

# An Opportunity for a new ISR CONOPS

## Piaggio Aero P.1HH & P180MPA

**FUTURE J-ISR**

**INCREASING INFORMATIONAL SUPERIORITY IN THE AGE OF INFORMATION**

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**Antonio Maglione**  
**Chief Technical Officer**  
**Piaggio Aero Industries**

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# Human Smuggling/Trafficking: a factual urgency

- ▶ Smuggling of migrants is a criminal phenomenon of significant dimensions:

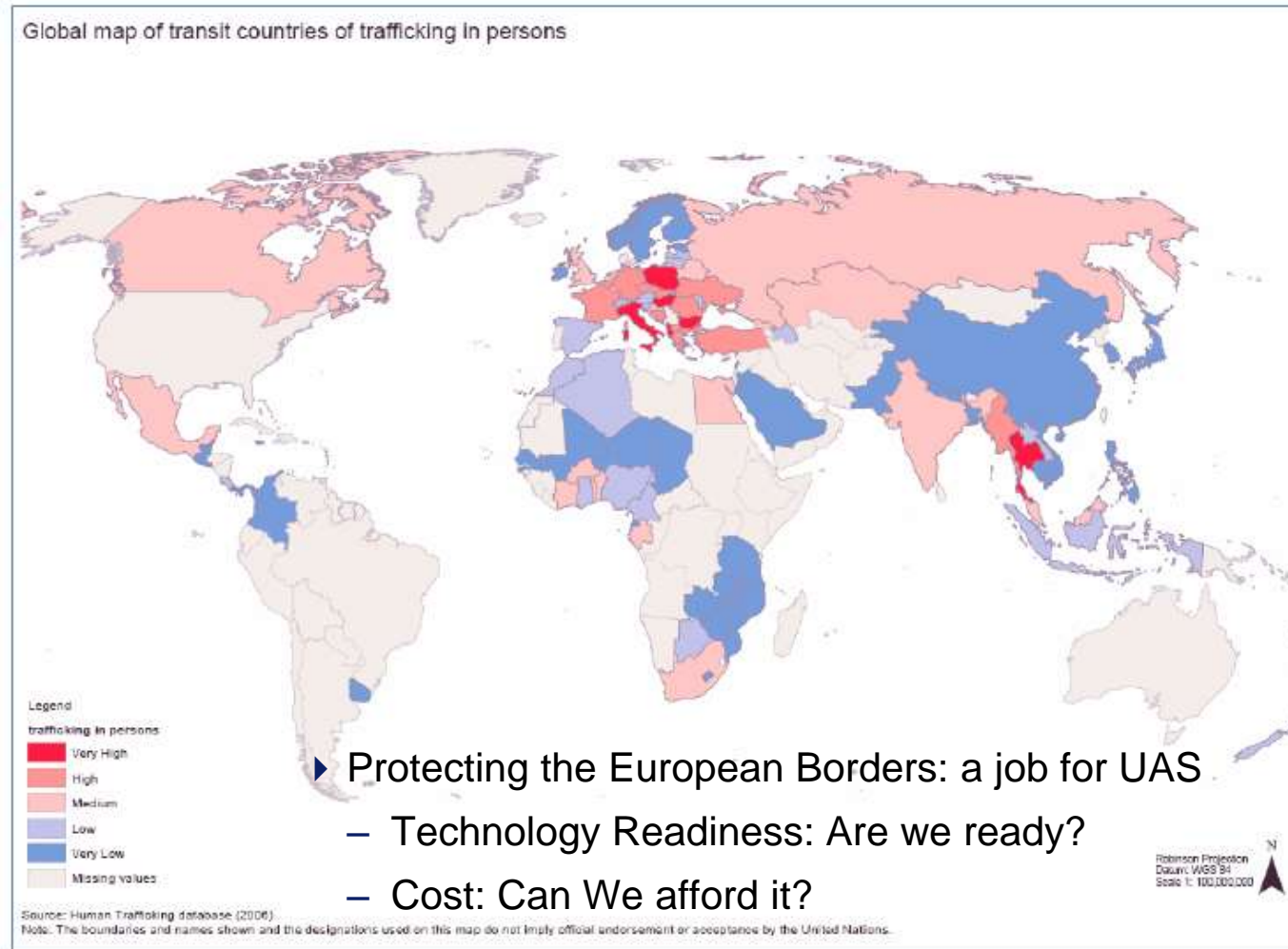
Table I. Migrants apprehended at sea borders, Italy, 1999-2008

