



PROJECT ON ADVANCED SYSTEMS AND CONCEPTS FOR
COUNTERING WEAPONS OF MASS DESTRUCTION



ANNUAL REPORT

2015

PASCC

PROJECT ON ADVANCED SYSTEMS AND CONCEPTS
FOR COUNTERING WEAPONS OF MASS DESTRUCTION
NAVAL POSTGRADUATE SCHOOL

For Unlimited Distribution



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Executive Summary

Since 2012, the Defense Threat Reduction Agency (DTRA) has sponsored the Project on Advanced Systems and Concepts for Countering WMD (PASCC) at the Naval Postgraduate School (NPS) in Monterey, California. PASCC's mission is to support DTRA by selecting a portfolio of strategic dialogues and studies to provide over-the-horizon analysis aimed at reducing the threats posed by weapons of mass destruction (WMD) and emerging weapons of mass effect (WME). PASCC is also interested in new means of supporting strategic stability and regional security in regard to WMD/WME, as well as mechanisms for increasing the effectiveness of both deterrence and nonproliferation/arms control efforts.

The dialogues and studies PASCC supports are of direct value to the U.S. government and the broader public. PASCC reports are widely available through its website as well as the NPS-sponsored Homeland Security Digital Library (www.hsdl.org). PASCC also facilitates briefings by project performers at events it organizes twice a year in Washington, DC, as well as assisting in setting up direct meetings with interested government stakeholders responsible for WMD/WME policies. The positive feedback PASCC receives from a variety of stakeholders stems from the thoroughness of its products, their objectivity, and their relevance to current and future WMD/WME threats and challenges.

PASCC sponsors innovative studies by working with a diverse set of research partners. The annual merit-based, peer-review process for selecting projects ensures that DTRA and other stakeholders benefit from the most rigorous research by the best subject matter experts (SMEs) in the field. In FY15, in accordance with the PASCC Broad Agency Announcement (BAA) released the previous spring, PASCC made 27 project awards to a variety of research performers. For FY16, PASCC anticipates 25 project awards based on its most recent BAA and the evaluation criteria of quality, rigor, and technical merits; responsiveness to PASCC's BAA; the qualifications, capabilities, and experience of the performer; and cost realism and efficiency.

PASCC is directed by Professor Clay Moltz of the NPS Department of National Security Affairs. Dr. Michael Malley serves as the Executive Director. Ms. Diana Wueger and Ms. Jumana Kavar provide critical program support. PASCC is also advised by the Center for the Study of WMD at the National Defense University. PASCC governance includes a Senior Steering Group (SSG) that assists the PASCC Director in setting research priorities. The 2015 SSG included representatives from the private foundation community, the national laboratories, the State Department, and other Department of Defense-affiliated entities. In the summer of 2015, PASCC convened a Proposal Review Committee of SMEs from the U.S. government representing various areas of expertise within the PASCC mission space to rate and select projects for FY16 funding.

Highlights and Accomplishments

During the fourth year of operations, PASCC accomplished the following milestones:

- PASCC held a half-day workshop on December 5, 2014, at the Center for Strategic and International Studies (CSIS), briefing a wide range of projects to U.S. officials and non-government experts.
- Between December and June, PASCC made 27 FY15 project awards to 20 different research organizations.
- The PASCC Broad Agency Announcement for FY16 funding was posted on April 23, 2015, leading to 67 high-quality white papers submitted for consideration.
- A revised Memorandum of Agreement (MOA) was finalized between NPS and DTRA and signed in July 2015.
- Fourteen strategic dialogues were held with counterparts around the globe.
- PASCC organized a second half-day workshop on September 25, 2015, with the Brookings Institution.



Gigi Kwik Gronvall (UPMC) presents research findings from the U.S.-Singapore Dialogue on Biosecurity at the December 5, 2014, PASCC semi-annual workshop, held at the Center for Strategic & International Studies in Washington, D.C.

Research Themes for FY15

PASCC's FY15 project awards marked the fruition of a multi-step process. Research projects were initially solicited through a PASCC Broad Agency Announcement (BAA) released on Grants.gov in the spring of 2014. The BAA for FY15 funding emphasized the PASCC research mission in five broad areas:

- 1. Proliferation of weapons of mass destruction (WMD, defined as nuclear, chemical, and biological) and weapons of mass effect (WME, defined as other high-casualty or high-disruption weapons that might have "strategic" effects).** This area includes: dealing with existing global horizontal and vertical proliferation concerns and their causes; developing strategies for preventing or, if prevention is not possible, minimizing the consequences of WMD/WME use; and anticipating new and emerging threats (whether by state or non-state actors). It especially seeks to emphasize strategic weapons of the future, including such topics as infectious diseases, nanotechnology, and autonomous systems. Strategies for improving U.S. resilience and/or recovery in the face of future WMD/WME threats/attacks are a related area of interest.
- 2. WMD/WME delivery systems** (including missiles, aircraft, ships, submarines, and unconventional modes). PASCC is especially interested in research on preventing new modes of delivery (including for biological weapons) and new approaches to managing or combating the spread of existing modes to countries of concern or non-state actors.
- 3. Management and prevention mechanisms/regimes.** PASCC's interests include improvements to and enhanced enforcement mechanisms for existing treaties, regimes, and international organizations responsible for controlling WMD/WME, developing proposals for new international mechanisms (including possible WMD/WME elimination), and explaining differing perceptions of (and assumptions about) WMD/WME.
- 4. WMD/WME issues in less-studied regions** (defined as areas besides Europe/Russia and China). While PASCC supports research on existing WMD/WME-capable states, PASCC especially encourages research on emerging capabilities in countries outside the known realm of possessor states and their implications for the United States. Problems associated with WMD/WME transfer or trafficking are another concern.
- 5. Multi-domain threats to strategic stability.** PASCC is interested in the linkages between strategic stability and emerging dynamics in other domains (space, cyber, maritime, etc.). This area includes research on the prevention of attacks against critical national technical means, infrastructure, and other systems linked to strategic stability. Attribution issues in these domains are another area of interest, as are tools for "measuring" the robustness (or fragility) of strategic stability.

