STS-135 / ULF-7
Mission Overview

03/31/11

LOCKHEED MARTIN

Name Brian Jones
Title Ground Controller

STS-135/ULF-7 *Atlantis(OV-104)*

Crew

Commander	Christopher Ferguson
Pilot	Douglas Hurley
MS-1	Sandra Magnus
MS-2	Rex Walheim

Flight Profile

Launch Date:	June 28, 2011
Launch Time:	3:40:17 PM EDT
Window:	10 Minutes
Orbit:	51.6° 122 nm
Mission Duration:	12+0+2

Ground Controllers

SSP Lead	*Brian Jones*
Ascent/Entry	*Bill Foster/ Aaron Frith*
Orbit 1	*Brian Jones/ Joe Morris*
Orbit 2	*Johnnie Brothers/ Ubaldo Garcia*
Orbit 3	*Mike Marsh/ Luke Greer*

Flight Directors

SSP Lead	*Kwatsi Alibaruho*
Ascent	*Richard Jones*
Entry	*Anthony Ceccacci*
ISS Lead	*Chris Edelen*

Mission Objectives:

- Resupply & equipment transfer to ISS using MPLM-2.
- Delivery of the Robotics Refueling Mission.
- Return of downmass payloads.

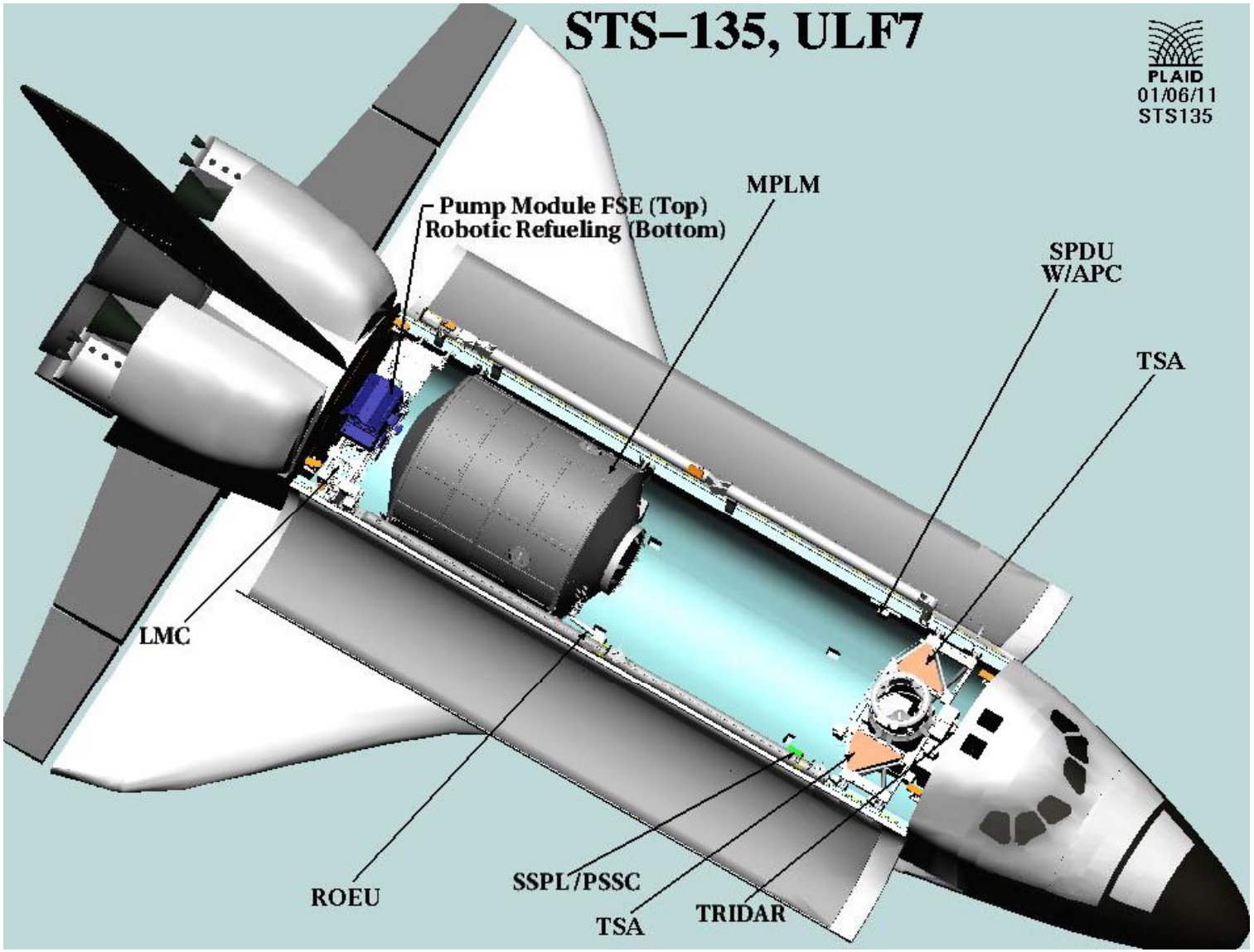
Milestones:

