Partnering for excellence in global aviation
Integration of all vehicles

Robin Garrity, SESAR JU
Context

- SESAR has traditionally been focussed on mainline Airspace Users
- SESAR 2020 now brings all AUs into the ‘family’
- Industrial Research projects must now consider how research concepts will affect, or provide benefits to, the whole family, manned and unmanned
- In this session, we hear from some new family members
Content

Matthew Baldwin (European Commission) - keynote address

1. Jean-Philippe Ramu (NetJets) – Business Aviation
2. Isabel del Pozo de Poza (EHA) – Rotorcraft
3. Juan Ignacio Del Valle – (EDA) – Military and IFR RPAS
4. John Korna (NATS) – General Aviation and ANSPs
5. Marc Kegelaers (Unifly) – VLL ‘drones’
Matthew Baldwin
Deputy Director-General for Mobility and Transport, DG MOVE
Save-The-Date

SESAR U-Space Workshop

20 April 2017

The Hague, Netherlands

Organised by:

Hosted by:

Hosted & Powered by RoboValley

#SESAR
Business aviation

Dr Jean-Philippe Ramu
NetJets Europe pilot
EBAA Consortium - SESAR Technical Manager
Business aviation – what and where

Europa

Economic Impact
Business Aviation is a leading contributor to the European job market, securing nearly half a million jobs and accounts for revenues of almost EUR 100 billion.

- 98 bn € in output
  (quantifies the sector's output, sales plus inventory increase and self-made assets)
- 27 bn € in GVA
  (quantifies the monetary worth of the production generated by firms in the Business Aviation sector and its suppliers)
- 21 bn € in labour compensation
  (provides all wages and salaries, incl. compensation of the self-employed, linked to the sector's economic activity)

Departures 2015

- 306,479
- 279,516
- 18,669
- 17,769
- 14,410

Market Share (Number of departures)

- Business Aviation
- Cargo
- Trad. Schedule
- Low Cost
- Charter

Total employment (direct & indirect)

- 371K jobs

Operations

- 37,140 in operation/FBO
- 10,197 in MROs

Manufacture

- 40,601 in manufacturers

Fleet: 3,496 based aircraft

- Business
- Heavy jet
- Midsize jet
- Light jet
- Turbo Propeller

+1K BusAv Operators

+1K operated Airports

Sources: Eurocontrol – WingX Advance – Handbook of Business Aviation – Amstat – Booz Allen Hamilton
Challenges with major airports

• Flexible departure time as opposed to on-time departure time
• Wake vortex free arrivals and capacity increase
Challenges with satellite airports

- 60% of operation in protected controlled airspace
- 25% of operation in unprotected controlled airspace
- 15% of operation in uncontrolled airspace

10x more TCAS RA

Inefficient operation
Benefit study – Egelsbach and Frankfurt

- Separated from Frankfurt traffic
- Remains in controlled airspace
- 30% fuel efficiency from FL300

Promising concepts... but new operation with new challenges
Challenges with secondary airports

• Circling approaches supported by visual RNAV procedures enabling ecological paths and enhancing safety in challenging terrain

• TIS and FIS enabling enhanced cooperation between IFR and VFR traffics in uncontrolled airspaces
Thank you for your attention

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Rotorcraft integration in the Single European Sky

Dr. Isabel del Pozo
European Helicopter Association (EHA)
Agenda

• Who we are & our mission
• EHA objectives in SESAR to foster RC
• Rotorcraft operational needs & challenges
• Achievements in SESAR1
• Our aspirations for SESAR 2020
The European Helicopter Association (EHA)

➔ We are the rotorcraft voice in Europe

NHAC = National Helicopter Associations Committee

AMAC (Associate Members Advisory Council)

Affiliated Member
The European Helicopter Association - mission

1. Recognition of the rotorcraft´s unique capabilities
2. Tailored sustainable rule
3. Equal access to the Single European Sky (SES)
EHA objectives in SESAR: to foster RC

• Integrate rotorcraft (RC) operations in the SESAR Concept of Operation (ConOps) and in the European ATM Master Plan

• Consider RC specific aspects in the SESAR R&D projects, when relevant

• Promote, coordinate and follow RC dedicated activities in SESAR
Rotorcraft main fields of activity

HELIKOPTER AIR AMBULANCE  
(HEALTH SECTOR)  

SEARCH AND RESCUE

POLICE

FIRE FIGHTING  
(CIVIL PROTECTION)

