National Aeronautics and
Space Administration

OVERVIEW

Orbital ATK CRS-9 Mission

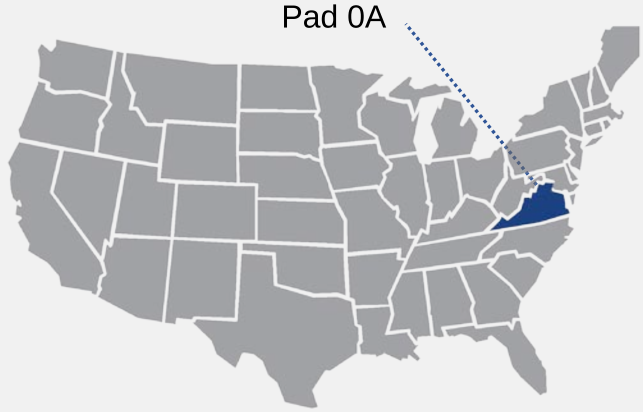
Orbital ATK's ninth contracted cargo resupply mission (CRS-9) with NASA to the International Space Station will deliver about 7,400 pounds of science and research, crew supplies and vehicle hardware to the orbital laboratory and its crew.

Launch is targeted for Sunday, May 20, 2018.

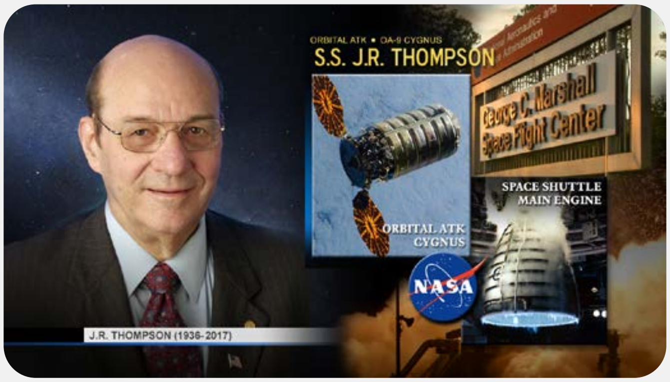
Launch Vehicle
Antares 230 Rocket

- Features RD-181 engines
- Increased performance and flexibility

Launch Site:
Wallops Flight Facility, Virginia
Pad 0A



S.S. J.R. Thompson



The Cygnus spacecraft for the OA-9 space station cargo resupply mission is named in honor of J.R. Thompson.

Cygnus Spacecraft

- Will deliver hardware and supplies to support dozens of science and research investigations
- Will spend over 7 weeks attached to the space station on the Unity module
- In July, will dispose of several tons of trash during destructive re-entry into Earth's atmosphere

For more information, visit www.nasa.gov/orbitalatk

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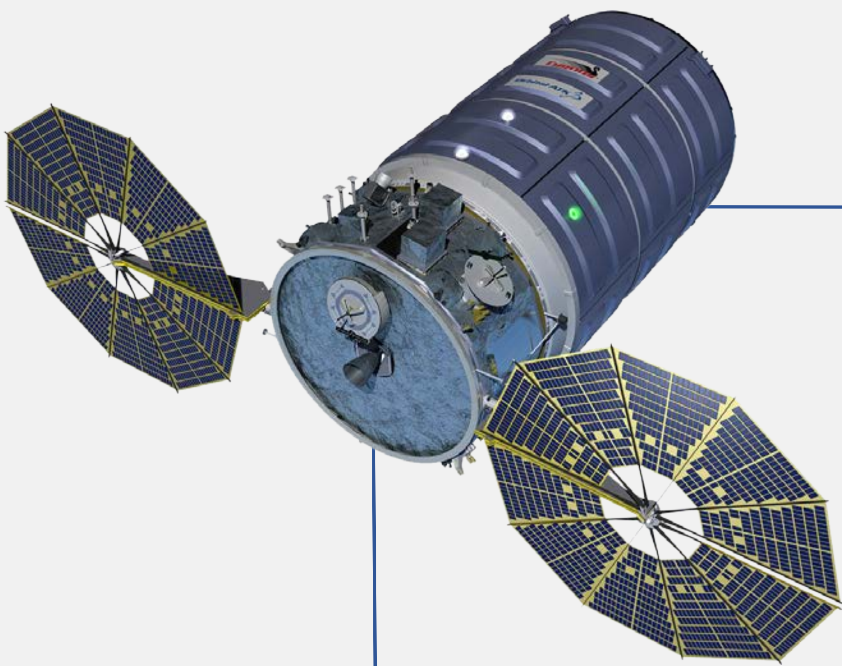
CARGO

