National Aeronautics and Space Administration

International Space Station

[MISSION SUMMARY]

EXPEDITION 69 began in March 2023. 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:**

Sergey Prokopyev (Roscosmos)
Commander

Born: Sverdlovsk, Russia
Spaceflights: Expedition 56/57, 68
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Dmitri Petelin (Roscosmos)
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Flight Engineer

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Warren "Woody" Hoburg (NASA)
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Sultan Alneyadi (United Arab Emirates)
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Andrey Fedyaev (Roscosmos)
Flight Engineer

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THE **SCIENCE:**

What are some investigations the crew is operating?

During Expedition 69, crew members will conduct experiments studying how particular materials burn in microgravity to keep spacecraft safe, test a new tool for deep-space immune monitoring in orbit, continue work with 3D-cultured cardiac muscle tissue to assess human cardiac function in microgravity, and test samples for microorganisms from outside of the space station.

Solid Fuel Ignition and Suppression Test

Gravity influences flames on Earth, but in microgravity aboard the space station, fire acts differently and can behave in unexpected ways. Some evidence suggests that fires may be more hazardous in reduced gravity, a safety concern for future space missions. The Solid Fuel Ignition and Extinction - Material Ignition and Suppression Test (SoFIE – MIST) study focuses on understanding the flammability of materials that could be used in future space missions. The equipment and procedures to detect and suppress a fire and to clean up afterward are also essential for crew safety. What we learn also could provide better understanding of fire safety and improve methods for testing material for homes, offices, aircraft, and other uses on Earth.

Immunity Assay

Studies have shown that microgravity weakens the immune system. Monitoring and maintaining human health are vital prerequisites for mission success. Immunity Assay aims to develop a new research tool to study the impact of spaceflight stressors, like microgravity and radiation, on cellular immune functions. Researchers are doing this by developing a new way to monitor health and immune functions in a blood sample. The outcome of this investigation could provide a handy tool for direct immune system monitoring on the space station, as well as on Earth.

Engineered Heart Tissues-2

This ISS National Lab-sponsored study continues work with 3D-cultured cardiac muscle tissue to assess human cardiac function in microgravity. Previous work with 3D cultures in space detected changes at the cellular and tissue level that could provide early indication of the development of cardiac disease. Engineered Heart Tissues-2 tests whether new therapies prevent these negative effects from occurring. A small magnet embedded into a flexible post is attached to each cardiac tissue. The contractile motion of the tissues moves the magnet. A sensor records real-time contractile function of the tissues by tracking the magnet's movement.

External Microorganisms Study

Scientists need to identify the microorganisms that may be transported with crew members during deep space exploration. That way researchers can better know what contaminants might be brought along, and which are native to the other planetary bodies. The ISS External Microorganisms study takes on this challenge by having astronauts collect samples from outside the space station to examine whether a spacecraft releases microorganisms and, if so, how many and how far they may travel. Results could inform preparations for future human exploration missions to the Moon and Mars.

Student-Built Ball Clamp Monopod

Manufactured by students, the High Schools United with NASA to Create Hardware (HUNCH) Ball Clamp Monopod is attempting to address astronaut comments on the difficulty of positioning video or still cameras in the middle of a module. NASA's HUNCH program enables students to fabricate real-world products for NASA as they apply their science, technology, engineering, and mathematics skills. The project is composed of an aluminum monopod fitted with a camera shoe and ball clamp so it can be attached to a standard space station handrail. This serves as a pivoting platform for photography and video. Students from Dade Middle School, Cy-Woods High School, and Conroe High School in the Houston, Texas, area worked to manufacture and produce the hardware and will be given pictures and videos of the hardware evaluation.

THE MISSION **PATCH:**

The Expedition 69 patch reflects the mission of the International Space Station to enable long-term exploration of space, for the benefit of Earth. The unique mosaic design is inspired by the vintage, Art Deco stained glass window in Star City, Russia that provides a stylistic portrayal of the beauty of space exploration. The number "69" forms a circle to symbolize the international partnerships and collaboration that make the space station program possible. The Earth is the central element inside the "6," as our home planet and the primary beneficiary of research onboard space station. The star shining from Earth, spanning multiple continents, represents the ground teams around the world who support every aspect of this expedition and ensure our safe return home. The space station itself signifies the contributions of thousands of people over the past several decades, whose vision and sustained efforts have made this miracle of a laboratory an unparalleled success. Looking towards the future, the next big steps in human space exploration are reflected in the Moon and Mars. The sun around Mars is symbolic of the human imagination, curiosity, and ingenuity that draws us to explore. The two white stars in the sky are taken directly from the Star City mural. The larger star represents the family and friends whose love and support makes this endeavor possible. The smaller star represents the explorers who came before us and helped pave the way to the stars.

Credits: NASA

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NP-2022-10-018-JSC