

In Brief

Cassini-Huygens closes in on Saturn

As the NASA/ESA Cassini-Huygens spacecraft closes in on Saturn, its view is growing sharper with time and now reveals new atmospheric features in the planet's southern hemisphere. This natural colour image was taken on 27 March by Cassini's narrow angle camera. The image is a composite of three exposures, in red, green and blue, taken when the spacecraft was 47.7 million kilometres from the planet.

Two faint dark spots are visible in the southern hemisphere – storms that are getting close and will eventually merge or squeeze past each other. Further analysis of such dynamic systems in Saturn's atmosphere will help scientists understand their origins and complex interactions.

Some of Saturn's moons are also visible in this image: Enceladus, Mimas, Tethys and Epimetheus. Brightnesses have been exaggerated to aid visibility. Its largest moon, Titan, has always fascinated scientists because it has a thick atmosphere that might resemble that of a very young Earth. Early in 2005, the Huygens probe will land on Titan's surface to collect clues about how life might have begun on Earth. At the same time, the Cassini orbiter will continue to explore Saturn and its rings.

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. Huygens will be the first probe to land on a world in the outer Solar System.



NASA/JPL/Space Science Institute

Space Girls' Day

"It is great to see that science and technology can be so much fun! And it is nice that people in these jobs are cool, too," says a 16-year-old while admiring the training pool in the European Astronaut Centre (EAC). On 22 April, EAC and the German Aerospace Centre (DLR) in Cologne and the European Space Operations Centre (ESOC) in Darmstadt, Germany, were full of teenage girls who wanted to see what it is like to work in the space sector. Girls' Day is a Germany-wide event for schoolgirls between 14 and 16. All across the nation, technology-based businesses, research institutes, laboratories, offices and organisations

like ESA and DLR open their doors to inform potential future engineers and scientists about career possibilities in science and technology.

More than 160 girls visited the different centres, conducted experiments in propulsion technology, tried out computers in ESOC's control room and chatted with female professionals from all disciplines about how they became interested in space. At the end of the day, the girls left exhausted and with lots of new knowledge in their heads – the most important of which is that science isn't scary after all!



The girls enjoyed the hands-on activities most.



Future control room staff?



Or future space scientists?

DELTA mission concluded successfully with Soyuz landing



ESA astronaut André Kuipers performs the SUIT experiment, assisted by his Russian colleague Gennadi Padalka



The Soyuz launcher is rolled out to the launch pad in Baikonur

The 11-day DELTA mission to the International Space Station (ISS) came to a successful conclusion when the Soyuz TMA-3 command module, carrying Dutch ESA astronaut André Kuipers and the ISS Expedition 8 crew, touched down on 30 April in Kazakhstan after a return flight of just over three hours. Alexander Kaleri, the Soyuz Commander, and the second Flight Engineer, Michael Foale (NASA), were the returning Expedition 8 crew who had been stationed on the ISS since 20 October. "It was just like a fun-fair ride," Kuipers said after the landing.

The DELTA mission included nine days on the International Space Station and achieved all of its major objectives. The astronauts carried out the intensive experiment programme successfully and the Soyuz TMA-3 spacecraft, stationed at the ISS for the past six months to act as the crew lifeboat, was replaced. André Kuipers' to-do list was one of the most extensive experiment programmes undertaken by a European astronaut so far on the International Space Station, spanning the fields of human physiology, biology, microbiology, physical science, Earth observation, education and technology. Many of these experiments were developed by Dutch researchers and built by Dutch industry and research institutions.

"I am very pleased with the execution of the experiment programme", said ESA's Delta Mission Scientist, Marc Heppener, also from the Netherlands. "André has had a very busy schedule for the past 11 days. I am also extremely pleased that we have already obtained scientific results during the mission itself. The results obtained from the experiments will undoubtedly have an impact across many areas both on Earth and in space."

Tens of thousands of schoolchildren in the Netherlands, Germany and other countries benefited from the mission, having carried out the same seed germination experiment as André Kuipers while he was on the ISS.



A view of the Soyuz spacecraft, the ISS and Earth.

The educational benefits of the mission will continue in the future through the production of educational materials to be distributed to 10 000 schools across Europe. These materials are being compiled using video footage of experiments shot on the ISS during the mission.

The DELTA mission was sponsored by the Dutch Government through the Ministry of Education, Culture and Science and the Ministry of Economic Affairs. During the mission André Kuipers had numerous contacts with the media in the Netherlands and other countries. André also had the opportunity to talk over amateur radio to schoolchildren who had won the "Zeg het ISS" competition and answer their questions.

