Living With a Star Sentinels

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LWS MOWG
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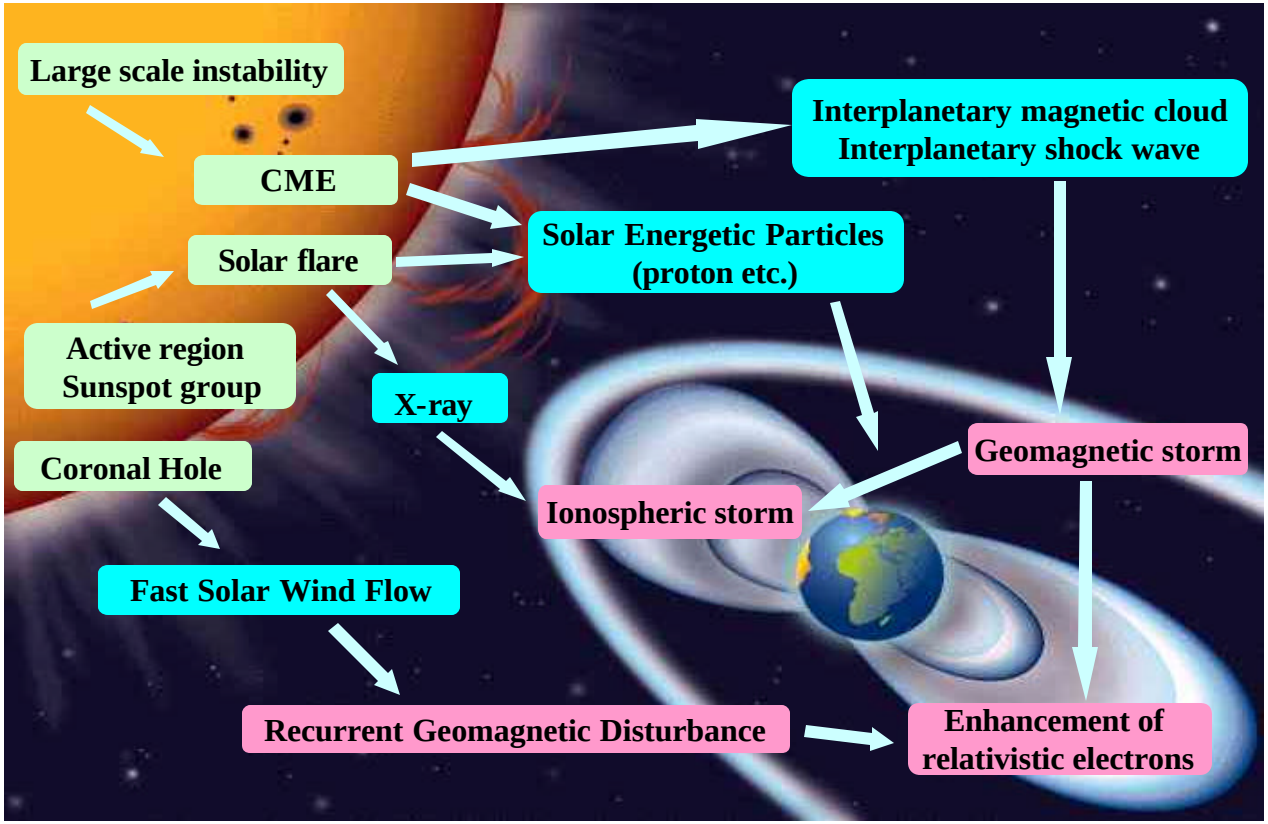
Primary Objective



Discover, understand and model the connection between solar phenomena and geospace disturbances.

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Chronology

• The LWS Science Architecture Team and Sentinels Pre-Formulation Team presented science objectives, observational strategies and possible mission scenarios to NASA HQ.	March 2000 – July 2001
• International LWS program initiated.	May 2001
• LWS SAT Findings and Report	July – September 2001
• First Heliospheric Strategy Panel Meeting.	November 2002
• HSP Report Completed	Fall 2003
• LWS Sentinels SDT formed	Early 2004

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Heliospheric Strategy Panel Charter

Objectives:

Assist the LWS Sentinels Project Scientist by identifying the near-term strategy to make progress towards the LWS heliospheric science objectives. In particular:

- Identify heliospheric measurements required to accomplish the LWS program objectives.
- Determine to what extent current and future assets could be used to contribute toward the LWS heliospheric objectives and make recommendations for improved utilization.
- Identify current and past mission data sets relevant for the LWS heliospheric objectives that are not publicly available and suggest possible solutions.

