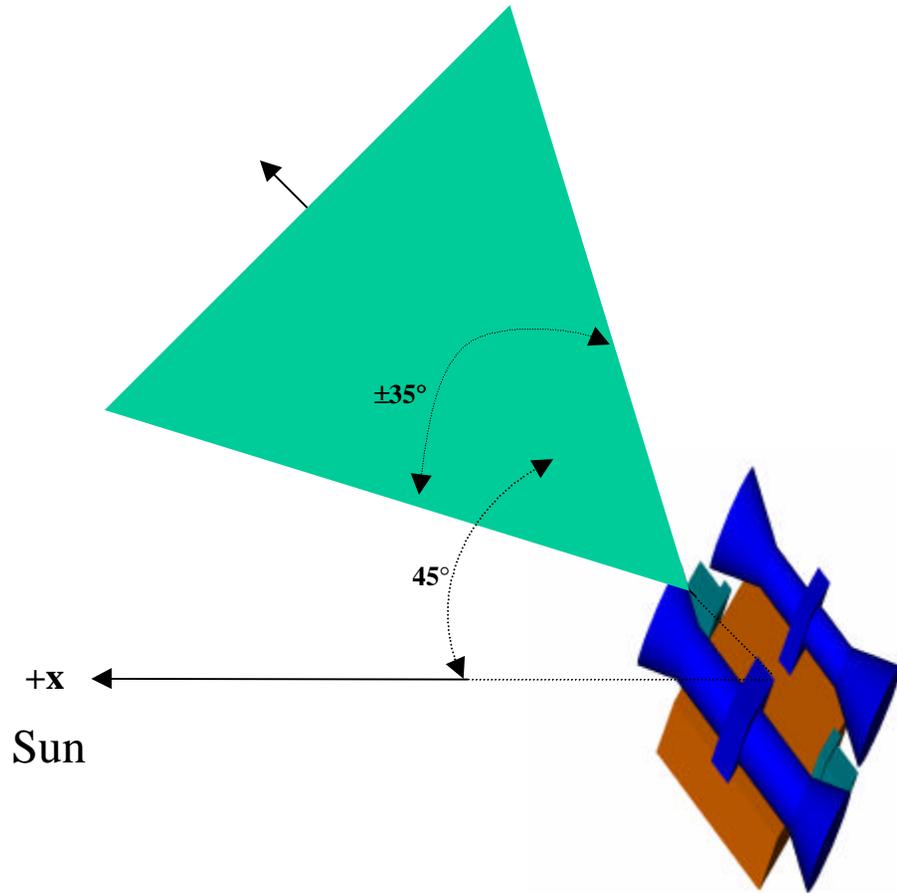


# Flight Instrument Selection

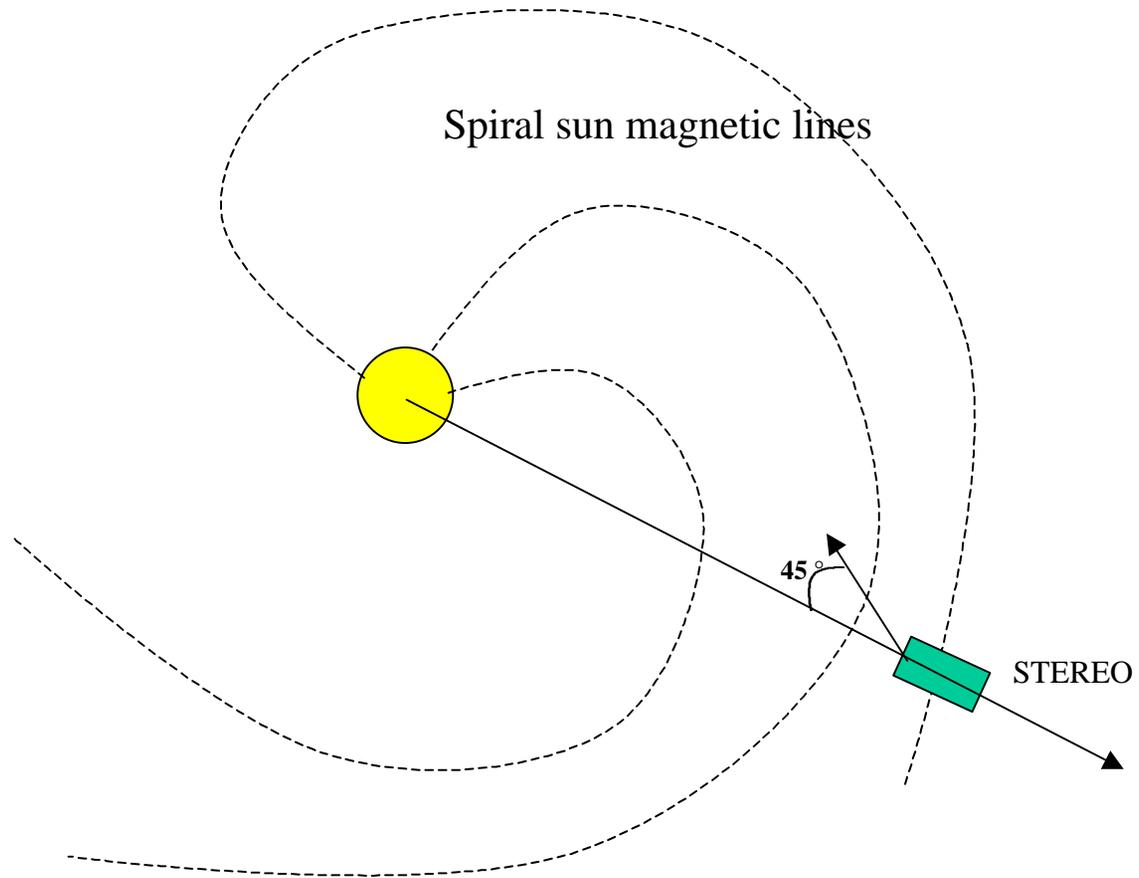
- AO will be released in 1999 soliciting science investigations and instruments for STEREO science
- Selection of the actual flight instruments will be made competitively on the basis of that AO
