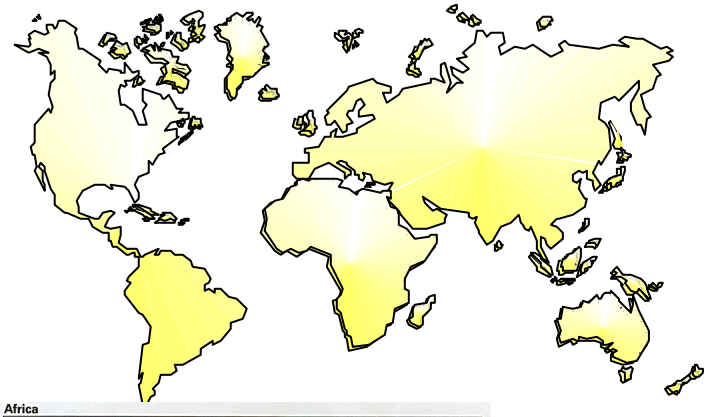
MASPALOMAS SATELLITE TRACKING STATION

GEOGRAPHICAL LOCATION

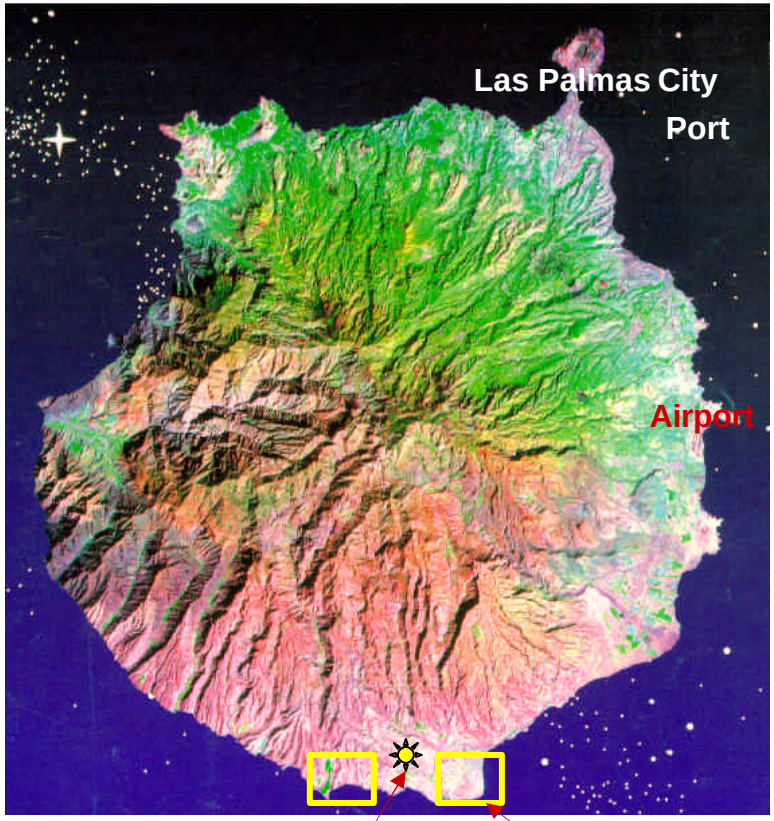


Maspalomas Tracking Station is located in the Island of Gran Canaria in the Canary Archipelago

The Canary islands are located in The Atlantic Ocean, at about 100 Km of Africa

About 27° 46’ North in latitude and 15° 38’ West in longitude

Station on the Island of Gran Canaria



- Maspalomas Tracking Station is located in the South most part of the Island of Gran Canaria
- It is aproximately 60 Km from the capital, Las Palmas of Gran Canaria, and 38 Km from the International Airport
- The station can be easily reached using the highway south from the airport
- It is close to the touristic area, where accomodations are accesible throughout the whole year

GRAN CANARIA FACILITIES (1) – PORT

Las Palmas port is the main port of the middle east Atlantic Ocean. It has the following statistics (taken from 2004):

i. Ships: 10.538

ii. Passengers: 652.698

iii. Tons: 17.739.138

Direct access to the GC-1 highway which goes along the coast to the South of Gran Canaria

