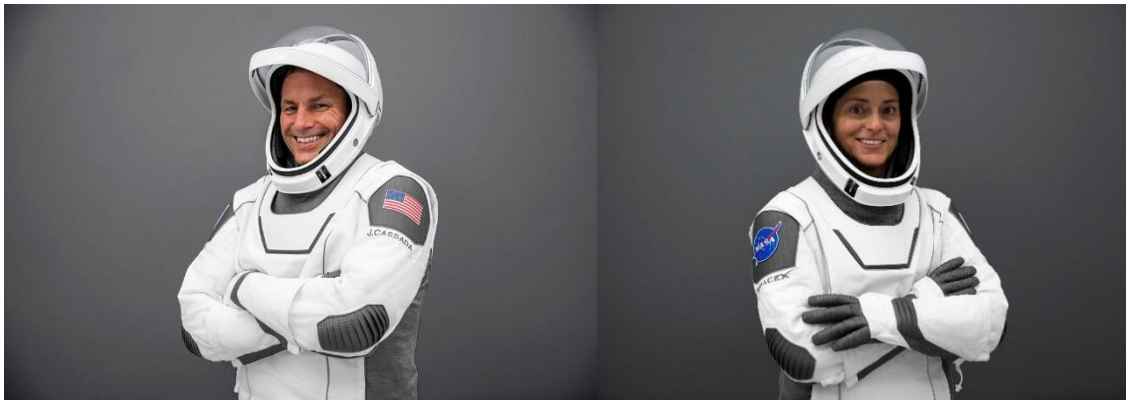
SpaceX CRS-26 Mission Overview

SpaceX's 26th commercial resupply mission with NASA to the International Space Station will deliver more than 7,700 pounds of science, research, crew supplies and vehicle hardware to the orbiting laboratory and its crew. This is the sixth mission under the second Commercial Resupply Services contract (CRS-2) with NASA. Launch is targeted for 2:20 p.m. EST Saturday, Nov. 26, 2022. Launch activities will air live on NASA Television, the NASA app, and the agency's website

Arrival and Departure

The Dragon spacecraft will arrive at the space station and autonomously dock to the zenith-facing port of the Harmony module on the space station at about 7:30 a.m. Sunday, Nov. 27. Coverage of the rendezvous and docking will begin at 6 a.m. NASA astronauts Josh Cassada and Nicole Mann will monitor the spacecraft's arrival, which will stay aboard the orbiting laboratory for about one month before splashing down and returning critical science and hardware to teams on Earth.



NASA astronauts and Expedition 68 Flight Engineers Josh Cassada and Nicole Mann

Research Highlights

Big Hopes for Small Tomatoes

A continuous source of nutritious food is essential for long-duration exploration missions, and the typical pre-packaged astronaut diet may need to be supplemented by fresh foods produced in space. Researchers have been testing a plant growth unit on station known as **Veggie** and have successfully grown a variety of leafy greens. **Veg-05**, the next step in that work, focuses on growing dwarf tomatoes.

This preflight image shows the Red Robin dwarf tomato used for Veg-05 growing in Veggie hardware at the Kennedy Space Center.
Credits: NASA

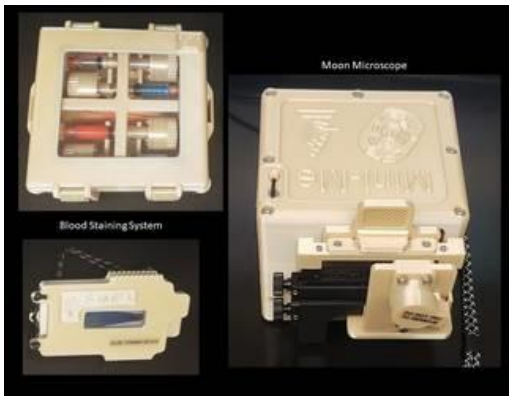
Picture of Health

Diagnoses on the Fly

Moon Microscope tests a kit for in-flight medical diagnosis that includes a portable hand-held microscope and a small self-contained blood sample staining device. An astronaut collects and stains a blood sample, obtains images with the microscope, and transmits images to the ground, where flight surgeons use them to diagnose illness and prescribe treatment.

The kit could provide diagnostic capabilities for crew members in space or on the surface of the Moon or Mars, as well as the ability to test water, food, and surfaces for

contamination. The hardware also may enable improved medical monitoring on upcoming Artemis and Gateway missions.



Staining reagents and syringe storage box (upper left), staining device (lower left), and miniature microscope (right) for the Moon Microscope investigation.
Credits: NASA JSC Immunology/Virology Laboratory

Building Bigger Structures

On Earth, gravity deforms large objects such as the beams used in large-scale construction. Microgravity enables fabrication of longer and thinner structures without this deformation. **Extrusion** demonstrates a technology using liquid resin to create shapes and forms that cannot be created on Earth. Photocurable resin is injected into pre-made flexible forms and a camera captures footage of the process. The capability for using these forms could enable in-space construction of structures such as space stations, solar arrays, and equipment.