More than 100 white papers were submitted by a total of 55 organizations for evaluation by the Proposal Review Committee in August 2014. Federally Funded Research and Development Centers (FFRDCs) and other organizations precluded in their charters from the non-government grant competition were able to submit project concepts that were evaluated separately on their individual merits.

Applying the evaluation criteria in the BAA and FY15 available funding, PASCC awarded 27 projects – nine dialogues and 18 studies.

Functional and Regional Analyses: New PASCC Projects in FY15

Functional analyses include:

Preparing for the Next
WMD Elimination Mission

Speaking Truth to
Nonproliferation:
Intelligence and Policy
Collaboration

Reconceptualizing
Strategic Stability in Major
Power Relations

Improving Security through
International Biosafety
Norms

Scoping Future Nuclear
Proliferation Risks Using
Socio-Cultural Modeling

Predicting Proliferation:
Forecasting Models as a
Policy and Analytical Aid

Implications of
Advances in Science
& Technology for the
Biological Weapons
Convention



Regional analyses include:

1

- European (U.S.-U.K.-France) Nuclear Dialogue

2

- Baltic States and Poland Track II Strategic Dialogue
- U.S.-Russian Academics of Sciences Dialogue

3

- Drawing Lessons from South Africa's Disarmament

4

- Iran's Evolving Ballistic Missile Doctrine
- Saudi Arabia's Nuclear Future
- Gassing One's Own People: Contrasting Iraq and Syria
- Next Steps Towards a Middle East Free of Chemical Weapons
- Scoping Study for a U.S.-Israel Strategic Dialogue

5

- U.S.-India Strategic Dialogue
- Implications of Indian Tactical Nuclear Weapons for South Asian Deterrence
- The Strategic Chain: Pakistan, India, China, and the U.S.

6

- Trilateral Cooperation in Northeast Asia
- U.S.-Australia-Japan Alliance Cooperation
- Managing Escalation in the Western Pacific

7

- U.S.-China Strategic Dialogue
- Understanding Chinese Nuclear Thinking
- Space, Cyber-space, and Strategic Stability in the Asia-Pacific

8

- U.S.-Singapore-Malaysia-Indonesia Multilateral Dialogue on Biosecurity
- Growing Nonproliferation Challenges in Southeast Asia

Projects Awarded in FY15

The following projects were selected during the 2014 application and review process and received FY15 funding. Project descriptions are based on the original proposals. Some projects will have minor adjustments during execution.

Reconceptualizing Strategic Stability as the Foundation for Major Power Relations

Performer: U.S. Air Force Academy Institute for National Security Studies (INSS)

Principal Investigator: James M. Smith

Cost: \$85,000

Achieving and maintaining strategic stability was the primary objective of the U.S.-Soviet relationship throughout the Cold War. During the Cold War, strategic stability was understood to be a largely quantitative calculation of balance across strategic systems and weapons. In the 21st century, however, the U.S.'s strategic relationships with Russia and China have changed, and the emphasis has shifted to avoiding tension and building a transparent, predictable, and positive set of relationships. This project will investigate the differing definitions and constructions of the concept of strategic stability among these states and regional nuclear powers. It will develop a policy-relevant understanding of the roots, contemporary manifestations, and policy implications of national characterizations of strategic stability by each of these states.

This project will begin with a workshop focused on developing a common template for investigation of each of the global and regional nuclear powers. The study will then proceed in three phases with an application of this analysis in the following order: 1) United States, Russia, and China; 2) Northeast Asia and NATO/Europe; and 3) the Middle East and South Asia. The project will conclude with a final workshop and report.

Next Steps toward a Middle East Free of Chemical Weapons: Strategic Dialogue, Research, and Report

Performer: Arizona State University (ASU)

Principal Investigator: Orde Kittrie

Cost: \$218,000

Since World War II, there have been a number of chemical attacks in the Middle East by state and non-state actors. Today, there is a significant risk that chemical weapons could be used against the United States or its allies by several regional terrorist groups. This research project aims to develop lessons learned and recommendations from past Middle Eastern experiences

with chemical weapons. Researchers will examine regional responses to Libyan and Syrian chemical weapons and Egypt's and Israel's behavior in regard to the Chemical Weapons Convention. They will also look at cooperative Middle Eastern efforts to prevent, detect, and respond to chemical attacks by terrorists and how the international community can more effectively encourage Middle Eastern governments and civil societies to deter and constrain chemical weapons acquisition and use by non-state actors. Findings from this research will enable regional analysts and states to better plan for cooperative efforts and share information.

The Strategic Chain: China, India, Pakistan, and the United States

Performer: The Brookings Institution

Principal Investigator: Robert Einhorn

Cost: \$200,000

This project will examine the strategic linkages among Pakistan, India, China, and the United States. This chain represents a series of relationships that possess the most active nuclear weapon, missile, and missile defense programs in the world. Pakistan looks to India as its principal threat, and India bases its threat perceptions off both Pakistan and China. China, meanwhile, looks to the United States and India. Foremost, the project seeks to identify policies and measures that could promote strategic stability and reduce incentives for arms buildups within the wider strategic chain. The research will also seek to promote a better understanding of the diverse strategic interconnections among these four nuclear powers and examine to what extent this chain represents an obstacle to strategic restraint.

This study will span 15 months and will be based on research conducted by the Brookings Institution in Washington, D.C., New Delhi, and Beijing, as well as with other foreign experts. It will involve two to three former senior officials and scholars from each of the chain's four countries. The key deliverable will be a report and related briefings that provide analysis and recommendations to promote stability and moderate competition.

Understanding Chinese Nuclear Thinking

Performer: Carnegie Endowment for International Peace (CEIP)

Principal Investigator: Li Bin

Cost: \$149,000

Despite more than two decades of official and unofficial U.S.-Chinese nuclear dialogues and scholarship, major questions about the sources of Chinese nuclear thinking remain poorly understood. This project aims to promote debate and understanding about sources of Chinese nuclear thinking through a dialogue between Chinese and American experts. This project also seeks to generate insights that help test competing theories of China's nuclear development, based on either economic scarcity or a specific understanding of nuclear deterrence. It will inform scholars and governmental and non-governmental experts in both countries in an

effort to improve strategic stability and remove rhetorical or political barriers to multilateral arms reductions. PASC funding will allow a series of papers drawn from a prior project to be translated into English and published in a volume, accompanied by Chinese and American assessments of these papers. In addition, there will be two workshops and briefings with several of the Chinese authors in Washington, D.C., to engage American scholars and government officials.