It has 9 Panamax Derricks (60 tons, 39 m. range) and 3 Super Post Panamax for container handling

GRAN CANARIA FACILITIES (2) - AIRPORT

The Gran Canaria International airport has all the capabilities of a modern airport. 2004 statistics are as follows:

i. **Passengers: 9.467.375**

ii. **Operations: 104.645**

iii. **Goods: 40.934.316 Kg**

It also has:

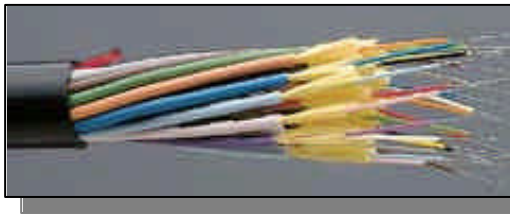
i. **Most of International Rent a Car Agencies**

ii. **Non stop bus service to the south of the island**

iii. **Bank services, VIP rooms, Restaurants...**

GRAN CANARIA FACILITIES (3) - COMMUNICATIONS

- Main transport network is done via fiber optic (FO) submarine cables:
  - 4 multi FO cables between Gran Canaria and the Spanish mainland (PENCAN IV, V, VI and VII)
  - 1 multi FO cable (SAT 3) for international traffic connected to Portugal, acting as a backbone.
  - 1 multi FO cable (COLUMBUS 2) for international traffic, acting as a backbone, and going to the United States of America
  - Speeds from 566 Mbps to 16 Gbps (PENCAN VII)
- Other communication services:
  - European mobile standards: GSM (900 MHz) and UMTS
  - All data transfer types: ISDN, leased line, DSL, etc.
  - RF radio links for internet operators



GRAN CANARIA FACILITIES (4) - SCIENTIFIC ENVIRONMENT

Gran Canaria island has numerous institutions related to scientific investigation and development such:

- **Las Palmas University which comprises 17 Faculties including**
  - **Electro-mechanic Engineering**
  - **Communications Engineering**
  - **Computer Science Engineering**
- **Other Institutions:**
  - **Institute for Cibernetic Science and Technologies**
  - **Institute for Applied Microelectronics Institute**
  - **Institute for Smart Systems and Numeric Aplications in Engineering**
  - **The Canary Islands Technological Institute (ITC)**
  - **The Institute for Marine Sciences**

GRAN CANARIA FACILITIES (5) – SPATIAL SCIENTIFIC ENVIROMENT

The *Astrophysic Institute of The Canary Islands (IAC)* have several of the most important sky observatories in the world

It has more than 20 telescopes belonging to many European countries such as England, Sweden, France, Italy, etc

The exceptional quality of the Canarian sky for astronomical observation is protected by law.

The IAC is closely linked to other members of the Astrophysics club, such us :

- **University of Copenhague – Denmark**
- **National Centre of Scientific Research – France**
- **Max Planck Institute – Germany**
- **National Institute of Nuclear Physics – Italy**
- **Nordic Optical Telescope Scientific Ass. – Sweden**
- **Imperial College of Science and Technology – UK**
- **Association of Universities for Research in Astronomy - USA**

La Palma island

Tenerife island

MASPALOMAS STATION

INTA (Instituto Nacional de Técnica Aerospacial) is the Spanish Aerospace Agency

INTA is the station owner

- The station is aproximately 60 Km from the capital, Las Palmas of Gran Canaria, and 38 Km from the International Airport
- Can be easily reached using the highway south from the airport

Satellite Tracking Station

BRIEF HISTORY OF MASPALOMAS STATION

- 1960 Built for the NASA Mercury program
- 1960 – 1975. Mercury, Gemini, Apollo, Apollo-Soyuz and Skylab
- 1980 … ESA – ESRIN, ESOC
- 1998 … NASDA, Japanese Space Agency, a present JAXA
- 2003 … XTAR, SPAINSAT