- Instrument descriptions in this package represent the strawman instruments identified by the SDT
- Instruments and interfaces may change as a result of the selection process

# STEREO Energetic Particle Detector EPD



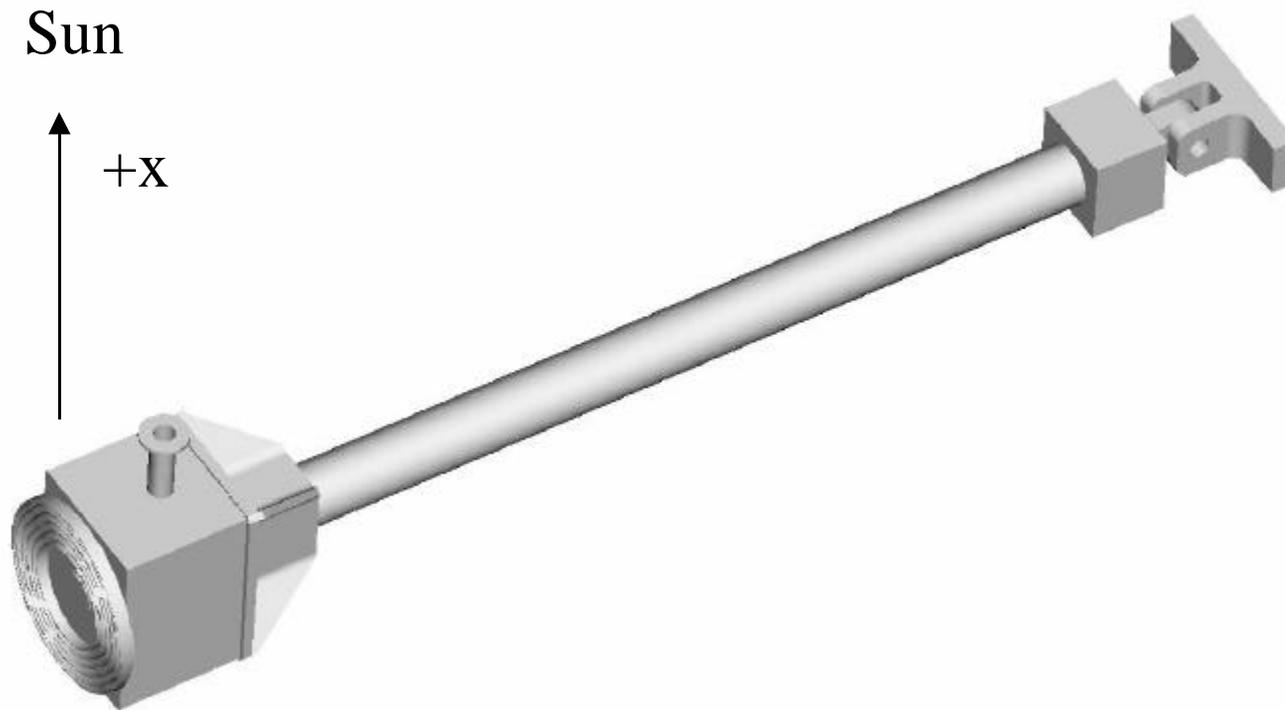
Envelope Dimensions: 25cm x 18cm x 12 cm

