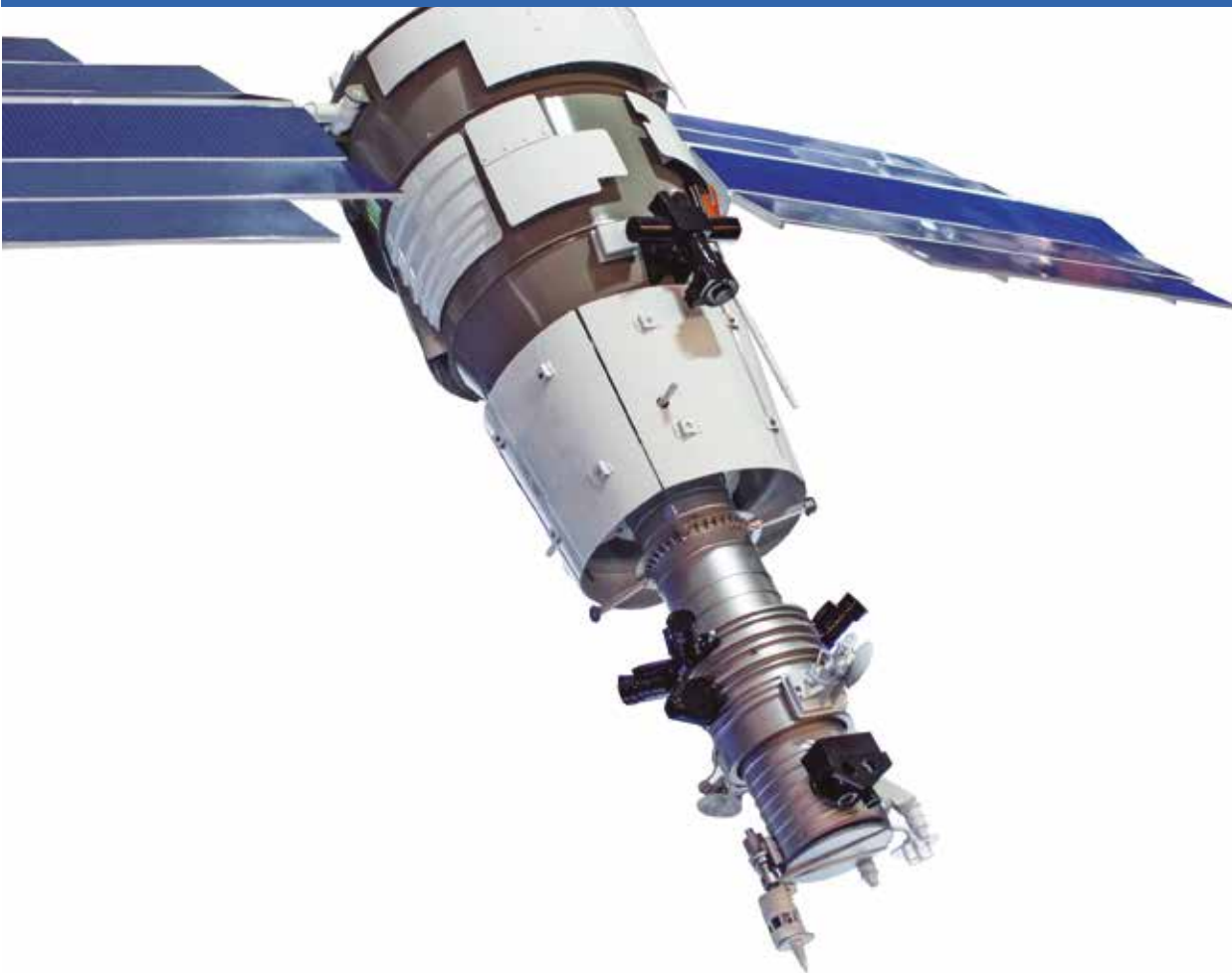


# 2.2

## Space Sector

**Isdefe** engages in engineering activities and provides specialised technical support in the space sector, in the field of navigation and satellite communications, Earth observation and Space Situational Awareness (SSA) for the Spanish administration, the European Commission and several international space agencies.

