



# EASA

European Aviation Safety Agency

# Avionics Mandates and CS-ACNS Navigation

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**STC WORKSHOP**  
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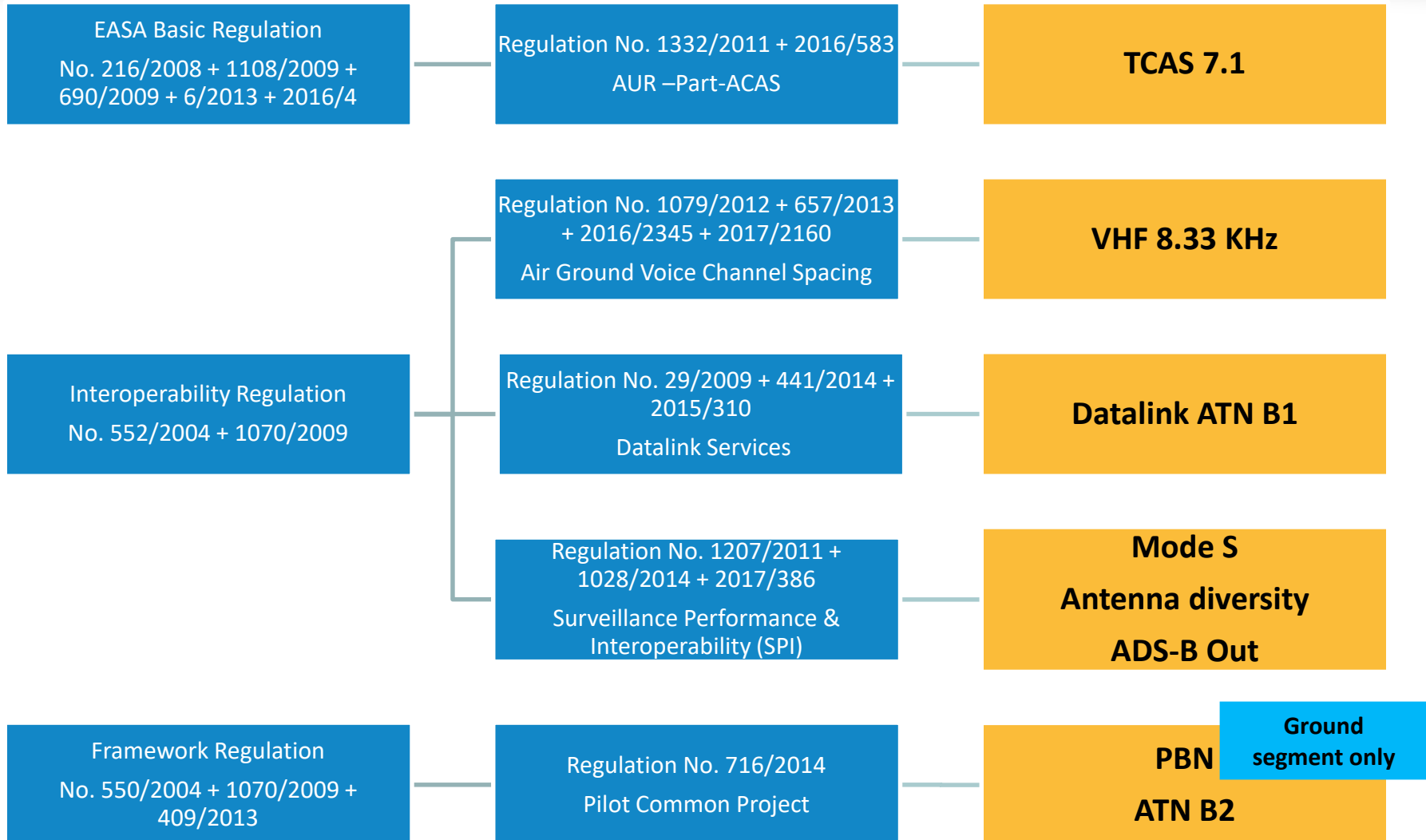


# Content

- Mandates:
  - Regulation
  - Applicability
  - Mapping with CS-ACNS
- CS-ACNS Navigation:
  - General
  - Assumptions
  - Structure
  - Summary




# Regulation






# Avionics Mandates: TCAS 7.1

AFFECTED PRODUCTS	CONDITION
<p>Turbine-Powered Aeroplanes</p> 	<ul style="list-style-type: none"><li>1) Aeroplanes with a maximum certified take-off mass exceeding 5 700 kg;</li><li>2) Aeroplanes authorised to carry more than 19 passengers.</li><li>3) Not applicable to unmanned aircraft</li><li>4) Not applicable to rotorcraft</li></ul>
DATE/DEADLINE	EXEMPTION
<p>1 December 2015</p>	<p>None</p>

