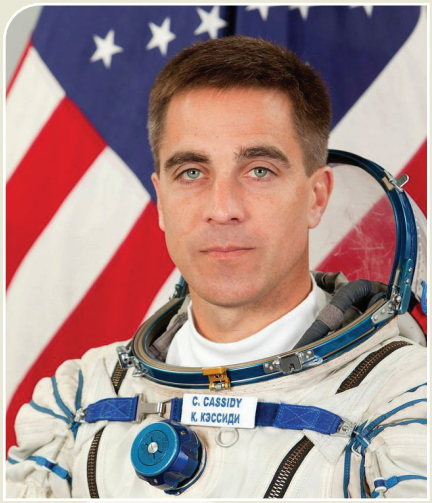
National Aeronautics and Space Administration

International Space Station
[MISSION SUMMARY]

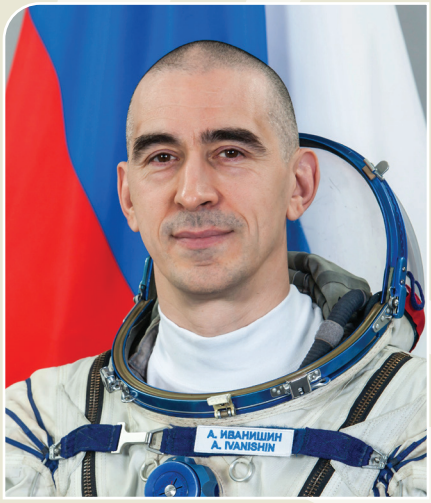
EXPEDITION **63** began in April 2020 and ends in October 2020. This expedition will include research investigations focused on biology, Earth science, human research, physical sciences and technology development, providing the foundation for continuing human spaceflight beyond low-Earth orbit to the Moon and Mars.

THE **CREW:**



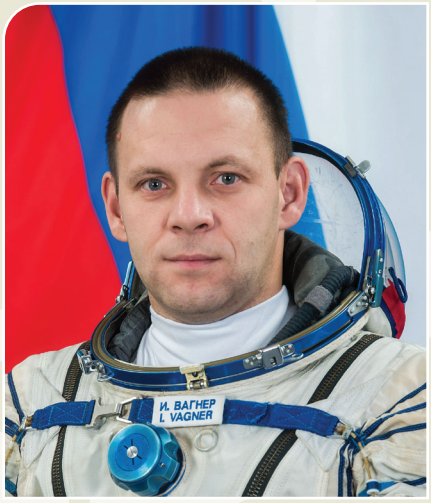
Chris Cassidy (NASA)
Commander

Born: Salem, Massachusetts
Spaceflights: STS-127, Exp. 35/36
Bio: https://go.nasa.gov/2NsLd0s
Instagram: @Astro_SEAL



Anatoly Ivanishin (Roscosmos)
Flight Engineer

Born: Irkutsk, Russia
Spaceflights: Exp. 29/30, Exp. 48/49
Bio: https://go.nasa.gov/2uy7DqK



Ivan Vagner (Roscosmos)
Flight Engineer

Born: Severoonezhsk, Russia
Spaceflights: First flight
Bio: https://go.nasa.gov/3e8efhq
Instagram: @ivan_mks63

THE **SCIENCE:**

What are some investigations the crew is operating?

During Expedition 63, scientists will collect standardized data from crew members to continue expanding our understanding of how human physiology responds to long-duration life in microgravity, and will test life support technologies that will be vital to our continued exploration of deep space.

ACE-T-Ellipsoids

This investigation creates three-dimensional colloids, small particles suspended within a fluid medium, and uses temperature to control the density and behavior of the particles. Colloids can organize into various structures, called self-assembled colloidal structures, which could enable 3D printing of replacement parts and repair of facilities on future long-duration space voyages. This use requires controlling particle density and behavior, however, and by designing and assembling colloids in microgravity, ACE-T-Ellipsoids provides insight into how to do so.

Universal Waste Management System

Everyone "goes," but space presents unique challenges for managing human waste. The Universal Waste Management System (UWMS) investigation demonstrates the long-term use of a compact toilet together with the Urine Transfer System (UTS). The UWMS allows simultaneous use of two toilets by providing automated control of flow into the Urine Processor Assembly (UPA) or storage containers. Automated offload of this backup storage saves time for crew members. The UWMS's smaller footprint and improved technology support possible expansion of space station crew and future long-term, deep-space exploration missions.

Spaceflight Standard Measures

This investigation collects a set of measurements – blood and saliva samples, skin samples, mood and sleep questionnaires, cognitive tests and more – from astronauts before, during, and after long-duration missions. These measures create a consistent set of data across the duration of the International Space Station Program that helps characterize the risks of living in space and how humans adapt to those risks. Scientists can use the data to monitor the effectiveness of countermeasures and interpret astronaut health and performance outcomes, as well as to support future human research on planetary missions.

Space Organogenesis

The need for human organs for transplants far exceeds the supply, creating a need for artificial organs made using regenerative medicine technology. Cell cultures on Earth are two-dimensional, but microgravity may enable growth of cell cultures in three dimensions without using artificial structures. Development of Advanced 3D Organ Culture System Utilizing the Microgravity Environment (Space Organogenesis) demonstrates growth of 3D organ buds from human stem cells in microgravity and analyzes changes in gene expression in the cells. This experiment represents an important first step toward growing artificial organs.

THE MISSION **PATCH:**

The Expedition 63 patch represents an intersection of the past and the beginning of a new dawn in human space flight as we continue to inhabit the International Space Station, aim towards returning to the Moon and plan for the journey to Mars.

Thirteen illuminated stars along the top of the patch commemorate the Apollo 13 mission celebrating its 50th anniversary during Expedition 63. The swoosh in the shape of the number "63" orbiting around the Earth and Moon honors the Apollo Program and the future missions to go beyond low Earth orbit.

The atom, shown overlaid on a vibrant sunrise, is the Expedition 63 crew's call sign symbolizing the energy to revolve, or orbit around a nucleus or in their case, the Earth. The international crew will continue to carry out the important mission of collaboration in preserving the space station as a microgravity and space environment research laboratory.

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