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ESA logo

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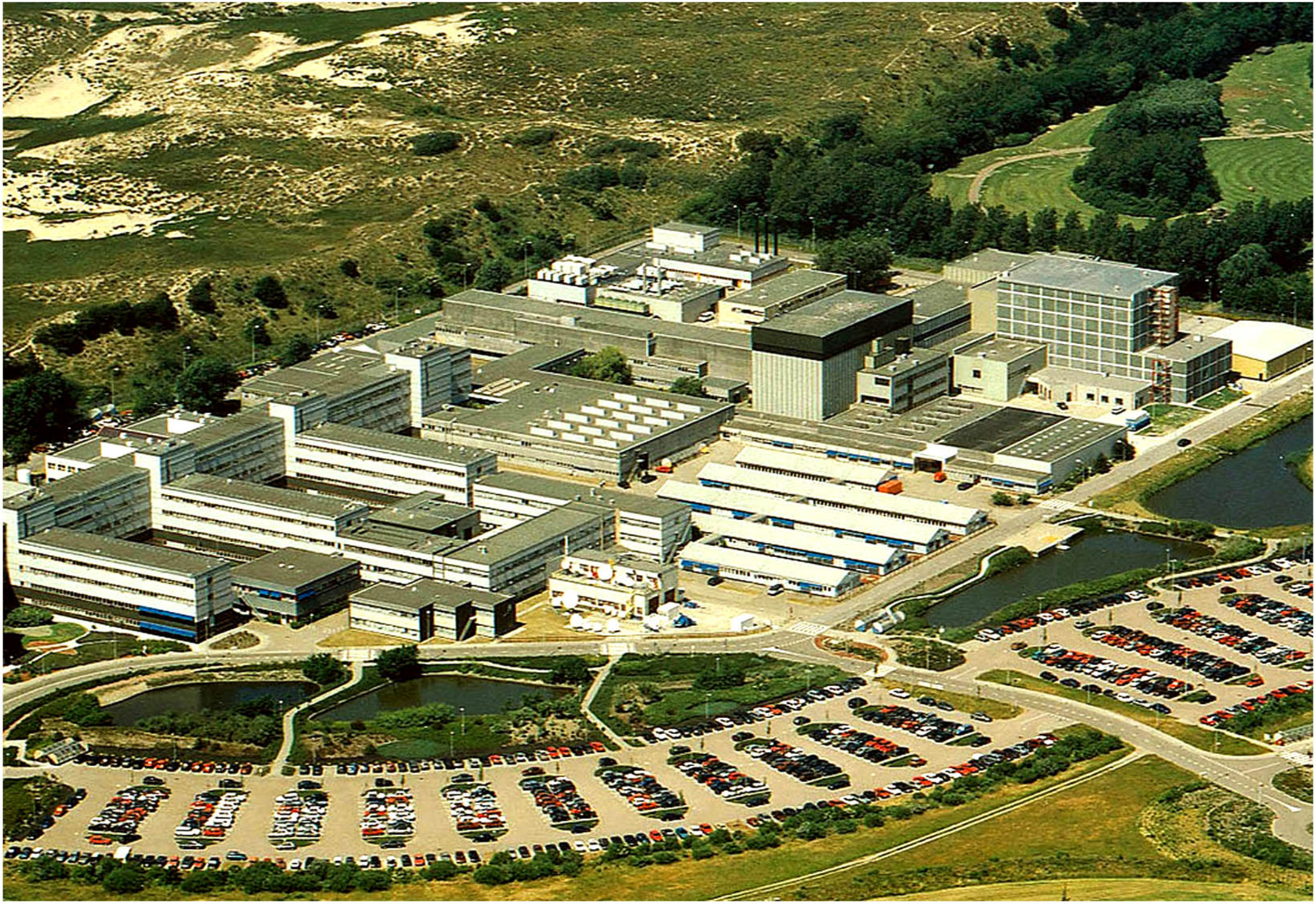
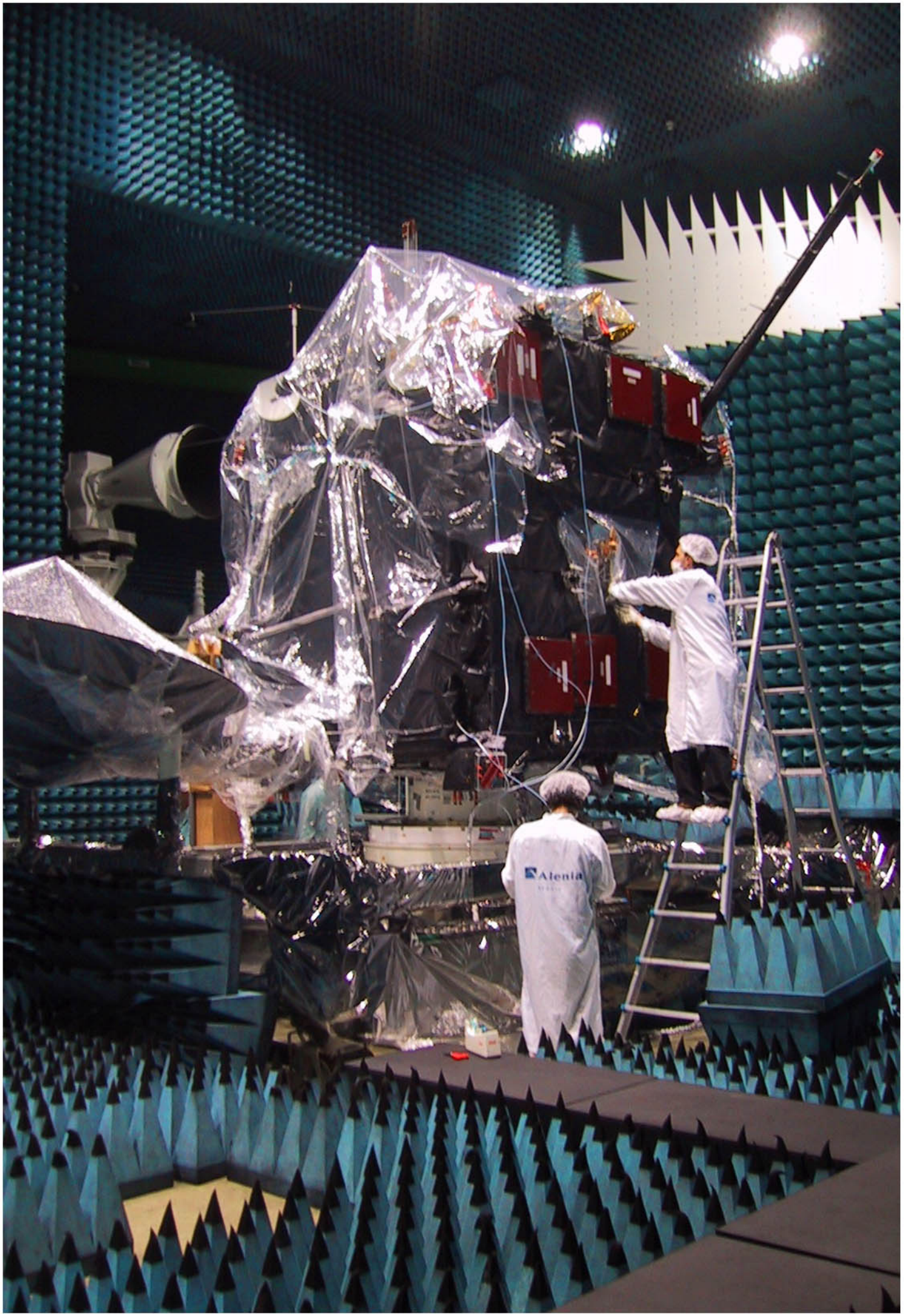
ESTEC Test Bay





