**Planning Framework Development for a Triple Threat to the Power Grid**

**Agenda for December 3rd**

8:00 AM Registration

9:00 Welcome and Introductions

(Chuck Manto, John Pi, National Guard, Gary Gardner, Mary Lasky)

9:15 Hold for Congressional or White House representatives

9:30 Goal for the day and Setting the Stage

Backdrop and Motivating Factors for Today’s Workshop

George Baker

The White House Space Weather Strategy

William Murtagh

Planning Model

Steve Volandt (Confirmed)

International Council on Systems Engineering (INCOSE) support

Michael deLamare (Confirmed)

10:10 Considerations for Communications

Ross Merlin (confirmed)

10:30 Break

10:45 Panel on the critical infrastructure

Moderators: Robert McCreight and Steve Pappas (Confirmed)

Medical – Leonard Taylor, Jr. (Confirmed)

Food -- Scott Cooper (Confirmed)

Water/sewer – Steven Bieber (Confirmed)

Commerce/contracts – Phil Palin (Confirmed)

Fuel/energy -- Frank Koza (Confirmed)

11:30 Ponderosa resources: survivable, adaptive and recovery-enhancing

Bill Harris (Confirmed)

12:00 Role for PSAs – Scott Breor (Confirmed)

12:15 FEMA Support -- Joe Burchette (Confirmed)

12:30 Lunch

1:15 Breakout and start of Planning -- using the Framework/Trigger Document

Executive Branch (States/counties)

Facilitator -- Connor Scott (Confirmed)

Scribe – Bill Harris (Confirmed)

Legislative Branch

Facilitator -- Andrea Boland (Confirmed)

Scribe – Dave Hunt (Confirmed)

National Guard

Facilitator -- General Newman (Confirmed)

Scribe – Robert McCreight (Confirmed)

Civil Disturbance

Facilitator – Gary Gardner (Confirmed)

Scribe – Michael Delamare (Confirmed)

Communications

Facilitator -- John Rosica (Confirmed)

Scribe – Bob Janusaitis & John Dew (Confirmed)

Volunteers & community

Facilitator – Pascalis Papouras (Confirmed)

Scribe – Steve Pappas (Confirmed)

Power – Electrical, gas, fuel, micro grids

Facilitator -- Tom Pruitt (Confirmed)

Scribe – Steve Volandt (Confirmed)

Financial

Facilitator -- Jeff Weiss (Confirmed)

Scribe – John Juhasz (Confirmed)

Floating / answer questions: George Baker, Chuck Manto, Ross Merlin, and Mary Lasky

2:15 Report out of breakouts –David Hunt (Confirmed)

3:00 Based on one-page write up, what needs does each Regional SIG have

3:30 Break

3:45 Regional SIGs – building their network

4:30 Next Steps

5:00 Closing Remarks

**SPEAKER BIOGRAPHIES**

**George Baker** is emeritus professor of applied science at James Madison University. In addition to teaching graduate and undergraduate S&T courses at JMU, Baker directed the start-up and served as Technical Director of the university's Institute for Infrastructure and Information Assurance (IIIA). For much of his career he served at the Defense Nuclear Agency (DNA) and the Defense Threat Reduction Agency (DTRA) directing national programs to protect strategic systems against EMP and RF weapons, including developing EMP protection standards, guidelines and test technology. A primary research interest stems from his experience as the Director of DTRA’s Springfield Research Facility - a national center for critical system vulnerability assessment, applying DoD lessons learned to critical infrastructure protection and community resilience. During 2002-2008 Baker served as principal staff on the Congressional EMP Commission. He presently consults in the areas of infrastructure protection, vulnerability assessment of DoD facilities, EMP and geomagnetic disturbance (GMD) protection, and nuclear and electromagnetic weapon effects. He presently participates on the Board of Directors of the Nonprofit Foundation for Resilient Societies, the Board of Advisors for the EMP Task Force on National and Homeland Security, the JMU Research and Public Service Advisory Board, the North American Electric Reliability Corporation GMD Task Force, the EMP Coalition, the National Defense Industrial Association (NDIA) Homeland Security Executive Board and the Infragard Richmond Chapter. Baker holds a Ph.D. in engineering physics from the U.S. Air Force Institute of Technology and an M.S. in physics from the University of Virginia.

