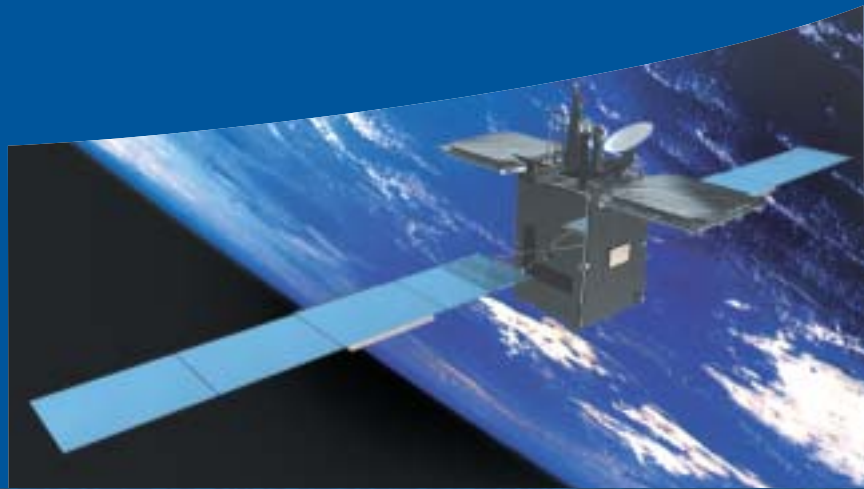




SPAZIO

A FINMECCANICA COMPANY



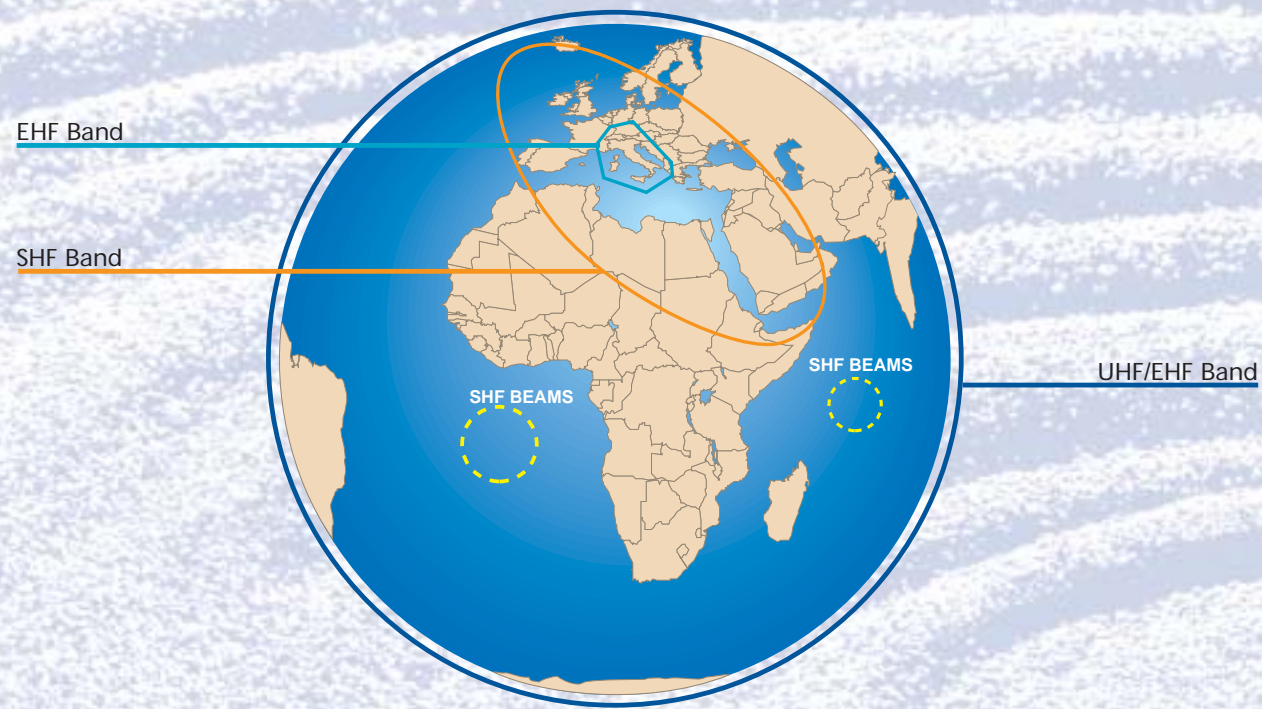
SICRAL

ITALIAN MILITARY COMMUNICATIONS SYSTEM



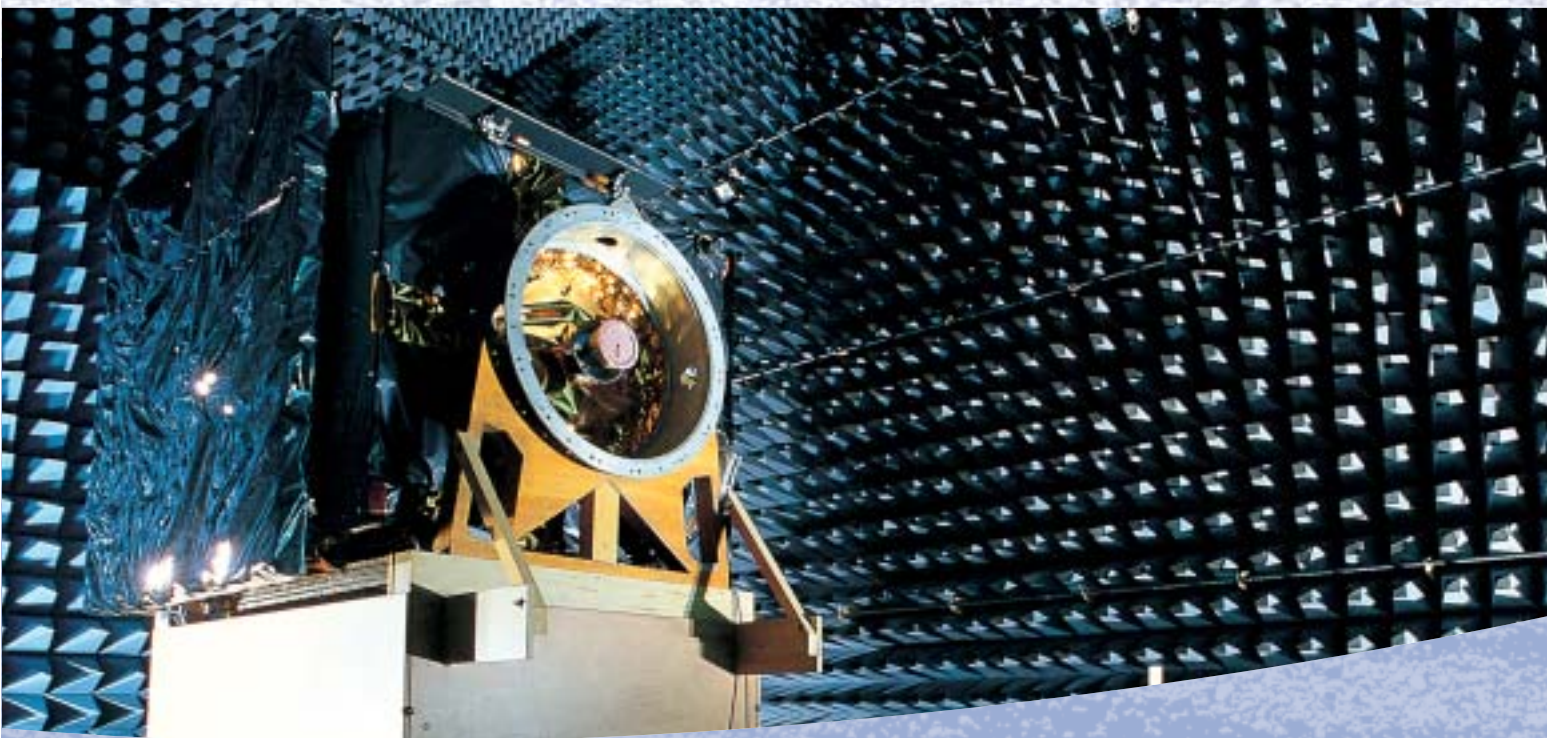
A new ally
for military communications

EHF, SHF, UHF COVERAGE AREAS



SICRAL, Italian Military Communications System

A new ally
for military
communications



The architectural, engineering and technological solutions used in creating Sicral make it a system of an undeniable strategic value, able to meet all present and future needs in military telecommunications through highly competitive and efficient performance.

The best defence is communication

Alenia Spazio has been active in advanced telecommunications for over 30 years and has had leading roles in landmark satellite systems: Intelsat, Hot Bird, Italsat, Globalstar, Arabsat, Nahuelsat and many others. Based on that extraordinary experience, Alenia Spazio is today prime contractor for a number of programmes including Sicral, the first Italian satellite system for military telecommunications developed by the SITAB consortium made up of

