Negative: Autonomous Weapons Ban

By “Coach Vance” Trefethen

***Resolved: The United States federal government substantially reform the use of Artificial Intelligence technology***

Case Summary: The AFF plan bans autonomous weapons – weapons that target and kill people without any human decision-making.

Negative: Autonomous Weapons Ban 3

INHERENCY 3

1. Existing safeguards 3

Status Quo Dept of Defense (DoD) policies are addressing the risks Affirmative is raising 3

MINOR REPAIR 3

Continue current policy but manage the risks and work for international cooperation 3

HARMS / SIGNIFICANCE 4

1. Ethics reversal #1: Using humans in combat 4

Unethical to use humans in combat when machines can do it 4

2. Ethics reversal #2: Changing social attitudes toward AI will reverse today’s concerns 4

A future generation might court-martial a human serviceman who overrides AI because the reliability of machines puts humans at risk when we “DON’T” use AI 4

3. False assumption 5

AFF is assuming today’s “moral standard” requiring human in the loop of weapons usage is permanently settled. But it’s not and probably will change over time 5

4. Moral objections melt away 5

Sure, the public has moral objections to fully autonomous lethal weapons. Until we start losing a battle. Then they’re for it! 5

SOLVENCY 6

1. More study needed 6

AI is changing rapidly. We should take more time to consider all the implications for military applications and rules of engagement 6

2. Too late 6

Autonomous kill technology is already out there 6

DISADVANTAGES 7

1. Civilian casualties / Humanitarian harm worsened 7

Stopping autonomous weapons won’t prevent humanitarian harms. Turn: It will make them worse by blocking improvements in technology that could have prevented them 7

Specific examples of how emerging autonomous weapons technology does better at protecting civilian lives in war time 8

2. Loss of US national security 9

Link: We have to maintain AI weapons because bad guys are developing them, and they’ll defeat us if we don’t keep up 9

Link: Must have full autonomous mode option available, even if we don’t normally use it, to prevent losing a battle if an enemy is using it 9

Link: US and China are in a struggle for international dominance. China threatens US hegemony 9

Link: China gaining Asian regional hegemony leads to gaining global hegemony, replacing USA 10

Brink: We lose military superiority in the next decade if we don’t accelerate AI capabilities 10

Impact: World peace & prosperity at risk without US influence. US hegemony is key to global peace & prosperity 10

3. Human error 11

Link: AFF plan trades machine error for human error 11

Impact: Death & Suffering increase. Because sure, machines are fallible. But humans are worse 11

Negative: Autonomous Weapons Ban

INHERENCY

1. Existing safeguards

Status Quo Dept of Defense (DoD) policies are addressing the risks Affirmative is raising

RAND Corporation study completed in 2018, published in 2020. (RAND is a non-profit research organization. Study was commissioned and funded by the US Air Force. Study authors were: [Forrest E. Morgan](https://www.rand.org/pubs/authors/m/morgan_forrest_e.html), [Benjamin Boudreaux](https://www.rand.org/about/people/b/boudreaux_benjamin.html), [Andrew J. Lohn](https://www.rand.org/pubs/authors/l/lohn_andrew_j.html), [Mark Ashby](https://www.rand.org/pubs/authors/a/ashby_mark.html), [Christian Curriden](https://www.rand.org/about/people/c/curriden_christian.html), [Kelly Klima](https://www.rand.org/about/people/k/klima_kelly.html), [Derek Grossman](https://www.rand.org/about/people/g/grossman_derek.html). Study was completed in Oct 2018 and released to the public in March 2020) Military Applications of Artificial Intelligence - Ethical Concerns in an Uncertain World <https://www.rand.org/pubs/research_reports/RR3139-1.html> (brackets added) (accessed 5 June 2021)

Many elements of DoD policy on military AI are broadly consistent with the demands of arms control advocacy groups and other actors and go a long way toward mitigating the risks they are most concerned about. These policy elements should be publicly underscored. Citizens should be informed that OSD and Air Force development efforts are concentrated in areas where the public is most supportive of military AI, such as force protection, improved compliance with LOAC, and systems intended to improve logistics and manpower issues. More emphasis on this will help OSD and the Air Force build trust in their stewardship of AI systems.

