Space

INDRA SPACE



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01 Corporate Information

02 Fields of activity

- Communications via satellite
- Remote sensing
- Satellite control
- Navigation and positioning
- Integrated logistic support

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INDRA SPACE I

- Indra Space is a subsidiary company of Indra and Thales Alenia Space, and is dedicated to the development of spatial systems in the ground segment.
- Over 25 years of experience in offering its customers turnkey satellite solutions.
- Use of Telecommunication, Earth Observation and Navigation Satellites.



INDRA SPACE II



- Income of 70 M EUR (2009).
- Experience in more than 20 countries.
- Over 370 engineers and technicians.
- Usual supplier to the European Space Agency (ESA).
- Shareholder of HISDESAT, the company that owns both Spainsat and XTAR-EUR satellites.

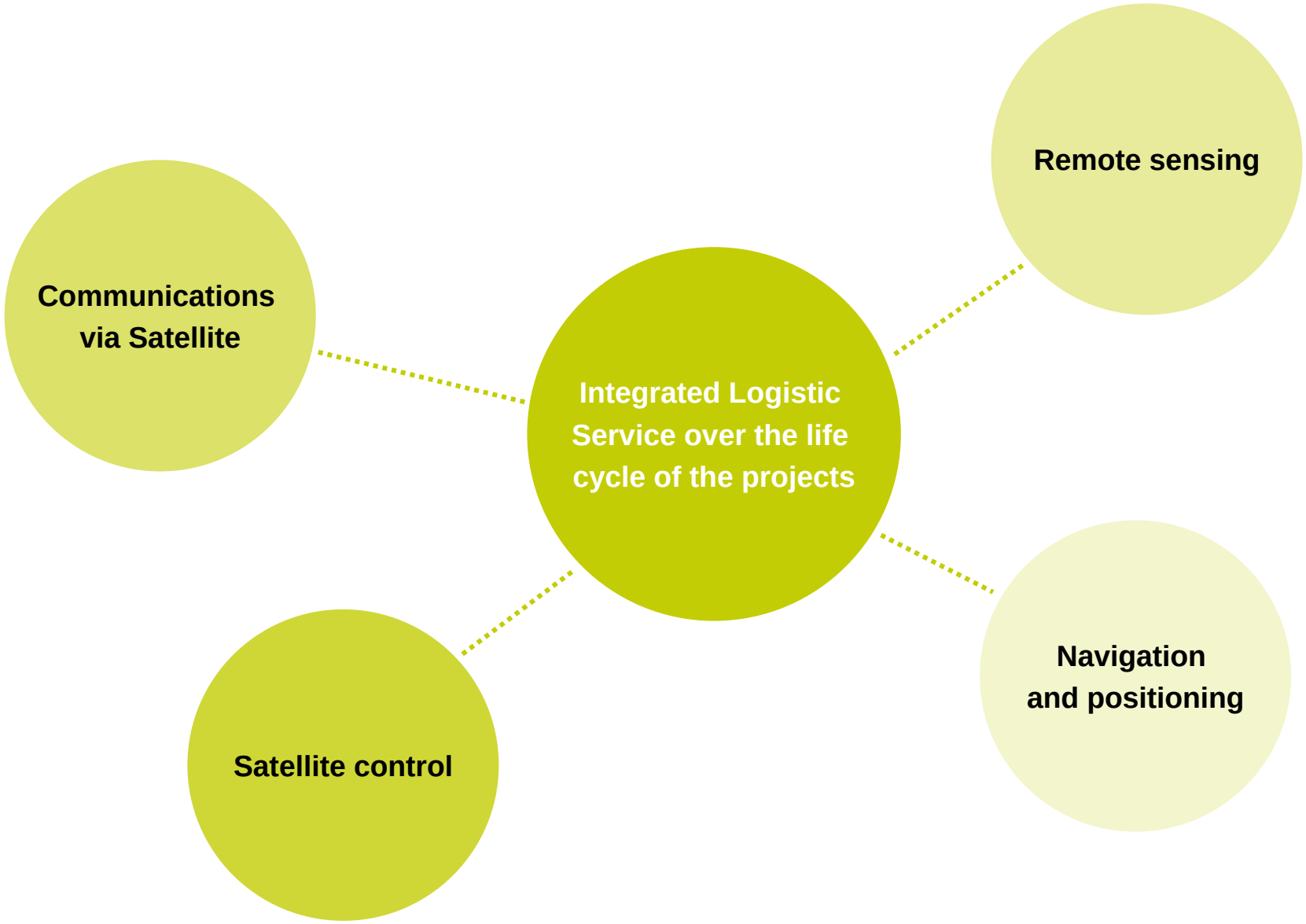
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TURNKEY SOLUTIONS



SERVICES



- Engineering and Consultancy
- Development of our own products
- Integration of systems
- Turnkey solutions
- Technical assistance and training

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COMMUNICATIONS VIA SATELLITE

Indra's offer in communications via satellite includes the implementation of satellite networks as well as the supply of equipment and systems.

