

## AY 2020-2021 Research Questions

### Political Science

- Why is 21st century deterrence more challenging than 20th century deterrence? Are there strategies to mitigate this?
- What are the key deterrence challenges with Russia, China, DPRK, and/or Iran? How can these be mitigated to enhance deterrence operations?
- Why is the China/Taiwan dispute a deterrence challenge for the U.S.? Are there different/new deterrence strategies that the U.S. can implement?
- Why do actions below the level of armed conflict or in the grey zone challenge deterrence strategies?
- Do deterrence strategies change based on a domain?
- What is the relationship between competition and deterrence? Can strategies of competition undermine or enhance deterrence strategies?
- The United States, Russia and China all have ongoing modernization programs to their nuclear arsenals. What is the impact on competition and deterrence?
- How has the trade war impacted deterrence strategies with China? How does less economic entanglement impact deterrence?
- What role do allies play in U.S. deterrence strategies? How can the U.S. better incorporate allies into deterrence operations?
- Is there still a role for arms control in the 21st century?
- From international agreements such as the Outer Space Treaty to bilateral agreements such as the New START Treaty, the United States has a long tradition of participating in multi and bilateral arms control regimes. What most of these have in common is they deal with capabilities that can render a strategic attack such as nuclear, biological or chemical weapons and their delivery systems. However, as technology has advanced, capabilities able to render non-nuclear strategic attacks continue to expand (e.g., Cyber, Hypersonic Weapons, Counter Space). Is arms control a useful approach to address these expanding forms of potential strategic attack? Is this an avenue to encourage non-traditional arms control partners (e.g., China) to become engaged in the process? How can these treaties be

enforced? Do traditional nuclear treaty verification regimes apply? Why or why not? Can arms control produce outcomes that contribute to deterring non-nuclear strategic attack?

- Can courses of action meant to compel negatively impact deterrence, and vice versa? If in a crisis during which both compellence and deterrence are in play, how might associated courses of action be prioritized/deconflicted from cancelling the other out? At best, how might they be complementary?
- The era of "great power competition," involves U.S. efforts to maintain the international status quo versus Russia and China's desire to establish a new international order. How does great power competition described in the 2017 National Security Strategy and the 2018 National Defense Strategy enhance and or inhibit deterrence? What are some effective strategies to mitigate escalation risks involved in this new age of intense competition?
- Cost imposition strategies focus on eliciting an adversary response that creates a hardship differential favoring the initiating nation and are very useful in the competitive spectrum. Part of this elicitation can be achieved through selective conceal and/or reveal of one's resource allocation or capability development choices. Cost imposition strategies consider a range of cost factors that an opponent has and what actions the initiating state (the U.S.) might take, and attempts to anticipate the decisions for strategy and resource allocation that the opponent is likely to take in response to that U.S. action. What changes are they likely to make to their programs, posture, and operating concepts? (The opponent's measure of effectiveness consists of the capability advantage created by the choice divided by the commensurate cost or hardship disadvantage.) The idea is to influence an opponent's choices such that they are burdened by a hardship differential or disadvantage. Given the forgoing, develop one potential cost imposition strategy specific to an opponent.

### **TECHNOLOGY**

- How might machine learning and modeling and simulation generate optimal attack paths in interdependent systems within a state to generate a non-kinetic strategic attack? Can it also assist in modeling mitigation of those vectors?
- What areas of decision support are appropriate for implementation of machine learning?
- What are the opportunities and risks of quantum gravity sensing capabilities to assured second strike?
- How might one leverage cyber tools to combat and to engage in information warfare?
- What nascent technologies might drastically improve situational awareness and how?

- What considerations may help draw parties to the table for multilateral talks on establishing norms and/or treaties for emerging technologies?
- Can you imagine and plan the use for a combination of an existing technology/weapon and an as-yet-to-be-fielded technology creating an asymmetrical strategic advantage?
- How can we leverage machine learning to identify vulnerabilities in fielded systems?
- How might we holistically represent, integrate, and manipulate sensor, intel and other data for decision support into useful configurable graphic visualizations?
- How could one use block-chain for identification of adversary activity in the virtual world?
- With operationalization of networked/swarming autonomous systems on the battlefield and as humans are taken out of some combat loops, will we encounter an environment where the loss of troops is less of a consideration in the Cost of Action quadrant of our decision calculus? Could this evolution of the physical environment require persistent autonomous engagement using AI-enabled systems in much the same way the cyber domain has evolved?

### **Psychology**

- Traditionally economic theories, such as prospect theory or expected utility theory, have been applied to deterrence studies to describe how humans make decisions. What are the weaknesses with this application? Are there psychological theories that are better suited to describe or analyze deterrence?
- How is deterrence defined and practiced in other nations? How is it different or similar to how the U.S. defines and practices deterrence? What are the implications if U.S. adversaries define and practice deterrence differently than the U.S.?
- What is belief perseverance? How does it impact our ability to influence our adversaries for effective deterrence campaigns?