National Aeronautics and Space Administration

International Space Station

[MISSION SUMMARY]

EXPEDITION 39 begins March 11, 2014 and ends May 28, 2014. This expedition will include research projects focusing on human research, biology and biotechnology, physical science investigations, technology demonstrations and educational activities. Crew members will even grow plants in space. There are no planned spacewalks for Expedition 39.

THE **CREW:**

Soyuz TMA-11M • Launch: Nov. 6, 2013 • Landing: May 28, 2014

Koichi Wakata (JAXA) – Flight Commander
(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: @Astro_Wakata
Astronaut Bio: http://iss.jaxa.jp/en/astro/biographies/wakata/index.html

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

Born: Waterbury, Conn.
Interests: Flying, baseball, basketball, swimming, woodworking, spending time with family
Spaceflights: STS-106, STS-118, and STS-131
Twitter: @AstroRM
Astronaut Bio: http://go.nasa.gov/YILlv5

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://go.nasa.gov/w4S298

Soyuz TMA-12M • Launch: March 25, 2014 • Landing: September 2014

Oleg Artemyev (Roscosmos) – Flight Engineer
(AH'-leg Ar-tuh-MY-ev)

Born: Riga, Latvia
Interests: Physics
Spaceflights: Exps. 39 and 40 mark his first missions
Cosmonaut Bio: http://go.nasa.gov/1iKilTW

Alexander Skvortsov (Roscosmos) – Flight Engineer
(Skuh-VORT-tsoff)

Born: Schelkovo, Moscow Region, Russia
Interests: Diving, soccer, badminton, fishing, hunting, tourism
Spaceflights: Exps. 23, 24
Cosmonaut Bio: http://go.nasa.gov/1ilN4Oh

Steve Swanson (NASA) – Flight Engineer
(SWAHN-son)

Born: Syracuse, NY.
Interests: Mountain biking, basketball, skiing, weight lifting, trail running, woodworking, spending time with family
Spaceflights: STS-117; STS-119
Astronaut Bio: http://go.nasa.gov/1bEdlAJ
Instagram: http://instagram.com/iss"

THE **SCIENCE:**

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

High definition camera equipment, growing plants in space, and a variety of physical science, biology and biotechnology experiments define the research of Expedition 39. Other investigations include human research, technology demonstrations and educational activities. Expedition 39 activities will continue to advance our body of scientific knowledge, provide a platform for Earth and astronomical observation, educate and inspire younger generations and prepare future crews for deep space exploration beyond low-Earth orbit.

Vegetable Production System (Veggie)

Outredgeous red romaine lettuce plants grow inside a prototype Veggie flight pillow. Veggie will help astronauts grow safe, fresh food and provide recreational activity while aboard the space station. (NASA/Gioia Massa)

Veggie is a plant growth facility capable of producing salad-type crops to provide the crew with appetizing, nutritious and safe fresh food and supporting crew relaxation and recreation. The Veggie unit provides lighting and nutrient delivery, but uses the cabin environment on the space station for temperature control and as a source of carbon dioxide to promote growth. This study will emphasize the focus on human habitability in space, since growing food in microgravity may improve long-duration spaceflight. Veggie can support a variety of studies used to determine how plants sense and respond to gravity. Astronauts will harvest the plants for further investigation. With continued plant growth studies aboard the space station using facilities like Veggie, crews may one day consume produce during long-term missions in low-Earth orbit or to an asteroid or Mars.

The Veggie unit's growth volume will be the largest volume available to date for plant growth on the space station, which will enable larger produce than was previously available, due to size restrictions. This improved understanding of plant growth and development in microgravity has important implications for improving plant growth and biomass production on Earth.

Advanced Colloids Experiment-Microscopy-2 (ACE-M-2)

ACE-M-2 examines the behavior of liquids and gases near the critical point, or the point at which there is no distinct boundary between the liquid and gas phases. ACE-M-2 uses a new microscope to record micro-scale events on short time scales; previous experiments observed large-scale behavior over many weeks. Liquids and gases of the same material usually have different densities, so they would behave differently under the influence of gravity, making the microgravity environment of the International Space Station ideal for these experiments. Particle separation and behavior in liquids, gels and creams is important for developing consumer and household products on Earth. The ACE investigations on the space station provide insight into product formulations that could be used to maximize stability and shelf life.

High Definition Earth Viewing (HDEV)

The HDEV investigation places four commercially available high definition cameras on the exterior of the space station for use in streaming live video of Earth for online viewing. The cameras are enclosed in a temperature-specific case and exposed to the harsh radiation of the space environment. Analysis of the effect of space on the video quality during the HDEV operational period may help engineers determine the best types of commercially available cameras to use on future missions. Using available products may be more cost-effective than designing new products. High school students helped design some of the cameras' components, through the High Schools United with NASA to Create Hardware program, and student teams will operate the experiment.

MicroRNA Expression Profiles in Cultured Human Fibroblasts in Space (Micro-7)

The majority of cells in the human body are non-dividing cells that provide critical functions, from blood cells to cells in different organs. Micro-7 studies how microgravity affects the genetic expression and physical shape of these types of cells for the first time. Understanding how these cells function in microgravity is a step toward understanding how organs, tissues and the entire body change during spaceflight. Researchers can use data from Micro-7 in future Earth-based studies to examine whether the cell changes observed during spaceflight are seen in disease states of tissues and organs as well. Ultimately, this may help scientists better understand disease. This type of research could lead to developing new drug treatments.

THE MISSION **PATCH:**

Expedition 39 of the International Space Station Program marks the 15th year of operation since the start of the space laboratory assembly. Today, the U.S., Russia, Japan, Canada and the European Space Agency are partnering in the operation of the largest-ever orbital outpost managed by humanity. The names of the six crew members are depicted in their native languages. For Expedition 39, the Soyuz spacecraft serves as transport vehicle for the crew members to and from the station. During this expedition, the space station will serve as a platform for scientific research, Earth and astronomical observation and education, as well as a stage for the development of new technologies used for exploring beyond low-Earth orbit. The star above the complex signifies human space exploration towards new frontiers. The crew members added these words: "The crew of Expedition 39 is proud to serve the international community in furthering our scientific knowledge and in expanding human presence in space."

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