It also undertakes management, operation and maintenance tasks involving space communication centres and complexes in Spain for the National Institute of Aerospace Technology (INTA), as well as for the European Space Agency (ESA) and the National Aeronautics and Space Administration (NASA).





## ■ Space centres and facilities

We provide engineering services and technical support for satellite communications and tracking, and for space exploration missions from space centres in Spain. We also manage the operation and maintenance of space complexes.

**Ministry of Defence / Secretariat of State for Defence (SEDEF) /  
National Institute of Aerospace Technology (INTA)**

### **INTA Space Facility Torrejón**

End-to-end support for all the activity carried out at CEIT (INTA Torrejón Space Centre). Multidisciplinary team with specialists in the Ground Segment, Control Centre, Mission Analysis and contribution to the search for new opportunities hand in hand with INTA. Of note is the success of the CHEOPS mission.

Extensive collaboration with ESA and Swedish and Norwegian national agencies to operate INTA's network of stations. Increase in activity due to the high demand for PAZ products.

### **INTA Space Facility Maspalomas**

Operation and Maintenance of the CEC (Canary Islands Space Centre). Close collaboration with CEIT to give INTA full support with its network of earth stations. The CEC has become the 24/7 operations centre for all INTA stations.

**Ministry of Defence / Secretariat of State for Defence (SEDEF) / Institute of Aerospace Technology (INTA) / NASA**

In 2021, the biggest challenge at the Robledo Centre was successfully maintaining round-the-clock operations 365 days a year, in parallel with the COVID-19 Recovery Plan. The successive waves of increasing numbers of positive cases forced intense and permanent monitoring to adapt work schedules and task planning to the phases described in said Recovery Plan. Likewise, despite the strong impact of FILOMENA, the largest snow and ice storm suffered in the history of the complex, it was possible to keep the service operational with the antennas in the rest of the network while the antennas and equipment in the complex, which were subjected to unusually low temperatures, were restored.

Isdefe continued to provide daily support to NASA missions, and in particular critical support to four L1 missions:

- » The launch of the James Webb Space Telescope.
- » The launch of the DART probe into a dual asteroid system.
- » The launch of the LUCY probe into the Trojan asteroids in Jupiter's orbit.
- » Arrival on Mars of the Mars 2020 probe and subsequent landing of the Perseverance rover with the Ingenuity helicopter.

The maintenance of the facilities and equipment required scheduling of daily corrective and preventive work, including 5 long outages scheduled over a total of 210 days to update and improve the systems in the DSN.

In relation to the DAEP project (DSN Antenna Enhancement Project) to build two new DSS53 and DSS56 antennas, the second of the two, DSS56, went into operation on 21 January 2021. For the first one, DSS53, the construction and integration activities of all the antenna systems were completed, with much of the acceptance, calibration and holographic tests being carried out.



Likewise, the maintenance of all the facilities of the Station required a considerable effort to update all the tasks that had been delayed in 2020 due to the strong COVID-19 restrictions. In addition, the project to update the electricity generation and distribution system of the entire station had a significant impact on the maintenance tasks of the rest of the complex, with numerous outages of the station being scheduled.

The upload of the Station's equipment into the MAXIMO logistics system continued, reaching 63% in the validation of the total equipment.

Ministry of Defence / Secretariat of State for Defence / INTA / European Space Agency (ESA)

**Astrophysics and Space Sciences**

Isdefe supports INTA's Astrobiology Centre (CAB) and ESA in the XMM mission in ESAC. Possible partnerships with public scientific research organisations are underway.

Isdefe has joined a consortium with Telespazio and SERCO to service ESA in the different work packages of the science contract at ESAC.

Of note is Isdefe's work in the CESAR programme, an education initiative in astrophysics and space sciences developed by ESA, INTA and Isdefe, with a special focus on scientific outreach and in recruiting scientists from an early age.