Implications of Indian Tactical Nuclear Weapons for South Asia Deterrence

Performer: Carnegie Endowment for International Peace (CEIP)

Principal Investigator: George Perkovich

Cost: \$104,000

India's new government plans to conduct a review of its nuclear policy, and it is reasonable to assume that the Modi administration will seek to improve India's overall defense strategy and management, which has frustrated Indian military and strategic communities for some time. This project will identify and analyze the options under consideration by Indian decision makers in terms of nuclear capabilities and doctrine. In particular, CEIP will examine the factors that India will have to consider in deciding whether or not to develop battlefield nuclear weapons as it seeks to provide more symmetric and flexible options for countering Pakistan's development and potential use of theater nuclear weapons.

CEIP will develop a typology of Indian perceptions and views and generate hypotheses to test in meetings with Indian and Pakistani counterparts. The resulting monograph will provide recommendations to Pakistan, India, and the United States to minimize the destabilizing effects of the next phase of the Indo-Pakistan nuclear competition.

Managing Escalation and Limiting War in a Conflict in the Western Pacific

Performer: Center for a New American Security (CNAS)

Principal Investigator: Elbridge Colby

Cost: \$149,000

China is modernizing, expanding, and improving its conventional weapons. As China continues to also modernize its nuclear arsenal, the question of how the United States could favorably manage escalation in a conflict with China while achieving its own political objectives is becoming increasingly important. This project will examine the implications of China's growing military power as it pertains to the U.S. ability to effectively deter conflict or, if need be, prevail in a manner that controls escalation.

Drawing on previous studies and discussions with experts, the Center for a New American Security will conduct an analytical study to synthesize the literature on the problems of limiting war and managing escalation, in order to baseline U.S. doctrine and thought on potential conflict. It will also review China's capabilities and identify opportunities for minimizing consequences of WMD/WME use.

Baltic States and Poland Track 2 Deterrence and Strategic Stability Dialogue and Study

Performer: Center for Strategic and International Studies (CSIS)

Principal Investigator: Kathleen Hicks

Cost: \$175,000

New questions arise daily concerning overall NATO alliance cohesion and commitment in the face of Russian aggression. Understanding how deterrence and crisis stability operate within conflict and how crisis actions may affect overall strategic stability is vital to efforts to prevent or de-escalate future tensions, particularly in NATO frontline states. CSIS will examine deterrence challenges that face frontline states on NATO's eastern border with Russia and the implications of military posture and security matters in that geography for overall strategic stability between the United States/NATO and Russia. This project will bring together U.S., Polish, and Baltic experts to review and discuss topics such as forward-deployed, non-strategic nuclear weapons, "gray zone" conflicts, and the importance of energy and economic markets to crisis stability. This project will provide scholars with new knowledge on emerging deterrence challenges faced in light of the Ukrainian crisis.

European Trilateral Track 2 Nuclear Dialogue

Performer: Center for Strategic and International Studies (CSIS)

Principal Investigator: Clark Murdock

Cost: \$200,000

This CSIS Track 2 dialogue's objectives are to promote trilateral understanding and cohesion on nuclear issues, enhance scholarship on emerging challenges, and provide insight to policy makers, experts, and the public about the evolving nature and future of the U.S., British, and French (P-3) security partnership. The project will investigate challenging nuclear issues facing NATO in general and the P-3 in particular. Such an effort is increasingly important as new obstacles to P-3 unity emerge, both from internal barriers to policy consensus and external challenges. These include issues regarding U.S.-Russia arms control, nuclear proliferation in states such as Iran and North Korea, and the evolving situation in the Middle East. The project will involve three meetings total, one in each P-3 member's capital.

U.S.-China Strategic Dialogues

Performer: Pacific Forum CSIS and Naval Postgraduate School (NPS)

Principal Investigator: Ralph Cossa, Christopher Twomey, and Michael Glosny

Cost: \$400,000

China is currently modernizing its military capabilities, including its nuclear arsenal, and there remains a lack of official discussions on these issues. This communications gap increases the risks to strategic stability and the potential for inadvertent escalation. This project's goal is to build greater understanding between the United States and China on strategic issues to prepare for or support official discussions. This dialogue project will build upon previous PASC-sponsored U.S.-China Track 1.5s to achieve a deeper understanding of the issues. Less-official dialogues such as this one, while not a substitution for official dialogues, can be used to help identify and clarify agenda items for official talks as well as delve more deeply into sensitive issues. Expected topics to be addressed include nuclear postures, nonproliferation policy, no first use, mutual vulnerability, missile defense, strategic stability, long-range conventional weapons, and confidence-building measures.

This project will involve two dialogue sessions, one in Hawaii and one in Beijing, for a select group of multidisciplinary experts and officials with knowledge about regional nuclear dynamics and national decision-making. Discussions will be summarized into key findings, PowerPoint briefs, and more comprehensive narrative reports (translated into Chinese) and distributed in hard and soft copy to academics, government officials, and the public.

Trilateral Cooperation to Strengthen Extended Deterrence in Northeast Asia

Performer: Pacific Forum CSIS

Principal Investigator: Brad Glosserman

Cost: \$207,000

Building on the results of previous trilateral meetings among the U.S., Japan, and Republic of Korea (ROK), this initiative will continue to explore each country's specific questions about the U.S. extended deterrent in a changing regional security environment. This strategic dialogue will investigate opportunities and obstacles to U.S.-Japan-ROK trilateral cooperation that could enhance or hamper extended deterrence among the U.S. and its two allies in Northeast Asia. This initiative will explore ways the three countries could work together to secure their national interests and reinforce the U.S. extended deterrent. The dialogue will build upon existing multilateral engagements to improve U.S. understanding about current thinking in Japan and Korea on topics such as the global disarmament movement, U.S.-Russian arms control measures, the U.S. nuclear weapons posture, China's nuclear modernization efforts, and the growing threat of proliferation from North Korea.

