National Aeronautics and Space Administration

OVERVIEW

SpaceX CRS-20 Mission

SpaceX's 20th contracted cargo resupply mission (CRS) to the International Space Station for NASA will deliver more than 4,300 pounds of science and research, crew supplies and vehicle hardware to the orbital laboratory and its crew.

Launch is targeted for Friday, March 6, 2020 at 11:50 p.m. EDT.

Launch Vehicle
Falcon 9 Rocket

- Second flight of this booster
- Last flight on CRS-1 SpaceX contract

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

Robotic Arm Operators for Dragon Capture

Jessica Meir (prime)
NASA

Andrew Morgan
NASA

Dragon Spacecraft

- This final flight of the CRS-1 contract results in 20 total Dragon missions berthed to the space station, including Dragon's first visit on a demonstration flight, providing over 94,000 pounds of resupply and 74,000 pounds of return mass.
- This Dragon previously flew on SpaceX CRS-10 and CRS-16. It will be attached to station's Harmony module.
- In April, it will re-enter Earth's atmosphere and splash down in the Pacific Ocean off the coast of Baja California with 3,700 pounds of return cargo.

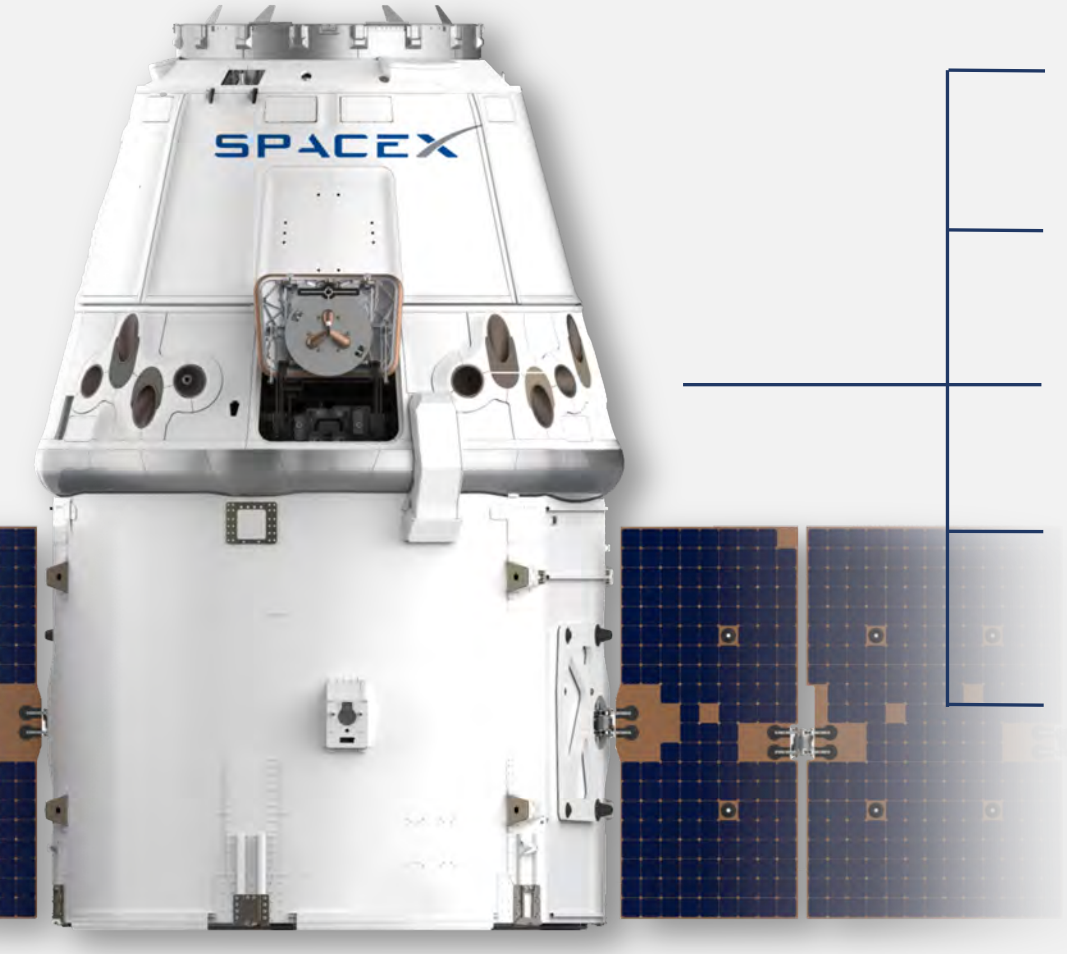
For more information, visit www.nasa.gov/spacex

National Aeronautics and Space Administration

CARGO

SpaceX CRS-20 Mission

*Masses are subject to change prior to launch



Crew Supplies
602 pounds / 273 kilograms

Science Investigations
2,116 pounds / 960 kilograms

Spacewalk Equipment
123 pounds / 56 kilograms

Vehicle Hardware
483 pounds / 219 kilograms

Computer Resources
2 pounds / 1 kilograms

Unpressurized Payloads (Bartolomeo Platform):
1,032 pounds / 468 kilograms

Total Cargo:	**4,358 pounds / 1,977 kilograms**
Total Pressurized Cargo with Packaging:	**3,326 pounds / 1,509 kilograms**
Unpressurized Payloads (Bartolomeo Platform):	**1,032 pounds / 468 kilograms**

National Aeronautics and
Space Administration

HARDWARE

SpaceX CRS-20 Mission

Hardware Launching

Urine Processor Assembly (UPA) Distillation Assembly (DA): Critical spare to support urine processing capability in the US segment. This is also the first of the “exploration-class” Urine Processing Hardware that will test out modifications to the existing DA design to extend its life for future Artemis missions to the Moon and Mars.