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ESTEC Compact Test Chamber

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ESRIN Armillary Sphere

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ESRIN Earth Disaster Management Centre

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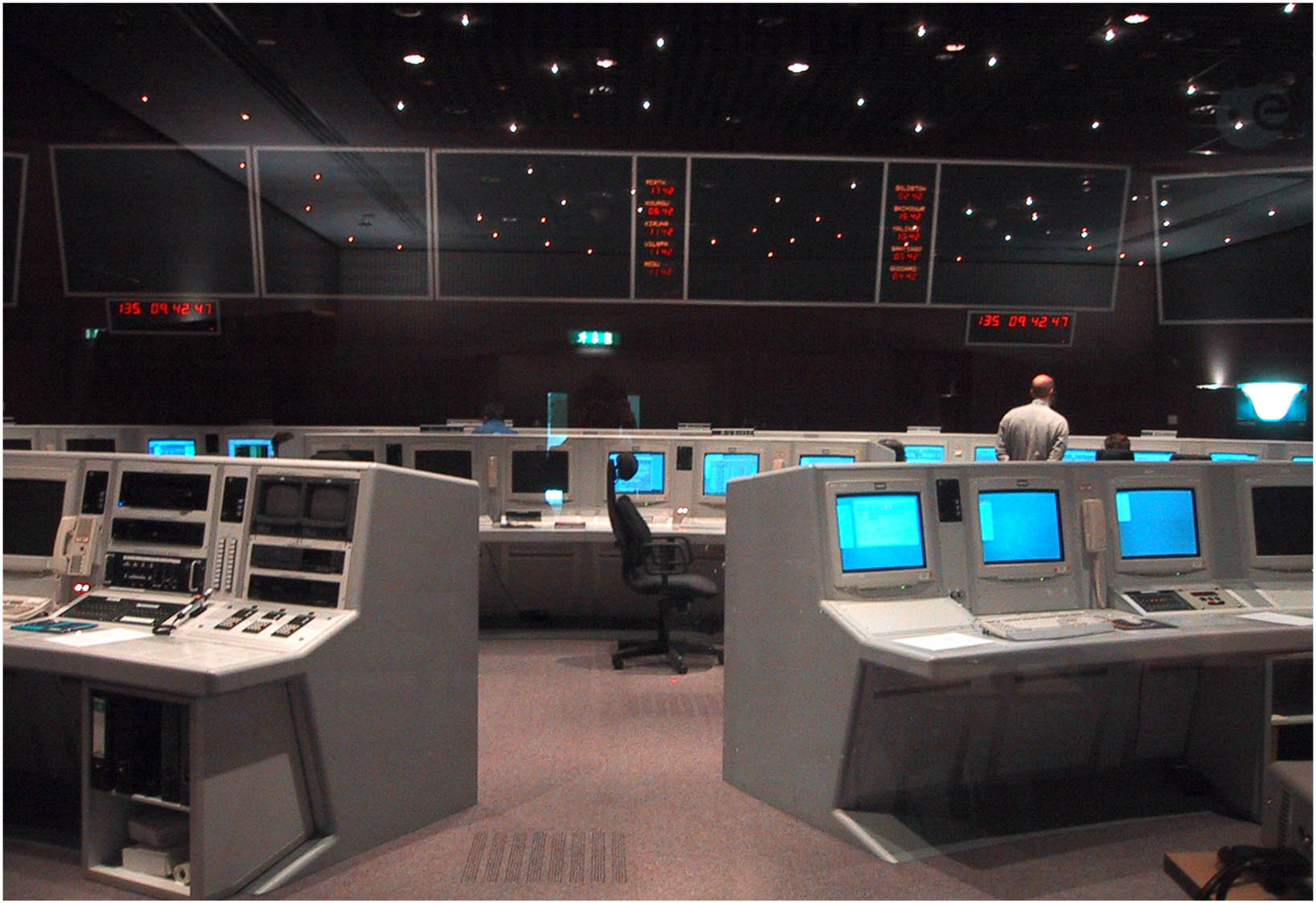
ESOC Main Control Room



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ESOC Mission Flight Simulation

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ESOC Spacecraft Control Room

