



S-Band TTCET Ground Station



TTCET Ground Station



► Main Performances

- ◆ **Reception frequency range :**
 - S Band: 2200 to 2300 MHz
- ◆ **Downlink Budget**
 - G/T S band : $> 10 \text{ dB/}^\circ\text{K}$ @ 10° of elevation in whole Bandwidth
- ◆ **Emission frequency range :**
 - S Band: 2020 to 2120 MHz
 - Emission level: 50 dBW in whole Bandwidth
- ◆ **Visibility : from 5° Elevation**
- ◆ **Pointing accuracy:**
 - $< 0,20^\circ$ in Program track,



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▶ S-Band TTCET



- ◆ Parabolic antenna: Ø3.1 meters (10.17 Feet)
- ◆ Azimuth / Elevation pedestal with dedicated pointing strategy for Zenithal passes.
- ◆ Designed for LEO Satellites Operations
- ◆ Automatic and Unmanned Station
- ◆ Operational Wind-Speed:
 - > 200 Km/h (124 Mph) with provided radome
- ◆ Operational Temperature:
 - -40°C / +60°C with radome and suited air-conditioning unit
- ◆ Low consumption system < 6 KW

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► Main Features

- ◆ Reception, demodulation and data transfer of S-Band (RHCP and LHCP) Telemetry:
 - Simultaneous emission and reception in S band,
- ◆ S-Band selectable (RHCP or LHCP) Telecommand
- ◆ Tracking Capabilities
 - Program Track (CNES pointing Files format)
- ◆ Multi-mission Station (designed for tracking several satellites and several passes per day)
- ◆ Permanent Remote Monitoring status
- ◆ Built-in Satellite Control Center interface
- ◆ Real time recording of station activity : Logbook.

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▶ Station based on COTS

- ◆ Down-Converter
- ◆ Receiver Demodulator
- ◆ Up-Converter / Modulator
- ◆ TT&C CCSD Font-End Processor
- ◆

