ELECTRONICS DIVISION

ULISSES

ULTRA LIGHT SONICS ENHANCED SYSTEM

LEONARDO

ULISSES (Ultra Light SonicS Enhanced System) is a light weight modular Sonics System based on edge technology, to provide an affordable solution for advanced Anti-Submarine Warfare (ASW) operations.

ULISSES fulfills the emerging customer requirements to increase operational effectiveness in Maritime Patrol Aircraft (rotary and fixed wing) in wide area search, in a stand alone configuration or integrated within a Mission Management System to provide operators with an effective tactical situation
ULISSES implements multistatic capabilities as well as concurrent processing on a large sonobuoys inventory, including the latest special purpose sonobuoys developed to detect low noise targets.

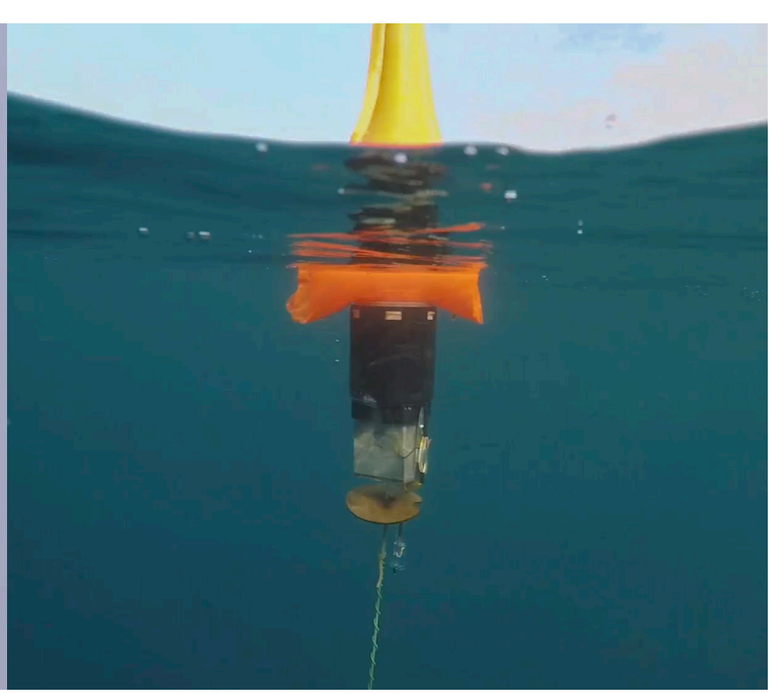
Thanks to its optimized weight and size, ULISSES is also suitable for installation in small platforms both manned and unmanned (UAV, USV, RHIB) while remains backwards compatible with dipping Sonar Sub-Systems, typically installed on medium/heavy class helicopters.

Acoustic Operator Console / Ground Station is available on request, for system operation management and Operator training, mission planning and post-processing tasks.

ULISSES Sonobuoy System can be combined with a Dipping Sonar System (DSS) to provide a complete ASW solution.

KEY FEATURES

- Search, detection, localisation and classification of targets in shallow and blue waters
- Automatic tracking of multiple targets
- Target range, bearing and doppler velocity computation
- Enhanced acoustic performance estimation
- Sound velocity profile and environmental noise measurement
- Classification library management
- Sonobuoy localisation capability
- GPS Sonobuoys capability
- Light weight system
- Multistatic capability
- Management of up to 128 passive and/or active sonobuoys
- Processing up to 32 sonobuoys
- Provision for Dipping Sonar Integration



SYSTEM COMPOSITION

The ULISSES system is composed of:

- UAP, Sonobuoy Processor capable to process up to 32 sonobuoys
- TELEMACHUS, providing V/UHF Receiver and Trasmitter capabilities
- VHF/UHF Antennas

The sonobuoys and antennas, being off-the shelf items, can be provided directly by the Customer or optionally provided by Leonardo.

ULISSES has been already integrated and operational on:

- Maritime Patrol Aircraft (e.g. ATR-72, undisclosable Jet platform)
- Helicopters with Firefly and HELRAS dipping Sonars (i.e. AW101, NH90).

The following sonobuoys are supported:

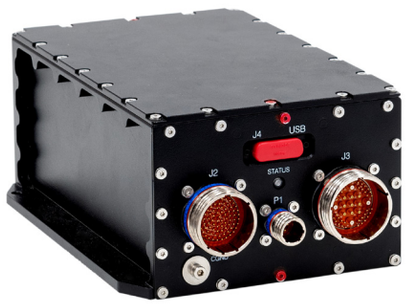
- WIDEBAND LOFAR
- DIFAR
- BATHY
- HIDAR
- ALFEA
- CAMBS
- LFA
- MULTIMODE
- DICASS

ULISSES ACOUSTIC PROCESSOR (UAP)

The ULISSES Acoustic Processor performs passive and active sonobuoy processing, audio processing, tracking algorithms,localization and classification of targets, with the aim of embedded and proprietary application software.