MINOR REPAIR

Continue current policy but manage the risks and work for international cooperation

National Security Commission on Artificial Intelligence 2021. (independent commission created by Congress; chaired by Dr. [Eric Schmidt](https://en.wikipedia.org/wiki/Eric_Schmidt) former CEO of [Google](https://en.wikipedia.org/wiki/Google)  and vice-chaired by former [Deputy Sec. of Defense](https://en.wikipedia.org/wiki/United_States_Deputy_Secretary_of_Defense) and [Under Secretary of the Navy](https://en.wikipedia.org/wiki/Under_Secretary_of_the_Navy) [Robert O. Work](https://en.wikipedia.org/wiki/Robert_O._Work) ) Final Report, March 2021 <https://www.nscai.gov/wp-content/uploads/2021/03/Final_Report_Executive_Summary.pdf> (accessed 3 June 2021)

Manage risks associated with AI-enabled and autonomous weapons. AI will enable new levels of performance and autonomy for weapon systems. But it also raises important legal, ethical, and strategic questions surrounding the use of lethal force. Provided their use is authorized by a human commander or operator, properly designed and tested AI-enabled and autonomous weapon systems can be used in ways that are consistent with international humanitarian law. DoD’s rigorous, existing weapons review and targeting procedures, including its dedicated protocols for autonomous weapon systems and commitment to strong AI ethical principles, are capable of ensuring that the United States will field safe and reliable AI-enabled and autonomous weapon systems and use them in a lawful manner. While it is neither feasible nor currently in the interests of the United States to pursue a global prohibition of AI-enabled and autonomous weapon systems, the global, unchecked use of such systems could increase risks of unintended conflict escalation and crisis instability. To reduce the risks, the United States should (1) clearly and publicly affirm existing U.S. policy that only human beings can authorize employment of nuclear weapons and seek similar commitments from Russia and China; (2) establish venues to discuss AI’s impact on crisis stability with competitors; and (3) develop international standards of practice for the development, testing, and use of AI-enabled and autonomous weapon systems.

HARMS / SIGNIFICANCE

1. Ethics reversal #1: Using humans in combat

Unethical to use humans in combat when machines can do it

Prof. Amitai Etzioni and Prof. Oren Etzioni 2017 (Amitai is University Professor and professor of international affairs at George Washington University in Washington, DC. Oren is chief executive officer of the Allen Institute for Artificial Institute and professor of computer science at the University of Washington ) ISSUES IN SCIENCE & TECHNOLOGY, Summer 2017 <https://icps.gwu.edu/sites/g/files/zaxdzs1736/f/downloads/Etzioni%20and%20Etzioni_Should%20Artificial%20Intelligence%20Be%20Regulated.pdf> (accessed 2 June 2017)

Finally, we hold that the study of killing machines should be expanded to include the opposite question: whether it is ethical to use a person in high-risk situations when a robot can carry out the same mission as well, if not better. This question applies to clearing mines and IEDs, dragging wounded soldiers out of the line of fire and civilians from burning buildings, and ultimately, fighting wars. If philosophers can indulge in end-of-the-world scenarios engineered by AI, then we can speculate about a day when nations will send only nonhuman arms to combat zones, and the nation whose machines win will be considered to have won the war.

2. Ethics reversal #2: Changing social attitudes toward AI will reverse today’s concerns

A future generation might court-martial a human serviceman who overrides AI because the reliability of machines puts humans at risk when we “DON’T” use AI

Dr Gordon Cooke 2019 (director of the West Point Simulation Center and an associate professor in the Department of Military Instruction at the United States Military Academy. Ph.D. in biomechanics and an M.S. in mechanical engineering from Stevens Institute of Technology, as well as graduate certificates in ordnance engineering and biomedical engineering from Stevens. Served as a combat engineer officer in the 11th Armored Cavalry Regiment) Magic Bullets: The Future of Artificial Intelligence in Weapons Systems 11 June 2019 <https://www.army.mil/article/223026/magic_bullets_the_future_of_artificial_intelligence_in_weapons_systems> (accessed 4 June 2021)

