Space Environmental Integration System (SEIS)

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The DoD recognizes the value of incorporating environmental representations into Modeling and Simulation (M&S) in order to allow for enhanced decision making regarding acquisitions, testing, operations, and planning. Moreover, DoD places great value on training decision makers to account for all factors that affect a decision, including the environment. While tremendous progress has been made in support of the terrestrial weather, ocean and surface components, very little has been done in support of the space weather component so critical to modern military operations. The ASNE MSEA in concert with the National Geophysical Data Center (NGDC), National Ocean and Atmospheric Administration (NOAA), is now transforming existing space environment data into potential effects-information for use in assessing impacts to space and land-based systems and allowing DoD models and simulations (M&S) to accurately incorporate effects caused by the space environment. In order to address these needs the Space Weather Analysis (SWA) project was started. The SWA generated a complete 11-year space weather representation using physically consistent data-driven space weather models. This project created a consistent, integrated historical record of the near-Earth space environment by coupling observational data from space environmental monitoring systems archived at NGDC with data-driven, physically-based numerical models. The resulting product is an enhanced look at the space environment on consistent grids, time resolution, coordinate systems, and containing key fields. A separate project, Space Weather Management Information Module (SWMIM) created a rule base that merges natural environmental data with AF space system performance parameters to assess and describe natural environmental impacts to: satellite communications; satellite operations; surveillance, missile warning, and missile defense radar operations; and GPS-aided systems (dual frequency). The Space Environmental Impact System (SEIS) program takes the two projects and creates, from the raw environmental archives and developed rule-base, a tool for describing the effects of the space environment on particular military

systems. This will include the generation of “hyper-cubes” which describe the effects of space weather on simulation entities at run time. The tool will also allow the generation of key statistics for particular rule sets and the creation of “stoplight” charts for military systems. This presentation will show how the SEIS tool allows warfighters to easily and accurately evaluate the effect of space weather in terms that are meaningful to them.