the use of medicines and medical technologies for force health protection, further complicates the picture. **Coordinating these internal components would ensure that policymakers could visualize all aspects of a biotechnology portfolio** — the entire elephant. This would enable the department to ask questions like: How can emerging biotechnology improve medical countermeasure development? What biotechnologies should be prioritized to improve warfighter performance?

To take just one example: The human “microbiome” comprises the natural bacteria that dwell in the human digestive tract, and affects digestive health as well as mental health. The popular pursuit of balancing the microbiome is evident in the wide range of “probiotics” products commonly seen in pharmacies — but for the warfighter, digestive distress is a real problem during deployments abroad, and can keep them out of the fight. Synthetic biology now enables specific engineering of the human gut microbiome that promises to improve digestive health and cognition — two areas crucial to warfighter performance. These microbes could potentially deliver beneficial pharmaceuticals to the body, either to simply maintain good health in warfighters or to deliver life-saving medical countermeasures. Conversely, the human microbiome could be co-opted to harm humans — for instance, through the development of agents that can target the natural microbiome or cancel the effects of therapeutic microbiomes. A comprehensive strategy for taking advantage of microbiome technology should also include approaches for countering this potential threat. The risks and benefits of leveraging the microbiome undeniably cross all the defense biotechnology silos. By connecting these disparate conversations, the Defense Department can start determining the best approaches.

Beyond the traditional human health arena, biotechnology presents other opportunities that prompt broader, crucial questions: What challenges does the warfighter face that are best solved with biotechnology? What risks are associated with the adoption of these biotechnologies? Biological components may play advantageous roles in materials, sensors, and many other tools. Some of these currently are being designed through the Synthetic Biology for Military Environments program. For example, novel biological resins that are both lightweight and flame retardant could be incorporated into making lighter drones, building lighter airframes, or fortifying ship hulls. Nanotubes, or ceramics produced from bioengineered cells, could operate in electronics, organic batteries, or other instrumentation. But to realize the promise of these discoveries in military tools and equipment, biotechnology must be a consideration in creating requirements for products and acquisitions that are outside of the traditional medical biotechnology siloes. And, of course, planners should consider any vulnerabilities biotechnological components may introduce that adversaries could target.

Acquiring Biotech and the ‘Valley of Death’

**Even if all needs for biotechnology were clear, the Defense Department would still need to improve the way it acquires biotechnology for the battlefield. Which capabilities should continue to be built in the department’s service research labs, and which ought to be acquired from external companies?** One option is to simply adopt useful commercial products off the shelf as they are innovated in the private sector, particularly since many innovative biological materials can be dual-purposed for both consumers and the military. For example, in addition to its promise as lightweight body armor, spider silk can be used in ordinary clothing, textiles, construction materials, and novel medicines. Alternatively, the Defense Department could ask the private sector to create defense-specific products from the ground up. A third option is to generate prototype products within the department, then use the private sector to scale and deliver them. Right now, the inability to scale up synthetic biology products from prototypes is a bottleneck hindering the broad adoption of biotechnology and the private sector is already investing in scaling solutions — whether for commercial markets or defense. While the answer is likely a combination of all these approaches, **the Defense Department needs to communicate clearly with biotechnology performers, since the private sector is not likely to make choices for manufacturing products for national security on its own**.

**The well-recognized “valley of death” that prevents technological innovations from being translated into medicines, equipment, and warfighter benefits is a problem much broader than biotechnology**. Since World War II, there has been a steady decline in the defense industrial base, as fewer companies are able to provide products specific to defense. **Supply chains have become burdensome and unwieldy**. For example, the successful genetic engineering of silk worms to make “dragon silk” for warfighters is promising. But producing dragon silk at scale will require thousands of silkworms — which in turn require a large acreage of mulberry trees not readily available in the United States. The company creating dragon silk hopes to use farming cooperatives in Vietnam to resolve the problem, but this will perpetuate the same kind of burdensome and costly supply chain that plagues defense acquisitions — working through foreign company contracts and embassies, and generating potential single points of failure through reliance on sole suppliers outside the country. To reduce these types of inefficiencies, defense planners must envision biotechnology products from inception through their full development and manufacture pathways that allow these technologies to be successfully shepherded through nimbler and more secure industrial supply chains.

The “valley of death” also prevents technology companies from seeing the Defense Department as an attractive customer. The Pentagon’s traditional models for acquisition tend to be time-consuming and less cost-effective than commercial contracts. Recently, a report commissioned by the president on the state of the U.S. industrial base described the uncertainty of federal spending, the unintended consequences of government acquisition behavior, and the loss of skills in the domestic workforce as “unprecedented” challenges to defense manufacturing. **America’s global competitors could be closing the technology gap because of process failures, rather than a lack of technology talent or innovative ideas**.

Some Proposed Solutions

**Strategic coordination of biotechnology for defense could go a long way toward addressing these challenges**. A defense-wide community of interest could enjoin experts from all defense components that involve biotechnology — so that those with the appropriate expertise could evaluate risks, benefits, and battlefield needs together. **This group could ensure that the Defense Department prioritizes cross-cutting biotechnology needs, whether through high-risk exploratory research, in-house capabilities, complete outsourcing, or a combination of these**. **Innovations could be encouraged through greater use of incentives and prize competitions in the defense innovation marketplace and specialized innovation units**. These diverse stakeholders would be able to communicate with the biotechnology sector with a single voice that clearly articulates battlefield needs, while creative public-private engagements could ensure awareness of potentially disruptive discoveries. Importantly, adopted biotechnologies should receive risk/benefit assessments to identify vulnerabilities; presumably there could be “chinks” in dragon silk armor that adversaries may attempt to exploit, potentially through their own developing biotechnology tools. Finally, ongoing assessment of potential biothreats posed by synthetic biology should continue, along with research on how novel biotechnology tools could mitigate those threats.

### 2AC – NATO Military Enhancements Good

#### Military alliance enhancements are key to prevent collapse of NATO – solves stability

AUSA ’21, Association of the United States Army - is a nonprofit educational and professional development association serving America’s Army and supporters of a strong national defense, “COOPERATION, READINESS CRITICAL TO US, NATO ALLIANCE”, AUSA, 7/15/21, https://www.ausa.org/news/cooperation-readiness-critical-us-nato-alliance

**The U.S. and NATO must continue to strengthen its partnership as the world enters a “period of potential instability,”** America’s top uniformed leader said. “In my view, the world is entering a period of potential instability as some nations ... **and clearly terrorist groups and perhaps some rogue actors are seeking to undermine and challenge the existing international order**,” Joint Chiefs Chairman Gen. Mark Milley said. “And **they seek to weaken the system of cooperation and collective security that has been in existence for some time**.” Speaking July 15 in a ceremony aboard the USS Kearsarge to celebrate NATO’s newest operational headquarters, Joint Force Command Norfolk in Virginia, Milley emphasized NATO’s role in maintaining security and called it “the most successful military alliance in human history.” “**NATO is still very much a vital and critical part of our regional security framework and indeed our global security framework**,” Milley. “In fact, in my view, it's the linchpin that holds together the period of great power peace that we are now enjoying.” Milley also stressed the importance of maintaining readiness and modernizing for the future, calling them keys to ensuring the U.S. can meet future defense challenges. “We have to maintain the readiness of the present, we have to modernize for the future,” Milley said. “**We are ready right now. Those who think we are not are mistaken, and any adversary that seeks to challenge the United States military resolve will do well to respect this military and our alliance and NATO**.” In particular, **Milley stressed that the incorporation of new technology will play a vital role in the military’s readiness capabilities over the next decade and said that technology, like precision munitions, artificial intelligence and biotechnology, will “have a fundamental impact on the conduct of war.”** Should the U.S. military not lean into technological advances, Milley gave a grim warning. “**There's a whole set of technologies that are driving fundamental change, and if we, the United States military, and we, NATO as an alliance, do not adapt and adopt these technologies, if we don't … put the pedal to the metal and do this right over the next 10 or 15 years, we are condemning a future generation to what happened 76 years ago.**” Moving forward, Milley emphasized that continued cooperation will be a key part of maintaining U.S. readiness, adding, “We as an alliance are stronger together than we are individually.” “**We're going to succeed or fail as a nation with our allies and partners, because the United States does not fight wars alone**,” Milley said.

### 2AC – Perm Do Both – Enhancements Ethical

#### The permutation solves---a combination of cognitive enhancements and virtue magnifies ethical capabilities.

Froding ’10 [Barbro; Senior Researcher at the Division of Philosophy at KTH; 9-22-2010; "Cognitive Enhancement, Virtue Ethics and the Good Life"; SpringerLink; https://link.springer.com/article/10.1007/s12152-010-9092-2; Accessed 6-26-2022; RL]

Combining Cognitive Enhancements and Virtue

So far it has been argued that neither cognitive enhancement nor virtue ethics is convincing enough on its own as a recipe for the good life for most people. The main problem with virtue ethics is that it appears nearly impossible to lead a fully virtuous and good life. So while the virtues are conducive to good moral behaviour, it is far from obvious that most people would be able to develop these unconditional dispositions to act, feel and generally respond in ways typical of the good person. It is, of course, perfectly possible to accept the claim that the fully virtuous life is the best and most fulfilled life and at the same time accept that it might be unachievable for most people, or indeed for everyone. Even in light of such misgivings, however, it does not follow that the idea of the virtuous life being the best conceivable life needs to be abandoned. A genuine commitment to virtue as the superior choice does not, on its own, provide reasons to think that the virtuous life would have to exclude cognitive enhancements. To the contrary, it is likely that some cognitive enhancements will prove conducive to the good life and could enable a larger number of people to embark on the virtuous path.

It is often assumed that a virtue ethics approach to the good life would be incompatible with human cognitive enhancements and that virtue ethics and human enhancement champion two deeply conflicting ideas. 41 This appears to be a mistake. Quite to the contrary, it seems that some cognitive enhancements might not only be seen as neutral from a virtue perspective but indeed as facilitating, for example, the habituation process. Notably this is not an attempt to construct an argument for cognitive enhancements per se, but rather to explore the best strategy for a happy life, all things considered.

As explained previously, critics of virtue ethics who claim, for example, that the theory is unachievable and unrealistic, have received support from findings in the natural sciences. The results indicate that most people suffer an array of cognitive constraints that could stand in the way of them developing the virtues and leading the good life. In general, humans respond to information ineffectively, which, in turn, is likely to lead them to acquire false beliefs. For example, being bad at deferring judgement means that we do not distinguish well between unreliable information sources and reliable ones. Furthermore, we are afflicted by numerous cognitive biases and have low impulse control. Such findings threaten to cast serious doubts on a number of central themes in virtue ethics. Perhaps not unexpectedly, however, our expanding technological and medical knowledge might also provide solutions to these problems in the form of useful cognitive enhancements for humans.

Very briefly, the idea is that cognitive enhancements might help us to overcome a number of biological constraints that threaten to block the development of the virtues. As previously mentioned cognitive enhancements could lift agents to a starting point from which embarking on the habituation process is a real possibility. In other words; neuroenhancers could enable more people to become virtuous. This would level the playing field and it ties in well with wide-spread intuitions about fairness and equality. In addition to making virtue more attractive as a moral theory, such a combination might also strengthen it by making the good life more achievable and less dependent on luck, which, in turn, fits very well with the central virtue ethics idea that agents are responsible for their morality, or lack thereof.

When discussing enhancement it is common to differentiate between therapeutic use, on the one hand, and use for gaining competitive advantage over one’s peers on the other. The debate is extremely infected and strong objections (for example on grounds of fairness, equality, potential social harm and potential risk) have been raised against the idea of boosting what is considered a normal capacity. Without getting entrenched in the ethical minefield that attaches to the topic, it should be noted that I do not wish to argue that all attempts to gain competitive advantage would be morally flawed. Moreover, even if we were to extend the practice to include individuals who already possess normal cognitive capacities, the competitive advantage they would gain would only be over themselves. What they might overcome would be their own biological constraints—after all our own biological make-up is our worst enemy in the quest for the good life. Acquiring the virtues is intrinsically valuable, as doing the fine and noble is leading the happy and good life and, evidently, for one person to live the good life is not in conflict with everyone else also leading the good life. The moral and epistemic virtues can hardly be described as goods which are available only in limited supply.Footnote42 Quite to the contrary, as pointed out by Aristotle, it is presumably much easier to learn and maintain virtuous behaviour in a virtuous society.Footnote43

Some virtue ethicists might fear that using cognitive enhancements in this way would distort people’s moral development but I believe this to be unfounded. The position defended here is certainly not that cognitive enhancements of the kind we have access to today or might have in the foreseeable future could or should take the place of, for example, the habituation process. While enhancement will not be a substitute, it may well work as a facilitator, contributing to making virtue ethics a more convincing theory to many modern scholars. If we accept that those individuals who manage to develop moral and epistemic virtues will, in general, fare better in life than those who do not, it seems reasonable to follow Aristotle both in recommending the virtuous life to others and to seek to lead it ourselves. Indeed, it could even be argued that anyone who takes the virtue project seriously should be prepared to explore this combination further.