# STEREO Energetic Particle Detector EPD Field of View



Required direction:  
 **$45^\circ$  to the right of the Sun  
when facing it.**

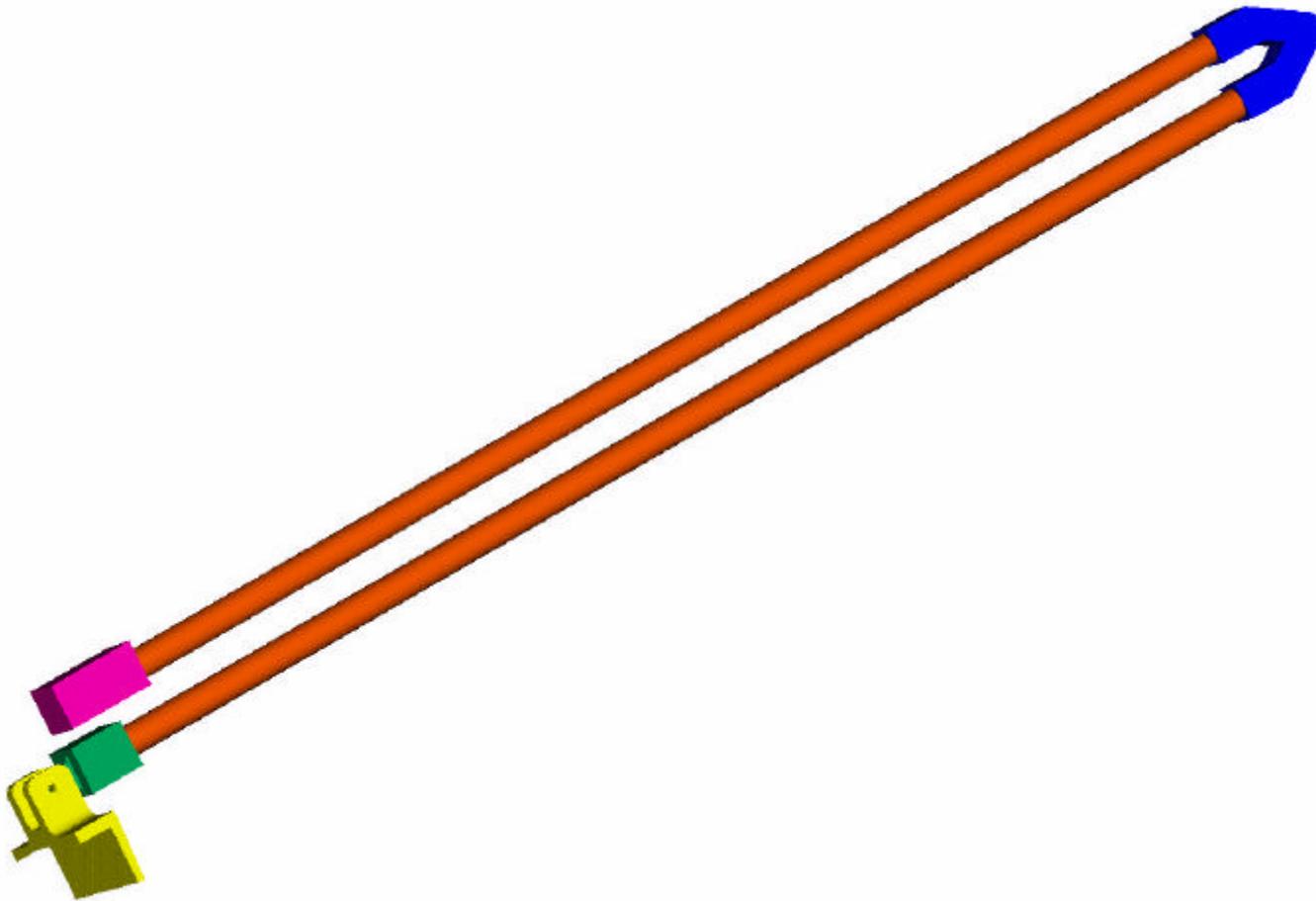
# STEREO Heliospheric Imager (HI)



