In Brief

Ariane-5 ES Launch of ATV *Jules Verne*

When the new Ariane ES launched ATV *Jules Verne* into the expected orbit with high precision on 9 March 2008, it was not just another perfect launch of Ariane-5 – it was something very special and frontier-breaking, opening up new perspectives for Europe.

The mission was the most complicated ever undertaken by any Ariane launch vehicle: a first boost of the upper stage over the Atlantic Ocean to reach an elliptical orbit, followed by a ballistic phase flying over the most populated parts of Europe, then a second boost over the Pacific Ocean to circularise the orbit at 260 km, then separation of the ATV *Jules Verne* in this orbit followed by a full orbit in order to perform a braking boost and a destructive reentry over the Pacific Ocean.

In order to monitor the Ariane-5 ES ATV mission, the most comprehensive tracking network ever established for an Ariane launch had to be deployed. It employed telemetry reception from Kourou, a vessel in the Atlantic Ocean, ESA's new tracking station in the Acores, tracking stations in Adelaide and Dongara in Australia and Invercargill in New Zealand.

This launch not only marked Ariane's first mission to the International Space Station (ISS), establishing Europe as a major partner in the ISS collaboration, but it also opened up new aspirations and opportunities for Ariane-5 in terms of missions needing reignition, such as for the deployment of the Galileo constellation. esa

The Ariane-5 ES-ATV launcher poised at Ariane Launch Complex No.3 (ELA-3) at the Guiana Space Centre. On board is Jules Verne, *ESA's first Automated Transfer Vehicle for the ISS*

Lift-off of the Ariane-5 ES-ATV launcher from the Guiana Space Centre, Europe's Spaceport, in Kourou, on 9 March 2008

Jules Verne Boosts ISS Orbit

ESA's ATV *Jules Verne* was used for the first time to raise the orbit of the International Space Station on 25 April. A 740-second burn of the ATV's main engines successfully lifted the altitude of the 280-tonne ISS by around 4.5 km to a height of 342 km above Earth's surface.

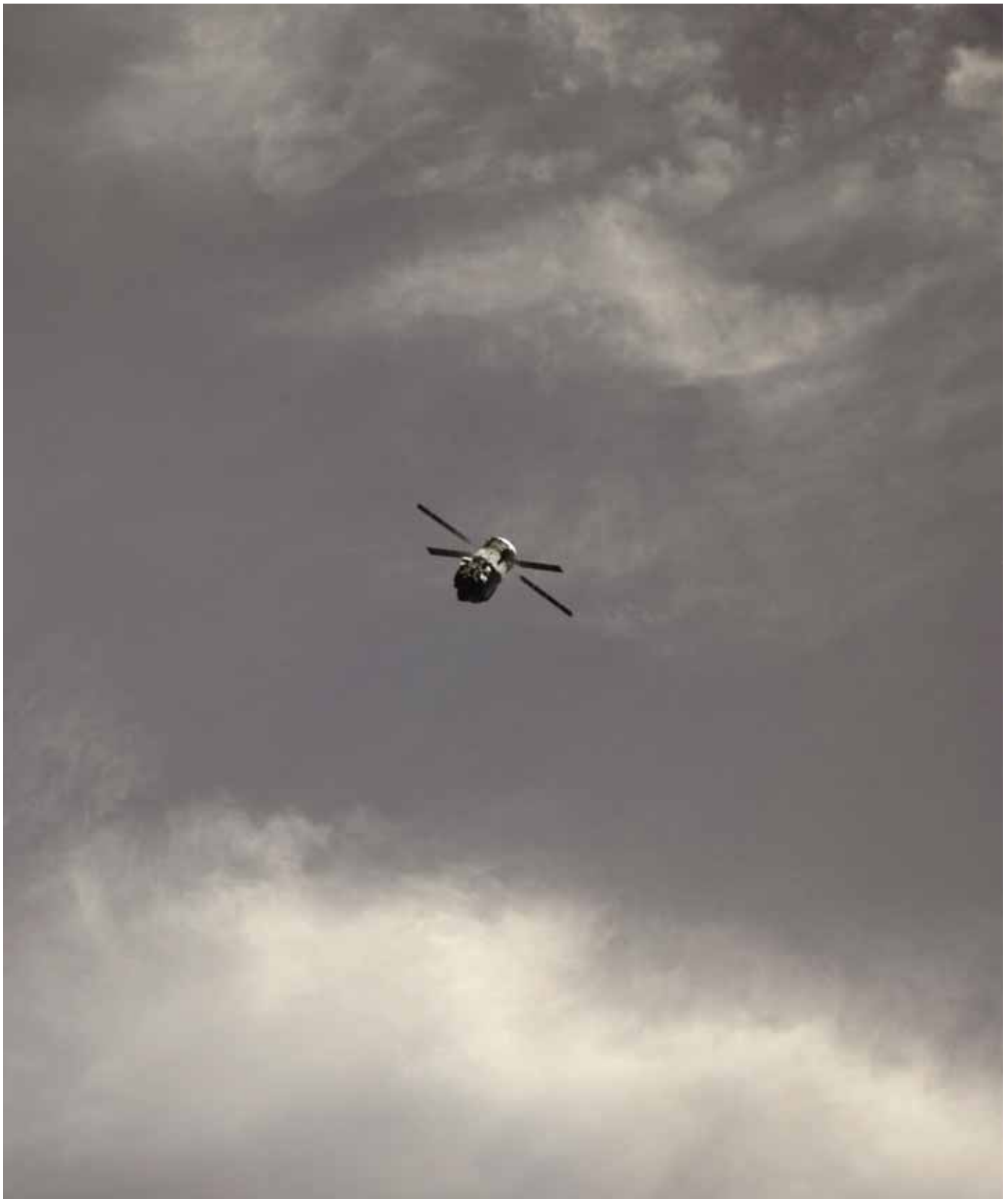
The reboost manoeuvre came just three weeks after *Jules Verne* successfully docked with ISS on 3 April 2008 delivering 1150 kg of dry cargo, including food, clothes and equipment, as well as additional supplies of water, oxygen and fuel. Since then, the European resupply spacecraft was in dormant mode attached to the docking port on the Russian Zvezda module.

