

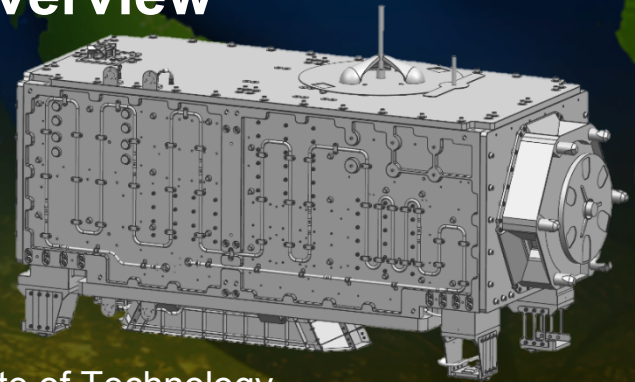


ECOsysteM Spaceborne Thermal Radiometer Experiment on Space Station



ECOSTRESS Project Overview

Wes Schmitgal
May 15, 2017



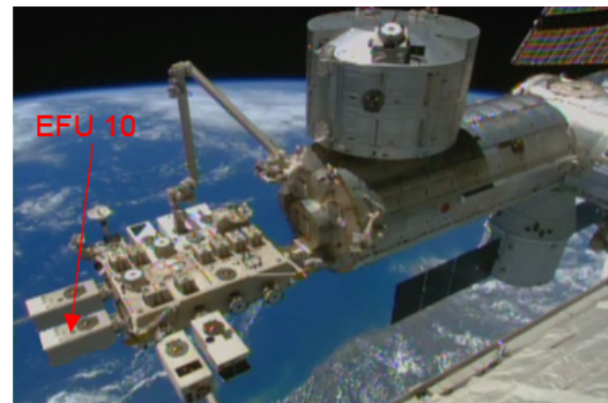
Jet Propulsion Laboratory, California Institute of Technology

Project Overview

ECOSTRESS is an Earth Venture Instrument-2 on the ISS

Overview:

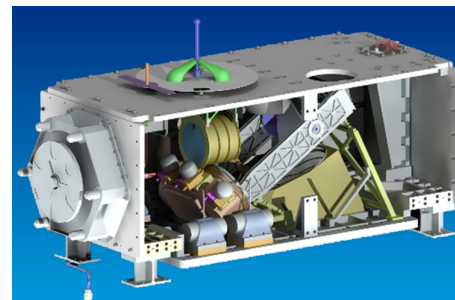
- Cost-Capped, \$29.9M Cat 3/Risk class D per NPR 7120.5E/ NPR 8705.4
 - Type II project with tailoring of the JPL flight practices, single string with limited redundancy using COTS hardware
- August 2017 planned payload “delivery to storage” date with an April 2018 planned launch date
- Launch on SpX-15 and deployed on the ISS on JEM-EFU 10
- Baseline operations: 1 year after 30 days on-orbit checkout



ISS JEM-EF

Timeline:

Cal Year	2014	2015	2016	2017	2018	2019	
KDP		B	C ACC		D/E	F	
Phase		A	B	C	D	E	F
Milestone	ATP Oct 1	SRR/ MDR	PDR	CDR	TRR CoFR HRCR SR	PSR ORR	Launch



