

**RTCA SC-186, Working Group 3
EUROCAE WG-51, SG-1
RTCA, Washington, DC**

**Latency Requirements and Proposed MOPS Changes
In Response to Action Item 25-09**

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Introduction

- As a result of discussion from last meeting, agreement was reached to reflect 100 millisecond tolerance for position timing accuracy from the current 200 millisecond tolerance to improve total latency for T=0 case.
- Additionally, Action Item 25-09 requested that a review of the T=1 requirements take place after observation that current requirements state time of applicability to an exact 0.2 second UTC epoch.
- The results of this review and the recommendation for the treatment of T=1 and T=0 in the Requirements and Test Procedures follows.

T=1 and T=0

- Requirements are currently divided according to
 - Integrity Classification
 - Precision
 - Non-Precision
 - Position Update Method
 - Extrapolation
 - Estimation - tracking or filtering of incoming data

Airborne Latitude Sections

- 2.2.3.2.3.7.2** **Airborne Latitude Position Extrapolation/Estimation (Precision Case, TYPE Codes 9, 10, 20 and 21)**
 - 2.2.3.2.3.7.2.1** **GPS/GNSS Time Mark Coupled Case (Extrapolation, "TIME" (T) = "1")**
 - 2.2.3.2.3.7.2.2** **Non-Coupled Case (Estimation, "TIME" (T) = "0")**

- 2.2.3.2.3.7.3** **Airborne Latitude Position Extrapolation/Estimation (non - precision)**
 - 2.2.3.2.3.7.3.1** **Airborne Latitude Position Extrapolation Case (non - precision)**
 - 2.2.3.2.3.7.3.2** **Airborne Latitude Position Estimation Case (non - precision)**

✓ Non-precision allows T=0 only

Proposed changes (1)

- Decouple $T=1$ and $T=0$ from precision or non-precision TYPE codes
 - Recall that position accuracy is decoupled from timing accuracy as per STP Ad-hoc
- Reorganize information on state estimation
 - Performance of the system should not depend on whether or not there is a tracker
- Reflect 100 millisecond timing tolerance for the $T=0$ case
- Incorporate timing tolerance for $T=1$ case
- Reflect changes in the test procedures

Proposed changes (2)

- For $T=1$, the position **shall** be applicable at the appropriate 0.2 UTC Epoch to within +/-15 milliseconds
 - Test procedures involve constant velocity and the tolerance at the measurement points will reflect 15 milliseconds at that velocity
- For $T=0$, the position **shall** be within +/- 100 milliseconds of the time of transmission
 - Precisely, $|T_D - (T_C + \Delta T_{C \rightarrow D})| < 100$
 - Test procedures involve constant velocity and the tolerance at the measurement points will reflect 100 milliseconds at that velocity

Proposed changes (3)

- Requirements are consolidated by combining precision/non-precision sections
- The requirements and test procedures are performance based
- If a tracker or estimator is implemented, it still must meet the performance
 - Notes should be added to the appropriate sections regarding implementing estimation techniques

Proposed Consolidated Airborne Latitude Sections

**2.2.3.2.3.7.2 Airborne Latitude Position Extrapolation/Estimation, GPS/GNSS Time
Mark Coupled Case (“TIME” (T) = “1”)**

**2.2.3.2.3.7.3 Airborne Latitude Position Extrapolation/Estimation, Non-Coupled Case
 (“TIME” (T) = “0”)**