The **Space Exploration Initiative** supports a range of microgravity and lunar research across science, engineering, art, and design. The experiment is packed inside a Nanoracks Black Box with several other experiments from the MIT Media Lab and is sponsored by the **ISS National Lab**.

The MIT Space Exploration Initiative team conducts a parabolic flight test of an early version of the hardware for Extrusion, which demonstrates a technology using liquid resin to create shapes and forms to support future construction of large structures in space.
Credits: Steve Boxall, MIT

On-Demand Nutrients

Supplying adequate nutrition is a major challenge to maintaining crew health on future long-duration space missions. Many vitamins, nutrients, and pharmaceuticals have limited shelf-life, and the ability to make such compounds on-demand could help maintain crew health and well-being. **BioNutrients-2** tests a system for producing key nutrients from yogurt, a fermented milk product known as kefir, and a yeast-based beverage.

The investigation kicks off phase two of the five-year **BioNutrients** program, headed by NASA's Ames Research Center and managed by Game Changing Development in NASA's Space Technology Mission Directorate. The program began with the launch of **BioNutrients-1** in 2019. BioNutrients-2 employs a smaller system with a heated incubator that promotes growth of beneficial organisms.

The researchers also are working to find efficient ways to use local resources to make bulk products such as plastics, construction binders, and feedstock chemicals. Such technologies are designed to reduce launch costs and increase self-sufficiency, extending the horizons of human exploration.

Preflight image of BioNutrients-2 Yogurt Bags. The blue color of their contents comes from the pH Indicator, and the SABL interface board behind the bags provides a reference for the starting and ending colors. BioNutrients-2 tests a system for in-space production of nutrients from yogurt, kefir, and a yeast-based beverage.
Credits: NASA Ames Research Center

Adding Solar Power

Two International Space Station Roll-Out Solar Arrays, or iROSAs, launched aboard SpaceX-22 and were installed in 2021. These solar panels, which roll out using stored kinetic energy, **expand** the energy-production capabilities of the space station. The second set, launching in the trunk of SpaceX-26, provides a 20% to 30% increase in power for space station research and operations.

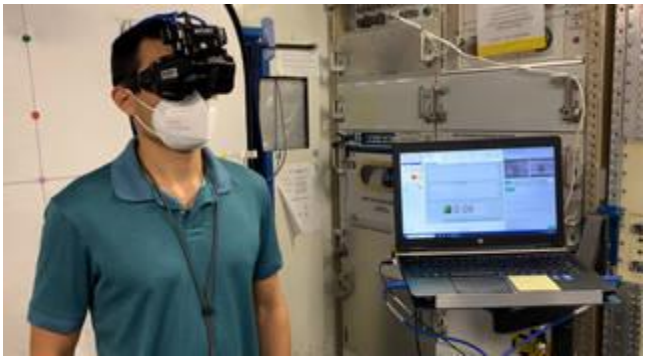
These arrays, the second of three packages, upgrade 50% of the station's power channels. iROSA technology was first **tested** on the space station in 2017. Roll-out solar array technology was used on NASA's Double Asteroid Redirection Test mission and is planned for use on the **Gateway** lunar space station, a vital component of NASA's Artemis Program. The iROSA upgrades use the space station as a proving ground for the technology and research needed to explore farther into space.

This image shows ROSA solar panels on the space station during earlier testing of deployment and retraction in 2017. A second set of iROSA panels launching in the trunk of SpaceX-26 could provide a 20 to 30% increase in power for space station research and operations.
Credits: NASA

