

**RTCA Special Committee 209**

**Working Group #1**

**Mode S Transponder MOPS Development/Maintenance**

**Meeting #3**

**RTCA, Washington DC**

**Proposed Changes to Section 2.1.5 of DO-181D in light of recent NTSB recommendations.**

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**SUMMARY**

This Working Paper proposes to add additional wording to Section 2.1.5, Operation of Controls, of RTCA/DO-181D, in light of recent NTSB recommendations following a mid-air collision in Brazil last year. The recommendations deal with the need for higher-level (more conspicuous) aural and visual annunciation when a transponder or transponder/collision avoidance system is disabled, thus compromising collision protection. It is believed that the transponder on one of the aircraft involved in the accident may have been inadvertently placed in the “standby” mode. Although the FAA sees this as mainly an installation issue, there is also opportunity for transponder (and transponder control panel) manufacturers to improve controls so that they are more tolerant of human error.

## 1.0 Introduction

This working paper proposes changes to § 2.1.5, Operation of Controls, in light of recent NTSB recommendations following a mid-air collision in Brazil last year. The intent is to place more emphasis on human factor considerations when selecting types and methods of operation of switches in the equipment manufacturers' design that is seeking TSO approval. This paper builds on the work already presented in Working Paper WG49N11-13 during the joint plenary session in Brussels the week of August 22, 2007. However, it is the opinion of this author that part of what was proposed in Working Paper WG49N11-13 is, in reality, out of the control of transponder manufacturer, and is more applicable to the applicant seeking installation approval. Although there is no direct requirement in the NTSB recommendations to affect the text in the RTCA DO-181D revision, the wording in § 2.1.5, Operation of Controls, could be enhanced to make equipment manufacturers that will use this MOPS more cognizant of control designs that could potentially lead to inadvertent pilot/flight crew error.

Proposed changes to § 2.1.5, are shown in "blue";

### 2.1.5 Operation of Controls

The operation of controls intended for use during flight, in all possible combinations and sequences, **shall not** result in a condition detrimental to the continued performance of the equipment (see §2.1.2). The operation of controls, intended for use during flight, should be designed and evaluated to ensure they are logical and tolerant to human error. In particular, where transponder functions are integrated with other system controls, the equipment manufacturer (transponder and controls) should ensure that unintentional transponder mode switching (i.e. 'ON' to 'STANDBY' or 'OFF') is minimized. In some cases this may have to be done in cooperation with the aircraft manufacturer, or the after-market aircraft modifier/installer. Operational status of the transponder should be readily available to the operator.

Typically 'Line Select' Keys, 'Touch Screen' or 'Cursor Controlled/Tracker-ball' methods used to change transponder modes should be carefully designed to minimize crew error. Depending on the installation evaluation, a means to alert the flight crew to a transponder mode change may be required.

### 2.1.6 Accessibility of Controls...(No Change proposed)

### 2.1.7 Flight Crew Control Functions...(No Change proposed)