Another aspect which merits consideration is that the epistemic and moral virtues will be increasingly important as we further explore enhancement. That will increase the likelihood for such pursuits being undertaken responsibly as agents will improve their sound judgement and their capacity to discriminate effectively. Hopefully this could create a platform for responsible—virtuous—enhancement where various techniques are evaluated on the basis of how well they contribute to the leading of the good life. Key aspects would of course be safety, voluntariness, autonomy and informed consent, fairness and transparency.

### 2AC – Russia Threat Real

#### Our threats are real – Russia blatantly shows resentment towards the US and the West.

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This current critical phase of the crisis in Ukraine has been manufactured by Russian President Vladimir Putin and the Kremlin. Russian troops, artillery, armored vehicles, tanks and other equipment encircle Ukraine: they are along the Russian border with Ukraine and in the annexed territory of Crimea as well as in Belarus, threatening a major military confrontation. It is hard to identify a specific trigger for Russia’s decision in 2021 to move thousands of personnel and their armaments close to Ukraine or for the sudden escalation of events in December 2021. The Kremlin’s policy toward Ukraine has towed a hard line since the early 2000s; and we can certainly point to an accumulation of factors since Russia first invaded Ukraine in 2014, annexed Ukraine’s Crimean Peninsula and set off the ongoing war in Ukraine’s eastern Donbas region that has now cost the lives of more than 13,000 Ukrainians. Nonetheless, the timing seems in many respects driven more by Vladimir Putin’s own political predilections and perceptions of developments and reactions in Ukraine, Europe, and the United States rather than by events on the ground in the contested Donbas region. Russia’s latest preparation for what now seems like a potential large-scale invasion of Ukraine was in part sparked by the current Ukrainian government inviting American and NATO forces to conduct joint exercises and engage in other military cooperation to boost Ukraine’s defensive capabilities against further Russian aggression. Despite the flurry of talks between and among Russia, the U.S., NATO and other allies—including offers to discuss Russian security concerns—since President Biden met with President Putin in Geneva in June 2021, Moscow has shown no sign of releasing the pressure. Indeed it has ramped up its military presence in recent weeks. EMBOLDENED IN EURASIA Several factors are at play for Moscow and Putin. First of all, the past two years have seen significant changes in Eurasia, where developments seem to have reached a tipping point. Thirty years since the dissolution of the Soviet Union in December 2021, and 22 years since Vladimir Putin came to power, Moscow has successfully reasserted itself as the dominant political force and security provider in the region. Only Ukraine and the three Baltic States that achieved membership in both NATO and the European Union in 2004 have managed to stay beyond Moscow’s grip. The United States never recognized the Baltic states as part of the USSR after their forcible reincorporation during World War II. In this context, forcing Kyiv and its leadership back into Russia’s orbit is unfinished business for Moscow and Vladimir Putin. Ukraine is the regional outlier in what Russia considers to be its “privileged sphere of interests.” Kyiv continues to pursue NATO membership, close ties with Europe and its own economic, political, and foreign policy path, as well as building up its military forces in evident opposition to Russia. In contrast, other former Soviet states have either been pressured into closer political and security relations with Moscow or into a neutral, marginal international status—by Russia leveraging economic and military ties or exploiting a territorial conflict. As one notable example, Georgia’s current government treads more carefully with Russia than its predecessor. Russia, of course, invaded Georgia in August 2008. Georgia’s then president, Mikheil Saakashvili, a perennial thorn in Moscow’s side, saw his popularity plummet in the aftermath and was eventually ousted in an election in 2013. He had a second political career in exile in Ukraine, but now sits in jail in Tbilisi after an ill-advised return to Georgia in October 2021. Russian officials and commentators frequently use Saakashvili and his fate as a cautionary tale. In November 2021, Russian Foreign Minister Sergei Lavrov warned Ukrainian President Volodymyr Zelenskyy of the risks of following Saakashvili’s path. And according to reports from the British government and intelligence agencies, Moscow has been scheming over the course of the current crisis potentially to replace Ukrainian President Zelenskyy with a pro-Kremlin puppet government. Next door to Georgia, in Armenia, in summer 2020, President Nikol Pashinyan—another leader out of favor with Moscow—saw his domestic position and foreign policy autonomy crushed by war with Azerbaijan. Given the fact that Russia and Armenia have a long-standing defense pact and Russian forces are permanently based in Armenia, Azerbaijan’s military assault to retake territory occupied by Armenia for three decades is unlikely to have been feasible without a green light from Moscow. Both Armenia and Azerbaijan resisted the imposition of Russian forces on the frontlines in Nagorno-Karabakh after a ceasefire was brokered in 1994, preferring that an international force oversee the implementation of any final resolution of the conflict. Russia exploited the 2020 war to introduce its military forces into Nagorno-Karabakh under the guise of peacekeepers. Russia has now moved to broker and manage Armenia’s future relations with both Azerbaijan and Turkey, sidelining the OSCE Minsk Group that previously managed international diplomacy in Nagorno-Karabakh. Elsewhere, in 2020-2021, Belarussian strongman Aleksandr Lukashenko, who infuriated Moscow with his frequent political overtures to Brussels and Washington at Russia’s expense, was forced back into the fold frightened by the wrath of his own disgruntled population. Lukashenko and Belarus now host new contingents of Russian military forces and war game exercises on Ukraine’s northern border. Similarly, in January 2022, Russia and its regional security alliance, the Collective Security Treaty Organization (CSTO), were called in to quash protests and quell a political power struggle in Kazakhstan. This was the first time that the CSTO was deployed to the territory of a member country. Russia feels emboldened by these developments in Eurasia. The United States played no significant role in addressing the upheavals. It was conspicuous in its absence. From Russia’s perspective, the United States seems grievously weakened at home and abroad. For Vladimir Putin, America’s political disarray, President Biden’s difficulties in achieving his domestic agenda, combined with China’s rise at the expense of the United States since the global financial crisis of 2008-2009 seem to mirror Russia’s predicament immediately after the dissolution of the USSR. In the 1990s, the United States and NATO pressed a politically and economically beleaguered Russia to withdraw its military forces from Eastern Europe. In Putin’s view, America’s predicament offers a rare opportunity. If the United States really is in a state of collapse at home and in retreat abroad, as the Kremlin assesses, then perhaps Russia can overturn the last 30 years of American dominance in European security, in addition to constricting Ukraine’s independence. SEEING OPPORTUNITY IN EUROPE Moscow also sees ample opportunity to take advantage of developments in western and eastern Europe. The reverberations from Brexit, Poland and Hungary’s disputes with the EU, the legacy of four years of rifts between the U.S. and its European allies during the tumult of the Trump presidency, the departure of long-serving German Chancellor Angela Merkel from the political scene, preparations for presidential elections in France and Washington’s precipitous withdrawal from Afghanistan, have exacerbated other frictions and fractures in NATO and the EU that Russia can exploit. European military spending and operational readiness have declined over the last decades relative to the U.S. and Russia. Despite an uptick in spending and deployments since Russia annexed Crimea, the two other significant European military actors, the UK and France, are increasingly at loggerheads, while Turkey is preoccupied with Syria and the Middle East. Russian saber rattling has fueled European anxieties about their ability to protect NATO and EU member states from Russian aggression let alone non-members like Ukraine. In addition, Europe’s punitive financial tools, along with the political will to deploy them, have been weakened. Moscow has effectively moved over the past decade of Putin’s rule to shore up the Russian economy against Western sanctions, including through paying off state debts and making strategic direct investments in companies across Europe in critical infrastructure, energy, and metallurgy. As soon as the United States and Europe imposed sanctions on Russia in response to the annexation of Crimea in 2014, Putin moved to adopt explicit import substitution policies in defense, food and other critical sectors. Despite the friction with their governments, Putin notably still encouraged close business cooperation with all foreign corporations previously invested in Russia, including American companies. Putin has long made it clear that he sees the global economy as a battlefield where he must defend Russia’s economic interests and maximize Moscow’s options and leverage. He has instructed Russian oligarchs in his innermost circle to “de-offshore” or repatriate their key operations and assets, and diversified Russia’s trade relations away from Europe and the U.S. But he has also assiduously courted international corporations to give them a direct stake in the Russian economy. Putin continues to try to deepen ties with the private sectors of key European countries even at the height of this crisis to off-set any retaliatory economic actions the West might take. Putin and the Kremlin believe that European and American investors in Russia, and those who manage or work in Russian-owned companies in Europe, will always work in Russia’s and their own corporate interests rather than in support of their governments’ positions. They will serve as Russian allies and advocates for limited sanctions, and they will push for a speedy reconciliation with Russia, limiting their government’s appetites and capacity for confrontation. For Putin, trade and investment are means of securing political leverage, along with offering lucrative positions on Russian corporate boards to former high-ranking Western politicians and grandees. Putin, for example, recently met with the heads of leading Italian companies to discuss their business in Russia, seeing Italy as a potential weak link in European unity. Putin has now been at this a long time, seeking to create a new version of the Cold War era mutually assured nuclear destruction in the advent of a political and economic standoff. If the West pulls the economic sanctions trigger, Western interests will suffer too. MAXIMALIST POSITIONS Russia’s assessment of its opportunities for action in Eurasia and Europe became clear in twin documents submitted to NATO and the U.S. on December 17, 2021. Moscow laid out maximalist positions on three sets of issues: 1) Ukraine; 2) NATO, and the future expansion of the alliance; and 3) the role of the United States in European security and internationally. Against the backdrop of threats and wargames, the December 17 documents reinforced Moscow’s much-emphasized demand for an ironclad guarantee from NATO that Ukraine and other former republics of the USSR will not at any point become members of the alliance. Russia’s December 17 documents also demanded an end to further NATO expansion (which would preclude close Alliance partners like Sweden and Finland seeking membership); NATO pulling back forces and weapons deployed in Eastern Europe since its first round of expansion to Poland, the Czech Republic and Hungary in 1999; and the withdrawal of U.S. nuclear weapons from Europe. The U.S. and NATO recently provided written responses to these demands—maintaining their long-held position that Moscow’s demands for a veto over NATO expansion are non-starters, but underscoring that they are open to discussions on reforming and refurbishing European security institutions as well as to negotiations on the disposition of conventional and nuclear forces in Europe. As far as NATO is concerned, Russia sees the institution as an extension of the United States, not an alliance based on mutual interest, collective defense, and voluntary association. Moscow continues to view the North Atlantic Treaty Organization in Cold War terms, as the equivalent of the Warsaw Treaty Organization that USSR created as a mirror image and coerced Eastern Europe into. Russian officials and commentators routinely deny any agency or independent strategic thought to any NATO member other than the United States. Note, for example, that Russia has not sent any similar documents to our North American neighbor, Canada, challenging its role in European security, despite its membership in both NATO and the OSCE and close ties to Ukraine. Canada and other countries barely exist in Russia’s calculations. In terms of Russia’s opposition to NATO expansion, Vladimir Putin first put the U.S. and NATO on notice in a speech at the Munich Security Conference in 2007. Putin asserted that Russia was rankled by the post-Cold War emergence of a unipolar world dominated by the United States and by NATO in Europe. Putin emphasized that Russia could not, and would not, countenance any further expansion of the Alliance beyond the Baltic states and the seven East European countries that joined NATO together in 2004. Russia made good on Putin’s “notice” to the Munich Security Conference in August 2008. The Russian military moved into Georgia in the aftermath of NATO’s April 2008 Bucharest Summit, where both Georgia and Ukraine were promised eventual membership. Russia would have made a similar move against Ukraine then had the government in Kyiv not stepped back from Ukraine’s NATO bid after seeing what happened to Georgia. But, of course, in 2014, Russia annexed Crimea and sparked off a war in Donbas, when Moscow thought Ukraine was trying to find an alternative route to NATO by concluding an association agreement with the European Union. CONFRONTING THE UNITED STATES As far as the United States is concerned, Putin has taken Russia’s ambitions and positions beyond Eurasia and Europe. Russia is consolidating relationships with U.S. adversaries with the blatantly signaled goal of challenging America’s global posture. At the end of January, for example, President Putin met with Iranian President Ebrahim Raisi to discuss economic, political and military ties. On January 21, Russia, Iran and China also began joint naval drills in the northern Indian Ocean, performing joint tactical maneuvering and practicing artillery fire at naval targets, as well as conducting search and rescue missions at sea. This week, on February 4, presidents Putin and Xi will meet in Beijing at the start of the Winter Olympics to discuss the current situation in and around Ukraine. These are just a few of many instances of Russian efforts to up the ante and draw our attention in other theaters. Putin has been quite explicit that successive Russian threats to deploy new nuclear weapons systems, or undermine the current international order are a gambit to get the U.S. to the negotiating table. Russia has long sought a commitment from the U.S., NATO and the Europe Union that it will have a clearly defined role in post-Cold War European security institutions and decision-making power whenever developments or events run counter to its interests. Russian officials have expressed frustration about the slow response from the United States to Moscow’s repeated requests to engage since 2008, when then President Dmitry Medvedev made a proposal for a new European security order in Berlin. From Moscow’s perspective, successive American administrations have dropped the ball on engaging with Russia to focus on other foreign policy priorities. Indeed, many observers believed that the Biden Administration also sought to sideline Russia to concentrate on China, as well as the COVID-19 pandemic and climate change. Putin was evidently dissatisfied with the slow pace of bilateral discussions after the first increase of tensions around Ukraine in spring 2021 and his meeting with President Biden in Geneva in June. He clearly believes that he needs to escalate the situation to keep us focused on Russia’s demands and get ahead of the U.S. 2022 midterm elections when our attention will necessarily be diverted to domestic issues. Putin is also mindful of 2024 when we have our presidential election, and he must submit himself for reelection at home. In many respects, time is of the essence for Putin to achieve resolution well before 2024. His public opinion ratings are not what they used to be. The last time Putin’s popular approval fell significantly was before the annexation of Crimea. Annexation proved universally popular in Russia, boosting Putin’s popularity to stratospheric levels. Putin may hope for a similar boost ahead of 2024 by showing the Russian people that he can take decisive action against Ukraine, NATO and the United States. In the meantime, at home in Russia, Putin has done a good job of making the United States and NATO look like the aggressors and perpetrators of crisis. Abroad, he is bent on convincing the rest of the world that Ukraine is either an internal matter for Russia to resolve or the object of a Cold War-style dust up with the United States—a proxy war like Korea or Vietnam in the worst case scenario. In recent Russian polling, half of Russians believed that the U.S. and NATO were to blame for the crisis, and only a tiny fraction thought that Russia itself was to blame. In stark contrast, slightly more than 70 percent of Ukrainians viewed Russia as a hostile state by December 2021 as a result of the rising tensions – up from 60 percent in spring 2021.