Secure military networks

- Network management systems
- Anchor stations (HUB)
- Transportable HUB stations
- Flyaway and mobile terminals
- Naval and submarine terminals
- Manpack terminals

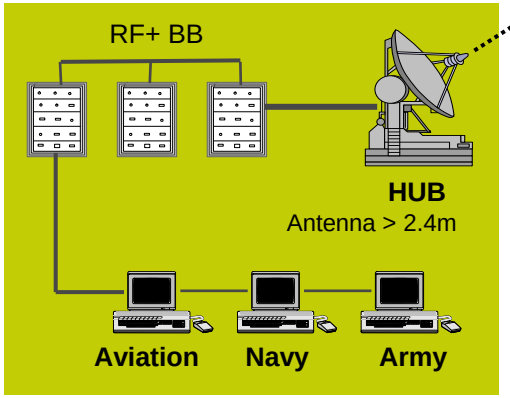
Civil networks for satellite communication

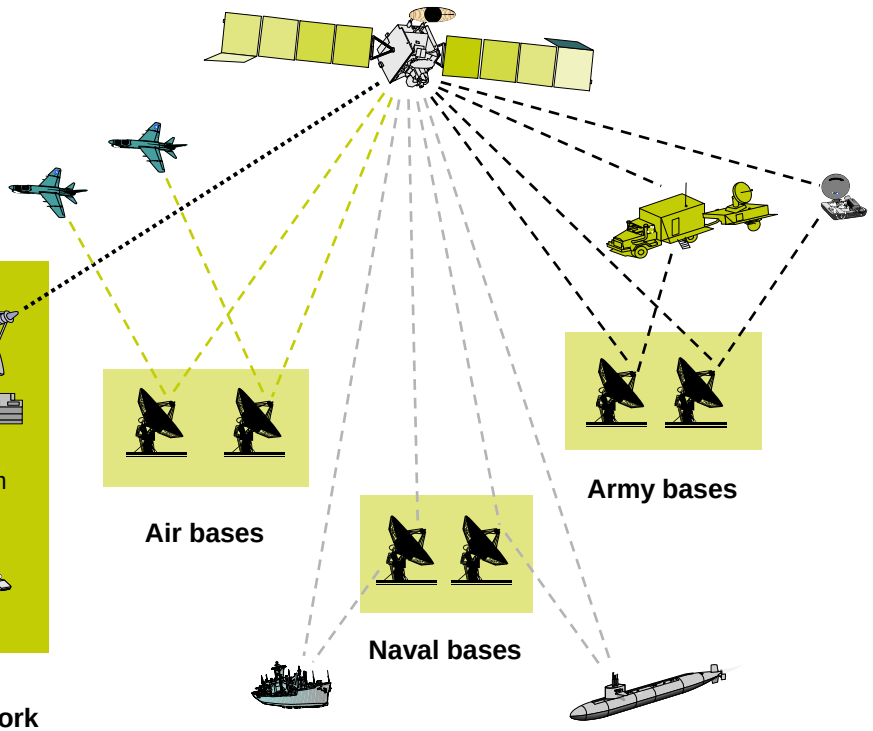
- Aeronautical authorities
- Broadband internet connection in remote areas
- Rural telephone operators
- TV distribution operators
- Search and Rescue services
- Governmental agencies

Equipment and satellite communication systems

- Antennas in X, Ku, and Ka frequency bands
- Antenna pedestals stabilised in three axes
- Antenna control units
- Frequency converters in both X and Ka bands
- Transceivers for both X and Ka bands
- IF equipment
- Modems
- Monitoring and control systems

MILITARY SATELLITE NETWORKS





- **Control centre**
- **Interface with the terrestrial network**



Military communications in X band for the following programs: SECOMSAT (Spain), SYRACUSE (France), SKYNET (UK), and CISCOMIS (Brazil)

