



WORKING GROUP MEETING MINUTES MEETING OF SPECIAL COMMITTEE 231

TAWS

Date: 8 December 2015 to 10 December 2015

Time: 0930 EST to 1700 EST

Place: RTCA Office, Washington DC

Co-Chairmen: Yasuo Ishihara Rick Ridenour

Designated Federal Official: Charisse Green

Attendees:

Name	Company/Agency
Becerikli, Eylem	STM A.S.
Fleury, Stephane	Thales
Green, Charisse	FAA
Hall, Michael	MITRE
Ishihara, Yasuo	Honeywell
Johnson, Steve	Honeywell
*Kapitov, Vasily %	IANS
*Kirtz, Jon	Rockwell Collins
Le Cann, Alexandre	Airbus
*McKeon, Sean	Universal Avionics
Moses, Hal	RTCA
Reynolds, Zach	ACSS
Ridenour, Rick	ACSS
Rossi, Angelo %	MITRE
*Sadilov, Seva %	IANS
Tubb, Nicholas	Boeing
Vafiades, Monica	U.S. Air Force
*Zapoluch, Steve	Garmin
*-attended by phone	
%Wednesday/Thursday only	&Tuesday/Wednesday partial day only



December 8:

A review of action items has taken place and is attached as Exhibit 1. As part of these actions, we discussed the NTSB data for the three cases of Birmingham, Cali and Tallahassee. For the Tallahassee case in particular, no lat/long data is available. We therefore will take no further action to enter this case into the eventual test case set. The Birmingham case is considered sufficient to meet the intent of including a real world PDA case.

A further action is needed for the Cali case, as we have not yet determined if the NTSB data is correctly showing the turning maneuver which took place during this crash.

Action (Y. Ishihara / 21 January) – Convert Cali Lat/Long data from FMS to confirm if this data is usable for a turn test case.

We noted that new information was arriving for Modes 1 and 2. Charisse presented the new Mode 1 Caution and Warning curves, showing a higher maximum level but with the same minimum level. Similarly, Charisse presented the Mode 2A and 2B envelope levels showing a higher maximum level but with the same minimum level. With this new information, an action took place:

Action (Y. Ishihara / 21 January) – Mode 1, Mode 2A/2B graphics to be re-generated based on new user input received 4Q 2015.

For action items 41 and 42, new Strawman sections were presented as separate sections of (a) Altitude Callout and (b) Class A/B/C and concepts approved within the meeting. The Strawman will later reflect these, while being careful to keep the concept of Bank Angles as a separate topic in the eventual strawman (this section was in the Altitude Callout).

A review of the set of 460 Strawman comments then constituted the remainder of the 3 days of reviews, using Exhibit 2, Comment Matrix, to accumulate responses while viewing Exhibit 7, TSO Strawman. The committee worked through comment 278. The Strawman was not changed during these meetings to preserve line numbers and original text, but rather column K of the Comment Matrix showed the resolution.

December 9:

Specific treatments of the following sections were covered, resulting from the Strawman comment set:

- Self Test and Failure indication - proposed by Jon Kirtz (Exhibit 3) – Accepted
- Manual Inhibition - proposed by Zach Reynolds (Exhibit 4) – Accepted
- Phase of Flight – proposed by Rick Ridenour. This set was not approved and will remain an open action item (Action #30)



- Must Alert / May Alert / Must Not Alert introduction – proposed by Stephane Fleury (Exhibit 5) – Accepted

In the first paragraphs of Section 2 of the Strawman, several paragraphs shown below describe general installation or box design criteria as “shall” requirements. These appear to add little value, create tracing difficulties. Ultimately, these are covered in other documents such as 14 CFR 25.1301, where the TAWS will meet the intended function.

These sections first appeared due to making use of a standard RTCA template. After consulting with Hal Moses, we have been informed that omission of these sections would be acceptable. That is, no objections have been raised over other DO documents which are not making use of these general statements.

2.1.1	Airworthiness.....	17
2.1.2	Intended Function.....	17
2.1.3	Federal Communications Commission Rules.....	17
2.1.4	Fire Protection.....	17
2.1.5	Operation of Controls.....	17
2.1.6	Accessibility of Controls.....	17
2.1.7	Effects of Test.....	17
2.1.8	Display of Navigation Facility Identification.....	17
2.1.9	Design Assurance.....	17

For section 2.1.5 and 2.1.6, we will keep the concepts in place for possible use in the Section 3, Manufacturer Considerations. All other sections appear to be met in other documents and are therefore deleted from the Strawman.

A discussion took place over the manner in which generic FLTA requirements are described in section 2.2.1.1.5.2.1. Steve Johnson took the action on this.

Action (S. Johnson / 21 January) – provide a generic statement or insertion of the test case reference (the basis for these requirements) into this section. The requirement set do not apply globally (infinitely high terrain would not allow the ITI case to pass, as one example) and yet the current wording makes the global application appear to be true.