Alenia Spazio (70%), FiatAvio (20%) and Telespazio (10%). The production of Sicral has required more than two million man/hours and in this considerable effort over 80% of the activities and technologies have been

carried out in Italy, involving some 400 people per year with 70% from Alenia Spazio. Sicral was born to meet precise and varied needs: it is characterised by flexibility of use, safety, low management costs and

the ability to adapt to changing operational conditions, especially in emergencies. The final applications of the system have demanded the design and construction of transmission equipment able to operate in three frequency bands (multi-payload and multi-transmission) with a repeater for each band.

• EHF (20-44 GHz)
This is the first repeater for advanced applications developed entirely in Italy and Sicral is the first satellite in Europe to carry it.

• UHF (260-300 MHz)
Sicral is the European satellite with the most powerful UHF payload and is the only one able to operate interconnecting with the SHF/EHF band. The Patch-type design of the UHF antennas (in planar array) was developed specifically for this programme.

• SHF (7/8 GHz)
Thanks to Alenia Spazio technologies, a satellite with equipment operating in this frequency has been developed for the first time in Italy.

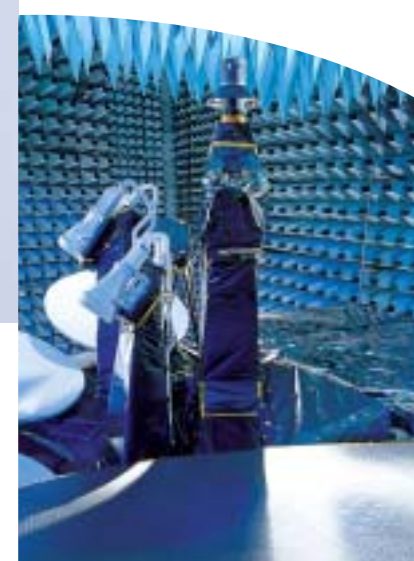


LEADING EDGE PERFORMANCES FOR STRATEGIC LINKS

After the experience with Italsat and Artemis, Alenia Spazio has reached complete self-sufficiency in the design of Sicral, the first Italian satellite system for military telecommunications characterised by autonomy, mobility, high capacity, safety, flexibility and inter-operability.

A defence network uniting air, land and sea

Sicral is a complex system made up of the satellite, the Management and Control Center at Vigna di Valle and over 100 user terminals for ground, sea and air platforms.



SATELLITE

All the components of the satellite have been designed and integrated by Alenia Spazio in Rome and the spacecraft will be launched from the Kourou (French Guyana) Space Center on an Ariane IV rocket. The satellite will be managed and controlled in orbit from the Vigna di Valle Center and the various electronic and information subsystems will be constantly monitored.

