National Aeronautics and
Space Administration

OVERVIEW

SpaceX CRS-22 Mission

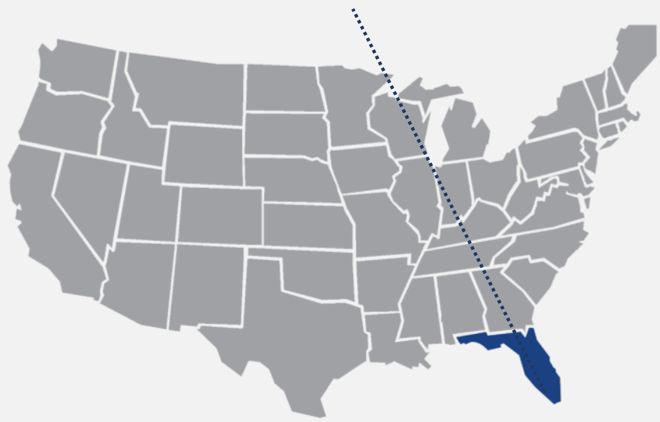
SpaceX's 22nd contracted cargo resupply mission (CRS) to the International Space Station for NASA will deliver more than 7,300 pounds of science and research, crew supplies and vehicle hardware to the orbital laboratory and its crew.

Launch is targeted for 1:29 p.m. EDT Thursday, June 3, 2021

Launch Vehicle
Falcon 9 Rocket

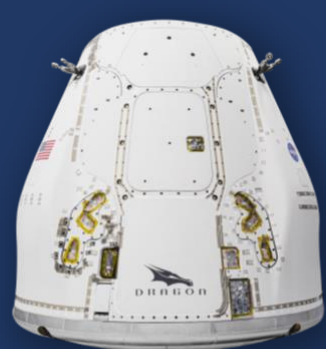
- First flight of this booster
- This booster will be used on the Crew-3 mission

Launch Site:
Launch Complex 39A,
NASA's Kennedy Space Center in Florida



Dragon Spacecraft Overview

Height	8.1 m / 26.7 ft
Diameter	4 m / 13 ft
Capsule Volume	9.3 m^3 / 328 ft^3
Trunk Volume	37 m^3 / 1300 ft^3
Launch Payload Mass	6,000 kg / 13,228 lbs
Return Payload Mass	3,000 kg / 6,614 lbs



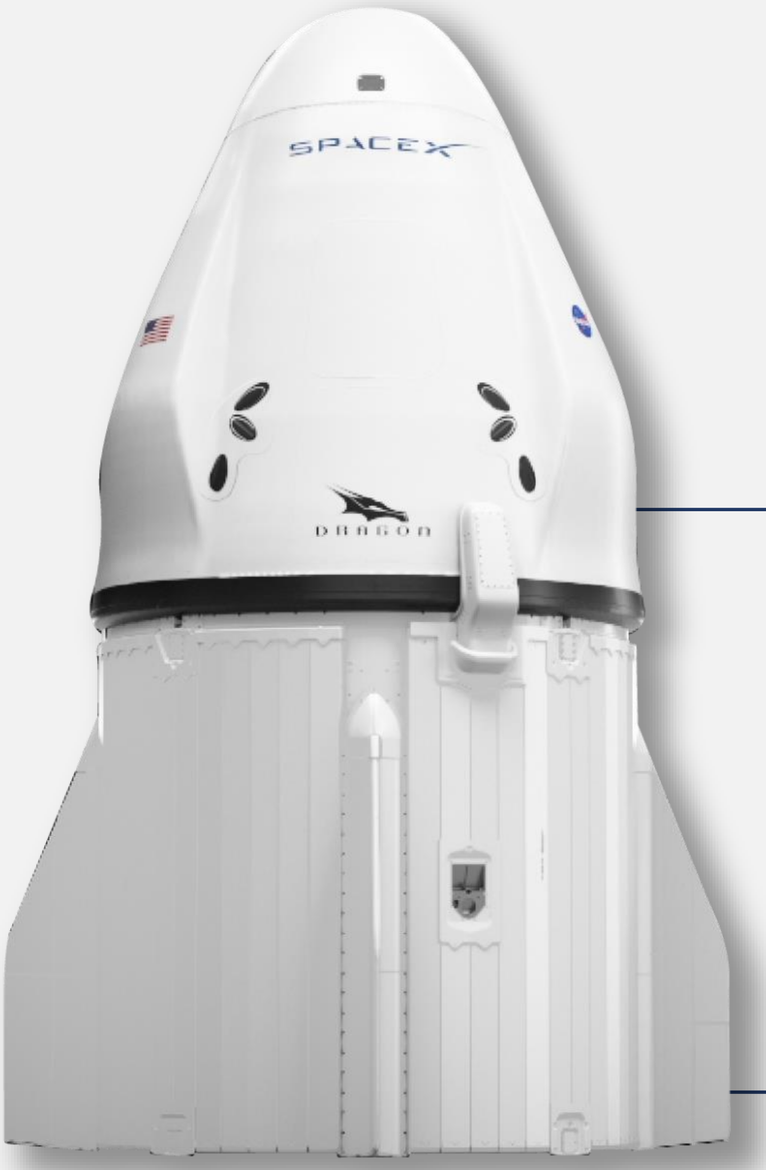
- First flight of this Dragon spacecraft
- Second upgraded Dragon cargo spacecraft to dock to the space station
- In July, it will re-enter Earth's atmosphere and splash down in the Atlantic Ocean near the eastern coast of Florida returning 5,300 pounds of experiment samples and cargo

