



EASA
European Aviation Safety Agency

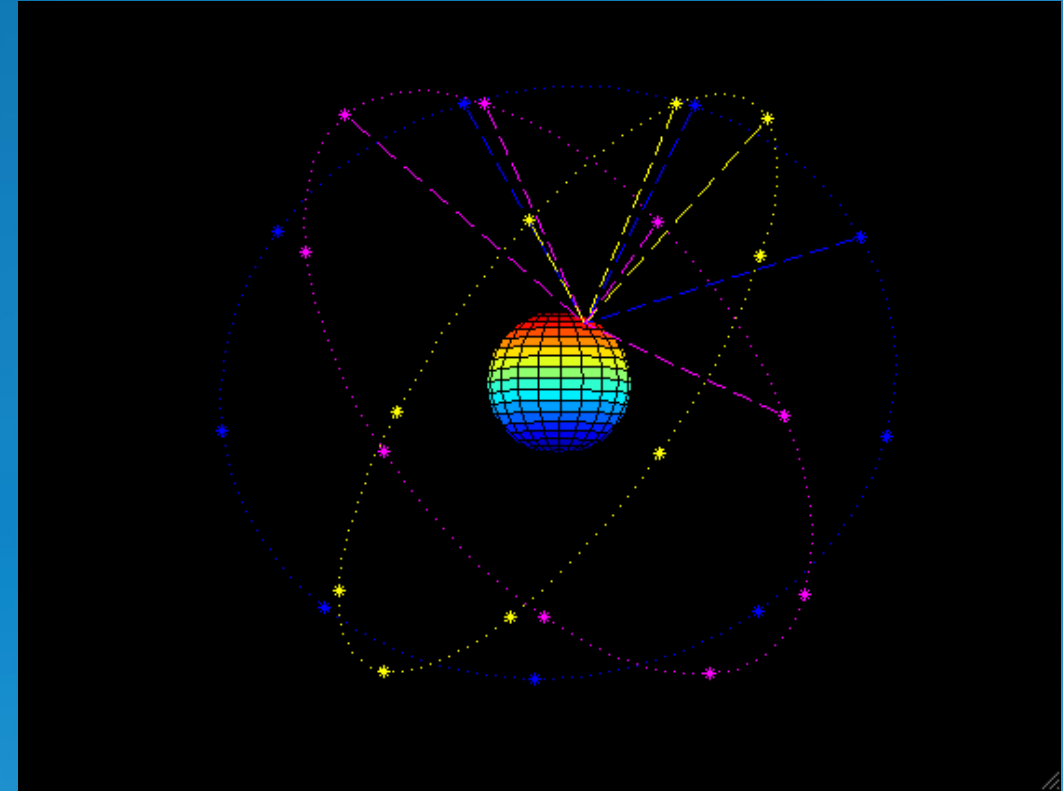
ETSO workshop 2018

ETSO standards for GNSS boards

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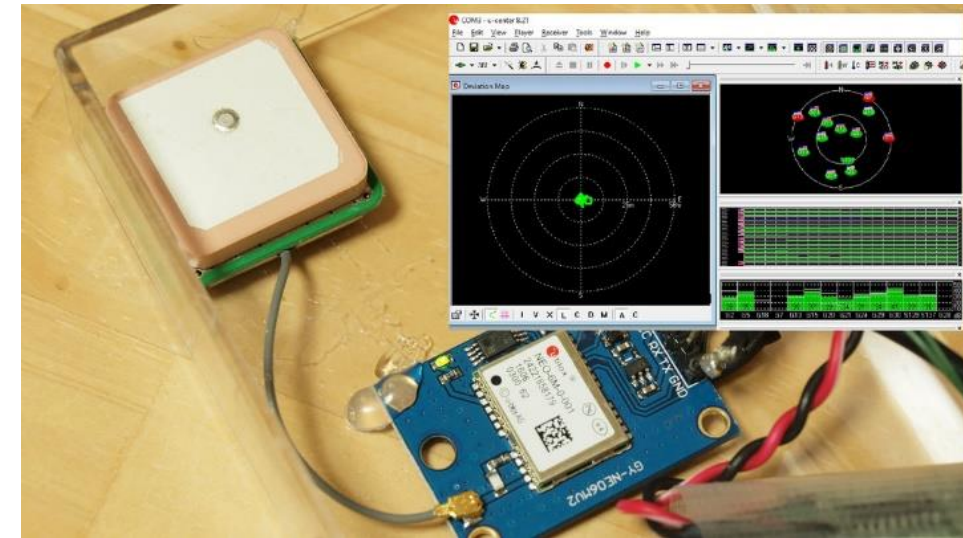
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Agenda

