



Climate Impact on National Security (CINS)

**A conference series organized and convened by
the Institute on Science for Global Policy (ISGP)
and the U.S. Army War College (USAWC)**

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**Documents prepared from material emerging from conferences
organized and convened by the Institute on Science for Global Policy
and the U.S. Army War College**

Climate Impact on National Security (CINS)

A conference jointly convened by the Institute on Science for Global Policy and the U.S. Army War College on Nov. 28 – Dec. 1, 2016

Conference Statement

Numerous national security and defense reviews spanning Republican and Democratic administrations, including the 2007 Cooperative Strategy for 21st Century Sea Power, the 2008 National Intelligence Assessment on geopolitical effects of climate change, the 2014 Quadrennial Defense Review, and the 2016 Report to Congress on Strategy to Protect US National Security Interests in the Arctic Region, describe climate change as a significant risk to national security. In September 2016, these assessments were reinforced by a bipartisan national security and military consensus, which included former defense officials from across the Reagan, G.H.W. Bush, Clinton, G.W. Bush, and Obama administrations. To discount or underestimate this risk in formulating and implementing national security policies and strategies would be short-sighted and an error of enormous consequence, especially with respect to the nation's ability to prepare for and respond to disasters. As with other more traditional strategic risks, the risks associated with a changing climate should inform our national and international security plans, policies, and decisions.

The impacts of climate change, such as increased flooding of coastal military installations related to sea level rise and intense storms, present significant risks to U.S. military readiness, operations, and strategy. State-of-the-art modeling and analyses of historical and current observational data strongly support a conclusion that climate conditions will continue to deteriorate, and that the rate of change will accelerate over time. These changes will adversely affect the geostrategic landscape in which the U.S. military operates (e.g., the South China Sea, the Arctic, and other strategic waterways). Observed and projected changes in climate conditions are altering, and will continue to alter, real-world events associated with sea-level rise, ocean warming, and disruptions in hydrological cycles, including heavier rains and flooding and intense droughts and wildfires. These changes will likely lead to increased competition within and between nations for water, energy, and arable land for food production.

Secondary consequences of these changes, especially when coupled with deficiencies in governance, include an increased likelihood of state instability and failure, mass displacement of peoples, energy market disruptions, and globally dispersed infectious diseases, all of which will place further strains on U.S. national security.

While this picture seems dire, it also presents opportunities for U.S. leadership. By proactively addressing these risks, the U.S. can strengthen and broaden alliances from the Asia-Pacific to Europe, and in doing so, compete more successfully with our adversaries for influence. Failing to take such actions will increase risks to existing and future U.S. national security objectives.

As former Army Chief of Staff General (ret) Gordon Sullivan said: "People are saying they want to be perfectly convinced about climate science projections...But speaking as a soldier, we never have 100 percent certainty. If you wait until you have 100 percent certainty, something bad is going to happen on the battlefield." There is very high scientific certainty to conclude that climate change is a high probability, high impact risk. Even the changes in climate already observed, whether from natural causes or human activity, are significant enough to merit immediate concern and serious, long-term attention. The consequences of these observed and

projected changes require that the reality, risks, and consequences of climate change be integrated into major societal decisions, including those being made by the U.S. military and the broader national security communities. To do otherwise jeopardizes U.S. global leadership, economic prosperity, international stability, and national security.

While this statement reflects the general principles and conclusions reached at the “Climate Impact on National Security” (CINS) conference held at the U.S. Army War College in November-December 2016, participants also recognized the need to develop and prioritize specific actions that can be practically implemented. Efforts by the Institute on Science for Global Policy, the U.S. Army War College, and the Center for Climate and Security are underway to identify and prioritize such actionable next steps as they pertain to the U.S. military’s mission. The integrated results of these efforts are designed to provide policy makers an accurate and practical view of how to effectively address the impact of climate change on U.S. national security interests, both in response to immediate concerns and in anticipation of future developments.



George Atkinson
Founder and Executive Director
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Lance Betros, Ph.D.
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Summary Report - Recommendations

Climate Impact on National Security (CINS)

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Preface

It is increasingly evident that the national security responsibilities embodied within the missions of the United States military are significantly affected by the changes in climate/weather conditions currently being observed, and reasonably anticipated, both domestically and internationally. The Climate Impact on National Security (CINS) conference series focused on identifying specific examples of how the changing climate directly impacts U.S. national security and on recommending prioritized actionable next steps that strengthen how the U.S. military can effectively fulfill its national security responsibilities.

The complex and often contentious debates throughout society concerning the significance of changing climate/weather conditions in policy decisions made by government and society *writ large* take on specific and urgent tones when viewed through the lens of U.S. national security and U.S. military actions. While the U.S. military has long recognized the significance of environmental factors in strategic planning and operations, the unexpectedly rapid and severe nature of recent changes in the climate require increased attention by the U.S. military and the public *writ large*.

For example, numerous analyses confirm that the severe weather conditions associated with the changing climate can accelerate and/or exacerbate societal instabilities directly threatening U.S. national security interests. Scientists also warn of increasingly arduous weather conditions in which U.S. military operations will be conducted as these national security challenges are addressed. Such scientific expertise provides the anticipatory perspectives needed to inform senior U.S. military leadership as they make proactive U.S. national security decisions, especially to avoid crisis climate conditions from which recovery is not ensured.

These changing environmental challenges are directly linked to the private sector production and innovation infrastructure critical to U.S. military performance and readiness. Prudent, well-informed decisions by governmental and private sector stakeholders regarding climate issues can either significantly enhance or degrade U.S. military capabilities to effectively respond to future national security challenges. Obviously, these decisions also have profound implications for the safety and prosperity of the Nation.

The conferences organized and convened by the Institute on Science for Global Policy (ISGP) and the U.S. Army War College (USAWC) facilitated a wide ranging, candid review and analysis of CINS. These CINS conferences were supported with assistance from the David Rockefeller Fund, Rockefeller Philanthropy Advisors, The Henry M. Jackson Foundation, George Mason University, Arizona State University, and The Center for Climate Security. The more than 80 participants in the CINS conferences included senior U.S. military, active and retired; scientists, researchers, and analysts with expertise in changing climate conditions; representatives from the U.S. intelligence community; and individuals experienced in governmental, economic, and policy decisions related to climate issues (CINS participant list attached).

Three CINS conferences were convened at the USAWC, Carlisle Barracks in Pennsylvania between November 28, 2016 and May 19, 2017. The results from the first CINS conference (CINS-1) are articulated in a brief Statement attached here. The recommendations from the second (CINS-2A) and third (CINS-2B) conferences are presented as this Summary Report and are prioritized in terms of **Urgent Actions, Immediate Concerns, and Long-Term Decisions:**

Urgent Actions: Direct observations and credible scientific analyses confirm the need for urgent actions addressing existing climate and extreme weather conditions impacting U.S. military responsibilities for national security.

Immediate Concerns: Rapidly changing physical conditions require immediate decisions concerning the implementation of specific, proactive activities designed to mitigate, forestall, and/or prevent evolving climate and extreme weather threats from impacting U.S. military responsibilities for national security.

Long-Term Decisions: Strategic commitments are needed to continue developing and strengthening domestic and global policies regarding climate conditions known to influence the societal, economic, and physical factors that impact U.S. military responsibilities for national security

Specific recommendations are organized as Areas of Consensus (AOC) and their respective Actionable Next Steps (ANS). To facilitate the implementation of these recommendations, each AOC and ANS is annotated in terms of six categories routinely used in centralized U.S. military decisions: Research, Education/Training, Relationships, Planning, Communication, and Infrastructure

Urgent Actions

1. AOC (Education/Training, Communications, Planning):

The rapidly expanding responsibilities undertaken by the U.S. military to address consequences from extreme weather events (e.g., flooding, landslides, droughts) and the disruption of societal stability (e.g., mass migrations, disease outbreaks) demand training protocols focused on risk assessment, public communication, and personnel protection. Observed changes in climate conditions, both domestically and internationally, are fostering more frequent and severe emergency events and exerting new stresses on federal, state, regional, and local resources as well as complicating jurisdictional decisions concerning how to address such emergencies.

A. ANS (Education/Training):

Design and implement comprehensive curricula for the ongoing educational and training programs at all military and first-responder levels to emphasize the risk-based decision making needed to address the increased number and severity of weather events and related societal emergencies. Educational and training programs need to meet the specific challenges facing military and civilian personnel responding to the diverse conditions encountered during climate-related emergencies (e.g., coastal flooding, droughts, dust storms, tornados, hurricanes).

B. ANS (Relationships, Communications):

Clarify the coordination protocols among national (e.g., National Security Council, Federal Emergency Management Agency, senior U.S. military leadership), state (governors), and local (mayors) officials for balancing the commitment of personnel,

equipment, and material resources in response to competing domestic and international emergencies affecting U.S. national security interests.

2. AOC (Research, Relationships, Planning, Communication):

The complex, multistage procedures underlying congressional actions on any topic, especially on issues related to national security, require champions from among senior staff and members who can articulate and defend specific concerns for their respective constituents. Decisions concerning climate issues, shaped by rapidly changing political and policy priorities, require these congressional champions to confidently present and patiently defend scientifically credible information while reflecting the specific perspectives and priorities of their constituents.

A. ANS (Relationships, Communication):

Enlist the counsel, support, and partnership of the DoD and Department of Homeland Security (e.g., U.S. Coast Guard) concerning their U.S. national security responsibilities associated with climate issues to obtain attention from within congressional communities. Special attention needs to address the significance of new climate conditions on a several critical security issues: degrading military infrastructure; reducing training time and access to unique training and operational facilities; threatening defense strategies in a navigable Arctic Ocean bordered by adversaries and allies; expanding options for resource exploration; and enhancing international trade and recreational travel.

B. ANS (Research, Planning):

Commission a comprehensive examination of how changing climate conditions impact the industrial defense infrastructure essential to current and future U.S. military capabilities. The study needs to evaluate the relationships between climate and the myriad components of private sector infrastructure underpinning U.S. military's land, naval, and air performance and readiness, including manufacturing capability, critical material development and deployment, personnel education and training, advanced research and technology programs, and physical and financial stability. The linkage of climate issues to private sector capabilities and the performance and readiness capabilities of U.S. military can be anticipated to influence future commitments to specific bases, facilities, and installations (i.e., the Base Realignment and Closure [BRAC] process).

