USMA CLASS OF 2006
WAR STUDIES CONFERENCE
POTENTIAL DISRUPTORS OF THE 'AMERICAN WAY OF WAR'

04-06 NOVEMBER 2018

Class of 2006 War Studies Conference
Potential Disruptors of the 'American Way of War'

This was the third annual Class of 2006 War Studies Conference, sponsored by the Modern War Institute, a research center housed within the Department of Military Instruction at the United States Military Academy. The event allowed distinguished representatives from the private sector, government, academia, think-tank community, and the joint military services to debate and discuss issues related to modern war and warfare. This year's conference explored the issue of next-generation warfare and potential disruptors to the "American way of war."

Specifically, the conference explored the following questions:

- What are the current and future megatrends that will reshape our military effectiveness?
- Can new technologies like AI reduce the fog and friction of the battlefield?
- How do they fit into America's larger strategy to win its future wars?
- How can the Pentagon and Silicon Valley partner more seamlessly to foster military innovation?

The above themes will inform a future edited conference volume, coauthored by a select group of participants and other experts, which is intended to frame a conversation with policymakers, senior military leaders, and other decision makers in the years ahead. The War Studies Conference volume will identify ways in which to move the current discussions on next-generation warfare forward to prepare ourselves for tomorrow's battlefields.

The conference consisted of six keynote addresses and discussions, as well as five seventy-five-minute panel sessions with moderators. All proceedings, with the exception of one keynote, were on the record.

We would like to thank all conference participants for their active involvement and insight in addressing national security reform. A special token of gratitude goes to Maj. Jacob Miraldi and Dr. Lionel Beehner, the War Studies Conference Co-Leads. Additionally, the War Studies Conference was made possible with the support of Mr. Vincent Viola. We are also grateful for the generous support of the USMA Class of 2006, and the West Point Association of Graduates. The opinions expressed in this report reflect the notes taken by the authors and do not reflect the position of the United States Military Academy, the United States Army, or any other government agency.

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Executive Summary

The focus of this year's conference was next-generation warfare and potential disruptors to the "American way of war." We are at an inflection point in history, akin to the one that followed the First World War, when strategic bombing, blitzkrieg, and nuclear warfare would come to define the next phase of war. What are the equivalents of these technological and doctrinal developments in today's age? Strategists have noted that we may be at the dawn of a new technological revolution, one that requires a "third offset." Others point to the transformative role of artificial intelligence. Whichever is the case, how do we reposition our US military to come out on top in the consequent global rebalance of power?

From the Army's creation of a new Futures Command to the Pentagon's plan to stand up an artificial intelligence (AI) center, the US military is reorganizing itself and updating its aging Cold War–era weapons technologies and doctrines for tomorrow's wars. The Army has laid out a series of modernization priorities, from long-range precision fires to robot-driven combat vehicles. But can new technologies like AI reduce the fog and friction of the battlefield? How do they fit into America's larger strategy to win its future wars? And how can the Pentagon and Silicon Valley partner more seamlessly to enable greater military innovation?

To answer these questions and prepare our defense establishment intellectually for "next-generation warfare"—sometimes called Fifth Generation Warfare—this conference convened an interdisciplinary group of top thinkers from across academia, the policy sector, Silicon Valley, and the military. Through a series of keynote speeches, moderated panels, and breakout discussions, this conference sought to introduce new ideas and forge effective solutions to the complex problems that next-generation war poses.

The United States has spent the past two decades conducting counterinsurgency and counterterrorism operations on behalf of host governments perceived by many as illegitimate. Arguably we have little to show for our effort and costs, both human and financial. It has become abundantly clear that no silver bullet technology will come along allowing us to magically win the wars we face or defeat the enemy bloodlessly. Worse, the type and pace of technological development arguably favors our adversaries. The barrier to entry of this new battlefield, given the affordability and availability of off-the-shelf technologies, are low. Our comparative advantages—a highly networked and free society, a sizable military trained and equipped in maneuver warfare, and the "soft power" of American values—have become our disadvantages in this dangerous new world.

Washington has finally woken up to this fact. It has shifted focus away from countering transnational groups like al-Qaeda and ISIS and toward deterring revisionist powers like Russia, China, and Iran. For the first time ever, the phrase "artificial intelligence" made an appearance in our National Security Strategy. And efforts like the Defense Innovation Board are positive first steps toward

creating incubators of next-generation technologies. Still, the question remains: How does our military stack up in a new, hyper-connected age, one whereby populations are more networked, sophisticated, and decentralized; where information can and will be weaponized; and hybrid forms of warfare will become an international norm, not an exception?

The conference proceedings will be captured in an edited conference volume and distributed to policymakers, military professionals, and the academy to shape future discussions of next-generation warfare.

Executive Agenda
04-06 November 2018

Sunday, 04 November 2018

Opening Keynote – Emerging Technologies and Megatrends Affecting Military Effectiveness

Speakers: The Honorable Bruce Jette, Assistant Secretary of the Army
The Honorable John Carlin, Fmr. Asst. Attorney General for National Security
Moderator: Dr. Nina Kollars, US Naval War College

Motivating Questions
- What are the megatrends that will reshape how we fight?
- What are the emerging technologies that we should be paying attention to?

Monday, 05 November 2018

Session 1 – Of Bits, Bots, or Battalions: What 'Next-Generation Warfare' Looks Like

Motivating Questions
- What do we mean by "next-generation warfare"?
- What are the central tradeoffs when it comes to prioritizing technologies that may change how we fight?

Session 2 – Fake News, Real War: How to Manage a Complex IO Landscape

Motivating Questions
- How does social media factor into our conceptualization of modern warfare?
- What are our chief vulnerabilities in the information domain?

Second Keynote – Can 'Deep Thinking' Defeat Tomorrow's Adversaries?

Speaker: Mr. Garry Kasparov, author of *Deep Thinking*
Moderator: Mr. Nicholas Schmidle, the *New Yorker*

Third Keynote – How Geography Will Reshape Great Power Conflict

Speaker: Mr. Robert Kaplan, author of *The Revenge of Geography*
Moderator: Mr. Jonathan Tepperman, *Foreign Policy*

Motivating Questions
- How is geography affecting the return to Great Power politics?
- How does geography influence "next-generation warfare"?

Session 3 – Beyond 'Slaughterbots': Reimagining War with No Soldiers

Motivating Questions
- What will a soldier-less future battlefield look like?
- What are the ethical or trust issues that arise between man and machine?

Session 4 – Rage Against the Machine Learning: Debating AI in Modern War

Motivating Questions`
- How might AI and machine learning shape our current and future wars?
- How is the ethical debate over its use harming or helping our understanding of its wartime functions?

