ICAO’s RPAS/3 Symposium

RPAS Operations – beyond the paradigm of manned aviation

Chengdu, 11 September 2018
Leonardo: a key player on RPAS

SKY-Y
MALE class, Technology demonstrator platform (eg MIDCAS)

FALCO – FALCO EVO
Tactical UAS Family, carrying wide selection of proprietary multispectral sensors for persistent ISTAR

MINI UAS
Mini UAS, delivering situational awareness and network interoperable

nEUROn
European programme for a new stealth unmanned combat air vehicle (UCAV)

EUROPEAN MALE CLASS RPAS
European program for a new –gen MALE class to support long endurance ISTAR missions.

PIAGGIO P1HH
GCS, mission system and sensors provider

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Leonardo Helicopters R - RPAS

Optionally Piloted  SW-4 Solo

MTOW 1800kg

MTOW 205kg

Unmanned

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AWHERO – Mission Payloads

Endurance Performance:
6 hours @ 35Kg
AWHERO - Missions Capabilities

**Missions:**
- Fire risk assessment mapping.
- Surveillance to provide fire early-warning.
- Day & Night mapping of fire evolution.
- Real-time data for firefighters and first responders.
- Assessment of natural disaster.
- Pollution damage assessment.
- Critical infrastructure assessments.
- Real-time data for first responders.
- Pipeline Monitoring.
- Search and Rescue (Land & Maritime).

**Payloads:**
- Gyro-stabilised camera systems with infrared thermal imaging sensors and colour TV sensors.
- Mobile phone localizer (SAR Missions).
- AIS and Maritime Radar (SAR Maritime Missions).

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SW-4 Solo RPAS/OPH – Scope of the Program

To develop a medium size Unmanned/Optionally Piloted Helicopter (RPAS/OPH) for:

- **Demonstration of Remote Piloting technology capability.**
- **Demonstration of Operational Mission capability in simulated and real environment (land and maritime).**
- **Industrialization of demonstrator/prototype and launch to market.**
An example of specific payloads for maritime missions surveillance:

- 14" EO/IR.
- Maritime RADAR.
- ESM (Electronic Support Measure).
- AIS (Automatic Identification System).

Distributed Multi Sensor C2 capability
The first "Application" to have a Permit to Flight (PtF) was presented to EASA and ULC (the Polish Aeronautical Authority) in order to fly in configuration RPAS, but with "Safety Pilot on board".

While the first "Application" to have a Permit to Flight to carry out RPAS flights "Without Safety Pilot on board" was presented to ENAC with the request to receive a PtF for the SW-4 Solo RPAS, as Annex II Experimental Aircraft, in accordance with Italian NAV 32 Circular.

RPAS System Safety Objectives were consistent with the guidelines provided by Jarus Working Group 6 – Safety & Risk Assessment for a RPAS-27, with a complexity level II. (ref. to JARUS AMC RPAS.1309. Issue 2, November 2015).

A technical report assessing the risk of the flight test activity in Grottaglie Test Range has been produced and discussed with ENAC.

It was prepared in accordance with the ENAC Guidance Document n. 2017001-NAV Ed. 1 of 16/01/2017, “Metodologia di Valutazione del Rischio in Operazioni RPAS per Autorizzazioni e Permessi di Volo non Geografici. Guida Applicativa”.

Up today, the SW-4 Solo RPAS/OPH has performed more than 200 flight hours in automatic flight with remote control.
SW-4 Solo RPAS/OPH – Demonstration Activities

Precision auto-land and auto-takeoff with a moving platform - Simulating Ship Operations

Generation of a position, velocity and full attitude vector between the H/C and a moving spot point.
Leonardo Helicopters RPAS/OPH
Demonstration Activities and Programs

Unmanned Warrior (achieved)
Where: Scotland
When: 10 – 20 October 2016
Sponsor: UK MoD
Platform: SW-4 ‘SOLO’
Objective: ISTAR capability demonstration and command & control integration in real operational environment.

Italian Blade (achieved)
Where: Viterbo - Italy
When: 22 June– 3 July 2015
Sponsor: European Defence Agency
Platform: SW-4 Solo
Objective: ISTAR Mission Capability and «manned/unmanned» teaming in real operational environment (LOI 2 demonstrated).

Full Unmanned Flight (achieved)
Where: Grottaglie - Italy
When: 2017
Sponsor: PV
Platform: SW-4 Solo
Objective: Flight without SP on board.

Surveillance Demonstration (achieved)
Where: Grottaglie - Italy
When: 2017
Sponsor: PV
Platform: SW-4 Solo
Objective: Flight with SP on board.

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When: 2017
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SESAR INsuRE (achieved)
Where: Grottaglie - Italy
When: December 2015
Platform: HERO
Objective: Flight demonstration in non segregated air space
Participants: UAS, ENAV & ENAC.

HELIMARIS (in progress)
Where: Poland
When: 2016-2019
Sponsor: Polish Gov.
Platform: SW-4 ‘SOLO’
Objective: Innovative use of OPH platforms in maritime operations.

CCD Demo PH1 (achieved)
Where: Galles - UK
When: 2013-2015
Sponsor: UK MoD
Platform: SW-4 Solo
Objective: ISTAR Mission Capability and shipboard operation in simulated environment.

CCD Demo PH2 (in progress)
Where: UK
When: 2016 - 2018
Sponsor: UK MoD
Platform: SW-4 Solo and AWHERO
Objective: Shipboard operations demonstration in real environment.

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SW-4 Solo RPAS/OPH – Full Unmanned Flights

14th & 16th December 2017 in the Test Range RPAS, approved from ENAC, located near the "Marcello Arlotta” Airport close to Grottaglie (Ta) the SW-4 Solo has performed two Flight Tests in RPAS mode without a Safety Pilot on board.

Duration of the both Full Unmanned Flights was in total of 1 hour.

Details of the two flights:

- **14.12.2017 – Lift-off and touchdown:**
  Purpose of this task was to execute an auto lift-off to the achievement of a stable hover and then auto-touchdown.
  Duration of the flight around 15 mins.

- **16.12.2017 - RPAS Demo mission:**
  Purpose of this task was the completion of an entire unmanned mission, starting from engine startup until its shutdown.
  The mission steps performed by SW4-Solo were:
  - Take off from main airport runway,
  - Climb to 1500 ft and to fly according to planned route with 60kts of airspeed,
  - Perform a loiter around a specific area,
  - Return to main airport runway and landing.
  Duration of the flight around 45 mins.
SW-4 Solo RPAS/OPH – Full Unmanned Flights
OCEAN2020

The Consortium

- As industry leader, Leonardo was awarded the most important project related to the first round of European Defence Funded Initiatives under the Preparatory Action on Defense Research program
- Ocean 2020 is a pan-European inclusive team of 42 partners, among which major defense players such as Saab, Safran, Indra, PGZ, MBDA, several SMEs and major Research Institutes such as TNO and Fraunhofer, with also the contribution from the NATO CMRE CoE
- The Consortium will be supported by several European Navies which will take active part in the trials

Project Objective:

- Enhanced situational awareness in a maritime environment through the deployment and integration of various domains’ UxS
- Meet the challenges to enhance surveillance persistency over a wider area Surveillance and multisource real-time data integration

Trials:

- **Demo 1 – Mediterranean Sea** Q3 2019
  Scenario 1: Fast Boat Interdiction
  Scenario 2: Cargo Vessel Interdiction
- **Demo 2 – Baltic Sea** Q3 2020
  Scenario 1: Unmanned surface threats
  Scenario 2: Unseen submerged threats
THANK YOU FOR YOUR ATTENTION