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Sicily	1973	2782	5504	18225	14017	13594	22824	21400	16585	34540
Sardinia							16	182	1548	1621
Italy	49999	26817	20143	23719	14331	13635	22939	22016	20165	36951

Source: Italian Ministry of Home Affairs, Department of Public Order.

- ▶ Firm statistics are not available, but ICMPD (*International Center for Migration Policy Development*) estimated that 100,000 to 120,000 irregular migrants crossed the Mediterranean Sea each year;
  - ▶ **Mortality rate is estimated to be 5% (United Nations Office on Drugs and Crime – UNODC)**
- ▶ According to UNODC, Trafficking of Human Beings is the third largest source of income for the organised crime groups after drug and arms trafficking

# UAS: developing an active role in patrolling the Mediterranean Sea



# The Southern Europe Protection Belt

- ▶ UAS can provide a “protection belt” to Europe by continuous patrolling the Southern Mediterranean Sea from Cyprus to Spain for a big search and rescue operation
- ▶ “Unavoidable” detection can be a strong deterrent for smuggling of migrants. Early detection can reduce the mortality rate of the influx of refugees and asylum seekers into southern Europe.



# Patrolling the Mediterranean Sea: size of the problem

- ▶ Size of the belt
  - Length: 1,800 nm
  - Width: 50 nm

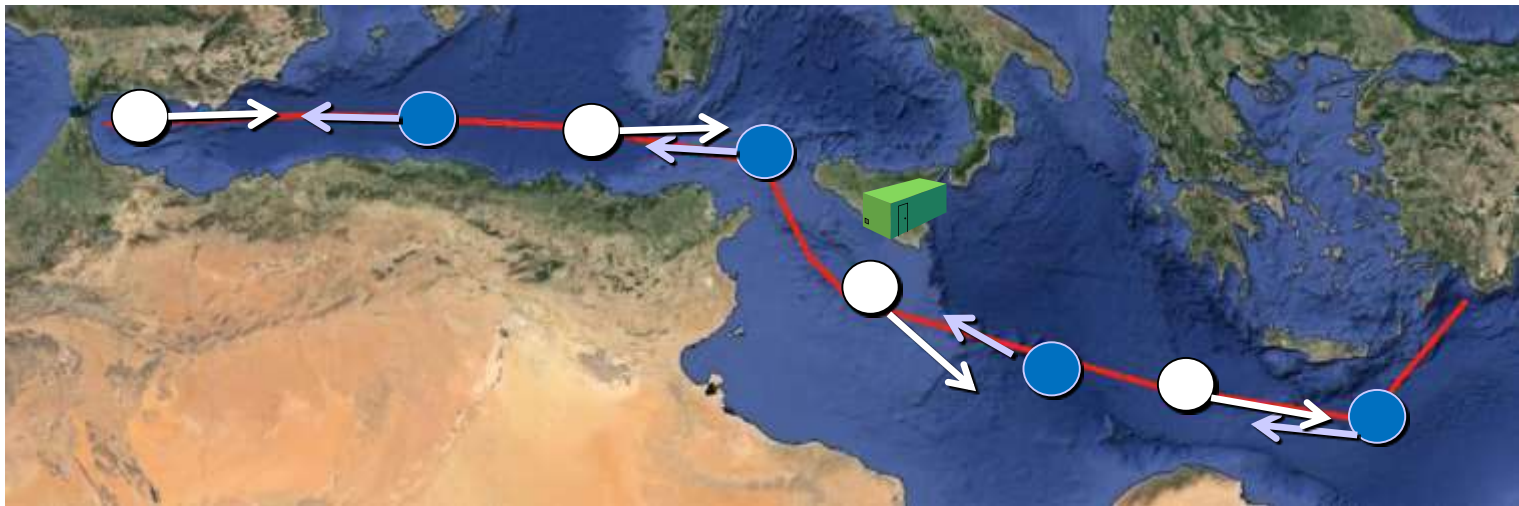


- ▶ Conservatively assuming that smugglers may use up to a Powerboat (50 knots), “unavoidable detection” is obtained by monitoring every spot of the belt once per hour
- ▶ Area coverage target is then of the size of 90,000 square nm per hour



# A patrolling CONOPS

- ▶ An operational solution employing a number of UAS with Marine Detection Capabilities (Radar plus SIGINT payload)
- ▶ Solution is based on UAV's in operations 24 / 7 with high patrolling speed
- ▶ One launch & recovery GCS / Remote Split Operations/ Data centralized



- ▶ Post detection, investigation can be performed by dedicated platforms (UAS to track the suspect boat) or MPA for SAR in a common, interoperable environment

# What is needed: Vehicle

- ▶ Mission Specific requirements:
  - Outstanding Max Range (order of several thousands nm), High Specific Range
  - High Max Range Speed (over 300 knots)
  - Low Operating Costs
