RPAS Definition Phase

- 1st Workshop
- SJU, Brussels 4th September 2014
## Welcome

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<tr>
<th>Slots</th>
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<tr>
<td>09:30/09:40</td>
<td>SJU Keynote Speech</td>
<td>Florian Guillermet</td>
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<td>09:40/09:50</td>
<td>EASA Keynote Speech</td>
<td>Eric Sivel</td>
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<td>09:50/10:05</td>
<td>EC(DG MOVE) Keynote Speech</td>
<td>Koen de Vos / Frédéric Claus</td>
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<td>10:05/10:20</td>
<td>Introduction to the RPAS Definition Phase</td>
<td>Denis Koehl</td>
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<td>10:20/10:40</td>
<td>EU ATM Master Plan Update</td>
<td>Henk Hof</td>
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<td>10:40/11:00</td>
<td>SESAR 2020 Programme</td>
<td>Peter Hotham</td>
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<td>11:00/11:20</td>
<td>Coffee Break</td>
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<td>11:20/12:00</td>
<td>Definition Phase - Objectives and Scope</td>
<td>Mike Lissone</td>
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<td>12:00/12:30</td>
<td>Definition Phase - Work already undertaken</td>
<td>RPAS Definition Phase Team</td>
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<td>12:30/13:00</td>
<td>Definition Phase - Identification of work packages</td>
<td>RPAS Definition Phase Team</td>
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<td>13:00/13:30</td>
<td>Definition phase - Work Planning</td>
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<td>13:30/14:00</td>
<td>Open Discussions</td>
<td>Denis Koehl / Mike Lissone</td>
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GENERIC RPAS ISSUES
History of RPAS

- 1849
- Austrian balloons bombed Venice
- Wind issue
What are Unmanned Aircraft?

- DRONES?
- UAV?
- Unmanned aircraft systems
- Autonomous aircraft
- ????????????????
- NO!!! They are called RPAS and they are a sub set of UAS!
  - Remote pilot station or ground station
  - Data link
  - Remote piloted aircraft
RPAS ARE AIRCRAFT
EUROPEAN AVIATION SYSTEM

- Conservative
- Lead in time at least 5 years
- RPAS integration driven by innovation
  - GOOGLE
  - FACEBOOK
- RPAS just another airspace user
- <150 kg State specific (for now)
- Civil and military have same integration obstacles
RPAS what is your perception?
Or societal benefits?

THEY ALL WANT AIRSPACE ACCESS
MAIN OBJECTIVE

Safe integration of civil and Mil RPAS operations into the European aviation system and ATM from 2016

- Phased integration (scalability)
- Non-segregated ATM environments
- SESAR COMPLIANT – Integrated into the European ATM Master Plan
EUROPEAN APPROACH

- 5 Workshops
- EC Staff working paper
- Development of 3 roadmaps:
  - Regulatory
  - R&D
  - Complementary measures
- Development of European RPAS integration roadmap
- Call for RPAS Demos and trials from SJU linked to ATM master plan
- EUROPEAN Roadmap was launched 20th June Paris Airshow
INTEGRATION CHALLENGES (1)
INTEGRATION CHALLENGES (2)

- DATA LINK requirements
- SPECTRUM
INTEGRATION CHALLENGES (3)

DETECT & AVOID
Rules of the AIR
R&D GAP ANALYSIS

Identification of gaps in technology or procedures led to the following topics:

- Detect & Avoid
- Human factors
- C2 (Command & Control)
- Contingency – e.g loss of link, …
- Security
- SESAR compliance
What is the state of play

- 15 countries have regulation (not harmonised)
  - 6 allow operations under strict conditions
- 2200+ civil approved commercial companies and growing
- Most operators and manufacturers have no aviation background
- Economic potential estimated at several billions before end 2020
- Pragmatic European approach………..
TYPES OF OPERATIONS

Instrument Flight Rules (IFR)

Visual Flight Rules (VFR)

Very Low Level Operations
  • Visual Line of sight (VLOS)
  • Extended- Visual line of sight (E-VLOS)
  • Beyond visual line of sight (B-VLOS)
(E)VLOS

Very Low Level operations (<500 ft AGL)

VLOS

E-VLOS

500ft

500 meters

restrictions

pilot

observer
Timeframe 2014-2018

Small R&D effort identified:

- Security – e.g. flight planning operations
- Human factors – e.g. pilot & observer team work
- Contingency
B-VLOS

Very Low Level operations (500 ft AGL)

GCS/pilot

restrictions
**B-VLOS**

**Timeframe 2014-2020**

Large R&D effort identified

- Detect & avoid (replicate the human ability to see & avoid)
- C2 communications
- Human factors including mixed fleet compatibility
- Contingency
- Security
- SESAR compliance

- B-VLOS below 500ft is completely new to aviation
IFR/VFR

Timeframe 2014-2028

Large R&D effort identified

- Detect & avoid
- Airspace and Airports access
- C2 communications
- Human factors
- Contingency
- Security
- SESAR compliance
Objective & scope
European objective

Safe **integration** of RPAS operations into European aviation system and ATM from 2016

- Non-segregated ATM environments –
  - Including VLL -
Objective and scope RPAS Definition phase

- Integrate RPAS R&D activities into SESAR 2020
- Integrate into ATM Master plan
- Up to DOW level 1
- Before end 2014
Work already undertaken
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RPAS Integration into DOW

- Use R&D road map
- 14 R&D activities based on types of operations
- Very detailed roadmap
Consolidated RPAS activities

- Activity 1  D&A
- Activity 2  C2
- Activity 3  Airspace & airport access
- Activity 4  Contingency
- Activity 5  Human Factors
- Activity 6  Security
- Activity 7  Demos and best practices
Workplan and timeline
Workplan

• Assessment of 7 activities
  - Gaps

• R&D dashboard (not in the R&D roadmap)
  - Overview of R&D activities
  - Maturity (E-OVCM)
  - Maintenance

• Key deliverables

• WORKSHOPS are for WORK!
Roles and allocation of work?

