

J2B: Earth/Moon Space Weather Forecasting & Mars Nowcasting

Targeted Outcome: Phase 2- 2015-2025, Opening the Frontier

Required Understanding

CME energy buildup

CME initiation and onset (triggering)

Ability to recognize precursors and triggers of large CMEs & incorporate them into models

Origin of SPEs and relation to CMEs and other phenomena

Relationship between solar magnetic field evolution, triggers, CME strength and propagation

Propagation of Ambient SW, SW transients, and SEPs

Relationship between CME evolution, SW conditions and SEP fluxes

Enabling Capabilities & Measurements

Next generation remote sensing and multi-point in-situ precursor measurements & models in place

Predict eruption of CMEs at the Sun

Predict the character of CMEs and their efficiency to accelerate particles

Predict particle escape from shock and transport through heliosphere

Assimilation of Integrated Sun-Earth-Moon-Mars models using observational inputs for predictive models

Enabling

Sentinels, SWB, Mars GOES – *Provide multi-point network of in-situ observations*

Enabling

L1-diamond, GEMINI, MagCon, IMC - *Characterize near-Earth environment*

Implementation Phase 2: 2015-2025

Enabling

DOPPLER, SHIELDS, SPI, SEPP, RAM, MTRAP - Identify NEW observational techniques & Precursor Signatures of CMEs and SPEs

Model/Theory Development - *Integrated predictive models for Earth-Moon System*

Enabling

Mars GOES, Far Side Sentinels – *provide remote sensing and in-situ observations to enable local space weather nowcasting at Mars*