3. AOC (Research, Communication, Infrastructure):

Accurate, authoritative information on changing climate conditions and their relevance to severe weather events needs to be readily accessible to military personnel, both in and outside operational theaters, and among civilian authorities where appropriate.

A. ANS (Communication):

Establish within the Department of Defense (DoD) a program in support of military personnel to accurately characterize climate conditions and to monitor the related weather affecting specific locations. Attention needs to be given to sharing information throughout the military command structure to ensure that lessons learned and best practices provide guidance and templates of mutual benefit to policy planners and military commanders.

- B. ANS (Research, Communication, Infrastructure):
Analyze and define how existing operational effectiveness is being impacted by current climate conditions experienced at specific military bases, installations, and facilities, both domestically and internationally (e.g., how routine base and community flooding affect daily operations and training efforts). Given the overlapping civilian and military responsibilities for these operational decisions, it is essential that vulnerabilities and corrective actions among all stakeholders be shared to avoid conflicting decisions and ineffective actions.
- C. ANS (Research, Infrastructure):
Initiate an evaluation by commanders concerning how future operational and training effectiveness is expected to be affected by changing climate conditions. These efforts need to inform a comprehensive response strategy that can practically address real-world domestic and international threats arising from new climate conditions.

4. AOC (Research, Education/Training, Planning):

The increasing relevance of climate issues to U.S. military responsibilities needs to be given a higher priority in DoD strategic planning and operational decisions. As climate-related weather conditions deteriorate worldwide, the challenges increase to effectively balance the allocation of U.S. military personnel and resources between responding to domestic emergencies and embarking on international operations. As the U.S. military focuses on more domestic missions (e.g., weather-related disaster response), fewer resources will be available for all engagements internationally.

- A. ANS (Education/Training, Planning):
Elevate the threat posed by changing climate/weather conditions to a level commensurate with the current threat baseline of four-plus-one (i.e. Russia, China, Iran, North Korea, and violent extremism) used within the Office of the Secretary of Defense to assess risk and plan joint force capabilities and capacities. Strategic decisions need to reflect a renewed commitment to minimize risks throughout the U.S. military commitments to operations, personnel, research, and military construction given changing climate conditions. Congressional support and cooperation with the Office of Management and Budget is essential to ensure the adequate resources are allocated in support U.S. military decisions that recognize risk-based conclusions and the impact of climate their national security responsibilities.
- B. ANS (Planning):
Integrate climate risk into decisions concerning resource allocations designed to strengthen DoD and other first-responder capabilities in addressing the increasing frequency, severity, and simultaneity of civilian homeland emergencies. Resource commitments need to recognize the wide range of emergencies that may occur at the same time across the homeland, including excessive heat, historically unusual floods, droughts, and wildfires, and rising sea levels and larger storm surges.
- C. ANS (Research):
Promote continuous monitoring of the international physical and societal conditions associated with climate that can be anticipated to accelerate and/or exacerbate societal events endangering U.S. national security and commanding U.S. military attention.

D. ANS (Planning):

Ensure strategic planning decisions integrate scientifically credible understanding of the significance of climate risk, resiliency, mitigation, and adaptation, especially as they pertain to U.S. military operational readiness and infrastructure investments.

5. AOC (Research, Education/Training, Planning):

Food insecurity, increasingly aggravated by climate change, drives severe societal instability worldwide (e.g., protests, riots, mass migration) that can threaten U.S. national security, and consequently command U.S. military attention. Many fragile societies facing food insecurities exacerbated by deteriorating climate conditions have dramatically increasing populations dominated demographically by the young. The recognition that younger individuals are especially susceptible to radicalization strongly suggests that proactive efforts to improve food security in fragile societies is among the important steps needed to ameliorate/forestall events that can impact U.S. national security interests.

A. ANS (Research, Education/Training)

Encourage new and support existing DoD and third-party programs designed to proactively identify, and eventually help mitigate, the severe weather conditions endangering food security in fragile communities (e.g., Africa, Southeast Asia) threatened by societal collapse. As a contributing partner, develop and implement strategically focused agricultural programs in fragile communities impacted by deteriorating climate/weather conditions to enhance food security, economic growth, and overall societal well-being.

B. ANS (Planning):

Coordinate the allocation of military and civilian resources needed to respond to severe food insecurity foreshadowed by deteriorating climate/weather conditions to ensure the efficient, effective use of limited resources and to provide strategically valuable, early warnings of emerging “hot spots” having direct importance to U.S. national security interests and U.S. military decisions.

6. AOC (Research):

The accuracy, and therefore the predictive value, of climate models critically depend on scientifically credible data and standards for analysis characterizing both existing conditions (e.g., land elevations) and anticipated vulnerabilities (e.g., sea levels, storm surges, and frequency of severe weather events). The expertise needed to obtain these data and identify useful standards requires cooperation among researchers, modelers, real-world practitioners, and policy makers, especially for developing risk analyses on which realistic vulnerability assessments related to climate issues can be based. The critical contributions made to U.S. national security by the existing, *in situ* observational system of satellites and other state-of-the-art measuring devices, tasked to obtain accurate, real-time data monitoring weather and climate conditions, cannot be overemphasized.

A. ANS (Research):

Initiate a comprehensive assessment of the effectiveness of satellite observation systems and of the new operational advantages provided by emerging technologies. Attention needs to focus on whether these satellite systems and other devices provide the quality of observational data and analyzed products required to accurately evaluate changing climate conditions impacting U.S. national security.

B. ANS (Research):

Launch a comprehensive, focused research and development agenda involving multidisciplinary perspectives and expertise (scientific, engineering, policy, social behavioral, and economic) on advancing climate model predictions and on learning how to effectively mitigate and/or adapt to the currently observed, and reasonably expected, changes in climate conditions.

7. AOC (Research, Education/Training, Relationships, Infrastructure):

The emergence of an increasingly navigable Arctic Ocean, created by changing climate conditions, presents serious diplomatic and security challenges for U.S. national security interests, especially regarding U.S. military operational capabilities and readiness at its Arctic bases, facilities, and installations. While the removal of the historic isolation among nations bordering the Arctic Ocean offers exciting opportunities for trade, recreation, and resource exploration, it simultaneously forces the U.S. military to confront more complex national security responsibilities with respect to established partners and known adversaries. The U.S. military must under all circumstances be capable of operating effectively in this “new” and rapidly evolving Arctic Ocean.

A. ANS (Education/Training):

Initiate training programs and develop specialized design and construction capabilities for U.S. military personnel to effectively address the unusual, and often unique, challenges of operating in a changing Arctic. A well-informed understanding, based on operational experience in the Arctic and on credible predictions of changing Arctic climate, needs to guide the curricula and material used in these educational and training programs.

B. ANS (Education/Training, Infrastructure):

Increase search and rescue capabilities, shipping route and human activity monitoring, and crisis response readiness in the Arctic. These efforts include giving priority for obtaining new, modern ice-breaker capabilities, other surface craft, and fixed- and rotary-wing aircraft designed for Arctic conditions, as well as training and equipping the personnel needed to effectively and safely deploy these services in the Arctic region.

C. ANS (Research, Infrastructure):

Enhance U.S. commitments to maintain the U.S. military infrastructure essential to promote U.S. national security interests and expand operations that guarantee free access for the U.S. military and support for U.S. commercial interests in the Arctic region. Infrastructure investments require an accurate understanding of the unusual, and often unique, challenges presented by the Arctic environment. Specialized training for those responsible for designing and constructing Arctic infrastructure is essential, especially in adapting to threats from flooding, coastal erosion, and thawing permafrost, servicing heavy-lift, long-haul aircraft, and building deep-draft harbors and ports of refuge.

D. ANS (Research)

Improve the characterization of the Arctic environment by enhancing sensor-based monitoring of the permafrost, evaluating the efficiency of thermosiphons, and using modern standards to expand surveys of maritime waters.

- E. ANS (Relationships):
Recognize that deteriorating Arctic climate conditions now affecting U.S. national security interests also overlap with the need for U.S. military assistance in civilian communities that are facing emerging, existential hazards found in the new Arctic environment. Deteriorating Arctic climate conditions often place coastal and rural indigenous Alaskan communities at special risk for access to food, water, energy, sanitation, and health services, all issues also of importance on the U.S. military agenda.

Immediate Concerns

1. AOC (Relationships, Communication):

Communicating the significance of climate issues on U.S. military operational effectiveness needs to be tailored to foster public trust, especially given the diverse perspectives on climate issues currently being expressed. Participation by the senior U.S. military leadership in these public discussions is critical to convey a realistic understanding of the increasingly serious role climate issues have in U.S. national policy formulation and security decisions.

- A. ANS (Communication):
Institute U.S. government-led “table-top” exercises for military, local and state government, academic, private sector, and citizen participants focused on gaming the potential impact of changing climate conditions on local, regional, and national arenas, especially with respect to national security consequences and economic prosperity. Outcomes from rational analyses and reviews of U.S. military priorities need to underpin public communication concerning how changing climate conditions impacting U.S. national security.
- B. ANS (Relationships, Communication):
Tailor communications to various stakeholders (e.g., local, regional and state authorities, business owners, school boards) and expand the communication of credible information and rational analyses concerning the significance of different climate conditions that may be faced by the U.S. military and the public. Communicating U.S. military priorities to state, regional, and local officials is critical to effectively coordinate mitigation and adaption activities, especially since many practical decisions regarding changing climate conditions are being made in these communities. Cultivate sustainable relationships and engagements among the research communities, DoD, and other national security agencies to aid in the public communication efforts.

2. AOC (Relationships, Education/training, Planning, Infrastructure):

A sustainable commitment focused on integrating the impact of climate issues on tactical, operational, and strategic decisions is an essential component within modern professional U.S. military training and educational systems. Training and educational programs need to prioritize the challenges presented by a changing climate in the 10-20 year planning horizon, given that military personnel are expected to operate in extreme weather conditions and/or deteriorating environments beyond those encountered historically.

