DSX Mission/SET-1

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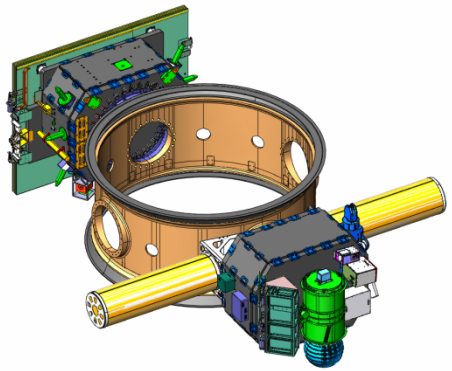
Objectives

Space Flight Experiments to perform basic research designed to significantly advance capability to operate in the harsh radiation environment of Medium Earth Orbit (MEO)



DSX comprises three main experiments:

1. **Wave Particle Interaction Experiment (WPIx):** to understand the physical methods of VLF injection efficiency, transmission and propagation in the magnetosphere and effects on magnetospheric electrons;
2. **Space Weather Experiment (SWx):** to characterize and model the space radiation environment in MEO, an orbital regime attractive for future DoD and commercial missions;
3. **Space Environmental Effects Experiment (SFx):** to research and characterize the effects of radiation on spacecraft electronics and materials. This includes the SET-1 experiments.

Flight Experiment Configuration

addressing DSX Objectives

3 Synergistic Experiments

1. **WPIx: Wave Particle Interaction Experiment: Transmit VLF waves into Magnetosphere.**
2. **SWx: Space Weather: Collect data and develop models for the MEO Slot Region at 10,000-km.**
3. **SFx: Space Environment Effects: Rad effects on electronics, thermal materials, & optical coatings.**

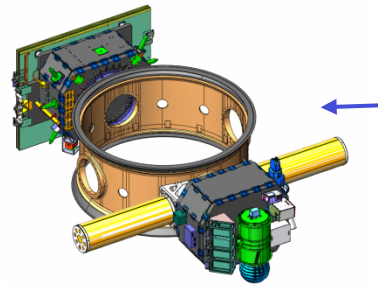
6000-km x 12,000 MEO Slot Orbit

54-m dipole antenna Transmit & Receive at VLF

16-m dipole antenna Receive at VLF

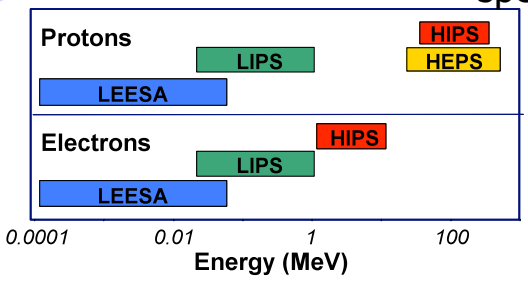
Photometer & Radiometers (materials effects)

