Total and Spectral solar Irradiance Sensor (TSIS)

Project Status

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TSIS Project Manager

https://www.nasa.gov/goddard/tsis-1
https://sunclimate.gsfc.nasa.gov
TSIS-1 Project Overview

**Project Description**
- Current status: TSIS-1 on International Space Station (ISS)
  - Launched December 15, 2017
  - Express Logistics Carrier 3, position 5
  - SpaceX Commercial Resupply Service launch
  - Robotic installation/de-installation at end of life
- Category 3, Class C

**Science Objective**
To maintain continuity of the total solar irradiance (TSI) and spectral solar irradiance (SSI) for climate research

**Instruments**
- Total Irradiance Monitor (TIM)
- Spectral Irradiance Monitor (SIM)

**Ground Segment**
- Science Operations Center and TSIS Science Data System at LASP
- Goddard Earth Science Data and Information Services Center (GES DISC)
- ISS Payload Operations Integration Center

**Partners**
- **ISS program**
- **Prime Contractor**
  Laboratory for Atmospheric and Space Physics (LASP), University of Colorado (CU)
TSIS-1 December 2017 Highlights

Launch
Dec. 15

In the Dragon trunk Dec. 15

On the robotic temporary platform (EOTP) Dec. 28

Deployed on ISS ELC 3 Dec. 31
TSIS Architecture

Payload communication through Payload Operations Integration Center (POIC) at Huntsville Operations Services Center

TSOC = TSIS Science Operations Center
TSDS = TSIS Science Data System
GES DISC = Goddard Earth Science Data and Information Services Center
Road from ISS Decision to TSIS-1 Operations

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TSIS-1 Integration and Test Summary

Legend / Process Owner

- Component (LASP)
- TSIS System (LASP)
- ISS Testing (LASP/KSC)
- Launch (SpaceX)

- 4 Environmental Tests
- 2 Comprehensive Performance Tests
- 29 Limited Performance Tests
- ~50 Special Performance Tests
- End-to-End Tests
- Simulations

March 21, 2018
TSIS-1 Project Status

- TSIS on orbit and 90-day commissioning activities complete
- As expected, ISS is a very dynamic environment and the TSIS team is learning more about it
  - Solar array Beta extreme (~26 days per year estimated)
  - Visiting vehicles, Extra Vehicular Activity (EVA) operations, payload maintenance, ISS re-boost, etc. (~17 days per year estimated)
- TSIS-1 transitioned to Earth Science Mission Operations project after successful Post Launch Assessment Review
  - 5 year mission with potential 2-year extension
  - Expect data available at Goddard Earth Science Data and Information Services Center (GES DISC) within 6 months
• NASA initiated TSIS-2 pre-formulation work in April 2017
  – Two study contracts with LASP in progress to study implementation approaches for TSIS-2

• Per FY2019 President’s Budget, NASA is planning to implement TSIS-2 as a CubeSat mission
  – Takes advantage of compact SIM/TIM technology development efforts funded by NASA’s Earth Science Technology Office
  – Project will begin formulation in calendar year 2018