The reboost set up the ISS for the arrival of Space Shuttle *Discovery* on the STS-124 mission to deliver the Japanese Kibo laboratory. Further reboost manoeuvres using *Jules Verne* are scheduled for 12 June, 8 July and 6 August.

"The Station's altitude naturally decreases with atmospheric drag. Until now this has been compensated for by performing a reboost using the Russian Progress, the Space Shuttle or by the ISS itself," explains Alberto Novelli, ESA's Mission Director at ATV-CC. *"Today, ATV has successfully demonstrated that it too is able to perform this vital function. Only Progress and ATV can provide this high level of reboost. ATV is unique due to the quantity of fuel available for such manoeuvres."*

ATV *Jules Verne* is scheduled to remain docked to the ISS until early August. At the end of its mission, loaded with up to 6.5 tonnes of material no longer required by the ISS, *Jules Verne* will undock and then burn up completely during a guided and controlled reentry high over the Pacific Ocean. esa

Backdropped by the blackness of space, ESA's ATV Jules Verne *approaches the ISS on 31 March 2008, for its 'Demo Day 2' practice manoeuvres. It moved to within 11 m of the Zvezda Service Module in a rehearsal for docking (NASA)*



Yuri Malenchenko (RUS), Expedition 16 flight engineer aboard the ISS, used a digital still camera to record several images of the ESA's Jules Verne *ATV during a the rendezvous test on 29 March 2008. Malenchenko took these photos while the ATV sat about 3 km from the ISS during the first of two demonstration days in the lead up to a first ISS docking attempt on 3 April (NASA)*

ESA to Select New Astronauts

The ESA Astronauts in 2008

ESA's human spaceflight activities have entered a new era and it is now time for ESA to seek out new talent to join the European Astronaut Corps for future manned missions to the ISS, the Moon and beyond.

We need to increase the size of ESA's Astronaut Corps in order to successfully accomplish our present and future programmes, and have therefore decided to initiate the process of selecting new astronauts.

Candidates from all 17 Member States (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom) are welcome to apply.

"*Europe has long been involved in exploration, even before the days of Christopher Columbus. After exploring Earth, space is the logical next step – and a new generation of explorers are needed to follow their illustrious predecessors and embark for those new worlds. I am therefore very pleased that at the beginning of 2009, we will be welcoming a new intake of men and women to the European Astronaut Corps to undertake missions to the ISS and beyond,*" said Daniel Sacotte, ESA's Director of Human Spaceflight, Microgravity and Exploration.