MASPALOMAS STATION

ESA – ESOC : 15 M TT&C Antenna

ESA – ESRIN : 10 M Antenna RX - Earth Observation

ESA – ESRIN : 1.8 m Antenna RX - Earth Observation

EUMESAT : 9.3 m TT&C Antenna Back-up Ranging Ground Station

COSPAS-SARSAT MSG : 4.8 m Antenna RX GEO

COSPAS-SARSAT GOES-East : 4.8 m Antenna RX GEO

COSPAS-SARSAT: 2.4 m Antenna RX LEO

JAXA : 10 m TT&C Antenna

HISPASAT : 3.8 m TT&C Antennae

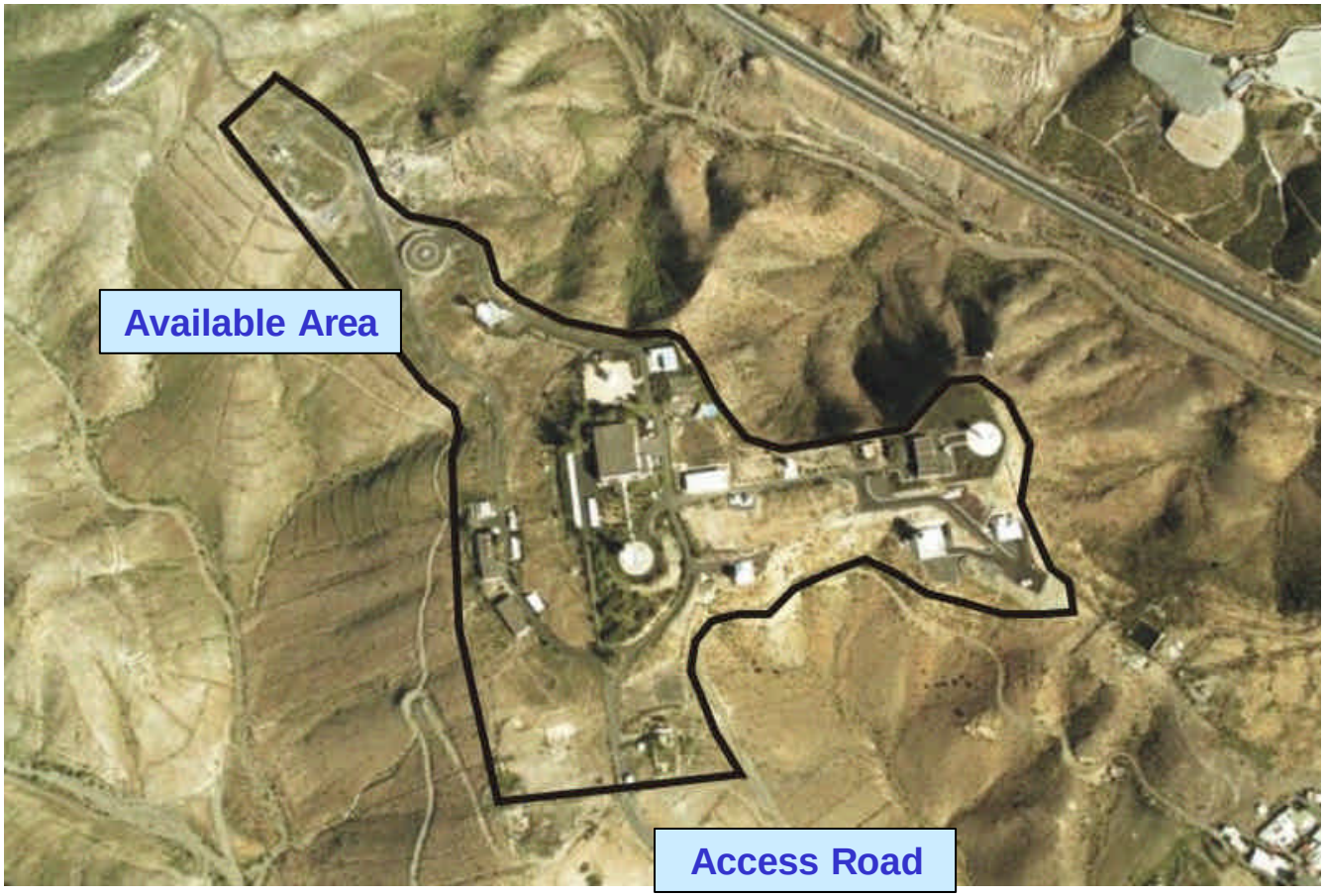
XTAR : 16.4 m TT&C Antenna

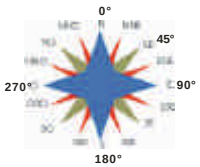
XTAR : 6.3 m TT&C Antennae

MASPALOMAS STATION INFRASTRUCTURE

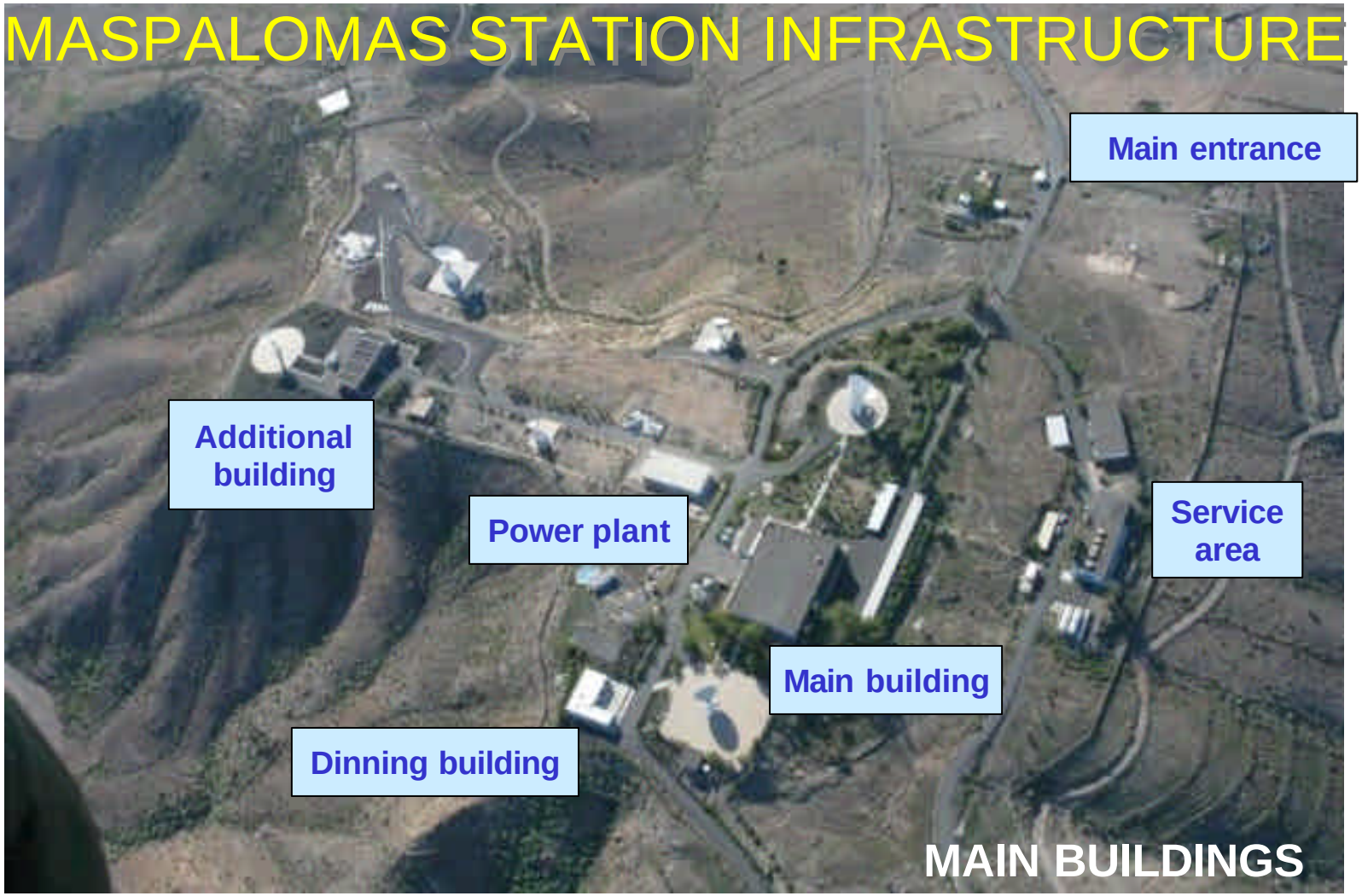
MASPALOMAS STATION INFRASTRUCTURE

1. GENERAL DESCRIPTION: WHITE HILL (Aprox. 150 m above sea level)

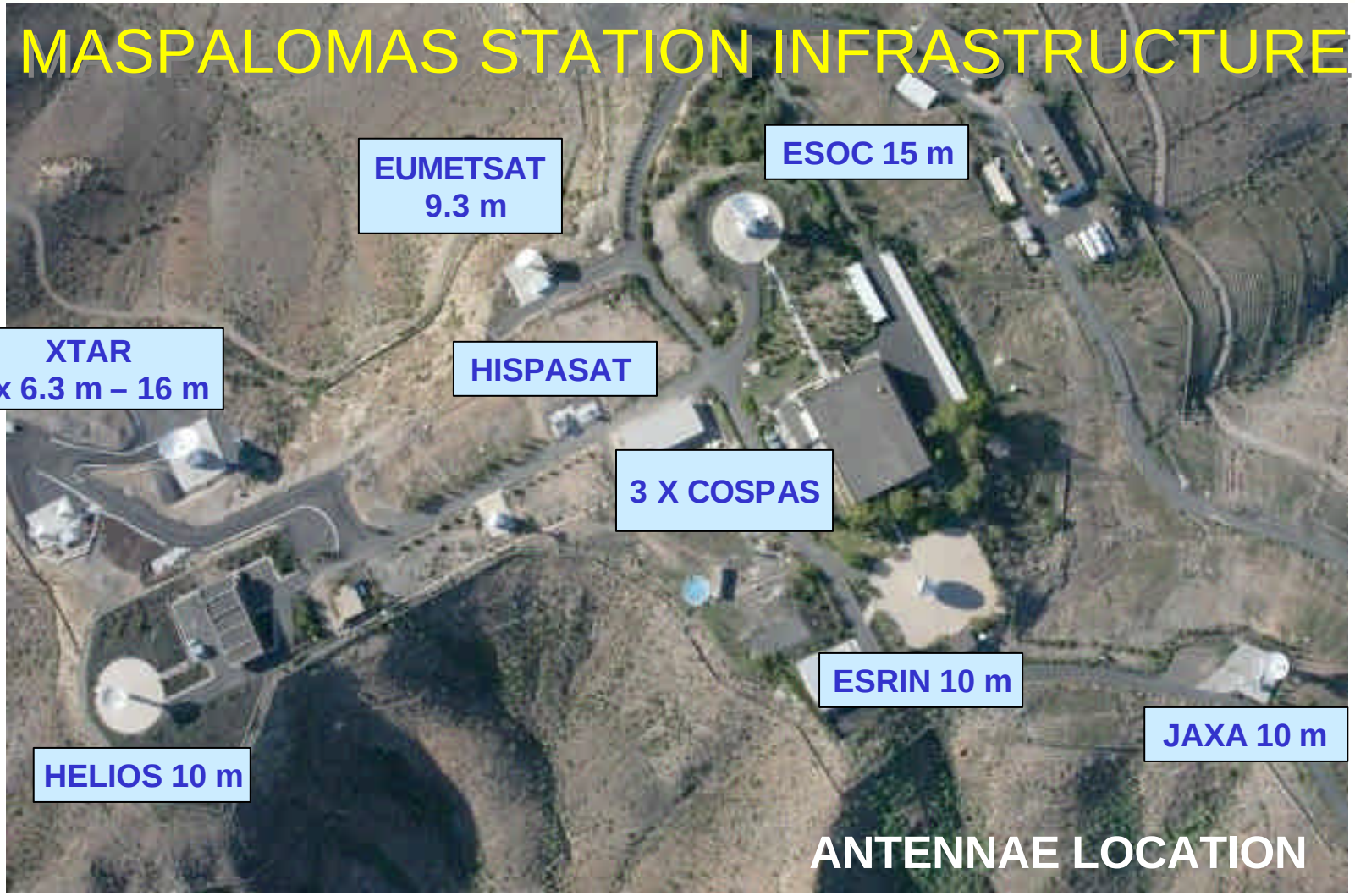




MASPALOMAS STATION INFRASTRUCTURE



MASPALOMAS STATION INFRASTRUCTURE



MASPALOMAS STATION INFRASTRUCTURE

2. SECURITY