6 Space Weather sensors map full particle energy spectrum



DSX is an ESPA free-flyer

EELV 2nd Stage

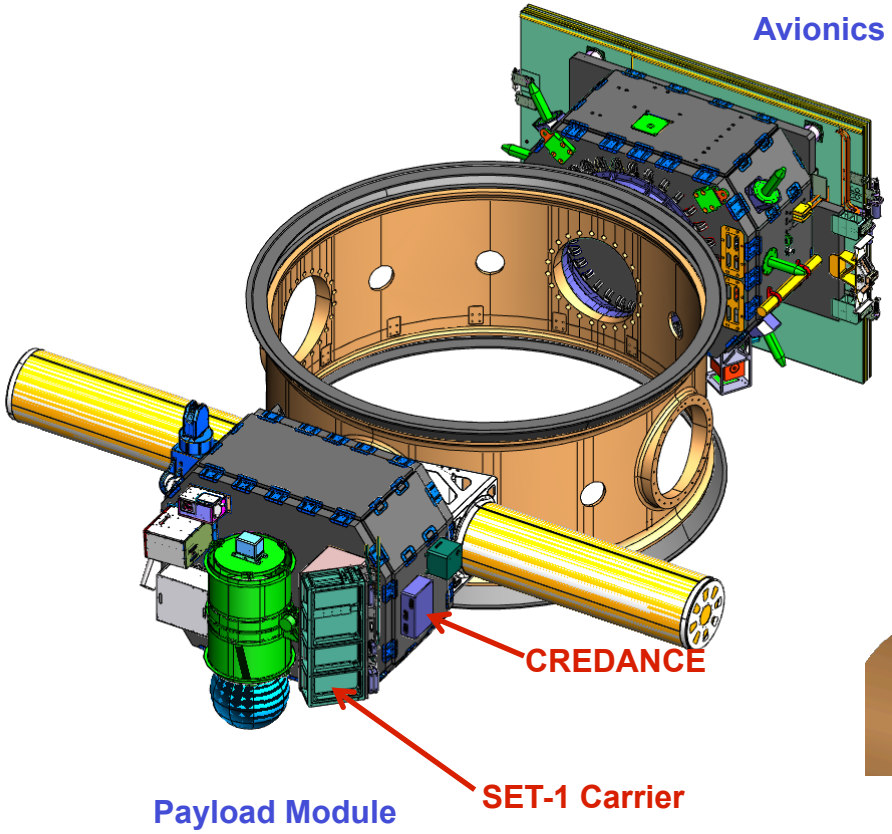


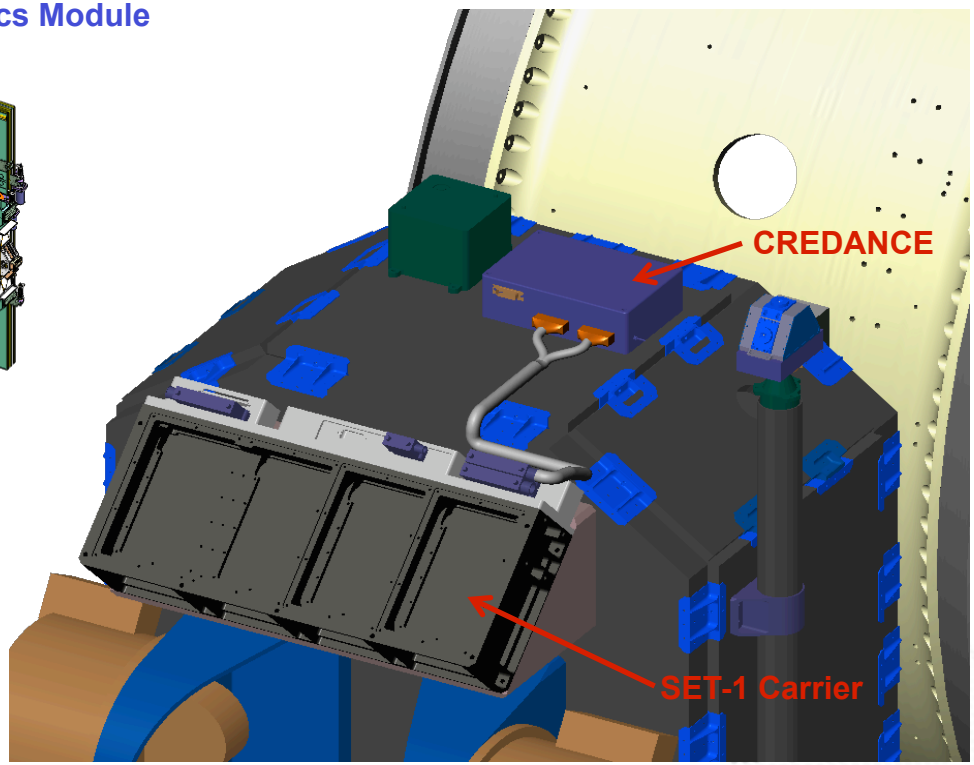
Space Environment Testbeds (NASA) (electronics effects)