Fourth Keynote – 'New Wars,' Old Doctrines: Rethinking Future Warfare

Speakers: Dr. Mary Kaldor, London School of Economics
                    Maj. Gen. Mick Ryan, commander of Australian Defense College
Moderator: Risa Brooks, Marquette University

Motivating Questions
- Are we in a post-Clausewitzian moment when it comes to fighting "new wars"?
- What are the political economy factors that are reshaping how we fight?

Tuesday, 06 November 2018

Fifth Keynote – Updating Doctrine for Future Warfare

Speaker: Lt. Gen. Eric Wesley, director of Army Capabilities Integration Center
Moderator: Mr. Max Brooks, author *World War Z*

Motivating Questions
- Are we in a moment similar to the post-Vietnam era in terms of doctrinal innovation?
- What is the Futures Command and will it revolutionize warfare?

Session 5 – Beyond the Horizon Scenarios with Near-Peer Adversaries

Motivating Questions
- What is the likelihood of great-power war with Russia or China and are we prepared?
- What might such a conflict look like?

Closing Keynote – Spurring Innovation between the Pentagon and Private Sector

Speakers: Mr. David Sanger, *New York Times*
                    Dr. Raj Shah, former managing director of Defense Innovation Unit

Motivating Questions
- What explains the poor relations between the Pentagon and Silicon Valley?
- How can the private sector foster greater military innovation?

Keynote Addresses

Prompt

Speakers during each of the keynote addresses faced different sets of tasks and discussion prompts. The opening keynote was meant to "set the table" for the conference and provide a sweeping overview of the emerging technologies and megatrends that will reshape how the US military fights from two diverse insiders' perspectives—one from the national-security law and cyber side, the other from the technological and acquisitions side. The next keynote tackled the issue of "deep thinking" and the roles of artificial intelligence, information operations, and the Russian way of warfare. The third keynote examined the role of geography as the US military reorients itself back toward great power conflict. The fourth keynote provided a deep dive on "new wars" from the point of view of a political economist, to examine the conditions and logic by which wars sustain themselves, and the implications for military doctrine and strategy. The fifth keynote (which was off the record and so will not be recounted here) examined doctrinal military innovation in the face of future threats. The sixth and closing keynote was a discussion of cooperation—or lack thereof—between the Pentagon and Silicon Valley and ways in which both sides can build trust to foster greater innovation.

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MWI Non-Resident Fellow Ms. Nina Kollars kicked off the conference during the opening keynote by asking the guest speakers a pertinent question: What are the megatrends, positive or negative, that will affect future war and warfare? The megatrends singled out were: organization, demographic shifts (e.g., decreasing birthrate, gender imbalances, economic inequality), connectivity/interconnectivity, climate change, geopolitics, timing (e.g., the need for speed), "the left-behinds," hubris, and geo-economics.

Assistant Secretary of the Army for Acquisition, Logistics, and Technology Bruce Jette discussed the importance of connectivity and China's continuous efforts to hack US systems. At present the FBI watches Chinese hacking in the United States in real time; the way in which the problem is tackled is "watch it occur without disrupting" (just as in Cold War). But Jette argues there is real harm to citizens. The lessons the US defense and security enterprise took from 9/11 is that better intelligence sharing is needed, and success will be measured by preventing large-scale attacks (in this case, a massive "theft of data"). He quoted Robert Mueller: "Rome built roads to conquer the world and the Normans used the same roads for the sack of Rome." The contemporary parallel to this is the American effort to create the World Wide Web, which has basically built a freeway for enemies to attack. "People get hyped about new technology but don't know what to do [or how to use them]," he said, pointing to advances like hypersonic technology. AI, he added, is a less mature technology in the operational environment. "How do I get AI to do what I want?" he asked. "We need to still find the algorithms that have the outcomes we want."

The megatrends that worry Former Assistant Attorney General for National Security John Carlin are speed and AI. With regards to the former, Carlin talked about the Ardit Ferizi case (in which the data of 1,351 military members and other government employees were published on an Islamic State "kill list") in 2016. How the case developed quickly, and how an interconnected world made it possible for data stolen from a US company to find its way into the hands of ISIS, who then published the kill list. "Speed enlarges our domain of vulnerability," he added. Yet while innovation is moving fast, its related security is not. This is rendered more difficult in an interdependent world (i.e., one in which our supply chain runs through China, a competitor. Hence, there is a real need for greater public-private cooperation. "Right now there is no discussion between DC and Silicon Valley," said Carlin. "There is distrust." Technology in the commercial space is vulnerable and the supply chain is contaminated. The United States—and democracies in general—also faces problems of how to react to cyberattacks and cyberespionage. Part of the problem is democracies' reluctance to report when hacks occurred.

With regards to AI, the issue is how to employ these new technologies in the unfolding battlefield. Acquisition is not the problem, but the lack of vision of what we want to achieve with these technologies. When it comes to this type of warfare with our main adversaries, the speakers pointed out that Russia is still constrained and limited to disinformation and election meddling, China is mostly interested in stealing "technological competency," and we are in a "low-intensity conflict" with Iran and North Korea, which use cyber tools to retaliate for sanctions. "We don't have a way of making them pay a price," said Carlin.

Jette added that, like AI, our challenge with emerging technologies is not one of acquisitions but our lack of an industrial policy, pointing out that the US possesses more rare earth metals than China but is unwilling to dig them up.

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The aim of the second keynote discussion was to hear one of the greatest chess legends and thinkers on machine learning, Mr. Garry Kasparov, discuss the importance of AI on the future of warfare. He recalled that when the first computer beat a human chess player, it was called a revolution of AI. However, he noted, it's not about the machine being perfect, but the machine being better and making fewer mistakes. He stressed that we need to get rid of the prejudice where we expect machines to perform at 100 percent effectiveness. Computers are computing, but also doing optimization, not transformation; in the end, they are still computing data gathered by humans. True, while machines can generate lots of data, they don't know what's relevant—humans need to ask the questions and create the limitations for computers. Meanwhile, companies can use computers to develop their data, but machines still can't see what humans can see through their eyes. So whether it's augmented or automated intelligence, according to Kasparov, humans won't become redundant, but "promoted."

Reflecting on his second match against an IBM computer, he said he "saw the future, not as human versus machine, but human *plus* machine," adding that we must look toward human-machine synergy and identify "machines' deficiencies that we can compensate [for]." Shifting to the subject of Russian

information operations, he said that Russia has pursued a deliberate strategy that entails the following: instead of starving people of information, they have overloaded them. "There's only one way to tell the truth," he noted, "but many different ways to lie." Returning to a common thread of the conference, Kasparov said he believes the United States and Russia are at war. Internally, Russia has found that when its domestic agenda is exhausted, it needs international enemies. He stressed the need for credibility in our threats, which was what made nuclear deterrence during the Cold War effective. However, as Kasparov noted, "We don't want to reach the point where we have to show our hand to make a threat."