Gassing One's Own People: Contrasting Leader Motivations and Behavior in Iraq and Syria

Performer: Georgia Institute of Technology

Principal Investigator: Lawrence Rubin

Cost: \$59,000

Leaders of both Iraq (Saddam Hussein, 1988) and Syria (Bashar al-Assad, recently) have used chemical weapons against their own people. There is now extensive documentation of Iraq's chemical weapon decision-making in 1988, making it a uniquely rich case study. This project will produce a monograph contrasting Iraq's chemical decision-making with Syria's recent use of chemical weapons and draw insights from Iraq that are applicable to understanding Syria's actions. As policy makers weigh options for contending with Syria, this research will provide timely and informed analysis. The research team will study records captured from Iraq available at the Conflict Records Research Center, Hoover Institution, and University of Colorado (Boulder), as well as recently declassified interrogation reports of Iraqi principals, records and testimony released from Iraqi war crimes trials, documents in the Reagan Presidential Library, and other sources.

Iran's Evolving Ballistic Missile Doctrine: From Deterrence to Anti-Access/Area-Denial Strategies & Capabilities

Performer: International Institute for Strategic Studies (IISS)

Principal Investigator: Michael Elleman

Cost: \$77,000

Iran is seeking to improve the accuracy of its missiles and is pursuing related technologies. Though it is unlikely that Iran will achieve the pinpoint accuracy and increased range it seeks, it is reasonable to assume that engineers will significantly improve the accuracy of Iran's short-range rockets and missiles. These capabilities could be used for political purposes by waging a campaign of fear on regional rivals. This study will estimate the accuracy of current Iranian missiles, forecast the accuracy of future systems, and assess the potential impacts of such improvements on Iran's current anti-access/area-denial strategy. Identified findings can then be shared with regional partners to help create a common operating picture for the Gulf Cooperation Council (GCC). In addition, the project could help facilitate a harmonization of military-defense requirements, strategic policies, and procurement priorities across the GCC.

Drawing Lessons from the Case of South Africa's Disarmament for Today

Performer: The Institute for Science and International Security (ISIS)

Principal Investigator: David Albright

Cost: \$100,000

South Africa is the only state to have relinquished its nuclear weapon program voluntarily, making it an excellent case study from which to draw lessons. The Institute for Science and International Security (ISIS) has a wealth of unpublished information on the program's disarmament and subsequent external verification. This project aims to develop lessons from South Africa's experience that provide a potential path forward for dealing with other countries, such as North Korea and Iran, which may require similar denuclearization. This project will rely on unpublished information on the South African case and conduct a one-day workshop with experts on the topic. ISIS will subsequently produce an annexed report mapping out the lessons learned from South Africa's experience.

American, Australian, and Japanese Perspectives on a Changing Security Environment

Performer: Johns Hopkins School of Advanced International Studies (SAIS)

Principal Investigator: Thomas Mahnken

Cost: \$100,000

Respective bilateral ties between the United States and Australia and the United States and Japan have both enjoyed a long history of strong and cooperative relations. However, China's rise has highlighted how insufficient these old security partnerships look in a shifting security environment. A more accurate assessment of Australian, U.S., and Japanese attitudes on this issue is therefore needed. This project will seek to provide that assessment by looking at how all three states approach current and future threat perceptions, concerns about strategic uncertainties and policy planning, and thinking on how to strengthen deterrence and extended deterrence. Findings from the project will highlight convergent and divergent views of the security environment, threats, uncertainties, and deterrence between the United States and its two closest Asian allies. This will foster greater understanding in the three countries' security communities and raise awareness of security, deterrence, and proliferation issues outside the three countries.

Saudi Arabia's Nuclear Future

Performer: King's College London

Principal Investigator: Matthew Moran

Cost: \$130,000

In recent years, much attention has been devoted to the potential regional impact of a nuclear-armed Iran. In particular, Saudi Arabia has been of interest since it has been assumed that if Iran goes nuclear so too will Saudi Arabia. Previous analysis in this context has been framed by a debate that has oscillated between those who believe Iran is intent upon acquiring nuclear weapons and those who maintain this threat is exaggerated. This research will generate insights into Saudi Arabia's nuclear intentions and how these are influenced by Iran. In addition, it will explore measures that the West might adopt to strengthen Saudi Arabia's commitment to nuclear restraint. This project will also provide a new perspective on proliferation behavior in the Middle East, which could be applied by analysts and policy makers to develop new measures to strengthen regional commitments to nuclear restraint. The research effort will also include a workshop around the theme of the region's nuclear future.

Preparing for the Next WMD Elimination Mission: Lessons Learned from Past Experiences

Performer: Middlebury Institute of International Studies (MIIS)

Principal Investigator: Chen Kane

Cost: \$148,000

In recent decades, there have been a number of opportunities for the United States to participate in WMD elimination. Yet the United States and its partners constantly reinvent the wheel instead of integrating lessons from past efforts. This project will analyze the key strategic, diplomatic, legal, interagency, and intra-governmental lessons from past WMD elimination efforts. Furthermore, it will help the United States and others prepare for and improve future elimination missions as well as aiding those trying to dissuade countries from developing WMD. Finally, this research will provide elimination practitioners with a better understanding of their role in future disarmament efforts. In order to garner information on past WMD elimination efforts, this project will examine a number of case studies including the Cooperative Threat Reduction program in the former Soviet Union; post-war Iraq (1991–1998 and 2003–2005); South Africa; Libya; and Syria. A workshop will also be organized to serve as an opportunity for presenting the draft study and gathering feedback on its findings.