ESA Headquarters

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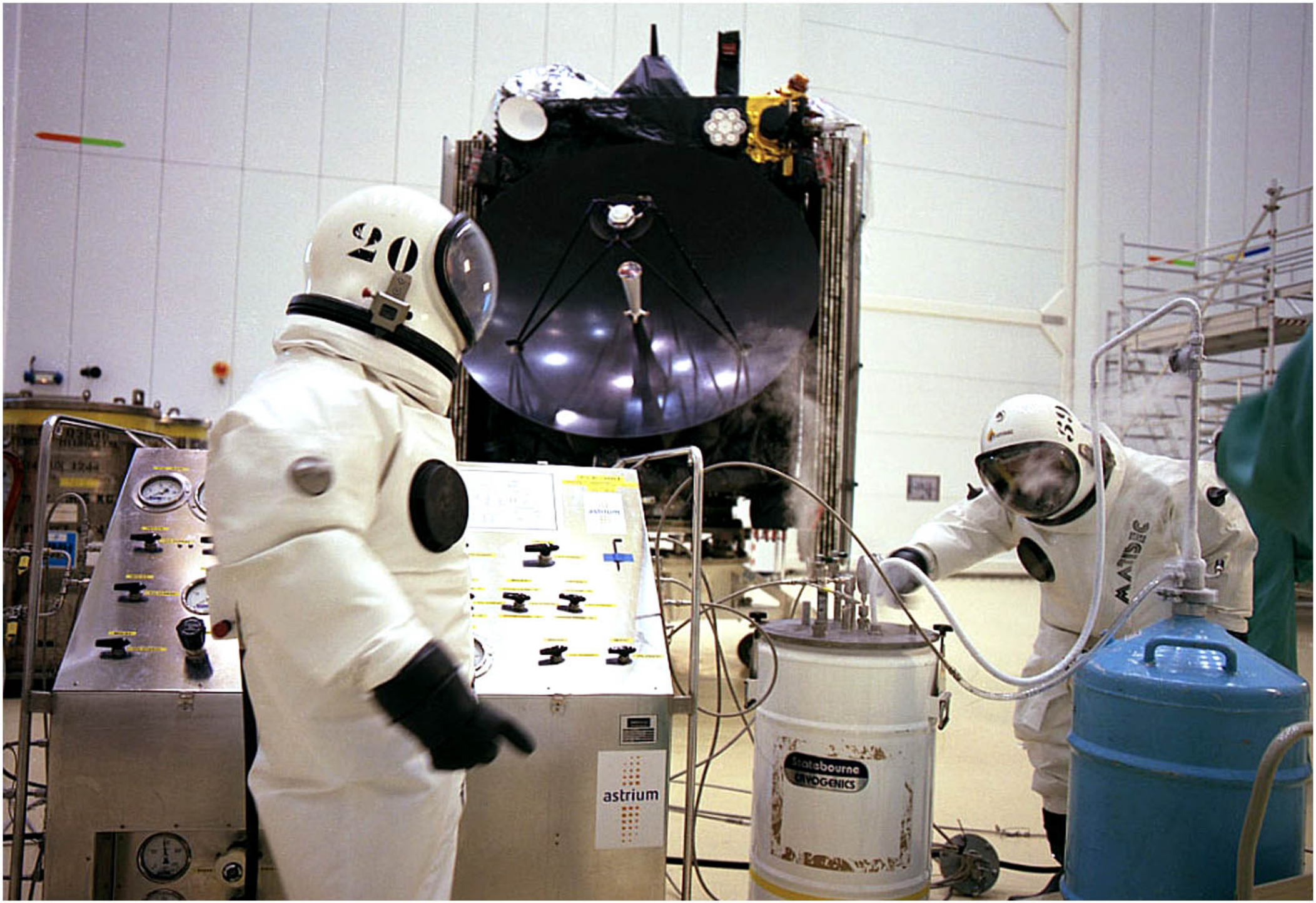
ESA Headquarters



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Kourou Jupiter Control Room

Kiruna

esa

EAC Crew Medical Support Control Room

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. They are scientists, engineers, information technology specialists and administrative personnel.

For further information visit: http://www.esa.int/esaCP/GGG4SXG3AEC_index_0.html

ESTEC (pictures 1-6):

ESA has several centres in Europe, each of which has different responsibilities. One of these is the European Space Research and Technology Centre (ESTEC) based in Noordwijk, the Netherlands. It is the largest site and the design centre for most ESA spacecraft and technology developments. More than 2000 specialists work on dozens of space projects such as science missions, human space flight, telecom, satellite navigation and earth observation.

For further information visit: http://www.esa.int/esaCP/SEMOMQ374OD_index_0.html

Places 1 – ESTEC CDF:

The Concurrent Design Facility (CDF) located in ESTEC, offers equipment to expert teams from various disciplines so that they can apply the concurrent engineering methods to the design of future space missions. It is primarily used to assess the technical and financial feasibility of future space missions and new spacecraft concepts by facilitating the interaction of all disciplines involved.

For further information visit: http://www.esa.int/SPECIALS/CDF/SEMQOF1P4HD_0.html

Places 2 – ESTEC Test Bay:

This is the Test Bay at ESTEC. In this building satellites are being tested thoroughly before being sent to space. This is important since satellites are expensive, and once in orbit they cannot be fixed. Within the Test Centre, the satellite is exposed to simulations of severe conditions that occur during the launch of a rocket or in space.

