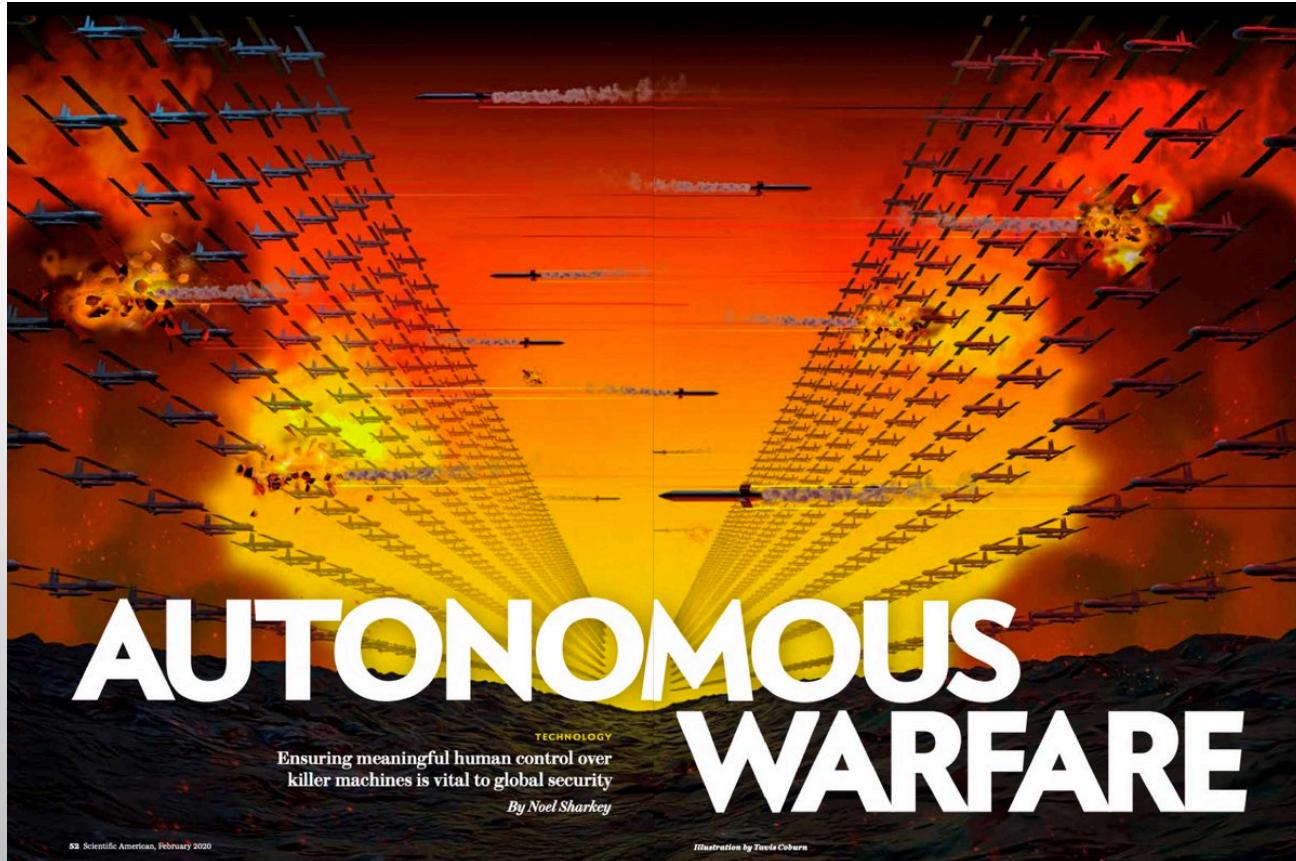




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Summary

Introduction



AWS



Risks and dangers associated with AWS



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Introduction



September 2019 a swarm of 18 bomb-laden drones and seven cruise missiles crashed into oil fields and their processing facilities in Saudi Arabia

Experts suppose that the drones were **not fully autonomous**

- They did not communicate with one another to choose their own targets
- Perhaps, they were programmed





Moreover, Turkey has announced plans to launch autonomous quadcopters in Syria by early 2020

- Once launched, quadcopter might find, track, select and attack targets with violent force
- All without human's control or supervision