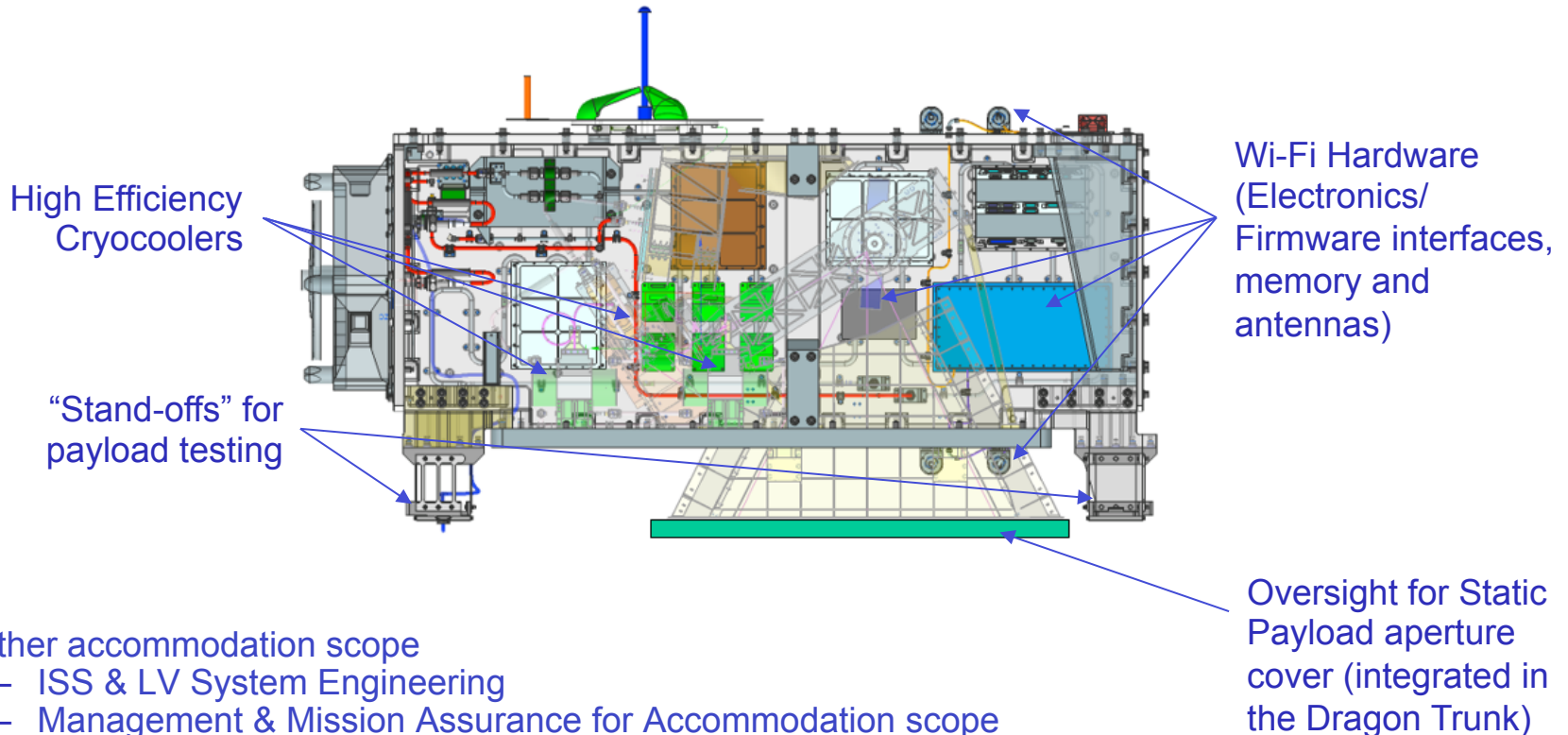
ECOSTRESS



Falcon-9

Cost Capped vs Accommodation Scope

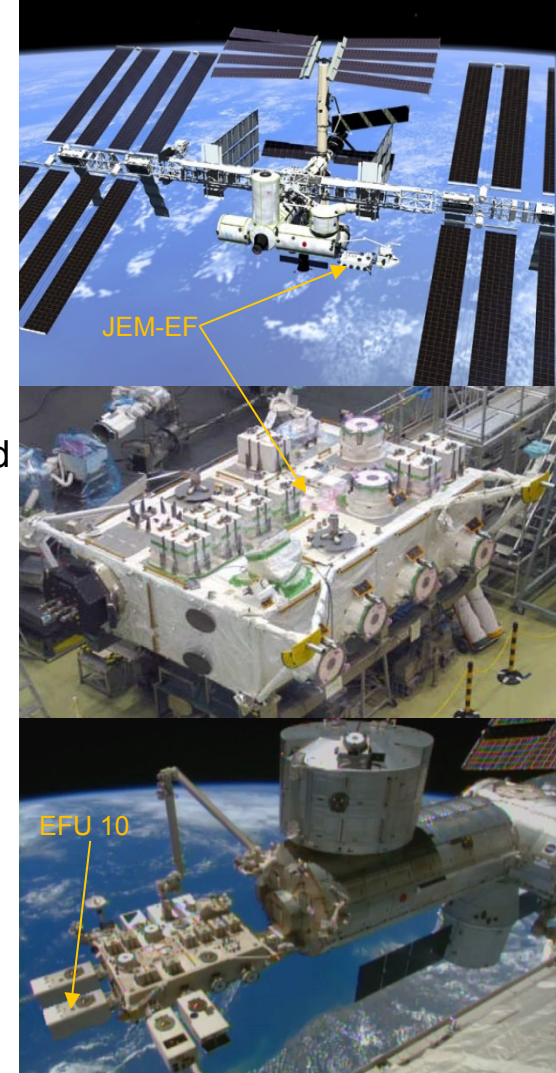
- Cost-capped project includes everything from Phase A through Phase E of the science investigation except the following identified items:



- Other accommodation scope
 - ISS & LV System Engineering
 - Management & Mission Assurance for Accommodation scope
 - ATLO Phase
 - DAAC Interface & Archival
 - Phase C gap and storage

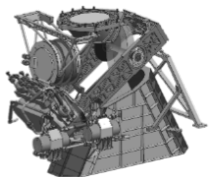
Interfaces and Provided Hardware

- ECOSTRESS will launch in Dragon Trunk of a Falcon 9 launch vehicle
 - Receive survival power while stowed in trunk
 - Will use a standard JEM-EF payload vehicle interface attachment
- Robotically installed on JEM-EF
 - Will use both Canadian arm and transfer to Japanese arm
 - No planned EVA (same as performed on CATS)
- ECOSTRESS will be hosted on the ISS's Japanese Experimental Module - Exposed Facility Unit 10 (JEM-EFU)
 - Will use the fluid loop for removing payload heat, 1553 for command and, receive power
- ISS External Wireless Communications (EWC) expansion program to provide wireless science data transfer between ECOSTRESS and ISS by May 2017
 - The ISS will provide a delay tolerant network (DTN) and downlink the data through TDRSS
- The LP DAAC will be used for science and MSFC Payload Operations
- GFE and GSE per PIA
 - JEM-EF payload hardware; PIU, FRGF and H-fixture
 - Wi-Fi hardware; Moxa card
 - LV interface hardware; pFSE
 - GSE; RAPTR, WAP and PIU Adaptor