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Heliospheric Strategy Panel Members

Primary		Advisory		Project	
Stuart Bale	Berkeley	Joan Feynman	JPL	Nicky Fox	APL
Nat Gopalswamy	GSFC	Len Fisk	U. Michigan	Bob Hoffman	GSFC
Dennis Haggerty	APL	Tony Galvin	UNH	Barbara Giles	GSFC
Steve Kahler	AFRL	Bob Lin	Berkeley	Vic Pizzo	NOAA
Davin Larson	Berkeley	David McComas	LANL	David Sibeck	GSFC
Glenn Mason	U. Maryland	Dick Mewaldt	Caltech	Chris StCyr	GSFC
Chuck Smith	Bartol	Ed Roelof	APL	Barbara Thompson	GSFC
John Steinberg	LANL			Ron Zwickl	NOAA
Adam Szabo	GSFC				
Allan Tylka	NRL				
Thomas Zurbuchen	U. Michigan				

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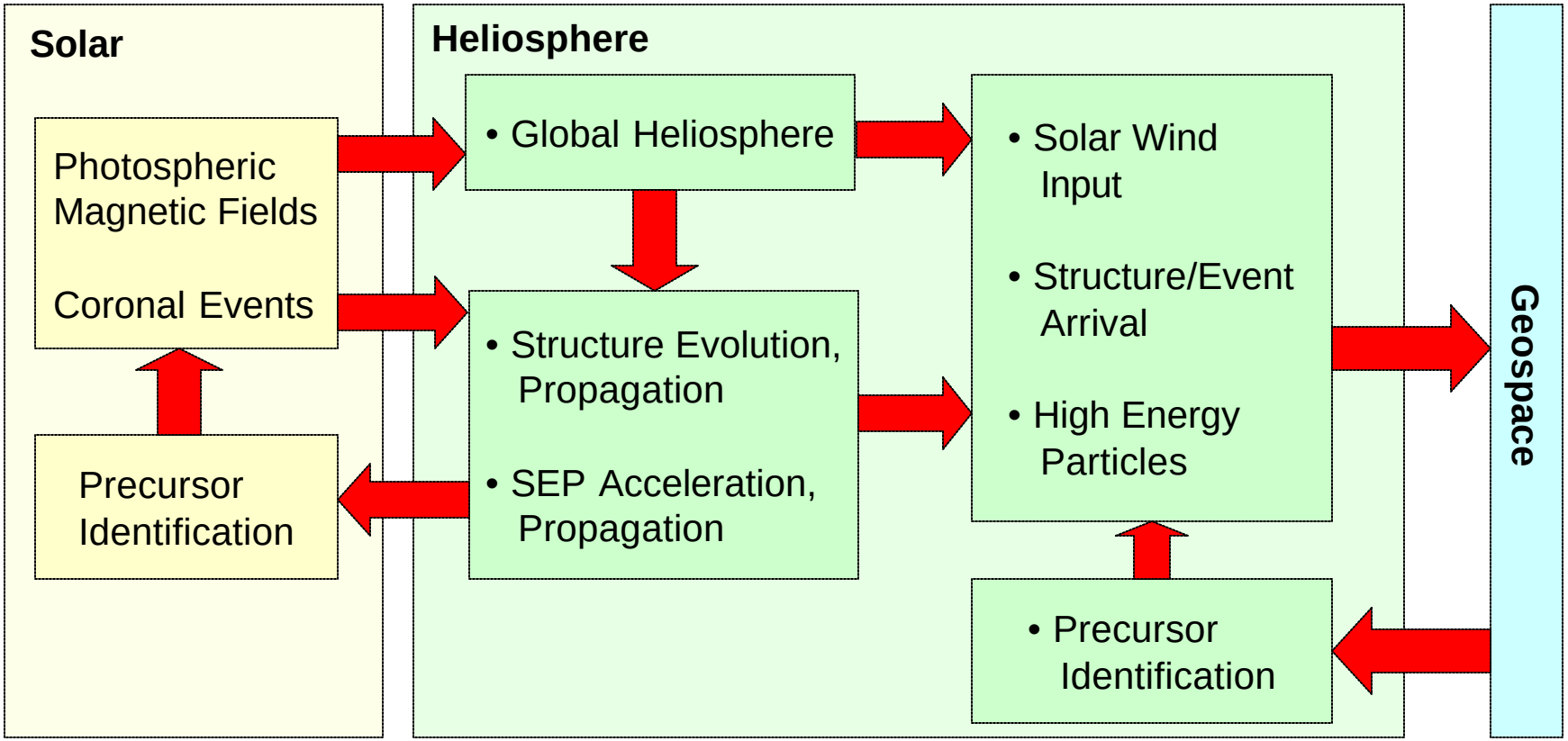
LWS Heliospheric System Objectives