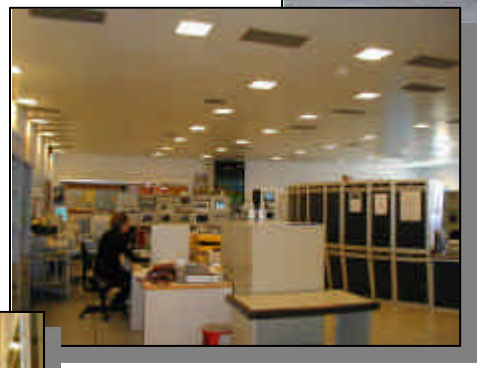
- Security supervisor
- Qualified security personnel
- Controls of all incoming and outgoing traffic
- Visitors controls
- Perimeter surveillance
- Periodic station check

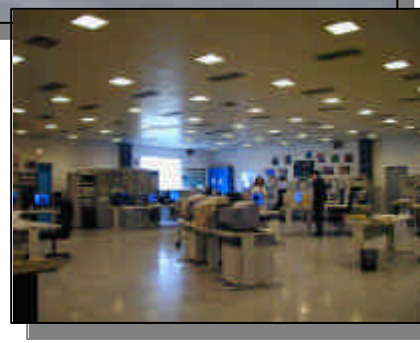
Main entrance & security checkpoint

MASPALOMAS STATION INFRASTRUCTURE

3. OPERATIONS BUILDINGS. MAIN BUILDING

- Two levels
  - First floor with offices, conference and meeting rooms
  - Second floor with offices and three main operational areas:
    - Earth Observation
    - TTC
    - Data Processing
- All rooms have temperature and humidity control





MASPALOMAS STATION INFRASTRUCTURE

3. OPERATIONS BUILDINGS. ADDITIONAL BUILDING

- Single floor level
- Two main equipment rooms:
  - Satellite Control Center
  - Available equipment room
- The equipment rooms have temperature and humidity control

MASPALOMAS STATION INFRASTRUCTURE

