

INTERNATIONAL SPACE STATION



EXPEDITION 64



Soyuz MS-17 Launch: October, 2020
Landing: April 2021



SERGEY RYZHIKOV (Roscosmos)
Commander

Born: Bugulma, Tatarstan
Interests: Traveling, reading, music,
gardening
Spaceflights: Exp 49/50
Bio: <http://en.roscosmos.ru/20651/>



KATE RUBINS (NASA)
Flight Engineer

Born: Farmington, Connecticut
Interests: Traveling, reading, music,
gardening
Spaceflights: Exp 48/49
Bio: <https://go.nasa.gov/3kKQ9Nb>
Twitter: @Astro_Kate7

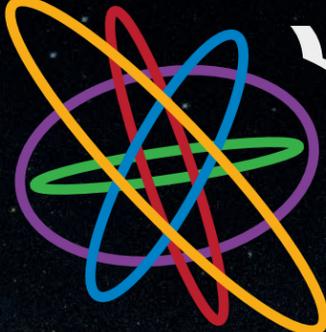


SERGEY KUD-SVERCHIKOV (Roscosmos)
Flight Engineer

Born: Leninsk, Baikonur
Interests: Hiking, climbing, speleology,
diving
Spaceflights: First flight
Bio: <http://en.roscosmos.ru/21634/>

EXPEDITION
64

Expedition 64 began in October 2020 and ends in April 2021. This expedition will include research investigations and technology demonstrations not possible on Earth to advance scientific knowledge of Earth, space, physical and biological sciences. Stay up to date with the mission at the following web page:
https://www.nasa.gov/mission_pages/station/expeditions/expedition64/index.html



SCIENCE ON THE



During Expedition 64, researchers will investigate how plants and rocks can be used in the future exploration of the Moon and beyond, while using the microgravity environment of the space station to explore possible new treatments for diseases here on Earth.

Follow the latest Space Station Research and Technology news at: www.nasa.gov/stationresearchnews

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.



Universal Waste Management System

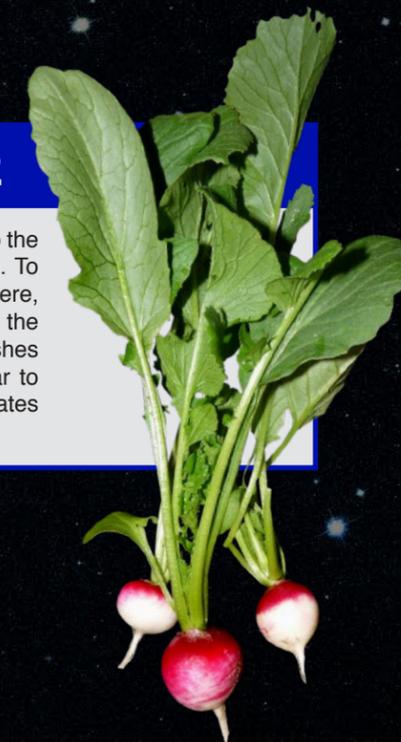
The Universal Waste Management System (UWMS) demonstrates a new, more compact and efficient toilet design. A number of its features improve on current space toilet operations and help us prepare for future missions, including those to the Moon and Mars. These features include a design that helps increase recovery of water from urine, sweat, and hygiene on the space station from a current 90% to 98%. Other features important for future space exploration include a simpler design that means less maintenance and a significant reduction in mass and volume. The new system's smaller size supports possibly having more crew members on the space station at a time and contributes to crew comfort on future long-duration missions. This type of compact, efficient waste disposal technology also has potential applications on Earth, including in remote areas not served by traditional waste treatment systems and following disasters.

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.

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.



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.



The Expedition 64 patch shows the International Space Station (ISS) illuminated by the city lights of earth. The illumination of the ISS modules represents the enduring partnership and continuous human presence on ISS 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.



Celebrating Station Science Welcome to the yearlong celebration of the International Space Station! Throughout the 2020-21 academic year, monthly themes connect 20 years of space station experiments to K-12 STEM curricula. Check out the resources below!
<https://www.nasa.gov/stem/iss20/>

STEMonstrations STEMonstrations fit the need for students and educators to have high quality, informative videos that cover the wide range of topics outlined in the Next Generation Science Standards (NGSS). Astronauts film videos instructing students in biology, chemistry, physics, Earth science, and space science. The videos align to a "Try This" one- to two-page lesson plan where students and educators can make connections to topics they are working on in the classroom.

<https://www.nasa.gov/stemonstrations>



Citizen Scientists

Citizen Science Projects For years, solar system and exploration have brought excitement and inspiration to people of all ages. This is especially true now, with new opportunities for students and citizen scientists to directly participate in expanding our knowledge of the solar system. Amateur astronomers and students with wide ranges of equipment and expertise are making valuable contributions to our growing understanding of our nearest celestial neighbor. Learn how you can become part of the adventure!

<https://science.nasa.gov/citizenscientists>

Sally Ride EarthKAM Sally Ride EarthKAM (Earth Knowledge Acquired by Middle school students) is a NASA educational outreach program that enables students, teachers, and the public to learn about Earth from the unique perspective of space. Students can "program" the camera to take pictures of the Earth from space and study the images they receive.

<https://www.earthkam.org/>



Spot The Station
International Space Station

Spot the Station Watch the International Space Station pass overhead from several thousand worldwide locations. It is the third brightest object in the sky and easy to spot if you know when to look up. Visible to the naked eye, it looks like a fast-moving plane only much higher and traveling thousands of miles an hour faster!

<https://spotthestation.nasa.gov/>

Story Time from Space While in space, astronauts videotape themselves reading books to children on Earth. In addition, cross-content curriculum is designed to support the Next Generation Science Standards and Common Core.

<http://storytimefromspace.com/>



In-flight Education Downlinks Wouldn't it be great if students could talk with an astronaut aboard the International Space Station about what it is like to live and work in space? Well, they can! Educational organizations located in the United States can host an in-flight education downlink with space station crew members. Students pose questions and watch as astronauts answer the questions and demonstrate science, technology, engineering and mathematics concepts in ways that are impossible on Earth.

<https://www.nasa.gov/audience/foreducators/stem-on-station/downlinks.html>

Amateur Radio on the ISS ARISS lets students worldwide experience the excitement of talking directly with crew members of the International Space Station, inspiring them to pursue interests in careers in science, technology, engineering and math, and engaging them with radio science technology through amateur radio.

www.ariss.org/



Expeditionary Skills for Life Expeditions are journeys made by people who share a definite purpose and specific experiences. To make their expeditions successful, NASA works with astronaut crews on skills that prepare them to live and work together during space missions. Some of these same skills are useful in everyday life here on Earth. This series of activities is designed to take you through various educational expeditions that will help you learn and practice skills that you can apply in almost every aspect of life.

<https://www.nasa.gov/education/4H>



<https://www.nasa.gov/stemonstation>