Geometry used on GSFC point design  
Detector Size: 20cm diameter x 12cm

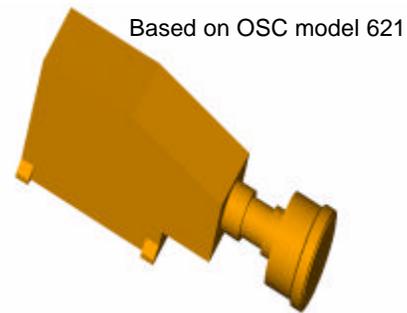
# STEREO

## Magnetometer Boom and Sensor



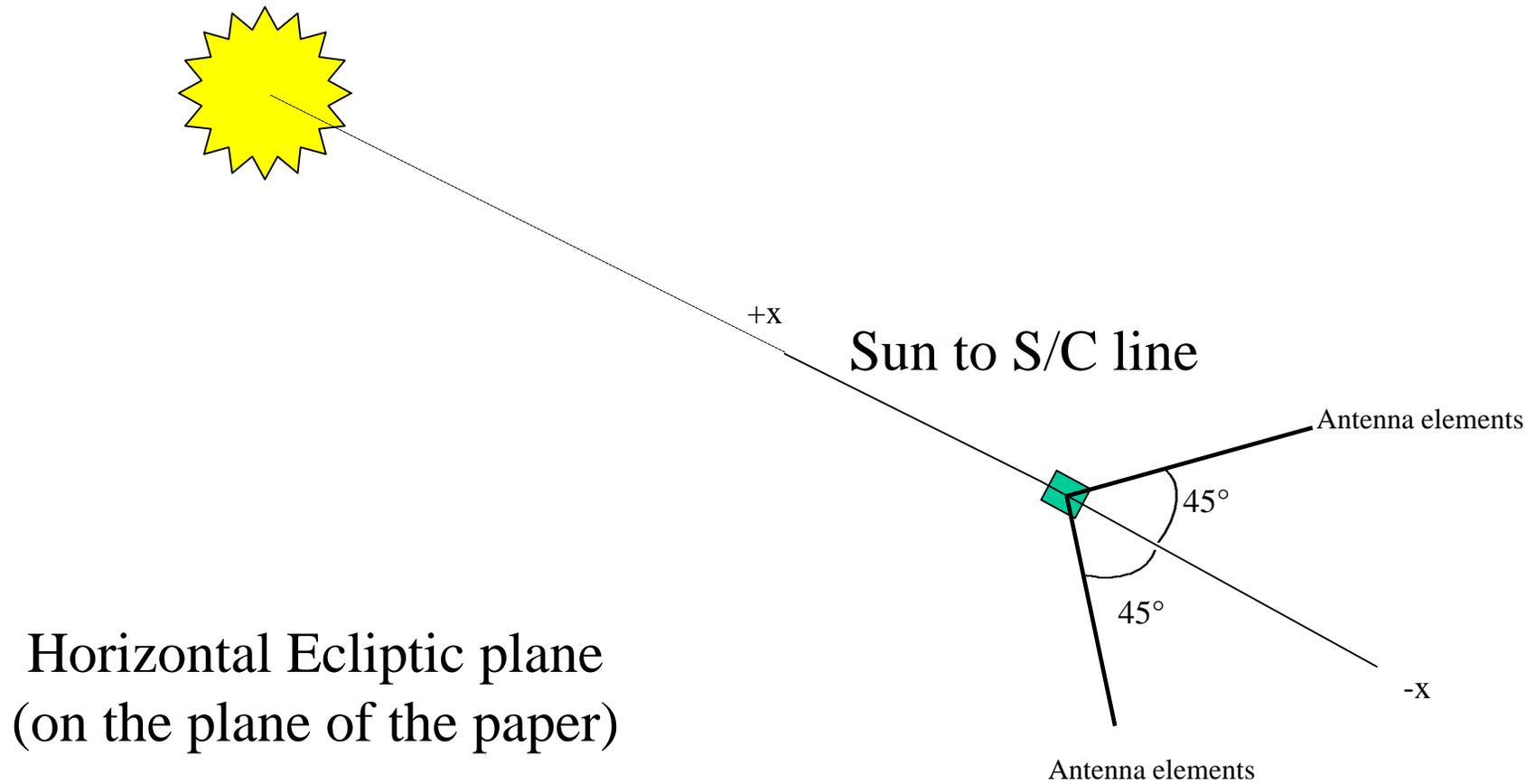
Sensor: 5 cm x 5 cm x 10 cm  
Boom: 3m long (Spacecraft provided)