4. POWER SUPPLY. MAIN POWER PLANT

- Voltage: 400/230 V 50 Hz
- Total Power: 850 KVA
- The Power system has two buses:
  - Short break - 690 KVA
  - No Break - 160 KVA
- Short break is fed from commercial power or diesel generators. Diesel generators response time 20-30 sec
- No break is fed via three UPS (80 KVA each) with 388 lead batteries
- Three diesel generators 425 KVA each are available

MASPALOMAS STATION INFRASTRUCTURE

4. POWER SUPPLY. EMERGENCY DIESEL GENERATORS

- In case of emergency situation (public and power plant generators supply failure) two more spare Diesel Generators are avalilable in a service building
- Their capability are 600 and 400 KVA

MASPALOMAS STATION INFRASTRUCTURE

5. COMMUNICATIONS

- External communications infrastructure:
  - Data lines connections are available through two paths:
    - Two FO links, acting as prime and backup. The present 155 Mbps multiplexor capacity could be increased when required
    - Several multiwire cables (used mainly for low priority lines)
  - Voice communications are through the Spanish PTT
- The internal data communications are provided by a star configuration network
- Internal voice communication between different buildings and rooms of the station is made by means of telephones connected to an IBERCOM PBX
- A paging system is also available

MASPALOMAS STATION INFRASTRUCTURE

6. WAREHOUSE

- Separated from main buildings
- Air conditioned
- Available storage space
- Controlled IN/OUT storage

MASPALOMAS STATION STAFF

Maspalomas Satellite Tracking Station has a highly qualified and experienced staff

- 4 Senior engineers (6 year university degree)
- 36 Technical engineers (3 year university degree)
- 5 Senior electronic technicians
- 6 Electromechanical technicians
- 3 Administrative clerks
- 3 Genitors