- A. ANS (Education/Training):
Focus U.S. military education and training on preparing personnel to operate in sustained extreme weather and under deteriorating environments beyond those encountered historically. Institutionalize consideration of climate issues into professional

U.S. military educational and training systems addressing tactical, operational, and strategic decisions. Specifically, develop and introduce classroom material and training exercises describing scientifically credible information on the military significance of changing climate conditions into existing and emerging curricula used in senior U.S. military education. These changes need to be tailored to the specific goals and programs within the respective educational institutions (e.g., U.S. Army War College, U.S. Naval War College).

B. ANS (Education/Training, Planning):

Prioritize contingency planning and strategic analyses for military decisions, including identifying postulated threats, and how the changing climate can alter human geography in operational arenas and potentially increase threats to U.S. national security interests. Increase the priority of climate issues both strategically and tactically by incorporating climate-related contingencies in planning documents.

C. ANS (Education/Training, Infrastructure):

Develop training protocols and equipment needed to ensure not only the physical protection and safety of military personnel, but also to optimize their abilities to effectively perform missions under greatly altered environmental conditions (e.g., limited water, extreme heat, coastal flooding, debilitating diseases).

D. ANS (Infrastructure):

Ensure acquisition programs properly account for climate risk and conduct resilience planning and testing across the full life cycle of weapon systems. Specifically, the weapon and operational equipment designs need to consider functionality under conditions of extreme heat and periodic excursions into unforeseen environmental stresses (e.g., extreme heat, prolonged storms, water extremes).

E. ANS (Relationships, Planning):

Negotiate and ratify international agreements pertaining to the detection, control, and treatment of diseases known to increasingly foster major outbreaks (i.e., pandemics) in the warming climates increasingly found in diverse geographical areas. Joining pandemic disease protocols establishes partnerships essential to preventing and/or mitigating disease outbreaks on the U.S. homeland and globally that both can affect U.S. military personnel. Agreements based on multidisciplinary studies of the water-food-energy-health nexus can help accurately identify societal tipping points affecting national security priorities. These conventions, protocols, and agreements strengthen the U.S. military readiness and force protection options needed to operationally adapt to societal instability, mass human migration, armed conflicts, and health/disease/food emergencies.

3. AOC (Relationships, Planning, Infrastructure):

U.S. military infrastructure, both domestic and abroad, is increasingly vulnerable to climate effects (e.g., base flooding, consistently hotter or drier conditions, thawing permafrost)

A. ANS (Infrastructure):

Analyze how changing climate conditions affect current siting and the potential need to reinforce/relocate infrastructure at all U.S. bases, facilities, and installations. This information can be critical to the BRAC process that needs to consider the impact of

changing climate conditions on continuing operational viability and functionality of infrastructure throughout the U.S. military.

B. ANS (Planning):

Utilize return on investment study for resilience planning (e.g., \$1 invested = \$4-\$10 of return) with respect to facilities that may not need to be reinforced/relocated, but have been identified as vulnerable to specific severe weather events.

C. ANS (Relationships, Planning):

Establish and codify defined collaborative processes to work with local civilian communities and municipalities to prepare for the physical and financial challenges resulting from the impacts of changing climate conditions (e.g., severe weather events). Develop policies and identify resources needed to support collaborative strategies that align with local, regional, state, and federal priorities focused on maintaining and improving the operational effectiveness of U.S. military bases, facilities, and installations.

D. ANS (Infrastructure):

Accelerate the development and deployment of innovative, clean-energy platforms used to meet U.S. military requirements, while reducing dependence on energy sources incompatible with observed and recognized changes in climate conditions (e.g., neutral energy consumption at bases, facilities, and installations). Renewed efforts to minimize reliance on carbon-based fuels and increase overall energy efficiency are essential. Innovative energy platforms designed for military applications need to anticipate the potential for analogous civilian applications having similar goals. (e.g., all-electric, non-tactical military vehicle fleets).

E. ANS (Relationships, Planning, Infrastructure):

Leverage free market, entrepreneurial innovation to strengthen and expand U.S. military capabilities designed to mitigate and adapt to changing climate conditions. Strategies to address climate issues of value to the U.S. military require the involvement of local, regional, and state governmental and private sector communities where the entrepreneurial and economic expertise and experience often exist. Free-market, private sector leadership can provide the perspective and support required to ensure that the industrial infrastructure, including efficient supply chain management currently critical to U.S. military capabilities, continues to be effective and robust, even in the face of changing climate conditions.

Long-Term Decisions:

1. AOC (Education/Training, Relationships, Planning, Communication, Infrastructure):

The overarching, long-term capability of the U.S. military to meet its national security responsibilities depends directly on its leadership as a major stakeholder in framing and executing global approaches to climate-related policy decisions. U.S. leadership creates opportunities to establish global climate policy and to determine which practical actions are taken to address specific climate issues, especially those having direct U.S. national security significance. Strengthening the U.S. diplomatic voice in global climate policy and technology decisions remains the cornerstone on which many U.S. military capabilities rely, especially in anticipation of the increasingly rapid and transformational security and economic consequences of a globally changing climate.

A. ANS (Relationships):

Reaffirm the important roles served by the critical linkages among diplomatic, international legal, and military options in addressing complex global issues such as those influenced by changing climate conditions. Strengthen long-standing military and diplomatic support for ratifying international agreements using global leadership to diplomatically resolve disputes without U.S. military engagement. For example, joining the Convention on the Law of the Sea opens opportunities to diplomatically resolve access rights to the continental shelf, transit passage regimes in the Arctic (Northwest Passage, Bering Strait, and Northern Sea Routes), and commercial and strategic resource sovereignty issues (e.g., access to oil, gas, critical mineral deposits, shipping, fishing). U.S. participation in these types of agreements strengthen U.S. national security by minimizing and/or avoiding the potential for conflict and the need for U.S. military engagements.

B. ANS (Relationships):

Expand diplomatic efforts surrounding the jurisdictional disputes in the Arctic including approval of the 1990 US-Russian maritime boundary agreement in the Bering and Chukchi Seas and resolution of the U.S.-Canadian maritime boundary dispute in the Beaufort Sea. Such negotiated agreements can directly expand U.S. military strategic and operational options for resolving national security issues, protecting Arctic ecosystems, and promoting significant private sector opportunities.

C. ANS (Education/Training, Relationships, Planning, Communication):

Expand engagements between and among communities, DoD, and other federal agencies and state entities (e.g., National Guard) to enhance community-based capabilities for mitigating the impact of deteriorating climate conditions and recovering from the associated extreme weather events. The effective engagement of these community organizations provides direct local and regional conduits for rapid response. The planning, training, and resources needed to understand the diverse economic, health, educational, cultural, and social needs of communities exposed to evolving environmental conditions are critical components of such preparation.

2. AOC (Research, Relationships, Planning, Infrastructure):

The increasing impact of severe weather, rare events (e.g., unexpected earthquakes and volcanic eruptions), and persistent climate stresses (e.g., water shortages or excessive flooding), on societal instability and human migration needs to be integrated into U.S. military decisions concerning civilian emergencies, both nationally and internationally. Humanitarian responses to emergencies by the U.S. military (e.g., Humanitarian Assistance and Disaster Response and Defense Supports to Civilian Authorities) need to be shaped by the diverse societal views embedded in respective communities (e.g., culture, economy, health, education). While the responsibility to protect populations, especially those at greatest risk due to socioeconomic weakness, remains an immediate priority, those actions cannot become a distraction to strategic priorities defining national security goals related to changing climate conditions.

A. ANS (Relationships, Planning):

Expand proactive, cooperative planning focused on identifying and mitigating the economic impact of changing climate conditions. Reaffirm existing and promote innovative new relationships among the U.S. military and local, regional, and state governments, together with their respective private sector, non-governmental, and

philanthropic stakeholders. Planning needs to link national security (military) priorities with the enhancement of societal stability and resilience as climate conditions evolve. The criticality of the industrial-defense nexus is evident during BRAC reviews in which the strength of the manufacturing, technological, and innovation infrastructure often defines existing and future viability of specific military facilities, bases, and installations.

B. ANS (Research):

Expand research on the historically important relationships between environmental conditions (e.g., extreme weather, sea level rise, persistent climate stresses) and the human geography and geopolitical factors that have often directly influenced U.S. national security priorities, and thereby U.S. military responsibilities. The unprecedented changes in climate conditions now observed, and reasonably anticipated, strongly suggest that proactive programs using modern technologies can improve how the U.S. military operates under increasingly arduous environmental and societal conditions.

Climate Impact on National Security (CINS) Conference Participants*

Dr. Richard Alley – Professor, Department of Geosciences, Pennsylvania State University
CINS-1 Presenter

Dr. Alley is the Evan Pugh Professor in the Department of Geosciences at Penn State. His research includes glaciology, ice, climate, sea level change, and abrupt climate change. He was the lead author of “Chapter 4: Observations: Changes in Snow, Ice, And Frozen Ground.” He has written papers for science journals, and chaired the National Research Council on Abrupt Climate Change. In 2000, he published *The Two-Mile Time Machine: Ice Cores, Abrupt Climate Change, and Our Future*. He was awarded the Seligman Crystal in 2005; and is one of several Penn State earth scientists who are contributors to the IPCC.

Dr. George Atkinson – Founder and Executive Director, Institute on Science for Global Policy (ISGP); Former Science and Technology Adviser, Department of State,
CINS-1 Moderator, CINS-2A Moderator, CINS 2B Moderator

Dr. Atkinson is the Founder and Executive Director of the Institute on Science for Global Policy (ISGP). He launched ISGP in 2008 as a new type of international forum. He served as Science and Technology Adviser to U.S. Secretaries of State Colin Powell and Condoleezza Rice. He is former Head of the Department of Chemistry at the University of Arizona and founded a laser sensor company serving the semiconductor industry. Dr. Atkinson received his B.S. (high honors, Phi Beta Kappa) from Eckerd College and his Ph.D. in physical chemistry from Indiana University.

Esther Babson – Program Manager of Climate Security at the American Security Project,
CINS-2B

Ms. Babson is the Program Manager of Climate Security at the American Security Project. She has a Masters in Global Security Studies from Johns Hopkins University with a focus on the impact of climate change on security in South Asia. As part of her studies, she participated in a three-week course held in Nepal, during which she studied the current and anticipated impacts of climate change on Nepal and current adaptation measures. She received her Bachelors of Arts in Environmental Studies from Dickinson College. While attending Dickinson College, she attended the UN COP 17 in Durban, South Africa.

