INVAP
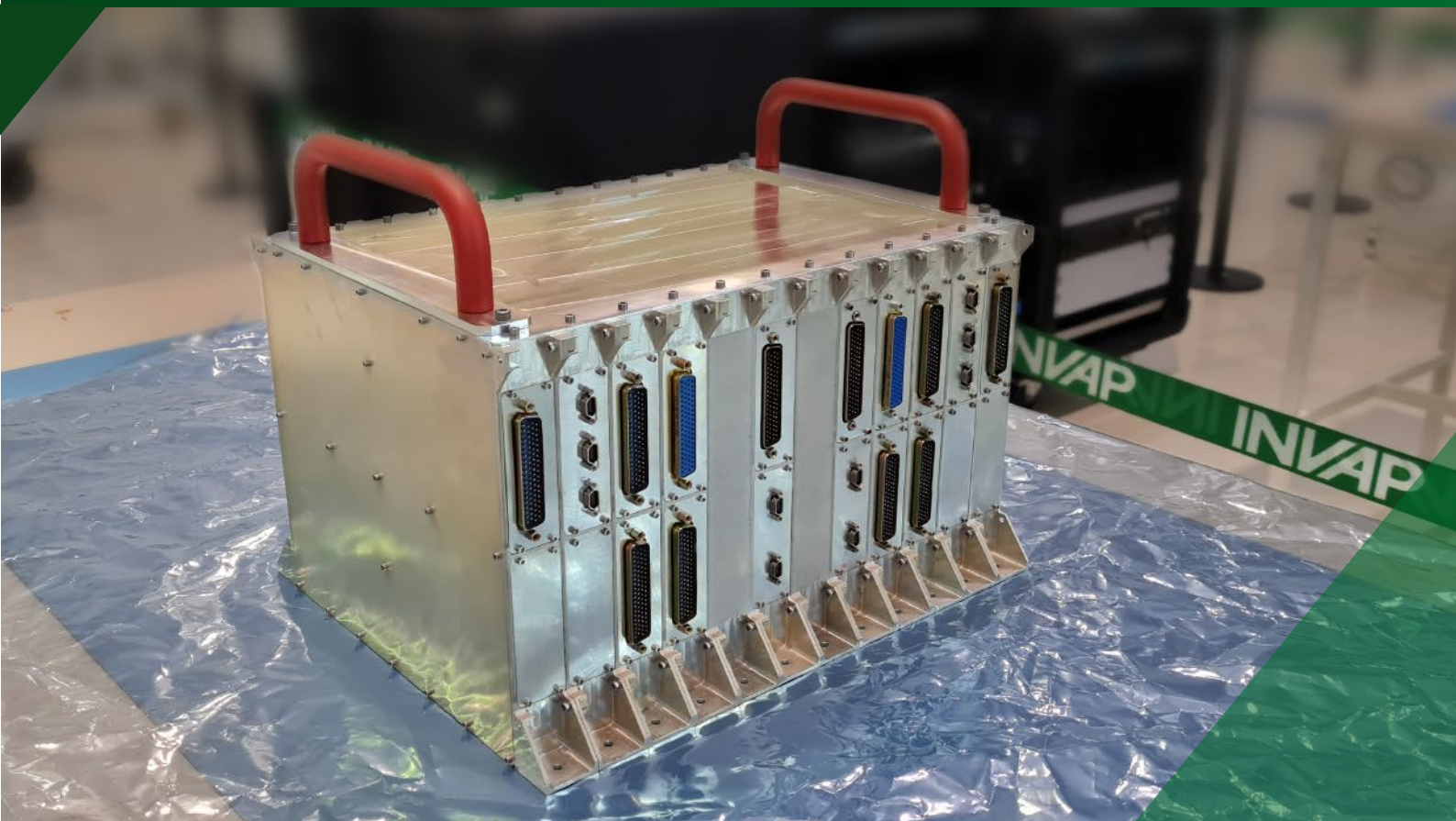
OBC-GEO
OnBoard Computer

Our new generation state of the art OBC is conceived as a centralized, modular and scalable subsystem that satisfies requirements for different missions. OBC performs the following functions: On board Data Handling, Attitude and Orbit Control, Thermal Control, FDIR and Initial Sequences, and Payload Handling.

Management functions

• Telecommand decoding and processing.
• Telemetry gathering, formatting and transmission.
• Time Management.
• System Telemetry (analog and digital) Acquisition.
• System supervision and FDIR execution.
• AOC Sensors data gathering.
• AOC Control loops execution and actuators commanding.
• Temperature acquisition.
• TCS Control loop execution and actuators commanding.
• Science and HK data storage (optional).
• System data and HK Telemetry formatting and transmission.
• Science data formatting and transmission (optional).