ESA made its first astronaut selection in 1978, followed in 1983 by the first Spacelab mission. Preparations for ESA's Columbus laboratory project, meanwhile, involved a second selection of astronauts in 1992.

The overall selection process starts on Monday, 19 May.

The final appointments will be officially announced in 2009. The selected candidates will then join the European Astronaut Corps and begin basic training at the European Astronaut Centre (EAC) in Cologne, Germany.

The first step in the formal application will be online screening at *www.esa.int/astronautselection*

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Hubble Finds First Organic Molecule on Extrasolar Planet

The NASA/ESA Hubble Space Telescope has made the first ever detection of an organic molecule in the atmosphere of a planet orbiting another star. This breakthrough is an important step in eventually identifying signs of life on a planet outside our Solar System.

Under the right circumstances, methane can play a key role in 'prebiotic' chemistry – the chemical reactions considered necessary to form life as we know it. Although methane has been detected on most of the planets in our Solar System, this is the first time any organic molecule has been detected on a world orbiting another star.

The planet now known to have methane and water is located 63 light-years away in the constellation Vulpecula, HD 189733b. It is so massive and so hot though that it is considered an unlikely host for life. However this observation is proof that spectro-scopy can eventually be done on a cooler and potentially habitable Earth-sized planet orbiting a dimmer red dwarf-type star.

Artist's impression of the extrasolar planet HD 189733b ESA/NASA/UCL (G. Tinetti)

The discovery comes after extensive Hubble observations in May 2007 that confirmed the existence of water molecules in the planet's atmosphere, originally discovered in 2007 by ESA fellow Giovanna Tinetti while at the Institute d'Astrophysique de Paris, France, using NASA's Spitzer space telescope.

Tinetti, now affiliated to University College London, added, "*Water alone could not explain all the spectral features observed. The additional contribution of methane is necessary to fit the Hubble data.*"

Methane, composed of carbon and hydrogen, is one of the main components of natural gas, a product of petroleum. On Earth, methane is produced by a variety of natural sources, but also from livestock and manmade sources such as waste landfills and as a byproduct of energy generation.

Tinetti is however quick to rule out any biological origin of the methane found on HD 189733b. "*The planet's atmosphere is far too hot for even the hardiest life to survive – at least the kind of life we know from Earth. It's highly unlikely that cows could survive here!*"

The ultimate goal of studies like these is to identify prebiotic molecules in the atmospheres of planets in the 'habitable zones' around other stars, where temperatures are right for water to remain liquid rather than freeze or evaporate away. esa

Endeavour Brings ESA Astronaut Back to Earth

The landing of STS-123 took place at 01:39 CET on 27 March, at the Kennedy Space Center shuttle landing strip at Cape Canaveral, Florida (NASA)

After its 16-day STS-123 mission to the International Space Station in March, NASA's Space Shuttle *Endeavour* safely returned to Earth with its crew of seven including ESA astronaut Léopold Eyharts (F).

Eyharts had been sent to the ISS on the previous Shuttle flight of *Atlantis* on 7 February with another ESA astronaut, Hans Schlegel (D), and then he spent nearly 49 days in space on a mission to dock and commission ESA's Columbus laboratory.

On 10 February, shortly after *Atlantis* had docked with the ISS, Eyharts was inducted in the resident ISS crew, replacing NASA astronaut Dan Tani as a member of the Expedition 16 increment alongside NASA's Peggy Whitson and Russian astronaut Yuri Malenchenko.

On 12 February, Eyharts became the first astronaut to enter the Columbus laboratory in orbit. He wore a mask and goggles and carried a flashlight to check the laboratory's status before the atmosphere was scrubbed and the lights were turned on. As soon as Columbus was cleared for access, together with Schlegel and other crewmembers, he immediately started reconfiguring and activating the module. Eyharts remained on the ISS when *Atlantis* departed with Schlegel to return to Earth.

As a qualified mission specialist in robotics, Eyharts also contributed to the STS-123 mission as an operator of the ISS's robotic arm. Together with NASA astronauts Garrett Reisman and Bob Behnken they added another new module to the ISS – the Japanese Experiment Logistics Module, Pressurised Section (JLP) – and supported the assembly and activation of the Canadian-built Special Purpose Dextrous Manipulator.