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During the third keynote, Mr. Robert Kaplan addressed the idea that, after the Cold War ended, geography took a backseat to other issues, like ethnicity, religion, and of course, globalization. Yet, with the return of "great power politics," how is geography reshaping how we conceptualize war? Much of the conference has focused on the role of digital technologies, AI, and autonomous systems, but in a potential military clash between two or more great powers, terrain and topography will inevitably matter. This is evidenced by China's "One Belt, One Road" initiative, as well as its creation of artificial islands in the South China Sea. With the rise of China and India, how is geography resurfacing as a determinant of global politics and what are its impact on how we structure our forces overseas? With an emerging world order that might be termed asymmetrically multipolar, might Alfred Thayer Mahan's call for controlling Asia's seas be as germane today as it was over a century ago? From Eurasia to East Asia, how is geography a driver of or deterrent to potential great-power war?

Discussing these and other questions, Kaplan focused on the fundamental and often overlooked link between geography and geopolitics. He said that technology is not defeating geography but *shrinking* geography. He then toured the globe to define what he means. Europe is affected by populism, the disappearance of the political left, and immigration. Regarding the last point, he cited a French geographer who wrote that the European border is the Sahara and that the Mediterranean is a connector, not a divider. "Arabs are locked in prison states—their collapse means that now their history (e.g., that of Libya or Syria) affects Europe," he said. Kaplan defines, as many do, the EU as an ambitious project, trying to unite different countries, cultures, and their bureaucracies—basically five empires with five different evolutionary patterns.

The United States as a nation benefits from unique advantages—a land with resources, navigable diagonal waterways, an arable cradle of the Midwest, etc.—which have accelerated our development and power. Geography, in other words, explains the rise of the United States as a superpower. Globalization, however, has split the United States and other countries. "If you worry," he said, "you concentrate on all problems with anxious foresight. That is the job of the policymaker." In some areas, he admitted, ideas are becoming more important than geography. Consider the role of disinformation, to take one example.

That being said, increasingly countries like China, Russia, and Iran are using geography to expand their control and influence Kaplan pointed to Beijing's "One Belt, One Road" initiative (which he dismissed as "a branding effort"), Russia's oil pipeline network, and Iran's push to be the "organizing principle of the Middle East"— rebuilding, in a sense, its old Persian empire, and leveraging its ability to influence events. He also highlighted the main difference between China and Russia. China is an institutionalized, corporatist regime; if Xi Jinping is gone, China will be okay. Russia's future is comparatively unstable, since it is incredibly personalized around Putin; if he is gone, it will face trouble.

Finally, climate change will change geography, given rising sea levels which could wipe out coastal parts of Bangladesh and other poorer parts of the globe. But since climate change is an issue that manifests itself gradually—slowly rising sea levels and a slow increase of temperatures—policymakers and military leaders don't pay too much attention. "The poorest freelance writer knows more than the [average] policymaker," he quipped.

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In the fourth keynote, the discussion focused on the idea of "new wars," a phrase that entered the scholarly lexicon in the late 1990s. How does it hold up two decades on? Modern warfare is arguably more about human insecurity than ever in the post–Cold War era, given the greater integration between the economic, social, and informational spaces. War is no longer about bringing the greatest violence to bear on the enemy, but rather about exploiting vulnerabilities across multiple domains to disrupt and soften the enemy without resorting to bullets or bombs. Are we, thus, in a "post-Clausewitzian moment"? Is current military doctrine updated to deal with new wars? This panel was tasked to provide a template for how war and warfare are changing, how the political economy of warfare affects modern war, what the evolving norms of warfare are that have created competitive disadvantages for the United States, and how the US military's traditional approaches may no longer suffice, whether we are talking about new wars, gray zone-conflict, or multi-domain battle.

Dr. Mary Kaldor responded to critics of her 1999 book on "new wars" by reaffirming that "war is still an act of politics," and is still rational, which is the essence of Clausewitz. However, she noted, "the logic of war has changed." Just as the "new wars" she described in the 1990s were different from the civil wars of the 1950s and 1960s, today's wars have also morphed. There are newer actors (before, the fighters were intellectuals, students, etc.). Insurgent tactics have also changed. For example, forced displacement is a central tactic of fighters on both sides. Wars are financed with the proceeds of looting, pillaging, and kidnapping, through taxation of humanitarian aid, from the diaspora, through smuggling, and by wealthy donors. Identity has become more important when confronted with death; that is, violence creates and strengthens one's identity. Armed actors "use the cover of identity politics to legitimize their activities."

She added also that "violence has a logic of its own," one that defies Clausewitz insofar as some armed actors gain legitimacy from violence, so violence continues. "Various parties gain more from violence itself than from winning or losing," she noted. "War is less about a contest of wills and is more about a

neutral enterprise," meaning, she explained, that "today's wars tend toward persistence." This is important for military strategy because to intervene on one side only makes the violence worse. In other cases, it creates perverse incentives, whereby people form armed groups to participate in peace talks. The solution, she suggested, is to create local ceasefires and peace zones, similar to ones in northern Serbia in the 1990s and in southern Ukraine today, and not unlike the local agreements that retired Gen. David Petraeus signed in Iraq at the height of the surge.

Maj. Gen. Mick Ryan of the Australian Defense University pointed out that we are in the midst of a profound transformation in warfare, what with today's ubiquitous connectivity, technological disruption, and the convergence of bio, tech, and other areas. But this convergence will not necessarily give Western democracies a military advantage, as "our military institutions are not adapting fast enough," given their old processes and mindsets. Ryan said he is sick of seeing media stories about "super soldiers" and would rather see what he called "super strategists," harnessing the strength of today's soldiers with cognitive augmentation thanks to AI. Given that this future is still a long way off, he added, "Our only advantage remains our intellectual edge."

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The closing keynote addressed the issue of cybersecurity and ways to foster greater military innovation between the Pentagon and private sector to fight tomorrow's wars. The keynote panelists, Mr. David Sanger and Dr. Raj Shah, began their conversation by discussing the role of cyber and its availability. It is cheap, easily deployable, and easy to control and moderate its effects (which is different, for example, from nuclear weapons). North Korea uses cyber as its primary weapon, as it avoids military retaliation. Consider the Sony case from a few years ago: former President Barack Obama called it an "act of vandalism," which Sanger said was a mistake as it emboldened Pyongyang. Picking up on a theme that John Carlin brought up in the opening discussion, it was pointed out that the government has decided to not announce certain hacks. The "US government," said Sanger, "contributes in certain ways to making cyber the perfect weapon with its avoidance of admitting being attacked."