  - Minimal Logistic Footprint
  - All weather operations
  - High Altitude – for traffic avoidance
  - Twin Engine - to reduce attrition rates
  - High Electrical Power availability



# What is needed: Technology

- ▶ System Architecture to meet the highest standards of safety requirements for UAVs (at least those considered mandatory for flight over the sea)
  - Redundancy
  - Health Management System /capability to reconfigure after failure
  - DO-178 SW
- ▶ BLOS Datalink – Remote Split Operations – Netcentric Data Center
- ▶ TCAS/ADS-B integration in Vehicle Control & Management System – to manage “sense and avoid”-like requirements in a cooperative scenario above 40,000 feet
- ▶ GCS to manage multiple UAVs at the same time
- ▶ Systems Interoperability

# What is needed: Operational Capability

- ▶ Agreed, shared set of regulations, at least of Open Waters, High Altitude
- ▶ Smooth handover procedures between Controllers (payload operators or pilots) and between crews in a 24/7 scenario
- ▶ Automatic takeoff and landing capability
- ▶ Focus on Mission (Payload management instead of A/V management) – high mission system “autonomy” to facilitate the dull 24/7 patrolling operations

## P.1HH & P180MPA: the available solution

▶ Developing efficient ISR vehicles is the objective of a major Piaggio Aero program, which is intended to develop a modern and efficient Medium Altitude Unmanned Aerial Systems and a competitive manned MPA based on P180 Avanti II, exploiting the potential of the fastest turboprop certified aircraft with the ability to autonomously carry significant payload in terms of volume, weight and power consumption.

▶ The P.1HH Hammerhead combines fastest patrolling speed (up to 395ktas), with outstanding Max Range (>4400nm) with a significant payload.



▶ The P180 MPA is a Multirole Patrol Aircraft which can be the perfect companion of the P.1HH Hammerhead for joint SAR operations



# Piaggio Aero Industries P.180:

## *A well proven basis for P.1HH development*

### ▶ Safety

- CS-23 Certified Platform (structures & sub-systems)
- Twin Engine
- All Weather Ops certified
- Outstanding Service History (800.000 hrs)

### ▶ Payload Capacity

- Significant Fuselage Volume & Weight allowance for Payload
- Outstanding Electrical Power (22.4 KW)