**Steven E. Bieber** is the Chief, Urban Watershed Programs and Homeland Security Department of Environmental Programs Metropolitan Washington Council of GovernmentsMr. Bieber has over 25 years of experience in water quality management, environmental regulation, critical infrastructure protection, and public policy. Presently, he is responsible for managing COG’s regional Anacostia Restoration Partnership, water security programs, energy security programs, critical infrastructure protection, drought management and response, urban stream restoration, green infrastructure, and other related environmental programs for local governments and utilities in the Washington, DC area. Previously Mr. Bieber was Chief of Watershed Planning and Outreach for the Maryland Department of the Environment. Mr. Bieber also has extensive experience working with international groups on watershed management and water security issues. Mr. Bieber holds a B.S. degree in Zoology from Michigan State University, an M.S. degree in Oceanography from Old Dominion University, and a Master of Public Administration degree from the University of Baltimore.

**The Honorable Andrea Boland** recently completed eight years of service in the Maine legislature. As State Representative, she worked to advance integration of nutritional wellness and prevention into the health care delivery system, consumer safety awareness of non-thermal electromagnetic radiation risk from cell phones and smart meters, safer siting of electric transmission lines, led nationally of renewal of Glass-Steagall policy. She introduced the first legislation in the world to call for warning labels for cell phones. She began her work on GMD and EMP research and legislation in 2011, at the behest of a trusted scientific advisor, and introduced the first legislation passed in this country for protecting the transmission system against GMD and EMP. Andrea served on the Maine legislature’s Government Oversight Committee and the State and Local Government Committee. She is a strong advocate for government transparency and government and corporate accountability. She earned the 2011 National Health Freedom Hero Award from the National Health Federation in recognition of her legislative work. She lives in Sanford, Maine, earned her MBA from Northeastern University and a BA in International Studies from Elmira College, including study at The Institute of Political Studies in Paris. She works independently as a title examiner and a Reliv distributor, and continues to support initiatives in the areas of her legislative work, with a special focus on GMD and EMP awareness and grid protections. She believes the states, with their regulatory authority over the transmission systems, present an obvious opportunity for mandating installation of grid protections to protect their residents and advance greater business and job development. Representative Boland serves on the policy advisory council of InfraGard’s Electromagnetic Pulse Special Interest Group (EMP-SIG), and as a member of the Task Force on National and Homeland Security.

**Scott Breor** currently serves as the Director for the Protective Security Coordination Division (PSCD) within the Office of Infrastructure Protection at the Department of Homeland Security (DHS). Mr. Breor is responsible for the day-to-day business and management of infrastructure security specialists known as Protective Security Advisors (PSAs) and the Office for Bombing Prevention. These programs provide communities with effective vulnerability and security gap analyses, training, support to Special Events, and improvised explosive device (IED) awareness and risk mitigation training. Prior to PSCD, Mr. Breor served as the Deputy Director for the Infrastructure Security Coordination Division (ISCD). ISCD was responsible for the execution of the Chemical Facility Anti-Terrorism Standard (CFATS) that imposes comprehensive federal security regulations for high-risk chemical facilities. The CFATS program has made our Nation more secure by identifying and regulating high-risk chemical facilities to ensure they have security measures in place to reduce the risks associated with their possession of chemicals of interest. Mr. Breor has over thirty years of military and senior executive experience in the United States government. Previously, Mr. Breor worked on the DHS Operational Integration Staff (I-STAFF) and then transferred to the Contingency Planning and Support Division following the establishment of the Preparedness Directorate. He later became the Deputy Director for the Office of Risk Management and Analysis and lead the Department’s efforts to establish a common framework to address the overall management and analysis of homeland security risk. Prior to DHS, Mr. Breor was a Naval Aviator and had served as the Senior Policy Advisor for the Chief of Naval Operations on all Homeland Security matters. While assigned to the Office of the Chief of Naval Operations (CNO) he led a division that supported the CNO on key warfare and Homeland Security and Defense policy decisions, which included: interagency coordination, incident management, and Department of Homeland Security/Department of Defense integration. In addition, he directed and managed the Navy Joint Doctrine program. For his work for the CNO and his efforts following the tragic events of September 11, 2001 at the Pentagon, he was awarded the Legion of Merit. As a Naval Aviator he supported operations in Iceland, Greenland, Adriatic, Mediterranean, Azores, and South America. Mr. Breor was a Senior Executive Fellow at the John F. Kennedy School of Government, Harvard University. He received a Masters of Arts in National Security Studies and in Homeland Security and Defense from the Naval Post Graduate School, and received a Masters of Business Administration from the University of Oklahoma. In addition, he earned a Bachelor of Science in Physics from The Citadel.