- Activity 1  D&A
- Activity 2  C2
- Activity 3  Airspace & airport access
- Activity 4  Contingency
- Activity 5  Human Factors
- Activity 6  Security
- Activity 7  Demos and best practices
Define the new 2020 programme(s)

On going EC-Council-Parliament Consultation

Call for SJU Membership

Competitive Dialogue

Council adopting the proposal

SJU Admin Board

PC Principles agreed

Exploratory Research Programme 2020 Preparation (WPE+internal SJU)

Large Scale Demo 2020 Preparation (BAFO III-project 14)

Industrial Research 2020 Preparation (BAFO III-project 15)

Refine the overall SESAR 2020 Programme WBS

Refine the DOWs

RPAS work programme integration DOW level

Launch Call(s)

Begin 2015

End JAN 2014

End FEB 2014

End Q2 2014

4th SEP 2014
Work plan for RPAS Definition Phase (September – December 2014)

- Preparation (SJU)
  - 4/09 Kick-off meeting

- V1 Drafting
  - 15-16/9 1st work session
  - 1-2/10 2nd work session
  - 28-29/10 4th work session
  - 26-27/11 6th work session
  - 10-11/12 7th close out session
  - End date 17/12

- V2 Drafting
  - 1-2/10 2nd work session

- V3 final draft
  - 26-27/11 6th work session

- Physical meetings
- Coordination WebEx (TBD)

- Activity 1
- Activity 2
- Activity 3
- Activity 4
- Activity 5
- Activity 6
- Activity 7
Programme 2020 – Work Breakdown Structure

SESAR 2020

ATM Design & Integration
Performance Management
Validation, Verification & Demo Infrastructure
Master Plan Maintenance

Exploratory Research
Knowledge Transfer Network
Future ATM Skilled Workforce

ATM Excellent Science & Outreach
Automation, Robotics & Autonomy
Complexity, Data Science & Information Management
Environment & Meteorology for ATM
Economics, Legal & Regulation
Intermodality & Outreach

ATM Application-Oriented Research
High Performing Airport Operations
Call 1 & Call n Projects

Optimised ATM Network Management
Call 1 & Call n Projects

Advanced Air Traffic Services
Call 1 & Call n Projects

Enabling Aviation Infrastructure
Call 1 & Call n Projects

ATM Operations, Architecture, Performance & Validation
Call 1 & Call n Projects

Industrial Research & Validation
High Performing Airport Operations

Enhanced Runway Throughput
Airport Safety Nets
Total Airport Management
Remote Tower for Multiple Airport

Optimised ATM Network Management
Advanced Airspace Management
Optimised Airspace Users Operations/UDPP

Advanced DCB (includes NOP)

Advanced Air Traffic Services
Separation Management TMA & En-route
Trajectory & Performance Based Free Routing
Enhanced Arrivals & Departures
Enhanced Air & Ground Safety Nets

Enhanced Runway Throughput

CNS
SWIM Infrastructures

4D Trajectory Management
Common Services
Air Vehicle Systems
CWP/HMI

Very Large Scale Demonstration

High Performing Airport Operations
Integrated Airport Ops (W1, W2)
Remote Tower Control (W1, W2)
Time-based Separation (W1, W2)

Optimised ATM Network Management
User Preferred Operations (W1)
Network Collaborative Mgmt (W1, W2)

Advanced Air Traffic Services
Multi-FAB Free Routing (W1, W2)
Extended AMAN (W1, W2)

Enabling Aviation Infrastructure
Initial Trajectory Sharing (W1, W2)
Flight Object Interoperability (W1, W2)

Very Large Scale Demonstration
Open Calls
Wave 1 Projects
Wave 2 Projects

Enabling Aviation Infrastructure
Virtual Centre (W2)

Future ATM Skilled Work-force

Call 1 & Call n Projects
Integration RPAS into SESAR 2020


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<tr>
<th>Activities</th>
<th>Project Code</th>
<th>Description</th>
<th>Start Date Initiation</th>
<th>Status Start Date Execution</th>
<th>Planned End Date</th>
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Overview of RPAS R&D activities

- **R&D DASHBOARD**
  - Providing clear overview
    - What
    - When
    - Who
- **E-OVCM maturity**
- **Maintenance**
Overview of RPAS INTEGRATION

- INTEGRATION DASHBOARD
- Providing clear overview
  - REG
  - R&D
  - COMPLEMENTARY
- Maintenance

![Dashboard images for REG, R&D, and COMPLEMENTARY categories]
Thanks for your attention