



FROM INNOVATION TO SOLUTION

# SESAR Integrated RPAS Demonstration Activities

## Status and results

RAID Final Workshop, Capua, June 21th 2016



founding members



# Introduction

- 9 RPAS demo projects launched in 2013;
- budget of EUR 4.2 million for a duration of two years;
- to assess the feasibility of RPAS integration in non-segregated airspace and what level of RPAS demonstration and operation was possible within the current regulatory and operating environment, using current technology;
- 9 projects completed – all but 2 needed extensions – several change requests.



## RPAS 0.6 ODREA – Operational Demonstration of RPAS in European Airspace



Rockwell Collins  
France; DSNA, ENAC,  
SAGEM

Real-time simulations and live trials to measure the impact of handling several RPAS arrival, approach and departure procedures in a terminal area alongside piloted aircraft. Sagem's Patroller OPV used in Toulouse.



## RPAS 0.5 TEMPAERIS - Testing Emergency Procedures in Approach and En Route Integration Simulation



DSNA; Airbus Prosky,  
Cassidian, STERIA,  
ENAC

Investigated RPAS performance in Bordeaux airspace through live flight trials and simulations providing conclusions on low-performance RPAS, including communications and operational latency (compliance with ATC instructions) and handling of non-nominal situations. Demonstrations carried out with MALE OPV.



## RPAS 0.4 MedALE - Mediterranean ATM Live Exercise



Alenia Aermacchi;  
Selex, ENAV,  
Nimbus, Thales  
Alenia

Gap analysis between existing RPAS capabilities and the procedures/rules required for insertion into non-segregated airspace. Real-time simulations and flight demonstrations with a fully remotely piloted RPAS (Alenia Aermacchi Sky-Y) in Italy.



## RPAS 0.2 INSuRE - Integration into non-segregated ATM



IDS ; Sistemi Dinamici,  
Air Navigation Services  
of the Czech Republic

Simulations and flight trials on SD-150 Hero piloted from a fixed station on the ground using CPDLC ,ADS-B, and TCAS technology to assess technological and operational procedures, as well as safety aspects required to allow safe integration of RPAS into a non-segregated airspace. Trials were conducted in Italy.



## RPAS 0.3 RAID – RPAS ATM Integration Demonstration



Cira, Deep Blue,  
Nextant, Nimbus,  
University of Malta,  
MATS

Demonstrates and evaluates the short-term ATM impact of RPAS integration into unrestricted airspace. Real-time simulations (CIRA facility and simulators in Malta) and flight trials in Italy by using FLARE OPV



## RPAS 0.7 CLAIRE - Civil Airspace Integration of RPAS in Europe



THALES UK,  
NATS, NLR

Live trials and simulated demonstration exercises using Thales Watchkeeper to investigate different classes of airspace and flight modes. ATC simulation exercises carried out by NATS (en route aspects) and NLR (ground sector and CTA operations). Trials also enable the RPAS to interact with the safety nets incorporated into current ATM processes and systems.



## RPAS 0.8 AIRICA - ATM Innovative RPAS Integration for Coastguard Applications



NLR, Ntl  
Coastguard,  
Schiebel, Royal  
Netherlands Air  
Force

Project will demonstrate a realistic coastguard mission, involving beyond visual line-of-sight flights. Appropriate sensors and onboard detect-and-avoid capabilities are implemented and tested. After take-off from Den Helder Airport, the RPAS flies towards the targeted area, performs its mission in non-segregated airspace, and returns.



## RPAS 0.1 DEMORPAS – Demonstration Activities for Integration of rPAS in SESAR



ISDEFE; ENAIRE, INTA,  
CREDA, FADA-CATEC

Two types of exercises (live trials) with 2 types of short range fully remotely piloted small aircrafts (SIVA, ALO) and 1 motor glide: STEMME S15) performed in a civil / military airfield in Spain.



## RPAS 0.9 ARIADNA - Activities on RPAS Integration Assistance and Demonstration for operations in Non-segregated Airspace



Indra Systems, ENAIRE,  
CRIDA, Fada-Catec

Satellite-Based Augmentation System (SBAS) approach and landing at an aerodrome; plus concepts for RPAS Ground-Based Situational Awareness solutions (SBAS – EGNOS). Using a rotary wing RPAS (logo).

# Main projects results and conclusions

- Apart from the lower performance of some RPAS types, no significant difference in the behaviour of RPAS compared to small general aviation aircraft perceived, when operating in the air traffic control (ATC) environment;
- Technical, operational, safety and security matters that need to be addressed before integration identified:
  - A harmonised and well-established civil certification system by the required certification authorities is needed;
  - Policies and procedures on how ATC should interact with RPAS to ensure efficient operations and to meet safety-level requirements;
  - Specific training and licensing for RPAS pilots; and
  - a detect & avoid (D&A) capability and compliance with European aircraft equipage requirements.



# Future research/demo needed

- Multiple RPAS demonstrations to extend the RPAS traffic and to validate the operational procedures related to their control and to the coordination with more than one RPAS pilot;
- These multiple demonstrations should have larger European scope covering hand-over of control (between different control stations and ATC agencies) for extending the mission areas beyond the data link and area limits;
- SWIM services for the ground-ground exchange of RPAS information could be implemented and validated for RPAS to share data with ATC and other airspace users;
- The demonstrations in particular should focus not only on the systems that are working in normal conditions, but address the emergency and contingency scenarios, verifying if the recovery system and emergency procedures are correctly working and compatible with ATM.





# Conclusions

- Call was rather ambitious – several amendments necessary – all projects flew in segregated areas, except one.
- All completed
- Valuable conclusions and recommendations resulted from these 9 projects – very much appreciated by EASA;
- Summary brochure to be published Q3 2016.