HUB STATIONS AND REMOTE TERMINALS



HUB - Antennas
3,8m - 11m



Multi-Band Terminal



Submarine Terminal



Naval Terminal



Transportable Terminal

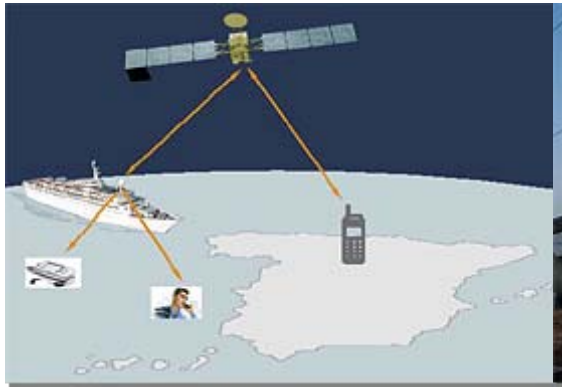


FLYAWAY
Light Tactical Terminal



MANPACK Terminal

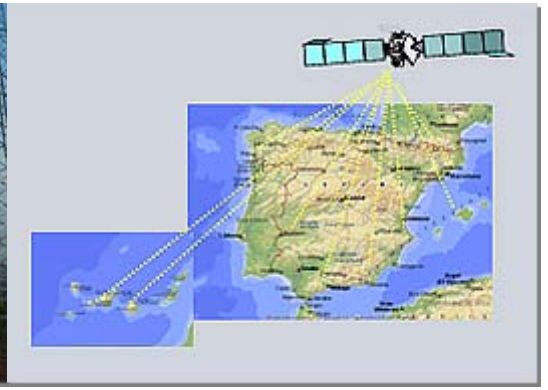
SATELLITE NETWORKS FOR CIVIL USE



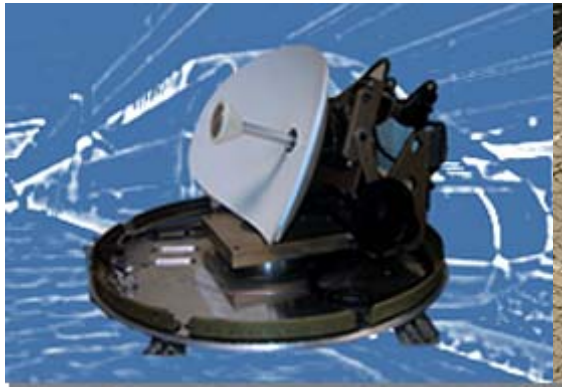
GSM Extension to the high seas



Air traffic control networks



Emergency networks



Internet connections in high speed trains



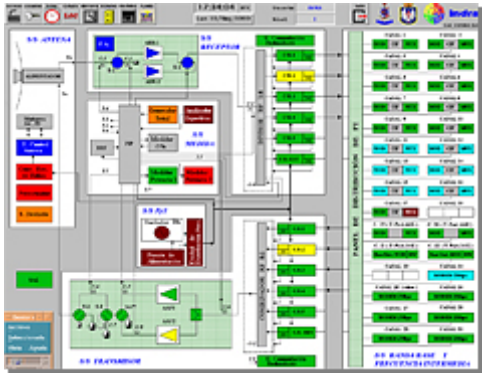
Mobile Communication Centre



Light naval terminal

M&C SYSTEMS





GENIUS System
for Monitoring & Control

- Generic tool for monitoring and control.
- Permits the supervision of the entire system.
- Automatic satellite follow-up.
- Real time monitoring.
- Data storage for each piece of equipment.
- Easy man-machine interface.

COMMUNICATIONS SYSTEMS

- Amerhis system includes on board signal processing on Amazonas satellite.
- The system consumes less bandwidth for video, internet and telephony services.
- Indra's Gateway connects the system to terrestrial networks.
- Its applications include telemedicine, e-learning, or bringing communications to remote locations.



Gateways

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01 Corporate Information

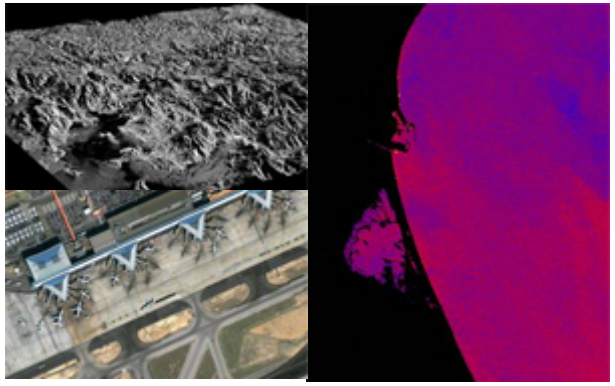
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REMOTE SENSING

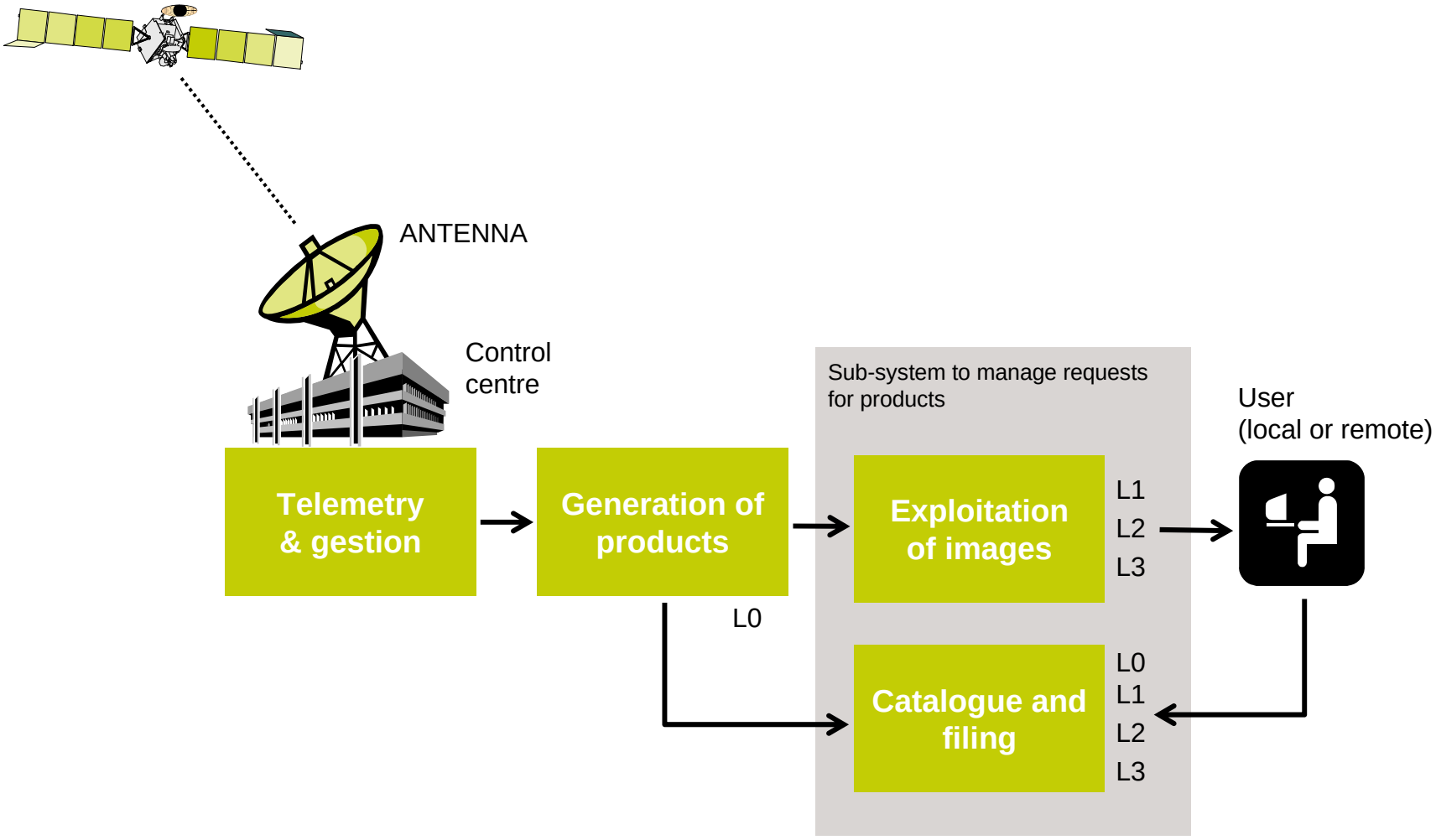
Indra offers solutions in the field of remote sensing, using optic observation satellites and SAR (Synthetic Aperture Radar).