Scoping Study of U.S.-Israel Dialogue

Performer: Middlebury Institute of International Studies (MIIS)

Principal Investigator: Chen Kane

Cost: \$70,000

Over the last twenty years, there has been an increase in security-related Track 2 dialogues in the Middle East. Yet, with Israel, one of the region's most important states and a nuclear power, few Track 2 dialogues addressing mutual security concerns have been held. They are needed to foster a more open exchange and discussion of emerging mutual security issues. This project involves background research and analysis, including of past attempts to establish Track 1.5 strategic dialogues and the reasons they have failed. Additionally, researchers will travel to Israel to discuss the project's objectives with a select group of Israeli government and non-government interlocutors, discussing such topics as Iran's nuclear program, Syria's civil war, a Middle East WMD-free zone, extended deterrence, missile defense, and other emerging security issues.

Growing Nonproliferation Challenges in Southeast Asia: Forecasting Emerging Capabilities and their Implications on Control of Sensitive WMD-related Technologies

Performer: Middlebury Institute of International Studies (MIIS)

Principal Investigator: Stephanie Lieggi

Cost: \$76,000

As the economies of Southeast Asia advance, so too does the risk of WMD proliferation. Regional governments are not fully cognizant that these growing capabilities mean their domestic industries will be seen as potential second-tier suppliers by proliferators. This project aims to answer two key questions: 1) How will the availability of dual-use commodities develop in Southeast Asia in the next decade? and 2) What can be done at the domestic, regional, and international levels to establish sustainable frameworks to keep the region from becoming the next major proliferation challenge? This research can help identify the most problematic sectors in the near- to medium-term to effectively allocate limited resources to combat the spread of WMD-related commodities. A report will disseminate knowledge gained about how illicit networks, non-state actors, and proliferating states could prey on emerging economies in Southeast Asia.

Assessing the Implications of Advances in Science and Technology for the Biological Weapons Convention

Performer: National Academy of Sciences (NAS)

Principal Investigator: Katherine Bowman

Cost: \$159,000

In recent years, there have been rapid advances in life sciences that promise significant contributions to health, food, and energy policy outcomes. Yet, there are concerns that the science and technology (S&T) that enables these benefits may also be used to develop new bioweapons or facilitate bioterrorism. These advances present fundamental challenges to national and international institutions focused on preventing the misuse of S&T. This project assesses new developments in S&T and their potential biosecurity implications. Through collaboration among several scientific organizations, the project will reach a broad audience of international security and S&T professionals in advance of the Eighth Review of the Biological Weapons Convention (BWC) in 2016 in Geneva.

U.S.-Russia Academies of Sciences Security Dialogue

Performer: National Academy of Sciences (NAS)

Principal Investigator: Rita Guenther

Cost: \$250,000

A positive U.S.-Russia relationship is important for world peace and security; however, the current relationship is broken. It is deteriorating over issues such as Ukraine, INF treaty violations, and disagreements over conflicts in the Middle East. The NAS Committee on International Security and Arms Control (CISAC) maintains a scientific-technical dialogue with the Russian Academy of Sciences to promote better understanding of each other's plans and actions and seek opportunities for cooperation. This project will develop new concepts for promoting constructive engagement. In addition, the dialogue functions as a mechanism for building ties between U.S. and Russian technical specialists on nuclear, dual-use science, and strategic stability issues.

As part of this project, CISAC will conduct two bilateral meetings (one in the United States and one in Russia). Each three-day meeting will involve six to eight experts from each side. Topics for discussion will include nuclear materials and nuclear terrorism, especially insider threats and sabotage; monitoring of nuclear materials, including tracking; science and technology for nuclear verification; ballistic missile defense in the context of strategic stability; and other topics as agreed upon.

Space, Cyberspace, and Strategic Stability in the Asia-Pacific

Performer: National Bureau of Asian Research (NBR)

Principal Investigator: Roy Kamphausen

Cost: \$225,000

The Asia-Pacific is emerging as the world's most dynamic strategic environment with expanding geopolitical significance and military importance. Emerging strategic dynamics, such as space and cyberspace capabilities, have the potential to dramatically influence regional stability. This two-year project seeks to analyze the implications of reliance on space and cyber technologies for strategic stability in the Asia-Pacific, including increasing pressure on traditional deterrence frameworks.

The National Bureau of Asian Research will host four Track 1.5 dialogues (two per year) involving scholars and officials from the United States and key countries in the Asia-Pacific. These dialogues will focus on how 21st century strategic stability will be affected by emerging dynamics in space and cyberspace. Each dialogue will be summarized in a report that offers recommendations. In addition, private briefings will disseminate the findings to government and non-government experts in the space and cyberspace fields.

Speaking Truth to Nonproliferation: Improving the Intelligence and Policy Nexus

Performer: Nonproliferation Policy Education Center (NPEC)

Principal Investigator: Henry Sokolski

Cost: \$92,000

The success of U.S. nonproliferation efforts has most often resulted from actions beneath the public radar. Policy makers have acted on early indications of proliferation and were able to take modest measures that proved effective. It is important to know how policy is influenced by intelligence and intelligence-led policy. This two-year project will produce detailed histories of how U.S. intelligence officers and policy makers have worked together on several challenging proliferation cases. It will distill practical lessons for the improvement of future collaboration in this area. The project will also include research to evaluate past U.S. intelligence and policy collaboration aimed at countering proliferation in India, Israel, North Korea, Pakistan, Taiwan, South Korea, and a set of other nuclear and missile cases.

U.S.-India Strategic Dialogue

Performer: Naval Postgraduate School (NPS)

Principal Investigator: S. Paul Kapur

Cost: \$205,000

The risk of nuclear war in South Asia is among the highest in the world. India perceives its security to be undercut by U.S. support to Pakistan, lack of official recognition of India's nuclear status, and acceptance of Chinese hegemony in the Indian Ocean. Although vast improvements have been made in the U.S.-Indian relationship since the Cold War, the areas of shared interests and values are not enough to minimize the nuclear and conventional dangers in the new environment. Recent changes to the Indian government, however, provide new opportunities for engagement and the potential for an improved U.S.-Indian relationship.

This two-day Track 2 dialogue will convene Indian and American experts from academia, the policy arena, and the military for off-the-record discussions on the security implications of international and foreign policy developments. By comparing the findings with conclusions from previous years, it will be possible to determine the extent of the evolution and current direction of the U.S.-Indian relationship. Specific topics of discussion in this dialogue will include the state of the U.S.-Indian strategic relationship; the nuclear arms race; the role of China; and developments in Pakistan, Iran, and Afghanistan.