TCAS 7.1



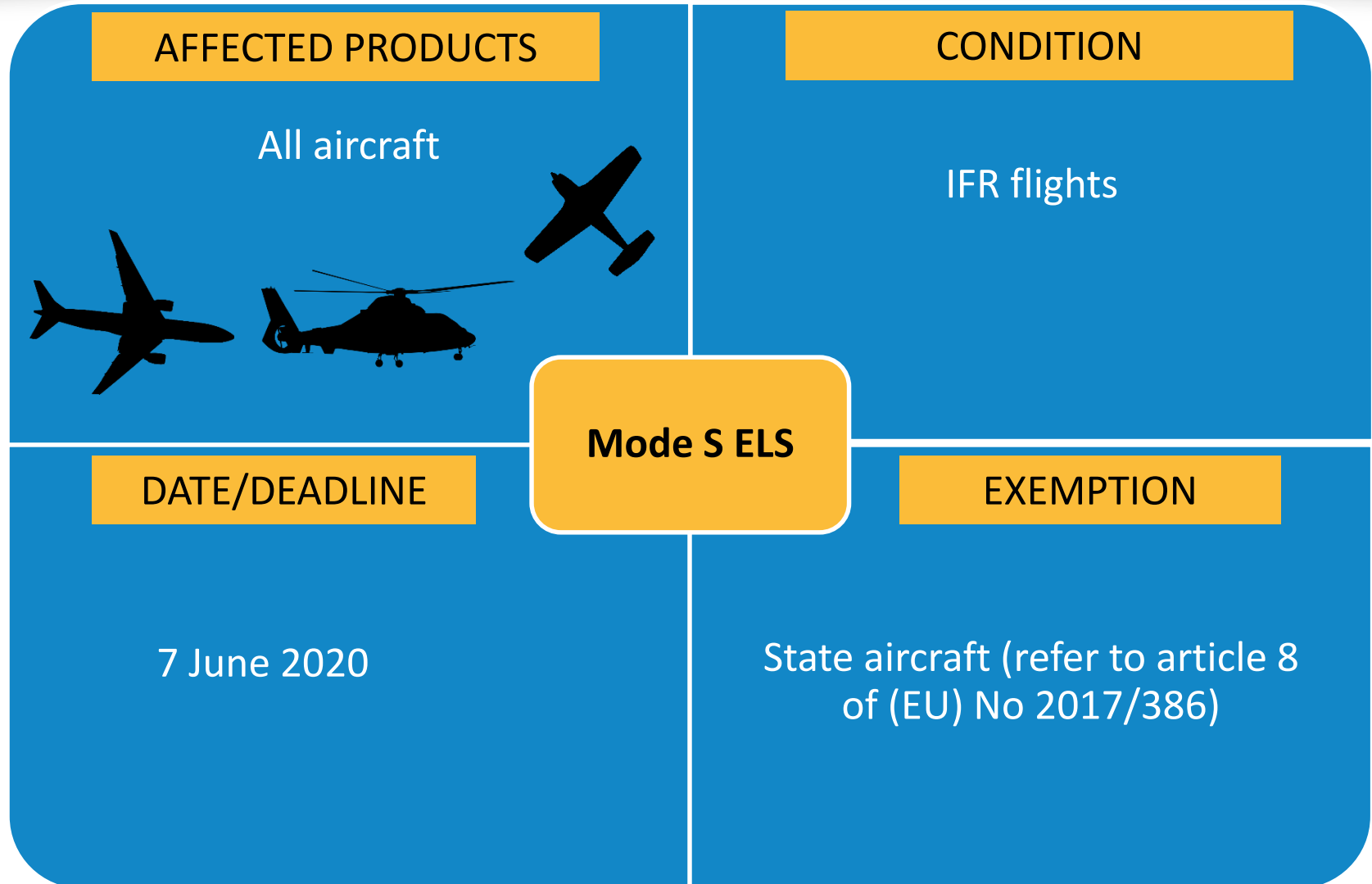
# Avionics Mandates: VHF 8.33 KHz

AFFECTED PRODUCTS	CONDITION
<p>All aircraft</p> 	<p>No Condition</p>
DATE/DEADLINE	EXEMPTION
<p>1 January 2018</p>	<p>State aircraft (refer to article 9 of (EU) No 1079/2012)</p> <p>Local exemptions from MS (refer to article 14 of (EU) No 1079/2012)</p>