At what point does the human in the loop on a weapon system stop deciding whether a weapon should be used and start clicking the "approve" button because the AI sensor system assessed the proposed target as a threat? If a family court judge rejected the results of a DNA paternity test because he didn't think the child resembled the father, there would be shock in the courtroom (followed by a quick appeal). What happens when faith in the performance of a technology is high enough that disagreeing with what the system tells you becomes unthinkable? What happens when we reach the point where we court-martial weapon operators for placing friendly units at risk when they override weapon systems? At that point, why is the human part of the process and what role do they serve? Societal attitudes toward autonomous systems are going to change. It is highly likely we will eventually see fully autonomous weapons on the battlefield.

3. False assumption

AFF is assuming today’s “moral standard” requiring human in the loop of weapons usage is permanently settled. But it’s not and probably will change over time

Dr Gordon Cooke 2019 (director of the West Point Simulation Center and an associate professor in the Department of Military Instruction at the United States Military Academy. Ph.D. in biomechanics and an M.S. in mechanical engineering from Stevens Institute of Technology, as well as graduate certificates in ordnance engineering and biomedical engineering from Stevens. Served as a combat engineer officer in the 11th Armored Cavalry Regiment) Magic Bullets: The Future of Artificial Intelligence in Weapons Systems 11 June 2019 <https://www.army.mil/article/223026/magic_bullets_the_future_of_artificial_intelligence_in_weapons_systems> (accessed 4 June 2021)

The technologies that allow creation of AI weapon systems are inevitable, if not already existent. It is no longer possible to prevent research unique to AI weapons while allowing research into helpful civilian applications to continue, because the remaining research areas are all dual-use. Furthermore, rudimentary but functional autonomous weapon systems can already be created with existing technology. The horse is out of the barn. What we need to do now is have a serious discussion about the moral and ethical implications of AI technology. But it must be one that starts from the reality of the current state of technology, the capabilities that already exist, and recognizes that bad actors will misuse any technology in the future. We should consider not just our current morals and ethics, but also account for how society's norms will shift over time, as they always do.

4. Moral objections melt away

Sure, the public has moral objections to fully autonomous lethal weapons. Until we start losing a battle. Then they’re for it!

RAND Corporation study completed in 2018, published in 2020. (RAND is a non-profit research organization. Study was commissioned and funded by the US Air Force. Study authors were: [Forrest E. Morgan](https://www.rand.org/pubs/authors/m/morgan_forrest_e.html), [Benjamin Boudreaux](https://www.rand.org/about/people/b/boudreaux_benjamin.html), [Andrew J. Lohn](https://www.rand.org/pubs/authors/l/lohn_andrew_j.html), [Mark Ashby](https://www.rand.org/pubs/authors/a/ashby_mark.html), [Christian Curriden](https://www.rand.org/about/people/c/curriden_christian.html), [Kelly Klima](https://www.rand.org/about/people/k/klima_kelly.html), [Derek Grossman](https://www.rand.org/about/people/g/grossman_derek.html). Study was completed in Oct 2018 and released to the public in March 2020) Military Applications of Artificial Intelligence - Ethical Concerns in an Uncertain World <https://www.rand.org/pubs/research_reports/RR3139-1.html> (brackets added) (accessed 5 June 2021)

The results of our survey of public opinion suggest that the U.S. public supports Department of Defense’s (DoD’s) investment in military AI applications. However, the results also indicate that the public is concerned about the ethical risks that military AI poses for accountability and human dignity. The public appears to hold strong convictions about the importance of human xv control over the use of autonomous weapons and to believe that an operator should be required to authorize attacks that take human life. Interestingly, despite the respondents’ objections to the use of autonomous weapons to kill people, they were more likely to permit it if U.S. forces were losing a battle, especially if the enemy was using autonomous weapons.