Russia is also developing aerial swarms for that region



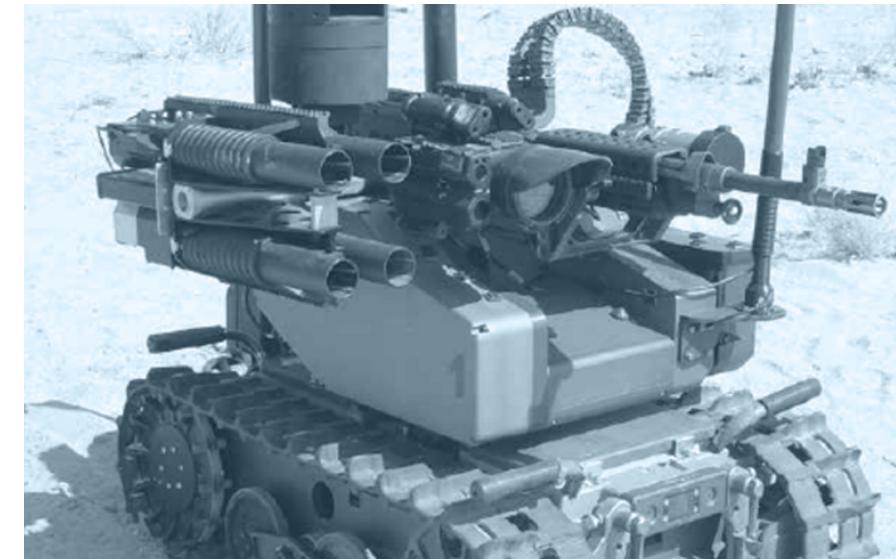
A u t o n o m o u s
weapons



Autonomous Weapons Systems (AWS) are a type of autonomous military robot that can independently search for and engage targets without human's involvement



Kargu, the Turkish quadcopter



The Modular Advanced Armed Robotic System, developed by Qinetiq



U.S. Navy's X-47B, that land and takeoff on windly conditions, 10 times the reach of piloted fighter jets, refuel in the air



Russian *T-14 Armata*, that might be automated in the next generation



Chinese *Anjian*, that could twist and turn so sharply and quickly that the g-force generated would kill a human pilot



Serbian *Land Rover Defender* towing trailer with "Miloš" tracked combat robot



U.S. *Sea Hunter*, supporting following features: meeting or surpassing all performance objectives for speed, maneuverability, stability, seakeeping, acceleration/deceleration, fuel consumption, and mechanical systems reliability in the open-ocean.



Chinese AVIC 601-S, that has low-observable flying wing UAV

Risks and dangers associated with AWS

On the battlefield, AWS have a few **important military advantages** that motivate governments as well as several defense companies to invest them



A BAE Systems Corax during flight testing

Risks and dangers associated with AWS

- Reach some areas that were previously inaccessible
- Remove human warfighters from dangerous missions
- Less of warfighters are needed for a given mission
- Robots and drones could perform operations much more faster than simple soldiers



A BAE Systems Corax during flight testing



- ! Some nations, particularly **U.S.** and **Russia**, are looking **only** at these potential military advantages of autonomous systems disregarding the **disturbing scenarios** that could become true



in July 2015, an open letter calling for a ban on autonomous weapons
was released at an international joint conference on artificial intelligence

Over three thousand AI and robotics researchers have also signed the letter



Steve Wozniak



Elon Musk



Noam Chomsky



But why **scientists, businessmen and top managers** do not support the idea of further development of AWS?

- AWS will find it very hard to determine who is a civilian and who is a combatant, which is difficult even for humans.
- It is unclear who or what are to be blamed or held liable
- irreplaceability of human conscience and moral judgment

But why **scientists, businessmen and top managers** do not support the idea of further development of AWS?

- Computers are often wrong, for example, in 1983 the nuclear war could started between the U.S. and Soviet Union because of the error at the onboard computing system on the Soviet satellites
- The speed of the robots is sharply higher than the human's one, moreover, in the decades they would become faster and faster «from fast subsonic to supersonic to hypersonic»

One another question without an answer: **what happens when enemy autonomous weapons confront one another?**

no one knows because it is impossible to predict how two complex systems controlled by top-secret computer algorithms would entertain between each other...

Example

A bookseller was selling a book of the cost around \$50 for \$23,698,655.93 within a week because of unpredicted behavior of confrontation between two simple and well-known algorithms.

Imagine now two AWS instead of these algorithms, what would happen?

- It is 2040, and thousands of autonomous weapons are distributed along Russia's border with Europe
- Suddenly, a sensor of an autonomous tank glitch triggered a confrontation mode, it fires a missile over the horizon, and a civilian airliner goes down in flames
- NATO's autonomous AWS that recognized an attack took off much more faster than the governments could understand

What's next?

The consequences would be destructive...



Moscow, Russia



Paris, France



Brussels, Belgium

Conclusion



Human is important !

Only a human expert that has:

- Full awareness of the situation and context
- Sufficient time to deliberate on the nature
- Significance and legitimacy of the targets
- The feel of the necessity and appropriateness of an attack and the likely outcomes

Should determine whether or not the attack will commence, **not the system by itself**



Solutions

- ✓ Even if thousands of scientists and many companies supported an idea that it is necessary to negotiate bans on AWS,
- ✗ several governments oppose them, in particular the U.S., Russia, Israel and Australia.

