National Aeronautics and
Space Administration

OVERVIEW

SpaceX CRS-13 Mission

SpaceX's 13th contracted cargo resupply mission to the International Space Station for NASA will deliver about 4,800 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. 15, 2017 at 10:36 a.m. EST.

Launch Vehicle
Falcon 9 Rocket

- Two-stage rocket minimizes the number of separation events
- First stage booster flown previously on SpaceX CRS-11

Launch Site:
Cape Canaveral Air Force Station in Florida

Robotic Arm Operators for Dragon Capture

Mark Vande Hei (prime)

Joe Acaba

Dragon Spacecraft

- Hardware and supplies will support dozens of science and research investigations
- This Dragon previously flew on SpaceX CRS-6. It will be attached to station's Harmony module.
- In January, will re-enter Earth's atmosphere and splash down in the Pacific Ocean off the coast of Baja California

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CARGO

SpaceX CRS-13 Mission

Crew Supplies
1,080.3 pounds / 490 kilograms

Science Investigations
1,567.5 pounds / 711 kilograms

Spacewalk Equipment
363.8 pounds / 165 kilograms

Vehicle Hardware
416.7 pounds / 189 kilograms

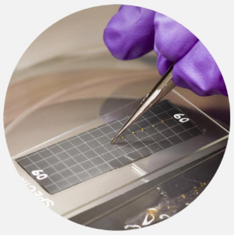
Computer Resources
11 pounds / 5 kilograms

Unpressurized Payloads
1,422 pounds / 645 kilograms

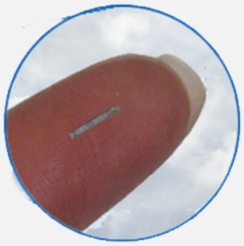
Total Cargo:	**4,861.2 pounds / 2,205 kilograms**
Total Pressurized Cargo with Packaging:	**3,439.2 pounds / 1,560 kilograms**
Unpressurized Payloads:	**1,422 pounds / 645 kilograms**

RESEARCH SpaceX CRS-13 Mission

The SpaceX cargo spacecraft will deliver dozens of investigations to the International Space Station, including how plants respond in microgravity, the accuracy of a device for diabetes management, and monitoring space debris.

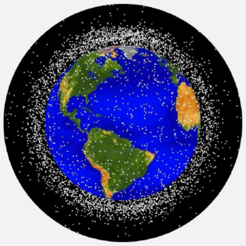


The Plant Gravity Perception mission, PGP, aims to investigate how plants sense and respond to gravity. Gravity perception is important to plants because they need to send their roots downwards towards water and nutrients and their shoots upwards towards light. Plants are known to detect gravity using statoliths, which are small starch-filled packets that settle at the bottom of gravity-sensing cells. However, mutant plants lacking functional statoliths still show consistent (though reduced) responses to gravity, suggesting that there is another system for sensing gravity. PGP will investigate the existence of a non-statolith gravity sensing system using the classic study organism Arabidopsis thaliana.



The Biorasis Glucose Biosensor investigation seeks to improve the accuracy of a wireless medically implantable continuous glucose biosensor (Glucowizzard) for day-to-day diabetes management. CASIS sponsored this research in partnership with Boeing/MassChallenge. Slow glucose transport within human tissue (through the capillary walls and surrounding tissue toward the sensing site of the biosensor) can create delays of up to 20 minutes in real-time monitoring of glucose levels. This delay can be detrimental in achieving tight glycemic control, which has been linked to serious secondary complications in patients with diabetes. The ISS provides a microgravity environment in which reduced fluid movement allows precise monitoring of the role of diffusion in glucose transport, thus improving the mathematical models that determine the accuracy of the Glucowizzard continuous glucose monitoring biosensor.

The Total and Spectral Solar Irradiance Sensor (TSIS) measures total solar irradiance (TSI) and solar spectral irradiance (SSI). TSI helps establish Earth's total energy input while SSI contributes to understanding how Earth's atmosphere responds to solar output changes. Energy input minus outgoing energy determines Earth's climate and energy from the Sun drives atmospheric and oceanic circulations on Earth. Knowing the magnitude and variability of solar irradiance is therefore essential to understanding Earth's climate. Solar irradiance represents one of the longest climate data records derived from space-based observations – nearing 40 years of data – and researchers anticipate maintaining continuity of that record with TSIS. The sensor will be delivered in the trunk of the SpaceX cargo spacecraft.



The Space Debris Sensor (SDS) is a calibrated impact sensor designed to directly measure the ISS orbital debris environment for 2 to 3 years. This approximately one square meter sensor will be mounted outside the ISS. SDS combines dual-layer thin films, an acoustic sensor system, a resistive grid sensor system, and sensored backstop to create a commercial off-the-shelf-based instrument that provides excellent semi-real-time impact detection and recording capability. The sensor will be delivered in the trunk of the SpaceX cargo spacecraft.