SOLVENCY

1. More study needed

AI is changing rapidly. We should take more time to consider all the implications for military applications and rules of engagement

RAND Corporation study completed in 2018, published in 2020. (RAND is a non-profit research organization. Study was commissioned and funded by the US Air Force. Study authors were: [Forrest E. Morgan](https://www.rand.org/pubs/authors/m/morgan_forrest_e.html), [Benjamin Boudreaux](https://www.rand.org/about/people/b/boudreaux_benjamin.html), [Andrew J. Lohn](https://www.rand.org/pubs/authors/l/lohn_andrew_j.html), [Mark Ashby](https://www.rand.org/pubs/authors/a/ashby_mark.html), [Christian Curriden](https://www.rand.org/about/people/c/curriden_christian.html), [Kelly Klima](https://www.rand.org/about/people/k/klima_kelly.html), [Derek Grossman](https://www.rand.org/about/people/g/grossman_derek.html). Study was completed in Oct 2018 and released to the public in March 2020) Military Applications of Artificial Intelligence - Ethical Concerns in an Uncertain World <https://www.rand.org/pubs/research_reports/RR3139-1.html> (brackets added) (accessed 5 June 2021)

Developments in military AI could cause a dramatic evolution, perhaps even a transformation, in the character of war. Yet the experts we interviewed offered a wide range of opinion regarding when, or even if, such a change might occur. AI technologies have developed rapidly and are being integrated into an increasing number of military applications. The United States, China, and Russia are all vigorously pursuing military AI capabilities. These technological developments have serious ramifications for a wide range of warfighting capabilities. As a result, careful consideration of how these capabilities can be employed in keeping with the LOAC [Law of Armed Conflict] and how the rules of engagement will need to accommodate them in future scenarios is needed. While we cannot predict how quickly military AI systems will emerge, we believe that, based on the pace of developments to date, there will be time to develop these understandings and establish appropriate safeguards if U.S. leaders are proactive.

2. Too late

Autonomous kill technology is already out there

Dr Gordon Cooke 2019 (director of the West Point Simulation Center and an associate professor in the Department of Military Instruction at the United States Military Academy. Ph.D. in biomechanics and an M.S. in mechanical engineering from Stevens Institute of Technology, as well as graduate certificates in ordnance engineering and biomedical engineering from Stevens. Served as a combat engineer officer in the 11th Armored Cavalry Regiment) Magic Bullets: The Future of Artificial Intelligence in Weapons Systems 11 June 2019 <https://www.army.mil/article/223026/magic_bullets_the_future_of_artificial_intelligence_in_weapons_systems> (accessed 3 June 2021)

Some have raised concerns about increasing autonomy in weapon systems. Groups such as the Campaign to Ban Killer Robots and the International Committee for Robot Arms Control have called for total bans on the research and development of autonomous weapons and limiting AI research to civilian uses only. Such calls for a ban on development of autonomous lethal weapons, however well-meaning, seem to ignore the fact that the technology they most seek to prevent (autonomous machines that indiscriminately kill humans) already exists. Autonomous armaments that can find and kill humans will appear on the battlefield, even if not introduced by the United States or another major state, because the required technology is already available.