As we find it hard to imagine nations agreeing to return to a world in which weapons had no measure of autonomy:

- "Autonomous" weapons should always be under significant human control.
- Adaptive learning devices should therefore be designed so that they are capable of clearly explaining their reasoning and decisions to operators

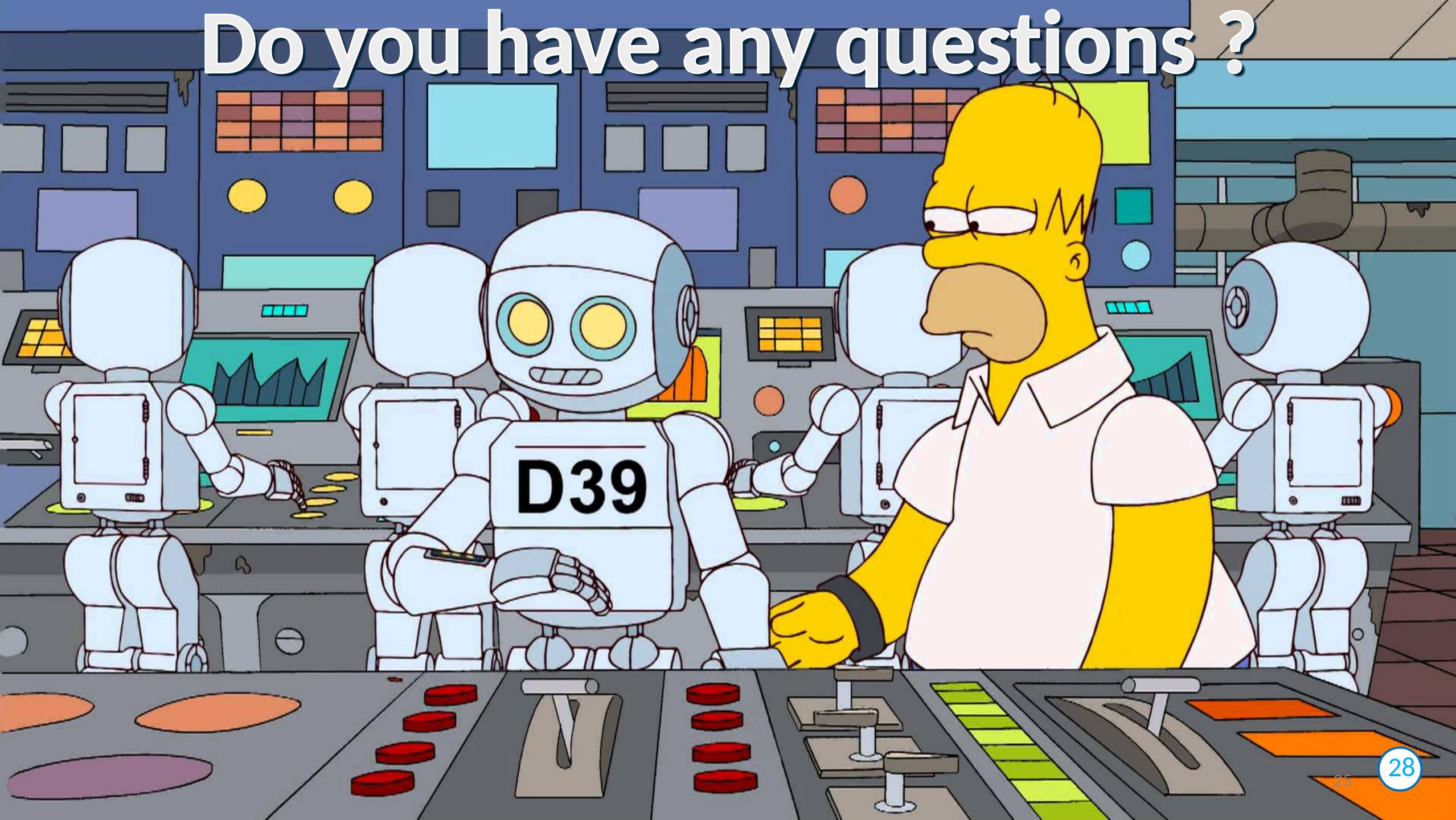


In your opinion:

1. Should we ban the development of AWS?
2. Would robots make more mistakes on the battlefield than the human?
3. Imagine now that an autonomous warrior miss-classified civils as enemies and killed them. Who should be responsible for that?

Thank you for your attention

Do you have any questions ?



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