For further information visit:
http://www.esa.int/techresources/ESTEC-Article-fullArticle_item_selected-20_10_00_par-48_1100010962710.html

Places 3 – ESTEC:

An aerial view of the ESTEC's site.

Places 4 – ESTEC:

At ESTEC with the main entrance and reception

Places 5 – ESTEC Compact Test Chamber:

The Compact Test Range is one of the largest test chambers at ESTEC. Here we see a Rosetta pre flight check. The chamber is used to simulate the electromagnetic environment different spacecraft will operate in. The inside of the chamber is lined with cones that absorb radio signals and prevent reflections. To avoid TV or radio interference, the walls of the chamber form a steel 'Faraday cage', blocking all electromagnetic signals from the outside world.

Places 6 – ESTEC Flight Model:

The Flight Model of ISO in the test centre. For more information visit ESA's Website for Science and Technology under http://sci.esa.int. Also, visit individual mission pages, e.g. http://sci.esa.int/science-e/www/area/index.cfm?fareaid=18

Places 7 – ESRIN:

Another centre is the European Space Research Institute (ESRIN) based in Frascati, Italy. ESRIN is the hub for Earth observation missions. Data collated from satellites is used by scientists to keep us informed about the weather and monitor environmental changes on a global scale. ESRIN is also the centre for all ESA information technology. Here the information systems and software, which ensure ESA runs smoothly, are designed and developed. Another task is the development of the small launcher called Vega, named after the brightest stars in the northern hemisphere. Last but not least, ESRIN contributes to keeping ESA Member States, European industry and the general public up to date with ESA's activities and programmes.

For further information visit: http://www.esa.int/esaCP/GGGYA78RVDC_index_0.html

Places 8 – Amillary Sphere:

The Amillary Sphere is an early astronomical device representing the horizon, the Equator, meridians, polar circles and tropics. In ancient times, Greek astronomers used a similar instrument to measure the distance and positions of stars.

Places 9 – ESRIN:

This is a picture of the reception at ESRIN. The entrance area is equipped with an overhanging flat screen, displaying ESA's most recent activities and programme results.

Places 10 – ESRIN Earth Disaster Management Centre:

At the secretariat of the International Charter on Space and Major Disasters, an operator is available 24 hours a day/ 365 days a year to ensure civil protection and to provide space agencies worldwide with specific data when natural or man made disasters occur.

For further information visit: http://www.esa.int/esaEO/index.html

Places 11 – ESRIN Web Video Studio:

In the Demo-Lab at ESRIN online videos are recorded to implement web stories.

Places 12 – ESOC:

The European Space Operations Centre (ESOC) located in Darmstadt, Germany, has monitored more than 50 satellites since its creation in 1967. Once a satellite is launched into orbit and its proper functions are confirmed, staff at ESOC monitor and handle the scientific and routine operations of the craft.

For further information visit: http://www.esa.int/SPECIALS/ESOC/SEM62CW4QWD_0.html

Places 13 – ESOC Main Control Room:

The ESOC flight control team handle the post-launch and initial orbital/trajectory operations from the Main Control Room. Here they receive live feeds coming in from tracking stations around across the globe to assist in determining the initial mission characteristics.

Places 14 – ESOC Mission Flight Simulation:

Simulated mission scenarios are carried out to prepare the various mission teams for the possible problems with spacecraft. It is also serves as an environment for testing and maintaining spacecraft software – the only item that can be updated once a spacecraft has been launched.

Places 15 – ESOC Mission Operations Centre:

After the successful launch of a mission the main centre hands over to an operational team. Each mission has its own operations room. Here we can see the entrance to the Rosetta and Mars Express operational control rooms.

Places 16 – ESOC Spacecraft Documentation:

Just like a car, a user handbook also accompanies a spacecraft. Here are just a few volumes for the Mars Express spacecraft!

Places 17 – ESOC Spacecraft Control Room:

Inside the Mars Express control room.

