JAXA SOLAR-C Mission

http://hinode.nao.ac.jp/SOLAR-C/index_e.html

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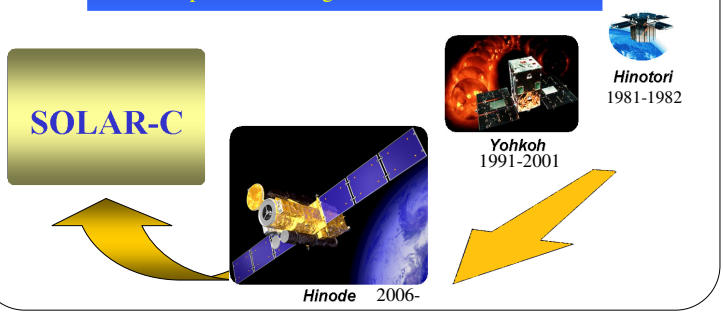
The Japanese solar physics community is proposing the next orbiting solar observatory, **SOLAR-C**, following *Hinode* (SOLAR-B). Two mission candidates are under study: PLAN-A and PLAN-B (no priority between the two plans at present). One is going to be proposed to JAXA for a launch in FY2016 after fundamental studies.

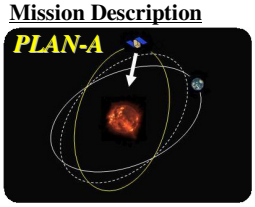
PLAN-A: Magnetic/X-ray and helioseismic observations of the polar and equatorial regions of the Sun to diagnose the surface magnetic activity and the internal flow/magnetic structures from an out-of-ecliptic orbit.

PLAN-B: High-spatial/throughput/cadence observations of the solar photosphere to corona with largely enhanced spectroscopic and polarimetric capabilities.

Japanese Orbiting Solar Observatories



Mission Description



- Magnetic/X-ray and helioseismic observations to diagnose the surface magnetic activity and internal flow/magnetic structures of the Sun from an out-of-ecliptic orbit
- Solar polar-region exploration by out-of-ecliptic observations
- Launched by JAXA H-IIA rocket
- Maintain 1AU distance for the final orbit

Science Objectives:

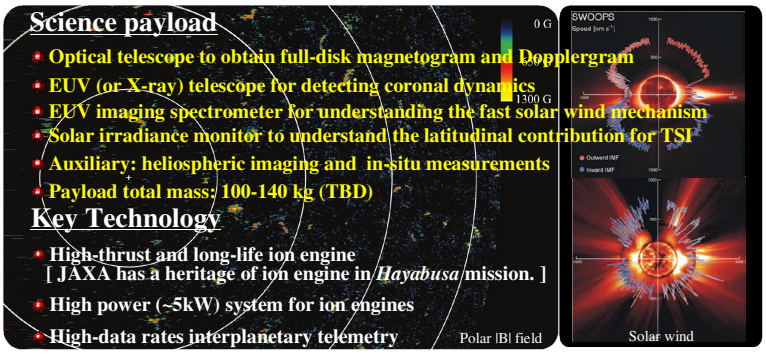
- Understand the internal structure of the Sun and the solar dynamo mechanism
- Understand the mechanism for high-speed solar wind from observations at vantage points for Doppler measurements
- Understand the variability of environments (space weather) in inner heliosphere with distance from the plane of the ecliptic

Science payload

- Optical telescope to obtain full-disk magnetogram and Dopplergram
- EUV (or X-ray) telescope for detecting coronal dynamics
- EUV imaging spectrometer for understanding the fast solar wind mechanism
- Solar irradiance monitor to understand the latitudinal contribution for TSI
- Auxiliary: heliospheric imaging and in-situ measurements
- Payload total mass: 100-140 kg (TBD)

Key Technology

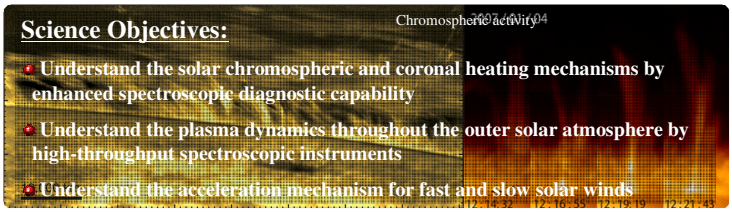
- High-thrust and long-life ion engine
  [JAXA has a heritage of ion engine in *Hayabusa* mission.]
- High power (~5kW) system for ion engines
- High-data rates interplanetary telemetry



