

FY19 KEY TOPICS: PASCC welcomes all proposals for studies and strategic dialogues that enable DoD and the USG to prepare for and combat WMD and improvised threats and to ensure nuclear deterrence. This year PASCC also highlights the following topics that are of particular interest:

1. Impacts of new technologies on the development of WMD or on efforts to counter WMD, including but not limited to: blockchain technology development, artificial intelligence, 3D printing, human augmentation, quantum computing, synthetic biology, additive manufacturing, autonomous systems, nanotechnology, or other emerging technologies within a time horizon of 5 to 10 years;
2. Improved WMD risk assessment to better address and model challenges associated with WMD risk (probability, consequences, vulnerabilities, threats), to include examination of lessons learned and quantitative and qualitative methodologies (for example modeling and simulation, Bayesian methods, Extreme Value Theory, and others) employed in other disciplines or industries (finance, biology, psychology, and others as appropriate for the available data);
3. Detection, characterization, and attribution of WMD use, including options for/deterrence effects of conducting attribution analysis in gray-zone conflict areas;
4. Assessing the impact of convergence between improvised explosive device (IED) technology facilitation networks and WMD proliferation networks;
5. Assessment of the impact on U.S. strategies to enable DoD and the USG to prepare for and combat WMD and improvised threats and to ensure nuclear deterrence post-JCPOA (whether the agreement expires or the United States withdraws);
6. Concepts for understanding and shaping the dynamics of strategic stability among global and regional powers possessing nuclear weapons (specifically Asia-Pacific and South Asia), including the strategies and motivations of different nuclear powers and U.S. efforts to promote stable deterrence relationships;
7. Specific approaches, concepts, and methodologies for informing future negotiations on arms control agreements or confidence-building measures addressing increased military competition (to include new weapons systems) among the major powers, particularly the United States, Russia, and China;
8. Assessment of signaling by WMD-armed adversaries to determine how signaling has evolved in the past 10 years and with what implications for U.S. deterrence postures and assurance policies;
9. Assessment of the impact on U.S. alliances should a non-nuclear ally or partner decide to initiate a nuclear weapons program; and
10. Identification and analysis of indicators and warnings in understudied regions as they relate to proliferation networks, intersections of global health security and biodefense, new weapon programs, and strategic stability.

Focus Areas: In addition to the above FY19 key topics, the six focus areas below identify areas for inquiry that are of enduring interest to PASCC.

1. **Countering-WMD proliferation.** Working with interagency partners, DoD seeks to defeat WMD proliferation pathways through interdiction, network disruption, and other activities that target the will, capacity, and capabilities of potential adversaries.
 - a. Enhanced understanding of WMD proliferation pathways with a focus on dedicated proliferation networks as well as enabling actions by witting and unwitting actors in the scientific, technological, academic, and commercial communities;
 - b. New or improved means and methods to delay, disrupt, or dismantle WMD proliferation pathways and associated networks;

