National Aeronautics and Space Administration

# OVERVIEW

## SpaceX CRS-14 Mission

SpaceX's 14th contracted cargo resupply mission to the International Space Station for NASA will deliver about 5,800 pounds of science and research, crew supplies and vehicle hardware to the orbital laboratory and its crew.

Launch is targeted for no earlier than April 2, 2018 at 4:30 p.m. EDT.


### Launch Vehicle
### Falcon 9 Rocket

- Two-stage rocket minimizes the number of separation events
- First stage booster flown previously on SpaceX CRS-12

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

Robotic Arm Operators for Dragon Capture

Norishige Kanai (prime)
JAXA

Scott Tingle
NASA

### Dragon Spacecraft

- Hardware and supplies will support dozens of science and research investigations
- This Dragon previously flew on SpaceX CRS-8. It will be attached to station's Harmony module.
- In May, 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-14 Mission


**Crew Supplies**
758 pounds / 344 kilograms

**Science Investigations**
2,359 pounds / 1,070 kilograms

**Spacewalk Equipment**
218 pounds / 99 kilograms

**Vehicle Hardware**
326 pounds / 148 kilograms

**Computer Resources**
108 pounds / 49 kilograms

**Russian Hardware**
24 pounds / 11 kilograms

**Unpressurized Payloads**
2,041 pounds / 926 kilograms

| | |
|---|---|
| **Total Cargo:** | **5,836 pounds / 2,647 kilograms** |
| **Total Pressurized Cargo with Packaging:** | **3,794 pounds / 1,721 kilograms** |
| **Unpressurized Payloads:** | **2,041 pounds / 926 kilograms** |

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# HARDWARE Highlights

## SpaceX CRS-14 Mission

## Launch Hardware

**Heater controller for CO2 scrubber:** This heater controller card will increase the robustness for the primary Carbon Dioxide (CO2) Removal Assembly (CDRA). The extra reliability allows for development of alternate systems for exploring deep space.

**Solar array cooling system:** The prime component of the solar array power cooling system, the Pump and Flow Control Subassembly, help to maintain the health of all 8 array cooling systems in the long term. This unit has been refurbished and is in the Dragon's trunk.

**External high definition camera assemblies:** Enhanced HD camera components will be used for external viewing for science and other utilization objectives.

**Common Communication for Visiting Vehicle (C2V2) assemblies:** A spare unit of the new C2V2 system will provide a more reliable communication link for future cargo and commercial vehicles. It is planned to be used for the first time on the Orbital ATK CRS-9 cargo mission.

**Printer:** Space station residents will receive an upgraded printer to allow them to print procedures, public affairs messages, and even personal photos from family members more efficiently and reliably.

## Return Hardware

**Urine Processor system Separator Plumbing Assembly (SPA):** –A failed SPA will be returned to Earth to do ground testing and influence future designs of regenerative life support systems for exploration beyond low-Earth Orbit.

**External TV camera group major subassemblies:** – These assemblies will be repaired and re-flown to support additional external camera views onboard space station for visiting vehicle, robotics, and spacewalk activities.

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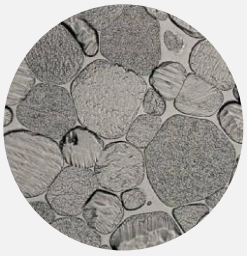
# RESEARCH

## SpaceX CRS-14 Mission

The SpaceX cargo spacecraft will deliver dozens of investigations to the International Space Station, including studies in materials as well as physiological, physical and plant sciences.

Alpha Space's Materials ISS Experiment Flight Facility (MISSE-FF) facility provides a unique platform that is available for the private sector, as well as NASA and other government entities, to utilize applied materials testing or technical demonstrations. The primary MISSE-FF platform provides the ability to test materials, coatings, and components of other larger experiments in the harsh environment of space, which is virtually impossible to do collectively on Earth. Testing in low-Earth orbit (LEO) allows the integrated testing of how materials react to exposure to ultraviolet radiation, atomic oxygen, ionizing radiation, ultrahigh vacuum, charged particles, thermal cycles, electromagnetic radiation, and micro-meteoroids in the LEO environment.

The MARROW study (Bone Marrow Adipose Reaction: Red Or White?) (Marrow) investigation looks at the effect of microgravity on the bone marrow. It is believed that microgravity, like long-duration bed rest on Earth, has a negative effect on the bone marrow and the blood cells that are produced in the bone marrow. The extent of this effect, and its recovery, are of interest to space research and healthcare providers on Earth.



Today, liquid phase sintering is a mainstay in a diversity of fields, such as metal cutting tools, armor piercing projectiles, automotive engine connecting rods, and self-lubricating bearings. Future applications include use of liquid phase sintering as a means to perform in-space fabrication and repair, and for example using lunar regolith to fabricate structures on the moon or using metal powder to fabricate replacement components during extraterrestrial exploration. To prepare for these applications, the MSL SCA-GEDS-German (NASA Sample Cartridge Assembly) will study the Gravitational Effects on Distortion in Sintering (GEDS). This experiment focuses on determining the underlying scientific principles to forecast density, size, shape, and properties for liquid phase sintered bodies over a broad range of compositions in Earth-gravity (1g) and microgravity (µg) conditions.

Organisms from single-celled bacteria to plants and humans grow differently in space. Future long-duration space missions will require crew members to grow their own food. Therefore, understanding how plants respond to microgravity and demonstrating the reliable vegetable production on orbit are important steps toward that goal. Veggie PONDS uses a newly developed passive nutrient delivery system and the Veggie plant growth facility aboard the International Space Station to cultivate lettuce and mizuna greens which are to be harvested on-orbit, and consumed, with samples returned to Earth for analysis.