Another problem is that corporate America and the US government are still unsure of what level of cyberattack merits retaliation. There are few cases in which the United States took action after attacks. It has taken preemptive action against ISIS, as well as against North Korea to disrupt its missile tests. Even still, the private sector is unimpressed by the government and the government doesn't know how to implement safety regulation for the private sector. One template might be to borrow the model of the UK's GCHQ—a signals intelligence agency similar to the United States' National Security Agency—which makes digital security tools available to UK companies. Touching on a theme of a previous conference, Sanger said that "we need deterrence in the cyber domain, but to deter you have to show capability." The panelists agreed that we need an open discussion about cyber capabilities and their use, which is still lacking, and if we don't publicly discuss US cyber capabilities (e.g., those demonstrated by the Stuxnet virus used to target Iran's nuclear weapons program) and how the United States uses them, then there is no way forward.

Shah discussed the distrust among Silicon Valley companies when it comes to cooperating with the Pentagon. He pointed to how Google was surprised that the NSA gained access to Google servers without Google's permission. "This revelation poisoned relations between Silicon Valley and the government," he noted. The Defense Innovation Unit (DIU), the agency he used to lead, has a mission to create cooperation between Silicon Valley and the Pentagon. He pointed to both philosophical (e.g., how data is used, etc.) and business challenges. On the latter, there are issues of speed, for example, certainty of contracts, with firms requiring two separate accounting books, and so forth. This list is not appealing to startup firms, so DoD must become less complicated, more reliable, and more transparent. DIU has the task of looking for new stuff that may be used for warfare—that is, systems going out in the commercial world that the government should aim to acquire. "When you try to do something new, the bureaucracy resists," said Shah. "Traditional manufacturers (i.e., big lobbying companies) of military systems see startups in Silicon Valley as a threat to disrupting the traditional investment model."

On the role of China, given what some call a new cold war in AI and quantum computing, the panelists noted that China is making internal efforts to achieve dominance in 2025. To that end, they have set up venture capital funds in Silicon Valley that effectively facilitate cyber espionage. They also discussed the commercial sector of AI—especially data collection and algorithms. China has great access to data, given that it has less privacy constraints. Chinese startups work in different, more permissive legal environments than those in the United States. The United States, as a result, has fewer users/consumers and more limited access to data. Again, touching on themes from previous panels, the United States must play to its strengths, by investing in STEM and R&D, and continuing to attract the next generation of startups, which is its distinctive advantage.

Moreover, the panelists emphasized that perfect cybersecurity is not possible. Instead, the United States needs to work on how to get back on track after an attack and how to be more resilient. The panelists gave a few anecdotes of how large international bureaucracies like NATO and those within the US government (e.g., NSA) still use Windows XP, which they called Russia's favorite system. This invites cyberattacks. An example is North Korea's WannaCry ransomware, which did not seek out to attack the UK health system but the government still had Windows XP, which was not patched, and never invested in upgrading the system.

Disinformation is becoming almost a larger problem than pure cyber. Responding to this problem means grappling with First Amendment issues, which are constitutionally protected. The way around it, according to the panelists, is to uncover and show the origin of false Facebook posts. In other words, the solution is detection and exposition at network speed, whereas attribution is generally the main problem in cyberwarfare.

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Panel Session 1 – Of Bits, Bots, or Battalions?
What 'Next-Generation Warfare' Looks Like

Panelists

      Dr. Amy Zalman, Strategic Narrative Institute
      Dr. Frank Hoffman, National Defense University
      Dr. Erik Gartzke, UC San Diego
      Maj. Gen. (ret) Robert Scales, MWI

Moderator

      Dr. Birthe Anders, Harvard

Motivating Questions

      What do we mean by "next-generation warfare"?
      What are the central tradeoffs when it comes to prioritizing technologies that may change how
          we fight?

Prompt

This panel focused on the importance of technology in future wars, how technology could change the landscape of war, and how we need to right-size our predictions of the compatibility of technology and warfare. The panelists emphasized that the types of warfare we see are a function of our enemies' weaknesses and vulnerabilities, not strengths. Russia employs information warfare because it is bad at airpower. China employs cyber because of its poor naval capabilities, and so forth. Put otherwise, the US military has an enormous tendency to say that everything our adversaries does is brilliant. On the future battlefield, the US military would be wise to let its adversaries make errors. The United States also struggles at thinking of itself as anything but dominant but maybe it is a "fool's errand" for us to dominate every military domain. Finally, it was pointed out that sometimes it is the most prosaic of technologies or other features—the oceans that divide us, concrete's use on the battlefield, etc.—that give us our advantage, a theme that will persist throughout the conference proceedings.

Discussion

Dr. Amy Zalman kicked off the conversation by emphasizing the need to think rigorously about the large-scale trends that will change the landscape of war, so that we can make the best possible decisions now. Not only do we have to analyze current trends and make probable predictions, but we have to imagine what could be possible in the future. There are currently changing trends we need to account for, such as the decreasing lethality of war, and the increasing role of the individual in this battlespace.

Dr. Frank Hoffman confirmed that we are living in a new age of autonomy, admitting there is a breakthrough in robotics and their convergence with warfare, and that this will alter the capacity of states. This new age will combine machines and computers in a way that will allow them to work together in groups to make autonomous decisions. There are several implications for this new age:

1. This new age of autonomy may lessen the ability of governments to handle their own populations.
2. Wars may cost *less* in terms of human lives.
3. The moral application to war may diminish.
4. Computers may learn and disobey.

Although we may be a few years out from this, according to Hoffman, we have to plan for it, and plan for when and where we will keep a "man in the loop."

Dr. Erik Gartzke said the US government does a really good job at anticipating and planning for things that never actually lead to our demise. It's the things we don't worry about that are problematic, he said, because we don't even know we should be worrying about them. There are two questions that should underlie the use of violence: whether or not you have to act with physical violence to get what you want, and what will happen if you do. Advances in technology can help balance these questions, in terms of how new technology interacts with existing capabilities and how they can offer advantages. However, we should beware of overstatements about engineering technology, such as how it is speeding up the pace of operations. Remember, he said, electrons are fast, but the people who move the electrons are slow. He discussed that in this new age we may be witnessing a second "cult of the offensive" (this term refers to the offensive-dominant mindset that favored surprise and first-mover advantages that fed the security dilemma in the lead-up to World War I). Given our advantage in fires, there should be a second-mover advantage. "The mirror image of surprise is deterrence," and given the chance to move second in rock-paper-scissors, said Gartzke, "you win every time."