Eyharts spent 44 days on the ISS and devoted a large part of his time to activation and checking of the Columbus module and its racks in order to be able start up actual science experiments inside the laboratory. When he left the ISS, he brought back with him the very first results of an experiment carried on Columbus.

Eyharts was the second ESA astronaut to have become part of the resident ISS crew, Thomas Reiter having spent six months onboard in 2006. This was Eyharts' second mission to a space station, having already flown to the Russian Mir station back in 1998.

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De Winne is Next ESA Astronaut to Join ISS Crew

Frank De Winne

With the Columbus laboratory now attached to the ISS, ESA long-duration flights will be carried out more often. The next ESA astronaut to go to the ISS will be Frank De Winne (B) in 2009. André Kuipers (NL) will be his backup.

From 2005, De Winne had been in training as back-up for Léopold Eyharts on his ISS expedition and the delivery of Columbus. In January 2008, De Winne was assigned as a prime crewmember of Expedition 19, a long-duration mission to the ISS.

Test-pilot De Winne joined ESA in 2000 and he flew on the Odissea mission to the ISS, serving as flight engineer on the updated Soyuz TMA spacecraft during ascent, and on a Soyuz TM during reentry.

During his nine days on board the ISS, De Winne carried out a programme of 23 experiments in the fields of life and physical sciences and education, including experiments in an important new research facility designed and developed in Europe, the Microgravity Science Glovebox.

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Royal Opening for New ESTEC Labs

Dutch Crown Prince Willem Alexander officially opened the new laboratory building at ESA's European Space Research and Technology Centre (ESTEC) in Noordwijk, the Netherlands, on 8 April.

The Prince and other guests were impressed with the high-tech facilities, including the Propulsion Lab and the Concurrent Design Facility. Dutch Minister of Economic Affairs Maria van der Hoeven and ESA Director General Jean-Jacques Dordain spoke about the importance of ESTEC for the Netherlands, for Europe and for European success in space.

HRH Prince Willem Alexander looks at an operating Hall-effect thruster in ESTEC's Propulsion Lab in April 2008

Forty years ago the same week, the Prince's mother, then HRH Princess Beatrix, officially opened ESA's technical centre in Noordwijk. At that time, the opening was testimony to the faith put in the spaceflight pioneers of the 1960s and in European cooperation on an international space stage. ESTEC has since played a leading role in over 80 successful spaceflight projects.

"ESTEC has to keep developing," said Michel Courtois, ESA Director of Technical and Quality Management and Head of ESTEC. *"These laboratories are a drastic improvement compared to the old ones. Engineers and scientists from all over Europe come together here to work on the design of space missions and new technologies. Now they can do so using the newest techniques and methods."*

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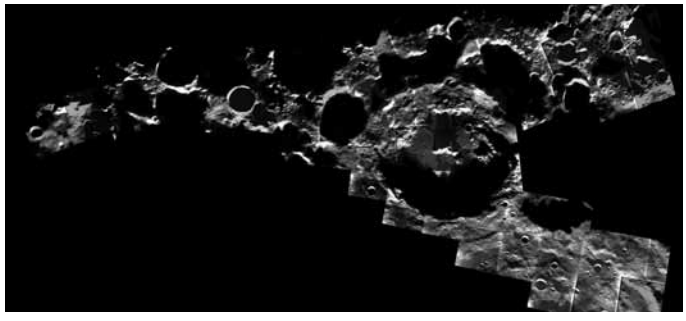
New Lunar South Polar Maps from SMART-1

Newly-released images of the lunar south-polar region obtained by ESA's SMART-1 are proving to be excellent tools to pinpoint suitable study sites for potential future lunar exploration missions.

SMART-1's Advanced Moon Imaging Experiment (AMIE) has collected many images of the lunar south-polar region with unprecedented spatial resolution. The images, obtained over a full year of changing seasons were used to study the different levels of solar illumination on the Moon's surface.

