National Aeronautics and Space Administration

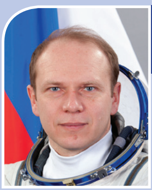
International Space Station

[MISSION SUMMARY]

EXPEDITION 38 begins begins Nov. 11, 2013 and ends March 12, 2014. This expedition will include research projects focusing on technology demonstration, cellular and plant biology, human health management for long duration space travel and maturing critical systems that currently support the International Space Station. There are two planned Russian spacewalks for Expedition 38: one in December 2013 and one in February 2014.

THE CREW:

Soyuz 36 TMA-10M • Launch: Sept. 25, 2013 • Landing: March 12, 2014



Oleg Kotov (Roscosmos) – Commander
(AH'-leg KO'-tuff)

Born: Simferopol, Ukraine
Interests: Scuba diving
Spaceflights: Exps. 15, 22, 23
Cosmonaut Bio: http://www.jsc.nasa.gov/Bios/htmlbios/kotov-ov.html

Sergey Ryazanskiy (Roscosmos) – Flight Engineer
(Sir-gey Rih-ZAN-skee)

Born: Moscow, Russia
Interests: Numismatics, playing guitar, tourism, sports
Spaceflights: Exps. 37 and 38 mark his first mission
Cosmonaut Bio: http://www.jsc.nasa.gov/Bios/htmlbios/ryazanskiy.html

Mike Hopkins (NASA) – Flight Engineer

Born: Lebanon, Mo.
Interests: Backpacking, camping, snow skiing, weight lifting, running, hockey, football
Spaceflights: Exps. 37 and 38 mark his first mission
Twitter: http://twitter.com/AstroIllini
Facebook: http://www.facebook.com/trainastronaut
Astronaut Bio: http://www.jsc.nasa.gov/Bios/htmlbios/hopkins-ms.html

Soyuz 36 TMA-11M • Launch: Nov. 6, 2013 • Landing: May 2014

Koichi Wakata (JAXA) – Flight Engineer
(Ko-ICH-ee Wah-KAH-ta)

Born: Saitama, Japan
Interests: Hang-gliding, baseball, tennis, snow skiing, flying
Spaceflights: STS-72; STS-92; STS-119; STS-127; Exps. 18, 19, 20
Twitter: http://twitter.com/Astro_Wakata
Astronaut Bio: http://iss.jaxa.jp/en/astro/biographies/wakata/index.html

Richard Mastracchio (NASA) – Flight Engineer
(Richard Muh-STRAH-kee-oh)

Born: Waterbury, Conn.
Interests: Flying, baseball, basketball, swimming, wood working, spending time with his family
Spaceflights: STS-106, STS-118, and STS-131
Twitter: http://twitter.com/AstroRM
Astronaut Bio: http://www.jsc.nasa.gov/Bios/htmlbios/mastracc.html

Mikhail Tyurin (Roscosmos) – Flight Engineer
(MEEK-hail Tee-YOU-run)

Born: Kolomna, Russia
Interests: Sailing, mathematics
Spaceflights: STS-105, STS-108; Exps. 3, 14
Cosmonaut Bio: http://www.jsc.nasa.gov/Bios/htmlbios/turin.html

THE SCIENCE:

What's the crew working on?

Expedition 38 includes a variety of research, ranging from protein crystal growth studies and biological studies of plant seedling growth to technology demonstrations that will improve understanding of liquid movement in microgravity to student experiments that observe celestial events in space. One of several key research focus areas for this expedition is human health management for long duration space travel, as NASA and Roscosmos prepare for two crew members to spend one year aboard the space station in 2015.

Multiple Protein Crystal Growth Experiments

An image of Crystal of Trypsin grown in microgravity during Expedition 4 on the International Space Station. (NASA)

High quality crystals grown on the space station are used to determine protein structure, which helps researchers better understand protein function. This knowledge will lead to designing new therapeutics for diseases. In fact, a previous study of protein crystals on the space station led to discovery of a water molecule in a protein-inhibitor complex that is now being used to develop a treatment for Duchenne muscular dystrophy.

Several new protein crystal growth experiments will be conducted during Expedition 38. One called the Commercial Protein Crystal Growth - High Density Protein Crystal Growth Modified (CPCG-HM) uses the microgravity environment to determine the best crystal growth strategies for optimal protein crystal structures. Another investigation, the Center for Advancement of Science in Space Protein Crystal Growth High Density Protein Crystal Growth-1 (CASIS PCG HDPCG-1) seeks to crystallize huntingtin, a protein associated with Huntington's disease. The CASIS PCG HDPCG-2 investigation seeks to crystallize the cystic fibrosis protein and closely related proteins to improve treatments for cystic fibrosis. The fourth new protein crystal investigation, the HDPCG (Merck) study, seeks to crystallize a human monoclonal antibody, an antibody capable of identical copy, developed by Merck Research Labs. This antibody is currently undergoing clinical trials for the treatment of an immunological disease.

Multi-Gas Monitor

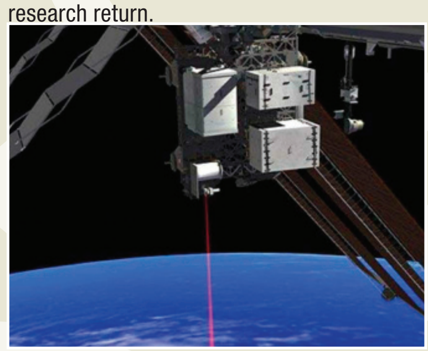
The Multi-Gas Monitor is a technology demonstration of a portable laser spectroscopy device that can simultaneously measure oxygen, carbon dioxide, ammonia and water vapor in microgravity. Spectroscopy studies the interaction between matter and radiated energy, and the data is often represented by a spectrum. Laser spectroscopy points a laser beam at a sample, resulting in a characteristic light source for analysis.

T-Cell Activation in Space

The T-Cell Activation in Space investigation seeks to identify the defect in T-cell activation, an immune response used to fight foreign antigens, during microgravity exposure. This research also can help in understanding and treating a range of auto-immune diseases such as arthritis and diabetes. Identifying this defect may someday inhibit the decline of the immune system as a normal part of the aging process.

Optical Payload for Lasercomm Science

The Optical Payload for Lasercomm Science (OPALS) investigation tests the use of laser optics to transfer information to the ground. The switch from radio frequency to a laser beam—which can be hundreds to thousands of times narrower in comparison to radio waves—could improve communication data rates by a factor of 10 to 100. This advanced approach stands to increase the amount of data future missions can send using the same power resources, optimizing research return.



An artist's rendering shows the Optical Payload for Lasercomm Science (OPALS) laser beaming down to Earth from the International Space Station. (NASA)

THE MISSION **PATCH:**

As the International Space Station has become a stepping stone to future space exploration, the Expedition 38 mission patch design paints a visual roadmap of exploration beyond low Earth orbit, most prominently represented by the design's flowing Expedition 38 mission numbers that wrap around Earth, the moon and Mars. Just as the sun is a guiding light in the galaxy, the space station illuminates the bottom of the design as a shining beacon of the advancement of science, knowledge and technology carried out aboard the space station. To visually capture the idea of the space station being a foundation for infinite discovery, the space station's iconic solar arrays span upwards, providing the number 38 and its exploration roadmap a symbolic pedestal to rest on. Finally, the overall use of red, white and blue in the design acknowledges the flags of the countries of origin for Expedition 38's crew -- the United States, Russia, and Japan.
http://spaceflight.nasa.gov/gallery/images/station/crew-38/html/iss038-s-001.html

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