Maj. Gen. (ret) Bob Scales called for everyone to avoid overestimating the importance of all new technologies—some things are cool to talk about, but at the end of the day they need to be tied to the changing nature of war. In war, there is a balance between killing power (comprised of lethality, range, and precision) and maneuverability (comprised of speed and protection), and technology *can* shift this balance. Today, the technology of warfare has shifted the balance from maneuverability to firepower, which is dangerous because these technologies are shared. Scales said we can restore our advantages and our dominance in the offense in two ways: returning to shock and awe (increased killing power); or the disaggregation of connectivity.

The panelists were asked if there is disagreement on what challenge we should address first. Is it a question of understanding what we do not know or of what we need to prioritize? Hoffman rephrased the question: "Is the future returning to the past? Are we entering high-intensity, kinetic operations or information wars? Socioeconomic wars? Or grey-zone conflict?" Scales answered that we need to know what war is going to look like, but we're not great at guessing correctly—the objective is not to get it

right, but to avoid getting it totally wrong. Zalman said we need a better process for predicting, as uncertainty is very real, and we can't possibly plan for everything

The panel was asked what the tension between automation, people, and urbanization means for the future of fighting wars in cities. Zalman answered that we can't really say if war will be in an urban space in the future. Urban conflict may happen by accident; for example, if we use drones, our targets may move to urban settings. Scales reframed the question: Are cities a problem to be avoided at all costs? Are they in fact sanctuaries, or do they perhaps provide militaries a strategic advantage? Hoffman claimed we do not see tons of automation in cities and expects to see more "Fallujah 1, not Fallujah 2 or Mosul," insofar as the fighting can be expected to be lethal and firepower-intensive, not a siege or slow drip of occupation.

Panelists were also asked a question that permeated and would resurface through the conference proceedings: Are we at war? The panel answered somewhat ambiguously: We are at war, they agreed, but not in the sense of how we usually define war. We are involved in a conflict with countries that are undermining our alliances, democracies, economy, and diplomatic relationships. Another questioner asked: Can and should we aspire to maintain dominance in these technologies (not just technology, to be precise, but the ability to intersect technology with war)? The question will also resurface in later panels. The panelists agreed on the need to work on the organizational capacity of militarily adapting to the unknown. Finally, the panel was asked if limited conventional war is even possible given today's technologies. What would a war in this new age look like? Panelists underscored the need to think more about the nature of competition, not the scale of competition.

Conclusion

One panelist put it bluntly, capturing the theme of the conference at large: "What the hell is future war gonna look like?" This panel emphasized that war cannot just be seen as a clash of machines. A human will always be directing the fight at some level, to illuminate and cut through the dimly lit fog of war. After all, most of what the military does is "nothing at all," as deterrence theory tells us. That is, most of what we do is posture through diplomacy. So then how do we leverage new technologies to maximize our ability to deter yet minimize our need to be forward deployed everywhere at once, balancing lethality, range, and precision? Balancing all these parts is harder in modern war than in, say, the Roman version of war. There needs to be a national conversation of what our priorities are, as the military has lost its intellectual emphasis on hypothesis testing and net assessment over the past twenty years.

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Panel Session 2 – Fake News, Real War:
How to Manage a Complex IO Landscape

Panelists

> Mr. Clint Watts, FPRI
> Mr. Brent Colburn, Princeton
> Mr. Graham Brookie, Atlantic Council's DFRLab

Moderator

> Mr. David Patrikarakos, author of *War in 140 Characters*

Motivating Questions

> *What role should social media play in our conceptualization of modern warfare?*
> *What are our chief vulnerabilities in the information domain?*

Prompt

The information space is a domain in which the United States is perceived to be fighting at a disadvantage, due to its adherence to norms, rules, and the laws of war. How is information warfare today different from the "active measures" of decades past? How can the US military better position itself to fight, deter, and defeat our adversaries when it comes to information operations? How should we interpret the "battlefield" in this space? What role should social media play in our conceptualization of modern warfare? This panel is tasked with doing a forensic analysis of the information space, and to pinpoint where the United States comes up short. From Ukraine to Utah, Russia has weaponized information and sought to undermine the integrity of democratic elections. What are our chief vulnerabilities in this domain? What are the digital tools available for the US military to "fight fire with fire"?

Discussion

Mr. Clint Watts kicked off the discussion by asking whether we are at war now and if there is a role for the military. Both Russia's and China's militaries regularly use disinformation and cyber tools. Russia, in fact, does not consider information warfare as a different domain. China is conducting an economic war paralleled by and reinforced by its information operations (IO). In other words, our adversaries do not divide these domains up, so should the United States? Watts worries that if the US military gets involved in the cyber domain without a commitment to win, then action is useless and harmful. "In terms of IO," he warned, "if you're not going to fight to win, don't get in." Watts also emphasized the importance of human and national agency: "Bots only work if you don't know about them," he said,

adding that the Balkanization of the internet will change warfare. He floated the idea that "maybe we need to cede that part of the battlefield."

Mr. Graham Brookie talked about disinformation, and how our adversaries fight in full-domain mode. Fake news is the wrong term, he said, given its political connotations, and he distinguished "misinformation" (inaccurate information, but not necessarily involving deliberate deception) from "disinformation" (which involves false information intended to deceive), arguing that the distinction is important so we can counter disinformation accordingly, create digital resilience, build media and digital literacy, and maintain credibility (using open sources). He also said we need to solve our internal problems, and hold ourselves accountable first (e.g., intellectual dishonesty in political campaigns).

Mr. Brent Colburn pointed out that the US military and bureaucracy lacked imagination and exhibited hubris as they thought that what happened in Ukraine would not happen in the United States. The administration and military were blindsided by what allegedly happened in the 2016 elections. Our adversaries have different structural abilities since they fully integrated cyberattacks in their operations (especially Russia). The United States lacks this, a function of its values-based constraints. There are other structural barriers. First, our competitors can pick up a phone from central command and make something happen. Second, our values mean we cannot always "fight fire with fire" by, for instance, creating an American equivalent of *Russia Today* (RT). Third, collectively, we lack political will. Colburn suggested doubling down on cyber and boosting our partnership with Silicon Valley, but cautioned that this will require understanding its culture and aligning our incentives (a subject that is touched upon in the closing keynote). US tech companies see themselves as "citizens of the world," operating in a global market with a different culture that does not see working with the government appealing. Chinese companies are forced to work towards "China First." The collective challenge is to work on these issues together—government, tech companies, the media—and any solution is based on citizens and consumers as the primary audiences. In World War II, to consider a historical corollary, there was full industrial participation; there was a true war and companies participated. Nothing of the sort exists today.

