National Aeronautics and Space Administration

International Space Station

[MISSION SUMMARY]

EXPEDITION 44

Expedition 44 began June 11, 2015 and ends September 11, 2015. This expedition includes human research, biology and biotechnology, astrophysics research, physical science investigations and education activities.

THE CREW:

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

Gennady Padalka (Roscosmos) – Commander
(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

Soyuz TMA-16M Launch: July 22, 2015 • Landing: November 2015

Oleg Kononenko (Roscosmos) – Flight Engineer
(AH-leg Koh-no-NEHN-koh)

Born: Chardzhow, Turkmenia
Interests: reading books, sports
Spaceflights: Exp. 17
Bio: http://go.nasa.gov/1PpoRUM

Kjell Lindgren (NASA) – Flight Engineer
(CHELL LIND-grehn)

Born: Taipei, Taiwan
Interests: amateur astronomy, church activities, movies, photography, reading, running
Spaceflights: Exps. 44 and 45 mark his first missions
Bio: http://go.nasa.gov/1zx1vd4
Twitter: @astro_kjell

Kimiya Yui (JAXA) – Flight Engineer
(KIH-mee-yah YOO-we)

Born: Nagano, Japan
Interests: cycling, flying
Spaceflights: Exps. 44 and 45 mark his first missions
Bio: http://go.nasa.gov/1cnrCde
Twitter: @Astro_Kimiya

THE SCIENCE:

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

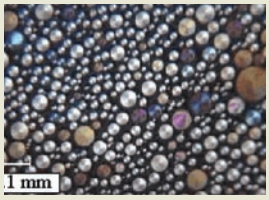
Crew members will install equipment and conduct experiments that help researchers study microparticles for nanotechnology and nanoscience, observe potentially threatening microbes, examine liquid crystals in motion, and perform a one-year comparison of the effects of space travel on identical twins during Expedition 44. Investigations like these demonstrate how space station crews help advance NASA's journey to Mars while making discoveries that can benefit all of humanity.

Microchannel Diffusion (Microchannel Diffusion)

Using microgravity, researchers seek insight into the interactions of particle flows at the nanoscale. Nanotechnology interactions occur at the atomic level, and some of the basic physical processes happen on small scales. Since fluid dynamics are very different on this small scale, scientists want to know how microparticles interact with surfaces of channels than with each other. Nanoscience and nanotechnology are the study and application of exceptionally small things and can be used across the fields of medicine, biology, computer science and many others. Knowledge gleaned from Microchannel Diffusion may have implications for drug delivery, particle filtration and future technological applications for space exploration.

Microbial Tracking Payload Series (Microbial Observatory-1)

A variety of microbes which can threaten crew health and jeopardize equipment reside aboard the space station. The Microbial Observatory-1 investigation monitors the types of microbes on the station over a one-year period. Samples returned to Earth enable scientists to understand the diversity of the microbial flora on the station and how it changes over time. The same techniques can be used to identify microbes in hospitals, pharmaceutical laboratories and other environments on Earth where microbe identification is crucial.



A close-up of smectic islands, part of the OASIS investigation aboard the International Space Station. Image credit: NASA

Observation & Analysis of Smectic Islands in Space (OASIS)

The OASIS research team examines the behavior of liquid crystals in microgravity. Specifically, the research team is observing the overall motion of the crystals and the merging of crystal layers known as smectic islands. This investigation may shine light on how microgravity affects the ability of liquid crystals to act like both a liquid and a solid. Liquid crystals are used in television and laptop screens, watches and clocks, and a variety of other electronics with flat panel displays. Studying them in microgravity may help researchers design better liquid crystal display (LCD) devices on Earth. Engineers also could use certain types of liquid crystals in small screens applied directly to the face shields in future space helmets, enabling astronauts to easily view the small screens and read important information during a spacewalk.

Twins Study

The Twins Study is an integrated compilation of multiple studies led by numerous principal investigators at various centers and academic institutions. The studies take advantage of a unique opportunity to look at the effects of space travel on identical twins: one in space and the other on Earth for the same year. The study looks at changes in the human body in the fields of genetics, psychology, physiology, microbiology, and immunology.

NASA Astronaut Scott Kelly along with his brother, former Astronaut Mark Kelly, at Johnson Space Center in Houston, Texas. Scott Kelly is participating in a one-year mission aboard the International Space Station. Image Credit: Robert Markowitz

THE MISSION **PATCH:**

The International Space Station is positioned in the foreground poised to study Earth, the sun and cosmos that lie beyond. Two members of the Expedition 44 crew will spend a full year on the space station, providing valuable experience for future long duration missions into deep space. The 12 Earths represent the planet's position around the sun over the course of that year. Four of the Earths are silhouetted in sunlight representing the four month duration of Expedition 44. The nine stars in the background represent the nine individuals that will visit and work on the space station during the course of the expedition, including the six-member crew, whose names are inscribed around the patch's border, and the three-person Soyuz "taxi" crew. The use of ellipses and circles throughout the patch reflect a theme of completion or return as investments made in this orbiting laboratory return benefit to the Earth and its inhabitants.

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