**Military Technology: The Ins and the Outs**

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The Use of Technology in the Military

In the growing era of a war-ridden planet, technology has revolutionized nearly every aspect of human existence; the area concerning the military is absolutely no exception. The utilization of advanced technology has vastly molded the landscape of warfare. It has enhanced strategic capabilities, operational efficiency, and situational awareness. From sophisticated (more explosive) weaponry to state-of-the-art communication systems, the military, regardless of nation, harnesses technology to gain a competitive edge and ensure national security. Within these following passages, the discussion will revolve around the ways in which technology is employed in the military, exploring its impact on defense strategies, combat effectiveness, and the future of warfare.

One of the primary benefits of technology in the military is the enhancement of situational awareness. Advanced sensors, surveillance drones, satellites, and reconnaissance aircraft provide real-time intelligence, allowing military commanders to make informed decisions quickly. These technologies enable the monitoring of enemy movements, identification of threats, and assessment of battlefield conditions with unprecedented accuracy. By leveraging data analytics and artificial intelligence (AI), the military can process vast amounts of information to discern patterns, detect anomalies, and predict adversarial behavior, thereby improving overall situational awareness and decision-making capabilities.

Technological advancements have ushered in an era of precision targeting, minimizing collateral damage, and maximizing operational effectiveness. Guided munitions, such as smart bombs and missiles, equipped with GPS and laser guidance systems, enable precise strikes on enemy targets with pinpoint accuracy. Homing missiles can be controlled manually to hit the required target without fear of damaging surrounding friendlies or civilians. This capability not only reduces civilian casualties but also enhances the lethality of military operations, effectively neutralizing threats while minimizing risks to friendly forces. Furthermore, advancements in weaponry, including directed energy weapons and hypersonic missiles, promise to further enhance precision and speed in future conflicts, reshaping the dynamics of warfare.

The concept of network-centric warfare (NCW) has gained prominence in modern military doctrine, emphasizing the integration of various technological systems to achieve synergy and operational superiority. Through interconnected networks, military units can share information, coordinate maneuvers, and synchronize actions in real-time, fostering greater agility and responsiveness on the battlefield. Command and control systems, communication networks, and digitalized platforms enable seamless coordination among disparate units, enhancing overall operational effectiveness and mission success. Moreover, NCW facilitates rapid adaptation to evolving threats, enabling the military to maintain a competitive edge in dynamic and complex environments.

In the ever-evolving digitized world, cyber warfare and information operations have emerged as critical components of modern military strategy. Cyberattacks, ranging from espionage to sabotage, pose significant threats to national security, prompting the military to develop robust cyber defense capabilities. Offensive cyber capabilities, including hacking and malware deployment, are employed to disrupt contemporary networks, degrade infrastructure, and undermine hostile operations. Additionally, information operations encompass psychological warfare, propaganda dissemination, and influence campaigns aimed at shaping perceptions, destabilizing adversaries, and gaining strategic advantages in conflict zones. The integration of cyber and information warfare capabilities underscores the importance of technology in shaping the information domain and shaping the narrative of contemporary conflicts.

Looking ahead, emerging technologies hold the potential to further revolutionize military operations and redefine the nature of warfare. Advancements in AI, autonomous systems, quantum computing, and biotechnology are poised to introduce new capabilities and vulnerabilities on the battlefield. Autonomous drones, robotic vehicles, and unmanned aerial vehicles (UAVs) promise to augment military forces, providing enhanced reconnaissance, logistics support, and combat capabilities. Meanwhile, developments in quantum cryptography and secure communications offer opportunities to strengthen cybersecurity and safeguard sensitive information from adversaries. Furthermore, the convergence of technologies, such as AI-enabled drones and swarms, presents novel challenges and opportunities for military planners, necessitating adaptability and innovation in defense strategies.

The very use of computers has far beyond affected the military. Military computer networks are being used for more and more purposes as technology advances. The military's computer networks were previously used to help supply stations, commanders on the battlefield, and headquarters communicate with one another – primarily speaking on the use during World War II and the Vietnam War. Providing quick and precise communication between fire bases and fire support, as well as accurate intelligence to officers on the front lines, are further applications for the networks. In order for combat commanders to prevail, they need the most precise and current intelligence available to them when making decisions. Armed with increasingly advanced weaponry, military computer networks now play a different role in combat. These days, weapons like DAYs are controlled remotely by computers. UAVs have been designed to be controlled by computer. The drone war was primarily fought through the use of a computer. Computers play a massive role in current and future tactical battles and wars.

Simply put, technology has become an indispensable asset in modern military operations, shaping the way armed forces plan, execute, and adapt to dynamic threats. From enhancing situational awareness to enabling precision targeting and facilitating network-centric warfare, technology plays a pivotal role in maintaining strategic advantages and ensuring national security. As advancements continue to accelerate and new challenges emerge, military organizations must remain vigilant, adaptive, and technologically adept to confront evolving threats in an increasingly complex global landscape. Embracing innovation and harnessing the power of technology will be essential in shaping the future of warfare and safeguarding the interests of nations in the 21st century.