Daniela Baeza – Senior Fellow, Institute on Science for Global Policy (ISGP),
CINS-1 Staff

Ms. Baeza, ISGP Senior Fellow and ISGP Forum cohost, holds bachelor's degrees in Global Affairs/International Relations and Political Science. With a focus on interdisciplinary cooperation between the scientific community, the private sector, and the public sector for international development, she has worked on various domestic and international research projects assessing development strategies, the latest evaluating the effects of economic development on living standards in Singapore.

Dr. Lance Betros – Provost, U.S. Army War College
CINS-1 CINS-2A, CINS-2B

Dr. Betros, Provost of the U.S. Army War College, Carlisle Barracks, Pennsylvania, assumed the position in 2012, following retirement from the U.S. Army and 35 years of continuous service. He served in staff assignments in the United States and Europe and was part of the U.S. joint task force in Somalia during combat operations. He is the author of *Carved from Granite: West Point since 1902* (2012), and holds a Ph.D. and M.A. in history from University of North Carolina – Chapel Hill, and a M.S. in national security and strategic studies from the National War College.

Jennifer Boice – Program Coordinator, Institute on Science for Global Policy (ISGP)
CINS-1 Staff, CINS-2A Staff, CINS-2B Staff

Ms. Boice has been the Program Coordinator at ISGP for the past seven years. She previously worked for 25 years in the newspaper industry, primarily at the Tucson Citizen and briefly at USA Today. She was the Editor of the Tucson Citizen when it was closed in 2009. Additional appointments at the Tucson Citizen included Business News Editor, Editor of the Online Department, and Senior Editor. She also was a business columnist. Ms. Boice received her M.B.A. from the University of Arizona and graduated from Pomona College in California with a degree in economics.

Daira Brayley – Fellow, Institute on Science for Global Policy (ISGP),
CINS-2B Staff

Ms. Brayley is a senior at Eckerd College in St. Petersburg, Florida. She is a double major in political science and environmental studies, as well as a double minor in international relations & global affairs, and law & justice. She spent her past summer in Bhutan conducting field research on community forestry and impacts of climate change. Her current research focuses on the measurement of gross national happiness and the role environmental factors play into all political decisions in the Kingdom of Bhutan. Ms. Brayley plans to continue her research on Bhutan and develop her findings into her senior thesis.

Dr. Phil Brown – Deputy, Joint Resources and Readiness Division, Training and Exercise Directorate, North American Aerospace Defense Command and United States Northern Command
CINS-1, CINS 2A Presenter

Dr. Brown is the Deputy in the Joint Resources and Readiness Division of the Training and Exercise Directorate at the North American Aerospace Defense Command and United States Northern Command. Since 2009, Dr. Brown has held responsibility for leading/supervising the Division's portfolio of Resources, Modeling & Simulation, and Lessons Learned. Dr. Brown's experiences include 30 years in the United States Air Force and follow-on work as a defense contractor professional prior to joining government civil service. He earned his Doctorate of Management from Colorado Technical University with current research interests in the current and future states of Arctic.

Dr. Harold Brooks – Meteorologist, National Severe Storms Laboratory
CINS-1, CINS-2B

Dr. Brooks was elected a Fellow of the American Meteorological Society (AMS) in 2010 and a Fellow of the Royal Meteorological Society (RMetS) in 1996. He has received the Department of Commerce Silver Medal in 2002, three NOAA Research Outstanding Paper Awards, and the NOAA Administrator's Award in 2007. He received a B.A. in physics and mathematics at William Jewell College, graduating summa cum laude. He earned a M.A. and M.Phil. at Columbia University from the Atmospheric Sciences Program within the Department of Geological Sciences and his Ph.D. in atmospheric sciences at the University of Illinois at Urbana-Champaign.

Dr. Antonio “Tony” Busalacchi – President, University Corporation for Atmospheric Research
CINS-2B

Dr. Busalacchi, president of the University Corporation for Atmospheric Research (UCAR), has a distinguished career in the geosciences, and experience in management of academic, laboratory, and government programs. After receiving a Ph.D. in oceanography from Florida State University, Dr. Busalacchi began his professional career at NASA's Goddard Space Flight Center. His research on climate variability and predictability has supported a range of international and national research programs dealing with global change and climate. He has served on National Academies of Science, Engineering, and Medicine activities. In 2016, he was elected as a member of the National Academy of Engineering.

Dr. Mark Cane – Professor Emeritus, Earth and Climate Sciences, Columbia University
CINS-1, CINS-2B

Dr. Cane is the G. Unger Vetlesen Professor Emeritus at Columbia University. Along with Dr. Stephen Zebiak, Dr. Cane devised the first numerical model able to simulate El Niño. In 1985 this model was used to make the first physically based forecasts of El Niño. In recent years Dr. Cane's research interests have focused on paleoclimate problems their relationship to climate change. He has written one book and about 250 papers on a broad range of topics. He is also a member of the American Academy of Arts and Sciences and of the National Academy of Sciences.

LtGen John “Glad” Castellaw – Lieutenant General, U.S. Marine Corps (retired); co-founder, Chief Executive, FarmSpace Systems LLC
CINS-1

LtGen John “Glad” Castellaw is co-founder and chief executive officer of FarmSpace Systems LLC. For 36 years, he led Marines around the world, while flying more than a two-dozen aircrafts. At the Pentagon, he oversaw Marine Aviation and then the Marine Corps budget. In 2010, he co-founded and acted as the president of the non-profit Crockett Policy Institute. He is a member of the USGLC National Security Advisory Council; lectures on National Security at the University of Tennessee, Martin; serves with several Washington, D.C., based groups; and sits on the American Security Project (ASP) board of directors.

Dr. Sweta Chakraborty – Associate Director, Institute on Science for Global Policy (ISGP)
CINS-1 Staff, CINS-2A Moderator, CINS 2B Moderator

Dr. Chakraborty is the Associate Director at ISGP. She received her doctorate in Risk Management from King's College London and her undergraduate degrees in Decision Science and International Relations from Carnegie Mellon University. She has more than 20 published articles, has contributed to three books, and is author of the forthcoming book "Pharmaceutical Safety: A Study in Public and Private Regulation." She is currently an adjunct assistant professor at Columbia University and a program associate on pharmaceutical regulation and product liability at Oxford University's Centre for Socio-Legal Studies.

Jennifer Coughlin – Advisory Scientist, Science and Engineering Technical Assistant (SETA) Support Contractor, Office of the Assistant Secretary for Defense for Research and Engineering,
CINS-1

Ms. Coughlin currently provides Systems Engineering and Technical Assistance support to the Human Performance, Training, and Biosystems Directorate in the Office of the Assistant Secretary for Defense for Research and Engineering (OASD/R&E). In her current support role, Ms. Coughlin has been tasked with identifying gaps and challenges in key strategic environmental S&T areas for potential future investment. She has specifically worked to develop and manage many R&D programs for Defense Advanced Research Projects Agency, Defense Threat Reduction Agency, the Army, and Office of the Secretary for Defense (OSD) in the life sciences. She holds a B.A. in chemistry from the University of Virginia.

Dr. Deborah Crawford – Vice President for Research, George Mason University
CINS-1

As Vice President for Research, Dr. Crawford is responsible for coordinating and overseeing the full range of the university's research activities. She joined George Mason University from the International Computer Science Institute. She formerly served as Senior Vice Provost for Research at Drexel University and worked at the National Science Foundation (NSF) in executive and program management positions in the Directorates for Computer and Information Science. A native of Glasgow, Scotland, Dr. Crawford earned her Ph.D. in Information Systems Engineering from the University of Bradford, and her B.Sc. (with honors) in Electronic and Electrical Engineering from the University of Glasgow.

Fred Downey – Consultant, national security policy, former Vice President, Aerospace Industries Association (AIA), and Senior Counselor and Legislative Aide for Defense and Foreign affairs to Sen. Joseph Lieberman
CINS-1, CINS-2A Presenter, CINS-2B

Mr. Downey is a former U.S. Army strategist and longtime defense and international affairs expert on Capitol Hill and was Vice President of National Security at AIA. Downey joined AIA from the office of Connecticut Sen. Joe Lieberman where he served as Senior Counselor and Legislative Aide for Defense and Foreign Affairs. He was the senator's key staff person on these issues for 12 years. Before joining Lieberman, Downey worked on defense analytical services for TASC Inc., which came after a 24-year career in the U.S. Army.

Dr. John Farrell – Executive Director, U.S. Arctic Research Commission
CINS-2B Presenter

Dr. Farrell is the Executive Director of the U.S. Arctic Research Commission. Dr. Farrell previously served as the Associate Dean of Research and Administration at the Graduate School of Oceanography at the University of Rhode Island; and was Director of the international Ocean Drilling Program. He organized and conducted the first successful international scientific ocean drilling expedition to the high Arctic in 2004. He participated in a U.S. ocean mapping effort in 2012. He obtained a Ph.D. and Sc.M. in geological sciences from Brown University, and a B.A. in geology from Franklin and Marshall College.

Francesco “Frank” Femia – President, Center for Climate and Security
CINS-1

Mr. Femia is Co-Founder and President of the Center for Climate and Security. He has written, published and spoken on the security implications of climate change, water stress, and natural resource mismanagement in Syria and North Africa. He previously served as Program Director at the Connect U.S. Fund. He holds a master’s degree from the London School of Economics and Political Science, where he explored European Union security and defense policy, including a field study on Cyprus’s stalemated conflict. He also serves on the advisory board of the Nuclear Security Working Group and the Planetary Security Initiative.

Dr. Tom Fingar – Distinguished Fellow, Freeman Spogli Institute for International Studies, Stanford University; former Deputy Director and Chairman of the National Intelligence Council
CINS-1, CINS-2B Presenter

Dr. Fingar is the inaugural Oksenberg-Rohlen Distinguished Fellow in the Freeman Spogli Institute for International Studies at Stanford University. He served as the first deputy director of national intelligence for analysis and, as Chairman of the National Intelligence Council. He previously served as Assistant Secretary of the Department of State’s Bureau of Intelligence and Research, Principal Deputy Assistant Secretary, Deputy Assistant Secretary for Analysis, Director of the Office of Analysis for East Asia and the Pacific, and Chief of the China Division. He graduated from Cornell University, and received his master’s degree and Ph.D. in political science from Stanford University.