- Total Staff: 57 people

ANNEX – CURRENT PROGRAMS

CURRENT PROGRAMS - ESOC

15 M TT&C ANTENNA
(ESA-ESOC)

ESOC TT&C

- TLM reception, TC transmission and Ranging
- Remotely controlled. Reduced operations
- Electrical, mechanical and electronic maintenance

15 m Tx&Rx ANTENNA

Receiving Frequency Band	Gain
S (2.200 - 2.300 MHz)	47 dB
X (8.400 - 8.500 MHz)	58 dB
Transmitting Frequency Band	**Gain**
S (2.025 - 2.120 MHz)	46 dB

Max. EL speed	Max. AZ speed
5º/sec	15º/sec

CURRENT PROGRAMS - ESRIN

ESRIN

- Local Operations and Maintenance
- TLM Reception, processing and archiving

10 M ANTENNA
(Earth Observation
ESA-ESRIN)

10 m Rx ANTENNA

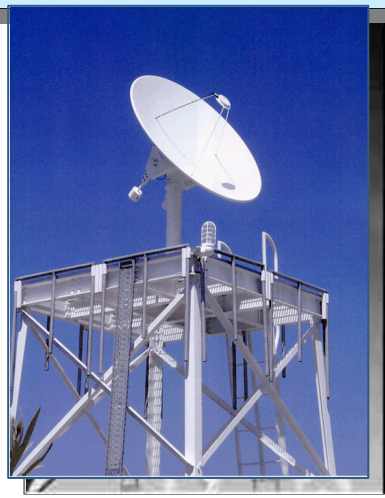
Receiving Frequency Band	Gain
L (1.650 - 1.750 MHz)	40 dB
S (2.200 - 2.300 MHz)	40 dB
X (8.025 - 8.400 MHz)	55 dB

Max. EL speed	Max. AZ speed
7º/sec	12º/sec

1,8 m Rx ANTENNA

Receiving Frequency Band	Gain
L (1.650 - 1.750 MHz)	28 dB

Max. EL speed	Max. AZ speed
7,5º/sec	15º/sec

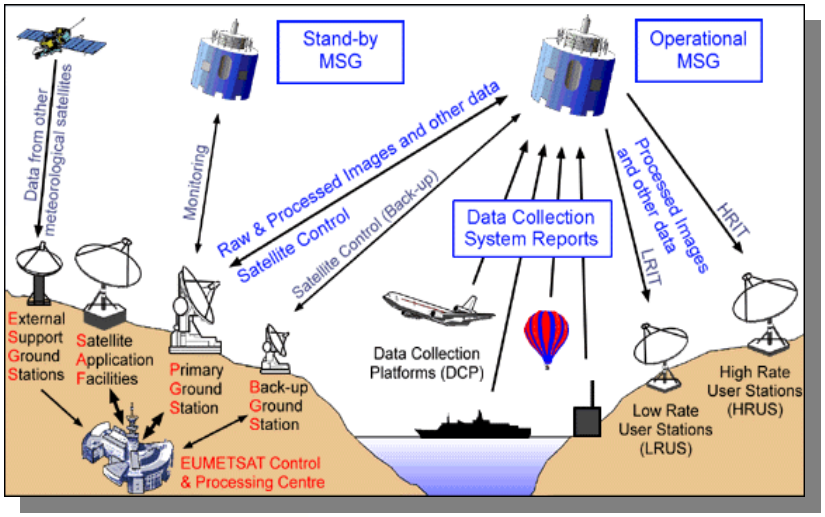


1,8 m ANTENA RX
(Earth Observation
ESA-ESRIN)

CURRENT PROGRAMS - EUMETSAT

MSG BRGS (Back-up Ranging Ground Station)

- Continuous support 24 H/D y 365 D/Y
- Telemetry and Telecommand (TTC)
- Ranging & Ranging Calibration
- Monitoring and Control
- Electrical, mechanical and electronic mnt