26,5 billion €  
Gross Value Added (GVA)*

Global turnover (mil €)  7.535
N° employees  35.000

OIL AND GAS  
(ENERGY SECTOR)

AIR TAXI/CHARTER  
(BUSINESS SECTOR)

AERIAL WORK

*Data source: year 2014
RC operational needs

1. **IFR access to VFR Final Approach and Take-off Areas (FATOs)**
   - Point-in-Space (PinS) RNP approaches/departures procedures to/from heliports

2. **Rotorcraft integration in dense/constrained airspace**
   - Specific Low Level IFR routes (LLR)

3. **Rotorcraft access to busy airports**
   - Simultaneous-Non-Interfering (SNI) rotorcraft
   - IFR approach/departure procedures to/from heliports located at airports
RC challenges

1. Latest RC have the highest technology standards
   - Satellite based navigation, 4-Axes Autopilot, LPV certification, Steep Approaches up to 9,9°

2. Rotorcraft Operators Need to operate 24/7
   - Operations in all weather situation (VMC and IMC)

→ Problem:
   - No LLR IFR Routes, lack of rotorcraft adapted procedures
Achievements in SESAR 1

- Rotorcraft community recognised as a player in the development of the future European ATM system
- Rotorcraft unique capabilities and specific operations are considered in SESAR ConOps and in the European ATM Master Plan
- R&D Projects and Large Scale Demonstrations dedicated to RC operations (P04.10, PROuD) are paving the way for operational implementation
  - Low Level IFR Routes RNP- 0.3 and PinS network for emergency rotorcraft operations (ENAV in Piemonte region)
  - LLR network and LPV approaches published in Norway (PIONEERS project)
Aspirations for SESAR 2020

• Integration of Low Level IFR rotorcraft routes in 4D managed dense airspace with connections to enhanced RNP approaches to RC landing locations

• Technologies relying on SVS/EVS/CVS to improve accessibility into small aerodromes in low visibility conditions

• Datalink and ADS-B IN broadcast services to support rotorcraft operations → separation of IFR & VFR traffic in uncontrolled airspace
Thank you for your attention

More information: www.eha-heli.eu
RPAS Air Traffic Integration

Juan Ignacio del Valle
European Defence Agency

Expert Point of view
European Defence Agency
Facts & figures

Established
2004
Based in
BRUSSELS

27 Member States
(all EU members except Denmark)
& Administrative Arrangements
with Norway, Serbia, Switzerland
and Ukraine)

General budget
30,5 Mio

Number and value of ad-hoc projects:
22 projects / 70 Mio

Value R&T projects 2004-2016
run within EDA: €1 billion
To support the Council and the Member States in their effort to improve the European Union’s defence capabilities for the Common Security and Defence Policy.”

*Treaty of Lisbon, signed in 2007, entered into force in 2009*
“...EDA and Commission to intensify their activities in the field of air traffic insertion, certification and regulation for a safe integration in Single European Sky” *

*Council conclusions, 18 May 2015
Enabling RPAS operations

The issue

• **Currently in Europe: RPAS (both civil and military) operations in segregated airspace**
  • Restrictions for operations and training
  • Segregation more difficult as air traffic density increases

• **Defining the issue: RPAS traffic integration in non segregated airspace**
  • Military? State? Civil? → Same barriers for RPAS operations
  • RPAS? UAV, drones, robots? → RPAS; MALE type (RPS – ATC)
  • Integration? insertion, accommodation? → Integration
  • Non segregated air space? → General Air Traffic (GAT)
Enabling RPAS operations

Barriers and enablers

• **Integration of IFR RPAS Traffic into GAT**

• **Barriers**
  - ATM concept of operations not adapted to RPAS
  - Regulatory framework not adapted to RPAS
  - Maturity of required technology

• **Enablers**
  - ICAO RPAS CONOPS; ICAO SARPS; ECRL ATM CONOPS
  - EASA RMT 0230 – Reg. framework accommodate UAS in the EU aviation system
  - Tech gaps & solutions ➔ European ATM Master Plan ➔ Exploratory Research; Industrial R&D ➔ Standardisation
## Integration of IFR RPAS traffic into GAT EDA and SJU industrial R&D