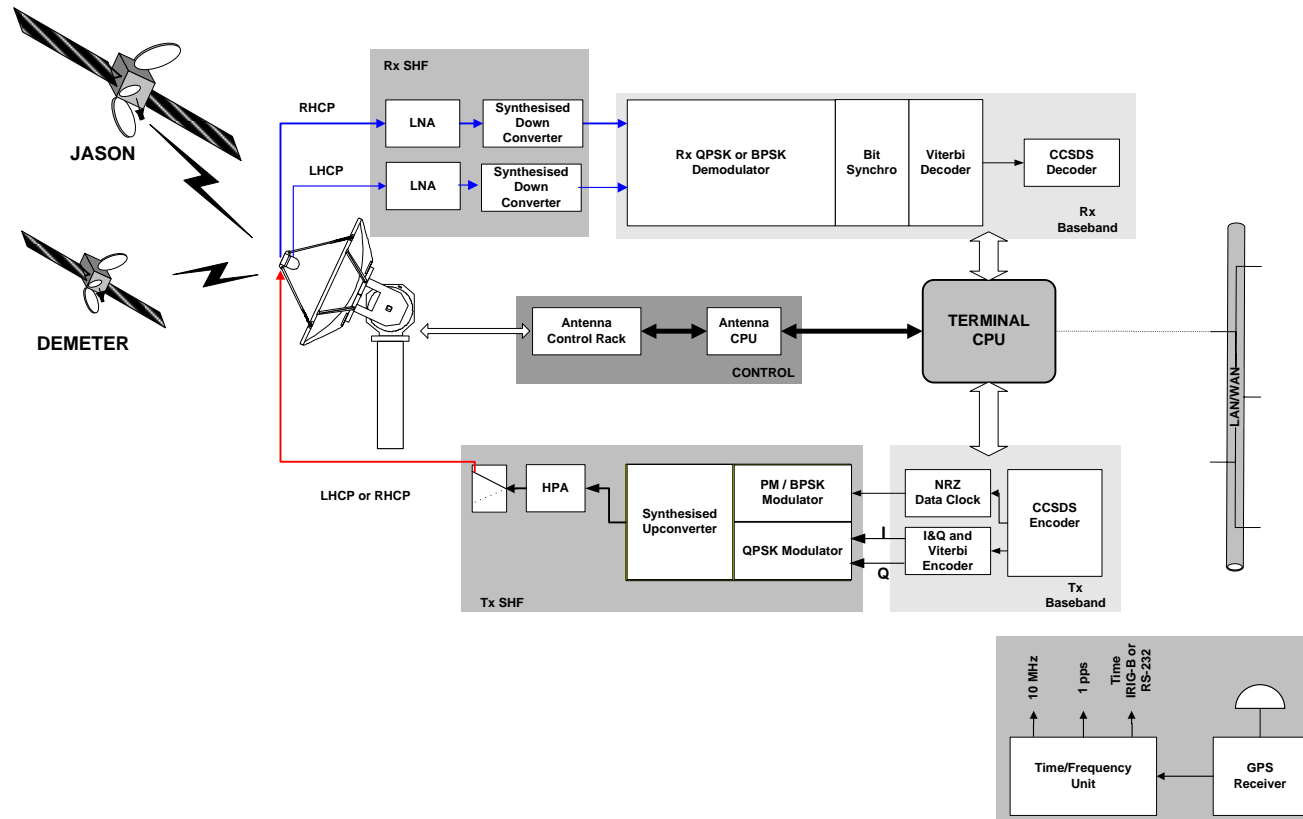


Which can be suited to specific mission requirements