**Michael deLamare** has practiced systems engineering for 33 years. His experiences include design and manufacture of satellite components (Hughes Aircraft); development, modification and sustainment of Intercontinental Ballistic Missiles (TRW); and requirements, engineering process development and configuration management of a nuclear waste vitrification plant and other complex, one-of-a-kind facilities (Bechtel National Inc). He currently serves as the corporate Systems Engineering Manager for Bechtel’s Nuclear, Security and Environmental business unit. His responsibilities include defining systems engineering processes for the business line; developing the SE culture and training; and establishing and overseeing SE implementation on projects for the business line. Mr. deLamare holds a B.S. in Physics from the University of California at Irvine, an M.S. in Systems Engineering from Johns Hopkins University, and is certified as an Expert Systems Engineering Professional (ESEP) by the International Council On Systems Engineering (INCOSE). Within INCOSE, Mr. deLamare represents Bechtel on the Corporate Advisory Board, chairs the Critical Infrastructure Protection and Recovery (CIPR) working group, and is the co-chair on the Infrastructure working group.

## GARY L. GARDNER is the President & CEO of TOTALeACCESS a security consulting firm*.* He brings over forty years of investigative, security, protection, intelligence, analysis, forensic, technology, consulting, management and teaching experience to the national and international business and law enforcement communities. His career spanned more than thirty years of diverse service with the Federal Bureau of Investigation in various capacities including executive management. His experience covers numerous areas of concern to today’s business and sports world. While serving several decades in the FBI, he held many positions in records management, laboratory technician, a Special Agent, investigating a wide variety of Federal offenses. In the New York City Office, he served as Supervisor/Co-Commander of both the renowned Bank Robbery and Terrorism Task Forces. Then, he was assigned to FBI Headquarters where he oversaw cutting-edge investigative information technology and crisis management. He led the FBI’s investigative computer support systems, directed investigative support and training for crisis situations, special events and major cases. He also designed, managed development and directed the FBI’s Law Enforcement OnLine (LEO), an international interactive computer communications capability and information service, used exclusively for the law enforcement/criminal justice/public safety community. He served as a consultant to *Lowe’s Motor Speedway* providing Security & Safety Coordination. He developed their Security & Safety Plan, with a Risk Assessment for racing events and then he served as NASCAR’s Director of Security, overseeing all aspects of NASCAR’s corporate and event security, encompassing investigations; physical and cyber security; international security, employment screening and executive protection, implementing many new collaborative risk mitigation approaches. During this period he collaborated with the US Department of Homeland Security to establish the first evacuation guide for large sporting events. Currently, Mr. Gardner established TOTALeACCESS specializing in state-of-the–art security, risk/crisis management, intelligence collection/analysis, simulation/modeling, business continuity/disaster recovery, information security/cybercrime, biometrics, training, tracking and e-commerce solutions. Mr. Gardner is a decorated U.S. Army Ranger veteran with service in Vietnam and a graduate of the American University in Washington, D.C. Mr. Gardner previously served as the President of the Charlotte InfraGard Chapter; a public/private sector organization for the protection of our Nation’s Critical Infrastructures, then on the national InfraGard Board of Directors and now is Chairman of the Board. He is also a member of the National Center for Spectator Sports Security and Safety (NCS4) Advisory Board and their Conference & Summit Director.

**William R. Harris** serves on the Board of Directors, and is the Secretary of the Foundation for Resilient Societies, a New Hampshire-based non-profit engaged in research and education on critical infrastructure protection.  He is an international lawyer (Harvard, J.D. 1966) and former energy, nuclear non-proliferation, environmental and national security project manager at the RAND Corporation. Working with physicists and engineers, he supports electric "reliability standard" development for international, federal and state institutions.