### 2AC – AT: Plan Unethical

#### Ethical issues are not a reason to forego cognitive biotech research – future technological development and ethical regulation solve.

**Cinel et al. 19** (Caterina Cinel, Davide Valeriani, Riccardo Poli "Neurotechnologies for Human Cognitive Augmentation: Current State of the Art and Future Prospects", Frontiers, https://www.frontiersin.org/articles/10.3389/fnhum.2019.00013/full, 1-31-2019, Accessed 6-26-2022)//ILake-SG

The neuroscience technologies shown in the roadmap in Figure 2 are those presented in section 2 plus wearable neuroscience technologies, since they appear to be a natural evolution of current technologies that will likely be available in the future. If past trends are the best predictors of future ones, then both significant improvements to existing technologies and new technologies for recording and stimulating brain activity should be expected in the medium to long term. It is likely that the development of each technology will continue over the next two decades, considering the advantages provided by each (see section 2). Non-invasive techniques will still remain central thanks to their continuous development and increased reliability. At present and in the context of potential applications, EEG, and fNIRS possibly offer the best compromise, particularly thanks to their portability, low-cost, non-invasiveness, and widespread adoption in current BCI and neuroergonomics studies. In the future, EEG is likely to become even more practical if dry electrode technology continues to develop at its current pace (Lopez-Gordo et al., 2014). However, it is expected that over time invasive brain-activity observation techniques, such as ECoG or implanted electrodes, will become progressively more ethically and medically acceptable, particularly if the long term risks associated with their presence inside the body are proven minor. After all, many forms of body modification are already accepted both for medical (e.g., pace makers, laser vision-correction, and cochlear implants) and aesthetic (e.g., face-lifts, body piercing, or tattoos) reasons. If that is the case, invasive techniques will offer a more precise and effective way of observing brains in action, particularly if the recent trends in recording technology (Qiao et al., 2016; Pesaran et al., 2018) continue. In relation to neurostimulation technologies, at present and in the context of potential applications, the best compromise is offered by tES, which is portable, generally cheap, and non-invasive. For brief exposures, this technology appears to be low-risk, and the recent development of a higher-definition form of tES suggests that further improvements are forthcoming. Energy considerations make it difficult to imagine how TMS could ever become portable. In the future, it appears as if FUS may become superior to both technologies in terms of resolution and portability (portable ultrasound devices already exist on the market, suggesting the feasibility of making FUS portable), but it is unclear whether it will ever be possible to stimulate multiple sites and large areas of the brain at once. If invasive techniques, such as implanted electrodes, ever become acceptable, they will of course offer a more direct and precise way to modulate brain activity. The roadmap in Figure 2 shows the trend of development of the main applications of neuroscience technologies reviewed in section 3. In the forecast horizon of the roadmap (a period of over two decades), an acceleration of these developments is likely, particularly as ethical, medical, and technological obstacles are progressively removed, paving the way to making invasive brain-activity observation technologies viable. In general, it can be expected that BCIs for communication and control will have improved sufficiently to become routinely used particularly in domains where higher than musculoskeletal reaction times are important or where covert communication is required. However, it is also clear that within this time frame many neuroscience technologies for augmenting human performance will continue to transition (having currently just started) outside the lab for field testing with some even in routine use. For instance, significant progress can be expected to be made in innovative applications in training and selection of personnel, decision-making, cognitive monitoring, and situation awareness, given their current initial successes. Finally, it should be noted that all forms of enhancement based on neurostimulation look, at present, extremely promising, although they still present risks. For instance, facilitation of one function might be expected to be associated with loss of some other, often unknown function. Furthermore, research on the long term effects of such technologies is lacking. For these two reasons, the future of stimulation technologies is harder to predict as their currently formidable expansion would likely come to a sudden halt if future research reveals that they have severe permanent side effects. Fear of change and of the unknown is understandable. Fuelled by this, often the ethical debate appears to focus on what is conceivable, rather than on what is scientifically foreseeable (i.e., there being only technological limits to its attainment) and what is already reality. This may lead to illogical and unexpected outcomes. As it is difficult to predict the exact future trajectory of neuroscience, neuroergonomics, BCIs, and human augmentation technologies, it is also difficult to predict how neuroethics, i.e., how society, will look at such technologies. It, therefore, critically important to track ethical implications, particularly in areas such as mind reading and privacy, agency, responsibility, and liability. Given the recent trajectory of neuroscience, BCIs, neuroergonomics, brain-to-brain-communication and neural engineering, and their formidable expansion, such applications may one day become reality, and, so, they deserve to be ethically debated. However, none of the ethical issues mentioned in section 4 appear to be a show stopper for human enhancing neurotechnologies. Some issues can be tackled technologically. For instance, preventing (future) BCIs from inadvertently communicating private thoughts or emotions could easily be achieved by requiring users to issue a particular sequence of mental commands (akin to the password required to unlock the screen of a smartphone) to switch the BCI on and off (in fact this is already an element of the family of so called “self-paced” BCIs). For other issues, it is possible to simply apply ethical standards already accepted in similar situations (for example Smidt, 2000). One can expect that over time ethical thinking will progressively change as a result of society being exposed to neuroscience technologies for human augmentation resulting in further acceleration in their development and adoption. Nonetheless, as neurotechnologies evolve, the development and adaptation of clear ethical regulation is becoming more and more pressing.

#### Modifying humans is completely ethical

Savulescu & Kahane 09 (SAVULESCU, J. and KAHANE, G. (2009), THE MORAL OBLIGATION TO CREATE CHILDREN WITH THE BEST CHANCE OF THE BEST LIFE. Bioethics, 23: 274-290. https://doi.org/10.1111/j.1467-8519.2008.00687.x)

In technical terms, PB is a maximizing principle. This has suggested to some that it must be vulnerable to standard objections to such principles. In this section we'll consider such objections. But first let us correct the mistaken impression that because PB is a maximizing principle, it must belong in a consequentialist ethical theory. Both consequentialists and the vast majority of their opponents agree that there is moral reason to promote the good. Where they differ is over whether there are moral constraints that limit the promotion of the good. In fact, within total act utilitarianism, PB could not be an independent moral principle but only a label for one kind of value that needs to be weighed in utilitarian deliberation. Indeed, the right act for a total act utilitarian will sometimes be to create a child with prospects for a poor life, if this will lead to a higher aggregate level of wellbeing. For example, it might be better for some parents to have a dull, lazy child than a highly intelligent and challenging child who herself would have a better life. PB may often clash with total act utilitarianism, although it is compatible with other forms of consequentialism. There is nothing in the PB that makes it incompatible with non-consequentialist moral theories. It is compatible, for example, with respecting persons as ends in themselves. We are not treating a future child merely as a means when we aim to have the child who will enjoy the most advantaged life – reasons of PB are not reasons of parental self-interest. And PB is also an extension of one central parental virtue: concern for the well-being of one's children. As such, it is equally compatible with virtue ethics.37 Furthermore, we have argued that reasons of PB can be outweighed or defeated by other reasons, and these reasons may be non-consequentialist in origin, such as reasons of justice. Even if PB is compatible with non-consequentialist views, it might still be vulnerable to familiar objections to maximizing moral principles. For example, several authors have claimed that PB is too demanding – that it places too stringent a burden on parents. As Glover argues, There is something to be said for avoiding the intrusion of too many or too stringent moral obligations into an intimate personal decision. There is a case against placing additional moral burdens on people having children, a case for simply welcoming whatever children is born.38 It has indeed seemed to many that morality couldn't require us to give up our personal projects and special ties to family and friends in order to increase the welfare of total strangers.39 Reasons of PB, however, are continuous with familiar parental duties governing the spacing of our children and the circumstances under which we should have them. It is not uncommon to hear the criticism, ‘They should have waited to have children.’ To the extent that parents have reasons to care about the expected well-being of their future children, these reasons can be seen as extensions of parents' special relations to their own children, not as the external demand of an impartial morality.40 Second, it is doubtful that the choice itself could be described as a burden. If parents believe, or would believe if they had reflected on the available information, that child A will have a better life than child B, how can it be a burden to select A? There is an important disanalogy here from many acts that promote the well-being of existing children. In many cases, the more an act promotes well-being (e.g. taking a child to speech therapy), the greater its cost (in terms of time and money). Now whether parents should undergo IVF in order to select the most advantaged child does depend on the costs – financial, emotional and physical. But in those cases where couples are already undergoing IVF for infertility or risk of genetic disorder, there are no significant further costs to selecting the most advantaged child compared to selecting a child without Down Syndrome.41 If parents have already committed themselves to spending a certain amount on their child's education, what further burden do they bear in selecting the better school out of several similarly priced options? Perhaps what is meant is rather that raising a child with extraordinary talents may be a burden to normal parents. This may be true in some cases. But whether and when can only be settled empirically. Another objection to maximizing principles is that they are self-defeating. If all a person aims to do is promote her self-interest, then she may find this aim self-defeating. She may have a better life precisely by being concerned about many things other than her self-interest. Directly and exclusively seeking happiness may make a person miserable. Couldn't this be said of seeking to have the most advantaged children?42 Notice first that this is not an objection to the truth of PB but to using it as a direct guide to action. In any case, this objection couldn't plausibly apply to the promotion of our biological and psychological potential and abilities. How can the capacity to remember things better, concentrate longer, be less depressed, or better understand other people's feelings have the effect that one will be less likely to achieve the good life? It may be self-defeating in some circumstances to aim directly at achieving the good, but it is surely sensible to aim directly at achieving the potential to be able to realize the good. If it is not self-defeating to alter the educational environment to maximize our children's potential and opportunities, why is it self-defeating to intervene more directly in their psychology or biology? Parents who obsess about their child's well-being and future accomplishment may indeed make their child less rather than more happy or accomplished. But this has nothing to do with the act of selection itself. Selecting the best is not, in this way, self-defeating, as compared to letting nature or chance take their course. It is subsequent attitudes to the child that may cause such damage. But if so, then this is no real objection to PB.43 It is an objection to certain styles of ‘hyperparenting’.44 There is one way in which PB may be self-defeating. One factor that can influence how well a person's life goes is her position on a range of positional goods – how she ranks compared to others on attributes such as intelligence and height. Not everyone can be the most intelligent or the tallest. But, to the extent that genetic selection is available to many reproducers, then whether and to what degree a given feature is likely to benefit their future child will thus often depend in part on other parents' genetic choices. Such coordination problems pose a genuine difficulty. But parents already face such difficulties with many decisions they make with respect to existing children. Moreover, many such goods are not purely positional. The world and the lives of the people in it might be better if everyone were funnier, more intelligent, more empathetic and less aggressive. And in so far as such joint action has significant social costs, these costs would provide independent reasons for restricting parental choice.