- 33rd mission of Atlantis.
- 37th shuttle mission to ISS.
- 166th NASA manned space flight.
- Last planned flight of the shuttle program.

STS-135 Mission Timeline Overview

- FD01 Launch
- FD02 TPS Survey
- FD03 Rndz/Dock
- FD04 MPLM Install/ MPLM Hatch Open
- FD05 MPLM Transfer/ EVA (ISS EV Crew)
- FD06 MPLM Transfer/Focused Inspection (If needed)
- FD07 MPLM Transfer
- FD08 MPLM Transfer
- FD09 MPLM Transfer
- FD10 Middeck Transfer/MPLM Uninstall/ ISS Hatch Closure
- FD11 Undock/Flyaround/Late Inspection
- FD12 Cabin Stow/ FCS Checkout/ L-1 Day Comm Checks
- FD13 De-orbit and Landing

Payload Bay Overview



Cargo Transfer

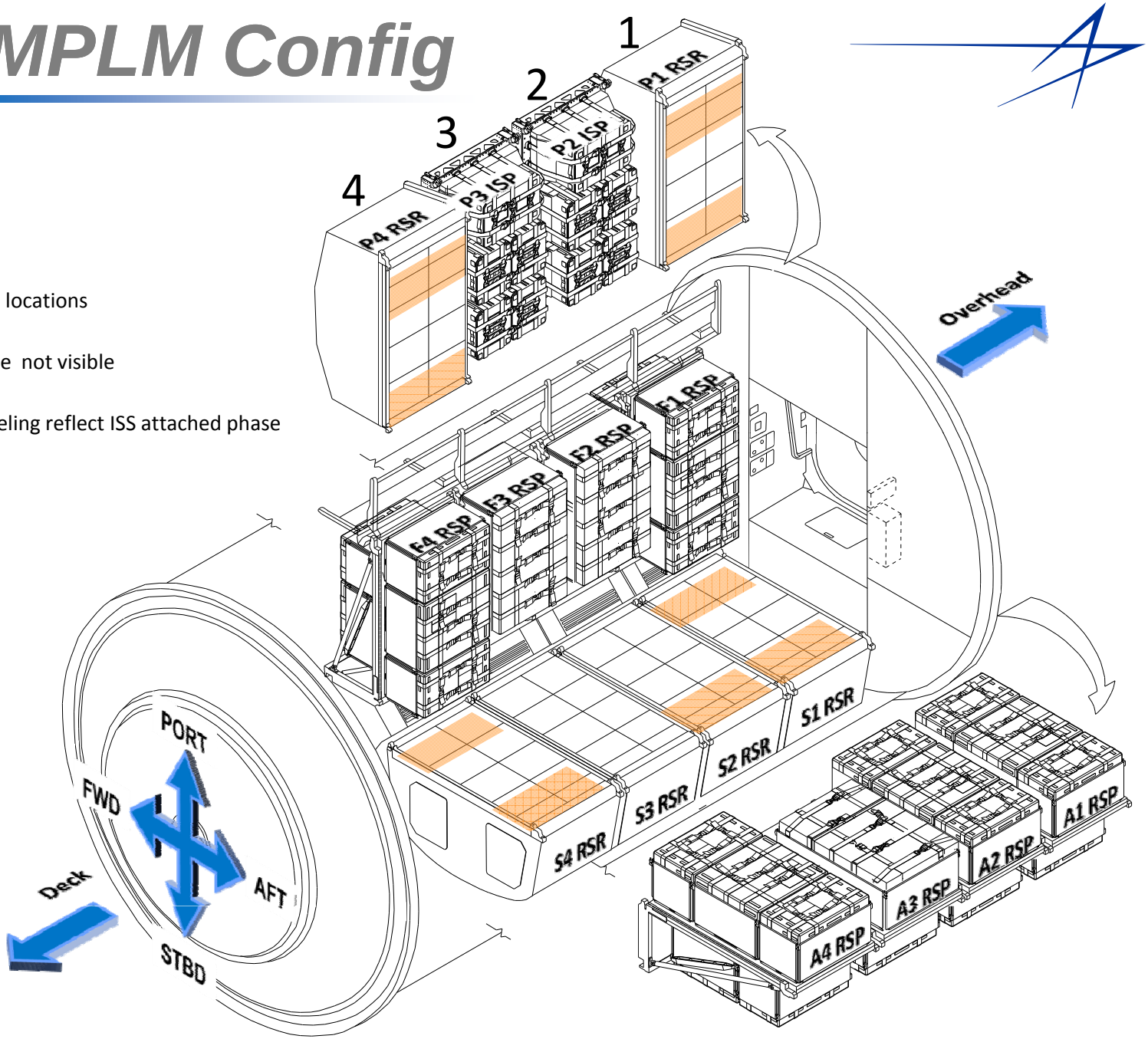
- **Transfer Time = 175 hours total**
- **Middeck - 30 hrs**
  - **If LON, middeck offload will reduce cargo transfer time to around 20 hrs**
- **Multipurpose Logistics Module (MPLM) - 145 hrs**
  - **8 Resupply Stowage Platforms (RSPs)**
    - Three to five M-bags strapped to front/back of each platform
      - Contents of M-bags transfer to ISS (CTBs or individual items)
      - M-bags remain on RSP
      - RSP can pivot to allow access to bags in the rear if necessary
    - M-bags packing configuration is CG sensitive
  - **6 Resupply Stowage Racks (RSRs)**
    - Hard racks containing 10 volumes of different sizes
    - CG is more flexible than RSPs
  - **2 Integrated Stowage Platform (ISPs)**
    - Hard platform similar to RSP, but bags are strapped only to front
    - Accommodates up to 11 CTBE
  - **Includes aft end cone stowage**
    - Twelve 1 CTBE bags