DISADVANTAGES

1. Civilian casualties / Humanitarian harm worsened

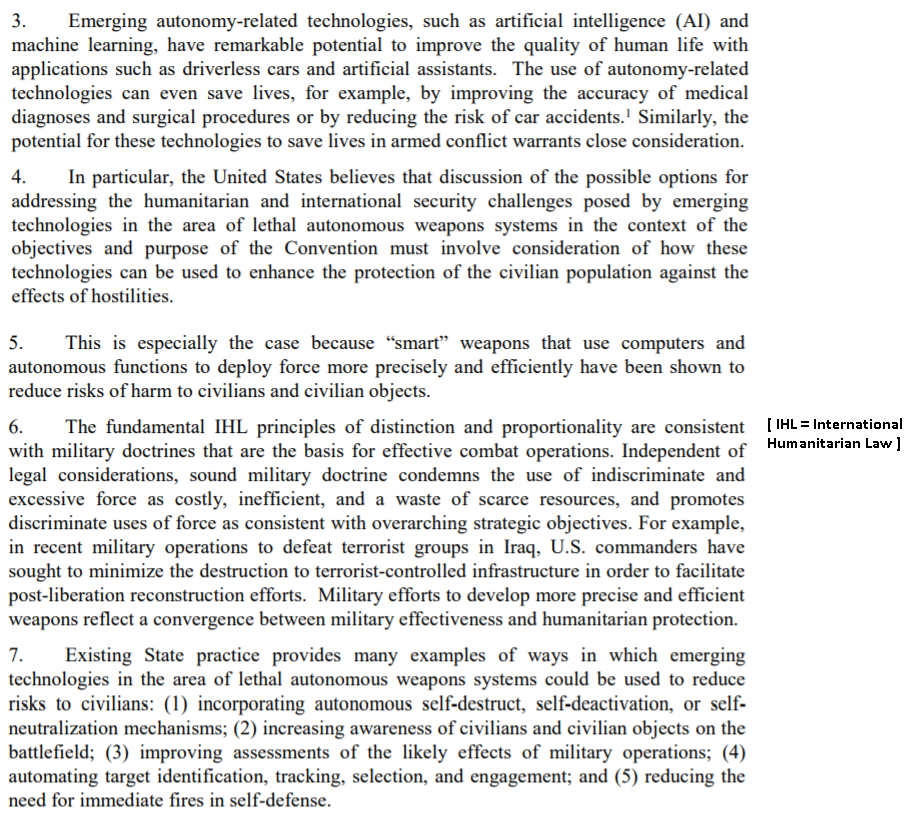
Stopping autonomous weapons won’t prevent humanitarian harms. Turn: It will make them worse by blocking improvements in technology that could have prevented them

Dr Gordon Cooke 2019 (director of the West Point Simulation Center and an associate professor in the Department of Military Instruction at the US Military Academy, West Point. Ph.D. in biomechanics and an M.S. in mechanical engineering from Stevens Institute of Technology, as well as graduate certificates in ordnance engineering and biomedical engineering from Stevens. Served as a combat engineer officer in the 11th Armored Cavalry Regiment) Magic Bullets: The Future of Artificial Intelligence in Weapons Systems 11 June 2019 <https://www.army.mil/article/223026/magic_bullets_the_future_of_artificial_intelligence_in_weapons_systems> (accessed 3 June 2021)

The reason we do not see major armies deploying such systems is because of a lack of the ability to discriminate between legitimate and illegitimate targets. Research and development in this area is in its infancy and is intertwined with needed policy decisions about how to precisely define a legitimate military target. Stopping research into autonomous weapons now will not prevent "slaughterbots" that indiscriminately kill; it will only prevent responsible governments from developing systems that can differentiate legitimate military targets from noncombatants and protect innocent lives.

Specific examples of how emerging autonomous weapons technology does better at protecting civilian lives in war time

US Representatives to the Group of Governmental Experts of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects 2018. (submitted by the United States delegation to the Geneva conference on the Convention on Conventional Weapons) April 2018 “Humanitarian benefits of emerging technologies in the area of lethal autonomous weapon systems” <https://undocs.org/pdf?symbol=en/CCW/GGE.1/2018/WP.4> (accessed 5 June 2021) (brackets added)



2. Loss of US national security

Link: We have to maintain AI weapons because bad guys are developing them, and they’ll defeat us if we don’t keep up

National Security Commission on Artificial Intelligence 2021. (independent commission created by Congress; chaired by Dr. [Eric Schmidt](https://en.wikipedia.org/wiki/Eric_Schmidt) former CEO of [Google](https://en.wikipedia.org/wiki/Google)  and vice-chaired by former [Deputy Sec. of Defense](https://en.wikipedia.org/wiki/United_States_Deputy_Secretary_of_Defense) and [Under Secretary of the Navy](https://en.wikipedia.org/wiki/Under_Secretary_of_the_Navy) [Robert O. Work](https://en.wikipedia.org/wiki/Robert_O._Work) ) Final Report, March 2021 <https://www.nscai.gov/wp-content/uploads/2021/03/Final_Report_Executive_Summary.pdf> (accessed 3 June 2021)

AI-enhanced capabilities will be the tools of first resort in a new era of conflict as strategic competitors develop AI concepts and technologies for military and other malign uses and cheap and commercially available AI applications ranging from “deepfakes” to lethal drones become available to rogue states, terrorists, and criminals. The United States must prepare to defend against these threats by quickly and responsibly adopting AI for national security and defense purposes. Defending against AI-capable adversaries operating at machine speeds without employing AI is an invitation to disaster. Human operators will not be able to keep up with or defend against AI-enabled cyber or disinformation attacks, drone swarms, or missile attacks without the assistance of AI-enabled machines. National security professionals must have access to the world’s best technology to protect themselves, perform their missions, and defend us.