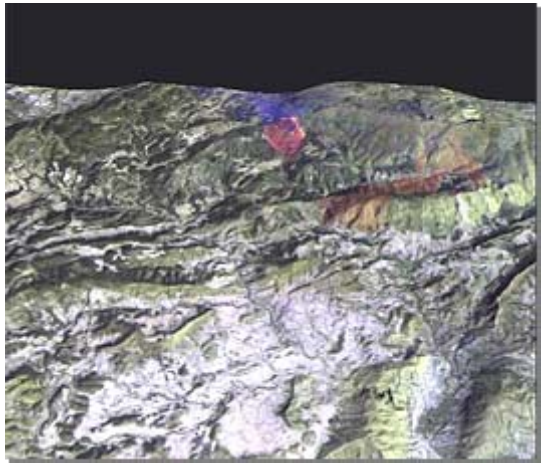


Earth Observation Systems	Applications
Satellite images: Reception; Processing; Generation; Filing; Exploitation	Natural and technological risks. Urbanism and land management. Natural resources and environment. Security and defence.

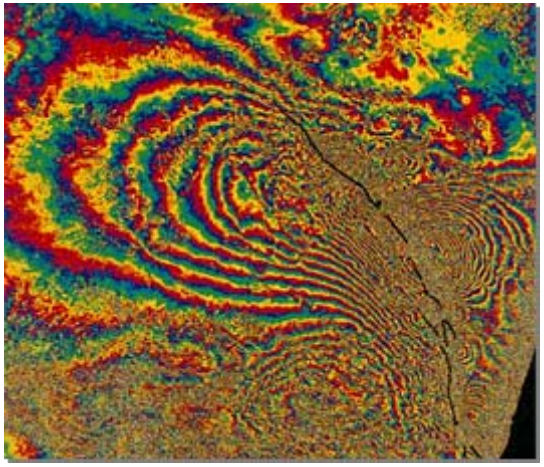
SYSTEMS - ARCHITECTURE

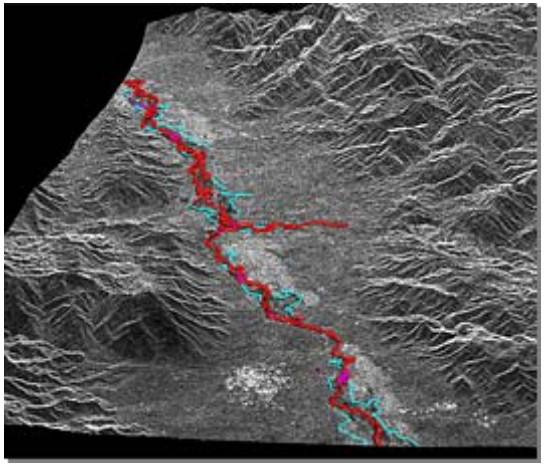


NATURAL AND TECHNOLOGICAL RISKS



Fire control



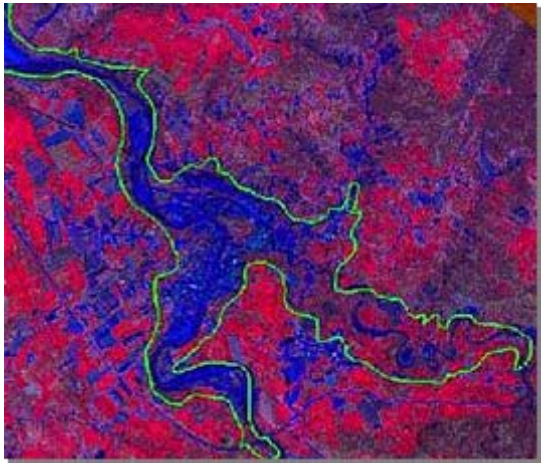




Detection and monitoring of oil spills



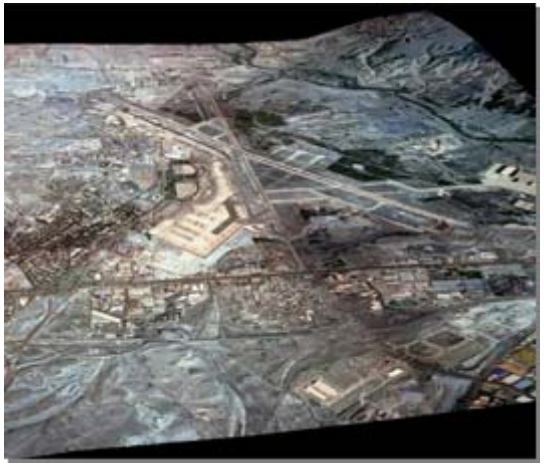
Subsidence detection



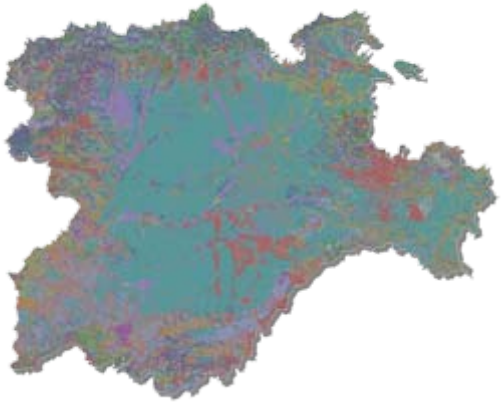
Flood control

URBANISM AND LAND MANAGEMENT

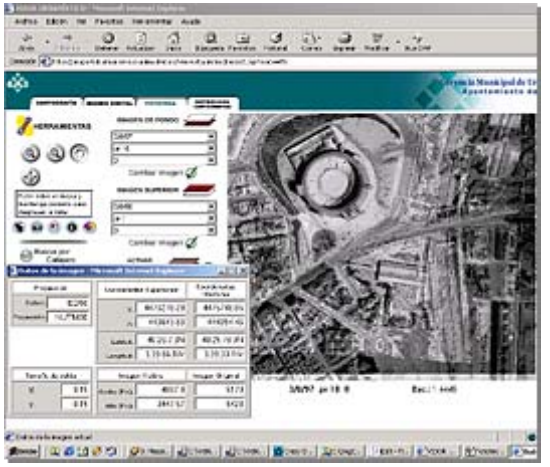