Universal Waste Management System (UWMS) Assembly Hardware: Initial assembly hardware to support the installation of the next generation toilet system on-orbit. This is also an Exploration technology objective, this toilet design is being used for Orion (note, the toilet itself will not fly until a later flight this is just the pieces of the system that integrate it onto ISS).

Potable Water Dispenser Filter: Critical filter assembly spare that enables drinking water dispensing capability to support US crewmembers.

Oxygen Generator Assembly (OGA) Hydrogen Sensor: Critical spare for the OGA, allowing the crew to monitor for the existence of hydrogen on the station.

Basic EXPRESS Rack (BER) Controller Assembly: Critical minimum on-orbit spare to ensure that there is no downtime to science rack operations.

Rodent Research Habitats and Hardware: Habitats for Rodent Research Mission 23 (RR-23), with pre-position hardware for future rodent missions during 2020.

Hardware Returning

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

Carbon Dioxide Removal Assembly (CDRA) Desiccant/Adsorbent (DA) Bed: Returning degraded units for future upgrade to enhance on-orbit operations.

CDRA Air Selector Valve: Returning on-orbit spare to be upgraded to extend the life within the CDRA system.

Nitrogen/Oxygen Recharge System (NORS) Tanks: Expended tanks to be serviced to support future payload operations.

Rodent Research Habitats: Rodent Research habitats used in previous missions being returned for refurbishment to support missions on future 2020 Rodent Research missions.

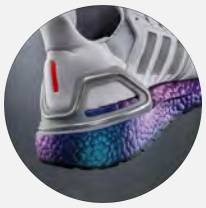
Life Sciences Glovebox (LSG) Work Volume Fan Assembly: Failed fan in the LSG returning to ground for refurbishment and needed for LSG payload operations.

National Aeronautics and
Space Administration

RESEARCH

SpaceX CRS-20 Mission

The SpaceX cargo spacecraft will deliver dozens of investigations to the International Space Station, including research on particle foam manufacturing, water droplet formation, the human intestine, heart cells, a new commercial research platform and other cutting-edge investigations.

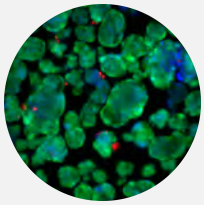


BOOST Orbital Operations on Spheroid Tesellation (adidas BOOST™) examines the particle foam mold filling process using different types of pellets. On Earth, adidas makes performance midsoles from thousands of individual foam pellets blown into a mold and fused together. Microgravity enables a closer look at the factors behind pellet motion and location, which could enhance manufacturing processes as well as product performance and comfort.

Bartolomeo is an ESA (European Space Agency) facility attaches to the outside of the European Columbus Module and hosts commercial and institutional payloads. Comprehensive mission services include assistance with payload preparation, launch and installation, operations and data transfer, and optional return to Earth. Bartolomeo offers the only unobstructed views both toward Earth and into space from the station. Potential applications include Earth observation, robotics, material science and astrophysics.

Droplet Formation Studies in Microgravity (Droplet Formation Study) evaluates water droplet formation and water flow of Delta Faucet's H2Okinetic shower head technology. To conserve water, flow rates in shower devices have been reduced, but this lower flow rate also reduces the effectiveness of these devices and often causes consumers to take longer showers, undermining the goal of using less water. Gravity's full effects on formation of water droplet size are unknown, and research in microgravity could help improve the technology, creating better performance and improved user experience while conserving water and energy.

Organ-Chips as a Platform for Studying Effects of Space on Human Enteric Physiology (Gut on Chip) examines the effect of microgravity and other space-related stress factors on Emulate's human innervated Intestine-Chip (hiIC). This Organ-Chip device enables the study of organ physiology and diseases in a laboratory setting and allows for automated imaging, sampling and storage. The investigation could identify the mechanisms that underlie development of intestinal diseases as well as possible targets for therapies to treat them.



Generation of Cardiomyocytes From Human Induced Pluripotent Stem Cell-derived Cardiac Progenitors Expanded in Microgravity (MVP Cell-03) examines whether microgravity increases the production of heart cells from human-induced pluripotent stem cells (hiPSCs). Heart cells or cardiomyocytes (CMs) derived from hiPSCs may be used to replenish cells damaged or lost due to cardiac disease. The investigation induces stem cells to generate heart precursor cells and cultures those cells on the space station to analyze and compare with cultures grown on Earth.