National Aeronautics and Space Administration

International Space Station

[MISSION SUMMARY]

EXPEDITION **66** began in October 2021 and ends in March 2022. This expedition will include research investigations focused on biology, Earth science, human research, physical sciences and technology development, providing the foundation for continuing human spaceflight beyond low-Earth orbit to the Moon and Mars.

THE **CREW:**

Anton Shkaplerov (Roscosmos) –Commander

Born: Sevastopol, Crimea
Spaceflights: Exp. 29/30, 42/43, 54/55
Bio: https://go.nasa.gov/2VUDpMf

Raja Chari (NASA) – Flight Engineer

Born: Milwaukee, Wisconsin
Spaceflights: First flight
Bio: https://go.nasa.gov/3lKpJfB
Twitter: @Astro_Raja

Mark Vande Hei (NASA) – Flight Engineer

Born: Falls Church, Virginia
Spaceflights: Exp. 53/54, 65
Bio: https://go.nasa.gov/2vzY0a8
Twitter: @Astro_Sabot

Tom Marshburn (NASA) – Flight Engineer

Born: Statesville, North Carolina
Spaceflights: STS-127, Exp. 34/35
Bio: https://go.nasa.gov/2ZhcUSE
Twitter: @AstroMarshburn

Pyotr Dubrov (Roscosmos) – Flight Engineer

Born: Khabarovsk, Russia
Spaceflights: Exp. 65
Bio: https://go.nasa.gov/30hV6am

Kayla Barron (NASA) – Flight Engineer

Born: Pocatello, Idaho
Spaceflights: First flight
Bio: https://go.nasa.gov/3Cm1cV4
Instagram: @astro_kayla

Matthias Maurer (ESA) – Flight Engineer

Born: Sankt Wendel, Germany
Spaceflights: First flight
Bio: https://go.nasa.gov/2Z69fH4
Twitter: @astro_matthias

THE **SCIENCE:**

What are some investigations the crew is operating?

During Expedition 66, crew members will conduct experiments that could help us identify new materials with innate antimicrobial properties that could be used in designing future space craft. New hydrogen sensors will be tested on the station's oxygen generation system to determine their stability over time. Astronauts will also manufacture optical fibers in microgravity, and contribute to research aimed at improving the infectious disease risk assessment for astronauts.

Fiber Optic Production-2

Fiber Optic Production-2 (FOP-2) builds on previous work to manufacture commercial optical fibers in microgravity using a blend of elements called ZBLAN. Earlier theoretical and experimental studies suggest that ZBLAN optical fibers produced in microgravity exhibit qualities superior to those of fibers produced on Earth. Results from FOP-2 could help further verify these studies and guide manufacture of high value optical fiber aboard the space station for commercial use.

Advanced Hydrogen Sensor Technology Demonstration

The Advanced Hydrogen Sensor Technology Demonstration (OGA H2 Sensor Demo) tests new sensors for the International Space Station's Oxygen Generation Assembly (OGA). The OGA produces breathable oxygen via electrolysis and has sensors for detecting hydrogen to protect it from failures. These current sensors, which are used to ensure that no hydrogen enters the oxygen product stream into the cabin, have sensitivity to humidity and drift over time, however, which limits their operational life. New sensors will be tested downstream of the existing OGA system in order to determine their stability over time; if these sensors prove to be superior to the current ones they may be integrated into the Advanced OGA which is geared for exploration missions.

Host Pathogen

The Host Pathogen investigation focuses on better understanding the relationship between increased microbial virulence and reductions in immune cell function during microgravity/spaceflight conditions. In spaceflight analogue conditions, bacteria and immune cells from healthy, ground-based test subjects are cultured to observe immune cell response, while for spaceflight, ten crew members provide blood and saliva samples to assess their primary immune cells for alterations in host response. The results from this study are expected to aid in development of health countermeasures and improve the infectious disease risk assessment for astronauts.

ESA Biofilms-II

The goal of the Biofilm Inhibition On Flight Equipment and On Board the ISS Using Microbiologically Lethal Metal Surfaces (ESA-Biofilms) investigation is to compare how biofilms are formed in low gravity, in a liquid environment on inhibiting and non-inhibiting metal surfaces, for the purposes of spacecraft sanitation and crew health. Various species of bacteria exposed to microgravity, simulated Martian gravity and Earth gravity are tested not only on different metallic surfaces (copper, stainless steel and brass), but also on an array of different laser-etched surface treatments to ascertain whether or not topological differences influence biofilm formation in space.

THE MISSION **PATCH:**

The Expedition 66 patch celebrates the continued utilization of the International Space Station as a path for human and scientific space exploration. Its shape reflects the Route 66 highway sign, which once guided an earlier expansion into distant, remote lands. The arc of the Earth's atmosphere is reminiscent of the well-known stop-motion photos taken by astronauts and cosmonauts of the Earth in eclipse. Two future destinations are depicted, the Moon resting inside one of the numerals, and Mars to the right. A multicolored bridge containing the colors of each of this mission's international partner's flags (Russia, Germany, France, Japan, and the United States) draws the viewer from the perimeter of the patch into the numeral 66 just as the space station bridges the gap from low-Earth orbit to these distant exploration destinations.

Credits: NASA

National Aeronautics and Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058

www.nasa.gov

NP-2021-00-000-JSC