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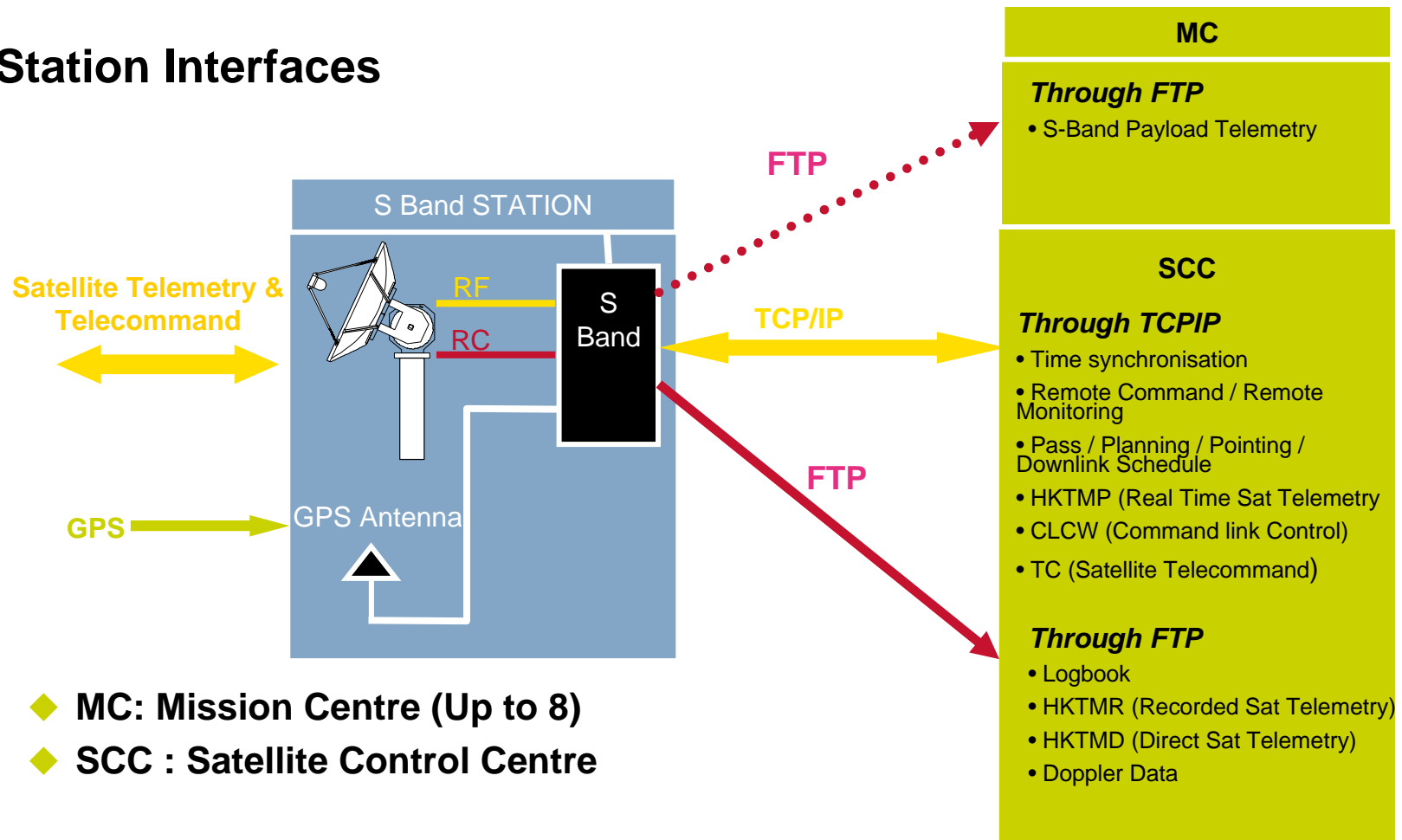
► Multimission Station Synopsis