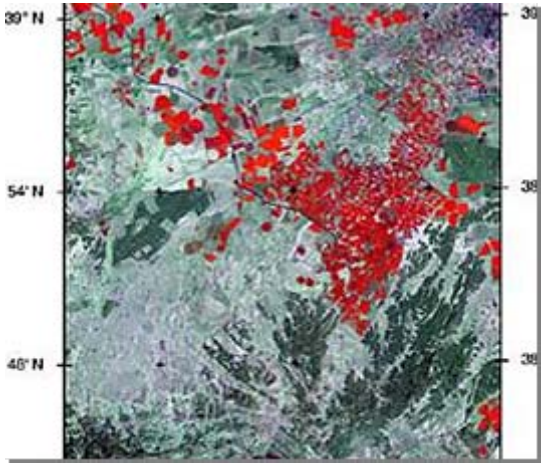


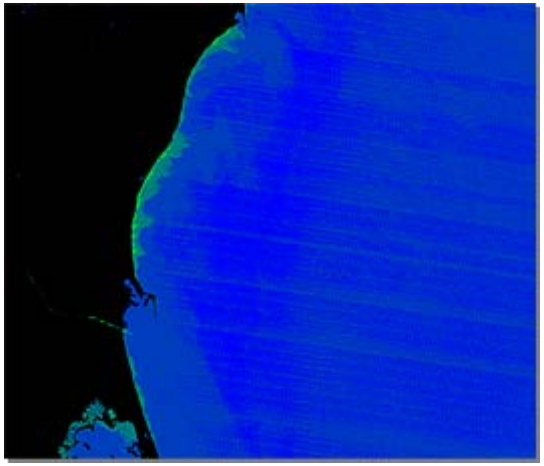
Maps of land use

Cartography generation

Assistance in urban management

NATURAL RESOURCES AND ENVIRONMENT



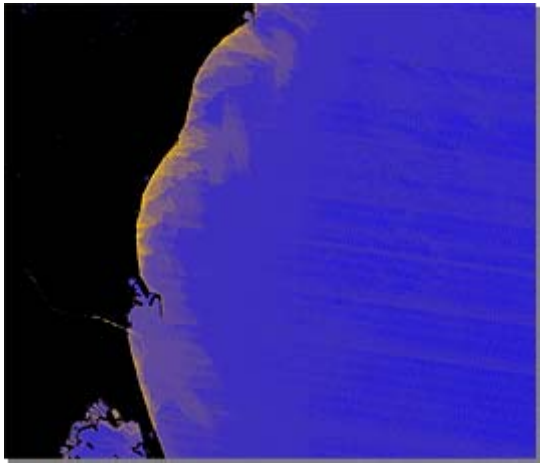




Delimitation of river perimeters

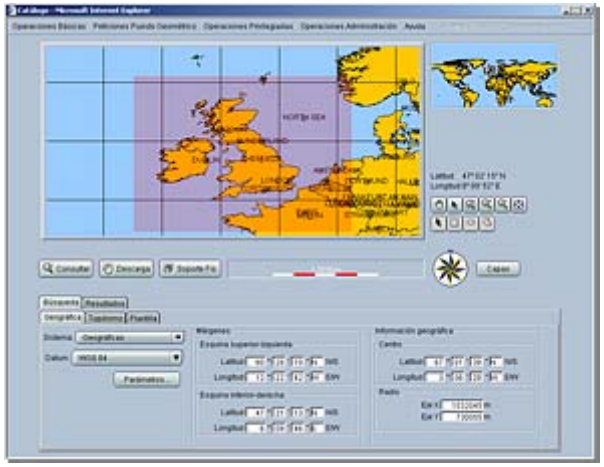


Determination of irrigated areas

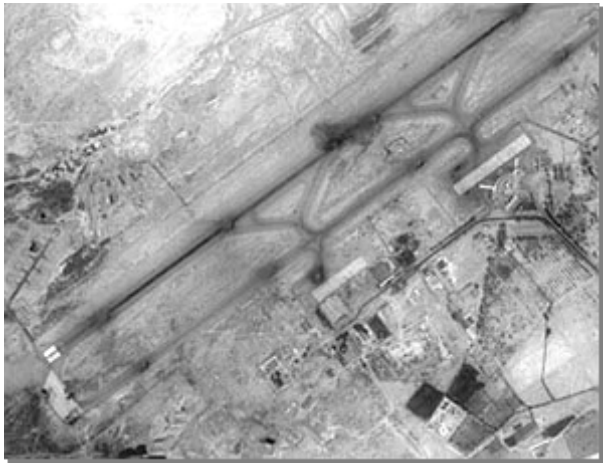


Water quality

SECURITY AND DEFENCE



Geospatial data distribution systems for defence





Modelling in 3D



Detection of targets and assessment of missions, under any given meteorological condition (SAR)

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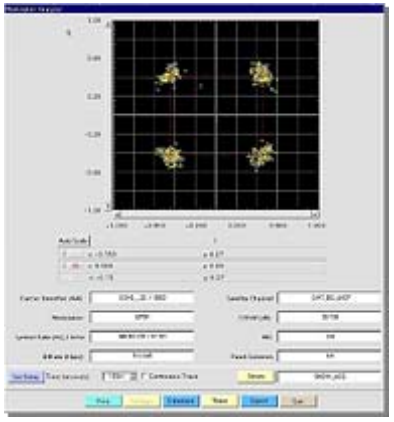