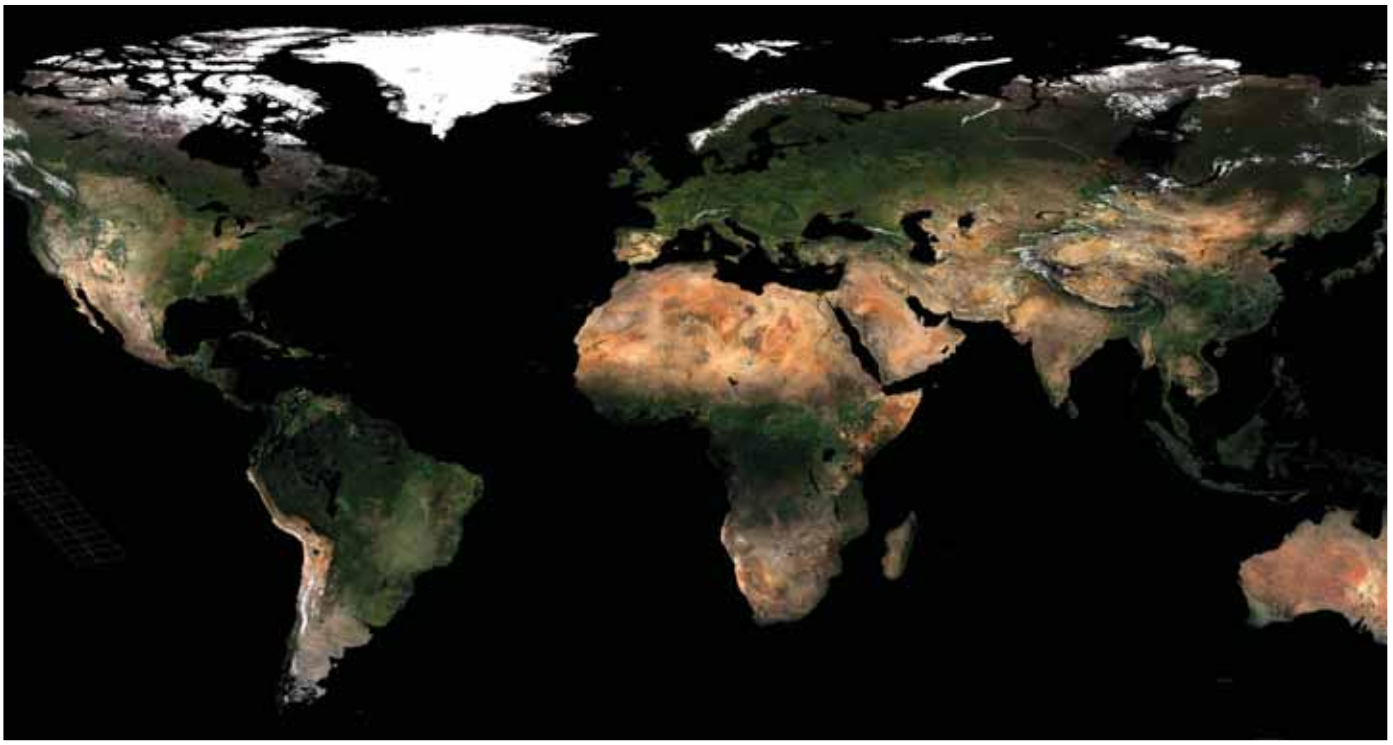
"The SMART-1 south polar maps indicate very exciting targets for science and future exploration, within travel reach from a rover or humans at the south pole," said Jean-Luc Josset, Principal Investigator for AMIE.



This mosaic of the lunar south pole is made of about 40 images taken by the Advanced Moon Imaging Experiment (AMIE) on board SMART-1 between December 2005 and March 2006. The images were taken from an altitude of 500 km, over more than 30 orbits, and cover an area of about 500 by 150 km at a resolution of 50 m/pixel (ESA/SMART-1/Space-X)

These high-resolution SMART-1 south polar mosaics were produced and analysed in study project for the design and operations of lunar polar robotic landers and rovers, by Marina Ellouzi, a Master's student in space engineering at the Paris-Meudon Observatory. The images were presented by the SMART-1 AMIE team and collaborators at the 39th Lunar and Planetary Science Conference in Texas in March 2008. esa

Earth Land Cover as Never Seen Before



A composite of images taken by Envisat's MERIS instrument, at a resolution of 300 m per pixel, over the whole globe

A new global portrait taken from space shows Earth's land cover with a resolution never before obtained. ESA, in partnership with the UN Food and Agriculture Organisation, presented the preliminary version of the map to scientists in March at the Second GlobCover User Consultation workshop in Rome, Italy.