The Application SW has been designed to comply with RTCA/DO178C Guideline for Design Assurance Level DAL D.

The UAP provide the Fill Gun and Classified Library Central Clear capability and a recording service of long-term data/ signals storage for off-board and on-board analysis.



Acoustic Processor main features are:

- Multiple interfaces with the Mission Computer
- Management up to 128 local and remote sonobuoys
- Processing of 32 sonobuoys in parallel
- Video Processing with two independent outputs
- Audio generation with two independent stereo outputs
- Geographical Map
- Active and passive Energy Map
- Multistatic processing modes:
  - Sonobuoy – Sonobuoy
  - Fielded Tx/Rx
  - Sonobuoy – Dipping Sonar
  - Sonobuoy – Ship Sonar (towered array)
- Sonobuoy Operation selectable parameters Management (CFS and CSG)
- Command generator for active sonobuoys
- Autoalert Processing
- Embedded Data Recorder compliant to STANAG 4283 Edition 6.

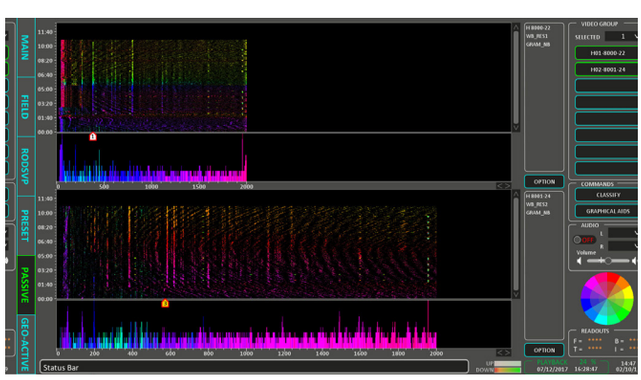
ULISSES ACOUSTIC CARD (UAC)

ULISSES acoustic processing has been integrated on a single board module named Ulisses Acoustic Card (UAC). For specific applications, where weight and size are major installation constraints, the UAC provides the complete ULISSES Acoustic pre-processing embodied in a Single Board Computer that can be installed into a pre existent equipment where a free slot and UAC interfaces are already available.

Specific form factor can be provided on customer request.

Based on Intel Architecture, is already available on two standard form factors (VME or VPX).

ULISSES Processor Card with embedded Application SW, can be integrated into Leonardo's Telemachus transmitter/ receiver, thus offering a perfect ultralight solution for UAVs or platform installation where an Acoustic Operator Console is not available.



TELEMACHUS

Telemachus is the new design of the Leonardo's sonobuoy digital receiver intended to support the needs of the most modern ASW systems.

It is an ITAR Free equipment which provides:
- V/UHF RX/TX with embedded amplifier
- Interface to antennas
- Open Architecture
- Spare slot to carry an additional SBC to perform sonobuoy processing without additional processor (UAC).
- Sonobuoy localisation (SLS)

Supports the following Radio Frequency interfaces:
- 1 VHF RX for sonobuoy data
- 3 VHF RX for Sonobuoy Location System (SLS)
- 1 UHF TX for sonobuoy Command (CFS and CSG).

Telemachus key features are:
- 99 RF channels coverage and 32 acoustic channels outputs
- Supports all NATO sonobuoy types
- Single VHF Antenna Input
- Digital Output (Ethernet)
- Built-In-Test Signal Generator
- GPS Sonobuoy support
- Sonobuoy Downlink.

ULISSES GROUND STATION

The ULISSES Ground Station provides the following features:
- to prepare the ULISSES Target Library to be loaded into the on-board ULISSES Acoustic Processor,
- to import from the ULISSES disk to the ground station the raw Sonobuoy data formatted following the Stanag 4283. The Ground station allows a real time processing (and a fast time analysis) of the recorded Sonobuoy data
- to provide the operator with a set of Target Library functionalities in order to improve the target identification and classification process.

TECHNICAL SPECIFICATIONS

PHYSICAL

• Dimension (mm)	
UAP	176.7 x 108 x 234
UAP Mounting Tray	228 x 164 x 452
TELEMACHUS	258 x 144 x 407
TELEMACHUS Mounting Tray	144.2 x 262.5 x 382.2
• Weight (kg)	
UAP	5
UAP Mounting Tray	3.5
TELEMACHUS	12
TELEMACHUS Mounting Tray	1
• Power Requirements	28 VDC (both UAP and TELEMACHUS)
• Cooling	Conduction cooled (UAP)
	Self-cooled (TELEMACHUS)

APPLICABLE STANDARDS
- RTCA/DO160 Rev. E/F (Environmental, EMC, Electrical)
- RTCA/DO178C
- MIL-STD-704E
- MIL-STD-810G
- MIL-STD-1553B
- STANAG 4283

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