Action taken to provide slight adjustment to the must not alert cases found in section 2.2.1.1.5.2.1, (for example: “Predicted height loss based on vertical speed continuation for 20 seconds”). Stephane indicated that the 20 second allowance is not sufficient for a sampling interval performed as part of this test. An additional fraction of a second allowance is needed to account for this.

Action (S. Fleury / 21 January) – Action to provide the additional fractional amount needed for the must not alert region of the FLTA alert cases. The example phrase is “Predicted height loss based on vertical speed continuation for 20 seconds”.



Action (S. Fleury / 21 January) – Provide treatment of Alert Criteria section (Enroute, Terminal, Final) of section 2.2.1.1.5.2.1. Also rows 1021-1053. This addresses a concern that the current outline view does not lend itself to parsing by DOORS or other requirement management tools.

December 10:

An introduction to the FLTA section which included ROC and RTC descriptions and the conversion of bulletized/outline indented information has been converted to body text. This is found as Exhibit 6.

A clarification of previous PDA data submittal has been made to address the below past action. In doing so, it is now apparent that the PDA limits provided represents correctly the 1.25 second time filter and not the larger (once 3.25 second) time. Therefore, the PDA curve can now be shared for discussion as to what is applied in the Strawman.

31	September SC-231 WG	9/24/2015	Provide PDA alert curve based on latency time of 1.25 seconds, assuming vertical speeds between 500 feet per minute and 2000 feet per minute.
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We looked at the existing levels and recalled the NTSB statement which recommends *“improvements to the TAWS requirements when an airplane is configured for landing and near the airport, including when the airplane is descending at a high rate and there is rising terrain near the airport.”*



Consolidated PDA Data



There was discussion over whether this PDA entry into the Strawman is the time to address the above NTSB recommendation. The NTSB requires *an improvement in requirement* and with the original TSO not dictating a required alert until 2.0 Nm (and even then no requirement), there is already an improvement in requirements. The Birmingham case made use of a previous PDA curve which would not meet even the above proposed envelope. So, an improvement has been made in going to the above PDA curve.

In fact, other considerations come to mind. Points were made that the NTSB did not dictate that the PDA needed to solve this problem; it could be a different alert. Another consideration is that the PDA today only issues a caution, where a pull-up maneuver is normally prompted by a warning alert which also seems to steer the solution away from today's PDA. Finally, the construction of the disarming zone near the runway is not specified but may also be within the solution space. The committee suggestion is that the existing supplier provided PDA curve could be inserted as is today and with remaining weeks of discussion to be used to further address the NTSB concern.

The last point on the graph has a singularity occurring at 15 Nm. We could eliminate this raised point and have the 15 Nm must alert minimum level set to 380 feet, the same as the 14.75 Nm point for reasonability. This was done.

The topic then moved to determination of a must not alert, where an aircraft clearly on a 3 degree approach would be assured to not receive a nuisance PDA. One thrust is to place the must not alert to the "should" limits already found in the heritage TSO:



- Above 300 feet within 2 Nm
- Above 800 feet within 5 Nm
- Above 1000 feet at 10-15 Nm

We are aware that the step down representation of the bullets above intersect a standard 3 degree approach, where everyday approaches would have nuisance PDAs. On that basis, it would seem reasonable to reduce the must not alert PDA region, perhaps interpolating these points, while still including the above points. However, not all current suppliers have been represented and therefore some suppliers may be providing PDA alerts but with some disarming logic at the interpolated lower must not alert points while still meeting the bullet points.

Then, the last point is that the step down must not alert is not very representative of what suppliers would design to because the must not alert would cause everyday alerts. The PDA never had a must alert region to begin with. With the thought that the *must not* alert line does not protect from a bad design, the committee decided that the best path was to eliminate the must not alert curve entirely.

Lower limits of the Mode 1 and Mode 5 curves were discussed, where some Airbus aircraft under some specific location/approaches are put into a steep approach mode which raises the lower limit to 130 feet. We intend to include this in the base curve.

Action (R. Ridenour / 21 January) – incorporate column K comments from the December meeting.

The latest Strawman, incorporating some column K comments from November will be posted on the RTCA site. We will still use the October 2015 Strawman for comparison to the comment set. If any others are able to convert the column K comments between now and 21 January, please notify Rick.

NEXT STEPS

The next telecon is planned for 21 January 2016 at 10:00 AM EST.

The next plenary/working group meeting is scheduled for 9-11 February 2016 in Phoenix at 9:00 AM MST. Nominally, we will adjourn at 5:00 PM MST on Thursday, 11 February. We are inquiring as to whether a fourth day can be added for Friday, 12 February. This will be resolved targeting end of December or at least by the January 21 telecon.

The following meeting is then proposed for 12-14 (potentially going to the 15th) April 2016 at RTCA in Washington.