## 2AC – AT: K – Ableism

### 2AC – Framework

#### Ableism is circular and bad for debate – normative statements are critical to depth and avoiding morally indefensible violence. The neg is an example of reductio ad at the cost of pragmatic political solutions

**Vehmas and Watson 13** (\*Simo Vehmas and \*\*Nick Watson, \*professor of special education with a focus on ethical issues related to disability at Stockholm University, \*\*Chair of Disability Studies, Professor of Health and Wellbeing, Associate at the School of Medicine, University of Glasgow. Disability & Society, "Moral wrongs, disadvantages, and disability: a critique of critical disability studies", 11/6/2013, https://www.tandfonline.com/doi/pdf/10.1080/09687599.2013.831751, accessed on 7/4/2022)//gideon

The ideas developed within CDS draw heavily on concepts developed in other areas of difference including ethnicity, sexuality and gender. Whilst it is not simply about conflating different approaches together with that of disability studies, the case for similarities are readily made (Shildrick 2012). McCruer (2010), for example, drawing on the ideas of Judith Butler juxtaposes compulsory heterosexuality with compulsory ablebodiedness, arguing that privileging heterosexuality and ablebodiedness acts to the detriment of others. The argument is that by disrupting the categories disabled/ non-disabled, the discrimination experienced by disabled people can be challenged. This attempt at what Sayer (2011) has called normative disorientation found in much of the theorizing around ableism creates problems. For example, how can we discuss or debate prevention when a feature of ableism is described as a ‘belief that impairment (irrespective of “type”) is inherently negative which should, if the opportunity presents itself, be ameliorated, cured or indeed eliminated’ (Campbell 2009b, 23)? Is the promotion of the use of folic acid before and during pregnancy based on an anti-disablist or perhaps ableist viewpoint; and if so, should CDS be campaigning against those who seek to promote these views? This gap is acknowledged by Meekosha (2011), but it has not been examined or unpacked. Whilst we may be accused here of constructing a ‘straw person argument’ it is consistent with Campbell's claim. This challenge to normativity, of what is good or bad, or right or wrong, characterizes much of the CDS literature. Whilst CDS often makes normative judgements 640 S. Vehmas and N. Watson about policies or about the current understanding of disability or how contemporary social organization is morally wrong, it offers no evaluative arguments on impairments or on the implications of living with an impairment. Shildrick (2012, 40), for example, has argued that ‘all bodies are unstable and vulnerable’ and that there is ‘no single acceptable mode of embodiment’. Shildrick attempts a move to an ethical realm by posing what she describes as ‘an important ethical question: how can we engage with morphological difference that is not reducible to the binary of either sameness or difference?’ And, in line with this rather leading question, she continues: ‘If we are to have an ethically responsible encounter with corporeal difference, then, we need a strategy of queering the norms of embodiment, a commitment to deconstruct the apparent stability of distinct and bounded categories’ (Shildrick 2012, 40). In Shildrick’s view, any strategy, political arrangement, or ethical conceptualization that is based on a group identity built upon a binary distinction or difference, is ethically wrong. This is an interesting suggestion but unfortunately Shildrick does not provide any ethical argument to support it or a practical example of how it may be enacted. It is, as Shildrick argues, safe to suggest that there is no ‘single acceptable mode of embodiment’, but at the same time it seems equally safe to suggest that there are a lot of people who would argue that some forms of embodiment are preferential to others. Seeing impairments as acceptable forms of human diversity is not the same as seeing them as neutral or insignificant. When people say that some forms of embodiment are preferential to others, they are ultimately referring to ideas about human well-being. In other words, one reason why people generally prefer not to have impairments is ethical; they believe that some impairments may in and of themselves prevent people from acting and moving as they wish, from doing valued activities, or faring well in general. Thomas (1999) coined the term ‘impairment effects’ to define these limitations and to separate them from those that arise from disablement. CDS is normative as well, albeit its normative focus is on social factors instead of individuals’ abilities. CDS, like the social model, contains a strong normative dimension that implies what is right or wrong as regards social arrangements, but neither model takes a clear normative approach to the lived, embodied and visceral experiences of having an impairment (Vehmas 2004). Human beings are dialogical beings and the significance of disability or impairment and their impact on well-being will tend to be comparative. As Sayer argues: ‘we measure ourselves not so much against absolute standards but against what others are like, particularly those with whom we associate the most’ (2011, 122). Evaluative judgements in relation to the individual experience of both disability and impairment are important. If we are to properly understand social phenomena, such as disability, we have to recognize their normative dimensions and the values attached to them. Value-laden statements, as Sayer (2011) argues, can strengthen the descriptive adequacy of accounts. Sayer demonstrates this by using the example of the Holocaust. This, he says, can be represented in two ways: ‘thousands died in the Nazi concentration camps’ and ‘thousands were systematically exterminated in the Nazi concentration camps’. The latter sentence is not only more value-laden than the first, but more accurate as well (Sayer 2011, 45). We would argue that talking about ableism, disablism or oppression does not make sense without reference to normative judgements about people’s well-being, as without such a discussion only a partial picture will emerge. The same may also apply to judgements about fair social arrangements. Disability & Society 641 CDS does not engage with ethical issues to do with the role of impairment and disability in people’s well-being and the pragmatic and mundane issues of day-today living. Imagine, for example, a pregnant woman who has agreed, possibly with very little thought, to the routine of prenatal diagnostics, and who has been informed that the foetus she is carrying has Tay-Sachs disease. She now has to make the decision over whether to terminate the pregnancy or carry it to term. The value judgements that surround Tay-Sachs include the fact that it will cause pain and suffering to the child and he or she will probably die before the age of four. These are morally relevant considerations to the mother. Whilst CDS would probably guide her to confront ableist assumptions and challenge her beliefs about the condition, considerations having to do with pain and suffering are nevertheless morally significant. The way people see things, and the language that is used to describe certain conditions, can affect how they react to them, but freeing oneself from ableist assumptions may not in some cases be enough. There may be insurmountable realities attached to some impairments where parents feel that their personal and social circumstances would not enable them to provide the child or themselves with a satisfactory life (Vehmas 2003). Impairment sometimes produces practical, difficult ethical choices and we need more concrete viewpoints than the ideas provided through ableism, which offers very little practical moral guidance. It is questionable whether the notion of ableism would help the parents in deciding whether to have a child who has a degenerative condition that results in early death. Campbell (2009a, 39, 149 and 159), for example, discusses arguments about impairments as harmful conditions, the ethics of external bodily transplants as well as wrongful birth and life court cases (whether life with an impairment is preferable to non-existence), and how ableism impacts on discourse around these issues. Whilst her analysis of such ableist discourses suggests ethical judgements, she provides no arguments or conclusions as to whether, for example, external bodily transplants are ethically wrong or whether impairment may or may not constitute a moral harm. Under the anti-dualistic stance adopted by CDS, even the well-being/ill-being dualism becomes an arbitrary and nonsensical construct. Under ableism it can be constructed as merely maintaining the dominance of those seemingly faring well (supposedly, ‘non-disabled’ people), and labels those faring less well as having lesser value. There may not be a clear answer to what constitutes human well-being or flourishing, but in general we can and we need to agree about some necessary elements required for well-being. Also, as moral agents we have an obligation to make judgements about people’s well-being and act in ways that their well-being is enhanced (Eshleman 2009). This is why we have, for example, coronary heart disease prevention programmes because the possible death or associated health problems are seen as harms. Possibly these policies are based on ableist perspective, but if that is the case then the normative use of ableism is null; eradicating supposedly ableist enterprises such as coronary heart disease prevention would be an example of reductio ad absurdum. Denying some aspects of well-being are so clear that their denial would be absurd, and simply morally wrong. CDS raises ethical issues and insinuates normative judgements but does not provide supporting ethical arguments. This is a way of shirking from intellectual and ethical responsibility to provide sound arguments and conceptual tools for ethical decision-making that would benefit disabled people. If we are to describe disability, 642 S. Vehmas and N. Watson disablism, and oppression properly, we have to explicate the moral and political wrong related to these phenomena. Whilst CDS has produced useful analyses, for example, of the cultural reproduction of disability, it needs to engage more closely with the evaluative issues inherently related to disability. As Sayer has argued (against Foucault): while one could hardly disagree that we should seek to uncover the hidden and unconsidered ideas on which practices are based, I would argue that critique is indeed exactly about identifying what things ‘are not right as they are’, and why. (Sayer 2011, 244) By settling almost exclusively to analyses of ableism without engaging properly with the ethical issues involved, CDS analyses are deficient. The moral wrongs related to disablism or ableism are matters of great concern to disabled people, and CDS should in its own part take the responsibility of remedying current wrongs disabled people suffer from.

### 2AC – Perm

#### Perm do both – BCIs can be helpful but stigmatization should be kept in mind

**Aas and Wasserman 16** (\*Sean Aas and \*\*David Wasserman, \*a Senior Research Scholar at the Kennedy Institute of Ethics and an Assistant Professor in the Philosophy Department at Georgetown; \*\*Department of Clinical Bioethics, National Institutes of Health. Journal of Medical Ethics, "Brain—computer interfaces and disability: extending embodiment, reducing stigma?", Jan 2016, https://www.jstor.org/stable/44014291?seq=1, accessed on 7/4/2022)//gideon

So, on the most optimistic scenario, the widespread adoption of BCIs will eventually replace the tyranny of the normal with 'morphological diversity'.4 18 But, we worry, getting to that actually have an adverse effect on people with disabilities. For in the short term, BCIs largely will be developed under a biomedical rubric, designed for the use of people with the most pervasive mobility impairments. Although commercial spin-offs for a wider market are already occurring, they are very expensive, and will likely remain confined to a small segment of the population in the foreseeable future. Justification for public funding of development will doubtless emphasise the value of the devices to people seen as 'trapped in their own bodies', 19 a metaphor that reflects an exaggerated, oversimplified view of the challenges of impairment. Funding motivated by a vision of biotechnological rescue may well divert attention from alternative and more immediately effective means of increasing the social participation of mobility-impaired people - by environmental and social modifications rather than by high-tech gadgetry. We do not claim that this price is excessive, merely that it must be taken into account in setting funding priorities and social policy. Dangers like these are not, we think, so clear and present that they give disability advocates reasons to oppose the further development and deployment of BCIs. After all, BCIs also offer positive prospects for both medical and social aspects of disability. Still, concerns about stigmatisation and backlash should be kept in mind as people with disabilities seek better functioning through neutrally connected devices. We have suggested that whether BCIs always remain tools or sometimes become parts of our bodies, disabled people stand to gain if they are widely adopted. Much more work would need to be done to determine which strategy for promoting BCI research and development maximises the practical and social benefits for people with disabilities, while minimising the risks we have described. We hope to have shown here that further reflection on the boundaries of the felt 'body' will be both (1) necessary and (2) far from sufficient for assessing the promises and pitfalls of BCIs for the public perception of disability.

### 2AC – No Link

#### No link – the aff isn’t ableist or eugenic – there is no functioning / enhancement distinction

**Chaproniere 21** (Lysette Chaproniere, PhD student in philosophy at the university of Glasgow, investigating the relationship between disability and human enhancement. Bioethics, "Is enhancement inherently ableist?", 12/18/2021, https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/bioe.12982, accessed on 7/4/2022)//gideon

Transhumanists and other proponents of enhancement have been criticized for their attitude to disability. Melinda Hall argues that transhumanists denigrate disabled people by devaluing interdependence and vulnerability, and implying that disabled people are dangerous. It might also be thought that further development of enhancement technologies would have bad consequences within current, ableist and otherwise oppressive social contexts. This paper responds to these objections, arguing that enhancement needn't be in conflict with disability justice. While enhancements can be used and promoted in ways that reinforce ableism and other oppression, ways of mitigating these problems might be found by drawing on ideas from the disability rights movement, and social justice movements more broadly. The development of more accessible environments, and a general openness to surprises about which traits promote well-being, can help to create conditions under which people have genuine choice over which enhancement technologies, if any, to use.

Is there something inherently ableist about enhancement? Can the promotion of enhancement coexist with the promotion of disability rights? This paper will engage with these questions by responding to criticism of enhancement from the perspective of disability justice. Engaging with these critiques is important for at least two reasons. One is that, if some disability activists have concerns about enhancement, these concerns should be taken seriously, and, because ableist and other oppressive assumptions can be easy to miss, should not be dismissed without careful reflection. Whether these critiques are entirely successful or not, there are important lessons to learn from them.

A second reason is that they might offer an alternative angle on enhancement. Arguments against enhancement typically rely on a distinction between treatment of disorder and enhancement of healthy traits to argue that, while treatment should be encouraged, enhancement should not be pursued.11 Daniels, N. (2000). Normal functioning and the treatment-enhancement distinction. Cambridge Quarterly of Healthcare Ethics, 9(3), 309–322; Sandel, M. (2004, April). The case against perfection. The Atlantic, 51–62. This distinction is difficult to support. Even if it is possible to distinguish between treatment and enhancement, it is hard to see why the distinction would be morally significant.22 Resnik, D. (2000). The moral significance of the therapy-enhancement distinction in human genetics. Cambridge Quarterly of Healthcare Ethics, 9, 365–377; Kamm, F. (2005). Is there a problem with enhancement? The American Journal of Bioethics, 5(3), 5–14. Showing that the treatment/enhancement distinction is unsupportable, however, does not show that all arguments against enhancement have been defeated. Perhaps enhancements are problematic, but so too are some treatments. Some disability activists have criticized the practice of selecting against disabled embryos or, more broadly, the societal focus on disability cures.33 Asch, A., & Wasserman, D. (2005). Where is the sin in synecdoche? Prenatal testing and the parent-child relationship. In D. Wasserman, R. Wachbroit, & J. Bickenbach (Eds.), Quality of life and human difference: Genetic testing, health care, and disability (pp. 172–216). Cambridge University Press; Clare, E. (2017). Brilliant imperfection: Grappling with cure. Duke University Press. Those who hold this view of disability needn't rely on a treatment/enhancement distinction in their criticism of enhancement. Considering the case against enhancement in its strongest form should therefore include engaging with arguments that do not rely on the treatment/enhancement distinction, or on dubious ideas of normal functioning.

