National Aeronautics and Space Administration

International Space Station

[MISSION SUMMARY]

EXPEDITION 65 began in April 2021 and ends in October 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:**

Mark Vande Hei (NASA) – Flight Engineer

Born: Falls Church, Virginia
Spaceflights: Exp. 53/54
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Akihiko Hoshide (JAXA) – Commander

Born: Tokyo, Japan
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Oleg Novitskiy (Roscosmos) – Flight Engineer

Born: Cherven, Belarus
Spaceflights: Exp. 33/34, 50/51
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Thomas Pesquet (ESA) – Flight Engineer

Born: Rouen, France
Spaceflights: Exp. 50/51
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Pyotr Dubrov (Roscosmos) – Flight Engineer

Born: Khabarovsk, Russia
Spaceflights: First flight

Shane Kimbrough (NASA) – Flight Engineer

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Spaceflights: STS-126, Exp. 49/50
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Megan McArthur (NASA) – Flight Engineer

Born: Honolulu, Hawaii
Spaceflights: STS-125
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THE **SCIENCE:**

What are some investigations the crew is operating?

During Expedition 65, crew members will work on experiments that could help us develop better pharmaceuticals and therapies for treating diseases on Earth, studies of cotton root systems that could identify varieties of plants that require less water and pesticides. They will also test a portable ultrasound technology, and will install new roll-out solar arrays based on a design tested on the orbiting laboratory in 2017.

Targeting Improved Cotton Through On-orbit Cultivation

Target, the retail store, is funding the investigation Targeting Improved Cotton Through On-orbit Cultivation that studies how cotton root system structure affects plant resilience, water-use, and carbon storing. Roots play a central role in plant stress resistance and survival, but their growth patterns depend upon gravity. This investigation examines how environmental factors and genes control development of roots in the absence of gravity. In order to explore deeper into space, humans need to be able to grow plants for food and oxygen production. The general knowledge of how gravity affects the structure and growth of plant roots gained in this investigation could contribute to future efforts to grow plants in space. What we learn could also enable the development of more robust cotton varieties that require less water and pesticide use.

Butterfly IQ Ultrasound

The Butterfly IQ Ultrasound investigation demonstrates the effectiveness of a portable ultrasound device used in conjunction with a mobile computing device in the space environment. The investigation examines ease of probe handling, quality of ultrasound images, and effectiveness of just-in-time instructions for autonomous use by the crew. Such commercial off-the-shelf technology could provide important medical capabilities for future exploration missions beyond low-Earth orbit. where immediate ground support is not an option.

Tissue Chips

An important scientific focus of Expedition 65 is continuing a series of Tissue Chips in Space studies. Tissue chips are small models of human organs containing multiple cell types that behave much the same as they do in the body. These chips may make it possible to identify safe and effective therapeutics – drugs or vaccines – much more quickly than the standard process. A partnership between the ISS National Lab and the National Institutes of Health's National Center for Advancing Translational Sciences (NCATS) has sent tissue chips to the space station to analyze the effects of microgravity on human health and translate that to improvements on Earth. Investigations are using tissue chips to study aging of the immune system, lung immune response, musculoskeletal disease, kidney function, muscle loss or sarcopenia, and more.

iROSA

Another important element of Crew-2's mission is updating the station's solar power system by installing the ISS Roll-out Solar Array (iROSA) – compact panels that roll open like a yoga mat. In 2017, the basic design underwent testing on the space station to determine its strength and durability. The new solar arrays will be positioned in front of six of the current arrays, and will use the existing sun tracking, power distribution, and channelization. This approach is similar to the one used to upgrade the station's external television cameras to high definition, using the existing power and control mechanisms. Each new solar array will produce more than 20 kilowatts of electricity, eventually totaling 120 kilowatts (120,000 watts) of augmented power during orbital daytime. The Expedition 65 crew is scheduled to begin preparations for supplementing the station's existing rigid panels this summer with the first pair of six new arrays.

THE MISSION **PATCH:**

The International Space Station Expedition 65 patch depicts the space station as it appears during the time the crew will be onboard. The space station flying over the Earth represents the overall reason for having a space station; to benefit the world through scientific research and international cooperation in space. When this expedition begins, the space station will have provided continued human presence in space for more than twenty years. Blue, the background color of the patch, symbolizes reliability. The stars represent the crew onboard the space station, as well as mission control centers located on three continents. Those stars, in that field of blue, also symbolize the thousands of space workers throughout the space station partnership who continue to contribute to the success of our International Space Station.

Credits: NASA

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