History of Technology in the Military

It starts with the spark of the Second World War (for sake of shortening this history lesson) and the advancements made to the current age. This range marks a transformative era in the history of military technology. Advances in science and engineering during this time revolutionized warfare, shaping the strategies and outcomes of conflicts around the world. This portion explores the key developments in military technology over these eight decades, highlighting the innovations that reshaped the nature of warfare and influenced geopolitical dynamics.

World War II (1939-1945):

The onset of World War II witnessed significant technological advancements in military capabilities. Aircraft emerged as a decisive instrument of warfare, with both Allied and Axis powers investing heavily in aviation technology. The development of long-range bombers, such as the B-17 Flying Fortress and the German Luftwaffe's Heinkel He 111, transformed the nature of aerial combat. Additionally, the introduction of radar systems played a pivotal role in air defense and early warning systems.

The use of tanks also saw significant evolution during World War II. The German Blitzkrieg tactics, employing fast-moving armored divisions, demonstrated the effectiveness of mechanized warfare. Tanks like the German Panzer IV and Soviet T-34 became iconic symbols of armored warfare, showcasing advancements in mobility, firepower, and armor protection.

Transportation as a whole was vastly improved. By allocating more national resources to wartime efforts, countries were able to develop incredibly efficient ways to transport not only manpower, but all these new technological advancements. Aircraft carriers were used to house crew and, of course, aircraft. Naval warfare was once a vital part of war in the 1800s and onward. With the introduction of war-ready submarines and ships, the battle at sea was just as vital during the height of World War II as it was on land and in the air.

The Cold War Era (1947-1991):

The Cold War era was characterized by intense technological competition between the United States and the Soviet Union. Probably the period with the most notable and quickest advancements. Nuclear weapons became a central component of military strategy, leading to the development of intercontinental ballistic missiles (ICBMs) capable of delivering warheads across continents. The arms race extended into space with the launch of satellites for reconnaissance and communication purposes.

Advancements in aviation technology continued during the Cold War, with the introduction of supersonic jets such as the American F-86 Sabre and the Soviet MiG-21. These aircraft pushed the boundaries of speed and maneuverability, enhancing air superiority capabilities. The era also saw the emergence of stealth technology, culminating in the development of stealth aircraft like the F-117 Nighthawk and the B-2 Spirit, designed to evade enemy detection systems. Overall, espionage technology was vastly improved in only the span of about seven to eight years since the last war.

Around this time, though not necessarily related to military advancements, the Space Race was deemed the start of development to investigate space travel. By competing with Soviet Russia in this Space Race, the United States would go on to develop advancements far beyond imagination in such a short amount of time. This, of course, leads to vast improvements in space technology worldwide.

The Vietnam War (1955-1975)

Whilst the world was in total panic surrounding the evident nuclear warfare, the U.S involved itself with foreign matters by declaring war on Vietnam. This war served as a testing ground for new military technologies, including helicopters and electronic warfare systems. The U.S. military utilized helicopters for troop transport, close air support, and medical evacuation, revolutionizing the concept of vertical warfare. Electronic countermeasures, such as jamming devices and radar-absorbing materials, played a crucial role in disrupting enemy communications and defense systems. Improvements were still being made to espionage tactics and infiltration of security systems during this time.

Post-Cold War Era and the Digital Revolution (1991-2001):

The dissolving of the Soviet Union marked the end of the Cold War and ushered in an era of rapid technological innovation. The rapid increase of digital technology transformed military operations, enabling real-time communication, data sharing, and precision targeting. The Gulf War of 1990-1991 showcased the effectiveness of precision-guided munitions (PGMs) and advanced reconnaissance systems, leading to a paradigm shift in modern warfare.

The integration of information technology also revolutionized command and control systems, allowing for greater coordination and efficiency in military operations. Unmanned aerial vehicles (UAVs) emerged as indispensable assets for surveillance, reconnaissance, and targeted strikes, reducing the risk to human personnel. This would also prove useful in missions that would later be known in the United States as a drone war.

The Global War on Terror (2001-2020):

The terrorist attacks of September 11, 2001, prompted a renewed focus on counterterrorism and irregular warfare. Military technology adapted to the challenges of non-normative conflicts, emphasizing agility, adaptability, and precision targeting. Special operations forces relied on advanced equipment and tactics, including night vision devices, unmanned ground vehicles (UGVs), and precision sniper rifles. The very scope of an infantryman’s rifle could be loaded with technology that displays a reticle, distance, or even zooms of up to 80x.

Cyber warfare emerged as a new frontier in modern conflict, with state and non-state actors leveraging cyberspace, or more simply put, the world of computers, for espionage, sabotage, and propaganda. Governments invested in cybersecurity measures to defend against cyber threats and protect critical infrastructure.

The history of military technology ranging back as far as the Second World War is a testament to human ingenuity and innovation in the pursuit of military superiority. Technological advancements have reshaped the nature of warfare and transformed the geopolitical landscape. As we look to the future, the continued evolution of military technology will undoubtedly shape the strategies and outcomes of conflicts yet to come – providing more advancements for everyone involved. From the smallest drone used to survey a single house in a village to the largest satellite used to analyze an entire country, the future holds endless possibilities for the advancements of technology in the military.

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