Orbital ATK CRS-9 Mission



Crew Supplies
1788 lbs. / 811 kg

Science Investigations
2,251 lbs. / 1,021 kg

Spacewalk Equipment
291 lbs. / 132 kg

Vehicle Hardware
2,626 lbs. / 1,191 kg

Computer Resources
220 lbs. / 100 kg

Russian Hardware
29 lbs. / 13 kg

NanoRacks CubeSat Deployer
181 lbs. / 82 kg

Total Cargo:	**7,386 lbs. / 3,350 kg**
Total Pressurized Cargo with Packaging:	**7,205 lbs. / 3,268 kg**
Unpressurized Cargo:	**181 lbs. / 82 kg**

HARDWARE

Orbital ATK CRS-9 Mission

Highlights

Optical Coherence Tomography (OCT) 2 hardware: Used for eye exams to assess Spaceflight Associated Neuro-Ocular Syndrome (SANS), one of the top medical risks of human spaceflight.

External High Definition Camera (EHDC) Assembly: HD cameras and components that will be installed on the forward end of the space station on a spacewalk in June.

Pressure Management Device (Air Save Pump): Transfers gas to be stored on the space station rather than overboard during depressurization operations (e.g. a vehicle berthing), which saves consumables.

V-Guide Bag Assembly: Newly developed external stowage solution that saves time during a spacewalk in the event that a thermal radiator would have to be replaced.

Solid State Lighting Assemblies: Upgraded lights that help maintain astronaut sleep cycles with adjusting lighting spectrums. Part of an ongoing upgrade.

Water Storage System (WSS) Tank Assembly: A component to help prepare for the activation of new spare water tanks and delivery system.

O_2 **NORS O2 Recharge Tanks (2):** Used for resupply of oxygen.

Spare and Redundant Hardware

- Catalytic Reactor for water processor
- Assorted Waste Hygiene Compartment (US toilet) Hardware
- Distillation Assembly for the urine processor

Robotic Arm Operators for Cygnus Capture

Scott Tingle (prime): NASA

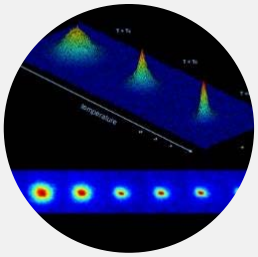
Ricky Arnold: NASA

RESEARCH

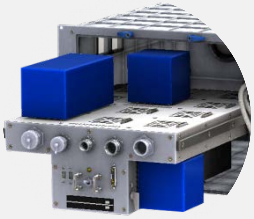
Orbital ATK CRS-9 Mission

The new experiments arriving to the orbital laboratory will challenge and inspire future scientists and explorers. Science payloads will study areas such as DNA sequencing, ultra-cold quantum gases, and liquid-liquid separators.

The Biomolecule Extraction and Sequencing Technology (BEST) investigation studies the use of sequencing for the identification of unknown microbial organisms living on the space station, and for understanding how humans, plants and microbes adapt to living on the station.



The Cold Atom Laboratory (CAL) will make use of the space station's unique microgravity environment to observe phenomena that would otherwise be undetectable from Earth. CAL studies ultra-cold quantum gases; scientists use the facility to explore how atoms interact when they have almost no motion due to such cold temperatures. Due to the microgravity environment of the station, matter can stay in a condensate form longer than on Earth, giving researchers the unique opportunity to observe these phenomena.



The Ice Cubes Facility is the first commercial European opportunity to conduct research in space, made possible through an agreement with ESA (European Space Agency) and Space Applications Services. Dubbed 'Ice Cubes', the facility offers room to run experiments and conduct research in weightlessness inside small modular containers that slot into a rack in ESA's Columbus laboratory. It will allow experiments to run for over four months in space with astronaut time and expert advice as part of the service package.

Zaiput Flow Technologies seeks to validate its innovative technology, a liquid-liquid separator, to enhance flow chemistry production in space. While common separation methods rely on liquid sedimentation, the Zaiput Liquid-Liquid Separation system has the unique characteristic of relying on surface forces to accomplish liquid-liquid extraction. The information gained from this work will be critical to define in detail the physics of the chemical production in space, that has both benefits to life on Earth (drug development) and for further station chemical experimentation in the future.

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