SET-1 on DSX

SET-1 is one of nine payloads on DSX

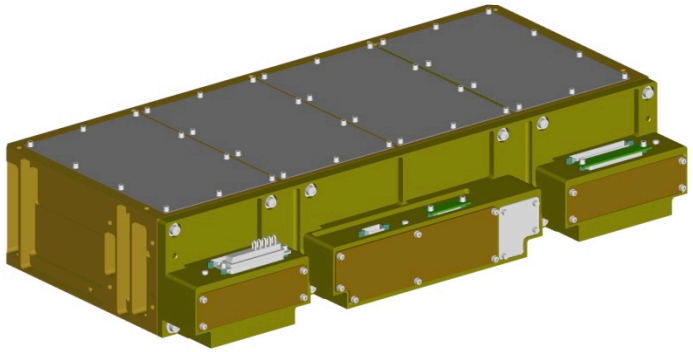
Stowed DSX





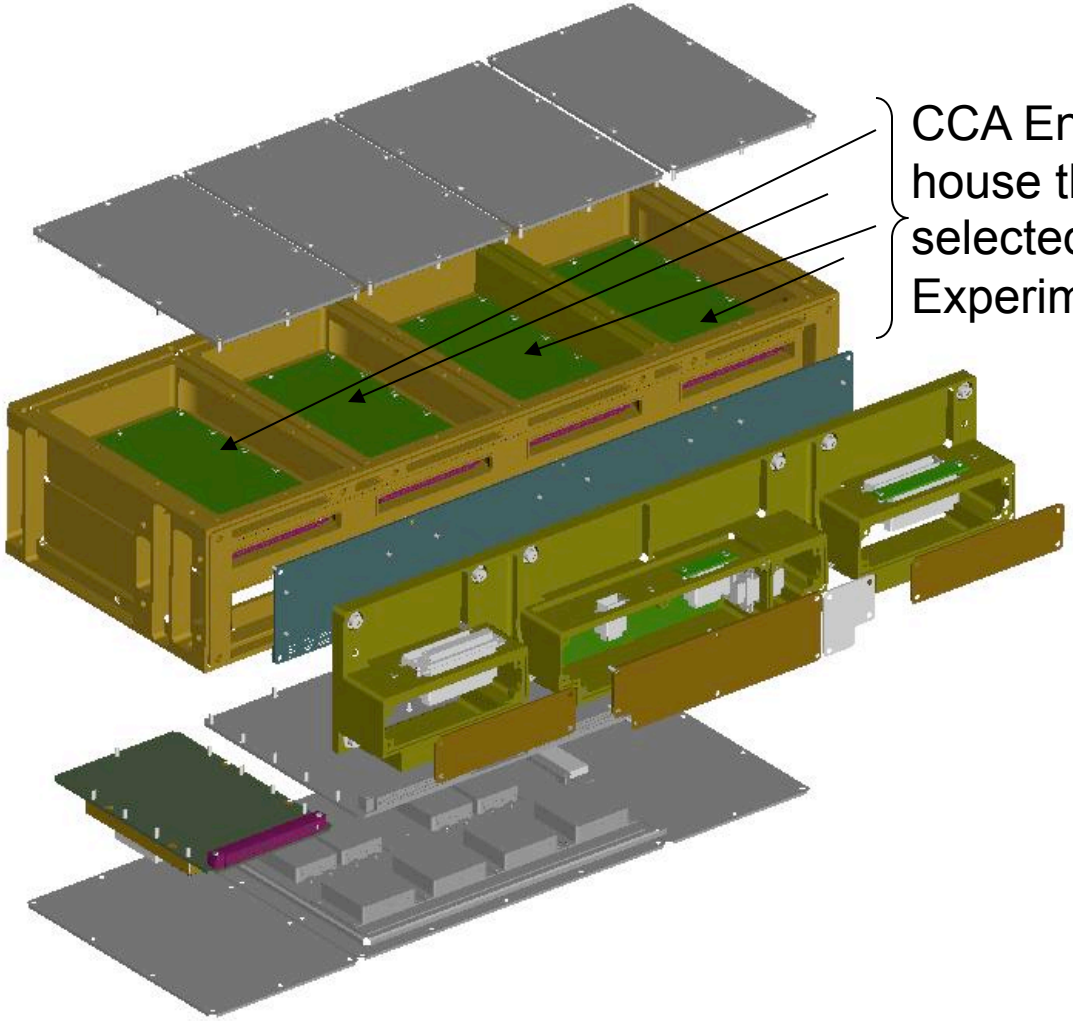
SET-1 Central Carrier Assembly (CCA)

