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Aviation in Europe – Innovating for Growth

The 7th European Aeronautics Days

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The 7th European Aeronautics Days

Overview of SJU RPAS Activities and results

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21/10/2015

European Vision for RPAS integration

Riga Summit March 6th 2015

- RPAS need to be treated as new types of aircraft with proportionate rules based on the risk of each operation
- EU rules for the safe provision of drone services need to be developed now
- Technologies and standards need to be developed for the full integration of RPAS in the EU airspace
- Public acceptance is key to the growth of RPAS services
- RPAS operator is responsible for its use

Everywhere in Europe as from 2016 onwards

High Level view of SJU's current work on RPAS

- In-line with the European Vision;
- RPAS Definition Phase completed;
- EU ATM Master Plan 2015;
- SESAR 2020 Programme description of activities;
- **9 co-financed demonstration projects.**

Outcome of the definition phase

- RPAS integration requirements must be linked to the EU ATM Master Plan and the ICAO Global Plan/ASBU timeline;
- RPAS will have to fit into the ATM system (and not the reverse), with required adaptations to enable the safe integration of unmanned systems;
- RPAS will have to prove to be as safe as current manned vehicle operations and their behavior in operations to be equivalent to manned aviation.

Alllowing a full RPAS integration

- Full range of activities defined in the EU Roadmap for civil operations;
- Ensures efficient and safe integration (analogue to manned aircraft);
- Remove the obstacles to operate in airspace either as IFR or VFR;
- VLL operations like B-VLOS could be considered in various ATM and airspace environments;
- Synergies with Military and GA/Rotary operations and enabling technology.

RPAS Demonstration Projects

- SJU co-finances 9 “RPAS Demonstration Projects”, which include integrated pre-operational flight trials activities;
- 3 concluded.

Integrated Demonstration Projects consortiums

Common objectives (1/2)

- Demonstrate how to integrate RPAS into non-segregated airspace;
- Focus on concrete results filling the operational and technical gaps;
- Be relevant at European scale;

Common objectives (2/2)

- Cover various types and sizes of RPAS;
- Capitalise on the SESAR delivery approach;
- Support paving the way and establishing current state of the art for future SESAR 2020 work on RPAS.







3 Concluded projects

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.	

RPAS 0.5 TEMPAERIS - Testing Emergency Procedures in Approach and En Route Integration Simulation			
	DSNA; Airbus Prosky, Cassidian, STERIA, ENAC	Investigated RPAS performance in low-medium TMA 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).	

3 Featured today

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.	

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.	

And the remaining 3

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.	

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

ISDEFE; ENAIRE, INTA, CREDA , FADA-CATEC	Three types of exercises (live trials) with 2 types of short range fully remotely piloted small aircrafts (SIVA, ALO) and 1 motor glide: STEMME S15) will be performed in a civil / military airfield.	 

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

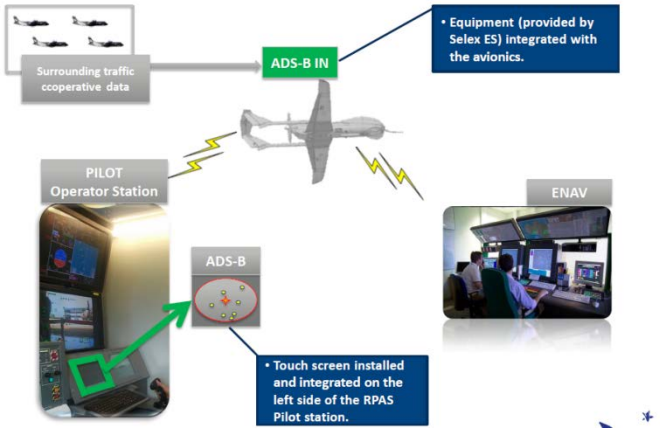
Indra Sistems, ENAIRE, CRIDA, Fada-Catec	Satellite-Based Augmentation System (SBAS) approach and landing at an aerodrome; plus concepts for RPAS Ground-Based Situational Awareness System (GBSAS). Condor platform will be used.	

Results so far (1/3)

- Technical and Operational feasibility of integrating RPAS into Mid-size commercial Airport demonstrated;
- RPAS behaviour was not perceived as different from the one of a small general aviation aircraft;
- Procedures for emergency and/or non-nominal operations should be established;
- The benefits of having a Detect and Avoid on safety were demonstrated – introduction of cooperative D&A is recommended with relevant on board integration and associate HMI on ground;
- Benefits of Tailored trajectories and Pre-defined Emergency procedures - Include RPAS in Trajectory Management Framework;
- The ANSP collaboration from the very beginning is key for successful demonstrations;

Results so far (2/3)

- There is a need for the appropriate technology (ex:HD cameras + communication architecture) to secure the use of the “line up behind and hold” procedure and also the see and avoid;



- It is recommended not to allow RPAS on airports where traffic is more than 20 movements per hour;
- he following contingency procedures: radio failure, C1/C2 loss, GPS failure, emergency landing will have to standardized in order to be made homogeneous at the ICAO level.
- Separation standards need to be reviewed and potentially altered;

Results so far (3/3)

- Usually RPAS are operated mostly in controlled airspace and are handled as special exceptions → policies and procedures must be set for how ATC can interact with RPAS without creating burdensome workloads;

- Procedures must be tuned for launch and recovery methods for departing / arriving airports and for different RPAS typologies;
- Communications performance are needed to meet safety requirements;
- Standardized methods must be established for how to pass RPAS performance characteristics and mission information to ATCO;

Suggestions to regulators

- Regulation requirements should be harmonised to the maximum extent possible
  - National level: NSAs, MoD, etc.
  - International level: NSAs, EASA, JARUS, OACI, etc.
- Use of military experience is a must;
- Administrative procedures for obtaining a permit to fly need to be reduced;
- RPAS operations may require on-short notice flights;
- A “catalogue” of operation oriented requirements would help to plan a flight
  - E.g. safety requirements for a given type of operation
  - Study the role of AOC for RPAS
- Coordination of multiple RPAS, together with multiple manned aircraft, in the same environment when significant changes occur, e.g. emergencies.

Thanks for your attention!

Coming events:

SESAR innovation days

Check our website regularly

www.sesarju.eu