Places 18 - ESA Headquarters:

ESA has its headquarters in Paris, France. Here the Director General and the majority of the Programme Directors have their offices, and the decisions that shape ESA's present and future activities are made. It is also the administrative centre and contains the main offices for staffing, legal affairs, finance, budget, internal audit, strategy, international relations and communications. The governing body of ESA - the Council with representatives of all 17 Member States and Canada - meets in the headquarters at ministerial level every two to three years. It is responsible for drawing up the European Space Plan and ensuring the long-term funding of the Agency's activities.

For further information visit: http://www.esa.int/esaCP/ESATE4UM5JC_index_0.html

Places 19 - ESA Headquarters:

The main entrance of the ESA headquarters in Paris.

Places 20 – ESAC:

The European Space Astronomy Centre (ESAC) in Villafranca del Castillo, Spain

Places 21 – ESAC:

The ESAC Centre – previously known as VILSPA – is a new key facility. Its role as a station has been essential to the success of a long list of space missions over the past few decades. By hosting the Science Operations Centres of many of ESA's science missions, ESAC will consolidate its position as a prime centre for multi-wavelength astronomy.

Europe's Spaceport in French Guiana (pictures 22-30):

Europe's Spaceport is situated in the northeast of South America in French Guiana, an overseas department of France. Kourou is a safe site from which to launch, having only very few inhabitants and lying close to the sea. Also, it is an ideal location since it lies close to the equator. This way, when launching a satellite into orbit, only a few changes have to be made for it to reach its trajectory. Launchers also profit from the 'slingshot' effect, that is the energy created by the speed of the Earth's rotation around the axis of the Poles. This increases the speed of a launcher by 460 metres per second. These important factors save fuel and money, and prolong the active life of satellites.

For further information visit: http://www.esa.int/SPECIALS/Launchers_Europe_s_Spaceport/index.html

Places 22 – Kourou Assembly Building:

This 90m high building is where satellites are prepared in the final stage before launched. Over the course of about two weeks the spacecraft payload(s) is positioned and integrated into the fairing on top of the launcher. Once done a series of system checks are carried out to ensure that both rocket and satellite are communicating properly with ground stations.

For further information visit:
http://www.esa.int/SPECIALS/Launchers_Europe_s_Spaceport/SEME3D67ESD_0.html

Places 23 – Kourou:

An Ariane launch campaign lasts five weeks. It involves preparation of the launcher stages, their erection and inspection, encapsulation of the payloads, transfer between the various buildings and the final countdown. One day before launch the Ariane 5 launcher, containing its payload, is transferred from the Final Assembly Building to the launch pad along the rail track. Once the mobile launch table is connected to the launch zone final countdown can begin.

For further information visit:
http://www.esa.int/SPECIALS/Launchers_Europe_s_Spaceport/SEMW1K67ESD_0.html

Places 24 – Kourou:

The Spaceport is open to visitors during the time of a launch. Interested parties may contact the space centre to see whether there are places available at one of the viewing sites. These are free but the number of places is limited. To attend a launch within the Spaceport there is a minumum age of 16 years for sites within 5 to 6 km of the launch pad and 8 years for sites within a 12 km distance.

For further information visit:
http://www.esa.int/SPECIALS/Launchers_Europe_s_Spaceport/SEMSIV67ESD_0.html\

Places 25 – Kourou:

With a total land area of 91 000 km^2, French Guiana is only slightly smaller than Portugal. The two main rivers are the Maroni, that forms a natural boundary with Surinam to the west, and the Oyapock, that marks the border with Brazil to the east. Altogether 95% of the land is covered by equatorial forest and most of the 158 000 inhabitants live along the coast. Europe's Spaceport has helped to bring jobs and wealth to French Guiana. Industry is centred around the spaceport and an estimated 24% of the population work directly or indirectly in jobs connected with the space industry.

For further information visit:
http://www.esa.int/SPECIALS/Launchers_Europe_s_Spaceport/ASEBGOI4HNC_0.html

Places 26 – Kourou Assembly Bay:

The Assembly Bay is used for the final preparations of a spacecraft before launch.

Places 27 – Kourou:

Estuary leading to ESA Spaceport

Places 28 – Kourou:

Main entrance to Europe's Spaceport in Kourou, French Guiana

Places 29 – Jupiter Control Room:

The Jupiter control room, 12 km away from the Ariane launch pad, receives all the information regarding the launch. Final countdown takes place here and the flight of the Ariane 5 is closely monitored until the satellites have been accurately placed in the correct orbit.