**Frank J. Koza** is the Executive Director, Infrastructure Planning PJM Interconnection, LLC. He is a registered Professional Engineer in PA. He has worked at PJM over 14 years, previously in charge of system operations. Presently, he is the Executive Director of Infrastructure Planning and in charge of the technical staff associated with generator interconnection and implementation of transmission enhancements. He is the Chair of the NERC Geomagnetic Disturbance Standard Drafting Team and former Chair of the NERC Operating Reliability Subcommittee. Previously, he worked for 29 years at Exelon/PECO Energy in a variety of assignments including construction of fossil and nuclear generation facilities, construction and maintenance of transmission, system planning, and system operations.

# Mary D. Lasky is a Certified Business Continuity Professional (CBCP). Mary is the Program Manager for Business Continuity Planning for the Johns Hopkins University Applied Physics Laboratory (JHU/APL), and also coordinated the APL Incident Command System Team.

Mary is the immediate Past President of the Community Emergency Response Network Inc. (CERN) in Howard County, Maryland. She is the immediate Past President of the Central Maryland Chapter of the Association of Contingency Planners (ACP). She is a member of InfraGard and on the executive committee for the InfraGard EMP-SIG. She is a member of the FEMA Nuclear - Radiation Communications Working Group.  She has held a variety of supervisory positions in Information Technology and in business services. For many years, she has been on the adjunct faculty of the Johns Hopkins University Whiting School of Engineering, teaching in the graduate degree program in Technical Management. Mary is the President of the Board of Directors of Grassroots Crisis Intervention Center in Howard County, MD. She is on the Finance Committee for Leadership Howard County and is co-chair of the Steering Committee for the Leadership Premier Program. Mary’s consulting work has included helping non-profit organizations create and implement their business continuity plans.

**Chuck Manto** is chairman of the InfraGard EMP SIG. He is the CEO of the Maryland-based company Instant Access Networks LLC (IAN). Mr. Manto won six patents in information, telecommunications and EMP shielding with others pending on microgrids and EMP shielding. He founded the InfraGard National EMP special interest group (SIG) and serves as its volunteer national manager. Mr. Manto’s education includes a BA and MA from the University of Illinois at Urbana/Champaign. He is a Senior Member of the IEEE.

**Robert McCreight** After serving the United States government at the State Department and other federal agencies over a 35 year career, Dr. McCreight retired from civil service in 2004 and served as a consultant for major homeland security and national defense contractors. His professional career includes work as an intelligence analyst, treaty negotiator, arms control delegate to the UN, counter-terrorism advisor, political-military affairs analyst and Deputy Director of Global Scientific Exchanges at State Department. During his service at State Department he was a senior Soviet military analyst with INR specializing in the assessment of nuclear, chemical and biological weapons programs. He participated in the design of remote collection, surveillance and verification systems. He also performed assignments involving the management or coordination international post-disaster relief and humanitarian operations, developed and coordinated peacekeeping policy, and promoted global science and technology cooperation projects. He was involved in the design and coordination of White House nuclear readiness command crisis exercises during the Reagan administration possessing extensive experience in geopolitical wargame design and strategic simulations. During his federal career he contributed to and coordinated well over 26 cabinet level strategic nuclear preparedness exercises, worked on Presidential Protection and Survivability Programs and directed the operation of several dozen senior-level military exercises involving theoretical force-on-force scenarios between the United States and the Soviet Union. He spent 27 years of combined active and reserve military service concurrently with his civilian work in U.S. Army Special Operations and has devoted 12 years to teaching graduate school as an adjunct at Georgetown, Virginia Tech, Penn State, George Mason and George Washington Universities in subjects as diverse as disaster and emergency management, strategic intelligence, nonproliferation policy, homeland security policies, terrorism analysis, intelligence analysis and assessing WMD threats. After completing his doctoral studies in 1989 he has remained active in graduate education programs in emergency and crisis management. He has also written and published three books on emergency exercise design, homeland defense and neuroscience issues in national security. He has also written over 35 articles on chemical weapons use, disaster management, disaster recovery, post-strike attribution, biological weapons threats to homeland security, WMD scenario development technology assessment and collegiate educational strategies for developing future crisis managers for government service. He lectures and assists periodically at National Defense University.