- Identify gaps in current state of knowledge
- Determine areas of research where progress is most likely

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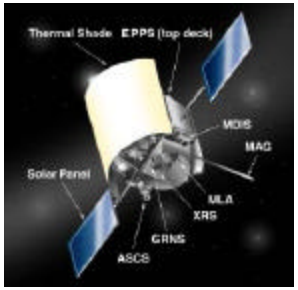
Preliminary Recommendations (1)

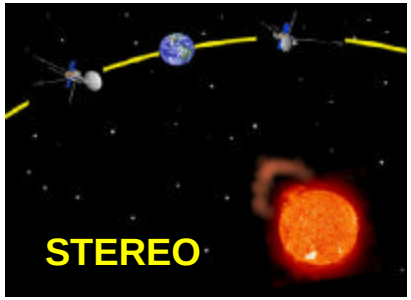
When possible, fill observational gaps using future NASA missions:

STEREO – Extend mission as late as possible

MESSENGER – Collect cruise data



MESSENGER

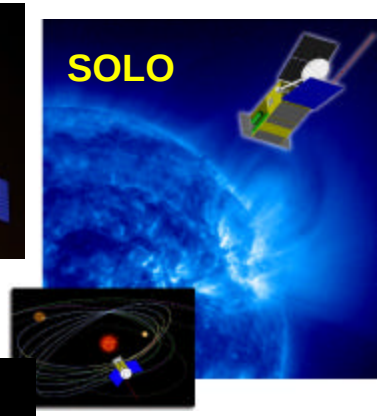


Cultivate international partnerships, ILWS:

Solar Orbiter – *In situ* instrumentation, telemetry

Bepi-Colombo – Interplanetary and cruise data

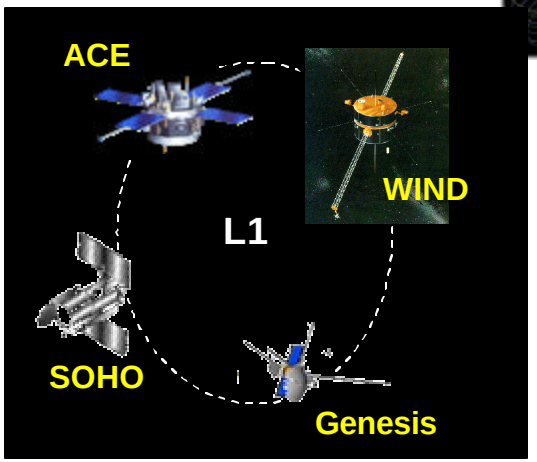
Ulysses – Continuation of mission

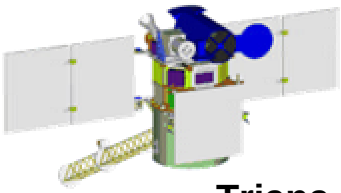


Extend the capabilities of existing near-Earth solar wind assets:

L1 Cluster – Forge unified observatory from ACE, WIND, Genesis, SOHO

Triana – Seek opportunities for launch





Triana

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Preliminary Recommendations (2)

- **Establish SDT for US component to improve on current space holder:**

Spacecraft: 4 identical spinning s/c with at least five-year lifetime.

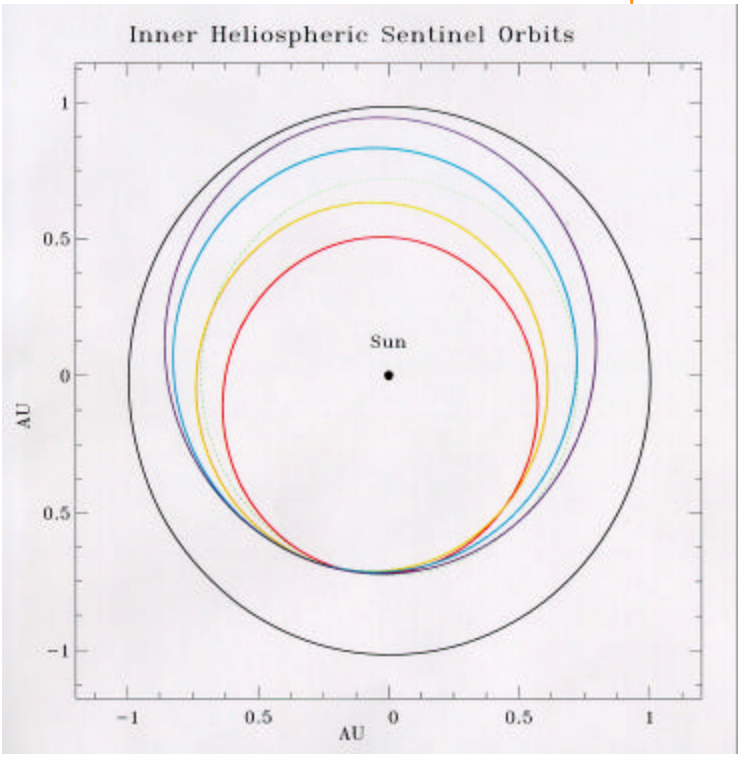
Orbits: 4 elliptical heliocentric orbits (0.5 – 0.95 x 0.72 AU) in the ecliptic.