Link: Must have full autonomous mode option available, even if we don’t normally use it, to prevent losing a battle if an enemy is using it

RAND Corporation study completed in 2018, published in 2020. (RAND is a non-profit research organization. Study was commissioned and funded by the US Air Force. Study authors were: [Forrest E. Morgan](https://www.rand.org/pubs/authors/m/morgan_forrest_e.html), [Benjamin Boudreaux](https://www.rand.org/about/people/b/boudreaux_benjamin.html), [Andrew J. Lohn](https://www.rand.org/pubs/authors/l/lohn_andrew_j.html), [Mark Ashby](https://www.rand.org/pubs/authors/a/ashby_mark.html), [Christian Curriden](https://www.rand.org/about/people/c/curriden_christian.html), [Kelly Klima](https://www.rand.org/about/people/k/klima_kelly.html), [Derek Grossman](https://www.rand.org/about/people/g/grossman_derek.html). Study was completed in Oct 2018 and released to the public in March 2020) Military Applications of Artificial Intelligence - Ethical Concerns in an Uncertain World <https://www.rand.org/pubs/research_reports/RR3139-1.html> (brackets added) (accessed 5 June 2021)

Rules of engagement should require modes of human supervision that enable adequate levels of discrimination and precaution, given the tactical situation, to ensure that risks to noncombatants are proportionate to the importance of military objectives. In most cases, this will require LAWS to run semiautonomously; however, in some scenarios this will not be practical, and if an adversary begins employing LAWS with full autonomy, U.S. forces should be able to match this escalation, in keeping with LOAC and relevant ethical principles, to assure adequate force protection and mission success. Although surveys indicate that the U.S. public is averse to autonomous weapons taking human life, they also suggest that the public supports further development of military AI and understands the need to match enemy escalation to avoid defeat.

Link: US and China are in a struggle for international dominance. China threatens US hegemony

Ashley Tellis 2020 (Tata Chair for Strategic Affairs and a senior fellow at the Carnegie Endowment for International Peace. He is also a counselor at the National Bureau of Asian Research and the research director of the Strategic Asia Program) 4 May 2020 "COVID-19 Knocks on American Hegemony" (accessed 3 June 2021) <https://carnegieendowment.org/2020/05/04/covid-19-knocks-on-american-hegemony-pub-81719>

After almost two decades of conflicted hesitancy, the United States finally acknowledged that it is involved in a long-term strategic competition with China. This rivalry, almost by definition, is not merely a wrangle between two major states. Rather, it involves a struggle for dominance in the international system, even if China as the rising power disavows any such ambition. China’s very ascendancy—if sustained—could over time threaten the U.S. hegemony that has been in place since the end of World War II. It is this reality of unequal growth—which has nourished China’s expanding influence and military capabilities—that lies at the root of the evolving rivalry.

Link: China gaining Asian regional hegemony leads to gaining global hegemony, replacing USA

Min-Hyung Kim 2019 (Department of Political Science and International Relations, Kyung Hee University, South Korea) 4 Feb 2019 “A real driver of US–China trade conflict: The Sino–US competition for global hegemony and its implications for the future” <https://www.emerald.com/insight/content/doi/10.1108/ITPD-02-2019-003/full/html> (accessed 3 June 2021)

Although China repeatedly claims that it does not seek to replace US hegemony in the world, its behavior revealed by the initiatives of the BRI, the AIIB and Made in China 2015 illustrates that its ultimate goal is to be a global hegemon. This is not surprising because all the rising powers in history invariably sought to first dominate the region they are situated ([Mearsheimer, 2011, 2014](about:blank#ref031%20ref032)) and expand their power globally ([Gilpin, 1981](about:blank#ref012)).