Said Mr Jörg Feustel-Büechl, ESA Director of Human Spaceflight: "ESA's cooperation with the Russian Federal Space Agency continues to produce excellent results. This is the fifth Soyuz mission to the ISS with an ESA astronaut, and its success heralds more Soyuz missions in the future, with two further missions under discussion for next year. The next flight by an ESA astronaut to the ISS on a Russian Soyuz will probably take place in April 2005."

In addition to the experiment programme, the DELTA mission served to change the crew on board the ISS. The ISS Expedition 8 crew have now been replaced by the ISS Expedition 9 crew, Gennady Padalka and Edward 'Mike' Fincke (NASA), who arrived with André Kuipers at the ISS in the Soyuz TMA-4 spacecraft on 21 April and are scheduled to return next October.



André Kuipers in the ordered chaos of the Space Station.



What does a real Dutch astronaut take into space? Oranges of course!



A cup of tea and some Dutch cheese after a safe, but turbulent landing.

Tune into EuroNews for some space TV

The ESA Bulletin provides you with a regular dose of space news. If you would like to supplement these with some moving pictures, find the EuroNews channel on your TV – a special TV magazine dedicated to Space, produced by EuroNews in collaboration with ESA, is being broadcast three times a day! This Space Magazine has already covered topics like Galileo, the European Astronaut Centre and the International Space Station, with topics changing every fortnight, and is also available on the web.

Although space issues are already covered in its bulletins for breaking news, EuroNews is now dedicating a special programme to Space issues, complementing its more technically focused Hi-Tech magazine. The stories will cover all space activities: science, applications, Earth observation, launchers and human spaceflight. The aim is to help Europeans understand the benefits of the missions and activities of their space agency.

EuroNews is a key medium for delivering international information with a European point of view. Broadcast in 79 countries, EuroNews reaches 144 million households in Europe, the Middle East, Africa, Central Asia and North and Latin America via cable, digital satellite and through terrestrial channels. This Space Magazine is produced and broadcast every two weeks in seven different languages, with a new programme starting every second Friday. Each magazine is

four minutes long and is broadcast 21 times per week, including evening prime time on Fridays and Saturdays, in order to reach the largest audience.

For more information, contact Claus Habfast, ESA's Television Executive Producer: Claus.Habfast@esa.int



ATV's videometer ready to dock

The 'videometer', a new technology device to ensure very precise automatic rendezvous operations between the 20.7 tonne Jules Verne Automated Transfer Vehicle and the International Space Station (ISS), has been successfully tested in March.

Based on the design of a star tracker, the Jules Verne videometer, the first automatic optical operational system ever used for spacecraft navigation, has been through extensive simulated rendezvous tests. "For the first time, the ATV rendezvous sensors were used successfully in real conditions. And, within their operational domain, they worked exceptionally well," said ESA ATV engineer Stein E. Strandmoe, who supervised a critical 10-day test campaign.

For the final rendezvous manoeuvres with the ISS, the ATV will use its eye-like sensors, combined with additional parallel measurement systems, which will allow automatic docking with

incredible centimetre precision while the spacecraft and the ISS are circling the Earth at 28 000 km/h.

The videometer is able to analyse images of its emitted laser beam automatically reflected by passive retroreflectors' serving as targets installed on the Station, next to the Russian docking port where the ATV will be attached.

During the last 200 metres of the orbital final approach manoeuvre, the videometer must automatically recognise the retroreflectors target patterns and then calculate the distance and direction to the docking port.

To realistically check the videometer, the tests were conducted in a hi-tech research facility at the French defence agency 'Délégation Générale pour l'Armement' (DGA), located in Val-de-Reuil, 100 km west of Paris. Inside the huge 600 metre long building, a 120 000-kg mobile platform riding on 550 metre-long

rails, enabled the simulation of a continuous approach between the two space vehicles. On the platform, a set of passive retroreflectors identical to the ones to be installed on the ISS faced the videometer, which was mounted on an articulated robotic arm representing the ATV in motion.

At greater distances, Jules Verne will use a relative GPS reference system to get closer to the Station.

"The most surprising thing was that the sensors were almost undisturbed when we tried to fool them with other reflecting surfaces or other lights that could interfere with rendezvous targets in the ISS background," said Strandmoe. *"It's amazing how the videometer, as a totally new development, proved to be such a robust system. I was quite surprised that it worked so well the first time it was tested!"*



Greece and Luxembourg to join ESA

Greece and Luxembourg are expected to become full members of the European Space Agency by 1 December 2005, after their national approval procedures have been completed.

The Hellenic Republic officially applied to join ESA last October, the Grand Duchy of Luxembourg in December. The ESA Council unanimously approved both applications. Greece and Luxembourg have been granted observer status to attend meetings of ESA's Council and all its subordinate bodies, to enable them to already familiarise themselves with the Agency's procedures and working practices.