Predicting Proliferation: High Reliability Forecasting Models of Nuclear Proliferation as a Policy & Analytical Aid

Performer: University of California at San Diego (UCSD)

Principal Investigator: Erik Gartzke

Cost: \$121,000

Scholars have spent decades studying and explaining nuclear proliferation. This project will develop a model to predict the behavior of states regarding their pursuit and acquisition of nuclear weapons. An accurate prediction model will allow for action against potential suppliers, interdiction of nuclear trade, intelligence collection on covert nuclear activities, and credible military action against countries of concern. The model will not only be a yes or no predictor; it will assess the probability of a state pursuing or acquiring nuclear weapons under a particular set of conditions. It is hoped that this model will be replicated and adjusted to suit the needs of analysts and scholars. Additionally, the model will provide the foundation for future predictive work.

To create the model, researchers will leverage 65 years of data on the characteristics of states that pursue nuclear weapons. They will examine mechanisms that particular countries use in their nuclear pursuits. Once built, the model will be tested using separate data. This model, built upon flexible quantitative techniques, will identify an empirically grounded set of triggers or conditions under which countries are most likely to shift from latent nuclear capability to a full-fledged nuclear weapons effort.

U.S.-Singapore-Malaysia-Indonesia: Multilateral Dialogue on Biosecurity

Performer: UPMC Center for Health Security

Principal Investigator: Anita Cicero

Cost: \$235,000

Countries in Southeast Asia are particularly vulnerable to biosecurity threats due to the region's dense population, high volume of cross-border traffic, and frequent, close-quarter co-location of humans and animals. For these reasons, Southeast Asia is susceptible to re-emerging and emerging diseases (e.g., SARS, H5N1, Nipah virus). Bioscience labs are also becoming more common in the region, and "viral sovereignty" continues to be an issue. Moreover, there are known terrorist networks active in the area. This project seeks to initiate sustainable and productive dialogue among the United States, Singapore, Malaysia, and Indonesia on sensitive issues pertaining to deliberate, accidental, and naturally occurring biothreats, dual-use science, and infectious disease outbreaks. The dialogue will help promote habits of trust and collaboration within a region where there is limited agreement on how to navigate the challenges of sharing essential public health information. It will not only strengthen each nation's ability to identify and respond to biothreats, but also help practitioners and policy makers identify effective practices to diminish risks posed by these threats to international security.

UMPC will convene two-day meetings in Singapore and Washington, D.C. The first will examine historic views and current perceptions of biological threats in each country, concerns about dual-use research, and lessons learned in biosecurity and biosafety. The second will discuss strategies to collectively strengthen the prevention of bioweapon use in the region and practical approaches to increasing biosafety and biosecurity. UPMC will release a report following each meeting.

Improving Security through International Biosafety Norms

Performer: UPMC Center for Health Security

Project Lead: Gigi Gronvall

Cost: \$150,000

The lack of national security norms and guidance governing research on highly transmissible pathogens (e.g., SARS and engineered influenza strains) poses a grave global security threat. Though norms exist at the research level, there is a lack of clear expectations and guidance at the national level for what constitutes biosafety norms. This project seeks to address the threat by providing the essential components for developing international biosafety norms. To achieve its objectives, this project will create a synopsis of biological safety and security arrangements. Researchers will draft a white paper on the current state and variability of national biosafety approaches based on case studies, interviews, and a two-day workshop. A final report will gather all data outlining biosafety norms for international consideration.

Scoping Future Nuclear Proliferation Risks: Emerging Trends in Sociocultural Modeling and Analysis

Performer: Utah State University (USU)

Principal Investigator: Jeannie Johnson

Cost: \$83,000

To anticipate the likelihood of successful nuclear acquisition, one must identify key constituencies within a polity of concern and assess the internal sociocultural drivers that shape thinking and decision-making on WMD/WME issues. This project seeks to strengthen and refine sociocultural analytic frameworks designed to anticipate WMD aspirants and isolate points of leverage within those national communities in order to disrupt or shift weapons aspirations. The principal investigator, in collaboration with the University of Maryland's Center for the Advanced Study of Language, will build upon the already-established Cultural Mapping Method and Cultural Analytic Framework. Two workshops will be held at the University of Maryland. The first will convene technical experts, case study authors, and other analysts to discuss recent developments in sociocultural analysis and potential WMD aspirants. The second workshop will critique the analytic framework and assess the findings of the case studies. The researchers will compile their findings into a comprehensive report.

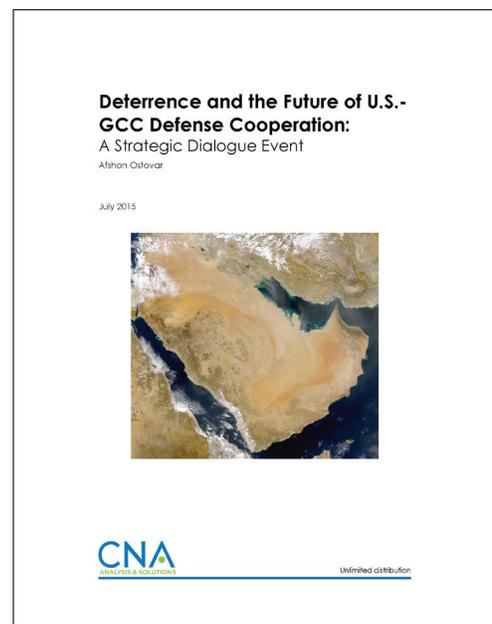
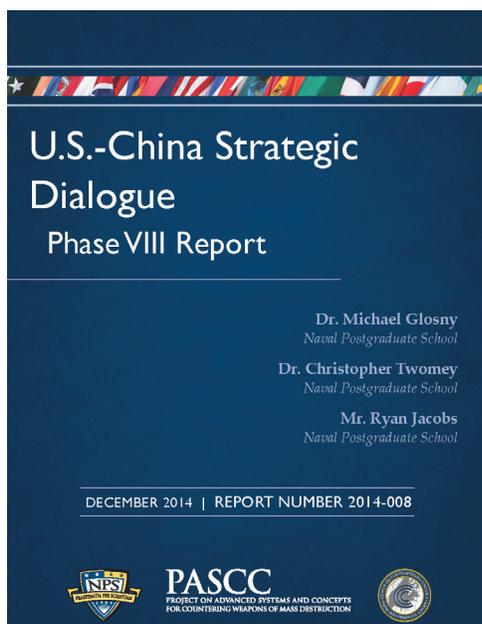


Participants in a U.S.-Russia Track II Strategic Dialogue, "21st Century Strategic Stability," hosted by NPS in May 2014, listen to a presentation by Abraham Denmark of the National Bureau of Asian Research.