- Background
 - FAA TSO standards C204a, C205a, C206
 - Link with (E)TSO-C145e, C146e, C196b
- EASA transposition– technical challenges
 - Taking profit from IMA experience with multiple stakeholders
- Way forward & EASA ETSO standards





Background – TSO on GNSS boards

- FAA TSO standards TSO-C204a, TSO-C205a, TSO-C206
 - FAA has published TSO standards enabling possibility of TSO authorization of GNSS boards
 - independently from TSO authorization of the integrated equipment TSO-C145e, TSO-C146e, TSO-C196b
- The purpose is for end-use equipment manufacturers to streamline their TSO-C145e/-C146e/-C196b application for the sensor board by using the TSO authorized Circuit Card Assembly (CCA) for partial certification credit.



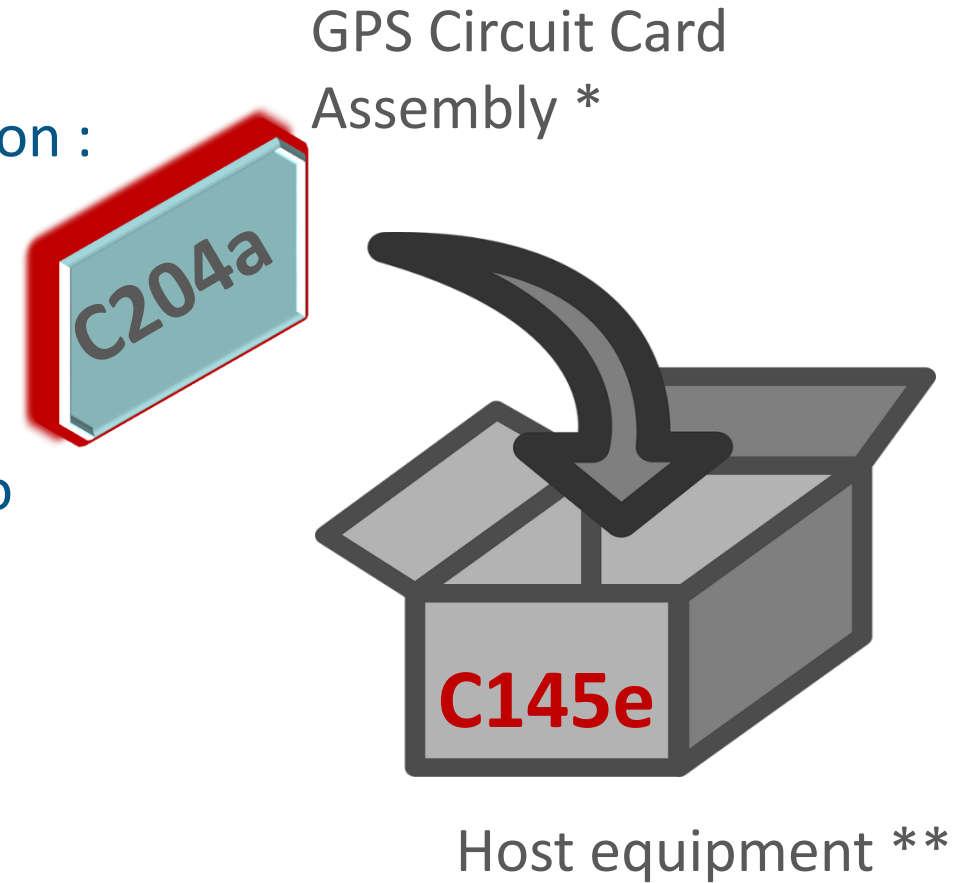
Background – TSO on GNSS boards

- FAA TSO-C204a, TSO-C205a, TSO-C206 require the same functional requirements than their host equipment
 - TSO-C204a – DO-229E class Beta,
 - TSO-C205a – DO-229E class Delta
 - TSO-C206 – DO-316
- FAA TSO standards do not demand that the boards can withstand conditions that correspond to an aviation environment
- Environmental tests are to be performed by TSO applicant for host equipment



Background – TSO on GNSS boards

- ▶ Link with (E)TSO-C145e, -C146e, -C196b
 - ▶ TSOA is given to CCAs with a limitation on installation :
 - ▶ *C204*-authorized CCA to be installed only into TSO-C145e** article*
- ▶ Applicant using the C204a/C205a/C206 CCA need to comply to their respective FAA TSOA-C145e/C146e/C196b
 - ▶ → Run the verification of the GPS functionality during environmental tests and demonstrate compliance to MOPS (DO-229E/DO-316)



