LEONARDO

Software-Defined-Radios Programs and Products

WInnF 2021 - Italy Programs Update

November 30th , 2021

ELECTRONICS DIVISION

Summary   > SDR Programs

           SDR EVO

           ESSOR EDIDP - European Programs

        > Related Leonardo SDR Products

           Land Products

           Naval Products

           Airborne Products

ELECTRONICS DIVISION

Programs

National

- "SDR Nazionale" (ground)
- "Legge Navale"
- "SDR Nazionale" (airborne)
- "SDR Evo"

International

- European Secure Software Defined Radio (ESSOR OC1)
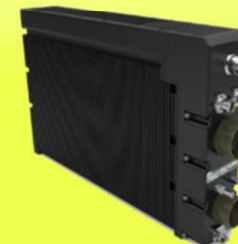- European Defence Industrial Development Programme (EDIDP)

Related Swave ® SDR Products

Swave ® SDR Vehicular

Swave ® SDR Naval

Swave ® SDR Airborne
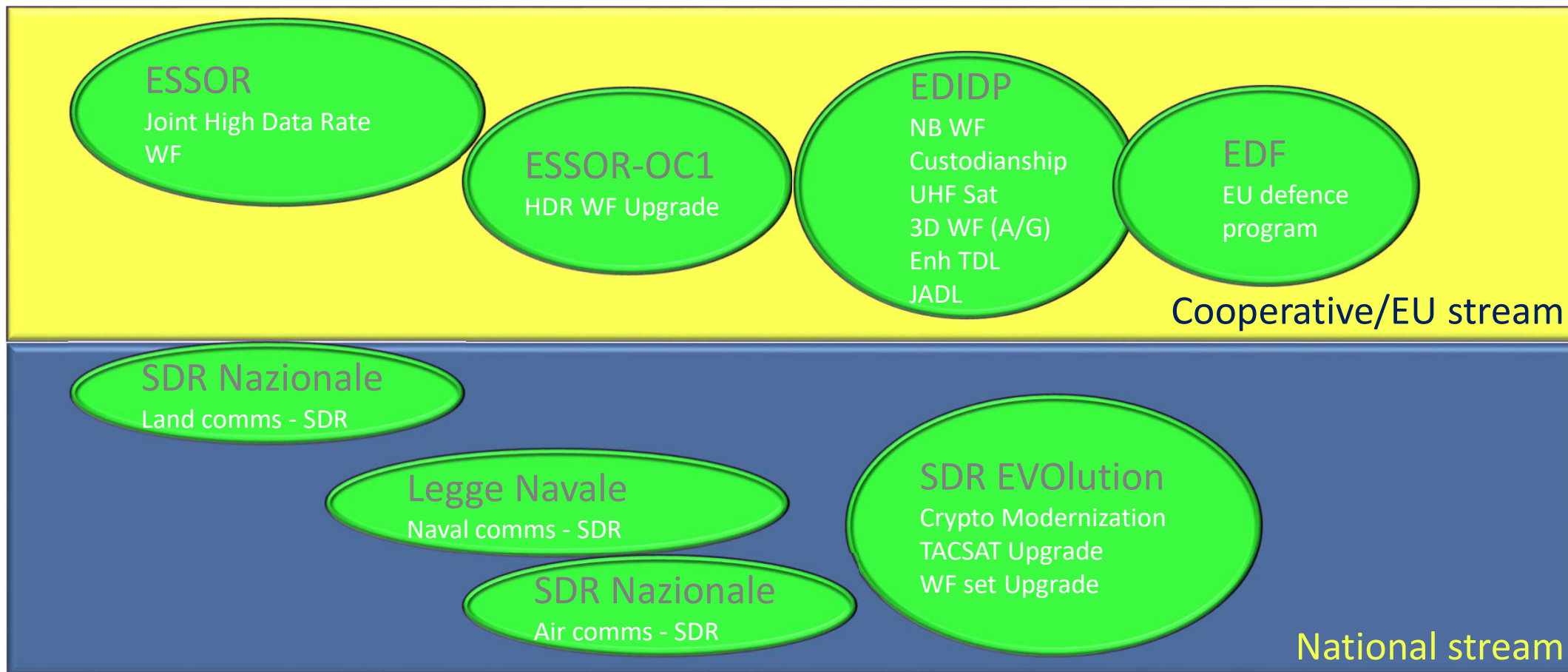
Airborne SDR V/UHF Radio (SRT-800)

The Airborne Swave Radio completes the Leonardo SDR product portfolio, covering any application in all operational scenarios.

