National Aeronautics and Space Administration

International Space Station

[MISSION SUMMARY]

EXPEDITION 64 began in October 2020 and ends in April 2021. 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 Ryzhikov (Roscosmos) – Commander

Born: Bugulma, Russia
Spaceflights: Exp. 49/50
Bio: https://go.nasa.gov/3arzAR

Mike Hopkins (NASA) – Flight Engineer

Born: Lebanon, Missouri
Spaceflights: Exp. 37/38
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Kate Rubins (NASA) – Flight Engineer

Born: Farmington, Connecticut
Spaceflights: Exp. 48/49
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Victor Glover (NASA) – Flight Engineer

Born: Pomona, California
Spaceflights: First flight
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Sergey Kud-Sverchkov (Roscosmos) – Flight Engineer

Born: Baikonur, Kazakhstan
Spaceflights: First flight
Bio: https://go.nasa.gov/2QAxHsN

Shannon Walker (NASA) – Flight Engineer

Born: Houston, Texas
Spaceflights: Exp. 24/25
Bio: https://go.nasa.gov/2X36Mta

Soichi Noguchi (JAXA) – Flight Engineer

Born: Yokohama, Japan
Spaceflights: STS-114, Exp. 22/23
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THE **SCIENCE:**

What are some investigations the crew is operating?

During Expedition 64, crew members will grow radishes in a study to better understand plant growth and nutrition in microgravity, conduct cancer therapy research, study how mining with microbes might be used on asteroids, and continue research into the effects of microgravity on the heart.

Plant Habitat-02

A new crop is heading to the International Space Station: radishes! When astronauts travel to the Moon and Mars, they are likely to grow edible plants to supplement food brought from Earth. To produce nutritious food in space, we need to understand how the differences in gravity, atmosphere, and soil conditions affect the way plants grow. As part of ongoing efforts to produce food in space, the Plant Habitat-02 investigation uses the Advanced Plant Habitat aboard the space station to grow radishes in different types of light and soils. Radishes are nutritious, grow quickly, and are genetically similar to Arabidopsis, a plant that scientists have already studied a lot in microgravity. This research also evaluates the nutrition and taste of the plants, because even space explorers like their food to taste good.

Onco-Selectors

Scientists use many screening methods and models in efforts to develop cancer drugs that work better and have fewer harmful side effects. Leveraging Microgravity to Screen Onco-selective Messenger RNAs for Cancer Immunotherapy (Onco-Selectors) tests drugs based on messenger ribonucleic acids (mRNA) for treating leukemia. Found in all our cells, mRNA plays a role in the process of making proteins and it can be different in healthy versus cancer cells. Under normal gravity conditions, some drugs are onco-selective, or can tell cancer cells from healthy ones. Researchers expect the ones that also have this trait in microgravity will make good candidates for safer, more effective, and affordable medicines to treat leukemia and other cancers. Such drugs could improve survival rates for thousands of people every year.

BioAsteroid

Microscopic miners are going to work in space! Microbes that interact with rock have many potential uses in future space exploration. They could be used to create life support systems that use regolith (the dust-like material on the surface of the Moon and other planets), break down rocks into soils for plant growth, and extract useful minerals from rocks. Gravity affects how microbes and rocks interact, though. The Microbe-rock Interactions for Human Space Exploration (BioAsteroid) experiment studies these interactions, and whether physical and genetic changes occur in biofilms in space. Results could help us understand the physical interactions of liquid, rocks, and microorganisms. If crew members on future missions can build Lunar or Martian bases using materials found there, they could bring fewer resources from Earth. That would save room and fuel on the trip and preserve valuable resources for use here.

Cardinal Heart

Microgravity significantly affects heart tissues, causing molecular and structural abnormalities that can lead to disease. Such changes could pose a risk on future long-duration space missions. Effect of Microgravity on Drug Responses Using Engineered Heart Tissues (Cardinal Heart) uses engineered heart tissues (EHTs) to study changes in cardiovascular cells and tissues in microgravity. The investigation could help establish ways to predict cardiovascular risk prior to spaceflight. Because the response to microgravity is strikingly similar to heart diseases on Earth, the work also could help identify how these diseases develop and better ways to treat them. In addition, it advances the potential of EHTs to serve as a way to monitor systemic changes in diseased versus healthy individuals and provide new ways to develop countermeasures.

THE MISSION **PATCH:**

The Expedition 64 patch shows the International Space Station illuminated by the city lights of earth. The illumination of the space station modules represents the enduring partnership and continuous human presence on station for 20 years. The modules from all partner countries represent the international cooperation, which sustains this presence in space. The aurora and light behind the horizon are beautiful features of our home planet, and the Moon and stars in the background shows our future exploration beyond Earth.

Credits: NASA

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