National Aeronautics and Space Administration

OVERVIEW

SpaceX CRS-16 Mission

SpaceX's 16th contracted cargo resupply mission to the International Space Station for NASA will deliver more than 5,600 pounds of science and research, crew supplies and vehicle hardware to the orbital laboratory and its crew.

Launch is targeted for no earlier than Dec. 4, 2018 at 1:38 p.m. EST.

Launch Vehicle
Falcon 9 Rocket

- Two-stage rocket minimizes the number of separation events
- New first stage booster

Launch Site:
Space Launch Complex 40,
Cape Canaveral Air Force Station in Florida

Robotic Arm Operators for Dragon Capture

Alexander Gerst (prime)
ESA

Serena Auñón-Chancellor
NASA

Dragon Spacecraft

- Hardware and supplies will support dozens of science and research investigations
- This Dragon previously flew on SpaceX CRS-10. It will be attached to station's Harmony module.
- In January, it will re-enter Earth's atmosphere and splash down in the Pacific Ocean off the coast of Baja California

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

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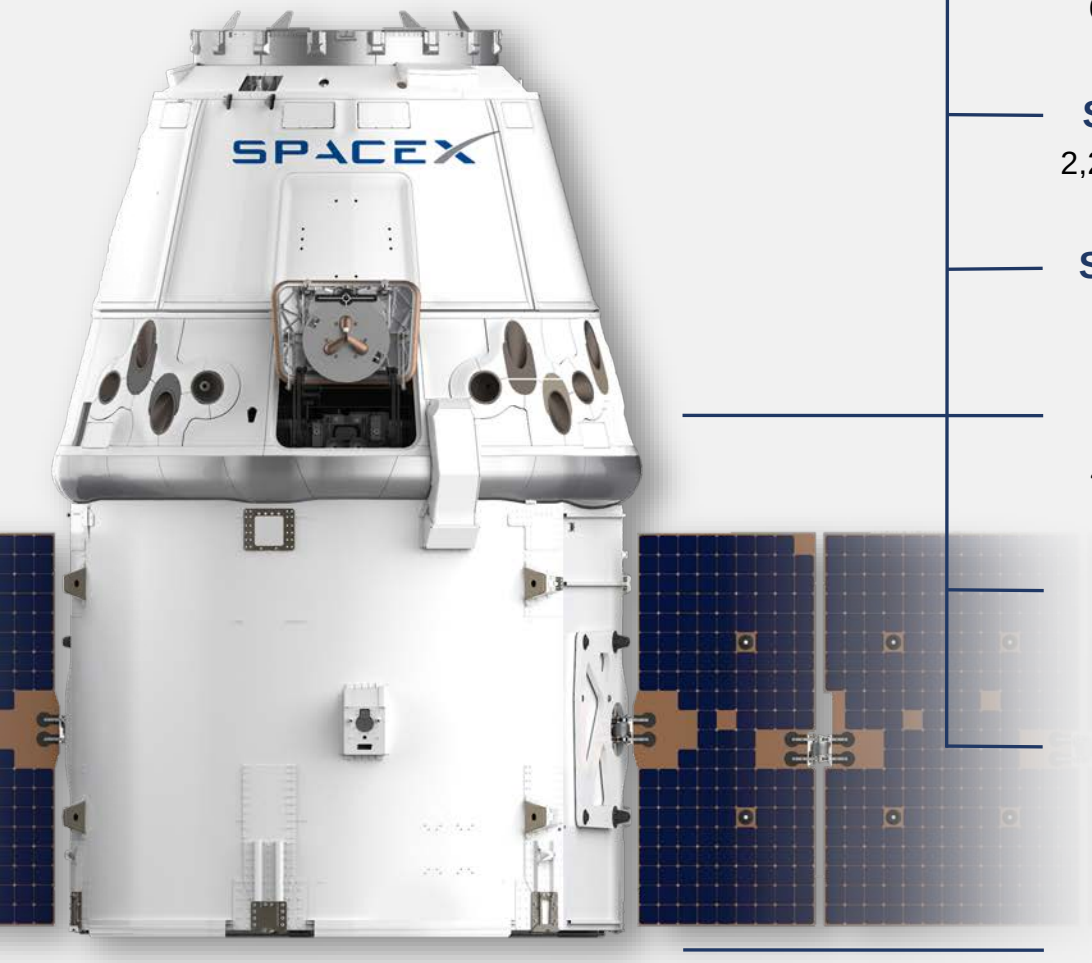
CARGO