Dr. Inez Fung – Professor of Atmospheric Science, University of California, Berkeley; Lead Writer (U.S.), *Climate Change: Evidence & Causes*, U.S. National Academy of Sciences and Royal Society
CINS-1 Presenter

Dr. Fung is a Professor of Atmospheric Science at the University of California, Berkeley. Her research focuses on understanding and predicting the causes and consequences of changes in the abundance of climactically significant trace species. She was the U.S. Lead Writer on a report from the Royal Society and the U.S. National Academy of Sciences, *Climate Change: Evidence & Causes*. She received her S.B. in Applied Mathematics and her Sc.D. in Meteorology from Massachusetts Institute of Technology. She joined the Berkeley faculty in 1998 as the founding director of both Berkeley Atmospheric Sciences Center and Berkeley Institute of the Environment.

Dr. Peter Gleick – Co-Founder, President Emeritus, Pacific Institute
CINS-2B

Dr. Gleick is a world-renowned expert on water and climate issues. He co-founded the Pacific Institute in 1987, which he led as president until 2016, when he became President Emeritus. He developed one of the first analyses of climate change impacts on water resources, the earliest comprehensive work on water and conflict, and defined basic human need and right to water. Dr. Gleick received the MacArthur “Genius” Fellowship and is the author or co-author of many scientific papers and 11 books. Dr. Gleick holds a B.S. from Yale University and an M.S. and Ph.D. from the University of California, Berkeley.

Dr. Leo Goff – Program Manager, CNA Military Advisor Board; Captain U.S. Navy (retired)
CINS-2B

Dr. Goff is the program manager for CNA’s Military Advisory Board, which has a focus on climate, energy, and national security. Additionally, he is a retired Navy Captain. He was the commanding officer of a nuclear submarine and a submarine tender. Since retirement, he has held the position of president and owner of ACARYIS. Dr. Goff holds a PhD in organizational behavior with a concentration in leadership; a master’s degree in Public Administration; and a master’s Degree in Executive Business Administration. He earned his commission at the United States Naval Academy, graduating with a Bachelor of Science in Ocean Engineering.

Sherri Goodman – Public Policy Fellow, Woodrow Wilson Center
CINS-1, CINS 2-B Presenter

Ms. Goodman is a Public Policy Fellow at Woodrow Wilson Center. She previously served as Senior Vice President and General Counsel of the Center for Naval Analysis. She is the founder and Executive Director of the CNA Military Advisory Board. Ms. Goodman has served as Deputy Undersecretary of Defense and currently serves on the boards of the Atlantic Council, the Joint Ocean Leadership Initiative, the Marshall Legacy Institute, and the Secretary of State’s International Security Advisory Board. A graduate of Amherst College, Ms. Goodman has degrees from Harvard Law School and the Kennedy School of Government.

Dr. Eban Goodstein – Director, MBA program and Center for Environmental Policy, Bard College
CINS-1

Dr. Goodstein is Director of the MBA program at Bard College and the Bard Center for Environmental Policy. He is known for organizing national educational initiatives on climate change, which have engaged thousands of schools and universities, civic institutions, faith groups, and community organizations in solutions-driven dialogue. He is the author of three books and numerous journal articles. Dr. Goodstein holds a Ph.D. in Economics from the University of Michigan. In recent years, he has coordinated a series of national educational events focused on climate change, engaging over 2,500 colleges, universities, and K-12 schools in solutions-based dialogue.

Kate Gordon – Vice Chair, Climate and Sustainable Urbanization, Paulson Institute
CINS-1 Presenter

Dr. Gordon is Vice Chair of Climate and Sustainable Urbanization at the Paulson Institute, as well as a nonresident Fellow at the Center on Global Energy Policy at Columbia University. She

is a nationally recognized expert on the intersection of clean energy and economic development. She served as Vice President of Energy and Environment at the Washington D.C.-based Center for American Progress and the Co-Director of the national Apollo Alliance. She earned a law degree and a master's degree in city planning from the University of California, Berkeley and an undergraduate degree from Wesleyan University.

Col Michael Gremillion – Chief, Weather Strategic Plans and Interagency Integration Division, U.S. Air Force,
CINS-1, CINS-2A, CINS-2B Presenter

Col Gremillion is Chief of the Weather Strategic Plans and Interagency Integration Division at the Director of Weather, at the U.S. Air Force Headquarters in Washington, D.C. He is responsible for integrating terrestrial, climate, and space weather environmental support into Air Force, Intelligence Community, and Federal Agencies. He coordinates weather requirements into and from the Air Force and Intelligence Community strategic planning and programs. He also serves as the Director of Weather's primary focal point for climate issues, supporting the Department of Defense and other government agencies. He has a Master of Science degree in Meteorology from Texas A&M University.

Keziah Groth-Tuft – Student, Dickinson College; Environmental Protection Agency-Greater Research Opportunities Fellow
CINS-2A, CINS-2B

Ms. Groth-Tuft is an International Studies Major at Dickinson College, focusing on globalization and sustainability, minoring in Arabic, and working towards a Certificate in Security Studies. She focuses on climate change governance. She also is a Environmental Protection Agency-Greater Research Opportunities Fellow. She attended Conference of Parties (COP) 21 in Paris and COP 22 in Morocco, researching Arab countries' representation in the United Nations Framework Convention on Climate Change. She studied abroad last year, first in Jordan where she looked at water quality and distribution politics, and then Denmark where she focused on the current refugee situation in Europe.

VADM Lee Gunn – Chairman, The Gunn Group; Vice Admiral, U.S. Navy (retired)
CINS-1, CINS-2A Presenter

VADM Gunn served in the U.S. Navy for 35 years. His last active duty assignment was Inspector General of the Department of the Navy where, together with his Marine Deputy, he was responsible for the Department's overall inspection program and its assessments of readiness, training, and quality of service. After concluding his active duty career, Admiral Gunn led the Executive Review of Navy Training. VADM Gunn holds a Bachelor's degree in Experimental and Physiological Psychology from the University of California, Los Angeles and a Master of Science degree in Operations Research from the Naval Postgraduate School in Monterey, California.

Lukas Haynes – Executive Director, the David Rockefeller Fund,
CINS-1

Mr. Haynes is Executive Director of the David Rockefeller Fund and also a member of the Center for Climate and Security's Advisory Board. He is also an adjunct associate professor of global affairs and philanthropy at New York University. He has worked at the John D. and Catherine T. MacArthur Foundation, provided foreign and security policy advice to the Obama

for U.S. Senate campaign, and served on the Policy Planning Staff of the U.S. State. He was educated at the College of William & Mary and Oxford University, where he earned a master's degree in international relations.

John Hempelmann - President, Board of Directors, Henry M. Jackson Foundation; Chairman and Founding Partner, Cairncross & Hempelmann

CINS-2B

Mr. Hempelmann is the President of the Board of Directors of the Henry M. Jackson Foundation. He is also the Chairman and Founding Partner of Cairncross & Hempelmann. The Jackson Foundation was created to advance the legacy of Senator Henry M. Jackson. John Hempelmann was a member of Senator Jackson's staff and also worked on the Senator's Presidential Campaign. He has more than 30 years of experience in real estate, land use, environmental, natural resources, and conservation law. He has a B.A. and M.A. from Georgetown University and a J.D. from the University of Washington.

Samantha Innis – Senior Fellow, Institute on Science for Global Policy (ISGP)

CINS-1 Staff

Mrs. Innis (née Cermignano) is a second year medical student at Drexel University College of Medicine. There, she is pursuing her MD degree while also finishing a Medical Humanities Scholarship project, directing the Medical Genetics Interest Group, sitting on multiple institutional task forces, and actively participating in a number of local, national, and international organizations including the AMA, AMWA, Sigma Xi, and others.

Prof. Christopher Jasparro – Associate Professor, Department of National Security Affairs, U.S. Naval War College

CINS-1, CINS-2B

Prof. Jasparro is an Associate Professor of National Security Affairs and Africa Area Study Coordinator at the U.S. Naval War College. He is an Asia-Pacific regional specialist with additional interests in African non-state security issues and regional geography. He is a former U.S. Naval Reserve Officer and an experienced field archaeologist. He holds a Ph.D. in geography from the University of Kentucky as well as a Graduate Certificate in Transportation Systems Management. He received an M.A. in geography from the University of North Carolina and a B.A. in anthropology and geography from the University of Vermont.

Hon. Jeffrey Johnson – Associate Justice of the California Court of Appeal; Member, Board of Visitors, U.S. Army War College,

CINS-2B

Justice Johnson has served as an Associate Justice of the California Court of Appeals since 2009. He is a member of the Court Facilities Advisory Committee, appointed by Chief Justice Tani Cantil-Sakauye. He attended Duke University and graduated with honors, earning a B.A. with a double major in political science and history. He also studied Politics, Philosophy and Economics at Oxford University and earned his J.D. from Yale Law School. He is a 2013 fellow of the United States Army War College National Security Seminar and a Lifetime Member of the United States Army War College Foundation.

CDR Kevin Jones – Arctic Policy Advisor, U.S. Coast Guard; Commander, U.S. Coast Guard (retired.)
CINS 2

CDR Jones serves as a civilian Arctic Policy Specialist for the U.S. Coast Guard, after serving on active duty for the Coast Guard for more than 23 years, retiring as a commander in 2016. He graduated from Officer Candidate School in Yorktown, Virginia, after receiving a degree in Political Science from Washington State University. His personal awards include the Meritorious Service Medal, the Coast Guard Commendation Medal, and the Coast Guard Achievement Medal. He is also authorized to wear the permanent Advanced Boat Force Operations insignia.

Dr. Mary Kavanagh – Minister-Counselor, Research and Innovation, European Commission
CINS-2B

Dr. Kavanagh is the Minister-Counselor for Research and Innovation at the European Union's Delegation to the United States of America in Washington, DC. She also endeavors to keep her Headquarters abreast of research and innovation policy developments in the U.S. Prior to her current posting, she worked in the International Cooperation Directorate of the Directorate-General for Research and Innovation at the European Union headquarters in Brussels. Dr. Kavanagh has a Ph.D. in Plant Science from University College Cork, Ireland, and carried out post-doctoral research in France and Switzerland before entering the field of science policy.