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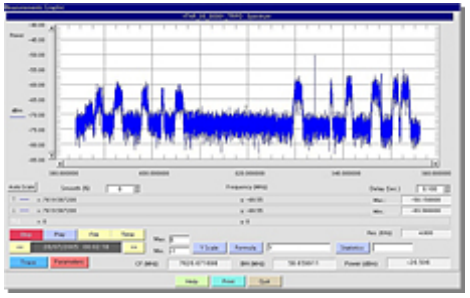
GROUND SEGMENT CONTROL I

Development and implementation of ground segment control systems for satellite control.



- Satellite control centres
- Applications for satellite control





GROUND SEGMENT CONTROL II



Data reception and acquisition stations

Development and installation of stations for the reception and acquisition of data and images coming from satellites.



IOT (In-Orbit-Test) Banks and advanced IOT Systems

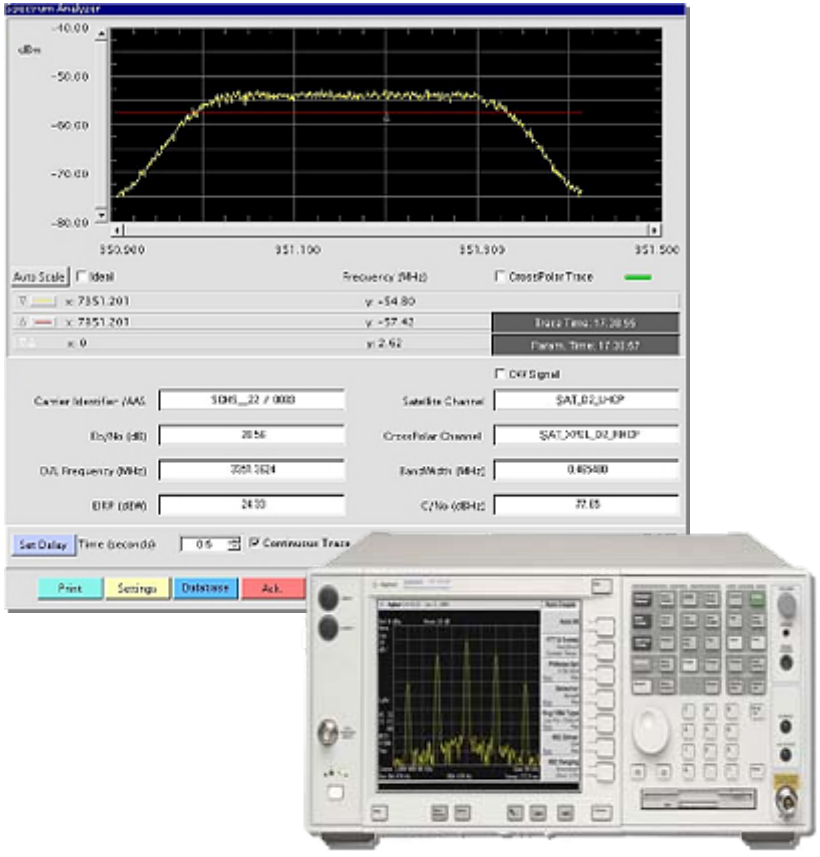
Full systems (equipment and software) to analyse the situation of key elements of the payload of the satellite.



