2018
ICNS conference
AIRBUS Perspective on CNS evolution

Didier DELIBES
Airbus ATM Engineering
April 10th, 2018
CNS evolution – Influencing factors

- Many factors influence CNS evolutions
  - ATM modernization
  - New technology opportunities
  - Rationalization
  - Digitalization
  - Mandates
  - Interoperability
  - Industrial roadmaps
  - Benefits for airspace users (BCBS, …)
  - …

CNS strategic roadmaps are needed to forge consensus and inform
CNS evolution – COM (1/2)

- Exponential need for air/ground COM
  - Predictive maintenance, data mining
  - Trajectory Based Operations (TBO)
  - Flight Tracking (ADS-C, Cloud recording, …)
  - AIS/MET in the cockpit
  - A/C as a weather sensor
  - RPAS, …

- Many technology opportunities
  - Satcom (SBB, Iridium, Iris, Ku / Ka, …)
  - 4G, 5G mobile com
  - LDACS
  - Internet Protocols
  - AeroMACS,
  - WAIC,…
CNS evolution – COM (2/2)

- Commercial IT COM vs Aeronautical protected COM?
- Impact of cyber security threat on costs and architecture?
- Resilience of satellite-exclusive COM means?
- COM segregation from NAV and SURV
- SESAR / NextGen DataCom harmonization

No stable COM avionics roadmap yet
CNS evolution – NAV

- Consensus on GNSS based navigation with DME, VOR as back-up
- GLS CAT3 operations in sight !
- Still some weakness in the GLS business case
  - ILS to GLS long transition period
  - “20+ array” ILS-LOC, …
- But overall confidence in the GLS potential
  - Increased Glide Slope, Displaced thresholds, …
  - Curved approach
  - …

GLS CAT 3 in the European “Common Project 2” proposal
CNS evolution – SURV

- ADS-B-Out and ACAS-X are main assets to Surveillance modernisation

- Potential triggers for SURV evolution
  - ADS-B-In applications (CAVS, IM, … self-separation)
  - Enhanced wake separations
  - Formation Flights
  - RPAS, Automatic freighters
  - New technologies (video sensing, LIDAR, …)
  - …

Additional SURV developments contemplated
Airbus CNS Roadmap

**ICAO**

Block 0
- 2009
  - APFD-TCAS
  - TCAP
  - ADS-B out
  - ATSA (VSA, ITP, AIRB)

Block 1
- 2013
  - RNP 0.1
  - GLS Cat1
  - AMM/BTV/ROP

Block 2
- 2019
  - SBAS - LPV
    - (A350)
  - A-RNP
  - 4D
    - VLD PJ 31
    - POP AF-6

Block 3
- 2025
  - ACAS-X
  - SPACING (NextGen A-IM ?)

**Surv**

- SURF-A
- VLD PJ 28,

**NAV**

- RNP 0.1
- GLS Cat1
- AMM/BTV/ROP

**COM**

- FANS A+/FANS B+

**Availability of functions subject to development launch decision**

- EFVS
- GNSS MC/MF
- IGS
- MRAP
- GLS CAT3 (GPS L1)

- CAVS / CAPP
- CAVS
- CDTI Assisted Visual Separation
- CTDI Assisted Pilot Procedure

- FANS A+/FANS B+
- THALES
- CAPP
- CDTI Assisted Pilot Procedure

- MRAP
- Multiple Runway Aiming Point
- MRAP
- In Trail Procedure

- GLS
- Ground Based Augmentation Landing System
- GLS
- Increased Glide Slope
- LVS
- LPV
- Localizer Precision Vertical

- CAVS
- CDTI Assisted Visual Separation
- CAVS
- Increased Glide Slope

- FANS C
- FANS C

- EFVS
- GNSS MC/MF
- IGS
- MRAP
- GLS CAT3 (GPS L1)

**Additional equipment required on ground**

- Very Large Scale Demonstration

- Common Project Deployment

- 4D 4-dimensional navigation
- BTV Brake To Vacate
- FANS Future Air Navigation System Ground Based Augmentation Landing System
- ITP In Trail Procedure
- MC/MF Multi Constellation Multi Frequency
- SURF Surface - Indications and Alerts
- VSA Visual Separation Assistance
CONCLUSION

- CNS evolution is prompted by the need for ATM modernisation
- CNS strategic roadmaps must feature the lighthouse for CNS evolution
  - COM strategic roadmap not fully stable nor harmonized
- CNS evolution and ATM modernisation must overcome the transition issue
  - Need for leadership on infrastructure set-up (Mandates, EU “Common Projects”, …)
  - Need for new concepts with optimized benefits (Performance-Based concepts, Best Capable Best Served operational incentives, …)
Thank you