SpaceX CRS-16 Mission

*Masses are subject to change prior to launch



Crew Supplies
670 pounds / 304 kilograms

Science Investigations
2,286 pounds / 1,037 kilograms

Spacewalk Equipment
33 pounds / 15 kilograms

Vehicle Hardware
421 pounds / 191 kilograms

Computer Resources
88 pounds / 40 kilograms

Russian Hardware
24 pounds / 11 kilograms

Unpressurized Payloads
2,150 pounds / 975 kilograms

Total Cargo:	**5,673 pounds / 2,573 kilograms**
Total Pressurized Cargo with Packaging:	**3,523 pounds / 1,598 kilograms**
Unpressurized Payloads:	**2,150 pounds / 975 kilograms**

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HARDWARE Highlights

SpaceX CRS-16 Mission

Launch Hardware

Major Constituent Analyzer (MCA) Orbital Replacement Unit (ORU) #2 – Additional spare required for sufficient gas analysis capability.

External High Definition Camera (EHDC) Assembly – Flying external camera units to support critical spacewalk planned for 2019.

NORS O2 Recharge Tanks – Flying two oxygen tanks necessary to support upcoming spacewalks as well as nominal operations.

Microgravity Science Glovebox (MSG) HD Video Drawer – Upgrade of the MSG to support further payload operations on-orbit. MSG provides a sealed environment with built-in gloves for conducting science and technology experiments.

Rodent Research Transport Assembly and Support Hardware – Flying all hardware necessary to support operations for Rodent Research-8.

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RESEARCH

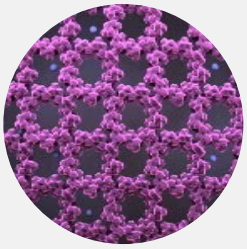
SpaceX CRS-16 Mission

The SpaceX cargo spacecraft will deliver dozens of investigations to the International Space Station, including observations of forests on Earth, growth of protein crystals in space, and trials of new technologies to advance techniques in satellite deployment and refueling.

The Global Ecosystem Dynamics Investigation (GEDI) provides high-quality laser ranging observations of the Earth's forests and topography required to advance the understanding of important carbon and water cycling processes, biodiversity, and habitat. GEDI is mounted on the Japanese Experiment Module's Exposed Facility (JEM-EF) and provides the first high-resolution observations of forest vertical structure at a global scale. These observations quantify the aboveground carbon stored in vegetation and changes that result from vegetation disturbance and recovery, the potential for forests to sequester carbon in the future, and habitat structure and its influence on habitat quality and biodiversity.

SEOPS' SlingShot is a small satellite deployment system delivered by Dragon that fits inside the Cygnus spacecraft's Passive Common Berthing Mechanism (PCBM). The space station crew will install the Slingshot deployer and controller prior to Cygnus's unberthing and departure. SlingShot can accommodate up to 18 CubeSat satellites of any format. After Cygnus is released from station, the spacecraft navigates to an altitude of 280 – 310 miles (an orbit higher than the space station) to deploy the satellites.

Robotic Refueling Mission-3 (RRM3) demonstrates the first transfer and long-term storage of liquid methane, a cryogenic fluid, in microgravity. The ability to replenish and store cryogenic fluids, which can function as a fuel or coolant, will help enable long duration journeys to destinations like the Moon and Mars.



Growth of Large, Perfect Protein Crystals for Neutron Crystallography (Perfect Crystals) crystallizes human manganese superoxide dismutase (MnSOD or SOD2) in order to analyze its shape. This sheds light on how the antioxidant protein helps protect the human body from oxidizing radiation and oxides created as a byproduct of metabolism. For best results, the analysis technique requires large crystals with minimal imperfections, which are more easily produced in the microgravity environment of the space station.