Chair: Yaireska Collado-Vega

8:30 a.m. Berger T. E. * Baker D. N. Woods T. N.  
*Space Weather Research and Operational Observing from a Cis-Lunar Deep Space Gateway [3147]*

We review the status of observational architectures for space weather research and operational forecasting and suggest ways in which the Deep Space Gateway may act as an ideal supplement to current and future space weather observing platforms.

8:40 a.m. Barjatya A. *  
*Spacecraft Charging and Space Environment Monitoring System Using Distributed Langmuir Probes Around the Deep Space Gateway [3162]*

The use of a Langmuir probe suite of instruments distributed around the Deep Space Gateway/habitat to monitor spacecraft charging as well as space environment in the spacecraft vicinity.

8:50 a.m. DeForest C. E. * Laurent G.  
*Instruments for Deep Space Weather Prediction and Science [3176]*

We discuss remote space weather monitoring system concepts that could mount on the Deep Space Gateway and provide predictive capability for space weather events including SEP events and CME crossings, and advance heliophysics of the solar wind.

9:00 a.m. DeLuca E. E. * Golub L. Korreke K. Savage S. McKenzie D. D. Rachmeler L. Wineburger A. Martens P.  
*Using DSG to Build the Capability of Space Weather Forecasting in Deep Space [3050]*

The prospect of astronaut missions to deep space and off the Sun-Earth line raises new challenges for space weather awareness and forecasting. We need to identify the requirements and pathways that will allow us to protect human life and equipment.

9:10 a.m. St Cyr O. C. Davila J. M. Newmark J. *  
*Space Weather Diamond: A 10x Improvement in Real-Time Forecasting [3057]*

Space Weather Diamond is based on a constellation of four platforms that are phased into eccentric heliocentric orbits but, from the perspective of a fixed Sun-Earth line, the spacecraft appear to orbit Earth.

*Evaluating Space Weather Architecture Options to Support Human Deep Space Exploration of the Moon and Mars [3170]*

NASA’s Engineering and Space Center (NESC) is conducting an independent technical assessment of space environment monitoring and forecasting architecture options to support human and robotic deep space exploration.

9:30 a.m. Collado-Vega Y. M. * Kuznetsova M. Mays L. Pulkkinen A. Zheng Y. Muglach K. Thompson B. Chulaki A. Taktakishvili A. CCMC Team  
*Space Weather Research and Forecasting Capabilities at the Community Coordinated Modeling Center (CCMC) [3090]*

The Community Coordinated Modeling Center (CCMC) supports and enables the research and development of the latest and future space weather models and facilitates the deployment of the latest advances in research of space weather operations.
9:40 a.m.  DISCUSSION

9:50 a.m.  BREAK


From Tempe to Denver:  Realizing the Wargo Axiom with the Cosmic Ray Telescope for the Effects of Radiation (CRaTER) [#3150]

We present a retrospective of LRO from the perspective of space radiation. We review synergies between exploration enabling science and science enabling exploration. We describe how CRaTER’s flight spare contributes both to the Deep Space Gateway.

10:10 a.m.  Wu X. *  Ambrosi G.  Bertucci B.

Real-Time Penetrating Particle Analyzer (PAN) [#3029]

The PAN can measure penetrating particles with great precision to study energetic particles, solar activities, and the origin and propagation of cosmic rays. The real-time monitoring of penetrating particles is crucial for deep space human travel.


Dose Spectra from Energetic Particles and Neutrons (DoSEN) [#3097]

DoSEN is an early-stage space technology project that offers advantages for active measurement of the complete spectrum of radiation. DoSEN combines two advanced radiation detection concepts with fundamental advantages over traditional dosimetry.

10:30 a.m.  Leitgab M. *

High Fidelity Measurement of Free Space Solar Particle Event and Galactic Cosmic Ray Environments at Intermediate Energies [#3117]

A charged particle measurement experiment mounted externally to the Deep Space Gateway is proposed, contributing to improving astronaut radiation exposure management during Solar Particle Events and Extra Vehicular Activities.

10:40 a.m.  Martens P. C. *

Forecasting Space Weather Hazards for Astronauts in Deep Space [#3188]

Deep Space Gateway provides a unique platform to develop, calibrate, and test a space weather forecasting system for interplanetary travel in a real life setting. We will discuss requirements and design of such a system.


We report on observations from CRaTER on LRO and predict the dose rates of galactic cosmic rays throughout the next solar cycle. We use these results to predict the most conservative allowable mission durations.

11:00 a.m.  Hassler D. M. *  Ehresmann B.

Next Generation Fast Neutron Detector for Space Exploration (Mini-FND) [#3175]

SwRI has developed a miniature Fast Neutron Detector (mini-FND), for use in the Deep Space Gateway, to characterize the neutron albedo radiation. Mini-FND will provide coverage of the biologically relevant neutrons at energies of 500 keV and greater.
11:10 a.m. Solomey N. * Barghouty N. Christl M. Johnson L. Meyer H.

Deep-Space Test of a Neutrino Detector [#3002]

Changes in solar neutrino flux make it advantageous to take a detector into space since it changes as the inverse square of the distance from the Sun. A space-craft with a neutrino detector in solar orbit would perform science study opportunities.

11:20 a.m. DISCUSSION