(*) respectively C204a, C205a, C206; (**) respectively C145e, C146e, C196b



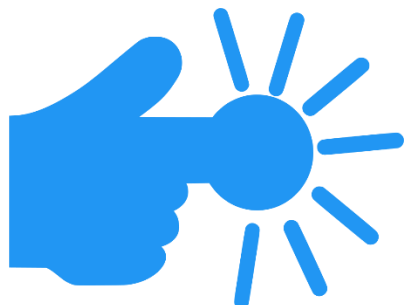
EASA transposition – technical challenges



- EASA agrees to provide a solution for EU applicant to
 - have independent GPS CCA authorization
 - streamline their ETSO-C145/-C146/-C196 application



- EASA agrees with FAA MOPS and transpose, but covering the technical challenges identified through EASA assessment.



and taking profit from IMA experience with multiple stakeholders



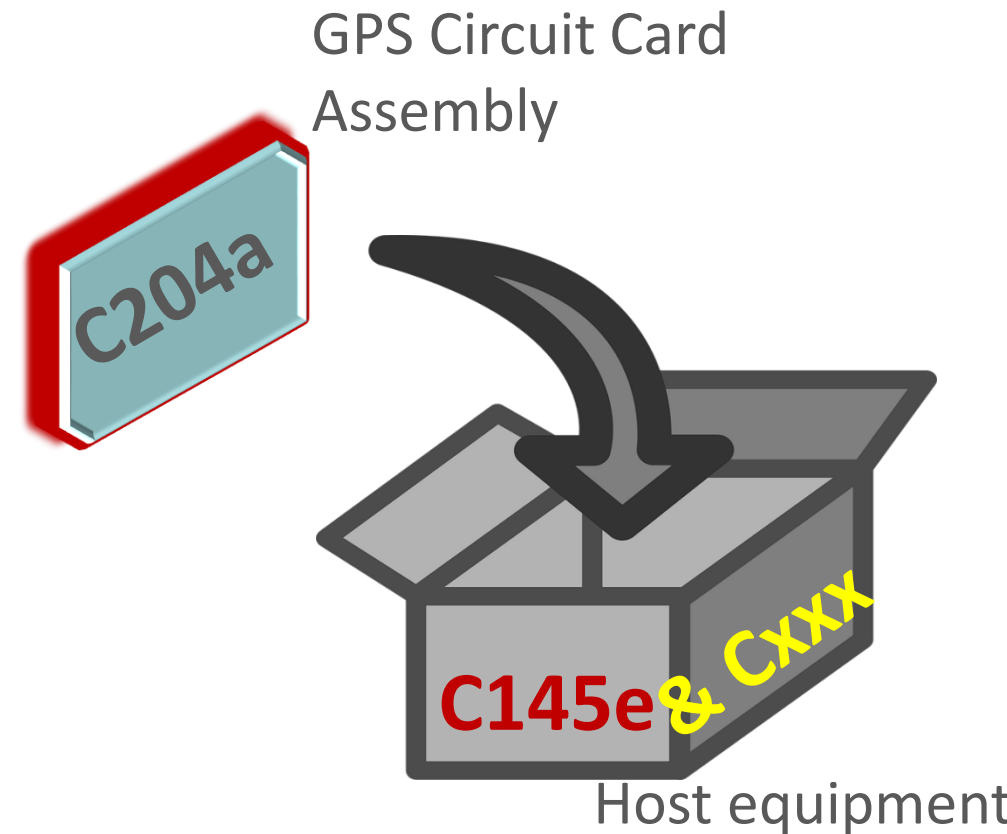
EASA transposition – technical challenges

- ETSOA is meant to be given to CCA aiming for aviation environment
 - datasheet of sustained environment

And often...

- Host equipment core function is another Cxxx
- Interest is for applicant of host equipm't that hasn't particular knowhow to design GPS CCA
 - In such case verification without support is not realistic/sufficiently reliable

→ Taking profit from IMA experience with multiple stakeholders





Way forward & EASA ETSO standards on GNSS boards

ETSO-2C204a article

- Meets MOPS DO-229E class Beta
- Perform minimum set of qualification Tests over environment
- Prepare Verification package for User

ETSO-C145e article

- Meets MOPS DO-229E class Beta
- Integration Tests (functional) using Verification package
- Meets DO-160
- Test of the GPS function using Verification package

► *Similar approach is foreseen for ETSO-2C205a & ETSO-C146e, and ETSO-2C206 & ETSO-C196b*

