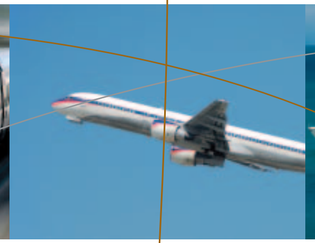

Gtr
Galileo
Test Range

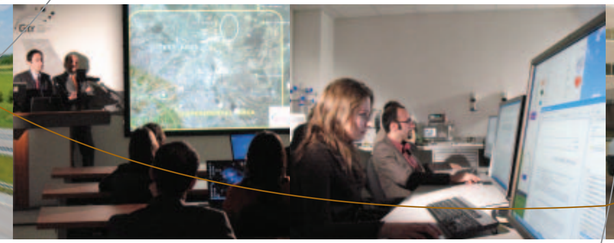
Galileo: the European programme for satellite navigation

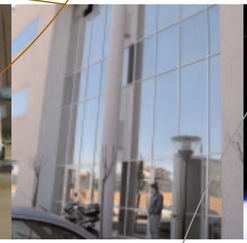
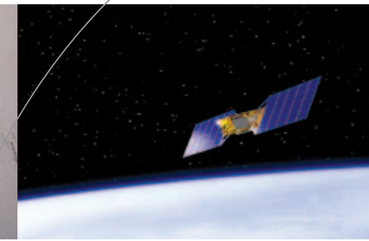
Galileo is a European satellite navigation system developed jointly by the European Union and the European Space Agency (ESA), and is the largest project ever conceived by the European institutions.
Galileo will provide the basis for a range of applications and services dedicated to a variety of sectors, including road, air, rail and sea transport, telecommunications, Earth mapping and cartography, gas/oil exploration and mining. For the public regulated services, security and defence applications will be developed, such as the protection of ports, airports, railway stations and other critical infrastructure, as well as other important civil protection and rescue services for people and vehicles in emergency situations.

Galileo Test Range: Italy's contribution to the development of satellite navigation

Galileo Test Range (Gtr) is the permanent laboratory for the validation of Galileo test signal and the development of navigation and positioning applications.
It is part of the Lazio's Aerospace Technology District, the first in Italy, and is financed by the Regione Lazio (the regional Council for economic development, research, innovation and tourism) with operational support provided by Filas, the Region's investment agency supporting innovation. A consortium comprising Telespazio, Thales Alenia Space and Finmeccanica was responsible for the creation of the Galileo Test Range.

Gtr represents the Italian initiative to build a technological centre of excellence enhancing the development of know-how in satellite navigation systems and services. Gtr is crucial to the development and exploitation of Lazio's expertise in satellite navigation, in industry, research and at universities. Gtr is also a key factor in making the Italian aerospace sector competitive internationally, and is an important element supporting the candidacy of Rome and Lazio as the base for the Galileo Supervisory Authority. Along with Gtr, a controlled environment was created for navigation and positioning tests. This will enable trials of receivers, terminals and applications based on the GNSS signals, including Galileo, to be carried out even before the satellite constellation becomes operational. Furthermore, Gtr could aid the processes of regulation and definition of standards, promote research on development of GNSS services and Galileo, and carry out high-level training.

Gtr: objectives

According to Galileo's development and entry into full operation, Gtr has set itself the following general objectives:

- to exploit the know-how of industry, SMEs and the research sector for the Galileo programme and support its development;
- to encourage innovation in industry by facilitating access to new satellite navigation products and services;
- to create a network of link-ups and exchanges between different national entities, public and private bodies, universities, research centres and industries, in order to boost Italian industry as it works together and shares knowledge with other similar groups in Europe;
- to encourage these national entities to participate in defining process of certification and standardization of products, services and applications based on Galileo at European level;
- to develop the involvement of Italian and European industry by using combined Galileo services together with other satellite navigation systems.

Gtr: phase one

The first stage of the programme was financed by Regione Lazio and began in July 2005.
The acceptance of the infrastructure started in February 2007. After a short phase of testing and validation of its services, the Gtr will operate on various projects including technology development, research and training. From 2007, therefore, Gtr will be able to test technologies and applications based on GPS and EGNOS standards. During this phase, the infrastructure will also use four pseudo-satellites (fixed and transportable transmission stations) located around Rome to create a test area.

Gtr: phase two

The second phase of the programme, beginning in 2007, will last for two years and will involve the Italian Space Agency (ASI). During this phase, which will be completed by the end of 2009, Gtr infrastructure will be equipped with new technology and functions, to ensure that all Galileo services are fully operation.

Gtr: system architecture

The Gtr system consists of:

- the Analysis and Control Centre
- the Experiment Area with the Test Area

The Analysis and Control Centre comprises the **Gtr** centre, 1800 sqm spread over three floors in Tecnopolo Tiburtino's facility in Rome.

The Centre includes:

- a **Control Centre**, which monitors and manages all internal and external aspects of the centre and houses the data archive;
- an **Orbit and Synchronisation Lab**, to calculate the offset between the Gtr's reference time and the time measured by the pseudo-satellites in order to enable navigation in the Gtr Test Area, and to test the orbit determination of the satellites;
- a **Time Lab**, equipped with atomic clocks (Active Hydrogen MASER and CESIO). This provides Gtr's reference time scale with a high degree of short and long-term stability;
- an **Integrity Lab**, which estimates the residual error of the measurements obtained using the Gtr navigation system and produces an integrity alarm if this exceeds certain thresholds connected to the application;
- a **Research and Development Lab** (the Gtr Lab), which includes a radio frequency constellation simulator, receivers and other hardware and software instruments for research, development and testing in satellite navigation field.

The Experiment Area with the Test Area houses the following:

- a network of **Pseudo-Satellites** known as pseudolites, which generate a GPS and Galileo like navigation signal from fixed or transportable positions. The positions of these transmitters define the Gtr Test Area, in which the signals can be received as if from a constellation of satellites with a certain geometry, to allow navigation receivers and applications to be tested. In the first phase, this area is located in the east of Rome, in the areas of Guidonia Montecelio and Tivoli;
- a network of **Differential Stations** capable of sending corrections to users in a test area that covers a range of operating environments (motorways, railways, urban areas, airports etc), for validation on the ground of applications and services that include navigation and communication. This network consists of two stations and covers the whole test area;
- Monitoring Stations, which collect measurements from the pseudolite and satellite signals, and pass them onto the Gtr centre, which processes orbitography and integrity data.

www.gtr-italy.eu

Gtr Galileo Test Range

Regione Lazio

Filas
Finanziaria laziale di sviluppo

TELESPAZIO
A Finmeccanica / Thales Company

ThalesAlenia Space

FINMECCANICA

mussetti rocchi pavese