**Major General Robert B. Newman, Jr., USAF (retired)** has over thirty years of business, military, and homeland security expertise in both government and private sectors in the fields of infrastructure protection, financial services, energy, and information security. As Senior Vice President and Director of Strategic Partnerships for Sera-Brynn, Mr. Newman assists the CEO with the company’s strategic planning effort and is responsible for the strategic marketing and industry awareness programs. He works with professionals both in and out of the information security field to develop new partnerships to expand the company’s client base and with other senior leaders in the company to develop new products and analyze their impact on the company’s clients and the market. Long having recognized the rapidly evolving cyber challenges that face our country, Mr. Newman worked as a consultant prior to joining Sera-Brynn with both public and private entities to help secure our nation’s cyber, financial, and energy infrastructures and to ensure their reliability for the American economy. He has also worked with the modeling and simulation industry in Virginia to identify opportunities and develop a strategic way ahead to ensure the industry’s continued success across the business spectrum in the commonwealth. Mr. Newman graduated as a distinguished aerospace graduate from the Virginia Military Institute. While a cadet at VMI, Newman was regimental commander of the Corps of Cadets, president of the honor court, and co-captain of the soccer team being twice named to the Virginia All-State soccer team. He received a Master of Arts in Management and Public Administration from Webster University. Following graduation from VMI, Mr. Newman attended US Air Force pilot training at Reese AFB, TX. Following graduation, he was assigned to the 23 Tactical Fighter Wing flying the A-7D Corsair II fighter aircraft. During his active duty Air Force career, he was an instructor pilot, a flight examiner, and was named to an 8-man USAF aerial gunnery team that flew against 10 Royal Air Force teams and won the RAF annual tactical fighter competition. Mr. Newman separated from active duty and returned to Virginia where he began a career as an institutional bond trader working for both Wall Street and regional brokerage firms. He also joined the Virginia Air National Guard flying the A-7D fighter later transitioning to the F-16C Fighting Falcon. Following the attacks on September 11, 2001, Mr. Newman was mobilized and assigned to the National Guard Bureau in Washington where he helped stand up homeland security missions assigned to the Guard, including the infrastructure protection mission, and directed the stand up of the National Guard’s initial element at US Northern Command. He was later promoted to brigadier general serving as the deputy J3/4 for operations and logistics at US Joint Forces Command. Following a two year tour of duty at the National Guard Bureau, Newman returned to Richmond where he served in the cabinet of Governor Mark Warner as deputy homeland security advisor continuing work to secure Virginia’s critical infrastructure and directing homeland security efforts that established the Virginia fusion center. In 2006, Governor Tim Kaine selected Newman to be the Adjutant General of Virginia commanding 10,000 Virginia Army and Air Guardsmen and promoting him to the rank of major general. Newman served on many national committees while serving as adjutant general including the Reserve Forces Policy Board and, drawing on his business experience, as a member of the Board of Directors of the Army and Air Force Exchange Services. Mr. Newman continues to be active in the community having served on many local and national boards to include the Board of Directors of LEAD Virginia, the Board of Advisors for Linxx Global Solutions, the Board of Advisors of the Center for American Studies at Christopher Newport University, the Board of Directors of the Virginia War Memorial Educational Foundation, and the Board of Directors of the Congressional Award.

**Philip J. Palin** currently serves as the principal investigator and staff consultant on supply chain resilience for the National Academy of Sciences; he consults with the City of Los Angeles and Federal Emergency Management Agency on disaster logistics, he serves as a Senior Fellow in Homeland Security with the Graduate School of Rutgers University and he is affiliated with the Institute for Public Research at CNA Corporation. Mr. Palin is the principal author for the *Catastrophe Preparation and Prevention* series from McGraw-Hill. Other publications include *Threat, Vulnerability, Consequence, Risk* and *Consequence Management*.  The Homeland Security Affairs Journal has published several pieces by Mr. Palin including *Resilience: The Grand Strategy*. In June 2008 Mr. Palin retired after ten years as Chief Executive Officer of Teleologic Learning Company. While with Teleologic he advised clients including the Department of Homeland Security, Department of Defense, and several private corporations. Prior to Teleologic Mr. Palin served as the CEO of an international education not-for-profit and as President of a liberal arts college in Japan.  Over his career Mr. Palin has been involved in several start-ups and early stage ventures.

