The NEMO-2 is a compact solid-state recorder that provides high-end mass memory storage and performance to a broad range of missions. This product line is the result of over 30 years, where Airbus Defence and Space has gained a strong flight heritage on solid-state technologies.

NEMO-2’s architecture is modular and scalable, based on qualified building blocks packaged in slice form factor. This mass memory provides straightforward and simultaneous record and replay capability using Flash technology.

NEMO-2 is a redundant unit, made of two to eight identical slices composed of memory slices with their dedicated DC/DC converters. The NEMO’s basic 2040 configuration has a user capacity of 4Tbits for only 22W primary power consumption and 8 Kg mass. Extended versions with 8 to 32Tbits total capacities are available. Real time data compression and cyphering are available as options.
Architecture and key features

- The unit is composed of an assembly of 2 up to 8 identical slices (modules) connected for data exchanges and cross-strapping features.
- Each of the slices is self-contained and adds inputs, outputs, control and power external interfaces to the mass memory equipment.
- In addition to the interfaces, each of the slices is featuring a memory bank of 4Tb and a high-end processing capability built on an advanced rad-tolerant FPGA coupled with a rad-hard processor.
- The number of slices is depending on the quantity of IOs, the data rates and the memory capacity required for the mission. One slice is generally added for further redundancy.

INTERFACES

FROM/TO SATELLITE MANAGEMENT UNIT
- Primary power input, unregulated redundant power bus 22-38V
- Redundant MIL-STD-1553B for TM/TC command and telemetry purpose
- TM/TC possible via the record Space Wire interfaces
- Power on/off status, secondary voltage telemetry and thermistor telemetry interface

RECORD INTERFACES
- Per slice: 4x Nominal + 4x Redundant High Speed Record Interfaces Wizzard links, input data rate up to 2.5 Gbps on each WZL link
- Per slice: 4 Instrument Record Interfaces SpW links, with internal cross-straps 2x 200Mbps + 2x 100Mbps
- Per slice: 1x Nominal + 1 Redundant SpW links for housekeeping / Ancillary data record & replay at 100Mbps

REPLAY INTERFACES
- Per Slice: 3 high Speed Replay Interfaces Wizzard links with control flow
  Or in option LVDS 8 bits outputs (Nominal + Redundant) up to 480Mbps

MAIN FUNCTION

- Non volatile Payload and Platform Data Storage (spacecraft housekeeping/ancillary...)
- Simultaneous record & replay are possible at highest data rates
- Provision of discrete telemetries (power status, internal temperatures & secondary operating voltages)

OPTIONAL:
- Real time CCSDS121.0 B2 lossless Data Compressor
- Real time payload data security with AES256 data encryption
- Payload data routing

PERFORMANCE PARAMETERS

User memory capacity: scalable from 4Tbits up to 32Tbits (3.8Tbits to 30Tbits EOL)
Aggregated record + replay data rate: up to 10Gbits/s per slice (i.e. n x 10 Gbit/s for a configuration operating n slices)

RELIABILITY & PERFORMANCE VS ENVIRONMENT

Life time: 12 years in LEO orbit, behind 2mm aluminium shielding
Quality Class: 1 or 2
Operating range: -25°C to +60 °C
NAND flash endurance: Minimum 60K Program/ Erase cycles
Residual Bit error rate: <5.3 x 10-17 error/bit/day for mission
Vibration: 24 g sine; 15 Grms random out of plane
Shock: 1000 g at 1600 Hz
Reliability: 0.995 over 12 years in-orbit@ 30°C (Model 2040)

BUDGETS

Mass: 8Kg for the 2 slice configuration
Power dissipation: <32W per active slice (with simultaneous Record/compression/Replay)

Model Total memory Capacity User memory Capacity Power Consumption (W) Mass (kg) Memory Slices Size LxHxW (mm)
2040 8 Tb 4 Tb 22 8 2 365x220x170
2080 12 Tb 8 Tb 44 11 3 365x220x230
2120 16 Tb 12 Tb 66 14 4 365x220x290

Models expandable up to 32 Tb total memory capacity by addition of slices