# STEREO Radio Burst Tracker (RBT)

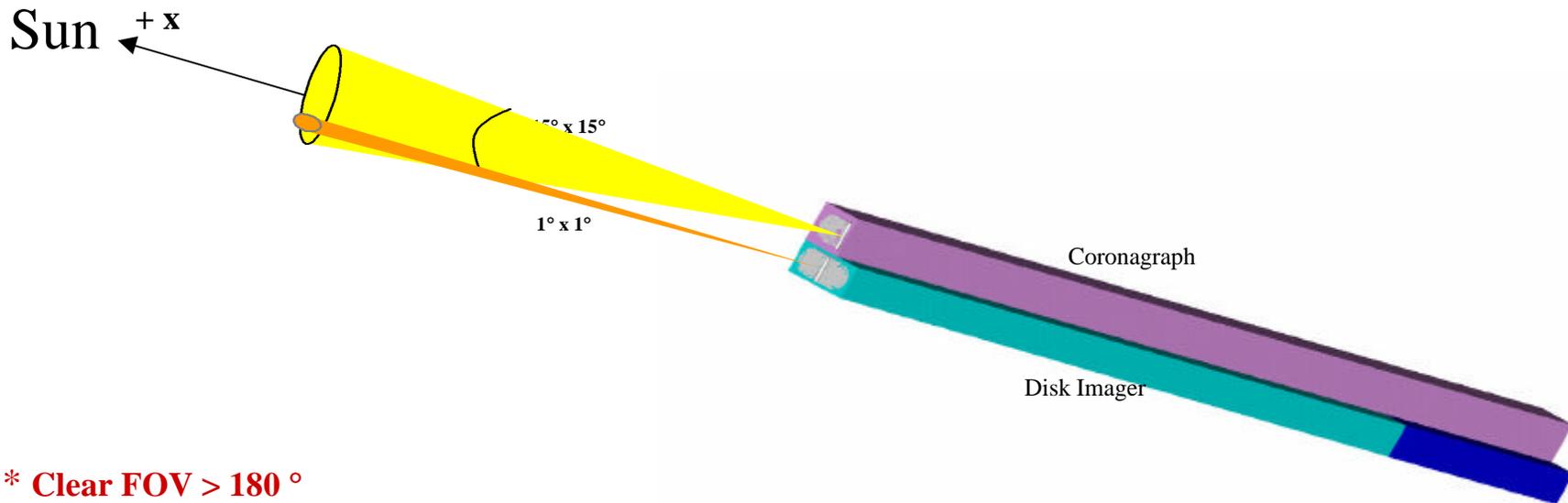


Antenna: 10 m long x 1.27 cm diameter  
Mechanism: 14cm x 9cm x 26cm  
Electronics Box: 20cm x 10cm x 3cm

