

ESTEC Test Centre

It was a very important year in the ESTEC Test Centre's development, with the commissioning of a new extension comprising a large integration area and associated check-out rooms and offices, in time for the arrival of the flight model of the Rosetta satellite. The new extension enabled the simultaneous hosting of three major ESA programme spacecraft: the Integral and Rosetta flight models and the ATV structural-thermal model, all of which arrived at ESTEC during the second half of 2001 and will remain at the Test Centre for almost a year.

Also during the year, the engineering facilities, design offices, calibration laboratory, clean room and electromechanical workshop were moved to a new building, allowing greater efficiency in the provision of engineering services to the Test Centre and to the programme Directorates.

Seven satellite test campaigns were in progress during the year, for the:

- Envisat flight model
- MetOp structural model (requiring a very specific thermal-vacuum test jig designed and manufactured by the ESTEC Engineering Section)
- MetOp engineering model
- Smart-1 structural model
- Integral flight model
- Rosetta flight model, and
- ATV structural-thermal model.

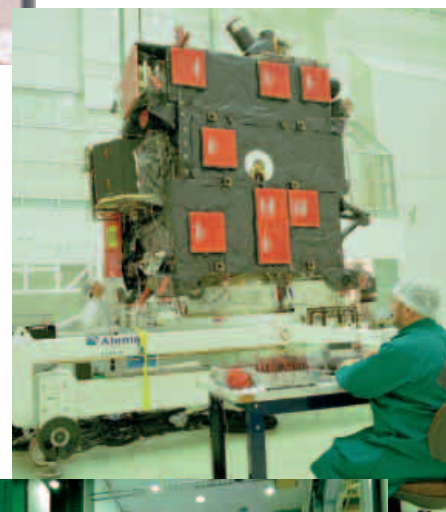
In parallel, a number of tests were conducted on satellite instruments, antennas and solar arrays. In the framework of ESA's policy of supporting European space industry, several tests were also performed for non-ESA programmes, including those for Alcatel on the Astra-1K satellite's reflectors and those for Fokker on the HotBird-7 solar array.

The company ETS, which was engaged in 2000 for the maintenance, operation, and marketing support of the ESTEC Test Facilities, was successfully audited for the ISO 9000 certification of the ESTEC Test Centre. The accreditation of the ESTEC Engineering Section's Laboratory Equipment Pool (LEP) as an official calibration body for electronic equipment was maintained following an audit by the Dutch Raad voor Accreditatie.

The Fourth International Symposium on Environmental Testing for Space Programmes, organised jointly by ESA and CSL, was held in Liège (B) in June. Like previous symposia in this series, the event attracted a large number of distinguished speakers and participants from the international space community.



Integral undergoing sine-vibration testing in the ESTEC Test Centre



The Rosetta flight model in the ESTEC Test Centre



The ATV structural-thermal model in the ESTEC Test Centre

European Co-ordinated Test Centres

Major ESA-related activities at the national test centres included:

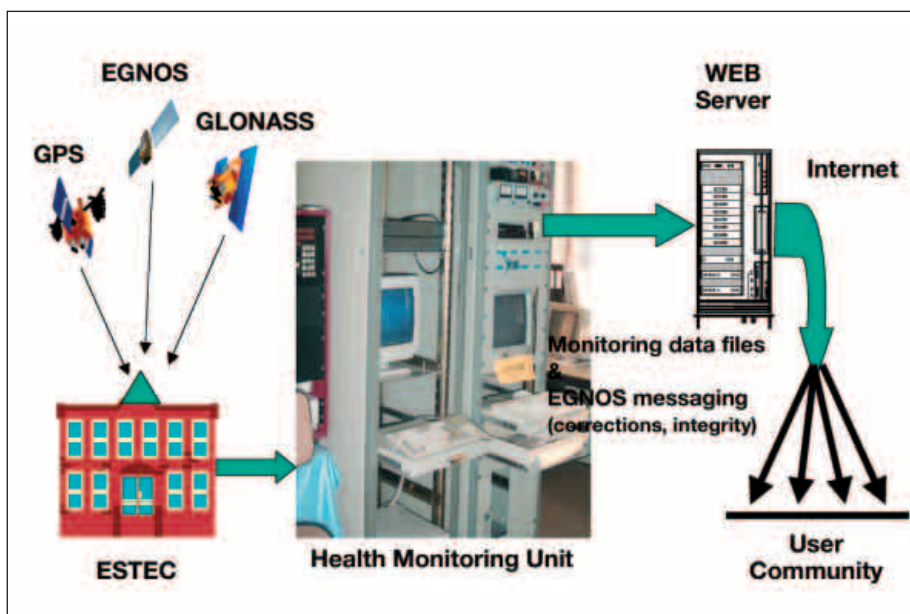
- IABG (D): tests on the ASCAT antenna for the MetOp satellite, and initiation of the test campaign (vibration, magnetic and EMC) on the Lander of the Rosetta satellite.
- Intespace (F): completion of the test campaign for the SPI experiment on the Integral satellite.
- CSL (B): continuation of the modification of the Focal-X facility to allow accurate mirror polishing using ion bombardment, optical testing under thermal-vacuum conditions of the secondary reflector developed for the Planck mission, upgrading of the ESTEC videogrammetry system, and completion of the CLEAN study addressing the possible contamination of space optics.

ESTEC Electric-Propulsion Laboratory

The ESTEC Electric-Propulsion Laboratory was used to support the RIT-10 ion-engine testing. The engine (manufactured by Astrium for Artemis) successfully completed over 15 000 hours of life-testing, the longest European test of this kind ever conducted. Special tests on these thrusters were also performed in the last quarter of 2001 to support the Artemis mission-recovery efforts. Other tests included verifications of FEEP and cold-gas thrusters for the mission-critical micro-propulsion thruster assembly for GOCE.

ESTEC Electrical Engineering Laboratories and Facilities

The ESTEC Electrical Engineering Laboratories and Facilities provide significant support to both ESA and industrial space activities in 2001. In the ESTEC Battery Test Centre, accelerated Stentor battery module lifetime tests were carried out for CNES, while the Compact Payload Test Range was used for major antenna, EMC and RFC tests, including those for MetOp.



The EGNOS system architecture

The ESTEC Radio Navigation Experimentation Unit (RNEU), a facility unique in Europe and available to the whole European radio-navigation community (industry, universities, national agencies, ESA programmes), is being used for the preparation of the European Global Navigation Overlay System (EGNOS) and Galileo satellite-navigation programmes, including their applications. The RNEU includes system simulation and evaluation tools that are heavily supporting the EGNOS development, such as the EGNOS Service Volume Simulator, the EGNOS End-to-End Simulator and the EGNOS Test-Bed Laboratory. Similar

tools are currently being developed for Galileo: the Health Monitoring Unit permanently monitors the GPS, GLONASS and EGNOS constellations, making the data acquired and the EGNOS messages available to users via an Internet server. The RNEU also includes a complete GPS/EGNOS/GLONASS Signal Constellation Simulator, which offers a very powerful means of testing navigation receivers for any type of application.