Earth's land cover has been charted from space before, but this map, which will be made available to the public upon its completion in July, has a resolution ten times sharper than any of its predecessors.

Scientists, who will use the data to plot worldwide land-cover trends, study natural and managed ecosystems and model climate change extent and impacts, are hailing the product – generated under the ESA-initiated GlobCover project – as 'a milestone'.

"*The GlobCover system is a great step forward in our capacities to automatically produce new global land cover products with a finer resolution and a more detailed thematic content than ever achieved in the past,*" said Frédéric Achard of the EC's Joint Research Centre (JRC).

"*Land cover data is an essential requirement of the sustainable management of natural resources, environmental protection, food security, climate change and humanitarian programmes,*" said John Latham of the Food and Agriculture Organisation (FAO). "*The GlobCover product will be the first freely available product at 300m resolution and is therefore a milestone product which will be fundamental to a broad level stakeholder community.*"

The map is based on 20 Terabytes of imagery – equivalent to the content of 20 million books – acquired from May 2005 to April 2006 by Envisat's Medium Resolution Imaging Spectrometer (MERIS) instrument. There are 22 different land cover types shown in the map, including croplands, wetlands, forests, artificial surfaces, water bodies and permanent snow and ice. For maximum user benefit, the map is compatible with the UN Land Cover Classification System (LCCS).

GlobCover, launched in 2005, is part of ESA's Earth Observation Data User Element. An international network of partners is working with ESA on the project, including the UN Environment Programme (UNEP), FAO, JRC, the European Environmental Agency, the International Geosphere-Biosphere Programme (IGBP) and the Global Observations of Forest Cover and Global Observations of Land Dynamics (GOFC-GOLD) Implementation Team Project Office.

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Students to Take Part in Sounding Rocket and Balloon Campaigns

Eight student teams from various ESA Member and Cooperating States have been selected to fly their experiments on future sounding rocket and balloon campaigns.

An announcement of opportunity was issued by the ESA Education Office in November 2007 for the REXUS and BEXUS programmes (Rocket/Balloon Experiments for University Students). After evaluation of the initial entries, the shortlisted teams were invited to present their proposals to experts from ESA and Esrange during a workshop in March 2008. The winners join six teams chosen earlier in the week for the same flights by the German Aerospace Center (DLR).

Three of the successful ESA-sponsored teams will have the opportunity to place their experiments on the REXUS-5 and -6 sounding rockets, to be launched from Kiruna, Sweden, in March 2009. The payloads developed by the other five teams will fly on the BEXUS-6 and -7 stratospheric balloons that will be launched from Kiruna in September 2008.

Each flight will carry a payload consisting solely of student experiments. Half of the overall payload is available only to German students through a DLR Announcement of Opportunity, while the other half is opened up to students from all other ESA Member States and Cooperating States by the Swedish National Space Board (SNSB) through a collaboration with ESA.

The three experiment teams selected for the REXUS sounding rocket campaign are from: the University of Bergen, Norway, the University of Oulu, Finland and the Finnish Meteorological Institute; the Castor Space Club of the Tampere University of Technology; and the Universitat Politecnica de Catalunya, Spain.

The teams selected for the BEXUS balloon flights are from: Luleå University of Technology, Sweden, with Charles University, Prague, and the Czech Technical University, Czech Republic; the 'Erasmus Mundus' Space Masters course, currently based at Luleå University of Technology, Sweden; the Scuola di Ingegneria Aerospaziale, Rome; the University of Rome 'La Sapienza', Italy; Romanian Space Agency with Warsaw University of Technology, Poland.

The next announcement of opportunity to fly experiments through the REXUS and BEXUS programmes will be issued in September 2008. These flights will take place during 2009 and 2010. esa

Galileo's GIOVE-B Launched

A further step towards the deployment of Europe's Galileo global navigation satellite system was made on 27 April 2008, with the launch of ESA's second Galileo In-Orbit Validation Element (GIOVE-B) satellite.

Carrying the most accurate atomic clock ever flown into space, the GIOVE-B satellite was launched into a medium-Earth orbit by a Soyuz-Fregat rocket from the Baikonur Cosmodrome in Kazakhstan by launch operator Starsem. Lift-off occurred at 04:16 local time on 27 April, and the Fregat upper stage then performed a series of manoeuvres to safely deliver the satellite into its orbit at an altitude of about 23 200 km some 3 hours and 45 minutes later.