### ▶ Performance

- Wide flight envelope
  - Max Altitude 41,000 ft
  - Max Speed 400 KTAS

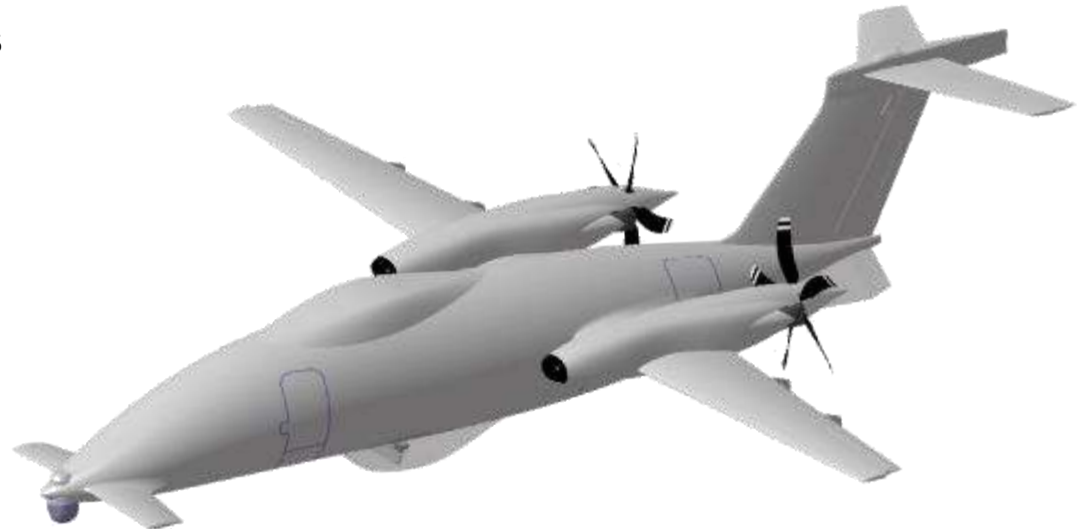


# The P.1HH Hammerhead:

## *Key Characteristics (1/2)*

Medium Altitude Long Endurance Unmanned Air System **developed in partnership with Selex ES** with full ISR capabilities, featuring Beyond Line Of Sight comms and Automatic Take Off & Landing

- ❑ Multi mission & Multi sensor platform  
ISR - COMINT/ELINT -more
- ❑ New fuel system (with an additional fuselage tank)  
Max Endurance: 16 hrs with 500 lbs of payload
- ❑ Fuselage & systems modifications  
Maximum payload 2,000 lbs  
Beyond LOS range
- ❑ Wide range of operational speeds  
(125 to 395 KTAS)
- ❑ All weather operations
- ❑ Augmented Wing Span and AR
- ❑ Max Ceiling: 45,000 ft
- ❑ Max Range: 4,400 nm



# The P.1HH Hammerhead: Key Characteristics (2/2)

- ❑ Full redundancy – Triplex VCMS Configuration
- ❑ Compliant with STANAG-USAR 4671 – AER(ER).P2
- ❑ HMS/Fault Tolerant Control
- ❑ ATOL: Automatic takeoff & landing
- ❑ GCS capable of managing up to 2 Air Vehicles in operation
- ❑ TCAS integrated for cooperative “Sense&Avoid”
- ❑ Advanced Mission Management System by Selex ES