SDR Programs

Italian SDR Programs - Roadmap

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ESSOR
Joint High Data Rate WF

ESSOR-OC1
HDR WF Upgrade

EDIDP
NB WF Custodianship
UHF Sat
3D WF (A/G)
Enh TDL
JADL

EDF
EU defence program

Cooperative/EU stream

SDR Nazionale
Land comms - SDR

Legge Navale
Naval comms - SDR

SDR Nazionale
Air comms - SDR

SDR EVOlution
Crypto Modernization
TACSAT Upgrade
WF set Upgrade

National stream

SDR EVO Program – Highlights

Italian program for the evolution of the current communications capabilities
- Algorythms update for NATO joint operations
- TACSAT capability upgrade
- New waveforms addition
- National assets upgrade (Land, Naval, Air)

EDIDP-ESSOR Program

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- Objective

to support the development of an interoperable secure defence communications system compliant with ESSOR and SCA software defined radio products.

- EDIDP / EDF framework

EDIDP Programme "Interoperable communication activities for waveforms at tactical level compliant with European Secure SOftware defined Radio (ESSOR) and Software Communication Architecture (SCA) software defined radio platforms   (direct Award – 2019)"

- Main INFO

➢6 Strands
➢2 Baskets
➢3 Consortiums
➢8 Participating Nations

Consortiums

Ground Basket

Air Basket

Beneficiaries Consortium

EDIDP-ESSOR Strands

- ESSOR Strands (Ground Basket)
- **NBWF** (Narrow Band Waveform)
- **Custodianship** (ESSOR products management)
- **UHF Satcom** (UHF over satellite Waveform)
- **3D** (A/G Waveform)

- Main Requirements/Objectives
- *ESSOR Custodianship Center* (*to manage* ESSOR *standard products*)
- *ESSOR Narrow Band Waveform* (*a military, secure, tactical, Narrow Band Waveform for land coalition operations*)
- *ESSOR 3D Waveform* (*a military, secure,* UHF 3D *waveform for Air and ground coalition operations*)
- *ESSOR UHF SATCOM* (*a military, secure UHF SATCOM waveform for BLOS communications*)

- ESSOR Strands (Air Basket)
- **Enhanced TDL**
- **JDAL (Joint Advanced Data Links)**

- Main Requirements/Objectives
- **ESSOR TDL** *new generation of European Tactical Data Link terminals compatible with the ESSOR and SCA standards*
- **ESSOR JDAL,** *European IFDL, Definition and development high data rate waveform between high speed moving aircraft.*

Leonardo Involvement:
- Coordinator of the Negotiation and Contract acquisition phase
- Responsible for the Beneficiaries Consortium
- Technical Leader of 3 strands

Leonardo related SDR Products

SWave® 4 Channels Vehicular Radio (VQ1)

- Spectrum Flexibility exploitation, 3-2000 MHz
- Four channels: fully simultaneous
- 50 W PeP transmit power
- Software reprogrammable (SCA/ESSOR)
- Security: Type 1
- Scalable: 2/3/4 channels
- Waveforms:
  - New generations Networked: ESSOR HDR, SBW, NBAW
  - BLOS: HF Suite, TACSAT
  - Ground to Air: HAVEQUICK I/II, SATURN
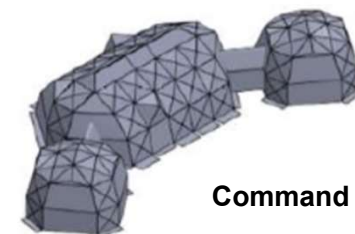 - Legacy Interoperability: SINCGARS, VLOS, 188-220 (STANAG 4204/5), HFWB (contiguous + ALE4G)

Netsec Module

Power Supply

Centauro

VBM

VTLM2

VTMM

Command Posts

SWave® HF and V/UHF Naval SDR

- Designed for Naval/Fixed application

- Common Core for HF and V/UHF band

- HF RF/PA Dedicated Module, including Amplifier and Pre-post Selector

- V/UHF RF/PA Dedicated Module, including Power Amplifier and Co-Siting Agile Filter

SDR HF RADIO :
- Frequency range : 1.5-30 MHz
- EmbeddedOutput Power: 150 W
- Waveforms:
    - MIL STD 188 -141B (ALE2G)
    - STANAG 4285
    - STANAG 4538
    - HFWB (contiguous + ALE4G) on 2022
- 500W/1Kw Power Amplifier Stage