Conclusion

The United States is hamstrung in this space because of the bureaucratization of its military and government, and so it is flabby, risk-averse, and slow. Unlike its adversaries such as Russia, which have clearly defined goals and operate almost with the speed and clarity of a startup, when it comes to IO the United States struggles with issues related to speed, values, and messaging. "If we don't know what we believe in, we can't win in counter-disinformation," said Clint Watts. The United States also suffers from hubris, as much of the advances in IO previously occurred in Ukraine, yet we either ignored them or dismissed them as a feature of that war. Outfits like Elliot Higgins's Bellingcat are revolutionizing the ability to call out our enemies during their disinformation campaigns. Yet, the US military and government still lags when it comes to effective messaging, deterrence in this space, and effectively

punishing those who lie and spread disinformation. The question for the US military is: How do we raise those costs?

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Panel Session 3 – Beyond 'Slaughterbots': Reimagining War with No Soldiers

Panelists

> Ms. Rosa Brooks, Georgetown University
> Lt. Col. Christopher Korpela, Army Robotics Research Center
> Dr. Jacquelyn Schneider, US Naval War College

Moderator

> Dr. Paul Scharre, CNAS

Motivating Questions

> *What will a soldier-less future battlefield look like?*
> *What are the ethical or trust issues that arise between man and machine?*

Prompt

What does a war with no soldiers look like? Are developments in robotics, AI, and gene therapies that target genetic vulnerabilities making human soldiers obsolete? As one member of this panel has asked, "Why bring an army to war when you can simply bring a scientist and a test tube?" How do these new technologies mitigate or make redundant traditional military tasks, like taking and holding territory or the provision of security? How do cultural and institutional norms factor into this new battlespace and shape the conduct of what Russian Gen. Valery Gerasimov called "contact-less warfare"? This panel discussed the implications of what a soldier-less battlefield might look like, given advances in machine learning and robotics. Motivated in large part by Ms. Brooks's 2016 book *How Everything Became War and the Military Became Everything*, the panel discussed how these changes in costs will change the threshold of war, and whether or not a completely soldier-less battlefield of killer robots is plausible or desirable.

Discussion

Dr. Jacquelyn Schneider opened the discussion by arguing how we often hear the future is robotic, and that unmanned is the future. But we need to think about how we can take pragmatic steps that are in the realm of possibility, and how these future technologies can fit in the future. Historically, she noted, past military revolutions have been driven by an increase in lethality and human involvement, not distance or range itself. Secondly, today's wars that we are choosing to fight in, in different ways, depend on the type of cost we are willing to endure, whether human, political, or economic.

Lt. Col. Chris Korpela made the case that Americans overestimate where we are in terms of current technologies—the robots we see being developed in the media would actually be hard to make operationally functional. "Where we are today, with data farming and hacking, is plenty scary," he said, "But I don't see a soldier-less battlefield in our lifetime, as human agency is critical for warfare." The areas where he sees greater autonomy are in autonomous weapons extending human control, in the humanitarian sector, or in being able to test these weapons. The two biggest barriers going forward on this front, he said, are trust and culture.

Ms. Rosa Brooks said we face a potential future in which all traditional forms of warfare coexist with forms that are highly individualized and increasingly non-violent and non-lethal. We need to focus on the ways in which these changes affect our laws, as well as our ability to maintain our laws. States and non-state actors have an expanding non-kinetic toolbox to coerce and control for political ends, and it's legally confusing due to the changes in how armed conflict is covered by the law. Lots of actors could exploit this legal ambiguity, as well as the administrative ambiguity it brings, such as who counts as warriors, who takes care of which problems, and so forth. Less manpower-intensive forms of warfare can also lead to a decrease in the spread of democratic values, as high manpower forms tend to lead to the expansion of political rights.

Given that international politics is driven by coercive pressure and threatening, in a world of autonomous warfare, do threats become cheaper? The panel agreed there is some element of truth to the fact that if no one is willing to risk lives, threats become cheaper, and if you're willing to risk lives, your threat is taken more seriously. The panel was also asked: How do we balance "can we do this" versus "should we do this"? We may have AI to help with training, planning, etc., but no computer can completely replace a human. Still, what does the removal of soldiers from warfare look like for the near future? A lower cost of human lives may enable us to be involved in more places, and may lower the threshold of using military force. This will also challenge civil-military relations going forward, as one of the hallmarks of any profession is its maintenance of a specialized body of expertise, but it is getting harder to make this claim, given the personalization of warfare. Further, it will challenge the military's identity going forward.

Conclusion

Generally speaking, society believes we are ten years ahead of where we actually are, technologically, when it comes to automation and soldier-less warfare. Getting outside the lab and into the operational domain is very difficult, and advances will be incremental. From a military perspective, there is a greater fear of server farms than killer robots. Yet, when it comes to public perception, there is also an attitudinal gap on this issue: the public protests the use of drones, but not Facebook or Amazon, which regularly use facial recognition technology. The panel agreed that we should never cede human agency over the operational level of war.

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Panel Session 4 – Rage against the Machine Learning: Debating AI in Modern War

Panelists

>   Dr. Timothy Hwang, Ethics and Governance of AI Initiative
>   Mr. Paul Scharre, CNAS
>   Ms. Elsa Kania, CNAS

Moderator

>   Mr. Andrew Liptak, *The Verge*

Motivating Questions

>   *How might AI and machine learning shape our current and future wars?*
>   *How is the ethical debate over its use harming or helping our understanding of its wartime*
>   *functions?*

Prompt

AI is considered by some to be a revolutionary game changer in the annals of warfare. This panel was tasked to unpack the various theories on how AI will influence the current and future battlefield. Is AI "inherently unstable," as Henry Kissinger recently opined? Will our investment in software like AI come at the expense of our focus on hardware (soldiers, weapons, etc.)? Or is its application a force multiplier for our frontline soldiers capable of harnessing its unblinking computational powers? Dr. Kai Fu Lee said recently that, "In an age of AI, Big Data is the new oil, and China is going to be the new Saudi Arabia." However, do AI's low barriers of entry for weaker adversaries risk fueling an AI arms race of sorts or leveling the playing field with our near-peer competitors? Finally, what might a comprehensive national or military strategy on artificial intelligence look like?

Discussion

AI is being harnessed by countries like China to enhance their economic power and great-power rivalry. Smaller states, too, have advanced on this front because of lower barriers to entry, a theory Michael Horowitz has advanced. Only a handful of actors have advanced AI programs because they are expensive to develop, but once an algorithm is trained, if it leaks it is easily usable and easy to proliferate. Still, it should be noted that AI is not a singular technology, and it will not be easy to see which side is winning on this front. On some issues, like facial recognition technology, China wields a competitive edge. On others, such as R&D, the United States is doing better. The United States and

China are deeply interdependent in this field, despite illegal transfers of technology or the Chinese exploiting academic partnerships for espionage purposes.