This 500 kg satellite was built by a European industrial team led by Astrium GmbH, with Thales Alenia Space performing integration and testing in Rome. Two years after the highly successful GIOVE-A mission, this latest satellite will continue the demonstration of critical technologies for the navigation payload of future operational Galileo satellites. esa

The Soyuz-Fregat launcher carrying GIOVE-B lifts off from Baikonur on 27 April 2008

Herschel Spacecraft Assembly Complete

The Herschel telescope resting on its cryostat at ESTEC, 16 April 2008

At the end of April, the Herschel telescope was connected to its payload and service modules, at ESA's European Space Research and Technology Centre (ESTEC) in The Netherlands, completing the assembly of the entire spacecraft.

This powerful telescope will allow scientists to look deep into space, at long infrared wavelengths. Herschel's spectral coverage, which ranges from far-infrared to sub-millimetre wavelengths, will be made available for space-based observations for the first time. Herschel will make it possible to observe and study relatively cool objects everywhere in the Universe, teaching us much more about the birth and evolution of stars and galaxies.

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Successful Test-firing for Vega Motor

Zefiro-23 second firing test at the Salto Di Quirra Inter-force Test Range in Sardinia, Italy, on 27 March 2008 (AVIO Space)

On 27 March 2008, the Zefiro-23 second-stage motor for Vega – Europe's new small launcher – successfully completed a static firing test at the Salto Di Quirra Inter-force Test Range in Sardinia, Italy.

Ignition of the qualification model of the solid-propellant rocket motor occurred at 13:15 CET. In just 14 seconds, the thrust reached 930 kN, equivalent to nearly 95 tonnes of force. This was the second and final firing test for the Zefiro-23, in which over 24 tonnes of propellant was consumed in 75 seconds with a flame temperature of over 3000ºC.

Vega is a single-body launcher composed of three solid-propellant stages and a liquid-propellant upper module. It is approximately 30 m high, and weighs a total of 137 tonnes at lift-off. Vega will be able to carry a 1500 kg payload into a 700 km altitude polar orbit, but the launcher is also designed to serve a wide range of other scientific and Earth observation missions.