**Pascalis Papouras** is International Orthodox Christian Charities’ Special Assistant to the Executive Office & Government Relations.  His current duties include representing IOCC to Congress, the Presidential Administration, the international diplomatic community, policy institutes, the ecumenical and inter-faith community; and he advocates on behalf of IOCC’s beneficiaries and programs.  He currently serves on the Board of Directors of National VOAD, a multi-lateral civil society organization, and is also Chairman of Maryland VOAD. With over 16 years of experience in emergency response management, development, and community mobilization, Pascalis has worked in the Middle East, the Caucasus, East Africa, and throughout the United States, where he developed an emergency response network of civil society and faith leaders, thus building the capacity of local communities to engage in post-crisis assistance, and long-term recovery efforts. He received his BA in History, Classics, and Ancient Greek from Miami University in Oxford, OH, and his MA from The Ohio State University’s Department of Greek and Latin, serving as a Graduate Teaching Assistant.

**Thomas V. (Tom) Pruitt** has over 35 years of experience in the electric utility industry and is a Principal Engineer with Duke Energy Corporation.  He currently provides System Operations engineering support for Duke’s regulated electric subsidiaries in seven states.  Over his career, he has experience in Power Generation, Electric Distribution, System Planning, and Merger and Acquisition analysis.  Pruitt currently serves as Duke’s representative in the North Carolina Department of Public Safety (NCDPS) effort to develop an EMP response plan for the state.  Pruitt currently serves on several NERC and regional committees and NERC Standard Drafting Teams.  He previously served on the NERC Severe Impact Resiliency Task Force (a complement to the Geomagnetic Disturbance and Cyber Attack Task Forces).  Pruitt has a BSEE from North Carolina State University.

**Connor Scott** is the Assistant Deputy Mayor for the City of Baltimore, Maryland, where he oversees the operations of seven city agencies with a combined annual budget of over $2 billion and 5,500 employees.  His portfolio encompasses the major infrastructure agencies including the Departments of Transportation, Public Works, General Services, and Information Technology, among others.  Prior to joining the Mayor’s Office he worked for the Office of Emergency Management in many roles over five years with the agency, eventually serving as the Deputy Director of Emergency Management.  He has earned numerous emergency management certifications, including the Certified Emergency Manager (CEM) credential, has been involved in several federally declared disasters, and has deployed to other jurisdictions to assist with major incidents, such as New York during Hurricane Sandy.  Connor began his career as a firefighter in the Philadelphia area where he served for 10 years and eventually earned the rank of Emergency Medical Services Lieutenant.  He holds a Masters of Public Administration from Villanova University where he was inducted into the Pi Alpha Alpha Honor Society for Public Affairs and Administration.

**Leonard Taylor, Jr., MBA, MFA, RA** is theUniversity of Maryland Medical Center, Senior Vice President for Operations and Support Services. Leonard Taylor is the Senior Vice President for Operations and Support Services at the University of Maryland Medical Center (UMMC). Founded in 1823 as the Baltimore Infirmary, the University of Maryland Medical Center is one of the nation’s oldest academic medical centers. Located on the West Side of Downtown Baltimore, the Medical Center is distinguished by discovery-driven tertiary and quaternary care for the entire state and region and innovative, highly specialized clinical programs. The 750 plus bed hospital is home to the University Hospital, the Marlene and Stewart Greenebaum Cancer Center, the R Adams Cowley Shock Trauma Center, and the University of Maryland Hospital for Children. Mr. Taylor is responsible for the maintaining, sustaining, improving and expanding the “environment of care” and the supply chain support for the thousands of patients, visitors, and employees at the Medical Center. An important part of this mission is planning for resilience including emergency management. He is the executive sponsor of the hospital’s emergency management (planning) committee and the leader of the hospital incident command system (HICS) team and the primary incident commander when HICS is activated. In his years as an executive leader at the University of Maryland Medical Center and previously at the National Institutes of Health (NIH), he has led emergency management activity across the wide spectrum of hazards and threats including securing the NIH 300 acre campus during 911 and the UMMC hospital during the Baltimore civil unrest in 2015, major facility fires, construction site collapse with a death, “snowmageddon,” and utility disruptions among others. In response to the Ebola Virus threat, Mr. Taylor lead the development and implementation of a coordinated plan to triage and treat patients under investigation and confirmed patients for the entire University of Maryland Medical System. Mr. Taylor is a licensed architect and holds a B.A. in architecture and urban planning from Princeton University, an M.F.A. in architecture from The Yale University School of Architecture, and an M.B.A. from George Washington University.

**Bill Murtagh** is Assistant Director for Space Weather at the White House Office of Science and Technology Policy.