

Using DSG to build the capability of space weather forecasting in deep space. Edward E. DeLuca¹, L. Golub¹, K. Korreck¹; S. Savage², D. D. McKenzie², L. Rachmeler², A. Winebarger², P. Martens³ ¹Harvard-Smithsonian Center for Astrophysics; MS 58; 60 Garden Street; Cambridge MA 02138 edeluca@cfa.harvard.edu. ²NASA MSFC, NSSTC ST13, 320 Sparkman, Dr. Huntsville, AL 35805; ³Georgia State University 25 Park Place South, Suite 605, Atlanta, GA 30303-2911

Introduction: The prospect of astronaut missions to deep space and off the sun-earth line raises new challenges for space weather awareness and forecasting. Combined efforts of the science and human flight communities are needed to identify the requirements and identify pathways that will allow us to address the requirements for protecting human life and equipment, on a timescale consistent with the deep space exploration program.

Role of Deep Space Gateway: The DSG provides a platform where we can develop, test and validate a combined space weather instrumentation, analysis and forecasting system that can be used when out of routine contact with near earth based assets. This presentation will attempt to outline the bounds of the problem and start the discussion about how to build an independent space weather program.

- Develop the requirements – is it only SEPs? Do we need to track CMEs? Do we need to forecast flare radiation? How about cosmic rays?
- Understand the communication issues – on what time frame can we expect data transfer from near earth assets? Is it feasible to construct a system that also includes direct communication between observing stations?
- Understand our current forecasting capabilities – esp SEP forecasts.
- What do we need to improve in the forecasting capabilities? What are the required measurements/observations? Can these be made on board?

Requirements for Deep Space Gateway: Instrument testing and validation requires a DSG orbit with substantial solar viewing (NHRO, EMDRO, or EML2). The availability of a test platform like the The CisLunar Interchangeable Observatory for Heliophysics (CLIOH) will facilitate a competitive appraisal of different instrument packages.