For further information visit:
http://www.esa.int/SPECIALS/Launchers_Europe_s_Spaceport/SEME3D67ESD_0.html#subhead1

Baikonur (pictures 30 –34):

Russia is one of ESA's major partners. Over the years, cooperation between ESA and Russia has strengthened and widened. Russia participates in various ESA projects and ESA uses Russia's launch facilities for a number of its missions (i.e. Mars Express, Cluster II). The Russian launch facility Baikonur Cosmodrome (spaceport), used among others by ESA and built on the barren steppes of Kazakhstan, is still the world's largest space launch facility even after 50 years. It covers 6717 square kilometres and extends 75 kilometres from north to south and 90 kilometres from east to west. The base contains dozens of launch pads, five tracking-control centres, nine tracking stations and a 1500-kilometrem-rocket test range. Baikonur is an historic place. It was from here that Sputnik, the first satellite to orbit the Earth, was launched, as was Yuri Gagarin, the first man in space

For further information visit:
http://www.esa.int/SPECIALS/ESA_Permanent_Mission_in_Russia/SEMRSA1XDYD_0.html
And
http://www.esa.int/SPECIALS/ESA_Permanent_Mission_in_Russia/SEM8IIW4QWD_0.html

Places 30 – Baikonur:

The Soyuz launch vehicle is renowned both for the number of successful launches made - more than 1600 - and for its role in carrying men and women from many different nations into space. To date it has been used for more human space flight missions than any other spacecraft. Here the ESA Cluster II mission is being prepared for launching.

For further information visit:
http://www.esa.int/SPECIALS/ESA_Permanent_Mission_in_Russia/SEMAM1X4QWD_0.html

Places 31 – Baikonur:

Mars Express spacecraft delivered to Baikonur by a massive Antonov An-124 transport plane.

Places 32 – Baikonur:

Cluster ready to launch on a Russian Soyuz launcher

Places 33 – Baikonur:

Launch of a Proton rocket. A similar rocket launched ESA's INTEGRAL satellite into its highly elliptical orbit in October 2002.

Places 34 – Baikonur:

Soyuz launcher en route to the launch pad .

Places 35 – Bordeaux:

This is the 'Zero-G' Airbus A300 used for micro gravity research. The aircraft, used by ESA for parabolic flights, has to free-fall through the air - with no force other than gravity acting upon it - to generate 20 seconds of weightlessness at a time.

For further information visit: http://www.esa.int/esaCP/SEM8WZ8YFDD_FeatureWeek_0.html

Places 36 – Kiruna:

Ground stations provide the link between the satellite in orbit and the operations control centre on the ground. ESOC has established a network of ground stations around the world to support ESA missions, and those of industrial customers. This network of ESA tracking stations is known as the ESTRACK network. One of these ground stations is situated in Kiruna, Sweden.

For further information visit:
http://www.esa.int/spacecraftops/ESOC-Article-fullArticle_idBanner-1082488220917_item_selected-8_1_00_par-33_1084173605643.html

Places 37 – Kiruna:

The Kiruna station is located in northern Sweden. It hosts a 15 metre- and a 13-metre-diameter antenna. It primarily supports the European Remote Sensing satellites, Envisat and ERS-2 and is equipped for tracking, telemetry, and command operations as well as for reception, recording, processing, and dissemination of data from the sensor instruments on board the two satellites.

For further information visit:
http://www.esa.int/spacecraftops/ESOC-Article-fullArticle_idBanner-1082488220917_item_selected-8_1_00_par-33_1084173605643.html
And
http://www.esa.int/spacecraftops/ESOC-Article-fullArticle_idBanner-1082488220917_par-33_1069167510793.html

Places 38 – EAC:

The European Astronaut Centre (EAC) of the European Space Agency is situated in Cologne, Germany. It was established in 1990 as a result of Europe's commitment to human space programmes and is the home base of the 13 European astronauts who are members of the European Astronaut Corps. The role of the EAC is to prepare and implement astronaut-training programmes for a variety of missions, including those for the International Space Station

For further information visit: http://www.esa.int/esaHS/ESAJIE0VMOC_astronauts_0.html

Places 39 – EAC Crew Medical Support Control Room:

The Crew Medical Support control room is used for monitoring the health of astronauts during their missions.

Places 40 – EAC Astronaut Training:

The training hall at EAC contains facilities that provide hands-on training for astronauts.