National Aeronautics and Space Administration

International Space Station

[MISSION SUMMARY]

EXPEDITION 42 began Nov. 10, 2014 and ends March 11, 2015. This expedition will include research projects focusing on the effects of microgravity on cells, Earth observation, physical science and biological and molecular science. There are three U.S. spacewalks planned during Expedition 42.

THE **CREW:**

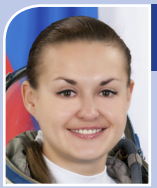
Soyuz TMA-14M • Launch: Sept. 25, 2014 • Landing: March 2015

Barry "Butch" Wilmore (NASA) – Commander
(Wil-more)

Born: Mt. Juliet, Tennessee
Interests: Football, flying
Spaceflights: STS-129
Bio: http://go.nasa.gov/tdaz79

Alexander Samokutyaev (Roscosmos) – Flight Engineer
(Sah-moe-koo-tee-YAH-yehv)

Born: Penza, Russia
Interests: Ice hockey, travel
Spaceflights: Exps. 27 and 28
Bio: http://go.nasa.gov/1Ad0gxC



Elena Serova (Roscosmos) – Flight Engineer
(Suh-ROH-vuh)

Born: Vozdvizhenka, Russia
Interests: Economics, flying
Spaceflights: Exps. 41 and 42 mark her first missions
Bio: http://go.nasa.gov/1AcZvVr

Soyuz TMA-15M • Launch: Nov. 23, 2014 • Landing: May 2015

Terry Virts (NASA) – Flight Engineer
(Verts)

Born: Baltimore
Interests: Astronomy, baseball, coaching youth sports
Spaceflights: STS-130
Bio: http://go.nasa.gov/w1eH1s
Twitter: @AstroTerry

Anton Shkaplerov (Roscosmos) – Flight Engineer
(SHKAP-luh-roff)

Born: Sevastopol
Interests: Fishing, golf, sports, travel
Spaceflights: Exps. 29 and 30
Bio: http://go.nasa.gov/1Dmd1Yd
Twitter: @AntonAstrey

Samantha Cristoforetti (ESA) – Flight Engineer
(Cris-ta-four-REHT-ee)

Born: Milan
Interests: Hiking, reading, scuba diving, travel, yoga
Spaceflights: Exps. 42 and 43 mark her first missions
Bio: http://go.nasa.gov/1EuQSa3
Twitter: @AstroSamantha

THE **SCIENCE:**

"What are some of the investigations the crew is working on?"

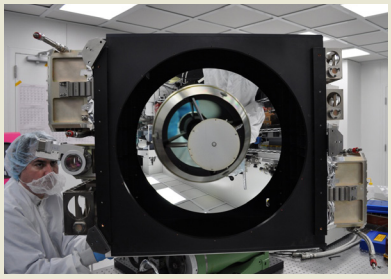
Observation of the genetic makeup of roundworms, aerosols in the atmosphere, levitating cooling liquid metals and immune cell repair in organisms are some of the highlights of the research to be conducted during Expedition 42. Organisms like roundworms, blue mussels and rodents will be used to examine the impacts of the space environment on their development, growth, and physiological and aging processes. This can lead to understanding better certain diseases and issues associated with human health.

Epigenetics in Space flown C. elegans (Epigenetics)

Epigenetics means "outside the genes," or changes that can be inherited for several generations without affecting an organism's basic DNA. This Japan Aerospace Exploration Agency study may help determine if the effects of microgravity are transmitted from one cell generation to another without changing the basic DNA of an organism. Researchers study millimeter-long roundworms (C. elegans) as models for larger organisms. In this investigation, four generations of the worms are grown aboard the space station, with adults from each generation preserved for later study on Earth.

Cloud-Aerosol Transport System (CATS)

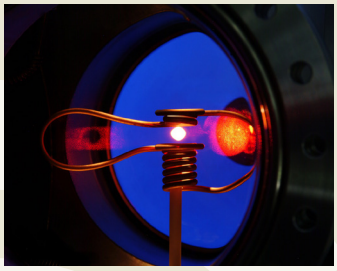
The CATS study examines the location, composition and distribution of aerosols – the particles that compose haze, dust, smoke and air pollutants – in the atmosphere. Aerosols are the atmospheric constituents that can affect weather, climate, airplane safety and human health. The CATS instrument measures aerosols using a light detection and ranging (LIDAR) system that is externally mounted on the space station. With the data, scientists may gain an improved understanding of the structure and evolution of Earth's atmosphere. This can lead to enhancements to spacecraft launch, landing and communications systems; help guide future atmospheric investigations of Mars, Jupiter or other worlds; and may help researchers model and predict climate changes on Earth.



Roughly the size of a refrigerator, the CATS instrument will provide more detailed information about the particles in Earth's atmosphere. Image Credit: NASA

Electromagnetic Levitator (EML)

The EML suite of material science investigations examines the effects of microgravity on various material properties. The EML acts as a furnace capable of levitating and heating metals up to 3,632 degrees Fahrenheit. Having such a facility in microgravity will allow scientists to observe the fundamental physical processes that occur as liquid metals cool. A potential outcome from EML research is the development of lighter, higher-performing alloys – mixtures of two or more metals or a metal and another material – for use on Earth and in space travel.



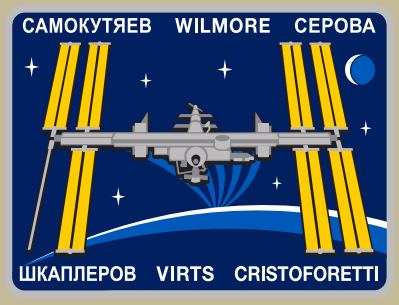
The new electromagnetic levitator on the International Space Station suspends liquid metals in weightlessness as they cool and solidify. Image credit: German Aerospace Center, DLR

Gene, Immune and Cellular Responses to Single and Combined Space Flight Conditions - B (TripleLux-B)

Gaining a better understanding of the effects of spaceflight at the cellular level of an organism may help scientists develop countermeasures to combat impairment of immune function in crew members on future long-duration missions. The TripleLux-B investigation compares the immune cells of blue mussels and rodents to determine how those cells fight bacteria and repair themselves after exposure to radiation and microgravity.

THE MISSION **PATCH:**

The Expedition 42 crew wrote the description that follows: The rectangular-shaped design portrays the International Space Station orbiting planet Earth with its solar array wings spread wide. Facing the sun with the lower left outboard solar array feathered, the left array portrays a prominent number "4" and the fully deployed arrays on the right form the Roman numeral version of "2." This signifies the two increment crews which, together, comprise the six-member international Expedition 42 crew. The crew and all supporting personnel around the world are also represented by the six stars adorning the sky around the complex.



National Aeronautics and Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058

www.nasa.gov

NP-2014-11-019-JSC