

H1A: Targeted Outcome to Capabilities to Implementation

Targeted Outcome: Phase 2005-2015, Understanding our Home in Space
Understand Propagation & Evolution of Solar Disturbances to Earth

Required Understanding

Radial Evolution of 3D CME structure

CME -CME & CME-solar wind coupling

Coronal and IP Drag force

True angular extent of CMEs and shocks

Radial evolution of shock standoff distance & geometry

Radial profiles of CME velocity from Sun to Earth & Mars

Correspondence between near-Sun and near-Earth CME substructures

Enabling Capabilities & Measurements

Coronagraph/heliospheric imager, radio-burst measurements of shock speed & strength from Sun to Earth

In situ field & particle measurements of CME structure at several radial locations

Density, temperature and magnetic field structure of solar wind & CMEs within the first 30 R_s

Simultaneous imaging & in situ CME observations

Use all available density, temperature and magnetic field info from the Sun to the magnetopause to model Sun-to-Earth CME evolution

Implementation Phase 1: 2005-2015

SoHO, Wind & ACE for CME & shock parameters; STEREO for 3D CME structure; SDO for solar source of CMEs

IHS for CME radial evolution with SIRA to image particle acceleration site in shocks

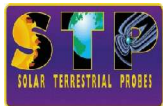
Develop theory of particle acceleration by CME-driven shocks

SP to get the near-Sun CME structure by in situ observations

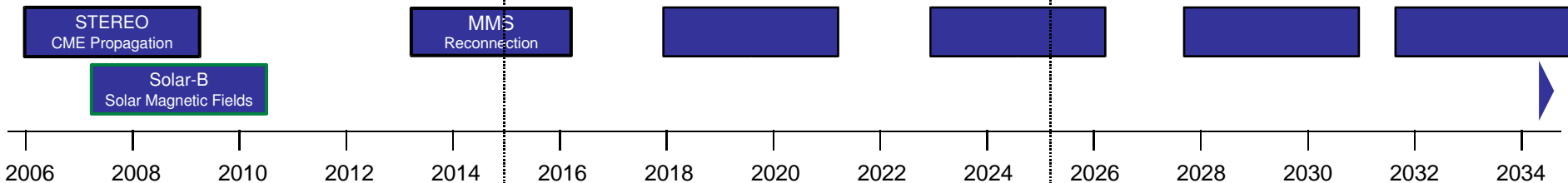
MHD models of CME propagation & comparison with observations. Model fast CMEs under LWS/TRT

Step 5: Known Resources to be applied

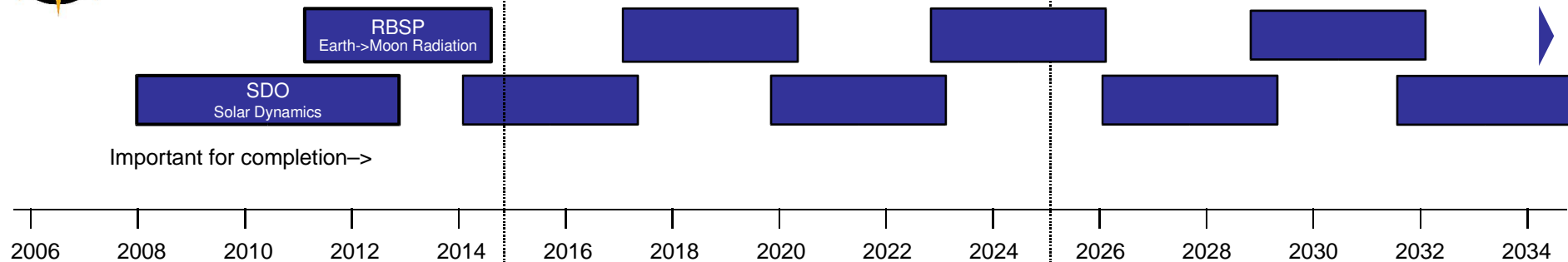
In Development
Partnership



Low- to mid cost, multi-objective, strategically planned for fundamental space physics and space weather investigations
Current Resources: 1 launch per 5 years



Low- to mid-cost, multi-objective, strategically targeted for Life and Society Science investigations.
Recommended: 1 launch per 3 years



Explorers, single objective, strategically selected to respond to new knowledge/decision points.
Recommendation: 1 launch per 2 years