Brink: We lose military superiority in the next decade if we don’t accelerate AI capabilities

National Security Commission on Artificial Intelligence 2021. (independent commission created by Congress; chaired by Dr. [Eric Schmidt](https://en.wikipedia.org/wiki/Eric_Schmidt) former CEO of [Google](https://en.wikipedia.org/wiki/Google)  and vice-chaired by former [Deputy Sec. of Defense](https://en.wikipedia.org/wiki/United_States_Deputy_Secretary_of_Defense) and [Under Secretary of the Navy](https://en.wikipedia.org/wiki/Under_Secretary_of_the_Navy) [Robert O. Work](https://en.wikipedia.org/wiki/Robert_O._Work) ) Final Report, March 2021 <https://www.nscai.gov/wp-content/uploads/2021/03/Final_Report_Executive_Summary.pdf> (accessed 3 June 2021)

Our armed forces’ competitive military-technical advantage could be lost within the next decade if they do not accelerate the adoption of AI across their missions. This will require marrying top-down leadership with bottom-up innovation to put operationally relevant AI applications into place.

Impact: World peace & prosperity at risk without US influence. US hegemony is key to global peace & prosperity

Capt. M. V. Prato 2009 (United States Marine Corps,Command and Staff College, Marine Corps Combat Development Command,Marine Corps University) “The Need for American Hegemony” <https://apps.dtic.mil/sti/citations/ADA508040> (accessed 3 June 2021)

The world witnessed a vast shift in the polarity of geopolitics after the Cold War. The United States became the world’s greatest hegemon with an unequalled ability to globally project cultural, political, economic, and military power in a manner not seen since the days of the Roman Empire. **[END QUOTE]** Coined the “unipolar moment” by syndicated columnist Charles Krauthammer, the disparity of power between the U.S. and all other nations allows the U.S. to influence the world for the mutual benefit of all responsible states. Unfortunately, the United States is increasingly forced to act unilaterally as a result of both foreign and domestic resentment to U.S. dominance and the rise of liberal internationalism. [**He goes on to conclude later in the same context QUOTE**:] The United States must exercise benevolent global hegemony, unilaterally if necessary, to ensure its security and maintain global peace and prosperity.

3. Human error

Link: AFF plan trades machine error for human error

Since humans are not infallible, preventing machines from making decisions because machines are fallible merely substitutes one fallible system for another. But the question is, which one is more reliable

Impact: Death & Suffering increase. Because sure, machines are fallible. But humans are worse

Dr Gordon Cooke 2019 (director of the West Point Simulation Center and an associate professor in the Department of Military Instruction at the United States Military Academy. Ph.D. in biomechanics and an M.S. in mechanical engineering from Stevens Institute of Technology, as well as graduate certificates in ordnance engineering and biomedical engineering from Stevens. Served as a combat engineer officer in the 11th Armored Cavalry Regiment) Magic Bullets: The Future of Artificial Intelligence in Weapons Systems 11 June 2019 <https://www.army.mil/article/223026/magic_bullets_the_future_of_artificial_intelligence_in_weapons_systems> (accessed 4 June 2021)

We must consider the fact that humans make mistakes about using lethal weapons in combat. The U.S. bombing of the Doctors Without Borders hospital in Kunduz, Afghanistan, in October 2015 and the hundreds of thousands of civilian casualties in Iraq and Afghanistan attest to this reality. We essentially still have the same "version 1.0" human that has existed for roughly 200,000 years, and capability development in humans is relatively flat. Our decision-making error rate in life-or-death situations is likely to be constant. Machine accuracy, on the other hand, is improving at an exponential rate. At some time in the future, machine accuracy at making combat-kill decisions will surpass human accuracy. When that occurs, it raises a host of interesting questions: Is it ethical to keep a human in the loop for weapon systems when a machine is less error-prone? Does the idea that only humans should be allowed to kill humans trump the desire to minimize civilian deaths? Are we willing to accept additional, avoidable deaths in order to keep humans in absolute control of lethal decisions? Is our human need to have someone to blame, someone to "hold accountable" and exact retribution from, more important than rational interest balancing that minimizes suffering?