# STEREO Radio Burst Tracker (RBT) Field of View



# STEREO Solar Coronal Imaging Package (SCIP)



**\* Clear FOV > 180 °**

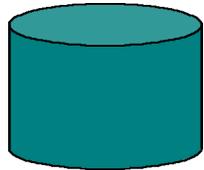
**Must have a clear field of view to avoid light scattering**

Dimensions: 11cm x 11cm x 150 cm

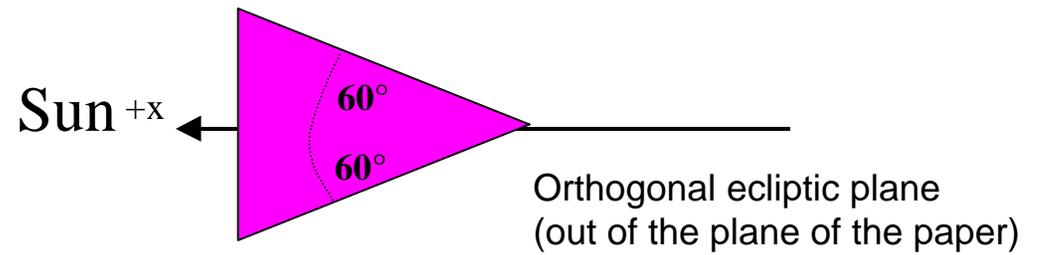
# STEREO

## Solar Wind Plasma Analyzer (SWPA)

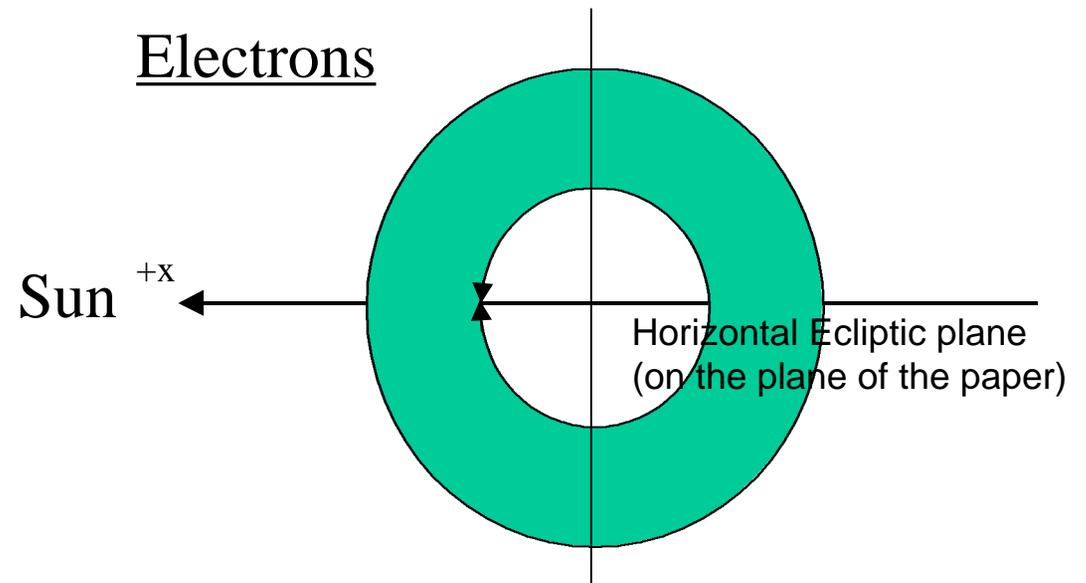
### Electrons and Ions



Cup: 12 cm in diameter x 12 cm  
Electronics : 10 cm x 10 cm x 15.2 cm



### Electrons



**1. *ENERGETIC PARTICLE DETECTOR (EPD)***

Quantity:	1 Electronics Box/Spacecraft
Dimensions:	25 cm x 18 cm x 12 cm
MOI:	TBD kg-m <sup>2</sup> ± TBD kg-m <sup>2</sup>
CG:	TBD cm ± TBD cm
Mass:	3 kg
Power:	2 W (Average) 2 W (Peak)
Voltage:	28 V ± 6 V
Detector Type:	Si Thin/Thick Film
Temperatures:	5°C ± 5°C (Operational) -10°C to +35°C (Non-Operational)
Field of View:	±35° from the 45° angle right to the spacecraft-sun line
Orientation:	Optimal look direction is 45° off spacecraft-sun line. (Must be mounted differently on each spacecraft).
Date Rate:	200 bps (Average/Peak)
Data Interface:	MIL-STD-1553
Mechanical Mounting:	Bolted, Electrically Coupled
Thermal:	Thermally Conducted

## 2. *HELIOSPHERIC IMAGER (HI)*

Quantity:		1 Unit/Spacecraft
Dimensions:		20 cm diameter x 12 cm
MOI:		TBD kg-m <sup>2</sup> ± TBD kg-m <sup>2</sup>
CG:		TBD cm ± TBD cm
Mass:		6.8 kg (includes electronics)
Power:		15 W (Average) 20 W (Peak)
Voltage:		28 V ± 6 V
Detector Type:		CCD
Temperatures:	CCD	≤ -70°C (Operational) -10°C to +40°C (Non-Operational)