Mission Description

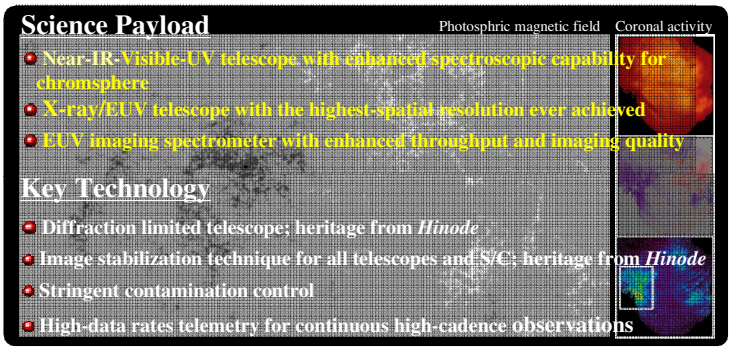
- Hi-spatial/throughput/cadnece observations of the solar photosphere to corona with largely enhanced spectroscopic and polarimetric capabilities
- Observations with higher-spatial resolution for transition region and corona than those in *Hinode*
- Launched by JAXA H-IIA rocket
- Sun-synchronous polar orbit or geosynchronous orbit

Science Objectives:



- Understand the solar chromospheric and coronal heating mechanisms by enhanced spectroscopic diagnostic capability
- Understand the plasma dynamics throughout the outer solar atmosphere by high-throughput spectroscopic instruments
- Understand the acceleration mechanism for fast and slow solar winds

Science Payload

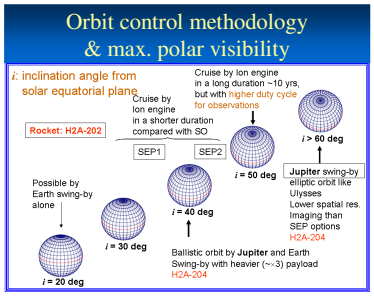


- Near-IR-Visible-UV telescope with enhanced spectroscopic capability for chromosphere
- X-ray/EUV telescope with the highest spatial resolution ever achieved
- EUV imaging spectrometer with enhanced throughput and imaging quality

Key Technology

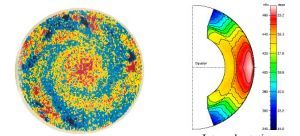
- Diffraction limited telescope: heritage from *Hinode*
- Image stabilization technique for all telescopes and S/C: heritage from *Hinode*
- Stringent contamination control
- High-data rates telemetry for continuous high-cadence observations

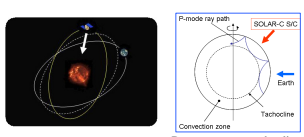
Orbit control methodology & max. polar visibility



SEP: solar electric propulsion
SEP1: no swing-by used, SEP2: Earth gravity assist used.

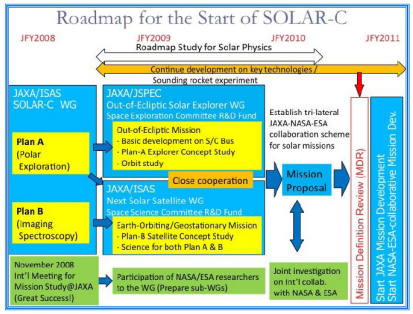
Filling lack of knowledge in polar regions



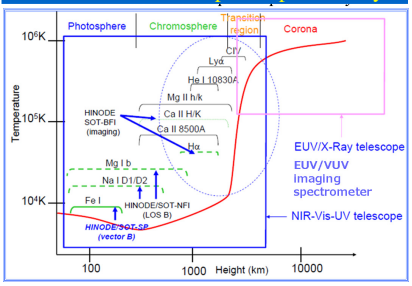


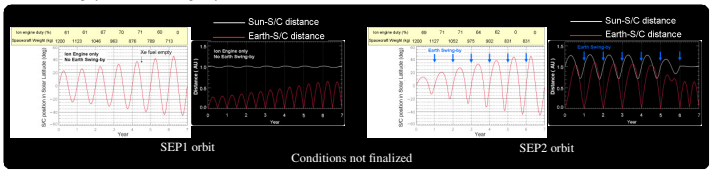
Deep survey at tachocline

Roadmap for the Start of SOLAR-C



Candidate lines for Spectro-polarimetry





Working Group Activity

- SOLAR-C Science Definition Meeting held at JAXA/ISAS in Nov 2008
  Many contributions were given from European and US scientists.
  The next meeting is going to be held in early 2010.
- Sub-Working Group Activity
  Five sub-WGs were organized to accelerate the studies on science cases and technical feasibility for preparing the best mission proposal. In the sub-WG activity there are contributions from European and US scientists/engineers.

Provisional Schedule

F.Y.	
2007:	SOLAR-C WG proposal WG established
2008-2009:	Feasibility study
2010:	Submit mission proposal
2011:	Phase A
2012-2014:	PM and FM
2015:	S/C tests
2016:	Launch