Each section of this paper responds to a disability-related objection to enhancement. An especially detailed critique of enhancement, especially of transhumanists, its strongest proponents, is presented by Melinda Hall, and I take her arguments to be representative of disability-related concerns about these ideas. Thus, five of the six objections I discuss are drawn from Hall's work: that aiming to develop mind uploading and lifespan extension technologies devalues our vulnerability, rejecting and making an enemy of the disabled body; that the transhumanist emphasis on autonomy presupposes an atomistic conception of the self, thereby devaluing disabled people on the basis that dependence and interdependence are undesirable; that transhumanism denigrates people with cognitive disabilities; that it depoliticizes the relationship between disability and well-being; and that the promotion of moral enhancement combined with the recommendation to use genetic selection implies that disabled people are dangerous and do not belong in optimistic visions of the future. Finally, I consider the idea that, even if enhancement is a good thing in the abstract, it will have net bad consequences within currently existing, oppressive social contexts.

Not all enhancement advocates would describe themselves as transhumanists. Some of the enhancements I discuss, such as mind uploading, are radical enough that describing their proponents as transhumanists seems reasonable, but the same is not necessarily true of all enhancements discussed here. Nevertheless, in this paper I will frequently refer to ‘transhumanism’ or ‘transhumanists’. Much of the literature I draw upon uses that terminology, so I will follow the same practice. Many of the critiques I discuss, however, are aimed at a broader group of enhancement advocates. Hall, for instance, refers to ‘[t]ranshumanist thinkers… and fellow travelers who claim enhancement is a moral obligation’.44 Hall, M. (2020). Second thoughts on enhancement and disability. In D. Wasserman & A. Cureton (Eds.), The Oxford handbook of philosophy and disability (pp. 633–650). Oxford University Press, p. 633. A natural reading of this quote would be that Hall intends to limit her critique to those who believe individuals have a moral obligation to use enhancement technologies. However, as I discuss in Section 3, Bostrom, one of the two primary targets of Hall's critique, has explicitly stated that people should be able to choose whether to use enhancement technologies or not. It might be thought, therefore, that she is critiquing those who hold that enhancement is a moral obligation in the sense that society has an obligation to develop enhancements and make them widely available. In using the term ‘transhumanism’, then, I do not intend to draw a sharp distinction between transhumanists and other proponents of enhancement, and none of my arguments depend on any particular view about where that line should be drawn.

In responding to these critiques, I am not primarily interested in evaluating whether particular arguments in the literature are ableist. Given the pervasiveness of ableism, and the close connections between disability and enhancement, it would be surprising if there were no ableism within transhumanist and other enhancement literature. Ableist arguments should of course be criticized wherever they are found, but where there is ableism in the arguments for a given position, it is worth asking whether the ableism is intrinsic to the view, or whether that element can be removed, keeping the core idea intact. My aim, then, will be to evaluate whether transhumanism, and other pro-enhancement views, are inherently ableist.

I will argue that the core commitments of transhumanists and other proponents of enhancement need not necessarily be in conflict with disability justice. That does not mean, of course, that there is no ableism within transhumanism, or no potential for enhancement to increase disability stigma. I suggest that the potential for ableism can be reduced by incorporating ideas developed within philosophy of disability and the disability rights movement, such as universal design, and taking seriously people's testimony about their quality of life.

The first criticism I respond to is that the pursuit of enhancement involves a problematic attitude to vulnerability. Two types of enhancement, both advocated for by Nick Bostrom, will be especially relevant here. First, the slowing or reversal of aging processes so as to delay death and extend lifespans as far as possible.55 Bostrom, N. (2005). The fable of the dragon-tyrant. Journal of Medical Ethics, 31(5), 273–277. Second, the more radical prospect of transferring a person's mind to a computer, often known as ‘mind uploading’.66 Bostrom, N. (2005). Transhumanist values. Journal of Philosophical Research, 30(Suppl.), 3–14, p. 7. The word ‘vulnerability’ has multiple meanings, and there are multiple senses in which we might think it desirable to accept or embrace it, not all of which are relevant to this discussion. We might, for instance, value emotional vulnerability, but I will not discuss that here because Hall is criticizing transhumanists for their attitude to bodily vulnerability. It is also worth distinguishing between wanting to reduce vulnerability, on the one hand, and being in denial about it, on the other. It may be unwise, for instance, to ignore pain, or one's need for rest and sleep; treating one's body as invincible may actually lead to damage. We might also criticize social norms that treat our vulnerability as a taboo subject. Again, these senses of denying or avoiding vulnerability will not be relevant to the discussion.

Hall objects to transhumanism because it seeks to reduce, as far as possible, our bodily vulnerability to disease and death. This is because of what she takes it to imply about disabled people: according to her, the ‘enemy’ of transhumanism is ‘the disabled body itself’.77 Hall, M. (2013). Vile sovereigns in bioethical debate. Disability Studies Quarterly, 33(4). https://dsq-sds.org/article/view/3870/3406, https://www-academia-edu.proxy.lib.umich.edu/2434257/Vile\_Sovereigns\_in\_Bioethical\_Debate By way of further explanation she writes, ‘If the (traditionally, that is, unenhanced) abled body is figured as constraint and vulnerability to death, the (traditionally) disabled body likely symbolizes an even greater degree of unwanted constraint and vulnerability to death’.88 Ibid: 15. Ladelle McWhorter echoes this objection when she says of transhumanist literature, ‘The body rejected in these texts is not merely a dependent body but a loser body—a slack body, a slow body, a body without the quick right answer, a penetrable body, a body riven by pain’.99 McWhorter, L. (2017). Symposium on Melinda Hall's The Bioethics of Enhancement (McWhorter). Discrimination and disadvantage. https://web-archive-org.proxy.lib.umich.edu/web/20200716114202/, https://philosophycommons.typepad.com/disability\_and\_disadvanta/2017/06/symposium-on-melinda-halls-the-bioethics-of-enhancement-mcwhorter.html. Section 1. As Hall and McWhorter see it, then, the avoidance of vulnerability is a rejection of the disabled body, and presumably thus of disabled people. Hall contrasts this attitude with her own approach of ‘viewing human life as fundamentally vulnerable and interdependent in valuable ways’.1010 Hall, M. (2016). The bioethics of enhancement: Transhumanism, disability, and biopolitics. Lexington Books, p. xxi.

It is certainly possible that some people have bad motives for using or desiring enhancement. Perhaps some people want to use enhancements simply because they want to avoid having a ‘loser body’, out of disdain for what they perceive as the weakness of disabled people or other groups. But do enhancement practices necessarily express such an attitude? That seems unlikely, given how we so often treat our bodily vulnerability to disease and death as undesirable. Indeed, Hall treats it as such when she argues that bioethics literature on enhancement ‘creates and directs risk rather than identifying and mitigating it’, and then lists examples of disabled people having difficulty accessing medical care.1111 Hall, op. cit. note 4, p. 642, emphasis in Hall. So, on the one hand, she criticizes transhumanists for wanting to reduce vulnerability rather than treating it as valuable, yet on the other hand, she, rightly, criticizes practices that leave disabled people ‘vulnerable to medical negligence and even death’.1212 Ibid: 642. Note that she is not merely arguing that transhumanists have failed by their own lights, in that they aim to decrease risk and vulnerability but have actually increased it, although that does seem to be part of her argument. She takes the ways in which disabled people are subjected to additional risk of disease and death to be unjust, as they of course are.

What, then, makes the kinds of risk and vulnerability that disabled people are subjected to through bioethics discourse, or society in general, different to the kinds of risk and vulnerability Bostrom seeks to overcome? Hall says very little about how she makes that distinction, but I will consider three possible differences. First, Hall argues that the risks associated with disability are significantly social and political, rather than primarily or mostly biological.1313 Ibid: 645. If this is to work as a way of making the distinction, one would need to hold that, by contrast, the risks Bostrom is concerned with are primarily biological rather than social. However, Bostrom's claims about the problems with our bodies can be framed as societal issues, in that we have failed to put sufficient resources into, for example, anti-aging research, and are morally blameworthy for this failure. Likewise, Hall's concerns can be framed as things that ought to be done to people's bodies; to make sense of the claim that subjecting disabled people to additional risk of medical negligence is unjust, we must accept that some bodily states are undesirable. Even if we reject the notion that disability states are especially risky, except insofar as social conditions make them so, we cannot make sense of the idea that it is unjust to refuse a disabled person an organ transplant, to take one of Hall's examples, without accepting that the risk and vulnerability from lacking a healthy heart or kidney ought to be avoided. In the end, both Hall and Bostrom are arguing that we have a moral obligation to change society so that there is wide access to medical interventions that reduce risk of disease and death, and so a distinction between social and biological risks cannot support Hall's position.

#### Ship of Theseus DA – there’s no brightline between positive and negative enhancements.

**Chaproniere 21** (Lysette Chaproniere, PhD student in philosophy at the university of Glasgow, investigating the relationship between disability and human enhancement. Bioethics, "Is enhancement inherently ableist?", 12/18/2021, https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/bioe.12982, accessed on 7/4/2022)//gideon

A second possible way of making the distinction comes from Hall's claim that one of the differences between the enhancements she critiques, and unproblematic enhancements accepted by everyone, is that the enhancements she critiques ‘refuse the body’.1414 Ibid: 645. The other criteria she offers for distinguishing between problematic and unproblematic enhancements are that the problematic ones ‘draw together positive and negative eugenics’ or ‘attempt to decide what sort of people there should be’ (ibid: 645). It would be hard to argue that enhancements such as life extension ‘draw together positive and negative eugenics’ or ‘attempt to decide what sort of people there should be’ any more than do the enhancements and treatments she accepts. Presumably, she intends these criteria primarily to pick out enhancement via genetic selection, such as in Savulescu's principle of procreative beneficence. For that reason, I will not address them in this section. But what makes an enhancement a problematic refusal of the body? Does it simply mean doing away with or transcending our fleshly bodies? If so, mind uploading scenarios would certainly count. But suppose that, instead of mind uploading, I gradually replace my body parts with prosthetic alternatives. At what point have I refused the body? It would seem ableist to say that using a prosthetic leg rather than one's natural leg is a problematic refusal of the limb. But where else could the distinction be drawn? Either one has refused the body at some point in the gradual replacement scenario, or that scenario never counts as refusal of the body, even when most or all of the flesh has been replaced, but mind uploading does. In either case, it is not clear what makes the relevant difference. It must also be considered whether this criterion applies to other types of enhancement. If refusal of the body is supposed to be the reason (or a reason) why lifespan extension is problematic, then the same reasoning would seem to apply to ordinary, uncontroversial enhancements and treatments. Are vaccinations a refusal of the body since they make us less vulnerable to disease? Perhaps not, since Hall puts gene therapy to boost one's immune system on the unproblematic side of the line.1515 Ibid: 645. But if there is a problem with lifespan extension because it aims to avoid death, which is just part of having a body, one could also argue that there is a problem with vaccinations because they aim to avoid disease, which is also just part of having a body. One could even argue that vaccinations reject the body with a weakened immune system. Refusal of the body, then, does not provide a helpful criterion for which enhancements are problematic.

Thirdly, it might be a matter of degree; the ways disabled people are put at risk makes them too vulnerable, but if Bostrom's dream became a reality, we would not be vulnerable enough, and we should strive for the optimal level of vulnerability. But how do we decide what the optimal level of vulnerability is? Setting a non-arbitrary threshold is often difficult, but it is an even greater challenge for those who reject the ideal of normality, as both Hall and I do, and as do many disability advocates. Some might argue, for instance, that we ought to give each person the opportunity to have a normal lifespan. Providing inadequate medical care to disabled people denies them that opportunity, but the forms of life extension Bostrom promotes take people beyond normal, and so fall outside that obligation, and may be unwise or even morally impermissible. But since Hall would not want to give so much significance to normality, if the distinction is meant to be a matter of degree, she would need to find an alternative way of setting the threshold.

My argument in this section does not necessarily show that, if we accept ordinary medical treatments, on pain of inconsistency we must also accept radical enhancement. Instead, I am arguing for something more specific: that the enhancements Hall critiques cannot be distinguished from medical interventions of the sort that almost everybody accepts based on how they treat our bodily vulnerability.