- The SET-1 CCA design requirements:
  - –Provide a common interface to experiments (CREDANCE, DIME1, DIME2, ELDRS, COTS-2)
  - –Provides a negotiated interface to DSX Spacecraft

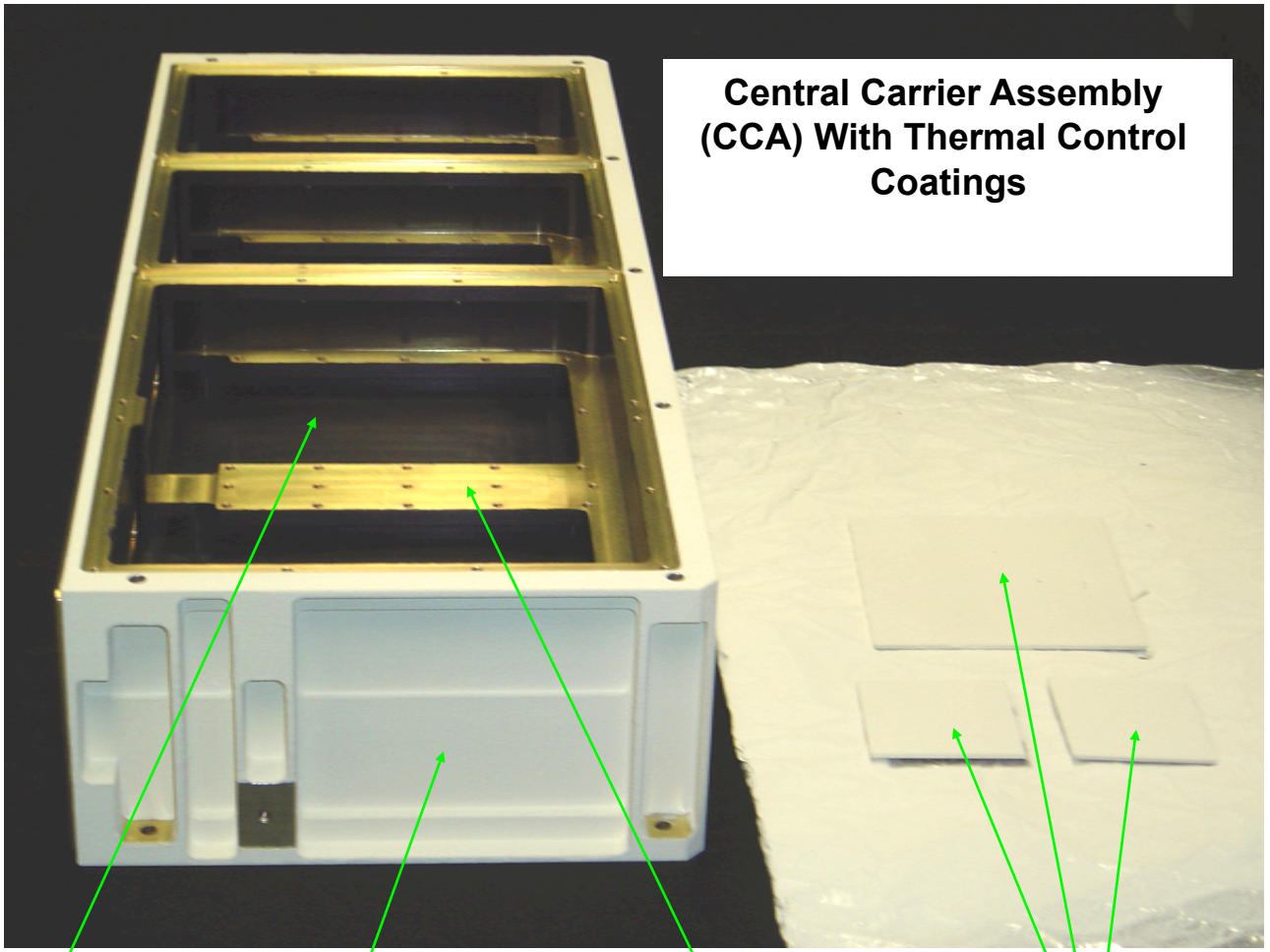


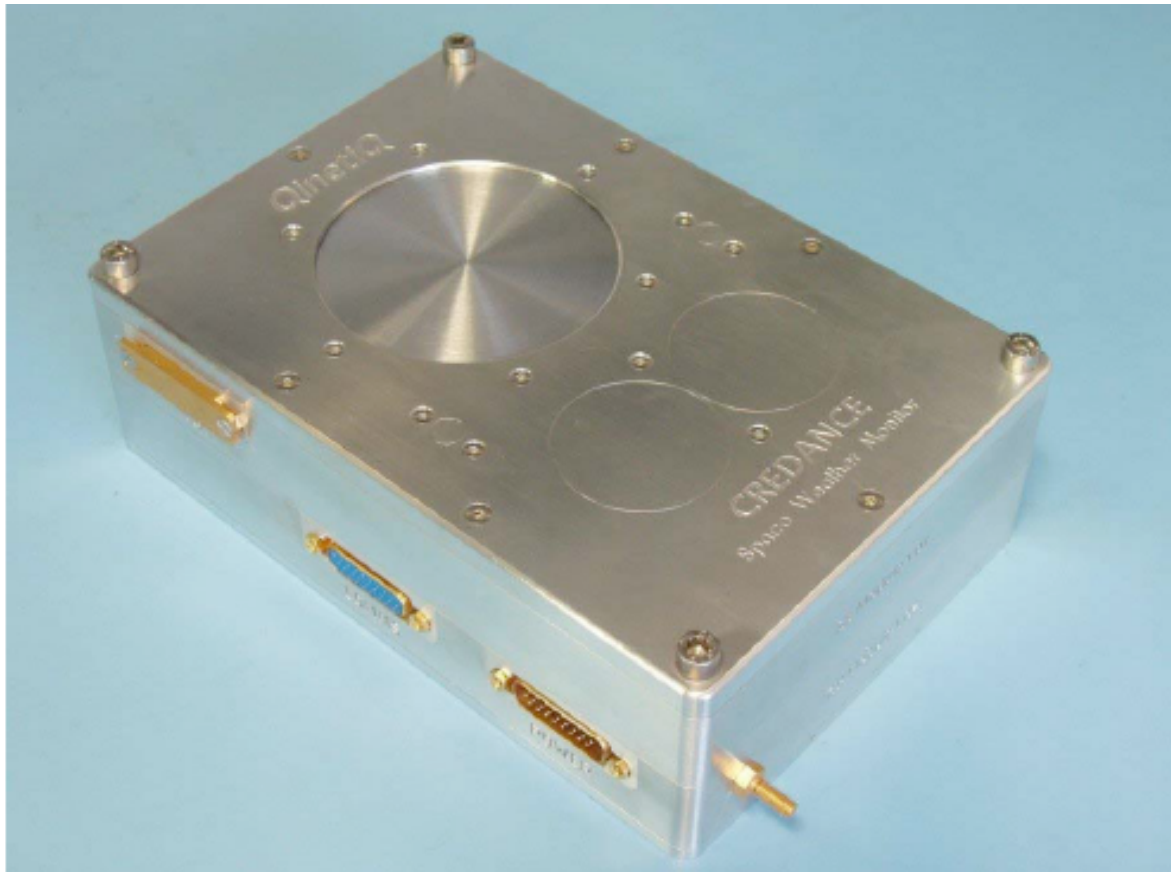
Single CCA Horizontal Configuration
(100 mil covers & external box I/F)

