

Step 5: Sun-Solar System Connection Roadmap

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 f&p measurements of CME
structure at several radial locations

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

Simultaneous imaging
& in situ CME
observations

Use density, Temperature and
magnetic field measurements
near the Sun to model the
evolution to 1 AU; cross-check
with in situ observations

Implementation Phase 1: 2005-2015

STEREO for simultaneous in situ
and imaging CME observations,
CME imaging from Sun to Earth,
and 3D CME structure

SOHO, Wind & ACE
for CME & shock parameters

IHS for CME
radial evolution

SIRA & HS for shock parameters

Theory Program
MHD models of CME
propagation & comparison
with *in situ* & remote
sensing observations