SDR VHF/UHF RADIO :
- Frequency range: 30-512 MHz
- Output Power: 100 W
- Waveforms:
    - VULOS AM/FM
    - STANAG 4204
    - STANAG 4205
    - HQ I/II (2022 with SATURN)
    - TACSAT IW (2024)

3U Rack

Common Core Module — RF/PA Dedicated Module

Cavour Air Carrier

FREMM Frigates, 1 Vessels
- GP
- ASW

2 additional Frigates for Foreign Market

New Naval Building Law
- 7 Patrol Boats (PPA)
- 1 Logistic Ship (LSS)
- 1 Landing Helo Deck (LHD)

SDO SuRS (Special and Diving Operations Submarine Rescue Ship)

SRT-800 SWave® Airborne SDR

LOS WAVEFORMS

➢ VLOS: AM/FM voice and data

➢ ATC in the 118-137 MHz band (8.33 kHz and 25 kHz channels) with embedded FM immunity i.a.w. ED-23C

➢ Link-11/Link-22 with external modem

➢ Sonobuoy

➢ Maritime in the 137-156 MHz band

➢ EPM: HaveQuick/HaveQuickII, SATURN, SINCGARS

➢ Selfnet® Soldier Broadband Waveform

➢ ESSOR's High Data Rate Waveform

➢ VMF i.a.w. MIL-STD-188-220D/MIL-2045-47001

➢ Capability to host indigenous SCA waveforms

SATCOM

➢ Functionalities:
  - ✓ MIL-STD-188-181/182/183
  - ✓ Data: MIL-STD-188-184

➢ Preloaded frequencies for Italian SICRAL1/1B and U.S. satellites

➢ Capability to load indigenous frequencies

➢ External Power Amplifier and Low Noise Amplifier

COMSEC

➢ Programmable Cryptographic module

➢ Compatible with external cryptos

➢ Capability to host indigenous algorithms

SWAP

➢ Weight: < 4,1 Kg

➢ Size: 2 MCU

➢ Power consumption: Rx 70 W; Tx 160 W

Airborne Radio: The road to the new SWave® SDR

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BLOS HF Radio Experience

Fixed Wing

C-130J

E2-D

C27J

ATR-72

B-737 AEW&C

Rotary Wing

CV-22 Tilt Rotor

NH-90

Surion

CH-47

AW-101

SRT-170 (legacy 125 W SYSTEM)

SRT-470 (legacy 400 W HF system)

SRT-200 (new 200 W system)

SRT-400 (new 400 W HF system)

... thousands of HF systems in service world wide and growing

LOS U/VHF Radio Experience

M-346

AW 1x9

EH101

NH90 NFH

NH90 TTH

CAEW

P-72

RT-651/RT-700

PC-21

AWACS

C27J

... thousands of V/UHF systems in service world wide

SRT-800 SWave® Airborne SDR - **Scenarios**

OPERATIONS

Classified Operation (Type 1)

Classified Operation (Type 1 & 3)

BNEC

Classified Operation (Type 1)