MPLM Config

- blocked RSR locations

Aft End Cone stowage not visible

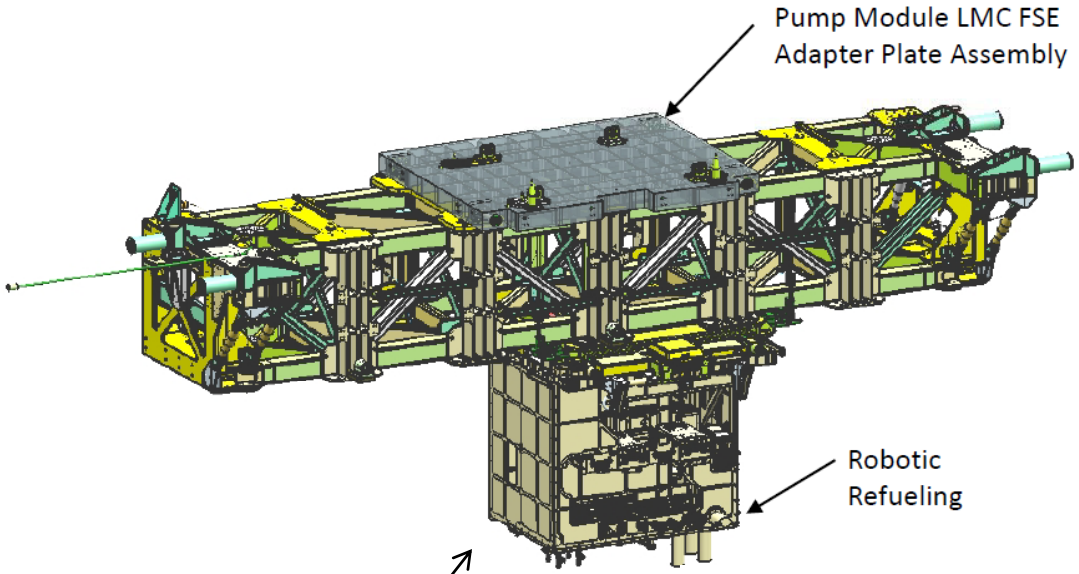
Orientations and labeling reflect ISS attached phase



Cargo Objectives

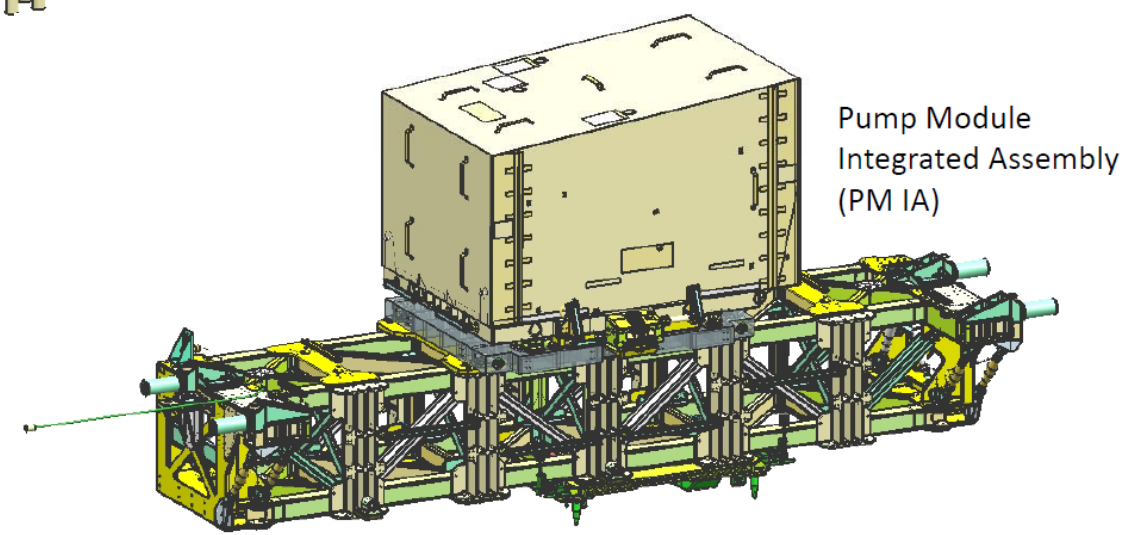
- **LMC – Lightweight Multipurpose Experiment Support Structure (MPESS) Carrier.**
  - Crossbay bridge with FRAM sites on top & bottom for delivery & return of ISS ORU's
  - PM – Pump Module
    - Return of the failed ISS Loop A ETCS NH3 pump package for failure analysis
    - Mounted on the top side of LMC
  - Robotic Refueling
    - Delivery of a satellite servicing technology demonstration payload
    - Mounted on the bottom side of LMC
- **PSSC – Pico Satellite Solar Cell.**
  - Bay 3 stbd sidewall spring ejectable small satellite
  - Satellite employs small rocket motors to alter its orbit for the purpose of testing the tracking capabilities of ground-based radars.
- **TriDAR (TriDAR Automated Rendezvous & Docking (AR&D) Sensor**
- **Payloads of Opportunity - SEITE, SIMPLEX, RAMBO-2, MAUI**
  - Passive ground and space-based observations of shuttle jet activity
  - Potential requests for dedicated burns if supported by geometry, crew time, and propellant availability.
- **Middeck**
  - Powered - list includes GLACIER (freezer) swap, two CGBA (Micro4 & NLP-Vaccine 17, cell growth), STL (cell growth), three AEM (mice)
  - Unpowered – BRIC/SyNRGE, NLP-Cells 7 (cell growth) , two Cube Lab Modules 7 & 8 (biological), Double Cold Bag (sample return), Forward Osmsis Bag (fluids), Sleep Short (watches,survey), Integrated Immune (swabs), Myco (skin cells), Reaction Self Test.