**VHF 8.33 KHz**




# Avionics Mandates: Mode S ELS





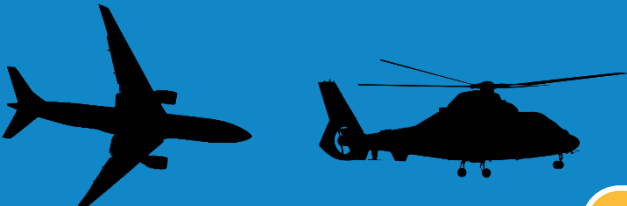
# Avionics Mandates: Mode S EHS

AFFECTED PRODUCTS	CONDITION
<p>Fixed wing aircraft</p> 	<p>IFR flights maximum certified take-off mass exceeding 5 700 kg or maximum cruising true airspeed capability greater than 250kts</p>
DATE/DEADLINE	EXEMPTION
<p>7 June 2020</p>	<p>State aircraft (refer to article 8 of (EU) No 2017/386) Possible for specific aircraft types with CofA prior to 7 June 2020 (refer to article 14 of (EU) No 2017/386)</p>

## Mode S EHS

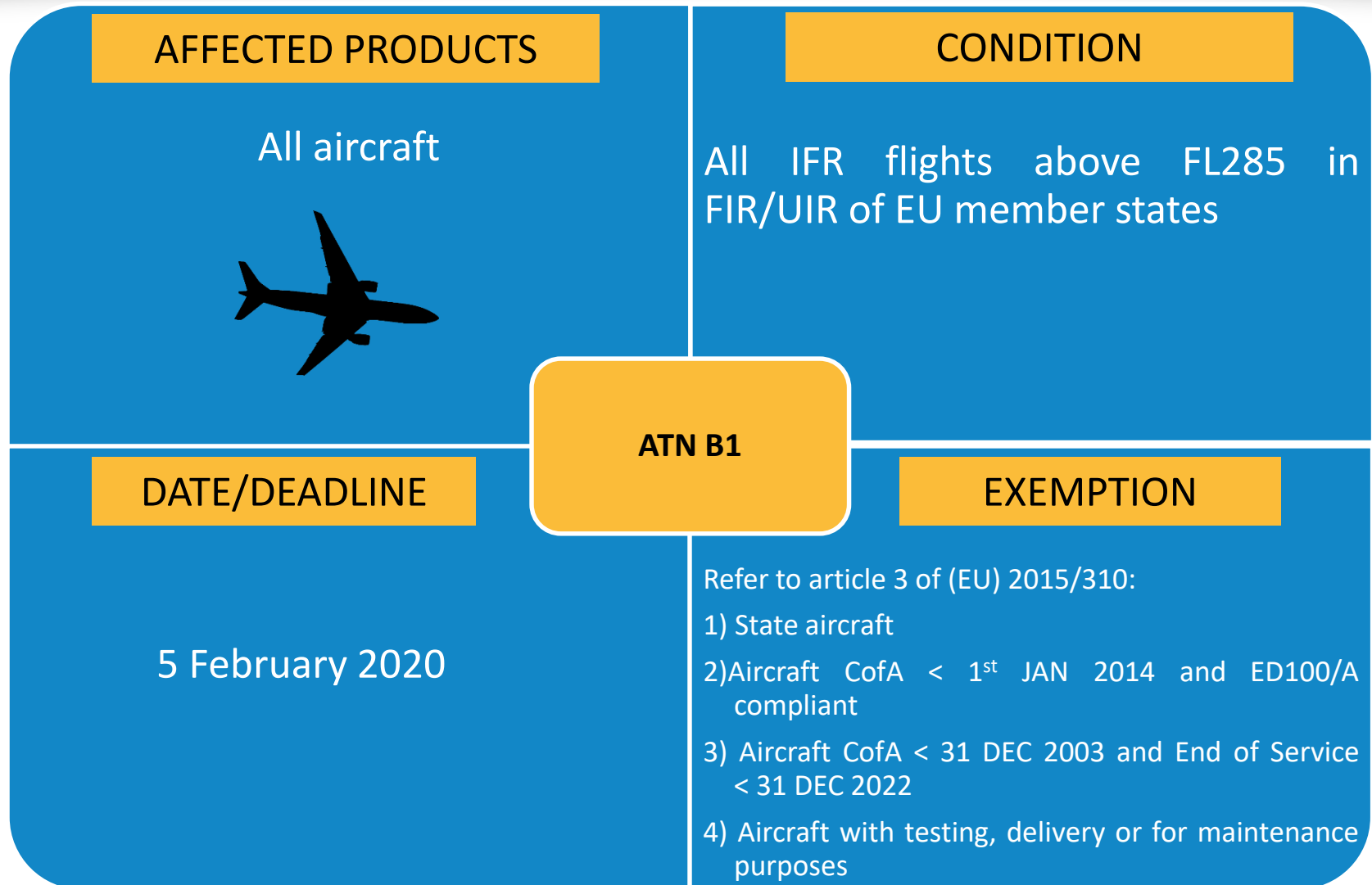


# Avionics Mandates: ADS-B Out

AFFECTED PRODUCTS	CONDITION
<p>All aircraft</p> 	<p>IFR flights</p> <p>maximum certified take-off mass exceeding 5 700 kg</p> <p>or</p> <p>maximum cruising true airspeed capability greater than 250kts</p>
DATE/DEADLINE	EXEMPTION
<p>7 June 2020</p>	<p><b>ADS-B Out</b> + <b>Antenna Diversity</b></p> <p>State aircraft (refer to article 8 of (EU) No 2017/386)</p> <p>Antenna diversity: Possible for specific aircraft types with CofA prior to 1 January 1990 (refer to article 14 of (EU) No 2017/386)</p>



# Avionics Mandates: Datalink ATN B1





# Mapping CS-ACNS / Mandates

CS ACNS	Mandates
<b>Subpart B COMMUNICATION (COM)</b>	
Section 1 – Voice Channel Spacing (VCS) →	VHF 8.33 kHz
Section 2 – Datalink Services →	ATN B1
<b>Subpart C NAVIGATION (NAV)</b> NPA in progress	Future PBN...
<b>Subpart D SURVEILLANCE (SURV)</b>	
Section 1 — Mode A/C only surveillance	
Section 2 — Mode S elementary surveillance →	Mode S ELS
Section 3 — Mode S Enhanced Surveillance →	Mode S EHS
Section 4 — 1090 MHz Extended Squitter ADS-B →	ADS-B out and antenna diversity
<b>Subpart E OTHERS</b>	
Section 1 – TAWS	
Section 2 – RVSM	