CAPTAIN (select) Danny W. King – Senior Navy Advisor, Peacekeeping and Stability Operations Institute, U.S. Army War College
CINS-1, CINS-2A

CAPT (sel) King was selected by the Army to become the first Senior Navy Advisor for the U.S. Army Peacekeeping and Stability Operation Institute (PKSOI) team. His selection was based upon his myriad of military and civilian assignments coupled with his vast amount of expertise. A prior enlisted Sailor with over 15 years of sea duty on board 7 ships, he is now a Navy Supply Corps Officer with more than 33 years of naval service. He holds an Occupational of Science Degree in Culinary Arts from Johnson & Wales University, a B.S. in Interdisciplinary Studies from Liberty University and Master's Degree in Strategic Studies from the U.S. Army War College.

Congressman Jim Kolbe – Senior Transatlantic Fellow, German Marshall Fund; former Arizona Congressman,
CINS-2A, CINS 2B

For 22 years, Congressman Kolbe served in the United States House of Representatives, elected in Arizona for 11 consecutive terms. He is currently serving as a Senior Transatlantic Fellow at the German Marshall Fund of the United States, and as a Senior Adviser to McLarty Associates. He is also Co-Chair of the Transatlantic Taskforce on Development with Gunilla Carlsson and is an adjunct Professor in the College of Business at the University of Arizona. He graduated from Northwestern University with a B.A. in Political Science and then from Stanford University with an M.B.A. and a concentration in economics.

Dr. John Krummel – Director, Environmental Science Division, Argonne National Laboratory
CINS-1

Dr. Krummel is the Director of the Environmental Science Division at Argonne National Laboratory, where his research areas include landscape and ecosystem ecology, development and application of geospatial technologies for environmental analysis, and energy-climate-environment system dynamics. He now has leadership responsibilities for regional and global climate research programs funded by the Departments of Energy, Defense, and Interior, including operation of the Southern Great Plains Atmospheric Radiation Measurement Supersite for the Department of Energy, the largest climate observatory and climate user facility in the world. Dr. Krummel received his undergraduate degree in natural resource science from the University of Wisconsin-Madison and Ph.D. in ecology from Cornell University.

Tara Kulkarni – Director, Center for Global Resilience and Security, Norwich University
CINS-1

Dr. Kulkarni is the Director of the Center for Global Resilience and Security at Norwich University, and an Assistant Professor in the university's Department of Civil & Environmental Engineering. Her research interests are in green infrastructure, sustainable water resources management, and climate change related disaster resilience through engineering innovation. She is also heavily involved in K-12 STEM outreach and community engagement in water and climate initiatives. Dr. Kulkarni's terminal degree is from Florida State University. She has previously served in engineering positions at the Florida Department of Environmental Protection and as Sustainability Manager for Environmental Management Center in India.

Andrew Light – Professor, George Mason University; Distinguished Senior Fellow, World Resources Institute
CINS-1

Dr. Light is a Professor of Public Policy and Philosophy at George Mason University and Distinguished Senior Fellow in the Climate Change. Previously, he served as Senior Adviser and India Counselor to the Special Envoy on Climate Change and Staff Climate Adviser in the Secretary of State's Office of Policy Planning. He is an internationally recognized expert on the normative dimensions of terrestrial restoration ecology, urban ecology, and climate change. He has authored, co-authored, and edited 19 books. He also served as Senior Fellow and Director of International Climate Policy at the Center for American Progress (CAP).

COL Matt Lissner – Colonel, U.S. Army; Strategic Studies Institute, U.S. Army War College
CINS-1, CINS 2A

COL Lissner has served in all three components of the Army — Active, National Guard, and Army Reserve — for more than 28 years. Currently he serves as the senior Army Reserve research advisor, Strategic Studies Institute, U.S. Army War College, at Carlisle Barracks, PA. He has held a wide variety of infantry assignments through battalion level with the 7th Infantry Division (Light), 11th Armored Cavalry Regiment-Opposing Force, and the 39th Separate Infantry Brigade (Enhanced), and has held staff positions at the 77th Regional Readiness Command.

Prof. Doug Lovelace, Jr. – Director, Strategic Studies Institute, U.S. Army War College,
CINS-1, CINS-2A, CINS-2B

Prof. Lovelace became the Director of the Strategic Studies Institute in 2000. He held the Douglas MacArthur Professor of Research Chair at the U.S. Army War College. His Army career included a combat tour in Vietnam and a number of command and staff assignments. He also was Director of Military Requirements and Capabilities Management at the U.S. Army War College. He is a graduate of the U.S. Army Command and General Staff College and the National War College. He holds an M.B.A. from Embry Riddle Aeronautical University and a J.D. from Widener University School of Law.

COL Lynn Lubiak – Director, Strategic Concepts and Doctrine, U.S. Army War College
CINS-1, CINS-2A, CINS-2B

COL Lubiak is the Director of Strategic Concepts and Doctrine at the U.S. Army War College. Colonel Lubiak has served on the Joint Staff in J8 with the Joint Integrated Air and Missile Defense Organization and also served on the Army Staff in the G-8 performing duties in Force Development. She is a graduate of Officer Candidate School and was commissioned a Signal Officer. She holds a B.S. degree in Political Science from Old Dominion University and a M.P.A. from Appalachian State University.

H. Quinton “Quin” Lucie – Visiting Professor U.S. Army War College; Office of Chief Council,
Federal Emergency Management Agency
CINS-1, CINS-2B

Mr. Lucie is on detail to the U.S. Army War College Center for Strategic Leadership as a Visiting Professor from the Federal Emergency Management Agency's (FEMA) Office of Chief Counsel. He has published numerous journal articles and blog posts on Homeland Security and emergency management, including an upcoming essay in the Homeland Security Affairs Journal on FEMA. He received his Master's Degree in Homeland Security Studies from the Center for Homeland Defense and Security at the Naval Postgraduate School, his undergraduate degree from Illinois State University and his J.D. from Southern Illinois University.

Dr. Amy Luers – Director, Climate Change, Skoll Global Threats Fund, currently on
secondment to the White House Office of Science and Technology Policy
CINS-1 Presenter

Dr. Luers is the Director of Climate Change at the Skoll Global Threats Fund (SGTF). She was on secondment to the White House Office of Science and Technology Policy (OSTP). Prior to SGTF, she was the Senior Environment Program Manager at Google. She is Co-founder and former Executive Director of Agua Para La Vida. She holds a Ph.D. in environmental science and an M.A. in international policy studies, both from Stanford University, and a M.S. and B.S. in environmental resources engineering from Humboldt State University.

LTC Judd Mahfouz – Branch Chief, Strategic Plans, National Guard
CINS-1

LTC Mahfouz serves as the Branch Chief for Strategic Plans, in the National Guard Bureau Directorate of Strategy, Policy, Plans, International Affairs (J-5), National Guard Bureau, the Pentagon, Washington, D.C. He has served in the National Guard as both an enlisted soldier

and officer since 1988. He is a graduate of the U.S. Army War College Basic Strategic Arts Program, The Joint Forces College Joint and Combined Warfighter School, and he completed a fellowship in International Relations, Foreign Politics, and the National Interest through the Massachusetts Institute Technology Seminar XXI advanced strategic education program.

Dr. Michael Mann – Professor, Atmospheric Science at Pennsylvania State University; Director, Penn State Earth System Science Center

CINS-1

Dr. Mann is a Distinguished Professor of Atmospheric Science at Pennsylvania State, with joint appointments in the Department of Geosciences and the Earth and Environmental Systems Institute. He is also Director of the Penn State Earth System Science Center). He was a Lead Author on the Observed Climate Variability and Change chapter of the Intergovernmental Panel on Climate Change Third Scientific Assessment Report in 2001 and was organizing committee chair for the National Academy of Sciences Frontiers of Science in 2003. His research involves the use of theoretical models and observational data to understand Earth's climate system.

Marissa McInnis – Senior Research Associate, Texas A&M Institute for Renewable and Natural Resources

CINS-2B

Ms. McInnis currently serves as a senior researcher with Texas A&M University's Institute for Renewable and Natural Resources. She works with the Department of Defense on adaptation and water resource strategies. In previous roles, she served as Climate Change and Sustainability Manager with the Department of Navy. At the Environmental Protection Agency, she launched and directed a partnership with Tribal Colleges and Universities as well as the communications and outreach shop for the Office of International and Tribal Affairs. McInnis received her M.S. in environmental science and policy from Johns Hopkins University and her bachelor's degrees in environmental studies and piano performance from Maryville College.

Dr. Michael Meyer – Founder, Modern Transport Solutions; Senior Advisor, WSP/Parsons Brinckerhoff; former Professor, Massachusetts Institute of Technology; Director, Georgia Institute of Technology

CINS-2B

Dr. Meyer is currently senior advisor for WSP/Parsons Brinckerhoff. He has written more than 300 technical articles and has authored or co-authored 28 books on transportation and infrastructure. He has written extensively on climate change, extreme weather and infrastructure adaptation. Dr. Meyer has focused his attention over the past eight years on climate change, extreme weather and transportation system resilience. In addition, he has led several state studies that have examined extreme weather and infrastructure resiliency. He was a member of a national panel in 1990 that investigated the vulnerability and resilience of the nation's surface transportation system.

Dr. Jerry Melillo – Scientist and Director Emeritus, Ecosystems Center, Marine Biological Laboratory, Woods Hole; Professor, Biology at Brown University

CINS-1

Dr. Melillo is a Distinguished Scientist and Director Emeritus at The Ecosystems Center of the Marine Biological Laboratory in Woods Hole, Massachusetts, and a Professor of Biology at Brown University. Dr. Melillo has been involved with national and international efforts to

advance science and assessment related to global ecology and climate change. He is an honorary Professor in the Institute of Geophysical Sciences and Natural Resources Research of the Chinese Academy of Sciences. Dr. Melillo graduated from Wesleyan University with a degree in Biology and from Yale University with a degree in Ecosystems Ecology.