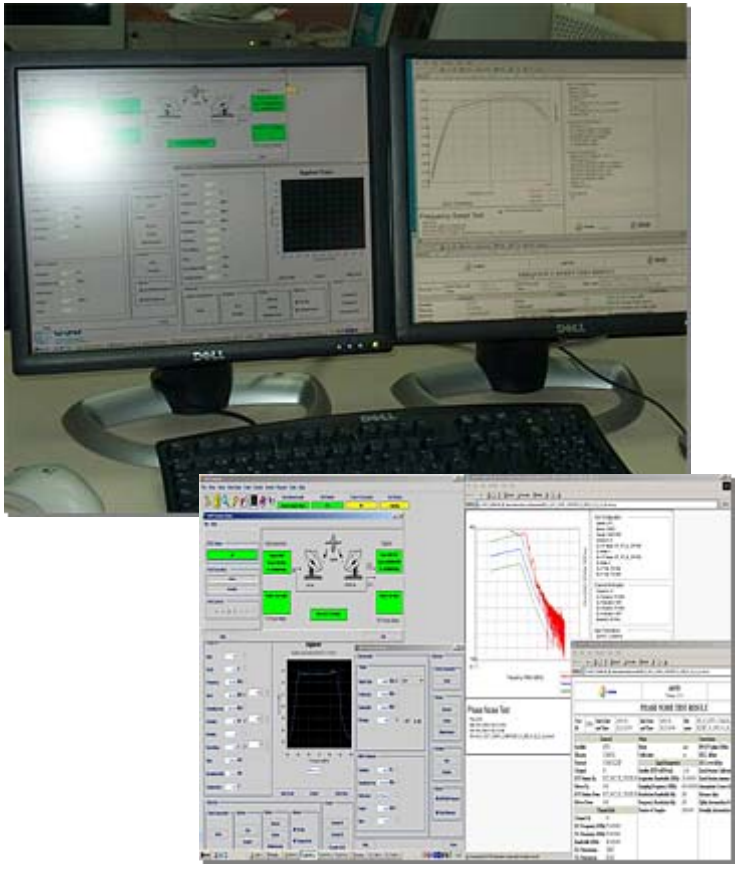
TT&C (Tracking, Telemetry and Command) Earth stations

Development of ground stations to carry out the TT&C functions of multimission systems.

SATELLITE CONTROL SYSTEMS



CARMO - Carrier monitoring system



AIOT - Advanced IOT bench

EXPERIENCE IN SATELLITE CONTROL



TT&C station for the THEOS satellite

Functions of the THEOS satellite include the prevention of catastrophes (tsunamis) and harvest control.

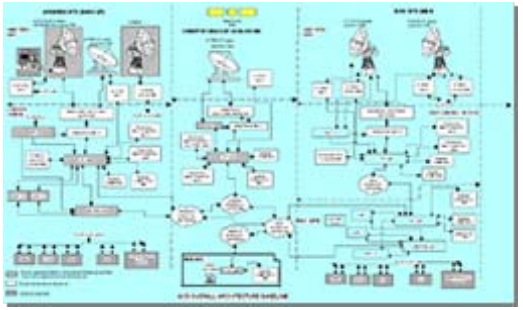
Indra supplies a station turnkey in S band, along with a 4.5 m antenna for ground segment control of the Thai satellite, THEOS, for Earth Observation.



IOT bench for the Skynet V constellation

The Skynet V constellation provides communications to the United Kingdom Defence Department.

Indra supplies the in-orbit-test bench for the payload of satellite telecommunications. This project includes the development of a specific software for the testing bench.



Control stations for Amazonas

The Amazonas communication mission covers Europe, America and Maghreb.

Indra supplies turnkey the ground control stations in Madrid, the Canary Islands and Rio de Janeiro. This project includes supply of TT&C systems.

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NAVIGATION AND POSITIONING

Indra develops systems and applications using the positioning technologies (via satellite) of the current navigation systems (GPS, EGNOS). Indra has participated in the development of Galileo from its conception.



- Reference stations and monitoring and archiving centres.
- Navigation systems engineering.
- Positioning applications.

REFERENCE STATIONS AND CONTROL CENTRES

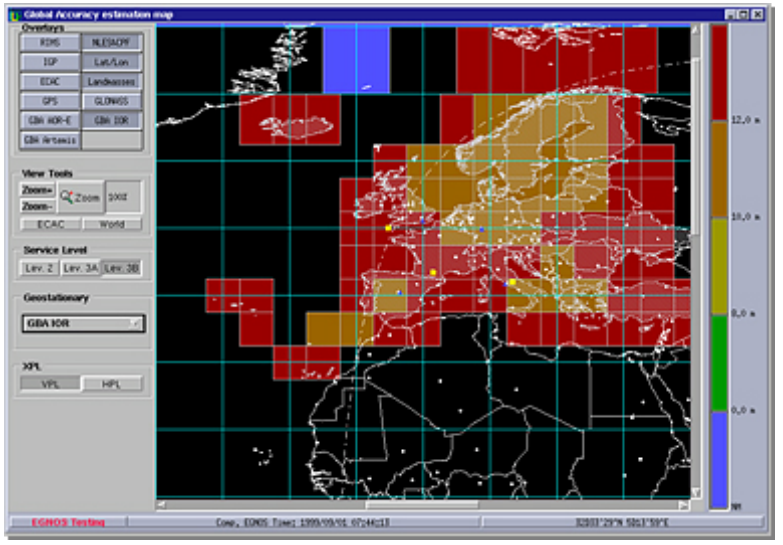


Reference stations (RIMS – Ranging and Integrity Monitoring Stations)

Reference stations and monitoring of the navigation systems signal.