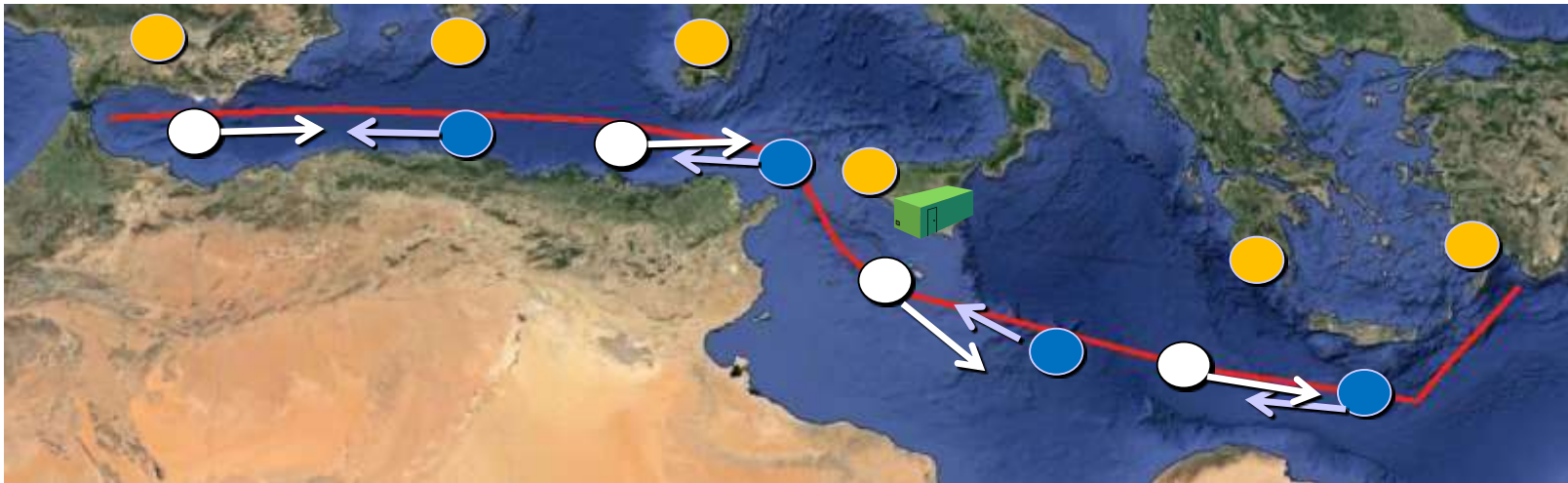
# P.180 Multirole Patrol Aircraft

- ▶ The P180 MPA aircraft is a **Long Range Endurance Aircraft** developed with **SAAB Defense Services** for quick sea surveillance/rescue actions, searching for friendly - or enemies - boats/ships to facilitate “first aid” action or immediate response, if necessary.
- ▶ P180 MPA aircraft is **an evolution of the P180** maintaining the same a/c configuration and well proven system architecture
- ▶ The P180 MPA best in class low/high speed performances associated to the integration of latest generation of surveillance sensors make the aircraft perfectly suited for SAR operations
- ▶ The MPA carries a **flight crew of two pilots and two mission operators** with BLOS datalink to connect real time the vehicle to Ground Control Station and Headquarter .
- ▶ Large and comfortable (noise, vibration) cabin of the segment with minimum equivalent altitude provides best in class working environment for the crew.



# A patrolling CONOPS

- ▶ An operational solution employing a number of UAS with Marine Detection Capabilities (Radar plus SIGINT payload)
- ▶ Eight UAV's in operations 24 / 7 with high patrolling speed (>300 KTAS)
- ▶ One launch & recovery GCS / Remote Split Operations/ Data centralized
- ▶ Four to Six P180 MPA optimally located in scramble for quick SAR actions



- ▶ Post detection, investigation can be performed by dedicated UAS to loiter around the target boat or by MPA for a SAR in a common, joint operations

# CONCLUSIONS

- ▶ A CONOPS for persistent surveillance of the Mediterranean Sea against Smuggling of Migrants has been presented
- ▶ A solution based on the Piaggio P.1HH Hammerhead meets the demand for early detection of Vessels of Migrants with the following features:
  - 24/7 detection
  - Very Low Operating Costs
  - Limited Logistic Footprint
- ▶ Interoperability/joint operations with P180 MPA of the Piaggio Aero ISR Family
- ▶ The solution is there, deployable in very short time



***GRAZIE DELL'ATTENZIONE***