At first it might appear that those who are concerned with the problems enhancement might cause for disabled people would be keen to emphasize autonomy and individual liberties. In a world where capacities can easily be enhanced and bodies can easily be modified, one might worry about whether people who wish to remain disabled will be free to not use these technologies. Hall would appear to have this concern, arguing that ‘physically disabled persons who wish to revel in difference and explore the unique functionalities, modes, and desires of their bodies would not fit Bostrom's schema for exploration of human potential’.1616 Ibid: 637.

Several transhumanist thinkers have addressed this objection. Anders Sandberg, for instance, defends a right to morphological freedom. He stresses that, while this includes the right to use enhancement technologies, it also includes the right not to modify oneself, and notes the uniqueness of those who resist popular technologies. Moreover, he explicitly states that some disabled people do not wish to be cured of their disabilities, and suggests morphological freedom as a point of commonality between transhumanists and disability activists.1717 Sandberg, A. (2013). Morphological freedom—Why we not just want it, but need it. In M. More & N. Vita-More (Eds.), The transhumanist reader: Classical and contemporary essays on the science, technology, and philosophy of the human future (pp. 56–64). Wiley-Blackwell. Bostrom, whom Hall is critiquing, argues that ‘[p]eople should have the right to choose which enhancement technologies, if any, they want to use’. He aims to distinguish transhumanism from eugenics, noting ‘the poor track record of centrally planned efforts to create better people’. Rather than imposing a single standard to which everybody must conform, we should appreciate that ‘[h]umans differ widely in their conceptions of what their own perfection or improvement would consist in’.1818 Bostrom, op. cit. note 6, pp. 11–12.

#### It doesn’t increase the ability divide

**Chaproniere 21** (Lysette Chaproniere, PhD student in philosophy at the university of Glasgow, investigating the relationship between disability and human enhancement. Bioethics, "Is enhancement inherently ableist?", 12/18/2021, https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/bioe.12982, accessed on 7/4/2022)//gideon

the transhumanist assumption that the possession of greater capabilities (particularly rational ones) necessarily leads to an increased opportunity range, which itself necessarily leads to greater happiness and a better life, strikes me as the kind of claim that only a fairly privileged philosopher (that is, likely a cis white man) could make. Or, at the very least, one who does not actually know any women philosophers.2323 Clune-Taylor, C. (2017). Symposium on Melinda Hall's The Bioethics of Enhancement (Clune-Taylor). Discrimination and disadvantage. https://web-archive-org.proxy.lib.umich.edu/web/20200716105814/, https://philosophycommons.typepad.com/disability\_and\_disadvanta/2017/06/symposium-on-melinda-halls-the-bioethics-of-enhancement-clune-taylor.html. Paragraph 5, emphasis in Clune-Taylor.

Clune-Taylor is certainly correct to say that having any particular type or level of intellectual capacity is not a sufficient condition for gaining social opportunities such as becoming a professional philosopher. Many people with far less education and privilege than even the most marginalized philosophers are unable to take full advantage of their intellectual and other capacities because of their social disadvantage. But even if having some specific physical, cognitive, or other capacity is not sufficient for having a given opportunity, it will sometimes be necessary, or at least very helpful.

It should also be noted that not all actual or proposed hypothetical enhancement technologies would increase our separateness and independence. As Hall herself notes, ‘We are many and porous, leaky and interactive’.2424 Hall, op. cit. note 4, p. 644. If we especially value our leakiness and porousness, that might be a reason to develop technologies that blur the boundaries between persons, or more generally make us less separate from one another. Bostrom, for instance, explores the prospect of making telepathic communication possible by augmenting our brains with radio transmitters.2525 Bostrom, op. cit. note 6, p. 7. Earp, Sandberg and Savulescu argue for the use of ‘love drugs’ to enhance relationships.2626 Earp, B., Sandberg, A., & Savulescu, J. (2012). Natural selection, childrearing, and the ethics of marriage (and divorce): Building a case for the neuroenhancement of human relationships. Philosophy and Technology, 25(4), 561–587. I do not intend to present these technologies as a solution to the stigmatization of dependence and interdependence. I am suggesting that some of the technologies discussed in the enhancement literature would make us less separate rather than more self-sufficient, and so the proponent of enhancement needn't endorse an atomistic conception of the self on which separateness is desirable.

### 2AC – Alt Fails

#### The problem is society, not the tech – either the perm solves or the alt fails

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Thus far, I have primarily been considering whether there is something ableist about the values of transhumanists and other enhancement advocates. I now turn to a different sort of disability-related objection to enhancement: that it will have bad consequences for disabled people.

To help us understand the objection, I will draw on Elizabeth Barnes's discussion of disability cures. Why is it, Barnes asks, that if a scientist is developing a cure for a disability, we think she is doing something good and hope she succeeds, but if a scientist is developing a ‘cure’ for being gay, we think she's doing something horrible and hope she fails? Barnes's answer to her own question is that these two cases may not be all that different. It's not that there's anything inherently wrong with a drug or other treatment that could change people's sexual orientation. In fact, it would be good if people could freely modify their sexual orientation as they saw fit. It's just that, since we live in a homophobic society, we expect the availability of such a treatment to have negative consequences. Gay people would be coerced or pressured into taking the treatment, or so the thought goes, and there would be less acceptance of those who would prefer to remain gay. Likewise, there's nothing inherently wrong with developing methods for making disabled people non-disabled. In fact, since bodily autonomy is a positive, it's a good thing if disabled people who would prefer not to be disabled have the option of removing their disability. As with being gay, however, we might worry that the existence of such technologies would lead to less acceptance of people who would prefer to remain disabled. And, just as most of us would think it inappropriate to talk of a ‘cure’ for being gay, many disability activists object to the language of ‘cure’ for disability, even if making it possible for disabled people to become non-disabled is not objectionable per se.5151 Barnes, op. cit. note 36, pp. 162–166.

Now let us extend Barnes's analysis to enhancement. Some people wish to extend their capacities, or otherwise modify themselves, and from the perspective of bodily autonomy and cognitive liberty, it is good if they can freely do so. This seems like a strong reason in favour of making enhancements available. Yet even if those reasons are accepted, we might worry about the negative consequences of enhancement within current social contexts. Will people be pressured into using enhancements in ways that reinforce oppressive social norms? Will we really have more freedom over our own bodies and minds? Do these potential negative consequences outweigh the positives?

Those who accept this way of thinking may be tempted by the following line of thought. Enhancement is a good thing in the abstract, but not in the oppressive societies that exist now. Therefore, until we have created a less oppressive, more equal society, enhancement should be banned, or strongly discouraged. This will not work, however. Enhancement is not a well-defined category, so proposing to ban enhancements, even temporarily, immediately raises the question of which specific technologies or practices ought to be banned. Enhancement technologies also have treatment uses, so it would have to be the enhancement uses of the technologies, rather than the technologies themselves, that were banned. Even if some interventions typically classified as treatments, such as removing particular disabilities, also ought to be banned, presumably some treatments would still be morally permissible, even required, so we would still need a principled way of making the distinction between permissible and impermissible interventions. Determining what goes either side of that line can itself cause problems, as ever more disorders are invented so that desired medical interventions can be put on the treatment side of the line.

Furthermore, the thought that enhancement should be banned until we have created a less oppressive society assumes that enhancements are something of a luxury. Many transhumanists would disagree with this, since they would argue that developing enhancements is a moral obligation. Bostrom, for instance, would have you reflect on how many people have died since you started reading this paper,5252 As he does in his TED talk (TED, op. cit. note 30). and urge us to put our resources into researching ways to delay or eliminate aging. According to him, research into lifespan extension is not merely something that would be nice to do, when we get around to it. All the time we delay it, people are dying.5353 Bostrom, op. cit. note 5. Persson and Savulescu would argue that we cannot create a sufficiently moral society quickly enough using only familiar methods of social reform, and that these must be supplemented by moral enhancement.5454 Persson & Savulescu (2012), op. cit. note 45. If they are right, perhaps we cannot end oppression, or end it quickly enough, without using moral enhancements that would make us less prejudiced. Such claims would have to be evaluated before enhancement could be banned. Even if these arguments are rejected, there is an additional reason for not conceiving of enhancements as luxuries, which has to do with our limited ability to know what it is like to inhabit another person's body.

#### Any alternative that rejects the technology links back

**Chaproniere 21** (Lysette Chaproniere, PhD student in philosophy at the university of Glasgow, investigating the relationship between disability and human enhancement. Bioethics, "Is enhancement inherently ableist?", 12/18/2021, https://onlinelibrary-wiley-com.proxy.lib.umich.edu/doi/full/10.1111/bioe.12982, accessed on 7/4/2022)//gideon

To some cis people, the hormonal treatments and gender confirmation surgeries opted for by many trans people may seem frivolous. Why, they might ask, would anybody want to modify a healthy body? Such people are not taking into account the distress of gender dysphoria, or the benefits to well-being that can come from modifying one's body to more closely align with one's gender. That is not to say that trans healthcare should necessarily be placed in the enhancement category. Those who would advocate for banning enhancement, at least temporarily, might say that, in the interest of trans rights, trans healthcare should be permitted. But if we can be so wrong about the body modifications required by many trans people, in what other ways could we be wrong about people's desires for their own bodies?

This idea should be familiar to disability activists; as discussed in Section 5, many disabled people say they enjoy high quality of life, and these claims are surprising to the non-disabled majority, who often disbelieve them. As with the desires of trans people, this is a case where the majority is wrong about what it is like to have a certain sort of body. Even if disability sometimes does lower quality of life, it is not the inevitable tragedy so often depicted.

Since we can so easily be wrong about what people require to live comfortably in their bodies, a blanket ban or social censure of enhancement may do more harm than good. Denying people body modifications can do great harm, even where that denial stems from a desire to prevent people from buying into oppressive norms. With respect to trans healthcare, consider the harms done by the idea that the desires of trans men for surgery and other aspects of transition are the result of internalized misogyny, the way that trans people of all genders are expected to be absolutely sure before being accepted for medical care5555 Lester, C. N. (2017). Trans like me: A journey for all of us. Virago, ch. 4. and the stressfulness and invasiveness of medical gatekeeping.5656 Pearce, R. (2018). Understanding trans health: Discourse, power and possibility. Policy Press, pp. 136–139. As Jamison Green suggests, ‘The theory that if trans people had some other culturally constructed option, a place to be socially male (or female) while remaining physically female (or male), then we would categorically refuse body altering technology is pure utopian conjecture’.5757 Green, J. (2020). Becoming a visible man (2nd ed.). Vanderbilt University Press, p. 191. Similarly, Kim Hall criticizes ‘the assumption that the body with which one is born is unambiguously one's own and that oppression is the only thing that prohibits this realization’.5858 Hall, K. Q. (2009). Queer breasted experience. In L. Shrage (Ed.), You've changed: Sex reassignment and personal identity (pp. 121–134). Oxford University Press, p. 122. Just as we cannot assume that trans people would no longer want to alter their bodies in a society without restrictive gender roles, we cannot assume that people would no longer want to become non-disabled, or enhance their capacities, in a world without ableism and other oppression. Nor can we assume that these body modifications are frivolous, or nice to have but inessential to the well-being of those who desire them, and that their development and use can therefore be delayed until we have achieved significant social reform. It is true that oppressive norms can distort people's desires about their own bodies, but insisting that all such desires are so distorted risks dismissing other kinds of oppression and suffering. Social justice movements are better served by accepting that people have different desires and needs for how their bodies or minds should be, whether that is trans people needing hormones and/or surgery, people wanting to remain or even become disabled, disabled people wanting to remove their disability, or people wanting to enhance their capacities beyond what we currently consider the norm.5959 On people wanting to become disabled, see Baril, A. (2015). Needing to acquire a physical impairment/disability: (Re)thinking the connections between trans and disability studies through transability. Hypatia, 30(1), 30–48.