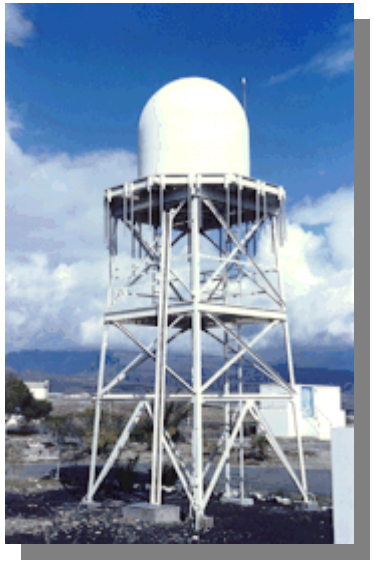
CURRENT PROGRAMS – COSPAS-SARSAT

4,8 m ANTENA RX GEO
(Cospas-Sarsat MSG)

COSPAS-SARSAT PROGRAM

- Search And Rescue (SAR) Support
- 24h/365d Operations
- Mission Control Centre (MCC) and Local User Terminal (LUT)

4,8 m ANTENA RX GEO
(Cospas-Sarsat GOES-East)



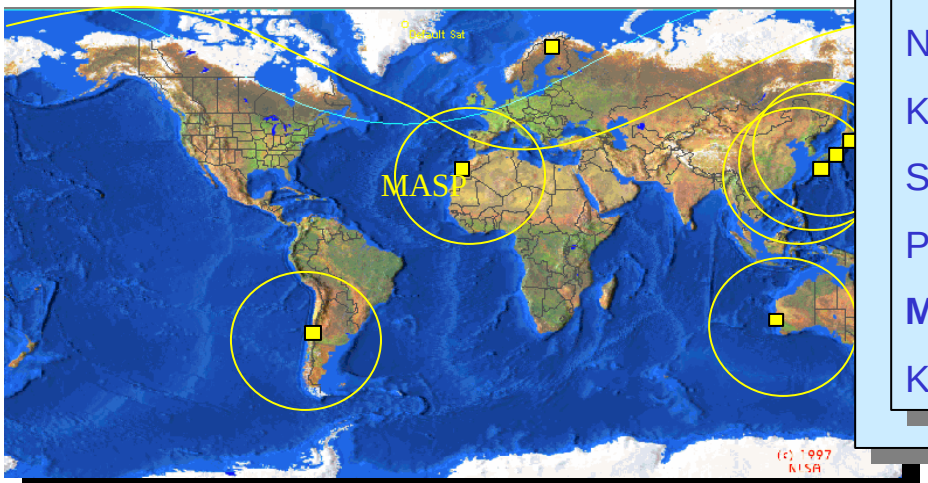
2,4 m ANTENA RX LEO
(Cospas-Sarsat)

CURRENT PROGRAMS - JAXA

10 m ANTENA TTC (JAXA)

JAXA PROGRAM

- Electrical, mechanical and electronic maintenance
- 10 m. S-Band Antenna, self contained Shelter



JAXA NETWORK

Okinawa (Japan)
Nasda (Japan)
Katsuura (Japan)
Santiago (Chile)
Perth (Australia)
Maspalomas (Spain)
Kiruna (Sweden)

CURRENT PROGRAMS - HISPASAT

HISPASAT ANTENNAE

HISPASAT

- **Remotely Controlled**
- **TLM reception, TC transmission and Ranging in Ka Band**
- **Electrical, mechanical and electronic maintenance**
- **HISPASAT and AMAZONAS**

CURRENT PROGRAMS - CREPAD

nter for REception, Processing, Archiving and Dissemination

Earth Observation Data and Products

Main Goals:
- **Central Processing and Archiving Facility in Spain For Remote Sensing Data.**
- **Promote the use of Earth Observation Data**
- **Make easier the I+D in Earth Observation Data**

CREPAD v1

Third party missions as AVHRR, SeaWifs, MOS, Modis

E-PAC

Spanish Processing Centre for ENVISAT

ATOVS

NOAA HRPT reception and re-transmission to EUMETSAT

METOP

Re-transmission of AVHRR and ASCAT for future METOPs

CURRENT PROGRAMS – XTAR/SPAINSAT

16.4 m TTC ANTENNA

SPAINSAT/XTAR

- **Remotely Controlled**
- **TLM reception, TC transmission and Ranging in S/X Band (16.4 m) and X Band (6.3 m)**
- **Electrical, mechanical and electronic maintenance**

6.3 m TTC ANTENNAE

Thanks for your attention