- c. The effectiveness of current U.S. Government or multilateral partnership efforts to prevent and counter WMD proliferation;
 - d. Building international capacity and mechanisms of cooperation, including in understudied regions; and
 - e. Development of comprehensive policies and strategies to forge a more holistic picture of WMD proliferation challenges, address gaps, and leverage synergies.
- 2. Countering improvised threats and facilitating rapid capability delivery.** DTRA enables DoD to counter improvised threats with tactical responsiveness and through anticipatory, rapid acquisition in support of CCMDs' efforts to prepare for and adapt to battlefield surprise in support of counterterrorism, counter-insurgency, and other related areas, including countering IEDs.
- a. Identifying and defeating adversary networks and pathways for creating and delivering improvised threats, to include via unmanned aerial systems; and
 - b. Preparing, adapting, and responding to improvised threats, to include via accelerated acquisition models that enable rapid delivery of adapted or new capabilities to address evolving threats.
- 3. Countering-WMD employment.** Identification, characterization, or analysis of new or improved approaches for:
- a. Force protection and countermeasures;
 - b. WMD defeat;
 - c. Operating in WMD-contaminated environments;
 - d. Defense against non-traditional means of delivering WMD (e.g., biovectors, hypersonic platforms);
 - e. Metrics for assessing progress in reducing WMD threats;
 - f. Enhancing partner capacity to defend against and respond to WMD use;
 - g. Intersections between homeland defense and CWMD;
 - h. Efforts to improve resiliency;
 - i. Assessment of current requirements for WMD defeat, defense, and elimination on the Korean Peninsula;
 - j. The potential impact of "limited" nuclear use on U.S. conventional military operations, and strategies and measures to counter this impact;
 - k. New research methods or concepts for calculating the potential impact of chemical agents on military personnel; and
 - l. Analysis of what the DoD "steady state" would look like 6-12 months after a nuclear weapon loss/theft by a non-state actor; what the security situation would be months/years after an improvised nuclear device detonation.
- 4. Deterrence, dissuasion, assurance, stability, and escalation.** The current geopolitical landscape – including changing strategic relationships, emerging regional challenges, and capability enhancements – requires new and adapted approaches for ensuring nuclear deterrence, combatting the use of WMD through dissuasion, assurance of allies facing WMD threats, establishing or maintaining the conditions for strategic stability between nuclear-armed states, and addressing the risk of escalation.
- a. Evolving requirements for detecting WMD signatures and for WMD deterrence, dissuasion, assurance, and control of escalation risks and dynamics in regional crises and conflicts;
 - b. Identifying, assessing, and understanding factors that determine how state or non-state actors intend to use WMD against the United States, its forces, allies, and partners (to

include motivations, threats, coercion patterns, and use as well as DoD and the Services' abilities to influence these factors);

- c. Assessment of the state of global and regional stability, and the nature of alliance and partner relationships after a conflict resulting from a failure of deterrence/assurance;
- d. Assessment of the potential for escalation, whether due to accidents, incidents, or miscommunication between two or more parties, or as the result of deliberate acts on the part of a potential adversary, and measures to prevent or counter escalation;
- e. Assessment of current understandings of thresholds for nuclear or other forms of WMD employment, and how thresholds may change or otherwise be affected by geopolitical or technological changes; and
- f. Applications of game theory to deterrence postures vis a vis Russia and China with focus on 1) how to model what Russia and China value, and 2) how to hold at risk what they value in order to improve the ability to deter use of WMD for intimidation, coercion, or potential employment in future conflict.

5. Nonproliferation: Regulation, prevention, and denial of WMD by international agreements and cooperative threat reduction (CTR) initiatives. The conditions that shaped earlier approaches to treaties, agreements, multilateral initiatives, and international organizations, and CTR efforts are changing, and international efforts to prevent, limit, or otherwise regulate WMD need to adapt.

- a. The effectiveness of sanctions as instruments of strategic coercion, and assessment of how to determine their impacts on a target economy, leadership, military, and population;
- b. New approaches to future arms control, nonproliferation, cooperative security, and confidence-building measures, including relevant new technologies and novel approaches;
- c. Assessment methodologies for future mutually verifiable strategic arms control agreements as to their acceptable implications for changes in force modification and replacement, and resulting cost savings estimation – i.e., can reductions limit costs and still maintain stability; and
- d. Requirements for and proposed approaches to future global CTR initiatives.

6. Emerging and future threats.

- a. Analysis of the positive opportunities presented by emerging technologies to advance our capabilities;
- b. Development and analysis of public policy measures to incentivize the private sector to build-in security measures to mitigate the down-side potential of emerging technologies;
- c. Methods to discriminate problematic biological activities from benign research (showing credible justification for prophylactic, protective, or other peaceful purposes);
- d. Intersections of global health security and biodefense and analysis of areas for greater leveraging between the two;
- e. Novel approaches to improve existing WMD delivery systems or that result in the development of new delivery systems that CWMD planning will need to take into account;
- f. Gaps in U.S. policy, strategy, or military planning for anticipating and countering emerging threats and measures to close those gaps;
- g. Analysis of the implications of the return of great power competition for DoD CWMD priorities;
- h. New, untapped, or underutilized sources for identifying and understanding emerging threats;

- i. Assessment of how the commercial internet of things could impact DoD and the USG's preparation for and combatting WMD and improvised threats and their ability to ensure nuclear deterrence; and
- j. Acquisition and potential employment of WMD by state or non-state actors that are interested in, but do not currently possess WMD, to include their motivation(s) for acquisition and likely scenarios for use.