Easing Gravity Transitions

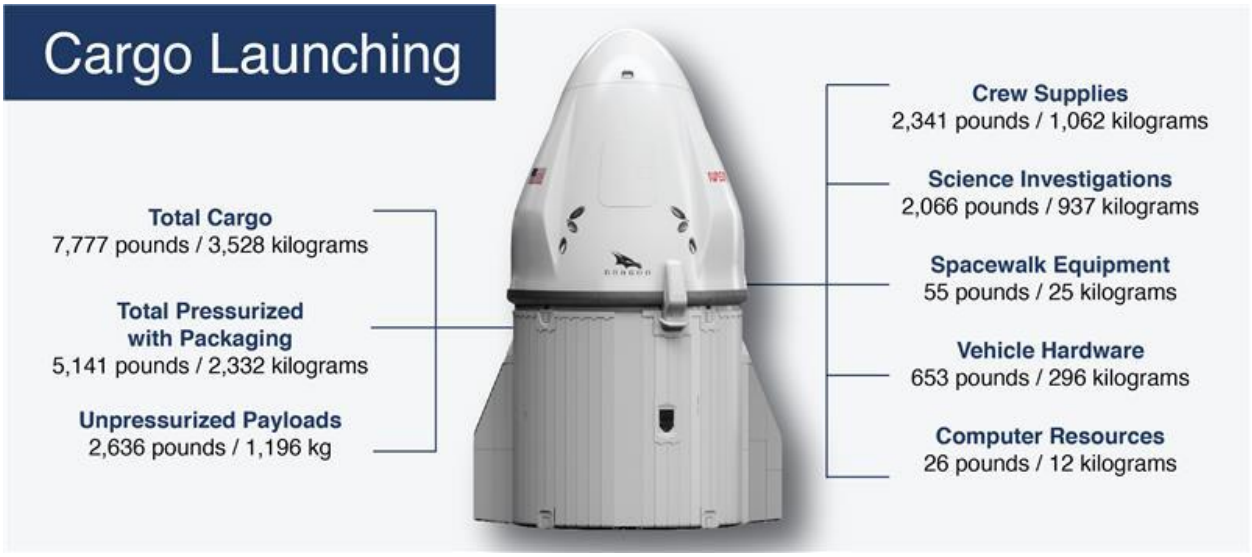
Travelers to space all face the transition from one gravity field to another. On future exploration missions, astronauts may encounter three different gravity fields: weightlessness while traveling in space, the gravity of another planet, and Earth's gravity when they return. These transitions can affect spatial orientation, head-eye and hand-eye coordination, balance, and locomotion and cause some crew members to experience space motion sickness.

The Falcon Goggles hardware captures high-speed video of a subject's eyes, providing precise data on ocular alignment and balance.



This image shows ground testing of the Falcon Goggles. This technology captures high-speed video of a subject's eyes, providing precise data on ocular alignment and balance and could guide researchers in developing ways to help crew members adapt to different gravity conditions on future exploration missions.
Credits: NASA

Cargo Highlights



Hardware

Launch:

- **ISS Roll-Out Solar Arrays (iROSA)** – Upgraded solar arrays to augment power capabilities on-orbit, and will be installed across two EVAs during the docked duration.

- **Purge Pump Separator Assembly (PPSA)** -- Exploration development hardware supporting Environment Control and Life Support Systems (ECLSS). This unit combines the functionality of the legacy Pressure Control and Pump Assembly, Separator Plumbing Assembly, and Purge Filter to provide optimal performance while supporting future exploration demonstrations onboard the station.
- **Space Integrated GPS/INS (SIGI)** -- Critical hardware required to support cargo and crew vehicle positioning operations when arriving and departing the station.
- **Cable Actuator Assembly, Hard Stop Right** -- Spare cables to support crewmember usage of the Crew Health Care System Advanced Resistive Exercise Device (ARED).
- **Portable Pulmonary Function System (PPFS)** -- This collaboration between the European Space Agency (ESA) and NASA is used to support respiratory, cardiovascular, and metabolic research for crewmembers onboard the station.

Return:

- **Nitrogen/Oxygen Recharge System (NORS), Oxygen and Nitrogen Recharge Tank Assemblies (RTA) --** High pressure gas tanks returning to the ground to ensure future EVA and payload support in the 2023 timeframe.
- **Catalytic Reactor --** Supporting the station’s Environmental Control and Life Support System's (ECLSS) Water Processor Assembly (WPA), this unit was uninstalled in 2022 following degraded performance. Returning to the ground for test, teardown, and evaluation (TT&E), this spare will be refurbished to support future ECLSS requirements and demand.
- **Pressure Control and Pump Assembly (PCPA)** -- This multi-tube purge pump enables the removal of non-condensable gas and water vapor from the distillation assembly within the greater Urine Processing Assembly (UPA) subsystem. This unit is returning to the ground for repair and refurbishment in support of the legacy ECLSS fleet.
- **Multifiltration Beds** -- Supporting the on-orbit Water Processor Assembly (WPA), these previously used units will be returned and refurbished to support water capabilities on-orbit.
- **Major Constituents Analyzer Mass Spectrometer** -- Used to monitor nitrogen, oxygen, carbon dioxide, methane, hydrogen, and water vapor onboard the ISS, this orbital replacement unit will be returned for ground repair and refurbishment.
- **Hydrogen Sensor** -- Critical ECLSS hardware that monitors for the presence of excess hydrogen in generated oxygen, which helps inform NASA of warnings signs with the OGS's cell stack. This uninstalled unit is returning for ground refurbishment and repair to support re-flight.
- **Potable Water Dispenser (PWD) Filters --** Major filter assembly used to remove iodine from water consumed by the crew during normal operations. These filters will be returned and refurbished for future support of the crew's water needs.