# CS-ACNS Navigation

## ➤ CS-ACNS Navigation:

- Contextual
- Assumptions
- Structure
- Summary



# CS-ACNS: context

- Subpart A: General
- Subpart B: Communications (COM)
- Subpart C: Navigation (NAV)
- Subpart D: Surveillance (SUR)
- Subpart E: Others (TAWS, RVSM)



**NPA 2018-02!**



# CS-ACNS Navigation: Context

## Foundation

- CS-ACNS is based on PBN Manual 4th Edition, AMC 20-XX, TGLs and AC 20-138D

## Commonality

- CS-ACNS maximises commonality with FAA AC20-138D, ED-75D/DO-236C, DO 283, DO-229d/e.
- ETSO-C115d is fully harmonised with TSO-C115d



# CS-ACNS Navigation: assumptions

Describe high level objectives in CS

- Recognition of the fact that safety and interoperability is assured through AMCs.
- Separate requirements (CS) from solutions (AMC)

CS & AMC only cover aircraft installation (Airworthiness)

- Recognition of the fact that OPS requirements are now covered in the AMCs to Part OPS.

RNAV vs. RNP: With GNSS installed, there is little difference at aircraft level

- Recognition of the fact that GNSS is standard fit on all modern aircraft.
- RNP qualification credited for RNAV.  
\*Exception: DME/DME based RNAV 1 (TBD)



# CS-ACNS Navigation:assumptions

AMCs written for organisations with less expertise

- Recognition of the fact that big organisations participate in writing MASPS\* & MOPS\*\* while others have difficulties to read and understand those documents.

Aircraft Architecture forms the baseline

- Recognition of the fact that regardless of the navigation specification, the function is performed by the same systems (FMS/Navigator, Displays, Autopilot, etc.)

ETSOs cover many aircraft level functions

- Recognition of the fact that many MASPS\* requirements (CS & AMC requirements) are also covered in the MOPS\*\* (i.e. required by ETSO).