MANAGEMENT AND CONTROL CENTER

Housing advanced and complex electronic,

information and telematic technologies. The Center's job is to guarantee satellite control and planning and management of the satellite

connections according to the needs of the different users. Control of the satellite and the communications network is integrated to unify actions for both

SATELLITE CHARACTERISTICS

Position	▶ GEO at 16.20 East
Stabilisation	▶ 3-axis
Satellite control	▶ Earth and Sun sensors
Launch mass	▶ 2,500 kg
Payload mass	▶ 450 kg
Power needs C/U	▶ 1,500 W, 900 W during eclipse
Solar cell production	▶ 3,000 W
TT&C	▶ S and EHF band
Max. pointing error	▶ 0.20 N/S and E/W
Fuel	▶ Liquid, bipropellant
Operative life	▶ 10 years
Launch system	▶ Ariane IV

System architecture

SICRAL SYSTEM

SPACE SEGMENT

SATELLITE LAUNCH SERVICE

- Bus
- Repeaters
- Antennas
- Ariane IV

GROUND SEGMENT

MANAGEMENT AND CONTROL CENTER USER TERMINALS INTEGRATED LOGISTICS

- Mission Control Center
- Network Control Center
- Satellite Control Center
- TT&C in S and EHF bands
- Transportable SHF
- Transportable EHF
- Fixed SHF
- Naval SHF
- Manpack SHF
- Naval UHF
- Avionic UHF
- Vehicular UHF
- Manpack UHF
- Portable UHF

the planning of the operative missions and the configuration of the satellite repeaters and user terminals. At the Vigna di Valle Center projects have been developed for links with the main telecommunication networks of the armed forces

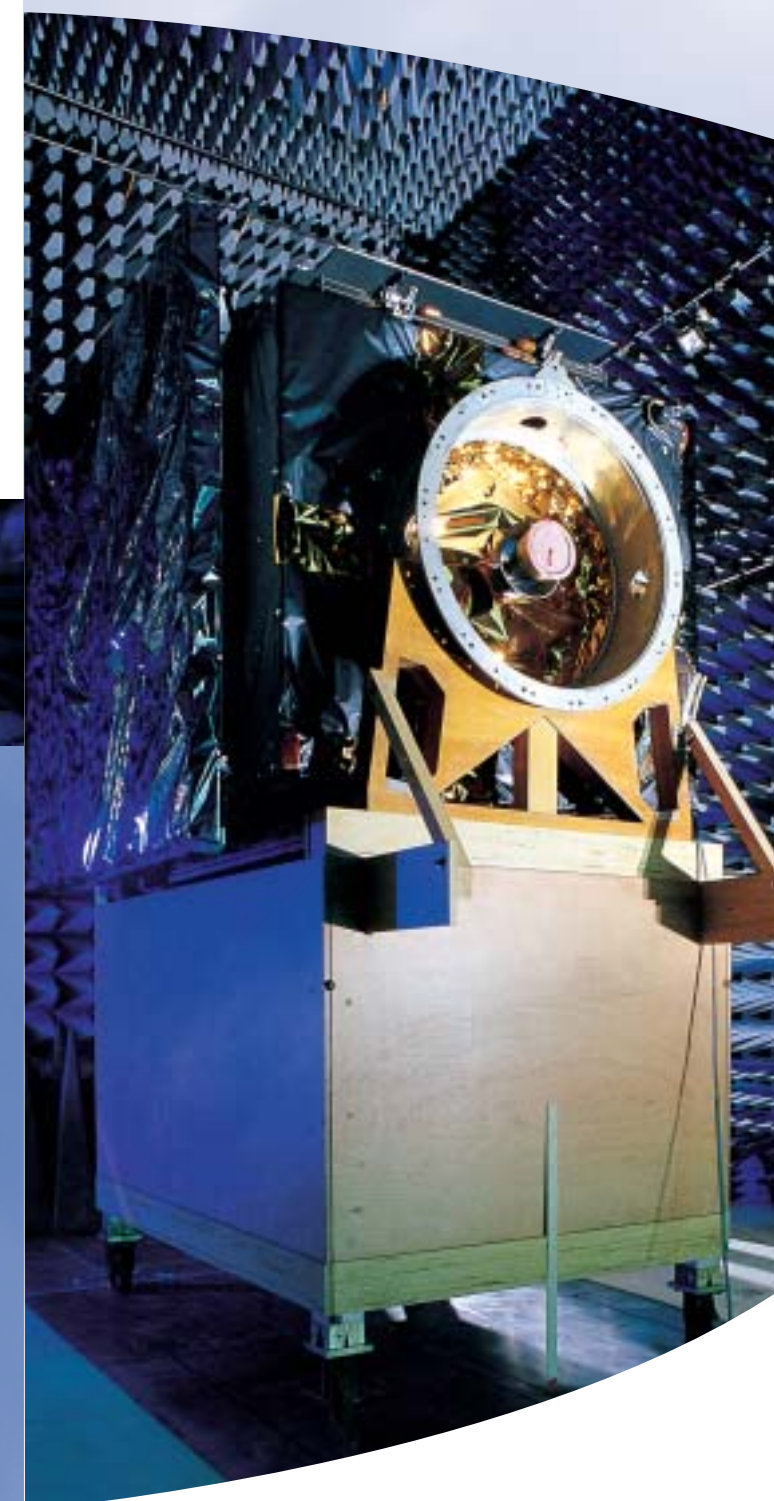
and with the "Interforces Numeric Network", with the aim of integrating military satellite resources with traditional ones. The Center also assigns the telecommunications resources to the various operations and users,

