



EASA
European Aviation Safety Agency

CS-ACNS: Navigation


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



- Overview:
 - Assumptions
 - Structure & Examples
 - Harmonisation & Publication



Assumptions



New concept: Assumption 1

~~To ensure that requirements are complied with, describe these in detail in the CS.~~

Describe high level objectives in CS.

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



New concept: Assumption 2

~~AMCs cover airworthiness and operations in a single document~~

CS & AMC only cover aircraft installation (Airworthiness).

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



New concept: Assumption 3

~~RNAV and RNP are distinctively different~~

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)



New concept: Assumption 4

~~ICAO Specifications form the baseline~~

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.)



New concept: Assumption 5

~~AMCs written for and with help from Airbus & Boeing~~

AMCs written for organisations with less expertise.

Recognition of the fact that Airbus & Boeing participate in writing MASPS & MOPS while others have difficulties to read and understand those documents.



New concept: Assumption 6

~~ETSOs are for equipment approval only.~~

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

In summary, CS-ACNS Navigation:

... has high level objectives at CS level

... recognises aircraft architecture

... recognises that GNSS is standard fit

... considers design organisation with less expertise

... recognises true value of ETSOA



This should result in:

- More practical approach towards certification of aircraft for PBN.
- Simplified procedures for the demonstration of compliance.

Aircraft certification for PBN made easier!



Structure & Examples



Structure:

A single section for lateral navigation.

Separate sections with supplementary requirements for specific PBN applications and functions.

Fewer duplications of requirements.



CS ACNS Navigation: Structure

Section 1 PBN Lateral Navigation: Common requirements
Section 1 also covers certification of RNAV 10, 5, 2 and 1
Section 2 through 6 cover specific NAV applications
Section 7 through 9 cover specific functionalities (RF, FRT)
Additional sections may be added when required (e.g. DME/DME)

	Basic criteria	Supplementary criteria							
PBN Specification	Subsections 1 & 2 LNAV	Subsection 3 LNAV in approach	Subsection 4 Advisory VNAV	Subsection 5 VNAV in final approach	Subsection 6 RNP AR	Subsection 7 Advanced-RNP	Subsection 8 RF	Subsection 9 FRT	Subsection 10 Parallel offset
RNP 4	Required							Optional	Required
RNP 2	Required							Optional	Optional
RNP 1	Required		Optional				Optional		
RNP 0.3	Required		Optional				Optional		
RNP APCH	Required	Required	Optional	Required			Optional		
RNP AR	Required	Required		Required	Required		Required		
A-RNP	Required	Required	Optional	Required		Required	Required	Required	Required



Objective based CS- Examples

...The area navigation system continuously displays, in each pilot's optimum field of view, the computed desired path and the deviation from that path.

...The continuity of vertical guidance provided by the area navigation system is commensurate with the intended operation.

...The area navigation system has the capability to intercept the final approach before the Final Approach Fix.



Credit for ETSO - Examples

... ETSO-C115d and ETSO-C146c are acceptable means of compliance

... Equipment holding an EASA authorisation against ETSO-C115d supports the CS criteria; however the applicant should ensure the flight deck interface comply with the CS.

... ETSO-C115d is an acceptable means of compliance.

... This alerting criterion is satisfied by equipment holding an EASA authorisation against ETSO-C115d but does not account for processing delays caused by the aircraft flight deck alerting system. The applicant should take this into consideration.



New in CS-ACNS Navigation



New in CS-ACNS Navigation:

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

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



New in CS-ACNS Navigation:

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.



Harmonisation & Publication



Harmonisation:

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

CS-ACNS maximises commonality with FAA AC20-138D, ED-75D/DO-236C, DO 283, DO-229d.

ETSO-C115d, C-145e, C-146e, C196a fully harmonised with FAA TSOs.



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Any questions?
Thank you for your attention

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