Asked about bots and disinformation, Ms. Elsa Kania said that 2016 will seem trivial to what we will witness in the future. As the prompt above suggests, while China might be the new Saudi Arabia because of its vast stores of data, the applications used to collect such data may be different than the ones used in the West, and so different data is collected.

The question to ask is not whether the United States and China are in an AI arms race, redolent of the Cold War, but rather what problem we want AI to solve militarily (e.g., recognizing objects). More specifically, what are the inputs we need for modern machine learning? AI is still a brittle tool in its infancy; it requires reams of data, properly running machines, and human talent. The country able to harness these resources will emerge victorious in this race. Mr. Paul Scharre warned that there is a lot of misinformation in this space. AI, used correctly, is very powerful and can conduct some tasks more efficiently than humans. However, there are lots of safety concerns, not to mention obvious vulnerabilities. Much of what the military does is logistics and moving forces; where AI can assist operations is through things like predictive maintenance to mitigate supply chains and tackle logistical tasks. Another important area of development is in the spread of global handheld device users—with two-thirds of the world's population now using mobile phones, villagers can now report where our forces are in real time.

The panel was asked if the United States needed to "China-fy" to win the AI arms race. AI, it was agreed, is an actively evolving field. Machine learning is malleable and we can shape it without having to follow China's model. In China, the military is primarily responsible for collecting and using AI data. It is a tool to manage its own population. China has data for the Chinese landscape but US companies have global data—what Scharre called a "Digital Silk Road"—and greater access to diverse data. More problematic, he said, is that the Department of Defense has a "thinking" and "doing" gap. It should double down on developing its STEM talent as a strategic resource, and commit itself to training more engineers. While the proposal for a joint AI center is a promising first step, AI should be a first-level major in professional military education to expand the pipeline of trained engineers into the military ranks. Other setbacks are DoD's reputation for being too bureaucratic for private industry to partner with, but also its issue with messaging (it was suggested the Pentagon should take "lethality" out of its messaging). A final challenge is the US immigration policy, which makes recruitment of AI specialists from abroad more difficult.

Conclusion

Because of its inherent uncertainty, AI can exacerbate the security dilemma and the tendency toward arms race dynamics. However, there is also a danger of overhyping its impact on future warfare. Machine learning, at its essence, is just really good statistics, and so it is doubtful that AI will change the true nature or character of war. Talk of an AI arms race with China may also be overblown. China has declared its intention to be a global leader in this space by 2030. But we should be reminded that

China's People's Liberation Army has not fought an actual kinetic war since 1979, so it engages in non-kinetic spaces to achieve dominance. The things to worry about are technology's impact on the economy and the increase in income inequality and the effects on democracy it fosters. Even though technology may be democratizing to some degree, it may not be great for democracy (for example, the use of social media by autocrats).

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Panel Session 5 – Beyond the Horizon Scenarios with our Near-Peer Adversaries

Panelists

> Mr. Michael Kofman, CNA
> Mr. Isaac Stone Fish, Asia Society
> Dr. Antulio Echevarria, US Army War College
> Dr. David Johnson, RAND

Moderator

> Ms. Andrea Goldstein, Fletcher School

Motivating Questions

> *What is the likelihood of great-power war with Russia or China and are we prepared?*
> *What might such a conflict look like?*

Prompt

As a coda to the conference proceedings, this panel provided a beyond-the-horizon perspective on future warfare and an opportunity for panelists to offer their best net assessment of what to expect beyond the horizon. The conference takes its inspiration from Dr. Echevarria's 2014 book, *Reconsidering the American Way of War*. With the United States presumably moving away from the global war on terrorism and stability operations and focusing more of its military attention on great-power conflict, does this favor traditional notions of the "American way of war"? Moreover, how does this war footing square with, say, the Chinese or Russian "way of war," if such things exist? The Army has laid out a series of modernization priorities, from long-range precision fires to robot-driven combat vehicles, yet are we doing enough and focusing on the right areas to deter China and Russia from redrawing the map in Eurasia and East Asia?

Discussion

The panelists discussed the implications of a war with our adversaries, most notably China and Russia. They agreed that, although other countries may be acting in warlike ways toward us, we are not currently at war. They also all emphasized the need for the US military to effectively innovate to remain competitive in the international sphere.

Dr. David Johnson said there is a turning point in war, and we must look to the past—such as when horses became obsolete—to predict how we will deal with this change. There will be new questions,

such as whether new technologies will really change everything or just improve our current operations. Presently there is a deficiency in the Army, in the sense that it must have a clear problem it's trying to solve in order to innovate. He said we know what our near-peer adversaries will do in 2020 or 2025 because they publish their national security strategies online. "We have all the info we need to do a threat-based net assessment," said Johnson. But the question is how we innovate to meet these challenges.

Mr. Isaac Stone Fish said the future of war, at least with respect to China, will be political warfare in which conventional weapons aren't used. Information gathered by adversaries like Beijing may have, in itself, enough coercive power to force changes. The Chinese leadership have two goals when it comes to political warfare: First, to convince the United States that China is not a threat and change how we frame our disputes with China or even the language we use to identify geographical locales (e.g., the South China Sea). Second, it wants the world to see the inevitability that China will dominate Asia. To do this, it seeks to weaken American support for Taiwan—and frame the dispute as a domestic issue. Finally, part of China's political warfare strategy is to take a Singapore-like approach to the media. That is, expect it to bring suits against American newspapers operating in China to stifle an open press. Stone Fish emphasized that we cannot "out-China China," but rather we should leverage our soft power and deter Muslim countries from aligning with China by reminding them of Beijing's harsh treatment of its Uyghurs.

Mr. Michael Kofman predicted that a likely war between Russia and the United States would not be a large-scale conflict on the European continent, because it would likely last only a couple of weeks. If Russia were to lose such a war, he argued, it would be likely to resort to nuclear weapons, so we must build up a strategic toolkit to prevent that from happening. How do we deal with the potential for a high-impact conflict? Organize strategically; develop our operational range; and become more tactically innovative.

Dr. Antulio Echevarria reiterated that the United States has a historical pattern in its use of force, whether through attrition or decapitation. Out first choice traditionally isn't military intervention, but economic coercion, then maybe clandestine operations, and finally military intervention. The best way to move forward is to create a more integrated view of warfare, and bring together all the aspects of war. These include social, political, military, economic, and technology aspects, and we need to think about more than one at a time to be effective on the future battlefield. "Can we think about more than two dimensions of war at the same time?" he asked.

