

Roadmap Goal Structure

Agency Strategic Objective: Explore the Sun-Earth system to understand the Sun and its effects on the Earth, the solar system, and the space environmental conditions that will be experienced by human explorers, and demonstrate technologies that can improve future operational systems.

<i>Expected Achievement</i>	Phase 1: 2005-2015	Phase 2: 2015-2025	Phase 3: 2025-beyond
<i>Objective F:</i> Open the Frontier to Space Environment Prediction	Measure magnetic reconnection at the Sun and Earth Determine the dominant processes of particle acceleration Identify key processes that couple regions - from the atmosphere to the heliosphere	Validate understanding of the magnetic processes that drive space weather* Quantify particle acceleration for the key regions of Exploration* Understand non-linear processes and couplings for prediction of the space environment and atmosphere.	Predict solar magnetic activity and energy release Predict high energy particle flux throughout the solar system. Understand the coupling of disparate astrophysical systems
<i>Objective H:</i> Understand the Nature of Our Home in Space	Understand how solar disturbances propagate to Earth Identify how space weather effects are produced in geospace_ Identify the impacts of solar variability on Earth's atmosphere Describe how space plasmas and planetary atmospheres interact	Identify precursors of important solar disturbances Enable continuous forecasting of conditions throughout geospace_ Integrate solar variability effects into Earth climate models Determine the habitability of solar system bodies	Image activity in other stellar systems_ Enable continuous forecasts of conditions throughout the solar system_ Predict climate change* Determine how the habitability of planets evolves in time
<i>Objective J:</i> Safeguard Our Outbound Journey	Determine extremes of the variable radiation and space environments at Earth, Moon, & Mars Nowcast solar and space weather and forecast "All-Clear" periods for space explorers near Earth	Characterize the near-Sun source region of the space environment Reliably forecast space weather for the Earth-Moon system; make the first SW nowcasts at Mars Determine Mars atmospheric variability relevant to aerocapture entry, descent, landing, surface navigation and	Analyze the first direct samples of the interstellar medium Provide situational awareness of the space environment throughout the inner Solar System Reliably predict atmospheric and radiation conditions at Mars to ensure safe surface operations*
Develop technologies, data, and knowledge systems to improve future operational systems			