on the basis of priority criteria defined by the General Defence Staff. To ensure the security of these operations, Alenia Spazio has developed a satellite telecommand encoding system that can detect any electromagnetic intrusions.

USER TERMINALS

The ground terminals make possible satellite links for the various uses. There are four different types of terminal: installed on mobile platforms, transportable, fixed and manpack (backpacks). The mobile terminals are

further divided into three versions depending on the foreseen use: naval, air and ground vehicular, generally small sized and fitted with omni-directional antennas. The characteristics of the user terminals give the Sicral system the mobility and flexibility needed to meet the special operative needs. Naturally, all the terminals have been built according to international protocols guaranteeing inter-operability with other countries, NATO ones in particular.



A SATELLITE READY TO GO INTO ACTION
Placed in geostationary orbit at 36,000 km above Earth, Sicral will ensure video, audio and facsimile links over the area visible to the satellite.



PARTECIPAZIONI

Industrial participation in the programme. Segment and Country.

SPACE SEGMENT

ITALY	USA	UK	GERMANY	FRANCE	NETHERLANDS
<ul style="list-style-type: none"> • Alenia Spazio • FiatAvio • Telespazio • Officine Galileo • Laben 	<ul style="list-style-type: none"> • Barnes Eng • Honeywell • EMS • Eagle Picher 	<ul style="list-style-type: none"> • Comdev 	<ul style="list-style-type: none"> • Astrium (ex Dasa) • Snecma • Ariespace 	<ul style="list-style-type: none"> • Aerospatiale&Pyrospace 	<ul style="list-style-type: none"> • Fokker

GROUND SEGMENT

ITALY	USA
<ul style="list-style-type: none"> • Alenia Spazio • Telespazio • Sepa • Marconi Communications • Datamat • Dataspazio • Elettronica • Digital 	<ul style="list-style-type: none"> • TIW System Inc.

USER TERMINALS

ITALY	USA
<ul style="list-style-type: none"> • Alenia Spazio • Alenia Aeronautica • Agusta 	<ul style="list-style-type: none"> • Ail-Dorne Margolin

In addition, there are approximately 150 smaller Italian companies covering virtually all those active in the space sector.

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