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

CARGO

SpaceX CRS-22 Mission

*Masses are subject to change prior to launch



Crew Supplies
751 pounds / 341 kilograms

Science Investigations
2,028 pounds / 920 kilograms

Spacewalk Equipment
115 pounds / 52 kilograms

Vehicle Hardware
760 pounds / 345 kilograms

Computer Resources
129 pounds / 58 kilograms

Unpressurized Payloads
(ISS Roll-Out Solar Arrays)
3,042 pounds / 1,380 kilograms

Total Cargo:	**7,337 pounds / 3,328 kilograms**
Total Pressurized with Packaging:	**4,295 pounds / 1,948 kilograms**
Unpressurized Payloads:	**3,042 pounds / 1,380 kilograms**

HARDWARE

SpaceX CRS-22 Mission

Hardware Launching

ISS Roll-Out Solar Arrays (IROSA): Solar arrays launching for installation during the summer 2021 spacewalks to upgrade power capabilities in-orbit.

Catalytic Reactor: Legacy unit launching to provide critical sparing support for the water production capability for the environmental control and life support system (ECLSS).

Commercial Crew Vehicle Emergency Breathing Air Assembly (CEBAA) Regulator Manifold Assembly (RMA): Completing the first set of emergency air supply capability, this integrated system supports as many as five crew members for up to 1 hour during an ISS emergency ammonia leak.

Zarya Kurs Electronics Unit: Critical hardware for cosmonaut remote-control docking of Russian spacecraft is launching to support planned maintenance activity during 2021.

Portable Water Dispense (PWD) Filter: Major filter assembly used to remove iodine from water consumed by the crew during nominal operations.

Commercial off-the-shelf (COTS) Air Tanks: Critical disposable air tanks to support gas resupply for routine cabin repress activities in-orbit.

Iceberg: Critical cold stowage capability to support expanded payload operations.

Hardware Returning

Failed or expended hardware no longer needed on the space station.

Catalytic Reactor Developmental Test Objective (DTO): Developmental environmental control and life support system (ECLSS) unit returning for testing, teardown, and evaluation (TT&E) to determine the cause of failure and subsequent re-flight.

Urine Processing Assembly (UPA) Distillation Assembly: Critical ECLSS orbital replacement unit used for urine distillation, processing, and future use returning for TT&E and refurbishment to support future spares demand.

Sabatier Main Controller: Major Sabatier system hardware used in conjunction with the Oxygen Generation System (OGS) for water production needs on-orbit.

Rodent Research Habitats (AEM-X): Habitats used during Rodent Research missions returning for refurbishment to support future missions in early 2022.

Nitrogen/Oxygen Recharge System (NORS) Recharge Tank Assembly (RTA): Empty gas tanks returning for reuse to support high-pressure gas operations and activities on-orbit.

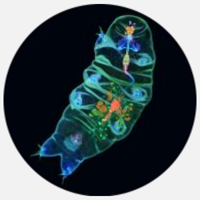
RESEARCH

SpaceX CRS-22 Mission

The SpaceX cargo spacecraft will deliver dozens of investigations to the International Space Station, including research that could help develop cotton varieties that require less water and fewer pesticides, and an experiment looking at tardigrade survival in space, which could advance understanding of the stress factors affecting humans in microgravity. Technologies will be tested, including a new way of providing tactile and visual feedback to astronauts during robotic operations, and a portable ultrasound device. These and other cutting-edge investigations join the hundreds of ongoing experiments aboard the orbiting laboratory.

The UMAMI study uses bobtail squid and bacteria to examine the effects of spaceflight on interactions between beneficial microbes and their animal hosts. This type of relationship is known as symbiosis. Beneficial microbes play a significant role in the normal development of animal tissues and in maintaining human health, but gravity's role in shaping these interactions is not well understood. This experiment could support the development of measures to preserve astronaut health and identify ways to protect and enhance these relationships for better wellbeing on Earth.

Cotton is used in many products, but its production uses a significant amount of water and agricultural chemicals. TICTOC studies how cotton root system structure affects plant resilience, water-use, and carbon storing. Root growth depends upon gravity, and TICTOC could help define which environmental factors and genes control root development in microgravity. What we learn could help us develop cotton varieties that require less water and pesticide use.



Tardigrades (also known as water bears) are microscopic creatures that can tolerate extreme environments. The Cell Science-04 experiment aims to identify the genes involved in water bear adaptation and survival in these high stress environments. The results could advance understanding of the stress factors affecting humans in space.

Butterfly IQ Ultrasound demonstrates use of a portable ultrasound alongside a mobile computing device in microgravity. This technology could provide critical medical capabilities to crews on long-term spaceflights where immediate ground support is not an option. It also has potential applications for medical care in remote and isolated settings on Earth.

An ESA (European Space Agency) investigation, Pilote, tests the effectiveness of remotely operating robotic arms and space vehicles using virtual reality and haptics interfaces. Pilote compares existing and new technologies in microgravity, including those recently developed for teleoperation and others used to pilot the Canadarm2 and Soyuz spacecraft. The study also compares astronaut performance on the ground and during spaceflight. Results could help optimize workstations on the space station and future space vehicles for missions to the Moon and Mars.

New solar panels are headed to station. The ISS Roll-out Solar Array (iROSA) is made up of compact panels that roll open like a huge yoga mat. Based on a previous technology demonstration of roll out panels performed on station, these arrays will provide an increase in energy available for research and station activities. The Expedition 65 crew is scheduled to begin preparations for supplementing the station's existing rigid panels this summer with the first pair of six new arrays launching on SpaceX CRS-22. The same solar array technology is planned to power NASA's Gateway, part of the Artemis program.