

# Aviation Panel Discussions Results Summary

## EGNSS User Consultation Platform Plenary

4<sup>th</sup> December 2018

# Agenda

- Highlights of Main Trends in the Market
- User Requirements
- Research and Innovation Priorities
- Discussion on Enhanced EGNSS Services
- Feedback on Back-up PNT Solutions

# Highlights of Main Trends in the Market

**Communication, Navigation and Surveillance:** Movement from the ground solution to space-based solution

## Navigation

- LPV implementation in good progress with more than 550 EGNOS-based approaches deployed in Europe
- LPV everywhere by 2024
- Commercial airlines, OEMs deliver new models with SBAS capability (A320 family, B777, B737 MAX)



Under development (2020)



737MAX

## Surveillance/ADS-B Out mandate

- Airspace Users acknowledge EGNOS benefits, such as lower separation, avoiding RAIM holes, even if not mandated
- ANSPs and Airspace users look for improved business case by rationalising ground infrastructure and demand high performance
- ADS-B is the cornerstone of the future Surveillance infrastructure

- Agreed by all speakers:

***Coordinated deployment is needed!***

***Harmonized equipage for LPV and ADS-B is beneficial!***



Q400 AirBaltic

# Highlights of Main Trends in the Market

## Aircraft distress tracking:

- ICAO reaction on the past accidents was to launch the GADSS (Global Aeronautical Distress and Safety System) and this is already reflected in the Annex 6 and EC regulations
- ELT(DT) based on Galileo MEOSAR is the most robust means to provide position of aircraft in distress
- ELT and ELT(DT) manufacturers are integrating Galileo capable receiver in their products
- Manufacturers are leading definition of ConOps for remote beacon activation with EUROCAE and looking for solutions to deal with distress situation that cannot trigger automatic activation

## Drones

- EGNSS contribution to U-Space services (geo-awareness, Detect and Avoid, e-identification, ADS-B)

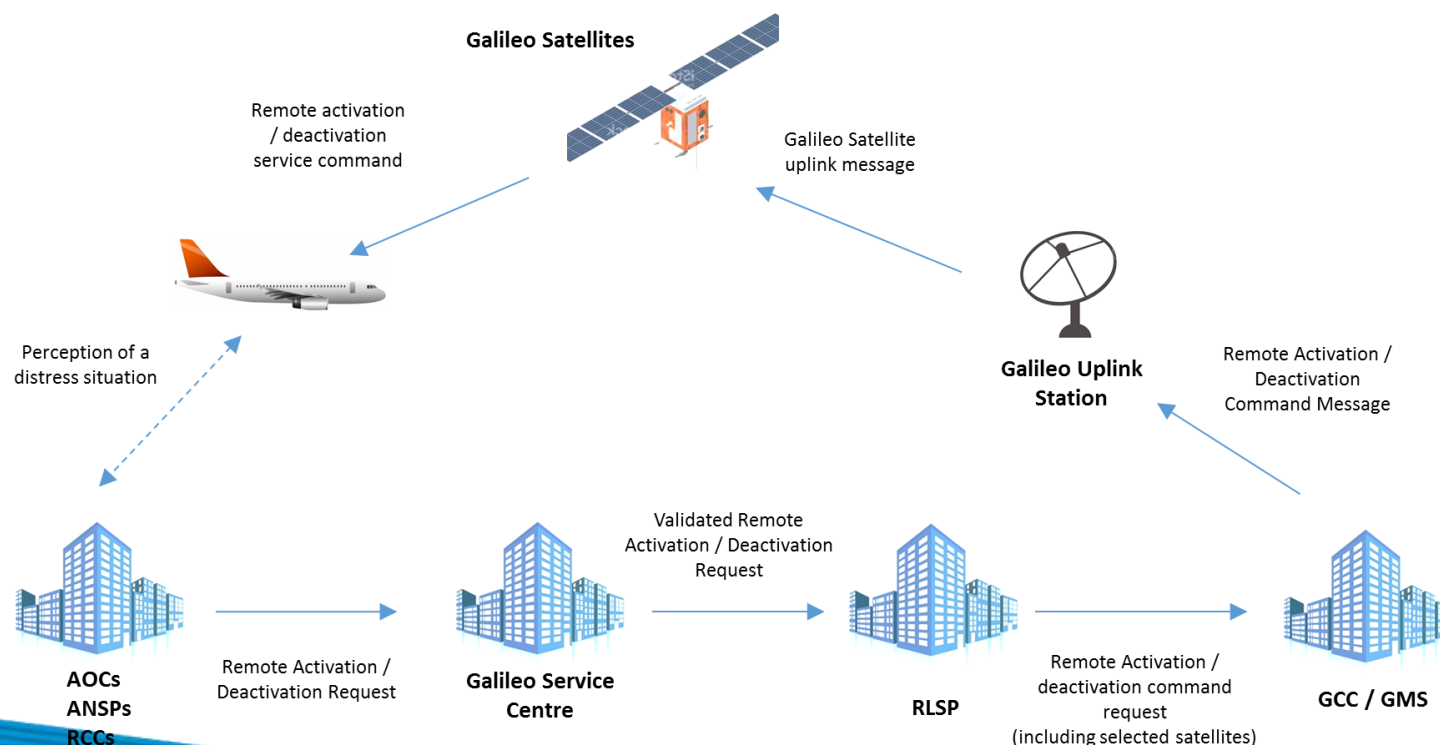
# User Requirements for Communication, Navigation and Surveillance