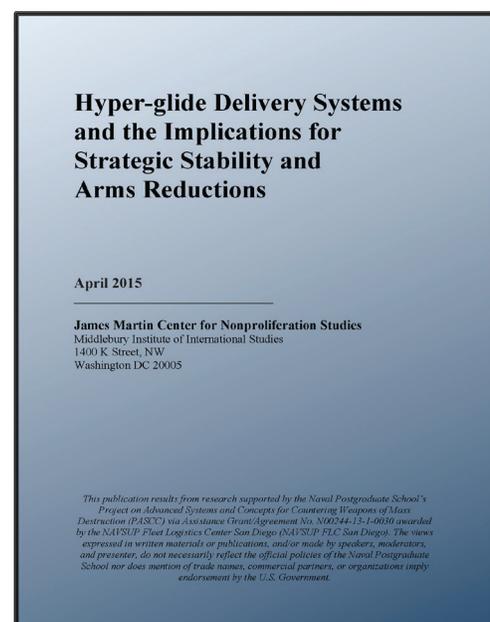
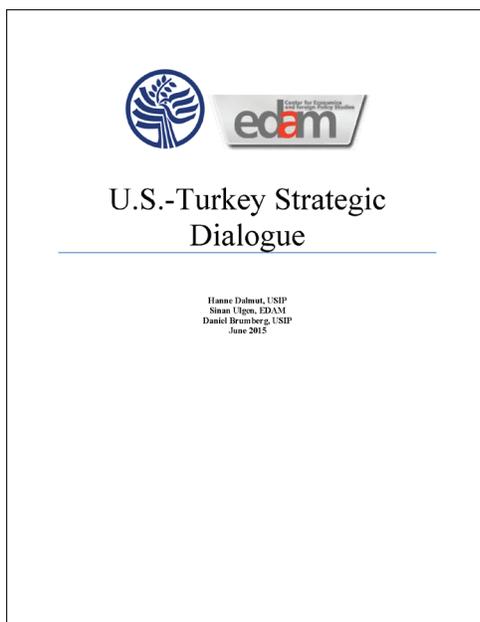
Reports Released in 2015

PASCC offers access to all publicly released PASCC-sponsored reports through the Homeland Security Digital Library (HSDL) at www.hSDL.org. Please click on "Refine by Publisher" and select PASCC to see the PASCC collection. HSDL is a public resource managed at NPS and leveraged by PASCC as a no-cost interface for PASCC reports. Some reports are also available through their authoring institutions.

Title	Author	Performer Institution	Distribution	Release Date
Perspectives on Global and Regional Security and Implications for Nuclear and Space Technologies: U.S.-Brazil Strategic Dialogue Phase II Report	Anne Clunan and Judith Tulkoff	NPS	Public	November 2014
U.S.-China Strategic Dialogue, Phase VIII Report	Michael Glosny, Christopher Twomey, and Ryan Jacobs	NPS	Public	March 2015
21st Century Strategic Stability: A U.S.-Russia Track II Dialogue	Mikhail Tsyarkin and Diana Wueger	NPS	Public	March 2015
U.S.-India Strategic Dialogue, 2015 Report	S. Paul Kapur and Ryan Jacobs	NPS	FOUO	April 2015
Military Applications of Nanotechnology: Implications for Strategic Stability	Margaret E. Kosal	Georgia Institute of Technology	Public	April 2015



Title	Author	Performer Institution	Distribution	Release Date
Hyper-glide Delivery Systems and the Implications for Strategic Stability and Arms Reductions	James Martin Center for Nonproliferation Studies	MIIS	Public	May 2015
Anatomizing Chemical and Biological Non-State Adversaries: Identifying the Adversary	Gary A. Ackerman et al.	UMD-START	Public	June 2015
Deterrence and the Future of U.S.-GCC Defense Cooperation: A Strategic Dialogue Event	Afshon Ostovar	CNA	Public	August 2015
Cruise Missile Penaid Suppliers	George Nacouzi and Richard H. Speier	RAND	FOUO	August 2015
U.S.-Turkey Strategic Dialogue	Hanne Dalmut, Sinan Ulgen, and Daniel Brumberg	USIP	Public	August 2015
North Korea's Evolving Nuclear Strategy	Shane Smith	Johns Hopkins SAIS	Public	August 2015
South Asia Stability Workshop 2.0: A Crisis Simulation Report	Feroz Khan et al.	NPS	Public and FOUO Versions	September 2015



Fiscal Year 2015 In Review

The following timeline presents critical milestones and project events.