Asked whether the United States was at war, the panelists answered that it depends on our definition of war, as there is a spectrum, and the normative state of peace may not actually exist. We are in a confrontation, and how we handle this may determine whether or not we go to war. What are we doing to compete with China? Stone Fish said we shouldn't overestimate China's ability—China and Russia have more to fear from each other than from the United States. Kofman said that Russia has chosen not to see China's rise as a threat and predicted that Moscow will balance with China against the United

States. China, meanwhile, has not made its choice yet—the Chinese government could choose to bandwagon or to balance. According to the panel, we also need to think about the private sector's relationship with China, and getting Chinese money out of the hands of ex-officials who work in consulting. Can the United States create a virtuous cycle of innovation, not dependent upon our adversaries? Maybe not, Johnson answered, as you cannot really innovate unless you have a set of adversaries, know their capabilities, and understand the problems you need to solve. Max Brooks asked what we can do to vaccinate our soldiers from cyber blackmail, and ensure cohesion in the military. Stone Fish answered that we can't keep members of the military off social media, so we need to educate them.

Conclusion

Net assessments of an over-the-horizon war with either China or Russia look starkly different from one another. For Russia, the objective is to sow panic and chaos among the enemy—or what one analyst has called "strategic anarchy"—and this includes the early introduction of non-strategic nuclear weapons into the conventional battlespace. For China, by contrast, it means engaging in political warfare to change perceptions of how Americans view the Chinese and "flooding the zone" with positive imagery so they will not be viewed as a threat. Escalation management will be critical, given that we are living through the second era of nuclear modernization. There remains a first-strike offensive bias among Russia's general staff, cultivated by its history fighting in World War II, whereas the Chinese leadership is more cautious militarily. To combat both threats, as the panel asked, can we think about more than two dimensions of war at the same time? There is also some uncertainty over whether Russia and China will balance or bandwagon against the United States, which will determine the likelihood and nature of future war with either. The historical patterns of the "American way of war" have vacillated between attrition and annihilation. We may be at a new inflection point, however, insofar as we cannot "out-Russia Russia" or "out-China China," according to the panelists. "We know what they'll do in 2020 or 2025, [because] they publish it," as one panelist put it. "We have all the info we need to do a threat-based net assessment." Like the period after the 1973 Yom Kippur War, which saw the advent of innovations like AirLand Battle, this will require greater experimentation, integration of forces, and doctrinal innovation to deter our adversaries going forward.

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Participant List

Name	Affiliation	Role
Dr. Birth Anders	Harvard University	Moderator
Dr. Lionel Beehner	United States Military Academy	Participant
Mr. Graham Brookie	Atlantic Council's DFRLab	Panelist
Dr. Aaron Brantly	Virginia Tech University	Participant
Mr. Max Brooks	Author of *World War Z*	Moderator
Dr. Risa Brooks	Marquette University	Moderator
Maj. Joseph Byerly	United States Army	Participant
Maj. Jess Caddell	United States Military Academy	Participant
Mr. Matthew Cancian	Massachusetts Institute of Technology	Participant
The Honorable John Carlin	Aspen Institute	Keynote
Mr. Brent Colburn	Princeton University	Panelist
Col. Liam Collins	Modern War Institute	Sponsor
Lt. Col. Nate Davis	United States Military Academy	Participant
Dr. Antulio Echevarria	US Army War College	Panelist
Mr. Isaac Stone Fish	Asia Society	Panelist
Dr. Jai Galliot	University of New South Wales	Participant
Dr. Erik Gartzke	University of California San Diego	Panelist
Mr. Dan Gettinger	Bard College	Participant
Brig. Gen. Steve Gilland	United States Military Academy	Participant

Ms. Andrea Goldstein	Tufts University	Moderator
Maj. Zach Griffiths	United States Military Academy	Participant
Dr. Bruce Gudmundsson	Modern War Institute	Participant
Dr. Frank Hoffman	National Defense University	Panelist
Dr. Michael Horowitz	University of Pennsylvania	Panelist
Dr. Timothy Hwang	Ethics and Governance of AI Initiative	Panelist
The Honorable Bruce Jette	Office of the Secretary of the Army	Keynote
Dr. David Johnson	RAND	Panelist
Dr. Mary Kaldor	London School of Economics	Panelist
Ms. Elsa Kania	Center for a New American Security	Panelist
Mr. Robert Kaplan	Author of *The Revenge of Geography*	Keynote
Mr. Garry Kasparov	Author of *Deep Thinking*	Keynote
Mr. Michael Kofman	Center for Naval Analyses	Panelist
Dr. Nina Kollars	US Naval War College	Moderator
Dr. Rita Konaev	Modern War Institute	Participant
Lt. Col. Christopher Korpela	Army Robotics Research Center	Panelist
Dr. Ron Krebs	University of Minnesota	Participant
Mr. Richard Kuzma	United States Navy	Participant
Maj. Ryan Leach	United States Military Academy	Participant
Col. (ret) Steve Leonard	Kansas University	Participant
Mr. Andrew Liptak	The *Verge*	Moderator
Mr. Mike Lyons	CBS Radio News Network	Participant
Dr. Jahara Matisek	United States Air Force Academy	Participant

Maj. Dan Maurer	United States Army	Participant
Mr. Albert Mauroni	US Air Force Air University	Participant
Col. William Ostlund	United States Military Academy	Participant
Mr. David Patrikarakos	Author of *War in 140 Characters*	Moderator
Dr. William Reno	Northwestern University	Participant
Maj. Gen. Mick Ryan	Australian Defense College	Panelist
Mr. David Sanger	*New York Times*	Keynote
Maj. Gen. (ret) Robert Scales	Close Combat Lethality Task Force	Panelist
Dr. Paul Scharre	Center for a New American Security	Moderator
Mr. Nicholas Schmidle	The *New Yorker*	Moderator
Dr. Jacquelyn Schneider	US Naval War College	Panelist
Dr. Christopher Sims	King's College London	Participant
Mr. Andrew Sollinger	*Foreign Policy*	Participant
Maj. (ret) John Spencer	Modern War Institute	Participant
Dr. Raj Shah	Formerly Defense Innovation Unit	Keynote
Mr. Jonathan Tepperman	*Foreign Policy*	Moderator
Mr. Clint Watts	Foreign Policy Research Institute	Panelist
Lt. Gen. Eric Wesley	Army Capabilities Integration Center	Keynote
Lt. Gen. Darryl Williams	United States Military Academy	Participant
Mr. Ali Wyne	RAND	Participant
Dr. Amy Zalman	Strategic Narrative Institute	Panelist