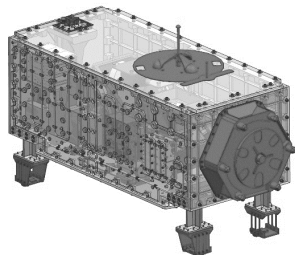


Mission Overview

Radiometer Instrument



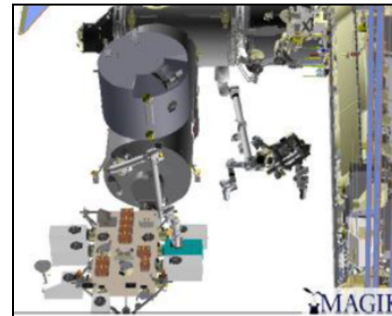
ECOSTRESS Payload



Dragon-Trunk Falcon-9 LV

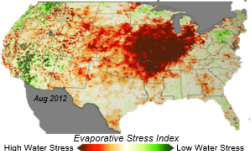


Installation on JEM-EF

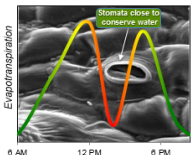


Science Data Processing and Archive

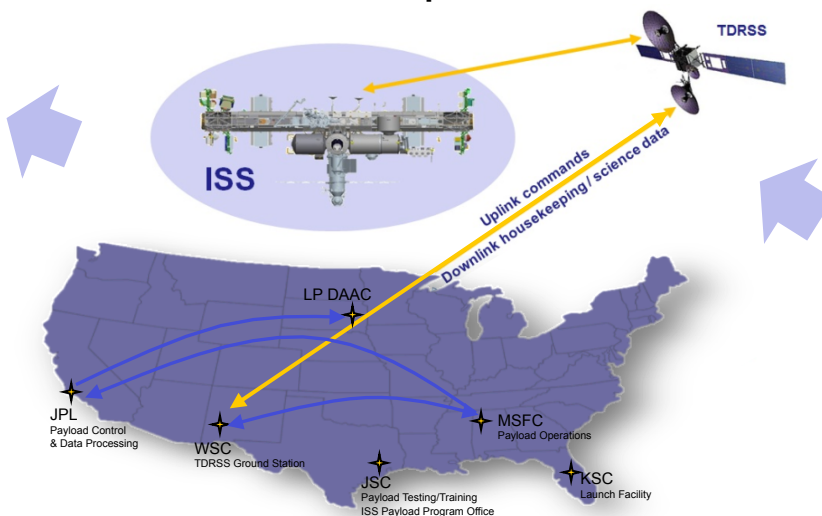
Water Stress Threatens Ecosystem Productivity



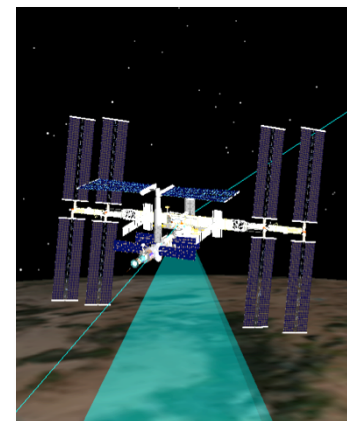
Water Stress Drives Plant Behavior



MOS and Ground and Space Network



Data Collection



EOL Payload disposal via Dragon Trunk re-entry





Decommissioning, Disposal Plans and Re-Entry Debris Assessment



- ECOSTRESS Payload disposal will be via Dragon trunk jettison prior to Dragon capsule re-entry
 - The Flight Support Equipment (FSE) separation mechanism will be used for interface during disposal
- The reentry vehicle is targeted in remote ocean areas with high reliability (Controlled reentry) and the risks from debris that survive reentry has been pre-assessed as part of the overall risk for the returning vehicle
- JSC is responsible for ensuring safe disposal plan
 - JPL will supply materials information for orbital debris
- JPL has filed ECLASS (Environmental Compliance Launch Approval Status System) required documentation





Major Milestones

<u>Item</u>	<u>Date</u>
– ETRR	April 2017*
– Safety Phase III Review	June 2017
– HRCR/CoFR*	Aug 2017
– Payload Completion	Aug 2017
– Storage Review	Aug 2017*
– Delivery to Storage	Sep 2017
– Pre-Ship Review	Dec 2017*
– ORR	Dec 2017
– KDP-D/E	Dec 2017
– End of storage period	Dec 2017
– Phase D Start	Jan 2018
– Ship to launch site	Jan 2018
– Launch	Apr 2018
– Complete IOC / begin Ops	May 2018
– Phase E Start	May 2018
– Phase F Start	May 2019

**center-led review*



Project Schedule

