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Cesa

space in daily life 1





Communication and Tracking Systems





Disaster and Rescue Services

space in daily life 5



Engineering and Mining

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Mobile Telecommunicatons

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Technology for the Disabled

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Transport Systems

# ESA Logo

This is the logo of the European Space Agency (ESA). The Agency is Europe's gateway to space. Its projects are designed to find out more about the Earth, its immediate space environment, the solar system and the Universe. It is also involved in developing satellite-based technologies and services. ESA has a staff of almost 2000 people including scientists, engineers, information technology specialists and administrative personnel.

For further information visit: <u>http://www.esa.int/esaCP/GGG4SXG3AEC\_index\_0.html</u>

### Slide 1 – Communication and Navigation

By 2006 navigations signals will become more accurate, locating particular spots within Europe thanks to EGNOS (European Geostationary Navigation Overlay Service). So far the Global Positioning System (GPS) has allowed users in Europe to determine their position within a range of 20 m. The new method however shall reduce this distance to 5 m. As you can see on the image, the updated navigation system shall benefit aeronautics, maritime and land transport.

For further information visit: <u>http://www.esa.int/esaNA/egnos.html</u>

### Slide 2 – Communication and Tracking Systems

When Marc Thiercelin left alone for a sailing race in 2004, he was well equipped with a navigation system to find his way in the deep blue of the ocean. At the same time the system was able to track his boat in case of emergency. In addition, ESA gave his boat a 'spacelift' to cut critical weight and optimise electricity systems.

For further information visit: <u>http://www.esa.int/SPECIALS/Technology\_Transfer/SEMX4DWJD1E\_0.html</u>

### Slide 3 – Communication and Tracking Systems

A sailor crosses the stormy Atlantic race by himself equipped with space gadgets.

For further information visit: <u>http://www.esa.int/SPECIALS/Technology\_Transfer/SEMX4DWJD1E\_0.html</u>

### Slide 4 – Disaster and Rescue Services

'Roboclimber' is designed to prevent landslides. Expertise from manoeuvring satellites into correct orbit has been used to develop the Roboclimber, which is controlled by a system originally built for ESA to control space robots and a robotic satellite arm.

For further information visit: <u>http://www.esa.int/SPECIALS/Technology\_Transfer/SEM9R03AR2E\_0.html</u>

### Slide 5 – Engineering and Mining

New transmitters have been produced for a tunnel-boring machine. Every second the transmitters send sound waves into the ground, while microphones receive the reflecting signals. This way changes up to 40 m in front of the rotary shear blade can be visualised. These innovative transmitters have been developed using the expertise gained during work on a spacecraft.

For further information visit: <u>http://www.esa.int/SPECIALS/Technology\_Transfer/SEMCJSXO4HD\_0.html</u>

# Slide 6 – Entertainment Software

The new PlayStation car racing game introduces two racing cars that took part in an endurance race and were both constructed using technologies developed for European space programmes.

For further information visit:

www.esa.int/SPECIALS/Technology\_Transfer/SEMP58RMD6E\_0.html

# Slide 7 – Green Engines

Running on liquefied petroleum gas (LPG), one of the least polluting fuels, and lubricated with sunflower oil, the *IdéeVerte* racing car is protected against fire hazards thanks to space materials.

For further information visit: <u>http://www.esa.int/SPECIALS/Technology\_Transfer/SEMRMXWJD1E\_1.html#subhead2</u>

# Slide 8 – Engineering

ESA's Technology Transfer Programme provided a sports team of endurance racing cars with innovative technologies that had already been developed for space missions.

For further information visit: <a href="http://www.esa.int/SPECIALS/Technology\_Transfer/SEMAK9T1VED\_1.html">http://www.esa.int/SPECIALS/Technology\_Transfer/SEMAK9T1VED\_1.html</a>

# Slide 9 – Harsh Environment Technology

ESA has contributed some space-cooling technologies to assist a racing team that participated in the Paris-Dakar rally taking in the Sahara Desert. These cooling systems were very important for the race, especially since temperatures could rise as high as 58°C.

For further information visit: <u>http://www.esa.int/SPECIALS/Technology\_Transfer/ESAWT68708D\_0.html</u>

### Slide 10 – Harsh Environment Technology

Henri Pescarolo takes ESA sponsored car through a water feature in during the opening 'special' stage in Marseille.

For further information visit: <u>http://www.esa.int/SPECIALS/Technology\_Transfer/ESAWT68708D\_0.html</u>

# Slide 11 – Internet

Telecommunications networks, both on the ground and via satellites, have led to the global expansion and usage of the internet.

# Slide 12 – Medicine

Telemedicine, which relies on satellite communication, offers the possibility for mobile units to visit disaster zones and work on site.

For further information visit: <u>http://www.esa.int/SPECIALS/Technology\_Transfer/SEMENCO3E4E\_0.html</u>

# Slide 13 – Medicine

A young boy wears ESA's UV-protection suit. He is a child with a rare genetic disorder that puts his life at risk when exposed to the Sun. But this protection suit promises to let him play safely in daylight.