LTC Arthur Moore – Infantry and Functional Area 49 Officer and Chief of Staff, Army Strategic Studies Group, Army National Guard; Lieutenant Colonel, National Guard
CINS-1, CINS-2A, CINS-2B

LTC Moore is an Army National Guard infantry and functional area 49 (operations, research, and systems analysis) officer currently serving as a Chief of Staff of the Army Strategic Studies Group Fellow. He served on active duty after graduating from the U.S. Military Academy in 2000. Since joining the National Guard, he has served in light infantry battalions in Virginia and Maryland, and deployed to Kuwait and Egypt. Prior to his current assignment, he was full-time Strategic Planner at the Army National Guard Headquarters and part-time Initiatives Group Chief at the 29th Infantry Division.

Dr. David Moran – Adjunct Professor, West Virginia University; President of Technology International Partnerships, LLC
CINS-1, CINS-2B

Dr. Moran is an Adjunct Professor at West Virginia University, President of Technology International Partnerships, LLC, and Past-Publisher, Sigma Xi, The Scientific Research Society, American Scientist and the Chronicle of the New Researcher. He has served as President of the National Technology Transfer Center; Director of Industrial Advanced Development & Industrial Outreach, Advanced Technology; Program Element Administrator for Nuclear Propulsion, Research and Development, Naval Material Command; and Senior Official for National Security, Harvard University's JFK School. He earned a Ph.D. in Hydrodynamics and Mathematics, at the University of Iowa and holds a Sc.M. and ScB. from Massachusetts Institute of Technology.

Michelle Myers – Strategic Policy Analyst, Chief of Staff, U.S. Air Force
CINS-1

Ms. Myers is a Strategic Policy Analyst for the Chief of Staff of the U.S. Air Force's Strategic Studies Group, Directorate of Strategy, Concepts and Assessments. Previously, she served as a Defense Legislative Fellow. She retired from the U.S. Air Force Reserves as lieutenant colonel and began her civil service career as a capabilities program analyst with Headquarters United States Strategic Command. She received a B.A. in Public Relations from the University of Oklahoma, a B.S. in Atmospheric Science from Texas A&M University, and an M.B.A. and master's degree in Industrial and Systems Engineering from Auburn University.

RADM Joseph Nimmich – Senior Executive Advisor, Booz Allen Hamilton; former Deputy Administrator, Federal Emergency Management Agency; Rear Admiral, U.S. Coast Guard (retired)
CINS-1, CINS-2B Presenter

RADM Nimmich is Senior Executive Advisor at Booz Allen Hamilton and formerly served as the Deputy Administrator of the Federal Emergency Management Agency (FEMA) under President Obama. During tenure, his focus was on strengthening and institutionalizing the Agency's business architecture. RADM Nimmich joined FEMA in 2013, and prior to joining, he was the

Director of Maritime Surveillance and Security at Raytheon Corp. He served in the U.S. Coast Guard for more than 33 years, retiring as a Rear Admiral. He earned his M.B.A. from the Stern School of Business at New York University.

Dr. Brian Nordmann – Senior Advisor, Arms Control, Verification and Compliance at U.S. Department of State

CINS-1

Dr. Nordmann was named Senior Advisor for Arms Control, Verification, and Compliance at the Department of State in 2015 and previously served as Director of the Office of Verification and Transparency Technologies and Director of the Office of Biological Weapons Affairs. He received a Ph.D. in Biodefense from George Mason University, a M.S. in Public Administration from Troy State University and graduated from University of California, Berkeley with a degree in Communication and Public Policy.

Dr. John T. Oliver – Senior Ocean Policy Advisor, Emerging Policy Staff, U.S. Coast Guard

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Dr. Oliver is assigned as the Senior Ocean Policy Advisor, Emerging Policy Staff, at U.S. Coast Guard Headquarters. He currently serves as the co-chair of the interagency subgroup to oversee the implementation of marine planning under the President's National Ocean Policy. He also heads a team developing a high-level Coast Guard Climate Resilience Framework. He retired from the navy after 30 years of active service. He graduated from the University of Washington School of Law, completed a graduate degree from the University of Virginia in ocean law and policy, and earned his B.A. degree from Stanford University.

Aubrey Paris – Senior Fellow, Institute on Science for Global Policy (ISGP)

CINS-1 Staff, CINS-2A Staff, CINS-2B Moderator

Ms. Paris, ISGP Senior Fellow and manager of ISGP's "The Forum," received Bachelor of Science degrees in Chemistry and Biology from Ursinus College (Collegeville, Pennsylvania) and a Master of Arts degree in Chemistry from Princeton University (Princeton, New Jersey). She is currently pursuing her Ph.D. in Physical Inorganic Chemistry at Princeton University, where she is a National Science Foundation Graduate Research Fellow and Princeton Energy and Climate Scholar. Her research involves the development of bimetallic alloy catalysts active in heterogeneous electroreduction of carbon dioxide into chemical feedstocks and fuels.

E. Rebecca Patton – Program Manager, Office of the Assistant Secretary of Defense for Energy, Installations and Environment

CINS-2B

Ms. Patton is the program manager for climate change resilience and water resource management in the Office of the Assistant Secretary of Defense for Energy, Installations and Environment. Her focus is on the development of integrated policies that consider future impacts of climate change to enable the Defense Department to continue executing its mission. She chairs the Department of Defense Climate Change Adaptation Working Group. Ms. Patton has more than 30 years of experience working with the Office of the Secretary of Defense, Navy, Marine Corps and Coast Guard. She holds a B.A. in chemistry from Indiana University and a M.Ed. in chemistry from George Mason University.

Dr. Jonathan Pershing – U.S. Special Envoy for Climate Change, Department of State
CINS-1 Keynote Speaker

Dr. Pershing is the U.S. Special Envoy for Climate Change and the former Principal Deputy Director of the Office of Energy Policy and Systems Analysis. Before his appointment to the Obama Administration, he spent six years as the Director of the Climate, Energy and Pollution Program at the World Resources Institute (WRI); five years as Head of the Environment Division at the International Energy Agency in Paris; and a decade in the 1990s, serving the Science Advisor and Deputy Director of the Office of Global Change in the U.S. Department of State. He holds a Ph.D. in geology and geophysics. (Dr. Pershing currently is working at the William and Flora Hewlett Foundation.)

RADM Ann C. Phillips – Rear Admiral, United States Navy (retired); Advisory Board, Center for Climate and Security
CINS-2B

RADM Phillips served in every warfare group of the Surface Navy, during her 31 years on duty she commissioned and commanded USS Mustin, and commanded Destroyer Squadron 28, and Expeditionary Strike Group 2. Ashore she was a Senior Fellow on the Chief of Naval Operations Strategic Studies Group and managed requirements and resources for the Surface Navy as Deputy Director and Director of Surface Warfare Division. Since retiring in 2014 she has completed her M.B.A. at The College of William and Mary, Mason School of Business.

Timothy Phillips – Senior National Intelligence Service, U.S. Government; former National Intelligence Collection Office, Office of the Director of National Intelligence
CINS-2B

Mr. Phillips is a senior national intelligence service executive and former national intelligence collection officer for South Asia with the Office of the Director of National Intelligence (ODNI). Previous intelligence assignments include service as Director Mission Integration at the National Geospatial Intelligence Agency; Chief of the National Intelligence Coordination Center; Managing Editor for Intelligence Today; and Chief Technical Collection for ODNI. From 2000-2006, Mr. Phillips served as chief of war fighter support and program manager for the Defense Information Systems Agency. Mr. Phillips has written or co-authored many classified intelligence products for senior national policymakers.

LTC Matthew J. Press – Office of Counterterrorism and Defense Operations Policy, U.S. Coast Guard
CINS-1

LLTC Press serves with the Office of Counterterrorism and Defense Operations Policy at the U.S. Coast Guard's Headquarters in Washington, D.C. LCDR Press' Coast Guard experience includes service as a Logistics Department Head, Engineer Officer, Boarding Officer, Deck Watch Officer, and Search & Rescue Controller with assignments in Texas, California, Mississippi, Kansas, and Guam. His undergraduate studies include Military Science, Theology, and Mechanical Engineering with a Master of Military Art and Science as well as a Master of Science in Astronautical Engineering.

The Honorable Thomas Pickering – Vice Chairman, Hills & Co. International Consultants;
Former U.S. Ambassador
CINS-1 Keynote Speaker

Amb. Pickering is Vice Chairman of Hills & Co. International Consultants and Strategic Adviser to NGP Energy Capital Management. Amb. Pickering served as the U.S. ambassador to the United Nations in New York, the Russian Federation, India, Israel, El Salvador, Nigeria, and the Hashemite Kingdom of Jordan. He was U.S. Under Secretary of State for Political Affairs, President of the Eurasia Foundation, and Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs. He graduated from Bowdoin College and received a master's degree from the Fletcher School of Law and Diplomacy at Tufts University.

Dr. Roger S. Pulwarty – Senior Advisor, Climate Research, Office of Ocean and Atmospheric Research, National Oceanic and Atmospheric Association
CINS-1

Dr. Pulwarty is Senior Advisor for Climate Research at the , National Oceanic and Atmospheric Association Office of Ocean and Atmospheric Research. His research focuses on climate, impacts, and adaptation in the U.S., Latin America and the Caribbean. He has helped develop and lead widely recognized programs integrating climate science and decision-making. He is a lead author of the U.N. International Strategy for Disaster Reduction assessments, Intergovernmental Panel on Climate Change (IPCC) Reports on Water Resources and on Extremes, and the IPCC Fifth Assessment Working Group II. Dr. Pulwarty provides testimonies before the U.S. Congress, and acts as an advisor on climate and risk to national and international agencies.

Dr. Stephen Romaniello – Geochemist, Arizona State University School of Earth and Space Exploration
CINS-2B

Dr. Romaniello is a founding partner with PlanetWorks and an Assistant Research Scientist in the Arizona State University (ASU) School of Earth and Space Exploration, where he currently manages the W.M. Keck Laboratory for Environmental Biogeochemistry and the Isotope Cosmochemistry and Geochronology Laboratory. With a background in biogeochemistry and climate, Dr. Romaniello's work explores Earth's chemical and biological evolution, with a focus on developing new technologies to solve pressing scientific problems. He received his Ph.D. in Geological Sciences from ASU, and a master's degree and B.A. from Cornell University.