European Union / European Space Agency (ESA)

**Cebreros Space Facility**

Technical support in Cebreros, which has become the main station in ESA's deep space network. Multiple station upgrades as a pilot test prior to deployment in the rest of the ESA deep space network. Work is under way to define the terms to renew the contract for another five years starting in 2023.

**SMOS project**

Technical services specialising in contract continuity. The mission has continued without incident, and large amounts of data have been reprocessed. Isdefe provides security control services for space launch operations at the French Guiana Space Base in KOUROU.



### European Union / GALILEO

The activities to monitor, track and improve ILS processes were carried out in compliance with the operational objectives established by the GSA. In addition, Isdefe provided support with the integration, validation and verification tests of the new operational environments of the GSC.

### European Union Agency for the Space Programme (EUSPA)

Support to the EU GNSS Security Accreditation Board (SAB) with the accreditation activities of the European Union's satellite navigation systems (EU GNSS Systems):

- » Independent audit of safety documentation.
- » Technical safety tests of the systems.
- » Analysis of open sources.
- » Risk analysis.
- » Development of safety standards.

Support to the GSC (European GNSS Service Centre) in the security activities of the centre related to the following services:

- » Security Officer.
- » CSM (Cybersecurity Manager).
- » Cybersecurity analyst. CIA (Cybersecurity Internal Auditor).





## ■ Satellite applications

We provide technical support in the field of developing and implementing new satellite navigation and communications applications. We offer technical support to scientific programmes in the field of space, earth observation, and space junk monitoring.

### Ministry of Defence / Secretariat of State for Defence (SEDEF) / National Institute of Aerospace Technology (INTA)

Isdefe continues to support INTA in the different GNSS (Global Navigation Satellite System) activities in which it participates.

Services at the three Galileo facilities in Spain:

- » Competent PRS Authority (CPA),
- » GNSS Service Centre (GSC) and
- » Backup Galileo Security Monitoring Centre (GSMC).

The Isdefe provide technical management support to INTA for the development and deployment of the CPA infrastructure to manage the PRS service nationally.

### Ministry of Transport, Mobility and the Urban Agenda / Railway Infrastructure Administrator (ADIF)

Isdefe continues to provide the service to manage and control satellite communications, in support of the localisation system of the metric gauge railways of ADIF-RAM (formerly FEVE).

In addition, in May 2021, Isdefe formalised an order with the CNIG (National Geographic Information Centre) to support the technical management, publication and dissemination of the Geographic Information of the **National Observation Plan of the Territory for the period 2021-2024**. This assignment enables the GNSS and Remote Sensing Department to resume activities in the field of Ground Observation and Remote Sensing.

Isdefe continued to support the improvement of the control processes for maintenance contracts within the Internal Audit Directorate, and the definition of a model to identify fraud early, based on a continuous monitoring system that relies on Artificial Intelligence algorithms.

With regard to the implementation of an Asset Management System, the strategic phases are complete (Strategic Plan, Communication and Change Management Plan, identification of critical assets, etc.) and work has begun to define the processes associated with maintenance and life cycle engineering (criticality, RCM; root cause, etc.). In addition, the detailed requirements and the management of corporate assets (EAM) that will soon be acquired, as well as the technologies associated with maintenance 4.0. that it should support, have been defined.

### European Commission / European Union Agency for the Space Programme (EUSPA) / DEFIS

Isdefe continues to participate with the GSC (Galileo Official Service Centre) operations staff, which this year has launched a new operational infrastructure. The GSC interfaces with user communities and supports the Open Service, Commercial Service, and Search and Rescue (SAR) Service of the Galileo programme.

Isdefe is part of a consortium led by Roland Berger to undertake a contract to promote the European space sector worldwide (Space Diplomacy), whose client is DEFIS (Defence Industry and Space of the European Commission)

Likewise, Isdefe is part of a consortium to offer consulting services to EUSPA in various space-related aspects; and of another consortium within the framework of GovSatcom to define the future European communications hub, pending resolution after the submission of the proposals.