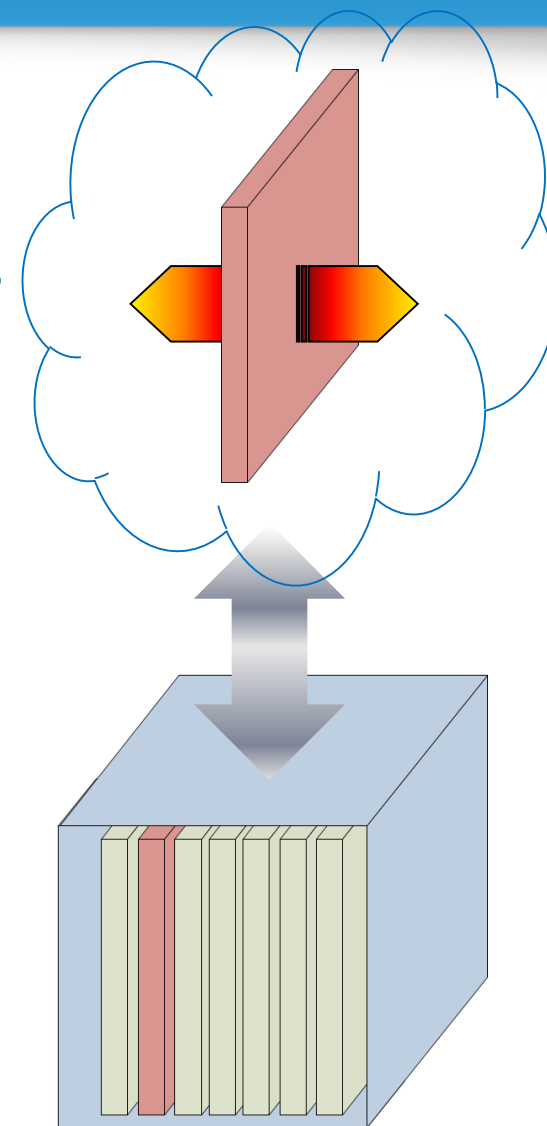


Way forward & EASA ETSO standards on GNSS boards

- This slide intends to provide more information on :
“Perform minimum set of qualification Tests over environment for GPS CCAs

- Anticipate a minimum set of environmental conditions
- Partial Qualification required
- Environmental usage domain characterized (data sheet...)

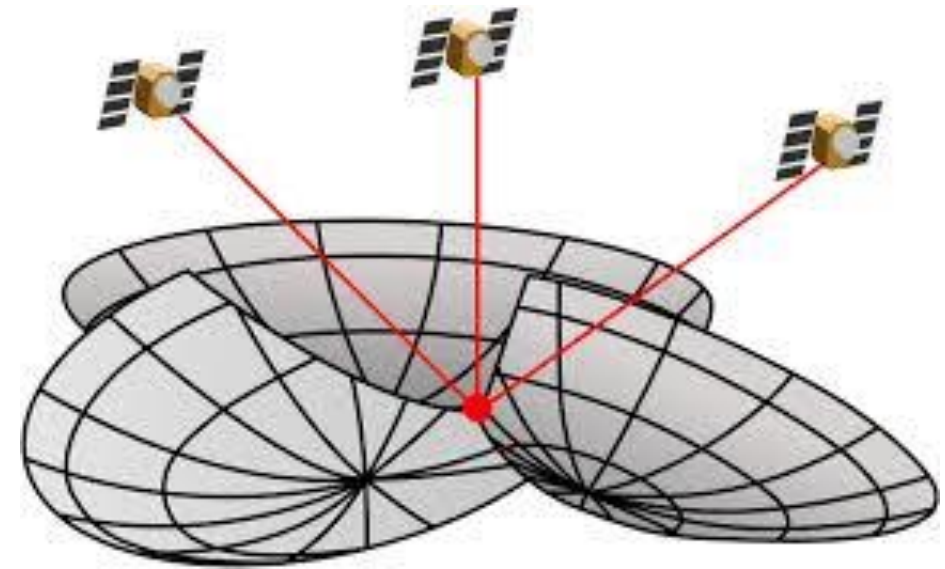
Note : Tests in integrated equipment with complete qualification data also accepted





Way forward & EASA ETSO standards on GNSS boards

- This leads to New Proposed Amendment drafts on
 - ETSO-2C204a & ETSO-C145eA1
 - ETSO-2C205a & ETSO-C146eA1
 - ETSO-2C206 & ETSO-C196b
- Material to be published for public comments in upcoming NPA
- EASA is currently exchanging with FAA on the technical differences





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Thank you for your attention!

Any questions?

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