National Aeronautics and Space Administration

International Space Station

[MISSION SUMMARY]

EXPEDITION 43 began March 11, 2015 and ends May 13, 2015. This expedition will include the beginning of research projects focusing on the One-Year mission, which includes medical, psychological and biomedical studies with NASA Astronaut Scott Kelly and Roscosmos Cosmonaut Mikhail Kornienko who will spend a year in space. Expedition 43 also will include astrophysics research, physical science investigations and technology demonstrations. There are no spacewalks planned during Expedition 43.

THE **CREW:**

Soyuz TMA-15M • Launch: Nov. 23, 2014 • Landing: May 13, 2015

Terry Virts (NASA) – Commander
(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, Crimean Peninsula
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, Italy
Interests: Hiking, reading, scuba diving, travel, yoga
Spaceflights: Exps. 42
Bio: http://go.nasa.gov/1EuQSa3
Twitter: @AstroSamantha

Soyuz TMA-16M • March 27, 2015 • Landing: September 11, 2015
Note: *Kelly and Kornienko will remain onboard until March 2016*

Gennady Padalka (Roscosmos) – Flight Engineer
(Puh-DOLL-kuh)

Born: Krasnodar, Russia
Interests: Diving, parachute sport and theater
Spaceflights: Soyuz-TM-28/Mir Exp. 26, ISS Exps. 9, 19 and 20
Bio: http://go.nasa.gov/1u1HVm6

Scott Kelly (NASA) – Flight Engineer

Born: Orange, New Jersey
Interests: Racquetball, running, water sports and weight lifting
Spaceflights: STS-103, STS-118, Exps. 25 and 26
Bio: http://go.nasa.gov/SbcMZD
Twitter: @StationCDRKelly
Instagram: stationcdrkelly

Mikhail Kornienko (Roscosmos) – Flight Engineer
(Kor-knee-EHN-koh)

Born: Syzran, Russia
Interests: Mountaineering
Spaceflights: Exps. 23 and 24
Bio: http://go.nasa.gov/Tg0ksk

THE **SCIENCE:**

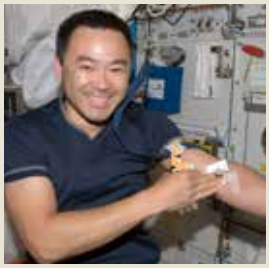
"What are some of the investigations the crew is working on?"

Researchers will begin to study meteors entering Earth's atmosphere and test the durability of a new synthetic material with human-like features when exposed to the harsh microgravity environment during Expedition 43. In addition, Expedition 43 marks the inception of the One-Year Mission of Kelly and Kornienko, which will include seven categories of human health research. These investigations are expected to yield beneficial knowledge on the medical, psychological and biomedical challenges faced by astronauts during long-duration spaceflight.

Fluid Shifts Before, During and After Prolonged Space Flight and Their Association with Intracranial Pressure and Visual Impairment (Fluid Shifts)

Scientists believe fluid shifts into an astronaut's head during spaceflight lead to increased pressure in the brain. This also may cause pressure to the back of the eye, causing the eye to change shape. The Fluid Shifts investigation measures how much fluid moves from the lower body to the upper body, in or out of cells and blood vessels, and determines the impact these shifts have on fluid pressure in the head, changes in vision and eye structures. The study results will help improve researchers' understanding of how blood pressure in the brain affects eye shape and vision. This knowledge may benefit people on Earth with disease states that include swelling and pressure to the brain or who are confined to bed rest. Results also could help scientists develop preventive measures against changes in astronauts' vision and eye damage.

Biochemical Profile (Biochem Profile)



NASA/PHOTO

Japanese Aerospace Exploration Agency astronaut Aki Hoshide finishes his blood draw and prepares to spin the blood tubes in the Human Research Facility Rack 2 Refrigerated Centrifuge during Expedition 32 aboard the International Space Station.

Another One-Year Mission study will allow for quicker response to researchers' requests for spaceflight data about the effects of microgravity on human physiology. Through the collection, processing and storage of crew member blood and urine samples, the Biochem Profile investigation will establish a database of biomedical data to be shared among multi-disciplinary researchers and medical operations that assess the effects of spaceflight on humans. This data can be used to provide information about medical risks during long-duration space travel and to evaluate potential countermeasures established to protect crew health. With greater understanding of how various physiological systems respond to changing gravity conditions, physicians may be able to design new treatments for people on Earth with limited mobility.

Meteor Composition Determination (Meteor)

The Meteor investigation, originally slated for delivery on the failed Orbital Cygnus Commercial Resupply Services-3 mission, will now be part of Expedition 43 research and will enable the first space-based observations of meteors entering Earth's atmosphere from space. Meteor uses high-resolution video and image analysis of the atmosphere to determine the physical and chemical properties of the meteoroid dust, such as size, density and chemical composition. The study of meteoroid dust from the space station provides information about the parent comets and asteroids. Researchers investigate the elemental composition of meteors to better understand how the planets developed. Continuous measurement of meteor interactions with Earth's atmosphere could spot previously unforeseen meteors and help protect spacecraft and Earth from potential collisions with this celestial debris.

NASA/PHOTO ISS028E024847

A Perseid meteor streaks through the Earth's atmosphere, as seen and photographed by astronaut Ron Garan while aboard the International Space Station on August 13, 2011

Synthetic Muscle: Resistance to Radiation; Ras Labs-CASIS-ISS Project for Synthetic Muscle: Resistance to Radiation (Synthetic Muscle)

The Synthetic Muscle investigation tests a specific type of polymer developed by Ras Labs in Quincy, Massachusetts. The polymer contracts and expands similar to real muscle. Since robots can perform tasks too dangerous for humans in space, building robots with synthetic muscle could create more humanoid robots with greater dexterity. The synthetic muscle will be tested with a variety of additives and coatings aboard the space station to make sure it can withstand radiation exposure encountered in microgravity. Results from this study may allow researchers to design more durable robots for deep space travel and could improve robotics and prosthetics on Earth.

THE MISSION **PATCH:**

The hexagon (six-sided) shape of the Expedition 43 patch represents the six crew members living and working onboard the orbital outpost. The International Space Station is portrayed in orbit around Earth, representing the multi-national partnership that has constructed, developed and continues to operate the space station for the benefit of all humankind. The sunrise marks the beginning of a new day, reflecting the fact that humanity is at the dawn of its history as a space faring species. The moon and planets represent future exploration of the solar system, for which the space station is a stepping stone. Finally, the five stars honor the crews who have lost their lives during the pursuit of human spaceflight.

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