Unclassified Operation

CAS

ATC controller
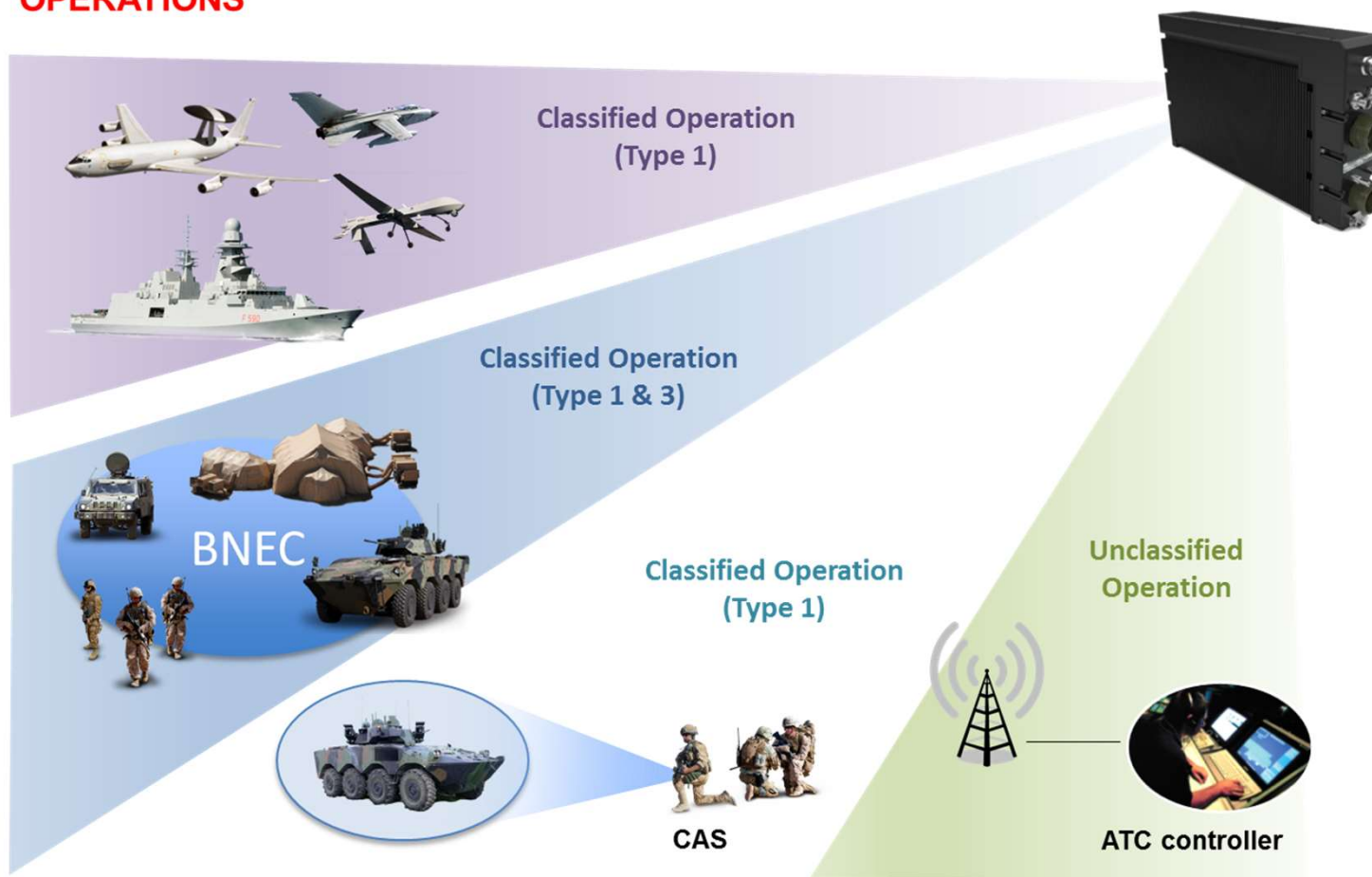
The Leonardo Swave® SRT-800 SDR is the result of the collection of demanding domestic and foreign operational requirements and user needs
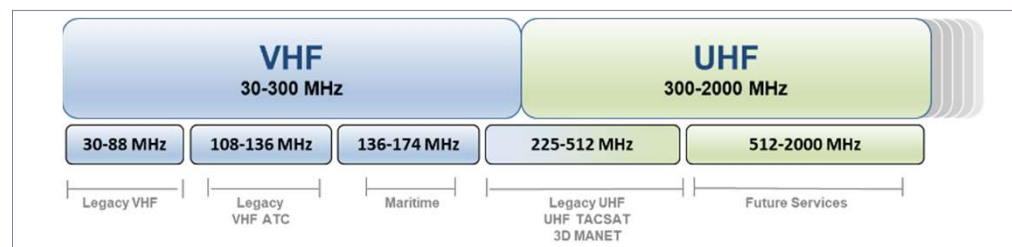
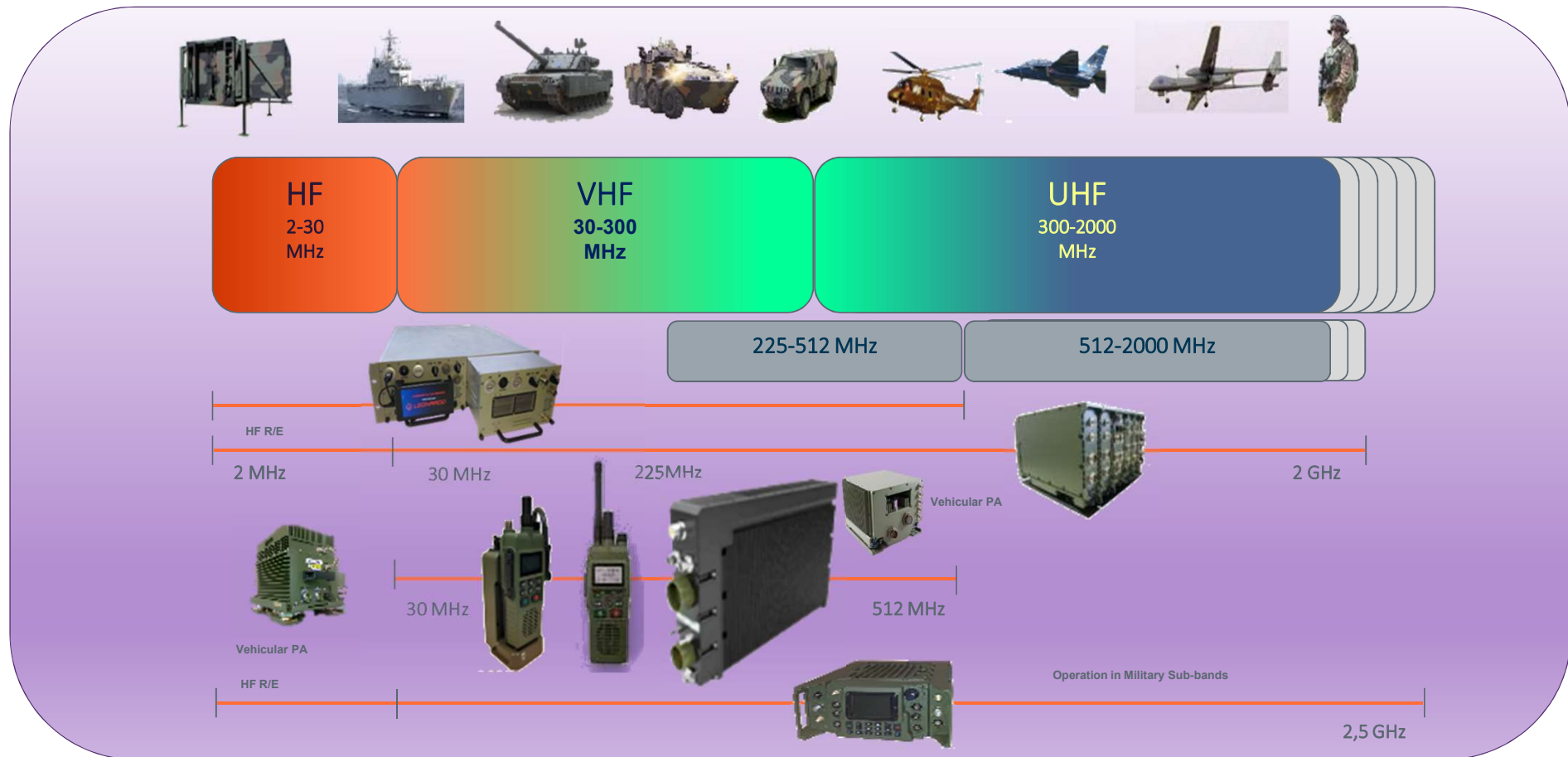# Airborne SDR V/UHF Radio (SRT-800)

NATO AWACS

P-180

SRT-800

AW-169

AW-249

Legacy Modem · Legacy cryptos · Legacy Radio → **SRT-800**

VHF 30-300 MHz			UHF 300-2000 MHz	
30-88 MHz	108-136 MHz	136-174 MHz	225-512 MHz	512-2000 MHz
Legacy VHF	Legacy VHF ATC	Maritime	Legacy UHF UHF TACSAT 3D MANET	Future Services

….. hundreds of this latest generation Airborne SDR system already on order

SWave® SDR – Leonardo complete SDR portfolio

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HF	VHF	UHF
2-30 MHz	30-300 MHz	300-2000 MHz

225-512 MHz	512-2000 MHz

HF R/E

2 MHz · 30 MHz · 225MHz · 2 GHz

Vehicular PA

30 MHz · 512 MHz

Vehicular PA

HF R/E

Operation in Military Sub-bands

2,5 GHz

Standard National/NATO, ESSOR and proprietary SelfNET Waveforms are supported through the whole portfolio of the Leonardo SWave® SDR

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THANK **YOU**
FOR YOUR ATTENTION

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