\*MASPS: Minimum Aviation System Performance Standards

\*\*MOPS: Minimum Operational Performance Standards



# CS-ACNS Navigation: Structure

Two sections for lateral navigation  
PBN LNAV:  
Common requirements & also covers certification of RNAV 10, 5, 2 and 1

Separate sections with supplementary requirements for specific PBN applications and functions: Section 3 through 7 cover specific NAV applications

Section 8 through 10 cover specific functionalities (RF, FRT, PO)

	Basic requirements	Additional requirements							
	Section 1 and 2 PBN LNAV	Section 3 LNAV Approach	Section 4 Advisory VNAV	Section 5 VNAV/LPV	Section 6 RNP AR	Section 7 Adv RNP	Section 8 RF	Section 9 FRT	Section 10 Parallel offset
RNP 4	Required							Optional	Required
RNP 2	Required							Optional	Optional
RNP 1	Required		Optional				Optional		
RNP 0.3 (HEL)	Required		Optional				Optional		
RNP APCH	Required	Required	Optional	Required			Optional		
RNP AR APCH	Required	Required		Required	Required		Required		
Adv RNP	Required	Required	Optional	Required		Required	Required	Optional	Required



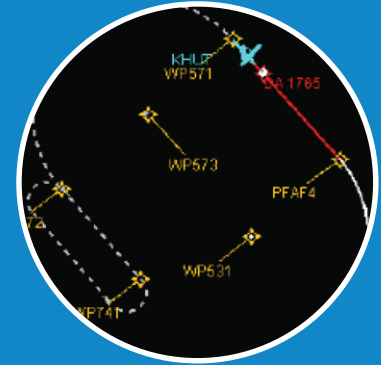
# CS-ACNS Navigation: Structure



An appendix has been added that provides guidance on installation and testing.



A second appendix provides rationalised requirements for installation of inertial systems – similar to 14 CFR Part 121, Appendix G

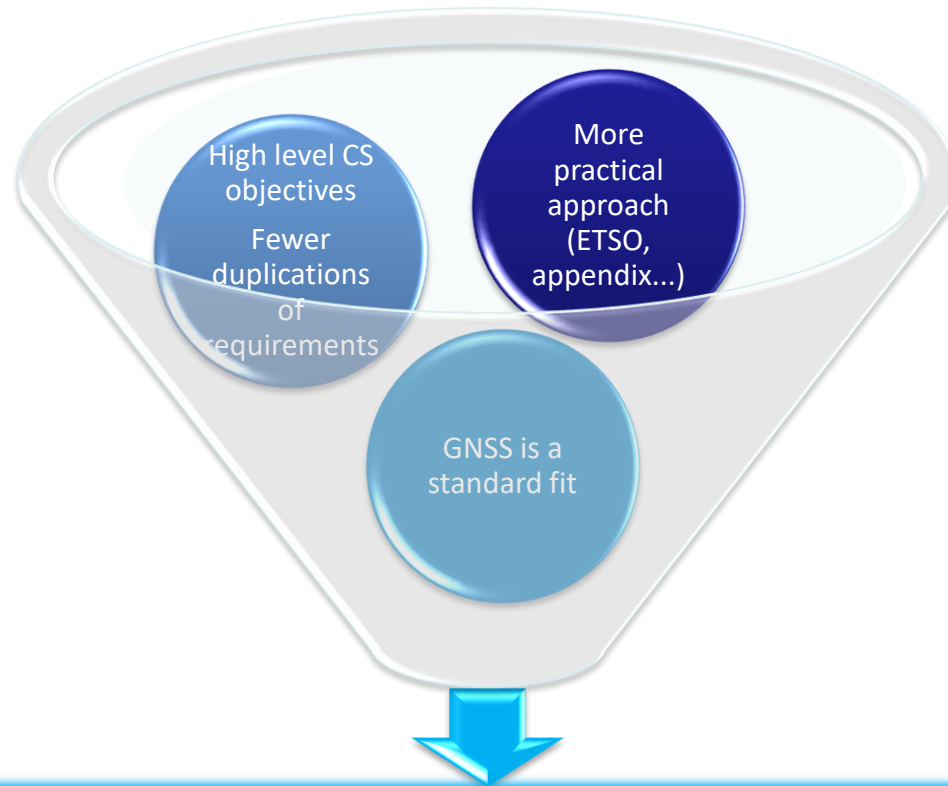


Example flight test patterns for RF leg capability demonstration have been included in an appendix. Similar to the test patterns of FAA AC 20-138D, but with revised instructions.

APPENDICES



# CS-ACNS Navigation: Summary



Aircraft certification for PBN made easier



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**Thank you.**

**Questions ?**

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# Key points of the Proposed amendment

- **No** change to the scope

- **No** change to 2020 equipage date

- Addition of transitional clause for retrofit and aircraft out of service not to equip with ADS-B and EHS

- Addition clause to permit other **case by case exemptions** to be considered

- Addition clause for Non equipage of ADS-B & EHS for of **maintenance, delivery or flight testing** (ELS must be installed)

- Clarification of **MEL** for ADS-B & EHS

- Transponder only to comply to Annex 10 to the Chicago Convention, Volume IV, Third Edition including all amendments up to **No 77**.

- Clarification of **continuity** requirements