October 2014

- CSIS U.S.-Russia Dialogue in Vienna
- MIIS Nuclear Decision-Making Workshop in Washington
- JHU North Korea Nuclear Futures Workshop in Washington

November 2014

- DTRA sends FY15 funding to NPS and PASCC obligates project award funding
- NDU WMD Education in the DOD Workshop in Washington
- UPMC Biosecurity Dialogue in Singapore
- CSIS European Trilateral Dialogue in Washington

December 2014

- PASCC hosts a public briefing on WMD and strategic stability in collaboration with the Center for Strategic and International Studies in Washington
- NPS U.S.-India Dialogue in New Delhi
- The first tranche of FY15 PASCC grants are awarded via the Navy Fleet Logistics Center, San Diego

February 2015

- NPS South Asia Crisis Simulation 2.0 in Kuala Lumpur
- FAS Chinese BMD Workshop in Washington
- USIP U.S.-Turkey Strategic Dialogue in Istanbul
- Pacific Forum U.S.-China Dialogue in Beijing

March 2015

- PASCC Director briefs the Nuclear Science and Engineering Research Center (NSERC) regarding PASCC
- PASCC Senior Steering Group meets at NPS
- PASCC co-sponsors the Carnegie Nuclear Policy Conference in Washington
- Virginia Tech Command and Control in South Asia Workshop in Washington

April 2015

- PASCC posts its new Broad Agency Announcement for FY16 project funding

May 2015

- USIP U.S.-Turkey Track 1.5 Dialogue in Istanbul
- CNA Understanding Gulf States' Strategic Thinking workshop in Istanbul
- Carnegie Chinese Nuclear Thinking workshop in Washington

June 2015

- All remaining FY15 grants are awarded via the Fleet Logistics Center, San Diego by June 30
- CSIS Russia Non-Strategic Nuclear Weapons Dialogue II in Washington
- PASCC receives 67 white paper submissions by the June deadline

July 2015

- PASCC distributes FY16 white papers to expert reviewers
- Pacific Forum East Asia Trilateral Dialogue in Maui
- CSIS European Trilateral Dialogue in London
- Amendment to the DTRA-NPS Memorandum of Agreement is fully executed
- PASCC FY16 Proposal Review Committee

August 2015

- Air Force Academy Reconceptualizing Strategic Stability workshop in Colorado Springs
- National Academy of Sciences Understanding Pathogenicity symposium in Vienna

September 2015

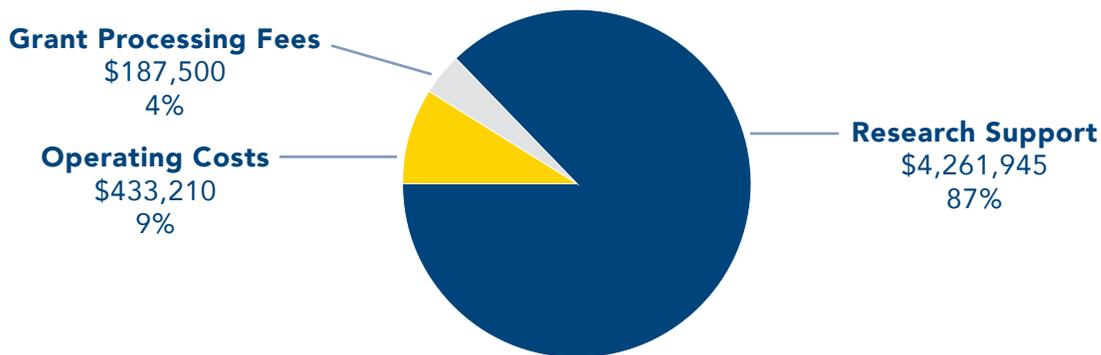
- NPS / Pacific Forum U.S.–China Track II Dialogue in Honolulu
- PASCC hosts a public briefing on New Approaches to Preventing Regional Conflict in collaboration with the Brookings Institution in Washington
- MIIS Nonproliferation Challenges in Southeast Asia Roundtable in Jakarta

Budget

FY15 funding was transferred to PASCC in November 2014. Using the new FY15 funds as well as remaining FY14 funds, PASCC was able to award \$3,846,062 in new grants. In addition, \$110,355 was obligated separately from the grant award process to research organizations affiliated with the U.S. government (the U.S. Air Force Institute for National Security Studies and the National Defense University), and \$330,883 was awarded to NPS principal investigators. These three categories added up to \$4,287,300 in total research support in FY15.

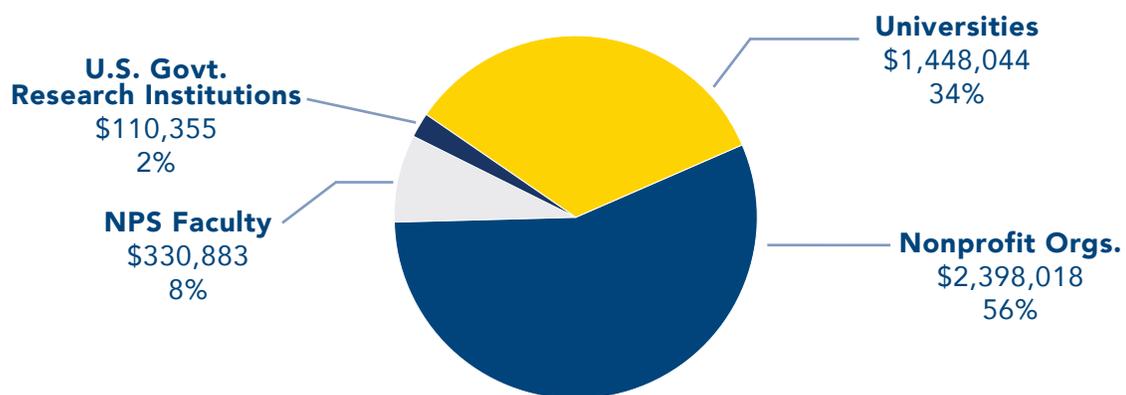
In FY15, PASCC spent \$433,210 on management and operations including labor, mission-essential travel, and NPS indirect costs. Per grant processing fees charged by the Navy amounted to \$187,500. PASCC operations expenses were equal to 9% of the total budget.

Fiscal Year 2015 Spending



The second chart shows the breakdown for research costs, grouping project awards into general categories based on the affiliation of the principal investigator—nonprofit think tanks, universities, FFRDCs (or similar quasi-governmental research organizations), and NPS faculty.

Fiscal Year 2015 Project Award Recipients



NPS expects to receive \$4.43M from DTRA in FY16. Twenty-five studies and strategic dialogues were recommended for funding in August 2015.





PASCC

PROJECT ON ADVANCED SYSTEMS AND CONCEPTS
FOR COUNTERING WEAPONS OF MASS DESTRUCTION

NAVAL POSTGRADUATE SCHOOL