Monitoring and archiving centres

Contain real time information about navigation system features.



POSITIONING APPLICATIONS



Search and rescue (GISAR)



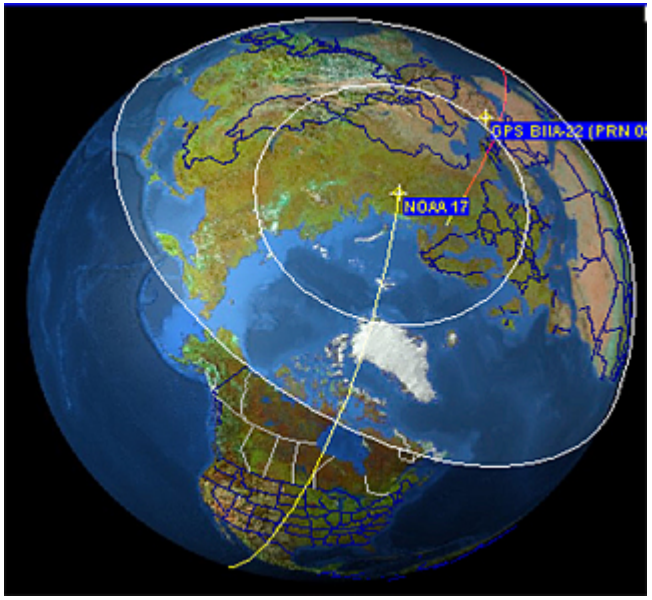
Fleet management



Control of container locations

SEARCH AND RESCUE - MEOLUT

Development of the Galileo reference station for GISAR - MEOLUT



- Estimation of the emergency signal position within seconds.
- Very precise location of alerts (few metres).
- Return Link Service to the emitting beacon.
- Multiple satellite detection and increased availability.

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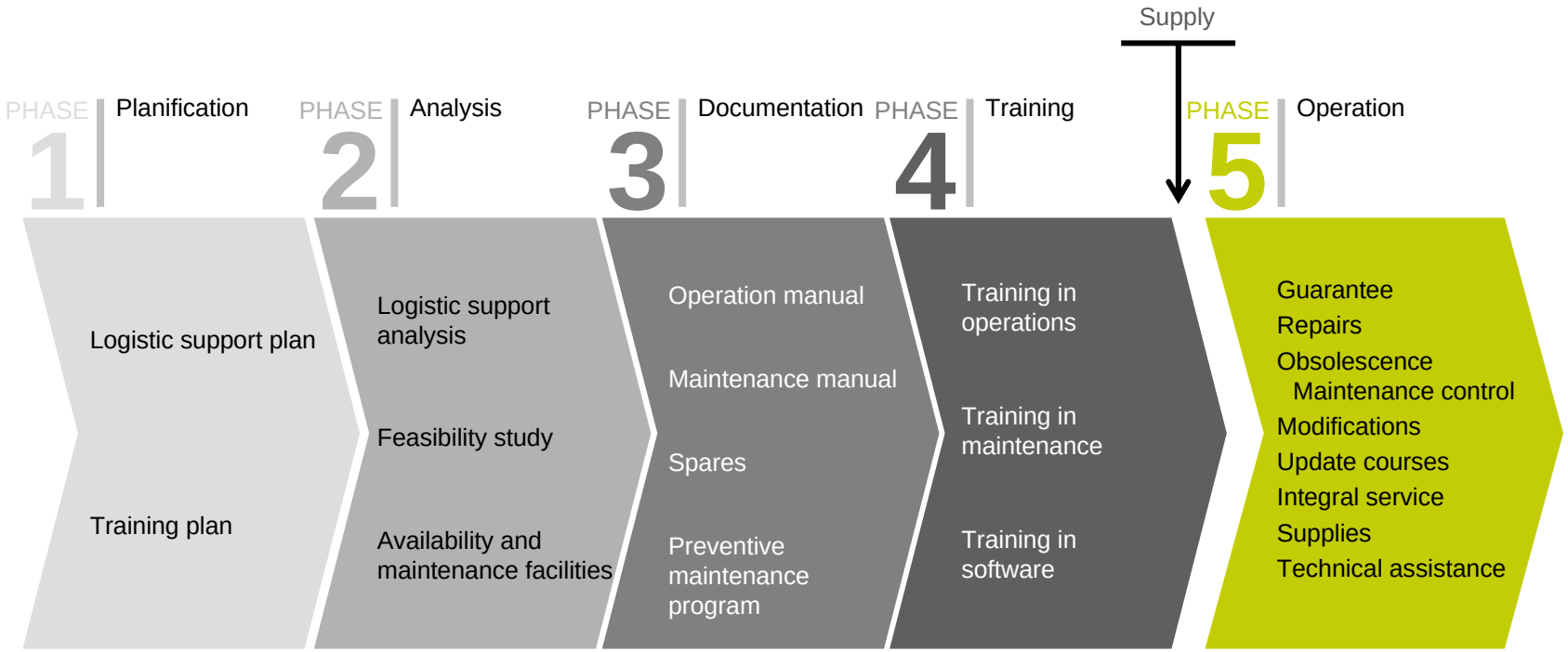
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INTEGRATED LOGISTIC SUPPORT

Indra offers logistic support for the duration of the project.





Mar Egeo, 4 Pol. Ind. 1
28850 S. Fernando de Henares,
Madrid - Spain
T +34 916 269 000
F +34 916 268 890
space@indra.es
www.indra.es