<table>
<thead>
<tr>
<th>ATI Tech Areas</th>
<th>SESAR 2020 Wave 1</th>
<th>EDA &amp; pMS Industrial R&amp;D</th>
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<tr>
<td>DAA</td>
<td>PJ.11 – ACAS Xu</td>
<td>MIDCAS SSP (Ad Hoc) TRAWA (Pilot Project – PA)</td>
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<td>C2 Datalink</td>
<td>PJ.03a, PJ.10, PJ.11</td>
<td>DeSIRE2 (OB) – SATCOM C2</td>
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<tr>
<td>Airspace access and airports ops</td>
<td>PJ.03a – RPAS ground ops PJ.10 – RPAS IFR Integration</td>
<td>ERA (Ad Hoc) – ATOL and autotaxi</td>
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<td>Security</td>
<td>PJ.03a, PJ.10, PJ.11</td>
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Integration of IFR RPAS traffic into GAT EDA and SJU cooperation

- EDA Contribution to EU ATM Master Plan update
- SJU Support in the definition of new R&D initiatives at EDA
- Support in evaluations
- Experts involvement in projects execution as stakeholder or observers
- Common objective in R&D → Standardisation through established European standardisation organisations
Enabling RPAS operations
Summary: EDA approach

- **Objective:** Integration of IFR RPAS Traffic into GAT
- **Barriers:** ATM CONOPS, regulations, tech. maturity
- **Enablers:** CONOPS Update, RMT.0230, R&D

EDA monitors the ongoing work on the applicable CONOPS, contributes to the update of the EU ATM Master Plan and leads specific dual-use Industrial R&D initiatives that ensure standardisation activities of key ATI technological enablers which in turns supports Rulemaking Tasks.
Thank you for your attention

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Integration of all vehicles: General aviation (GA) and ANSPs

John Korna

NATS
Context

• Historically, UK ANSP and GA challenges have been:
  • Infringements of controlled airspace
  • Mid-air collision risk
  • Controlled flight into terrain

• Other topics old and new of interest
  • Oil rig “wrong deck” landings
  • Cost and complexity to certify GA ADS-B installations
  • Appropriate use of low cost “good enough” technology by GA
  • Drones
EVA outcomes

See, be Seen and Avoid

• It can be really difficult to visually acquire aircraft (and drones!)
• Pilots typically overestimate their ability to spot other aircraft
• A pilot who sees no aircraft may believe they are they only one in that airspace, thus a pilot may relax their scan – making the odds of spotting other a/c even less likely
• Traffic information, either from an ATS Unit, or a cockpit device can prevent that downward spiral
• Traffic Alert Displays must minimise heads down time
• UK CAA now has requirements and approval procedures for low cost, low power, low/no integrity ADS-B devices: CAP1391
This is the aircraft you are looking for
Aspirations for the SESAR programme

• Maintain, or reduce safety and service risks for airspace users as demand increases

• Lower or remove barriers; close the GA business case
  • Compelling benefits in answer to “So what’s in it for me?” challenge
  • Reduce risk of divergent technologies and closed eco-systems

• Development of seamless, transparent interoperability between existent & emergent airspace users, commercial aircraft, and ground services ATM & in future UTM

• Mutually interoperable technology capability and service solutions with appropriate Size, Weight and Power-Cost (SWaP-C) for all GA stakeholder communities
Technology, standards, regulation & cost

- Need for appropriate “Risk Based” avionic requirements for low hours, low budget users
  - Perfect solutions will cost too much, take too long and not be bought
- Generating suitable enabling standards take time and commitment from all stakeholders – easy to be overtaken by events
  - Modern rapid, frugal innovation will enable non-traditional technology actors to produce low cost solutions
  - If there is a perceived market/need someone will look to fulfil it
- Make it easy for stakeholders to adopt - give them something they want!
  - Clear, compelling answers to “What is in it for me?”
  - Seek to build user pull, showing how GA benefits; benefits should not all be for Commercial Air Traffic or ANSPs
- Interoperability, interoperability, interoperability
Thank you for your attention

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Drones in VLL airspace

Marc Kegelaers

Unifly
Unifly – the company

• Young / Scale Up
• “Operations Ready” UTM Solution
• History:
The challenge
The solution – use of EAD data
EAD for recreational users
Unifly & SESAR

• SESAR SWIM Masterclass 2014 Runner-up
• H2020 SESAR UTM Exploratory Research
  • Topic 1 – UTM Concept definition = CORUS
  • Topic 4 – Ground-based technology = CLASS
  • Topic 6 – Security & Cyber-resilience = SECOPS

• Next: H2020 SESAR UTM VLD ( ? )
• Ideal integration unmanned/manned
Thank you for your attention

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Thank you for your attention

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