



**Space Operations
Mission Directorate
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Key Challenges



- Completing assembly of the International Space Station
- Utilizing, operating and sustaining the International Space Station
- Commercial space launch acquisition; mixed fleet and emerging players
- Future space communications architecture; beginning pre-formulation of TDRS replenishment strategy; manage upgrade of the deep space network
- Transition from Shuttle to future space transportation systems and its impacts



Shuttle Missions in 2006

STS-121 July 4-17



Mission Highlights:

- First flight on an External Tank without a protuberance air load (PAL) ramp
- First three-person crew since May 2003
- First long-duration mission for an ESA astronaut aboard the ISS
- Delivery of over 11,000 lbs of cargo, including the U.S. Oxygen Generation System (OGS)
- Three spacewalks totaling 21.5 hours

STS-115 Sep. 9-21



Mission Highlights:

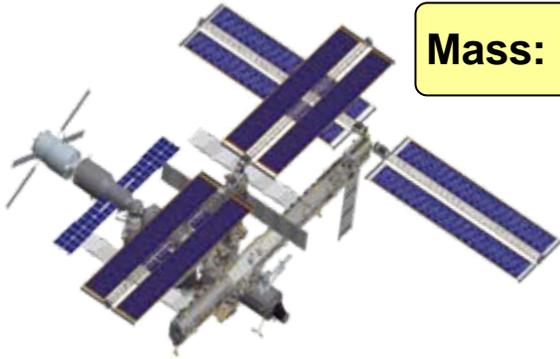
- Launch and installation of the P3/P4 truss segment to the ISS, and deployment of solar arrays
- First ISS assembly mission since STS-113 (Nov '02)
- Three spacewalks totaling 19.5 hours:

ISS: ~55% Assembly Completed

Remaining US elements flight-ready at KSC

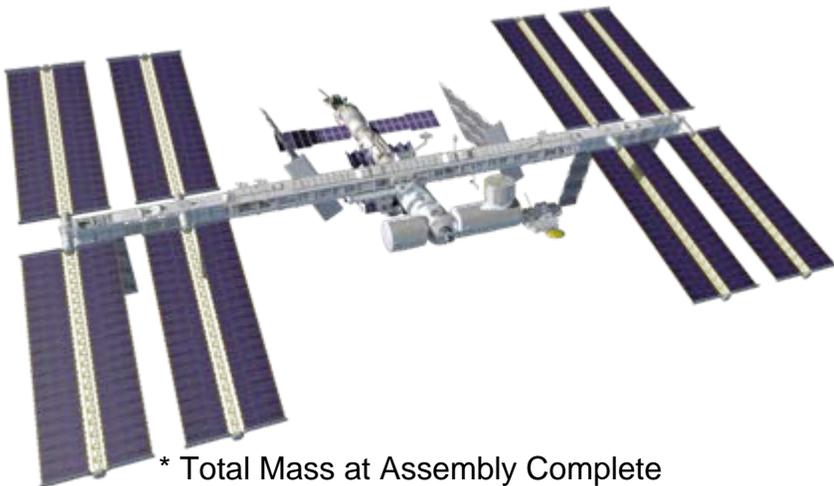


On Orbit Today (Post 12A)



Mass: ~213 MT

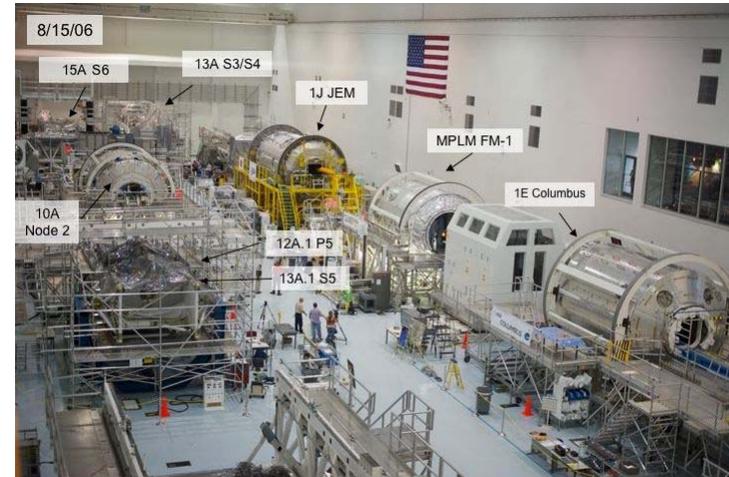
Mass: ~390 MT*
at Assembly Complete



* Total Mass at Assembly Complete includes Logistics and Outfitting flights.

8 Assemblies In-Process at KSC

Mass: ~84 MT



6 Assemblies In-Process at Partner Sites

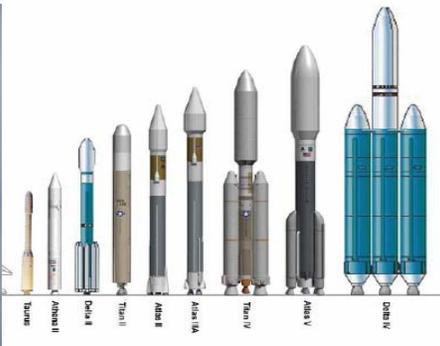
Mass: ~68 MT

The amount of ISS Extra Vehicular Activities will exceed that of all other programs combined, totaling almost 700 hours

Launch Services Program & Rocket Propulsion Test



- 4 of 4 successful launches in 2006
- Modified the primary launch service contract mechanism to allow emerging launch providers to be considered for NASA missions
- Develop Propulsion Test Facility Management Plan
 - Evaluate what facilities should be maintained/consolidated/closed/built to provide the required propulsion test capabilities
- Increase DoD/NASA collaboration & cross utilization
- Increase technical collaboration between RPT Centers
 - Cross-training to develop workforce
 - Cross- utilization of equipment and workforce
 - Common standards and specifications
 - Increase understanding of facility maintenance & operational requirements





Space Communications

- NASA's Space Communication Architecture Working Group completed a space communication architecture that will provide communication and navigation services to all NASA science and exploration missions through the 2030 time frame.
 - Important features: interoperability, scalability, adaptability, reliability, and minimum user burden
 - Pre-coordination of spectrum requirements as a basic prerequisite
 - Opening discussions with other space agencies with Lunar and/or Martian missions planned in the 2009 – 2030 timeframe





Implementing the Vision

**Space Exploration Conference
2006**

Back up



NASA Strategic Plan: SOMD Goals



- **Fly the Shuttle as safely as possible until its retirement, not later than 2010**
- **Complete the ISS in a manner consistent with NASA's International Partner commitments and the needs of human exploration**
- Encourage the pursuit of appropriate partnerships with the emerging commercial space sector
 - **Develop and demonstrate a means for NASA to purchase launch services from emerging launch providers**
- Establish a lunar return program having the maximum possible utility for later missions to Mars and other destinations
 - **Implement the space communications and navigation architecture responsive to Science and Exploration mission requirements**