- Need for ADS-B Out enabling 2NM separation in TMA only achievable with SBAS
- Demand for improved EGNOS performance in terms of continuity to support widespread LPV200 deployment
- Raise awareness among AU on rationalization of the conventional navaids by 2030 and need to get equipped with PBN (SBAS)
- Enable LPV combination with EVS/SVS to reduce minima below 200ft in low visibility conditions
- Proper 'acceptance criteria' and regulations need to be set in order to use Galileo (and in general core constellations other than GPS)
- Increased demand for robustness and resilience
- Provide new funding opportunities for uptake by airspace users



# User Requirements for Aircraft distress tracking

- Remote activation as a new functionality offered by Galileo by return link to prevent the case of non-cooperative aircraft (MH370)
- Airlines strongly support a pilot project to validate the end-to-end validation concept including all actors such as air traffic control





# User Requirements for Drones

## Quantitative performance requirements:

- Horizontal and Vertical accuracy- sub-meter level;
- Majority of respondents requires a warning in case of a failure in GNSS system
- Geo-awareness: Horizontal- sub-meter accuracy; Vertical- meter accuracy
- Geodetic approach based on EGNSS for altitude determination

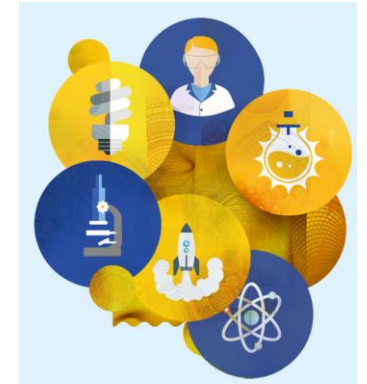
## Supporting functions:

- Galileo authentication feature required for many drones operations
- PBN/RNP like operations similar to manned aviation for operations following pre-defined trajectory (tailored specification RNP 0.01...)
- Need for a web tool to support implementation of SORA and how EGNSS can be support risk mitigation during drones operations



# Research and Innovation Priorities

- New Rotorcraft operations for critical services to public
- RNP APCH down to LPV to non-instrument runways
- Advanced navigation operations:
  - Flexible glide slopes, displaced threshold with EGNOS
  - Approaches to lower minima and taxiing guidance with Enhanced / Synthetic Vision systems
  - 4D operations, Curved, steep approaches
- Lightweight portable solutions for GA ADS-B (Automatic Dependence Surveillance) in applications
- Galileo SAR global and decision efficient enabler services
- Drones
  - Detect and avoid, geo-fencing solutions with E-GNSS
  - EGNOS and Galileo based Robust navigation for very low level operations
  - Authenticated position
- Hybridisation of different technologies to guaranty resilience and accuracy of PNT
- Traffic management





# Discussion on Enhanced EGNSS Services

## ARAIM:

- The panel welcomed the potential to have LPV-200 worldwide thanks to vertical ARAIM

## High Accuracy Services:

- Recognised as being very beneficial for drone operations, subject to further assessment of suitability in the dynamic flight environment
- Needs to be secured from cyber attack and robust across the end-to-end operation

## Ionospheric Prediction Service:

- Widespread interest in the validation of the tool in comparison with alternates, e.g. flights in high altitude (grater than FL500) and drones operations in polar regions
- Possible 'extension' linked to understanding radiation impacts at altitude

# Feedback on Back-up PNT Solutions

- Aviation is a mature market segment with several alternative means already existing and expected to be maintained already recognising the need for an alternative, e.g.
  - DME/DME, ILS
- There is focus on rationalisation of navigation and surveillance infrastructure with supporting operational procedures
  - Minimum operational network maintained to enable RNAV 1/RNP 1 in En-route and/or TMA with ILS CAT I for approach
- This is the focus on current R&D being led by SESAR within PJ.14-03-04 APNT and to be continued post 2020

# Thank you !

**Russell Dudley**, European Regions Airlines Association & Aviation panel