



Commercial Resupply Services: Orbital ATK Return to Flight Status

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Orbital and ISS Cargo Resupply



- In 2005, NASA was charged with the task of “stimulating commercial enterprise in space by asking American entrepreneurs to provide innovative, cost-effective commercial cargo and crew transportation services to the International Space Station”
- **From 2006 to 2013, under the Commercial Orbital Transportation Services (COTS) program, NASA acted as both an investor and advisor**
 - Under this Program and in less than 5 years, Orbital ATK developed and flew the “Antares” medium class rocket and the “Cygnus” advanced maneuvering space vehicle, designed to meet the stringent safety requirements for International Space Station operations.
- **Commercial Services were then provided under NASA’s follow-on Commercial Resupply Services (CRS) contract**



Cygnus Delivers for NASA



- **Demo Mission – Fully Successful**
 - **700kg Delivered**
 - **1000kg Taken Away**
- **Orb-1 Mission – Fully Successful**
 - **1465kg Delivered**
 - **1461kg Taken Away**
- **Orb-2 Mission – Fully Successful**
 - **1664kg Delivered**
 - **1650kg Taken Away**
- **Orb-3 Mission – Loss of Mission**
 - **2290kg Was Manifested**

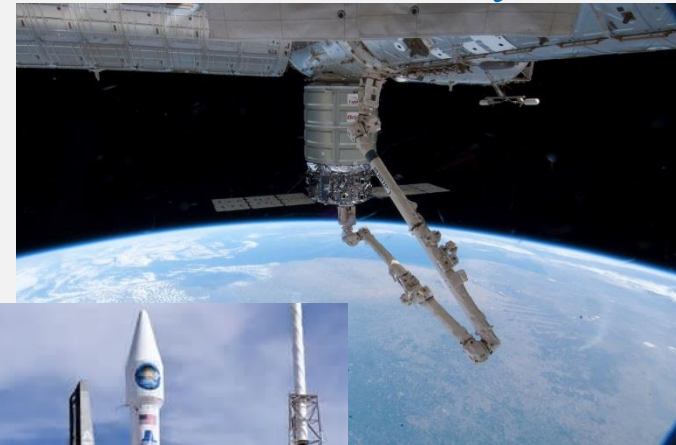


In three missions, Cygnus has delivered ~8400 lbs of pressurized cargo

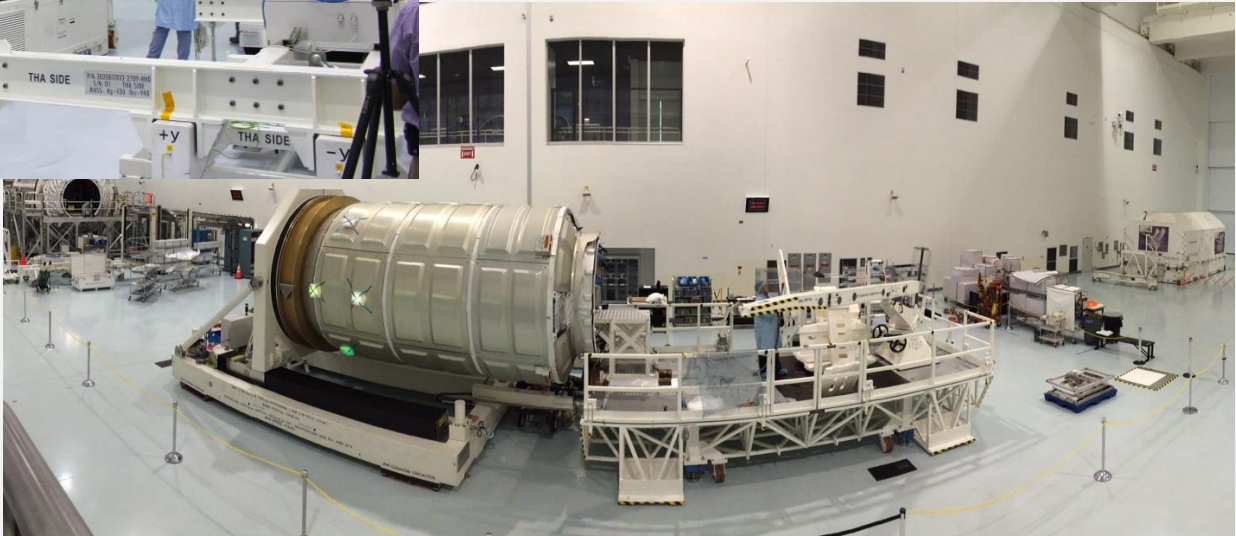
CRS Return To Flight Planning



- Orbital ATK Is Implementing a Return to Flight Plan That Delivers Cargo to the ISS by December 2015
- The Orbital ATK Plan:
 - Return Antares to Flight in early 2016 Using New, In-production RD-181 Engines
 - Purchase Launch Services from Atlas V to Launch Cygnus during the Antares Down-time
- Cygnus was designed to be compatible with multiple launch vehicles
- Integration with Atlas V going very smoothly and scheduled to launch in early December 2015
- Antares is making great progress on its return to flight program
 - First flight engines are delivered and integrated onto LV
 - First mission planned for May 2016
- Updated Pressurized Cargo Module (PCM) configuration of internal structure allows for higher cargo loads
 - Approximately 3500 kg manifested on OA-4



OA-4 Preparations Underway – Pressurized Cargo Module at KSC



The OA-4 Service Module Arrives at KSC on October 15th

- Orbital is meeting all requirements under CRS-1 contract:
 - Deliver the Remaining Cargo Obligation on the Contract
 - Deliver that Cargo by the End of Calendar Year 2017
- Outline of the Plan:
 - Return Antares to Flight as Soon as Possible Using New, In-production RD-181 Engines
 - Purchase Atlas V Launch Services to Launch Cygnus During the Antares Down-time
 - Use the Increased Performance of the Purchased Launch Services and the Re-engined Antares to Deliver the Remaining CRS Contractual Cargo Mass in Only Four ISS Visits Instead of Five
- Cygnus is Compatible With the Atlas V LV with Minimal Changes to Cygnus
 - Increased Cargo Loading Efficiencies will Enable Cygnus to Take Advantage of the Increased Launch Vehicles' Lift Capabilities
- Orbital has the Experience and Resources to Support the Necessary Launch Vehicle Management and Launch Campaigns with all Candidate Providers

**Orbital ATK Will Be Ready to Restart Cargo Deliveries
to the ISS Later This Year**