#### Rejecting ableist discourse resigns disabled people to suffering – their reductionist anti-normative claims are wrong and don’t interact with the tangible effects of disability, ceding the political

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The influence of CDS and its challenge to the assumption that disability is a uniform condition have enabled the emergence of new ideas on disability. In particular, this has enabled the development of a theory that can take account of not only impairment effects but also can include class, ethnicity, sexual orientation or cultural identities. It has also argued for the re-emergence of a new political identity, one where a solidarity that was previously built on a common single identity is replaced by one that incorporates multiple voices including representatives from across the range of constituencies. The politics that it seeks to develop will be the ending of the single interest group identity of the disability movement to be replaced by single-issue groups campaigning for different social issues. To paraphrase Lister (1998, 74), if disability and impairment are simply to be ‘deconstructed into a kaleidoscope of shifting identities’ and ableist discourses, there will be no disabled people left to either fight for the right to be, or to be a citizen. If the principles of CDS are evaluated critically in the light of disadvantage, its analytical and political value becomes questionable. Its relativism and its suggestions that impairments are ethically and politically merely neutral differences are false. Impairments often have very tangible effects on people’s well-being, many of which cannot be explained away by deconstruction (for example, Shakespeare 2006; Thomas 1999). Recognizing impairment effects is necessary in order to secure proper treatment and social arrangements that enhance disabled people’s well-being and social participation. CDS runs the risk of dismissing not only the personal experiences of living with impairment, but also the significance of the differences between socially created disadvantages. These disadvantages that often result from oppressive social arrangements, are very much real and take place in different ways for different disadvantaged groups. 646 S. Vehmas and N. Watson

Disabled people typically experience disadvantage in relation to the market and capitalism, and they have to a large extent been excluded from employment and from equal social participation, respect and wealth (Wolff and De-Shalit 2007, 26). On top of these materialist disadvantages, disabled people are stigmatized as deviant and undesirable, and also subordinated to various oppressive hierarchical relations. For disabled people to achieve participatory parity, they require more than recognition; they need material help, targeted resource enhancement, and personal enhancement (Wolff and De-Shalit 2007). Disability is rooted in the economic structures of society and demands redistribution of goods and wealth. In contrast to some other oppressed groups, disabled people require more than the removal of barriers if they are to achieve social justice. This extra help might be small – for example, allowing a student with dyslexia extra time in an examination – through to complex interventions such as facilitated communication, a job support worker or 24-hour personal assistance. Whatever the size, it is an extra cost both to employers and to the state. These are real needs and represent real differences. Without an acceptance of these differences it is hard to see how we could move forward. Whilst these ‘real differences’ can be presented as the result of dominant ableist discourses where disabled people’s needs are regarded as extra cost, this does not solve the problem. The problems disabled people face require more than ideological change, and ideological change is of little use if it does not result in material change. CDS fails to account for the economic basis of disability and offers only the tools of deconstruction and the abolishment of cultural hierarchies to eradicate economic injustice. This, as Fraser (2000) has argued, would be possible in a society where there were no relatively autonomous markets and the distribution of goods were regulated through cultural values. In such a society, oppression based on identity would translate perfectly into economic injustice and maldistribution. This is far from the current reality where ‘marketization has pervaded all societies to some degree, at least partially decoupling economic mechanisms of distribution from cultural patterns of value and prestige’ (Fraser 2000, 111). Markets are not controlled by nor are they subsidiary to culture; ‘as a result they generate economic inequalities that are not mere expressions of identity hierarchies’ (Fraser 2000, 111–112). The disadvantage related to disability is to a great extent a matter of economic injustice, and before this injustice can be corrected we have to be able to identify those individuals and social groups that have been disadvantaged by social arrangements. Whilst this does create and foster categories and binaries between groups of people, it also requires some sort of categories to start with; namely, the various categories of disadvantage. Both the social and physical mechanisms that produce human diversity are real, and they produce tangible differences that cannot be challenged, let alone abolished, merely by pointing out the wanton nature of difference, and deconstructing the meanings attached to disability. Changing the social conditions that disadvantage and disable some people demands that the diverse, sometimes dualistic, reality of social advantage and disadvantage between different groups of people is recognized. This is exactly why group identities based on, for example, impairment, gender, or sexuality have been invaluable tools in the resistance against discrimination and oppression – in the fight against socially produced disadvantage. Confident, positive disability identity has enabled many disabled people to actively challenge the status quo that disadvantages them and to claim rights and power and participation in dominant institutions. Being different from the so-called normal majority is no longer Disability & Society 647 considered to conflict with a good life, equality and respect. Quite the opposite, positive realization of one’s difference has been liberating and empowering to many disabled people (Shakespeare 2006; Morris 1991). For a radical and active disability movement to emerge and for disabled people to take action on their own account, they have to see themselves as an unfairly marginalized or disadvantaged constituency and a minority group (Shakespeare and Watson 2001). The category disabled/ non-disabled is a good abstraction that can enable the development of communities of resistance, and without it is hard to see how these could develop. CDS is premised on the idea that difference acts as a precursor to the normalizing of behaviour and a requirement to treat people differently and, importantly, less favourably. There is, however, no evidence to suggest that the categories that are applied to disabled people create an unnecessary divide between disabled and nondisabled people. You could equally make the point that without these categories we would not know what it is we have to do, what actions we have to take or what services we have to put in place to include disabled people. Indeed, for many disabled people the disadvantages they are subjected to arise not as the result of domination but through neglect and the denial of services and through society failing to take responsibility for those in need. As Wolff (2009, 114) points out: ‘anti-discrimination policy needs to identify a group to be protected.’ In other words, it is impossible to fight the oppression of a group of people that does not exist. Recognition of impairment is also crucial regarding legislation and policy that aim to protect disabled people against discrimination. The point of anti-discrimination legislation is to protect people from discrimination on the basis of their physical and mental properties, not on their opportunity to achieve equal participation and respect. Thus, ‘the parallel to race and gender is not disability but impairment’ (Wolff 2009, 135).

#### The alt can’t change society’s worldview and marginalizes material experiences – the choice to enhance or not is valid, but refusing solutions for real anguish is totalizing and nonsensical

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The disability movement, like other emancipatory movements, is based on a positive sense of a group difference, and whilst the CDS perspective does not deny the reality of social groups such as disabled people, it asserts that such social group differences are undesirable and potentially harmful. We argue that this normative thinking is not fruitful because a society without group differences is not a realistic possibility; CDS is neither able to articulate or to even theorize how such a society would exist. For CDS to be successful one has to accept the idea not only that the disabled/non-disabled binary does not exist but also that such a binary is neither desirable, ethically justifiable or useful. Further, deconstructing differences will not in and of itself produce respect and equality between all people with various characteristics. Neither will it result in a social order free from a sense of difference. It is simply unrenalistic to assume that a society could exist were people would not see some other people as different, and their lives or characteristics as representing a deviation from some norm considered important regarding good human life. This is because some of the individual characteristics that define disabled people are, sometimes with good reason, undesirable, even in a utopia where all differences would have been queered. Disability is not the same as many other group identities and we need to explore both morally and socially disability and difference rather than simply use difference as a concept through which to critique the disability identity. There are no rational reasons to consider homosexuality or gender undesirable characteristics whatever the social 648 S. Vehmas and N. Watson context, but there are many impairments that can reasonably be seen as undesirable (Shakespeare 2006). Motor neuron disease, depression or spinal cord injury are the kinds of conditions that we would prefer not to have, and this is not merely because of the cultural representations attached to them but because these conditions are the kinds of predicaments that cause suffering irrespective of one’s cultural environment. In acknowledging that impairments can include an undesirable dimension does not imply devaluing people with impairments nor their positive group identity (Shakespeare and Watson 2010). As long as people are genuinely free to decide for themselves and feel about themselves however they wish to feel, we are pretty close to relational justice, free from hierarchical evils. Imposing on people ableist or disablist assumptions is certainly wrong, but so would be the denial of the personal experiences of fearing the loss of one’s physical and mental capacities, or the fear of dying (Carel 2008**).** To explain the psychological anguish related to conditions such as motor neurone disease or depression merely in terms of internalized oppression and ableism would be insensitive, disrespectful and simply nonsensical. We have argued that CDS and its principles of deconstructing differences are ethically and politically unhelpful. CDS fails to offer guidance on how to solve moral dilemmas and on how to distribute goods in society fairly. Matters of distribution and relations between people are inescapable in making a just society, and exactly the kinds of issues any truly critical theory of disability must seriously engage with, if it wants to make a real difference in the real world

## 2AC – AT: K – Heidegger

### 2AC – Nazism

#### **Heidegger’s Nazi ideologies were both explicitly anti-Semitic AND damning towards his own ideologies, proving that his mindset can only lead to fascism and the obliteration of ethics.**

Kirsch 16 (Adam Kirsch, "Is Heidegger's Philosophical Complexity Enough to Excuse His Overt Anti-Semitism?", Tablet Magazine, https://www.tabletmag.com/sections/arts-letters/articles/heidegger-was-really-a-real-nazi, 9-26-2016, Accessed 7-7-2022)//ILake-SG