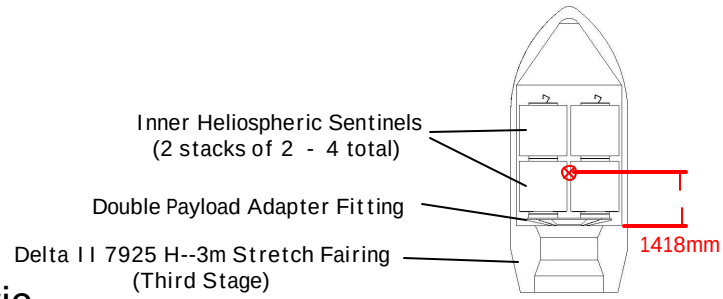
Instruments: Magnetometer, solar wind analyzer, energetic particle detector, radio waves instrument.

Space Access: Single launch on a medium class ELV (Delta II 7925H)

Cost: $300M - $350M including launch vehicle and 2 years of operations.

Limitations: No coverage within 0.5 AU
No latitudinal coverage outside of the ecliptic.





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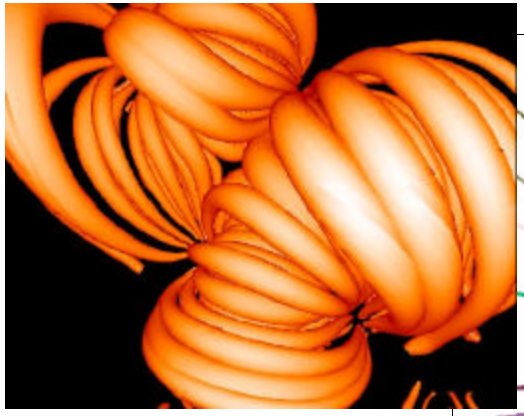
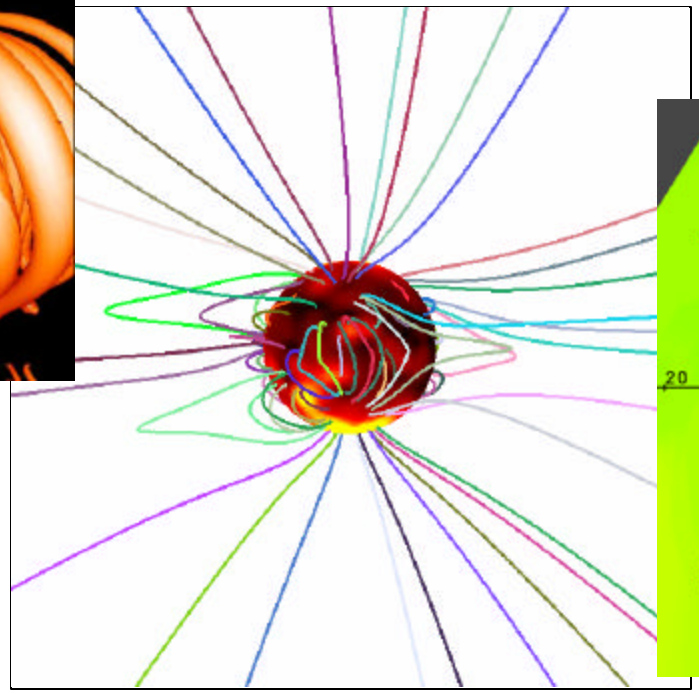
Preliminary Recommendations (3)