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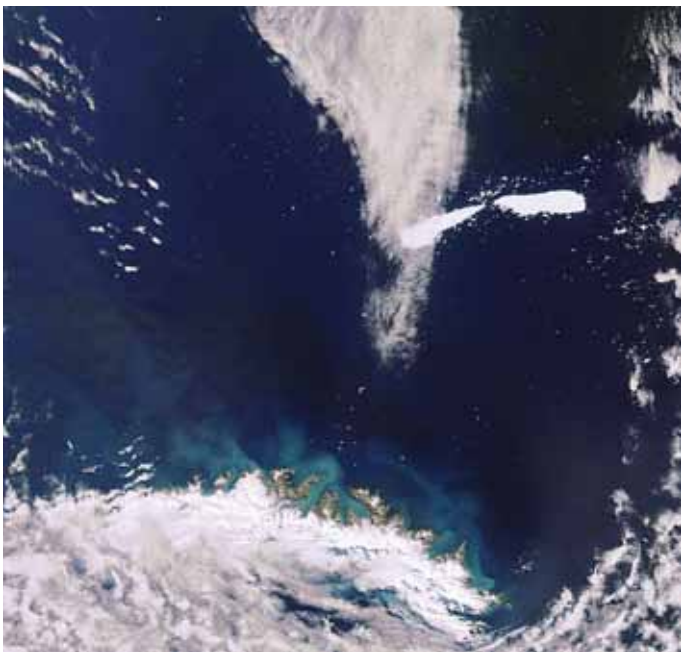
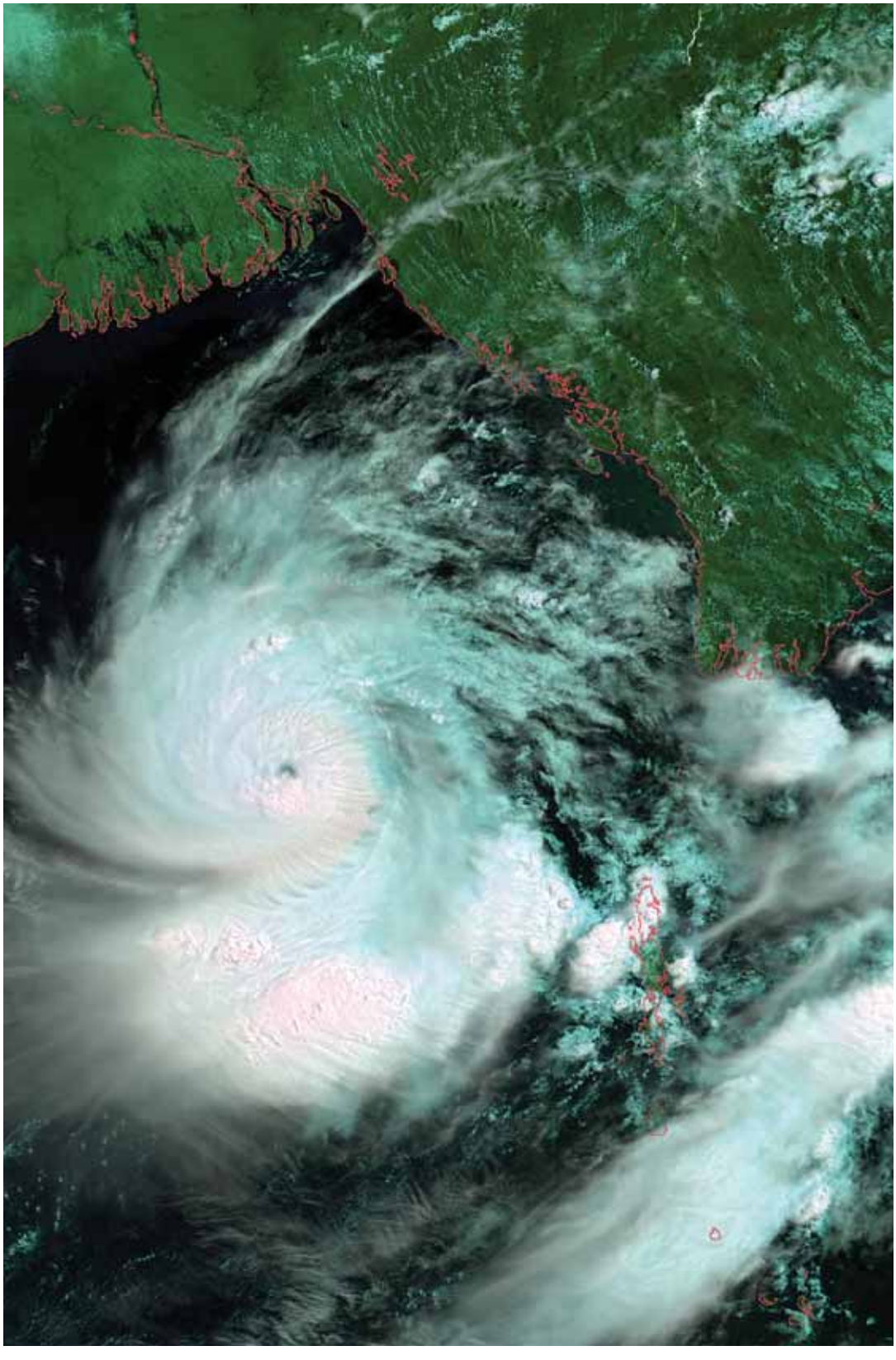
Envisat Tracks Berg Break-up

On 1 March 2008 Envisat's Advanced Synthetic Aperture Radar (ASAR) instrument spotted a huge fissure running south to north through the massive A53A iceberg (visible at top right) drifting to the east of South Georgia Island in the southern Atlantic Ocean. ASAR is able to produce high-quality images of icebergs and ice sheets and is capable of differentiating between different types of ice because it is able to see through clouds and local darkness – conditions often found in polar areas



Envisat's Medium Resolution Imaging Spectrometer (MERIS) sensor captured the break up of the A53A iceberg east of South Georgia Island in the southern Atlantic Ocean. The resulting two new bergs are around 30 km in length. As a reference, South Georgia Island is approximately 180 km long

Cyclone Nargis Approaches Myanmar



Envisat captured Cyclone Nargis making its way across the Bay of Bengal just south of Myanmar on 1 May 2008. The cyclone hit the coastal region on 3 May and devastated large areas of the country