One of the greatest philosophers of the 20th century was a Nazi. There is no disputing this stark fact: Few people would argue Martin Heidegger’s claim to preeminence, and his Nazism, at least at first, was public and enthusiastic. In the spring of 1933, a few months after Hitler took power, Heidegger joined the Nazi Party and was elected rector of Freiburg University, where his expressed goal was Gleichschaltung—the “alignment” of the academy with the new party-state. At his inaugural ceremony, the audience gave the Hitler salute and sang the Horst Wessel Song, the anthem of the Nazi party, before Heidegger spoke about “the glory and greatness of this new beginning.” Just what was involved in the “glory and greatness” of National Socialism was already on full display: Dachau opened in March, Jewish businesses were boycotted in April, and Heidegger was sworn in as rector in May. He lasted only a year before he was outpoliticked by cruder and more aggressive Nazi academics, and for the rest of the Third Reich he made no overt political statements. Yet Heidegger never publicly apologized for his early endorsement and service of Hitler, nor fully reckoned with what his Nazism meant for his legacy as a thinker. Yet for some reason among philosophers and intellectuals there seems to be perpetual amnesia about this subject. Heidegger’s Nazism was common knowledge to anyone who lived through the 1930s. After World War II, he was banned from teaching by the Allied occupation authorities because of his Nazi allegiances. But when biographers Victor Farias and Hugo Ott wrote about Heidegger’s political involvement in the 1980s, the world of thought, especially in Germany and France, greeted it as an explosive new discovery. The same thing happened in 2005, when Emmanuel Faye unearthed Heidegger’s course lectures from 1933-35 and showed that he had, in Faye’s terms, accomplished “the introduction of Nazism into philosophy.” And in 2014, the scandal erupted once again, with the publication of Heidegger’s “Black Notebooks” from the 1930s, the private journals in which he sketched his thoughts on philosophy, current events, and the connection between the two. Now the “Black Notebooks”—a sinister-sounding name for what were, in fact, just black notebooks—are beginning to appear in English translation, allowing Americans to join in the latest round of the controversy. The first volume, Ponderings II-VI: Black Notebooks 1931-38 has just been published; a companion volume, Reading Heidegger’s Black Notebooks 1931-41, contains essays on the texts, in which various experts argue about how far they implicate Heidegger in Nazism and anti-Semitism. Why is this 80-year-old story still able to shock? The reason must be that, no matter how much we find out about Heidegger’s Nazism, it still seems like a contradiction in terms. After all, we think we know what Nazis are like and what philosophers are like, and the two identities simply don’t match. Thinkers are supposed to be idealistic, moral defenders of the highest values of civilization; fascists are brutal, barbaric, appealing to humanity’s lowest instincts. Nazis burn books; philosophers write them. But Heidegger did both. In 1927, he published one of the most influential books in the history of philosophy, Being and Time; six years later, as rector of Freiburg University, he presided over a public bonfire of “un-German” books, proclaiming, “Flame, announce to us, light up for us, show us the path from which there is no turning back.” Like the famous optical illusion in which the same figure is both a duck and a rabbit, then, we keep twisting and turning our image of Heidegger, trying to see in him both the Nazi and the philosopher at the same time. \*\*\* I am not sure how much I knew about Martin Heidegger’s story when I first read Being and Time, his magnum opus. I’m pretty sure that I knew he had been, at least temporarily, a Nazi; but oddly, as it now seems to me, this had no effect on my enthusiasm for the book. Certainly, it never occurred to me that, as a Jew, I should shun or distrust this great thinker who had given his allegiance to Adolf Hitler. I think my 21-year-old self was right not to be frightened off by this fact. After all, I had just finished four years of studying the classics of English literature, many of which are far more overtly hostile to Jews than anything Heidegger ever wrote. Reading Chaucer’s heart-rending portrait of a child ritually murdered by Jews in The Pardoner’s Tale, or T.S. Eliot’s dark mutterings about the jew (lower case) squatting on a windowsill in “Gerontion,” I was not too offended or dismayed to enjoy the poems. That is because I knew they were not talking about me, an actual Jew, who understood and appreciated them so well. They were addressing Jews of their imagination—malign fictions that no longer seemed to have any power, certainly not in the America where I grew up. Like any Jew in Western civilization, I knew instinctively how to peel apart the ignorance and hatred from the sweetness and the light. But with Heidegger, sweetness and light were never part of the package, and that was the key to his power. Being and Time was the first book of philosophy I had read that seemed to understand the human condition in the same way that literature did—less through abstract intellectual concepts than through the lived experience of mood. For Heidegger, existence—in German, Dasein—is grasped first and foremost not by the rational mind, but by the emotions that determine the very shape and texture of the world in which we live. The affects he dwells on are primarily “negative” ones—fear, alienation, anxiety, rather than love or joy—but he argues that these dark and disorienting moods are precisely what disclose the world to us most primally. As he writes in Being and Time (as translated by John Macquarrie and Edward Robinson): A state-of-mind not only discloses Dasein in its thrownness and its submission to that world which is already disclosed within its own Being; it is itself the existential kind of Being in which Dasein constantly surrenders itself to the “world” and lets the “world” “matter” to it in such a way that somehow Dasein evades its very self. The highly specialized terminology here might function as an obstacle to understanding at first, but it is an integral part of Heidegger’s literary effect. By coining new, technical terms like “thrownness” (Geworfenheit), and by referring to the human being not as a person or even a “subject” but as Dasein—literally, in German, “being-there”—Heidegger refreshes the reader’s perception of existence in the same way that poetry does. For a human being, he emphasizes, existence means being “thrown” into a world not of our making, a world whose basic facts are care and death. Most of the time, we soothe ourselves by avoiding these facts, “surrendering … to the world” rather than confronting it. We see ourselves from the outside rather than owning our fate, allowing the chatter of “the They” (das Man) to fill our minds. It is only when we are anxious that our customary thoughtlessness recedes and we are able to see that world in its true alienness. In this way, Heidegger’s existentialism, his method of understanding the world not through concepts but through the lived experience of existence, leads to a particular ethical stance. Being and Time is not an overtly ethical book—it has nothing to say in the traditional vocabulary of Western philosophical moralism, no use for ideas like Plato’s “the Good” or Kant’s categorical imperative. That is largely because Heidegger is not very interested in the central problem of ethics (and of politics), which is how to live with other people. For him, the key experiences and challenges of existence are individual: Alone we suffer, alone we die, and alone we must make meaning out of our fate. The highest value, then, is not goodness but authenticity; above all, authenticity in the face of death. To accept one’s actual condition of mortality and thrownness, not to flee from these difficult facts into consoling illusions and abstractions, is for Heidegger the ultimate moral achievement. As he writes, “Authentic Being-towards-death can not evade its ownmost non-relational possibility, or cover up this possibility by fleeing from it, or give a new explanation for it to accord with the common sense of ‘the they.’ ” What Heidegger does here is to pluck a kind of meaning from the midst of nihilism. It is precisely because life is meaningless, because it has no value or purpose imposed on it from above or outside, that the individual human being must endow it with meaning by deciding on an authentic existence. But authenticity and decision are fundamentally anti-ethical concepts, because they deny the existence of any established values, such as justice, equality, or sympathy. Why be a “good” person rather than a “bad” person, if terms like good and bad are mere conventions? If life has the meaning we decide to give it, what’s to stop us from finding that meaning in arbitrary violence, domination, or irrationality? What if we choose to find meaning in serving a Volk or a Führer? Of course, Heidegger’s thought does not lead directly to fascism. On the contrary, his most important readers were French existentialists like Sartre and Camus, who believed the ideal of freedom called for commitment to the anti-Nazi resistance. But in an important sense, Heidegger leaves the door open for fascism, because he values the intensity and authenticity of a belief over its goodness or truthfulness. In a world defined by nihilism, any source of strong new beliefs and convictions is potentially redemptive. That is why, in the early days of the Hitler dictatorship, Heidegger could take the new Nazi regime as a potential source of new values—an assertion of will that would create an entirely new spiritual and philosophical world. This hope is expressed again and again in the “Black Notebooks” for 1933, the year Hitler took power and Heidegger became rector of his university. “A marvelously awakening communal will is penetrating the great darkness of the world,” Heidegger writes. Nazism, with its rhetoric of destiny and rebirth, was going to define new coordinates for human life, simply by the authenticity and confidence of its self-assertion. These coordinates might be upside-down, from the perspective of conventional morality; Nazism might call murder, conquest, racism and dictatorship good, where the old Judeo-Christian morality thought them bad. But because values are determined by conviction, not vice versa, the Nazis could succeed in bringing into being a new world in which evil actually was good. “The mission—if precisely this were the mission: the full imposing and first proposing of the new essence of truth?” Heidegger asks, thrilled at the prospect that truth itself can be transformed. A central part of the new Nazi “essence of truth,” of course, was anti-Semitism. When the accounts of Heidegger’s Nazism are drawn up, it has usually been counted in his favor that he was not a racist anti-Semite, as though this demonstrated the refinement of his own version of Nazism. In the 1994 biography Martin Heiddegger by Rudiger Safranski, one chapter is titled “Is Heidegger Anti-Semitic?” and the answer is a reassuring no: “Certainly not in the sense of the ideological lunacy of Nazism. It is significant that neither in his lectures and philosophical writings, nor in his political speeches and pamphlets are there any anti-Semitic or racist remarks.” Indeed, Heidegger was very close to Jews in the first part of his life, including his most important teacher, Edmund Husserl, and his greatest student, Hannah Arendt. Yet the attempt to construct firewalls around Heidegger’s Nazism, to save areas of his reputation from its taint, has suffered one failure after another, and this one too must fall. It used to be argued that Heidegger was an unworldly man who briefly blundered into Nazism; this was the exculpatory argument made by Arendt in a radio address broadcast in Germany on his 8oth birthday. This account became unsustainable after the research of Farias and Ott demonstrated the depths of Heidegger’s involvement with Nazism, including his carrying out of the law that purged Jews from university teaching. Then Heidegger’s defenders tried to distinguish between his political activity, which may have been culpable, and his thought, which remained untainted. But Faye proved beyond a doubt that, in the first years of Hitler’s rule, Heidegger taught seminars in which he gave his most famous philosophical concepts and terms an explicitly Nazi resonance. Now the publication of the “Black Notebooks” has given the lie to the idea that Heidegger was not really anti-Semitic. It is true that his anti-Semitism was not biological, in the classic Nazi fashion. This was one of the crude aspects of National Socialism from which he kept a deliberate distance. “The question of the role of World Jewry is not racial; it is, rather, the metaphysical question of the nature of a type of humanity, the absolutely unbound, that can assume the world-historical ‘task’ of uprooting all beings from Being,” runs one of Heidegger’s dozen or so remarks about Jews. But this is hardly exculpatory. On the contrary, it is especially damning because it brings anti-Semitism into the central precincts of his thought. For Heidegger, the “uprooting of beings from Being” was the metaphysical curse of the modern world, the source of the nihilism that afflicted humanity. Where the ancient Greeks enjoyed a holistic and organic relationship with Being—which for Heidegger is close to, but not quite identical with, what earlier Romantic thinkers meant by Nature—modern philosophy and technology set the individual at odds with Being. Instead of the miraculous background of human existence, Being is reduced to a series of objects that can be mathematically calculated and industrially exploited. These themes dominate Heidegger’s later thought, where he condemns the way of thinking he calls “enframing” (Gestell) and calls humanity to its true role as the “shepherd of Being.” And who is responsible for this modern curse? In his published work, Heidegger traces it all the way back to Plato and Aristotle, suggesting that it was the fate of Western civilization to turn against itself in this way. But in the “Black Notebooks,” he finds a much simpler and more familiar scapegoat: the Jews. “World Jewry,” Weltjudentum, with its overtones of hostile conspiracy, was a common Nazi phrase that the philosopher had no qualms about embracing, using it several times in the privacy of the notebooks. Thus in 1941 Heidegger writes: “World Jewry, spurred on by the emigrant that Germany let out, remains elusive everywhere. Despite its increased display of power, it never has to take part in the practice of war, whereas we are reduced to sacrificing the best blood of the best of our own people.” This is a breathtaking example of how Nazi anti-Semitism precisely inverted reality: At just the moment when the Holocaust was killing millions of helpless Jews, Heidegger suggests that it was “elusive” World Jewry that was killing Germans. Several of the contributors to Reading Heidegger’s Black Notebooks are not deterred even by the latest revelations of Heidegger’s deep involvement with Nazism and anti-Semitism. “That Heidegger was a Nazi and that he also held anti-Semitic views are simple facts—but they are just that, and as facts, they are all too simple,” writes Jeff Malpas. Heidegger is a writer who cultivates a mystique of complexity; this is part of what attracted me to him because it makes reading him feel like an arduous quest that promises high rewards. And it is quite true that with such a subtle and profound thinker, Nazism and anti-Semitism will take subtle and “profound” forms. But this does not mean that our judgment on them is not, in the end, simple. The most important thing we have to learn from Heidegger today is how the allure of profundity and authenticity can lead to the destruction of ethics and of thought itself. Heidegger’s Nazism does not mean that we should stop thinking about him; on the contrary, it is all the more urgent to think about him, so that we can learn how to think against him.

### 2NC – Technopessimism Wrong

#### Heidegger was wrong – the technofication of humankind is in progress, inevitable and inconsequential.

**Bailey 14** (“Enframing the Flesh: Heidegger, Transhumanism, and the Body as “Standing Reserve””, July 2014, https://jetpress.org/v24/bailey.pdf, July 2014, Accessed 7-7-2022)//ILake-SG

Brad Allenby and Daniel Sarewitz, in their book The Techno-Human Condition, and Andy Clark, in Natural-born Cyborgs: Minds, Technologies, and the Future of Human Intelligence, argue persuasively that we have, in Clark’s phrase, “always been cyborgs.” Allenby and Sarewitz argue that technology is not something “new” that is present only in power plants or coal mines but absent in windmills or farming; for them, the human condition is, and always has been, what they call “The Techno-Human Condition.” We are all already “enhanced,” and “some would say transhuman” (Allenby and Sarewitz 2011, 2). They argue that some have made the distinction between “inner” and “outer” transformation of the body – e.g. the difference between wearing eyeglasses to enhance vision, and some sort of HGE or “artificial body parts” that ensure perfect vision. But, they ask: “is anything new really going on?” They, of course, answer in the negative. For Allenby and Sarewitz, the technological modification of the body is simply “fulfilling our biology.” The fact that we “never forget how to ride a bicycle, or how to read, shows that allegedly external technologies do in fact have an enhancing effect on our internal capabilities” (2011, 15). There would thus be no substantial difference between writing down facts we want to remember, or using Google to “enhance” our memory, or having a microchip implanted in the brain which has access to data that we can consciously and immediately control. “The history of our species is a history of redesigning ourselves, of fuzzing the boundaries between our inner and outer worlds” (2011, 16). So, they argue, it “isn’t clear to” them that HGE is “crossing some domain that humans have never entered before, a domain that demands a new kind of debate or raises new moral considerations and dilemmas” (2011, 17). We will see that Heidegger might agree, to some limited extent, with this assessment: While enframing is certainly not “fulfilling our biology,” it is true that the troubling alteration of human thought began long before HGE became a foreseeable possibility. Drawing on what has come to be called the “extended mind hypothesis,” Andy Clark argues that as soon as humans began writing we began incorporating technologies into our consciousness (2004, 6). For Clark, this process is nothing new, and nothing to be feared. This is not to say, however, that he does not recognize how emerging technologies will increase exponentially the ways that human beings will become cyborgs: New waves of user-sensitive technologies will bring the age-old process of cyborgization to a climax, as our minds and identities become ever more deeply enmeshed in a nonbiological matrix of machines, tools, props, codes, and semi-intelligent daily objects. We humans have always been adept at dovetailing our minds and skills to the shape of our current tools and aids. But when those tools and aids start dovetailing back – when our technologies actively, automatically, and continually tailor themselves to us just as we do to them – then the line between tool and user becomes flimsy indeed. (2004, 7) While this observation about the blurring of the line between humans and technological products could easily have been written by someone who would preach caution at such a merging with machines, Clark is a vocal optimist about the momentous transition that he describes. Clark is correct to suggest that this change, marked by a situation in which the technological extensions of our powers begin to “dovetail back,” is fundamentally important, and requires attention. There is a subtle phenomenological difference between the situation of a blind person with a cane (as described, for example, by Merleau-Ponty) and a situation in which the enhancement is performed by a technological product, designed by other people and purchased by the “user.” In both situations there is a dimension in which there is a “flimsy” line between the hand and the tool; however, this facility is developed by the blind person through interaction and practice. All people develop organic relations with the world – relations that are more noticeable in people with disabilities – in which cane, pen, paper, eyeglasses, etc., are phenomenologically extensions of the hand, the mind, and the eye. These organic relations, however, are fundamentally different from a cybernetic attachment through which our relation to the world is designed, marketed, and then purchased according to the whim and will of the designers and the corporation that sells the cybernetic product. In his book, Clark addresses several worries about these changes that he has encountered in being a vocal proponent of transhumanism. In particular, he discusses the concern that technology might come to “control” us: “Many feel, for example, that increased human-machine symbiosis directly implies increasing control. In an age of ubiquitous computing must we be slaves to the whims of the machines that surround us?” (2004, 175). Here, Clark addresses what he takes to be the concern that if we become merged with machines, the machines might “control” us; he is, however, operating on what I take to be an extremely mundane and even naïve conception of “control”; he does not seem to give any credence to the more subtle negative forms of influence that merging consciousness with technology might have. Thus, he responds: “… the kind of control we, both as individuals and as society, look likely to retain is precisely the kind we always had: no more no less… The fear of ‘loss of control,’ as we cede more and more to a web of technological innovations is simply misplaced” (2004, 175). Perhaps he is right to say that the kind of control we have over technology – and the control it has over us – is no different in kind from the influence modern technology has over us; but if Heidegger is correct, the extension of that control to our biology and to the direct alteration of our consciousness and our genetic code is reason enough for serious caution and reflection. In the Parmenides, Heidegger writes: Perhaps the much discussed question of whether technology makes man its slave or whether man will be able to be the master of technology is already a superficial question, because no one remembers to ask what kind of man is alone capable of carrying out the “mastery” of technology. (1998, 86)