	Optics	0°C to +20°C (Operational) -10°C to +40°C (Non-Operational)
	Electronics	0°C to +35°C (Operational) -10°C to +50°C (Non-Operational)
Field of View:	Optical	165° x 165°
	Thermal	2π steradian view of cold space for CCD radiator
Orientation:		Optical axis is 90° from Sun-earth line, pointed towards Earth
Date Rate:		7 kbps (Average/Peak)
Data Interface:		MIL-STD-1553
Mechanical Mounting:		TBD
Thermal:		TBD

### 3. **MAGNETOMETER**

Quantity:		1 Electronics Box/Spacecraft 1 Magnetometer/Spacecraft 1 Deployable Boom/Spacecraft
Dimensions:	Sensor Electronics Boom	5 cm x 5 cm x 10 cm 20 cm x 15 cm x 8 cm 3 m length x 3.175 cm dia. Provided by spacecraft.
MOI:	Sensor Electronics Boom	TBD kg-m <sup>2</sup> ± TBD kg-m <sup>2</sup> TBD kg-m <sup>2</sup> ± TBD kg-m <sup>2</sup> TBD kg-m <sup>2</sup> ± TBD kg-m <sup>2</sup> (Stowed) TBD kg-m <sup>2</sup> ± TBD kg-m <sup>2</sup> (Deployed)
CG:	Sensor Electronics Boom	TBD cm ± TBD cm TBD cm ± TBD cm TBD cm ± TBD cm (Stowed) TBD cm ± TBD cm (Deployed)
Mass:	Sensor Electronics Boom	0.3 kg 1.7 kg 3.5 kg (Part of S/C mass budget)
Power:		2 W (Average) 2 W (Peak)
Voltage:		28 V ± 6 V
Detector Type:		N/A
Temperatures:	Sensor Electronics	-20°C to +50°C (Operational) -20°C to +70°C (Non-Operational) 0°C to +40°C (Operational) -20°C to +50°C (Non-Operational)
Field of View:		N/A
Date Rate:		200 bps (Average/Peak)
Data Interface:		MIL-STD-1553
Mechanical Mounting:	Sensor Electronics	Attached to Boom Bolted, Electrically Coupled
Thermal:	Sensor Electronics	Thermally Isolated from Boom Thermally Conducted