CCA Enclosure – Exploded View

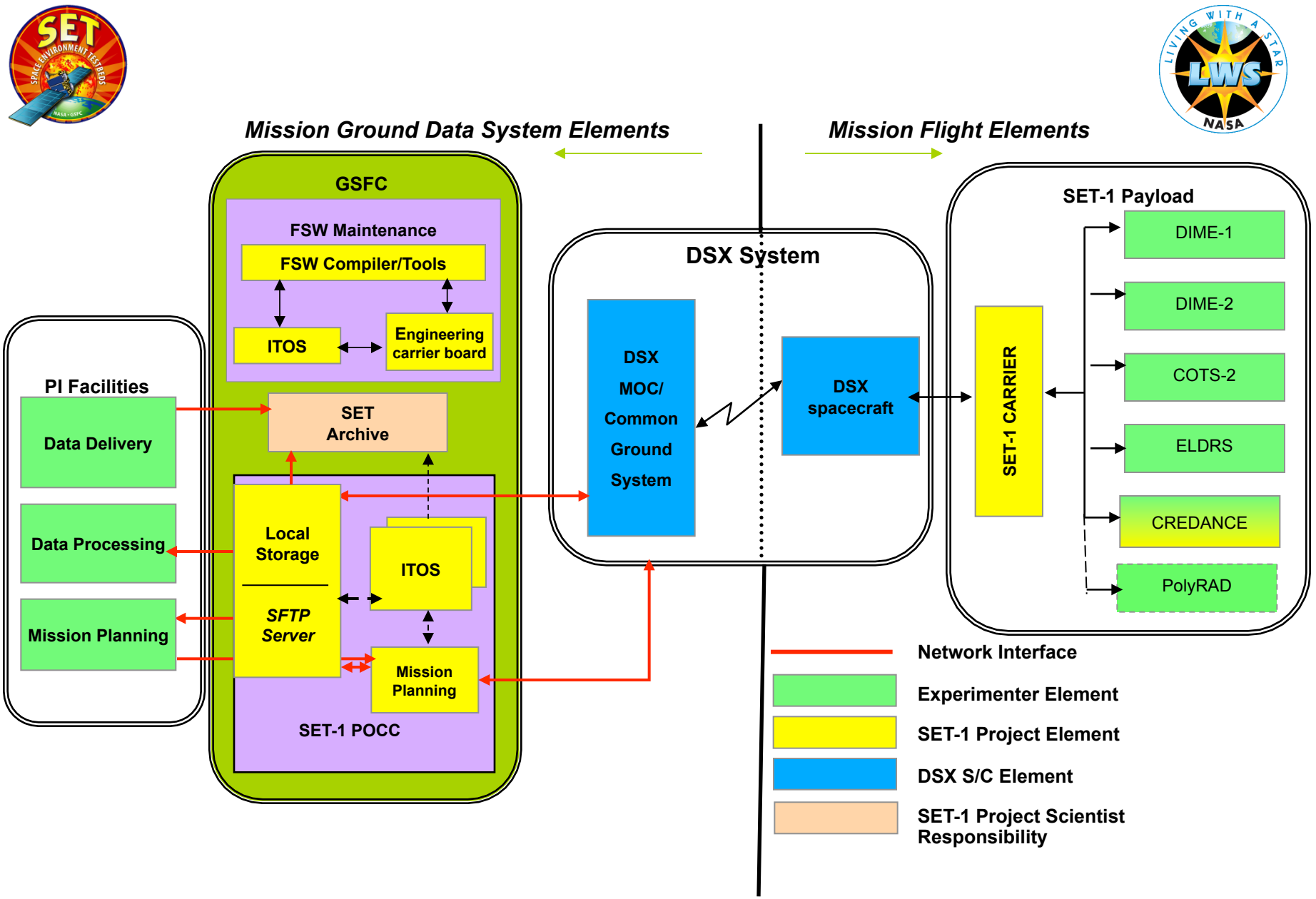


CCA Enclosures house the four selected 3U Experiment boards


Central Carrier Assembly (CCA) With Thermal Control Coatings
Black Anodize
NS43G Conductive White Paint
6U Bay Divider Interface (Iridite)
Paint Coupons for α_S, ε_N Measurements



CREDANCE space weather monitor as delivered


Mission Ground Data System Elements
Mission Flight Elements
GSFC
FSW Maintenance
FSW Compiler/Tools
ITOS
Engineering carrier board
SET Archive
Local Storage
SFTP Server
ITOS
Mission Planning
SET-1 POCC
PI Facilities
Data Delivery
Data Processing
Mission Planning
DSX System
DSX MOC/ Common Ground System
DSX spacecraft
SET-1 Payload
SET-1 CARRIER
DIME-1
DIME-2
COTS-2
ELDRS
CREDANCE
PolyRAD
Network Interface
Experimenter Element
SET-1 Project Element
DSX S/C Element
SET-1 Project Scientist Responsibility