Redundancy philosophy

• Full redundancy cross strapped architecture allowing switching between individual functions or switch-over of complete computer function via modular design. Reconfiguration and surveillance module offering a Safeguard Memory.

• OBC design criteria avoid Single-Point Failure.

Optionals

• Analog and Digital Input/Output lines scalable by configuring modules selection.

• Mass Memory Module with 66+66 [GB] EOL storage capability.

• EM available for testing and validation.
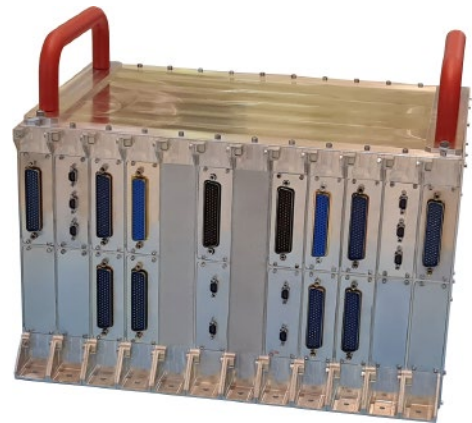
Features

Number of modules	13 (5 different types)
Power Supply	24-36 V
CPU Processor	LEON3-FT - ASIC GR712 @80Mhz
Performance	107,2 DMIPS @ 80MHz per core
Safe guard memory [Mb]	1 x 2

Environment

Application fields	GEO Telecom missions
Lifetime	15 Years
Radiation	SEL immune / SEU tolerant
Temperature range	- 15 /50 °C Operation - 25 / 60 °C Qualification
Cold Start up	- 25 °C
EMI/EMC	MIL-STD-461
EEE Quality	Level 1
Vibration	25 g peak, 14 grms

Budgets

Mass	15,5 Kg
Dimensions (L x W x H)	288 x 290 x 210 mm
Power Consumption @ Typical Configuration	56 W (<86 W peak)

interfaces @ typical configuration with redundancies

CAN BUS / Mil-STD-1553	1 / 1
SpaceWire	4
Digital	48 GPO / 80 GPI
UART	8
Temperature lines	180
Analog	48 Inputs / 4 Outputs
HPC	88 (FSW controlled) 16 (Hard Command)

INVAP has more than 25 years of experience designing and implementing flight software for LEO and GEO missions.

OBC includes the Flight Software libraries and Applications to be extended for specific missions.

Flight Software Development is based on ECSS-E-ST-40C Standard.

FSW

APPLICATION

Libraries

SERVICES	APP SUPPORT
HW SUPPORT	CORE
NV MEM SUPPONT	CAN

RTOS

BSP
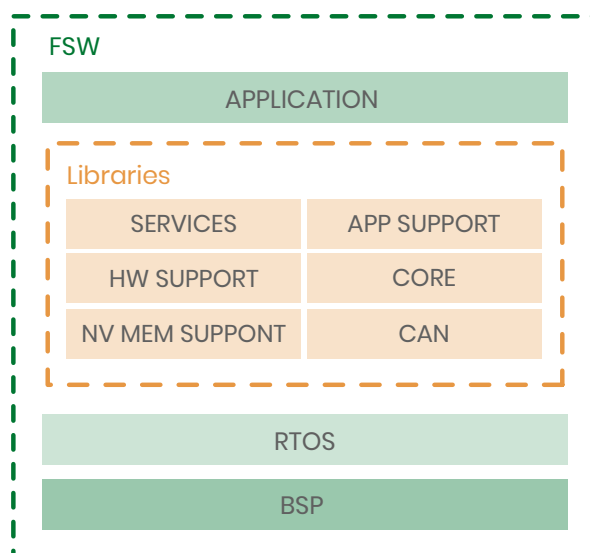
Fligth Software Components

• Application: Mission-specific code, configure services and libraries, start point of the specific application.

• APP Support Library: Packet adaptation layer from PUS (ECSS-E-ST-70-41C - Telemetry and telecommand packet utilization Standard) packet format to internal format.

• Services Library: PUS format routines (services specified in the PUS standard) PUS extension for mission-defined service, and general infrastructure software services. Includes the software library that provides the altitude and orbit control functionality as a software component.

HW Support Library: Software device controller's abstractions for the OBC.

• Core Library: Software components common to all FSW sharing this architecture. This library provides the basic software infrastructure for all the above layers.

• CAN Library: CAN Bus components and routines that manage the interface.

• NV MEM support Library: This library provides tools and services for managing Non Volatile Memory.

• BSP (Board Support Package): HW-dependent components of the RTOS.

• RTOS (Real-Time Operative System): RTEMS (version 4.10.2).

NUCLEAR

DEFENSE,
SECURITY AND
ENVIRONMENT

SPACE

MEDICAL
SYSTEMS

INVAP

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