LMC Configuration

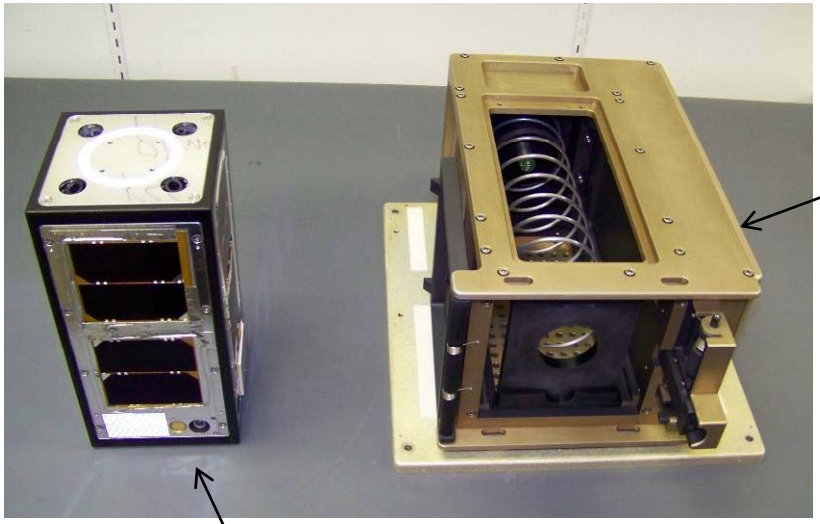


Ascent Config
(front view)

Return Config
(front view)



PSSC Hardware



Deployer

Mounted to PLB sidewall

Satellite

EVA 1 Overview

- **Pump Module**
  - Removed from ESP-2
  - Transferred to PLB by EV on SSRMS (based on Node 2)
  - Installed on top side of LMC
- **Robotic Refueling**
  - Removed from underside of LMC
  - Transferred by EV on SSRMS (based on Node 2)
  - Intalled on SPDM EOTP (planned location on Lab)
- **EVA Get Aheads (TBD)**
  - MISSE 8 ORMatE-III install on ExPA

EVA 1	00:00	01:00	02:00	03:00	04:00	05:00	06:00				
EV1 (Fs)	Egress/Setup	Setup COLT install	Remove PM FRAM From ESP-2	Xlate to PLB	Install PM FRAM on LMC	Remove R2D2 FRAM From LMC	Transfer R2D2 FRAM to EOTP	Iinstall R2D2 FRAM on EOTP	SSRMS Cleanup	Get-Ahead / Contingency	Cleanup/Ingress
EV2 (Ga)	Egress/Setup	SSRMS Setup	Remove PM FRAM From ESP-2	Transfer PM FRAM to PLB	Install PM FRAM on LMC	Remove R2D2 FRAM From LMC	Xlate to Lab	Install R2D2 FRAM on EOTP	TBD		Cleanup/Ingress