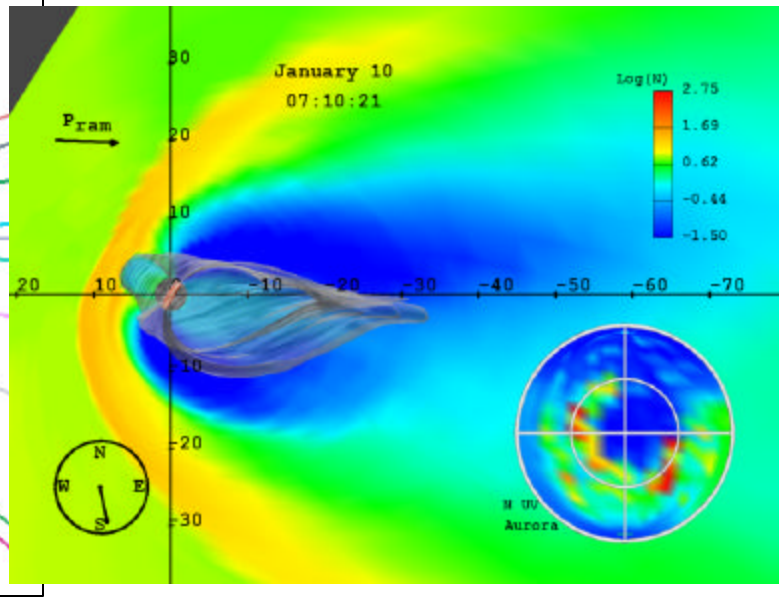
The Role of Theory and Modeling

- Vigorous support of heliospheric modeling through TR&T particularly at the solar and magnetospheric interfaces

- Establish close ties between modeling center output and observational data services







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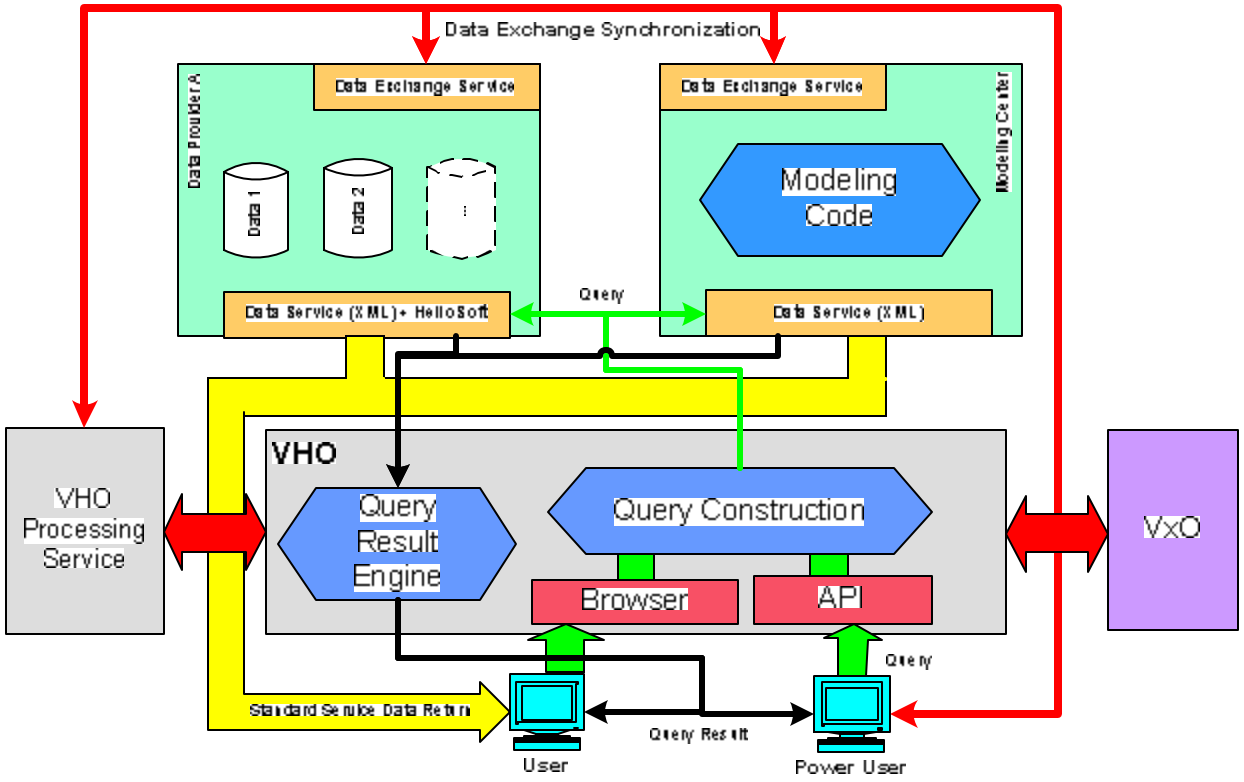
Preliminary Recommendations (4)

Data Services

- Develop a distributed data environment for all heliospheric missions, the Virtual Heliospheric Observatory (VHO)
- Treat observational data, processing service, and model output providers in similar fashion.
- Encourage interdisciplinary interaction.