Cheryl Rosenblum – Executive Director, Military Advisory Board; Senior Director, Strategic Development, Center for Naval Analysis
CINS-1

Ms. Rosenblum is the Executive Director of the Center for Naval Analysis (CNA) Military Advisory Board and Senior Director of Strategic Development for CNA. She served as the Deputy Director for Energy Research at CNA. She supported the development of the energy and climate sections of the Quadrennial Defense Review, directed projects on climate change and federal adaptation policy, and developed the Department of Navy's framework for an energy strategy. She earned an M.P.M. in environmental/energy policy from the University of Maryland College Park and received her bachelor's degree in economics from the Rochester Institute of Technology.

CDR Tony Russell – Military Advisor to the Director, Office of Net Assessment, Secretary of Defense, and Commander, U.S. Coast Guard

CINS-1

CDR Russell, of the U.S. Coast Guard, is a Military Advisor to the Director, Office of Net Assessment, in the Office of the Secretary of Defense. Between his five operational tours as a Cutterman he has served as Press Secretary for the Commandant of the Coast Guard and National Incident Commander for the Deepwater Horizon Oil Spill Response, Communication Advisor to the White House Office of Energy and Climate Change, Public Affairs Officer for the Seventh Coast Guard District, and Public Affairs Officer to Coast Guard Forces Southwest Asia for Operation Iraqi Freedom in 2003.

Dr. Thomas Scherer – Program officer, U.S. Institute of Peace

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As Program Officer at the U.S. Institute of Peace (USIAP), Dr. Scherer studies the connections between economics and conflict and currently has research projects in Afghanistan and Nigeria. He will lead USIP's new focus on resource scarcity, how it can lead to violence, and what can be done to disrupt that connection. He has a Ph.D. in Politics from Princeton University, where he specialized in international relations and formal/quantitative methods. His dissertation, *Peace for Keeps*, examines how host governments use U.N. peacekeeping operations not to create peace but rather to stay in power. He has a Bachelor's degree in chemistry.

Dr. Gavin Schmidt – Director, Goddard Institute for Space Studies, National Aeronautics and Space Administration

CINS-1

As the Director of Goddard Institute for Space Studies (GISS) and Principal Investigator for the GISS ModelE Earth System Model, Dr. Schmidt is interested in understanding past, present and future climate and the impacts of multiple drivers of climate change. He is the Associate Editor of the *Journal of Climate*, was the Chair of American Geophysical Union Climate Communication Prize award committee 2014-15, co-chair of the Past Global Changes/Climate and Ocean — Variability, Predictability, and Change Intersection Panel 2008-13, and a member of the Community Advisory Board for National Center for Atmospheric Research/Community Earth System Model 2008-14.

Dr. Rod Schoonover – Director, Environment and Natural Resources, National Intelligence Council

CINS-1 Presenter

Dr. Schoonover is the Director of Environment and Natural Resources for the National Intelligence Council (NIC) in the Office of the Director of National Intelligence. His specialties include climate change, water security, food security, strategic minerals, wildlife trafficking, marine health, biodiversity, and complex systems. Before transitioning to the NIC, Dr. Schoonover was the senior scientist in the State Department's Bureau of Intelligence and Research for six years. Dr. Schoonover earned his Ph.D. in theoretical chemical physics at the University of Michigan, where he studied complex systems and chaos theory.

COL James Marbrooks “Brooks” Schultze – Peacekeeping and Stability Operations Institute, U.S. Army War College
CINS-1, CINS-2B

COL Schultze is assigned as the Infrastructure Advisor in the Stability Operations section of the Peacekeeping and Stability Operations Institute. Some of his most recent previous assignments include: Chief of the Commanding General’s Initiatives Group for US Army Europe; Battalion Commander of the 15th Engineer Battalion in Grafenwoehr, Germany; Deputy District Commander of the Galveston District, U.S. Army Corps of Engineers. His operational deployments include Intrinsic Action to Kuwait, KFOR 03A to Kosovo, two deployments to Operation Iraqi Freedom, and a deployment to Operation Enduring Freedom, in Afghanistan.

BG George M. Schwartz – Assistant Adjutant General - Army, Pennsylvania National Guard; Deputy Commandant for Reserve Affairs, U.S. Army War College,
CINS-1, CINS 2A

BG Schwartz is dual-hatted as Assistant Adjutant General of the Pennsylvania National Guard and as the Deputy Commandant for Reserve Affairs at the U.S. Army War College at Carlisle Barracks, Pennsylvania. He was commissioned in the Regular Army as a Cavalry Officer in 1984, and his first assignments were in company and battalion staff. He returned to service in 1999 with the United States Army Reserve and transferred to the Pennsylvania Army National Guard. In addition to service during a number of state emergencies, he has mobilized for two overseas missions: Kosovo, and Afghanistan.

GEN Gordon Sullivan – Chairman, Army Historical Foundation; General, U.S. Army (retired); former Army Chief of Staff
CINS-1

GEN Sullivan currently serves as the Chairman of the Board of the Army Historical Foundation in Arlington, Virginia. He previously was the President and Chief Executive Officer of the Association of the United States Army and recently completed an appointment as the Chairman of the Board of Trustees of Norwich University. He retired from the Army after more than 36 years of active service and culminated his uniformed service as the 32nd Chief of Staff, and a member of the Joint Chiefs of Staff. He earned his B.A degree in history from Norwich University.

Dr. Kevin Trenberth – Senior Scientist, Climate Analysis Section, National Center for Atmospheric Research
CINS-1

Dr. Trenberth is a Distinguished Senior Scientist in the Climate Analysis Section at the National Center for Atmospheric Research. His primary research has focused on global energy and water cycles. He was a lead author of the 1995, 2001, and 2007 Scientific Assessment of Climate Change reports from the Intergovernmental Panel on Climate Change, and shared the 2007 Nobel Peace Prize. He is a fellow of the American Meteorological Society, the American Association for Advancement of Science, the American Geophysical Union, and an honorary fellow of the Royal Society of New Zealand.

Prof. Bert Tussing – Director, Homeland Defense and Security Issues, Center for Strategic Leadership, U.S. Army War College
CINS-1, CINS 2A Presenter, CINS-2B

Prof. Tussing joined the Center for Strategic Leadership of the U.S. Army War College in 1999 and his focus areas include Homeland Defense, Homeland Security, Terrorism, and Civil-Military Relations. He graduated with honors from The Citadel and was commissioned a Second Lieutenant in the United States Marine Corps. He served in the U.S. Marine Corps for 24 years, participating in operations in Grenada, Beirut, Bosnia, and Somalia. He received a master's degree in National Security and Strategic Studies from the U.S. Naval War College and a master's degree in Strategic Studies from the U.S. Army War College.

Hon. Fran Ulmer – Chair, US Arctic Research Commission
CINS-1

The Hon. Fran Ulmer is chair of the U.S. Arctic Research Commission. Previously she was appointed to the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling and was chancellor of Alaska's largest public university, the University of Alaska Anchorage. Ms. Ulmer served as an elected official for 18 years as the mayor of Juneau, a state representative, and as Lieutenant Governor of Alaska. She earned a J.D. cum laude from the University of Wisconsin Law School, and has been a Fellow at the Institute of Politics at the Kennedy School

Joan Vandervort – Former Deputy Director, Ranges, Sea, and Airspace, Office of the Deputy Assistant Secretary of Defense (Readiness)
CINS-2B

Ms. Vandervort has more than 28 years of professional experience working with the Department of Defense across a broad spectrum of issues. During her tenure, she was responsible for policy development, congressional responses and engagements, and representing the Department's operational perspective in multiple interagency and intra-agency forums and committees. Ms. VanDervort holds her master's degree from the University of Chicago in Geography, with a concentration in coastal geomorphology, and her undergraduate degree in Geography from the University of Maryland, Baltimore County. She also holds a certificate in Sustainability from the University of Virginia, Darden School of Business.

Sperry Van Langeveld – Associate Fellow, Institute on Science for Global Policy (ISGP)
CINS-1 Staff

Mr. Van Langeveld is an ISGP Associate Fellow whose career has included positions in polymer research and senior management for large industrial suppliers. In 1984, he established a personal computer manufacturing business that he and his wife operated until their retirement in 1999. He holds diverse graduate degrees and studies and teaches at the University of Arizona.

Andrea Vazquez – Fellow, Institute on Science for Global Policy (ISGP),
CINS-1 Staff, CINS-2A Staff, CINS-2B Staff

Ms. Vazquez, an ISGP Fellow, graduated from Arizona State University with a degree in social work. She is also a College Prep-Assistant at a high school in Tucson, Arizona. Her goal as a social worker is to challenge social injustice and advocate for people who are vulnerable and oppressed, especially youth.

Cleo Warner – Senior Fellow, Institute on Science for Global Policy (ISGP)
CINS-1 Staff, CINS-2B Staff

Ms. Warner is a graduate from Eckerd College in St. Petersburg, Florida, with a degree in literature and environmental studies. Her research interests include food systems, science communication, and other ways in which society and the environment interact. Ms. Warner has worked on numerous environmental community development projects both in Florida and internationally, and will be continuing her research at the University of Utah as she pursues a Masters in environmental humanities.

Col Tom Watson – Director of Government Affairs, The Center for Climate and Security; Colonel, United States Air Force (retired)
CINS-2A, CINS-2B

Col Watson is the Director of Government Affairs at the Center for Climate and Security. Previously, he served as the Senior Project Lead for Climate Adaptation and Critical Infrastructure in the Cross-Sector Integration and Innovation Center in the Department of Homeland Security (DHS) National Protection and Programs Directorate. Prior to DHS, Col Watson served on active duty in the U.S. Air Force for 30 years. He is a graduate of the United States Air Force Academy, the United States Army War College, Naval Postgraduate School's Homeland Security Executive Leadership Program, and the Department of State's National Security Executive Leadership Seminar.

COL Sam White – Deputy Director, Center for Strategic Leadership, U.S. Army War College; Colonel, U.S. Army (retired)
CINS-1

COL Sam White is Deputy Director of the Center for Strategic Leadership at the U.S. Army War College (USAWC) and is a member of the Army War College faculty, teaching courses in futures, force design and joint military operations. Following his retirement from active duty as a Colonel, he became the Deputy Director of the Center for Strategic Leadership. He holds a bachelor's Degree in Engineering Management from the United States Military Academy, a master's in Military Arts and Science from the Command and General Staff College, and a master's in Strategic Studies from the USAWC.

*One individual who participated in the CINS conference series requested that their name be removed from the list.