**4. RADIO BURST TRACKER (RBT)**

Quantity:		3 Antenna/Spacecraft 3 Deployment Mechanisms/Spacecraft 1 Electronics Box/Spacecraft
Dimensions:	Antenna Mechanism Electronics	10 m length x 1.27 cm dia. 14 cm x 9 cm x 26 cm 20 cm x 10 cm x 3 cm
MOI:	Antenna Mechanism Electronics	TBD kg-m <sup>2</sup> ± TBD kg-m <sup>2</sup> (Stowed) TBD kg-m <sup>2</sup> ± TBD kg- m <sup>2</sup> (Deployed) TBD kg-m <sup>2</sup> ± TBD kg-m <sup>2</sup> TBD kg-m <sup>2</sup> ± TBD kg-m <sup>2</sup>
CG:	Antenna Mechanism Electronics	TBD cm ± TBD cm (Stowed) TBD cm ± TBD cm (Deployed) TBD cm ± TBD cm TBD cm ± TBD cm
Mass:	Antenna Mechanism Electronics	23 g/m/antenna 1.0 kg/unit 4 kg
Power:		4 W (Average) 12 W (Peak during deployment)
Voltage:		28 V ± 6 V
Detector Type:		N/A
Temperatures:	Antenna Electronics	+10°C to +30°C (Deployed) -10°C to +50°C (Operational) -20°C to +50°C (Non-Operational)
Field of View:		N/A
Orientation:		Orthogonal, however angles between antenna can be < 90°; Prefer not to have one parallel to the magnetometer boom an not parallel to spacecraft-sun line
Date Rate:		200 bps (Average/Peak)
Data Interface:		MIL-STD-1553
Mechanical Mounting:	Mechanism Electronics	Bolted, Electrically Coupled Bolted, Electrically Coupled
Thermal:	Mechanism Electronics	Thermally Conducted Thermally Conducted

5. *SOLAR CORONAL IMAGING PACKAGE (SCIP)*

Quantity:		1 Unit/Spacecraft
Dimensions:		11 cm x 11 cm x 150 cm
MOI:		TBD kg-m <sup>2</sup> ± TBD kg-m <sup>2</sup>
CG:		TBD cm ± TBD cm
Mass:		30 kg
Power:		15 W (Average) 20 W (Peak)
Voltage:		28 V ± 6 V
Detector Type:		CCD
Temperatures:	CCD	-70°C ± 5°C (Operational) -10°C to +40°C (Non-Operational)
	Optical Bench	+15°C ± 1°C (Operational)
	Filter Wheel	+20°C ± 1°C (Operational)
	Electronics	0°C to +40°C (Operational) -10°C to +50°C (Non-Operational)
Clear FOV:		> 180° (must stick out above everything else)
Field of View:	Optical	15° x 15°; 1° x 1°
	Thermal	2π steradian view of cold space for each CCD radiator (2)
Orientation:		Sun Pointing
Date Rate:		67 kbps (Average) 400 kbps (Peak)
Data Interface:		MIL-STD-1553 (T&C) RS-422 (Data)
Mechanical Mounting:		Three Kinematic Mounts
Thermal:		Thermally Isolated

## 6. SOLAR WIND PLASMA ANALYZER (SWPA)

Quantity:		1 Electronics Box/Spacecraft 2 Faraday Cups/Spacecraft
Dimensions:	Cup Electronics	12 cm x 12 cm x 12 cm 10 cm x 10 cm x 15.2 cm
MOI:	Cup Electronics	TBD kg-m <sup>2</sup> ± TBD kg-m <sup>2</sup> TBD kg-m <sup>2</sup> ± TBD kg-m <sup>2</sup>
CG:	Cup Electronics	TBD cm ± TBD cm TBD cm ± TBD cm
Mass:	Cup Electronics	2 kg/cup 1 kg
Power:	Cup Electronics	0.5 W/cup (Average/Peak) 2 W (Average/Peak)
Voltage:		28 V ± 6 V
Detector Type:		Grids/Collector Plates
Temperatures:	Cup  Electronics	0°C to +40°C (Operational) -20°C to +50°C (Non-Operational) 0°C to +40°C (Operational) -20°C to +50°C (Non-Operational)
Field of View: plane		±60° perpendicular to the ecliptic  360° on the horizontal ecliptic plane
Orientation:		Two cups sun facing; one opposite to first to cover 360 deg
Date Rate:		200 bps (Average/Peak)
Data Interface:		MIL-STD-1553
Mechanical Mounting:	Cup Electronics	Bolted, Electrically Coupled Bolted, Electrically Coupled
Thermal:	Cup Electronics	Thermally Conducted Thermally Conducted