For further information visit: <u>http://www.esa.int/SPECIALS/Technology\_Transfer/SEM247XO4HD\_0.html</u>

### Slide 14 – Medicine

Space medicine is not limited to monitoring the health of astronauts, indeed; it is meant to help people on Earth too. Space medicine research has a lot to offer, especially for elderly people. Many conditions experienced by the elderly – like for instance osteoporosis, or problems with the circulatory and vestibular system – also affect astronauts after a longer period in space.

For further information visit: <u>http://www.esa.int/SPECIALS/Technology\_Transfer/SEMPIVWJD1E\_0.html</u>

# Slide 15 – Meteorology

Satellite images can be used to foresee natural disasters caused by phenomena such as hurricanes, for instance. By sending out warnings on time to the affected population, damages can be minimised.

# Slide 16 – Meteorology

Space weather can influence human life in many ways. For instance, this picture illustrates the interaction between the solar wind and the Earth's magnetic field. The wind caused the magnetic field to deviate from its original shape, travelling onto the opposite side of the sun. This impact can affect space-born and ground-based technologies. Imagine you were sitting comfortably on your sofa in front of your TV. Suddenly the screen starts flickering and the image is gone and you have no influence whatsoever. The satellite transmitting to your TV set at home has been influenced by solar weather instead.

### Slide 17 – Mobile Telecommunication

TV companies are reporting about a volcano outburst on site. This mobile communication has become possible thanks to satellite technology, which transmits the news onto our TV sets.

# Slide 18 –Navigation System

Satellite navigation systems such as EGNOS, developed by ESA, will help to improve safety for maritime.

For further information visit: <u>http://www.esa.int/esaNA/ESAG130VMOC\_eqnos\_0.html</u>

# Slide 19 – Pollution Mapping

The global image shows the American mean troposphere nitrogen dioxide  $(NO_2)$  vertical column density (VCD) between January 2003 and June 2004, as measured by an instrument on ESA's Envisat.

### Slide 20 – Pollution Mapping

The global image shows the European, African and Asian mean troposphere nitrogen dioxide  $(NO_2)$  vertical column density (VCD) between January 2003 and June 2004, as measured by an instrument on ESA's Envisat.

# Slide 21 – Satellite Navigation and Internet

At the front of the car next to the steering wheel one can detect a small screen. It is a navigation system, which indicates the location of the car on the map to the driver. The second screen is used to surf the Internet. Both, navigation system and Internet are only possible thanks to satellite technology.

### Slide 22 – Solar Power

The solar car is an electric vehicle that carries its own generator. Solar panels on top of the car generate electrical power by converting light energy into electricity. A battery pack stores this energy.

For further information visit: <u>http://www.esa.int/SPECIALS/Technology\_Transfer/ESA62YPV16D\_0.html</u>

### Slide 23 – Solar Power

The Solar Impulse aircraft, which resembles a glider with a 70-metre wide wingspan, flies at an altitude of 10 000 to 11 000 metres above clouds to capture all available sunlight. The plane also uses propeller engines powered by solar-generated electricity.

For further information visit: <a href="http://www.esa.int/SPECIALS/Technology\_Transfer/SEMJ90FCASD\_0.html">http://www.esa.int/SPECIALS/Technology\_Transfer/SEMJ90FCASD\_0.html</a>

### Slide 24 – Solar Power

The solar powered vehicle is designed for an average of 100km/h, with a maximum of 160 km/h and its most important component is therefore the solar generator.

For further information visit: <u>http://www.esa.int/SPECIALS/Technology\_Transfer/ESA62YPV16D\_0.html</u>

### Slide 25 – Sport Equipment

Next to wind, vibrations reduce the speed limit of a skier and might keep him/her from winning a race. That is why this new pair of skis has a built-in vibration stabilization system, based on space technology developed for ESA's Rosetta comet chaser.

For further information visit: <u>http://www.esa.int/SPECIALS/Technology\_Transfer/SEMWJT57ESD\_0.html</u>

### Slide 26 – Sport Equipment

The aim is to reach a speed of 255 km/h with a set of skis that contain a built-in vibration stabilization system.

For further information visit: <u>http://www.esa.int/SPECIALS/Technology\_Transfer/SEMWJT57ESD\_0.html</u>

### Slide 27 – Technology for the Disabled

An athlete (right) wins gold in 100 m sprint at the Paralympic Games in Athens thanks to a space technology enhancing his prosthetic leg.

For further information visit: <u>http://www.esa.int/SPECIALS/Technology\_Transfer/SEM7DFADFZD\_0.html</u>

# Slide 28 – Telecommunication

Wherever we are, telecommunication networks can be set up thanks to satellite technology.

# Slide 29 –Textiles

Fire resistant materials designed for use at rocket launch sites have been found a use with fire fighters tackling petrochemical based fires.

# Slide 30 –Textiles

The machine to monitor colour variations during textile production uses a 'space eye', a special camera developed to identify colour variations. The introduction of this new technology could significantly reduce the millions metres of dyed fabrics discarded annually in Europe because of their undesired colour.

For further information visit:

http://www.esa.int/SPECIALS/Technology Transfer/SEMJJ2YEM4E 0.html

# Slide 31 – Transport System

Software, originally used for verifying spacecraft systems, is now used to control and coordinate railway signalling.