

David Winks, InfraGard EMP SIG response to the Request for Information for the National Space Weather Strategy Update.

4. *What innovative tools, platforms, or technologies are needed by the Federal Government and space weather research and development communities to operations for models and observations of space weather phenomena? Please include any barriers to implement the identified tools, platforms or technologies.*

Response:

- a. The observation of space weather phenomena is intended to provide advanced warning of an impending solar storm that would damage or disable communications and infrastructure. Developing communication, navigation, computing, and power systems that are not affected by solar storms and EMP events would be beneficial.
5. *In priority order, what opportunities exist to enhance U.S. operational space weather predictions, alerts, and services, for Earth, near-Earth, and deep space applications? Please include any barriers for implementation and utilization of these capabilities.*

Response:

- a. The prediction of solar storms assumes that critical infrastructure could take actions, such as shutting off systems, to limit the damage from solar storms. It's important to consider cyber hardening of the sensors systems to prevent adversaries from spoofing the sensors and triggering unnecessary shut downs of critical infrastructure.
 - b. Specifications such as DODI 5200.44 should be considered to cyber protect systems at the substrate and chip level. Likewise, cyber hardening at the binary layer should also be included in the design of sensor systems.
6. *Are there regulatory or other barriers to commercial activities associated with space weather predictions, observations or the transitioning of research to operations? Please list any in priority order, and describe how the barrier(s) impedes activities.*

Response: Regulatory or other barriers:

Considerable research and development has occurred to protect spacecraft from Solar Storms. While much of this work is sensitive or classified, it may be possible to utilize some technologies and materials for critical infrastructure protection while protecting the technology in the same way the government protects controlled substances and munitions.

- a. The Federal Government could provide government produced chips and circuit boards that are numbered and tracked to trusted critical infrastructure providers. This would help to mitigate the effects of solar storms, EMP events, and cyber-attacks.
 - b. The Federal Government could provide testing facilities that allow private industry to submit products for testing. The government could conduct the testing without disclosing the waveforms utilized in the testing.
7. *Beyond regulation and grant programs, what can the Federal government do to enable and advance the private sector role for capabilities, forecasting, modeling, mitigation, research, development, and observation in the space weather domain?*

Response: Private companies innovate best when regulation is less prescriptive on how a solution is implemented. The Federal government could define the requirement to be the continuity of power during solar storms, EMP events, and cyber-attacks. It could then allow industry to respond with creative solutions.

- a. Instead of grants, the federal government could offer tax credits to companies and end users to install Solar Storm, EMP, and Cyber protection for their electronics. Likewise, the Federal Government could provide tax credits to companies that purchase protected grid power that continues through these events. The tax credits would create demand from end users that would encourage power providers to offer Solar Storm, EMP, and Cyber protected grid power. The tax credits could offset higher tariffs associated with stricter Service Level Agreements covering Solar Storms, EMP events, and Cyber Attacks.
- b. To leverage the power of Federal, State, and Local purchasing, contracts could be amended to include Service Level Agreements that require uninterrupted electrical power during Solar Storms, EMP events and cyber-attacks. This would create demand for the electrical providers and provide a means of cost recovery for enhancing grid protection.
- c. Public Utility Commissions could be evaluated differently. Instead of focusing on the least cost to power consumers, the commissions could be evaluated on the resiliency of the power system to continue during solar storms, EMP events and cyber-attacks.
- d. Legislation could be amended to allow companies to install shielded microgrids that are normally detached from the larger grid. Power providers could compete for the design, construction and maintenance of these private (off-grid) shielded microgrids. The shielded microgrids could be designed to connect to the larger grid after a solar storm, EMP event, or cyber-attack to assist in recovery provided such connection is done in coordination with the utility providers. (The opposite of the current approach).