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▶ Station Interfaces

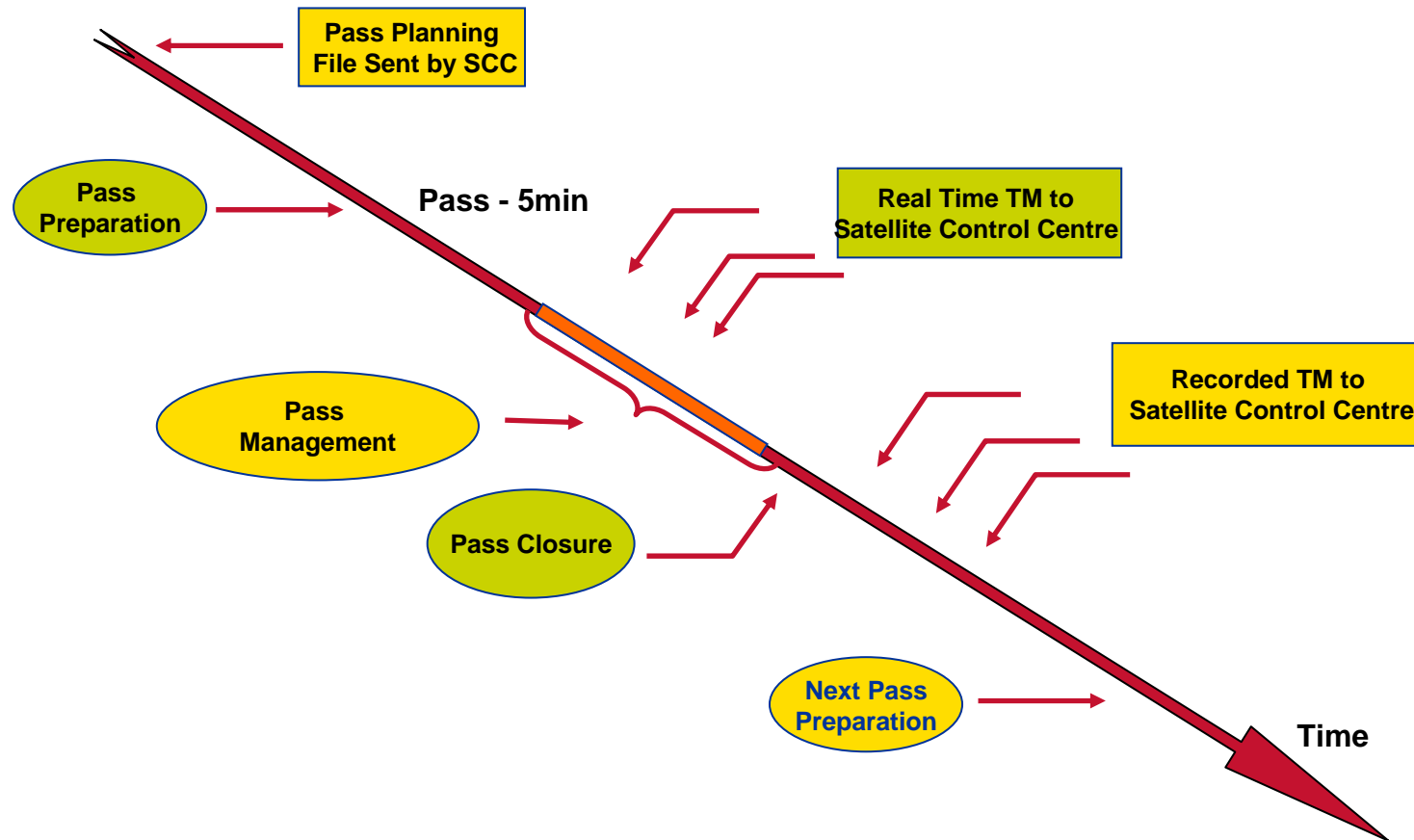


- ◆ **MC: Mission Centre (Up to 8)**
- ◆ **SCC : Satellite Control Centre**

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▶ Satellite Pass Processing



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► Options

◆ Earth Terminal Test Equipment

- Manual bench test designed to check the performances of the station and enables an easy maintenance.

◆ GenRec

- Digital data stream generator from binary files or digital data stream Telemetry or Telecommand recorder.
- Be easily installed on a Ground Station Telemetry or Telecommand chain thanks to the input connector which duplicates the input signal towards an output auxiliary connector.

◆ Service contracts

- Technical Visits
- On site assistance (LEOP Support, Training,...)
- Technical support

◆ SLE gateway (ESA licence).

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► This station has been installed at:

- ASAL (Algeria) – 2 stations
- CNES (France) – 2 stations
- EUMETSAT (Germany) – 2 stations
- INPE (Brasil)
- Ministry Of Defense (France) – 2 stations
- SSC (Sweden)



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▶ Significant Heritage

◆ More than 10 satellites daily operated

- JASON-1,
- DEMETER,
- ESSAIM (4 –Microsatellites out of service since end of 2010),
- PARASOL,
- COROT,
- CALIPSO,
- JASON-2,
- SMOS.

◆ and soon: ALSAT-2, ELISA, JASON 3, PICARD and TARANIS with installed stations basis

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▶ Robust Design and High Availability Figures

- ◆ **Mean Time Between Failure > 47 000 Hours**
 - Based on 3 passes per day with a pass duration of 20 Minutes each.
- ◆ **A station designed for 95% of availability but availability processed from past experience is better >99%**
 - (with spare parts collocated to the station).
- ◆ **Identical software version for all S-Band stations under Windows 2003 server.**
- ◆ **This robust software continuously maintained contributes to the high availability of the station.**

TTCET Ground Station



► More than 10 satellites daily operated

**SIGNIFICANT
HERITAGE &
QUALIFICATION**

**AUTOMATIC & REMOTE
FUNCTIONS**

DESIGN FOR MULTIMISSION



**EASY
MAINTENANCE AND
LOW OWNERSHIP COST**

**OPERATIONAL UNDER
ALL WEATHER
CONDITIONS**

**HIGH
AVAILABILITY**