

RTCA Special Committee 209
ATCRBS / Mode S Transponder MOPS Maintenance
Meeting #11

RTCA, Washington DC
8-10 September 2010

**Clarification for Regular Use of Non-Selective Lockout to Block
Mistaken Replies to ATCRBS Only All-Call**

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SUMMARY

This Working Paper is in response to Action Item 10-08.

It may not be clear that the transponder should interpret multisite lockout in an interrogation where $DI = 1, 7$ and non-selective lockout in the same interrogation where $PC = 1$, and set the T_D and appropriate T_L timers accordingly from that single interrogation.

This function is useful as a means of providing transponder lockout to ATCRBS/Mode S All-Call in a netted interrogator configuration using multisite lockout for network coordination. This can curtail nuisance replies to ATCRBS-Only All-Call interrogations that seem to be the result of misinterpretation of a garbled narrow P4 pulse.

The committee may also consider adding interpretation of $PC = 0, 1$ in an interrogation where $DI = 3$ to support SI lockout and non-selective lockout in a single interrogation.

1.0 Introduction

It may not be clear that the transponder should interpret multisite lockout in an interrogation where $DI = 1, 7$ and non-selective lockout in the same interrogation where $PC = 1$, and set both the T_D and appropriate T_L timers accordingly from that single interrogation.

This function is useful as a means of providing transponder lockout to ATCRBS/Mode S All-Call in a netted interrogator configuration using multisite lockout for network coordination. This can curtail nuisance replies to ATCRBS-Only All-Call interrogations that seem to be the result of misinterpretation of a garbled narrow P4 pulse. This proposed clarification option is instead of another option that would change the processing of ATCRBS interrogations with a P4 pulse (narrow or wide) so that the transponder will not reply to these interrogations.

The committee may also consider adding interpretation of $PC = 0, 1$ in an interrogation where $DI = 3$ to support SI lockout and non-selective lockout in a single interrogation.

2.0 Proposed Changes to DO-181D

Changes for the following figure and paragraphs in DO-181D show existing material in black and proposed material highlighted.

In DO-181D paragraph §2.2.14.4.28, please make the following change from:

“The PC field **shall** be ignored for the processing of surveillance or Comm-A interrogations containing $DI=3$ (see §2.2.19.2.1.1).”

To:

“The PC field **values 2 through 7 shall be ignored and the values 0 and 1 shall be processed** for the processing of surveillance or Comm-A interrogations containing $DI=3$ (see §2.2.19.2.1.1).”

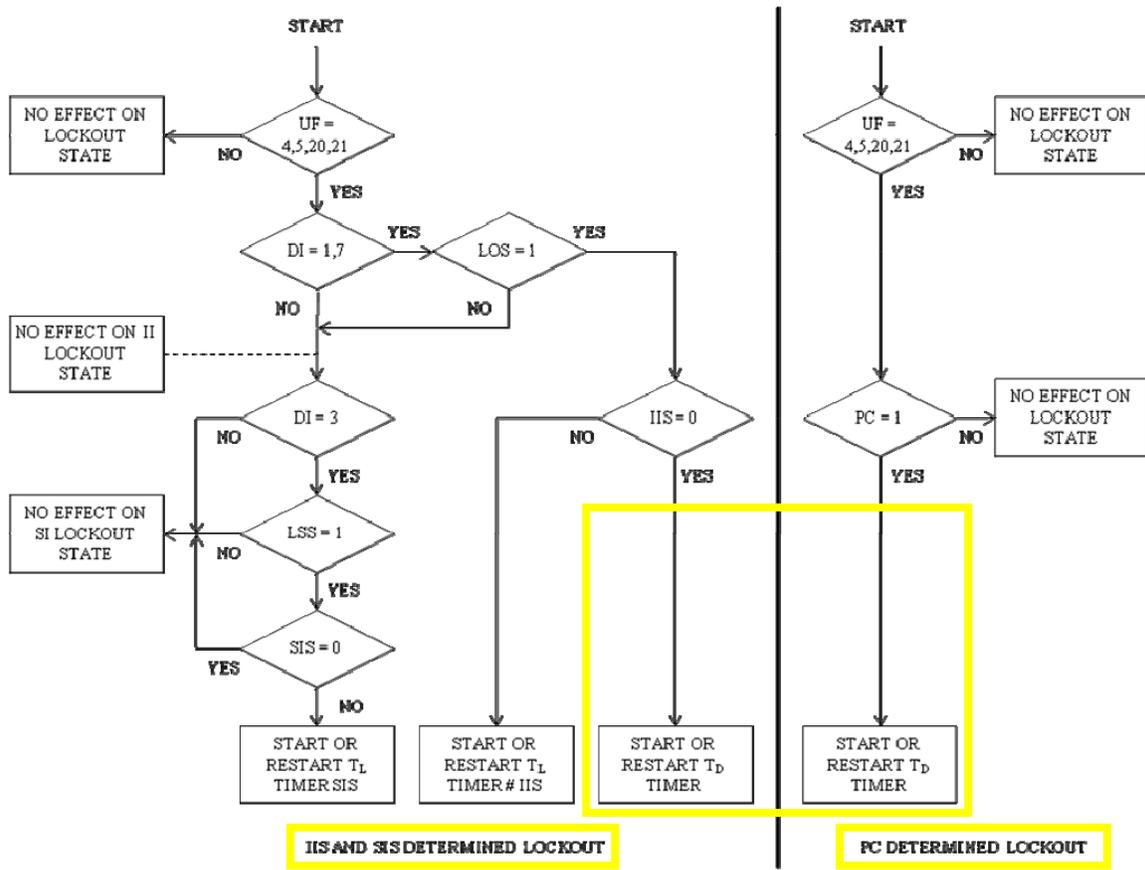
In DO-181D paragraph §2.2.18.2.4, please add the following note:

Note: *Non-selective All-Call lockout and multisite lockout are not mutually exclusive. Interrogators using multisite lockout protocols for interrogator networking coordination may simultaneously use non-selective lockout. The non-selective lockout use may be to prevent Mode S transponder replies to ATCRBS-Only All-Call interrogations due to misinterpretation of the narrow P4 pulse as a wide P4 pulse.”*

In DO-181D paragraph §2.2.18.2.5, please add the following note:

“3. Multisite lockout and non-selective All-Call lockout are not mutually exclusive. Interrogators using multisite lockout protocols for interrogator networking coordination may simultaneously use non-selective lockout. The non-selective lockout use may be to prevent Mode S transponder replies to ATCRBS-Only All-Call interrogations due to misinterpretation of the narrow P4 pulse as a wide P4 pulse.”

In DO-181D Figure 2-13 please make these highlighted changes (note the figure was reformatted out of convenience in editing for this paper):



Notes. For actions of T_D , T_L and IIS, see acceptance protocol.

Figure 2-13: All Transponders: Lockout Initiation Changes Highlighted

3.0 Proposed Changes to ED-73C

Changes for the following figure and paragraphs in ED-73C show existing material in black and proposed material highlighted.

In ED-73C paragraph §3.18.4.26, please make the following change from:

“The PC field shall be ignored for the processing of surveillance or Comm-A interrogations containing DI=3 (3.23.2.1).”

To:

“The PC field values 2 through 7 shall be ignored and the values 0 and 1 shall be processed for the processing of surveillance or Comm-A interrogations containing DI=3 (3.23.2.1).”

In ED-73C paragraph §3.22.2.4, please add the following note:

“NOTE: *Non-selective All-Call lockout and multisite lockout are not mutually exclusive. Interrogators using multisite lockout protocols for interrogator networking coordination may simultaneously use non-selective lockout. The non-selective lockout use may be to prevent Mode S transponder replies to ATCRBS-Only All-Call interrogations due to misinterpretation of the narrow P4 pulse as a wide P4 pulse.”*

In ED-73C paragraph §3.22.2.5, please add the following note:

“NOTE 3: *Multisite lockout and non-selective All-Call lockout are not mutually exclusive. Interrogators using multisite lockout protocols for interrogator networking coordination may simultaneously use non-selective lockout. The non-selective lockout use may be to prevent Mode S transponder replies to ATCRBS-Only All-Call interrogations due to misinterpretation of the narrow P4 pulse as a wide P4 pulse.”*

In ED-73C Figure 3-11 please make these highlighted changes (note the figure was reformatted out of convenience in editing for this paper):

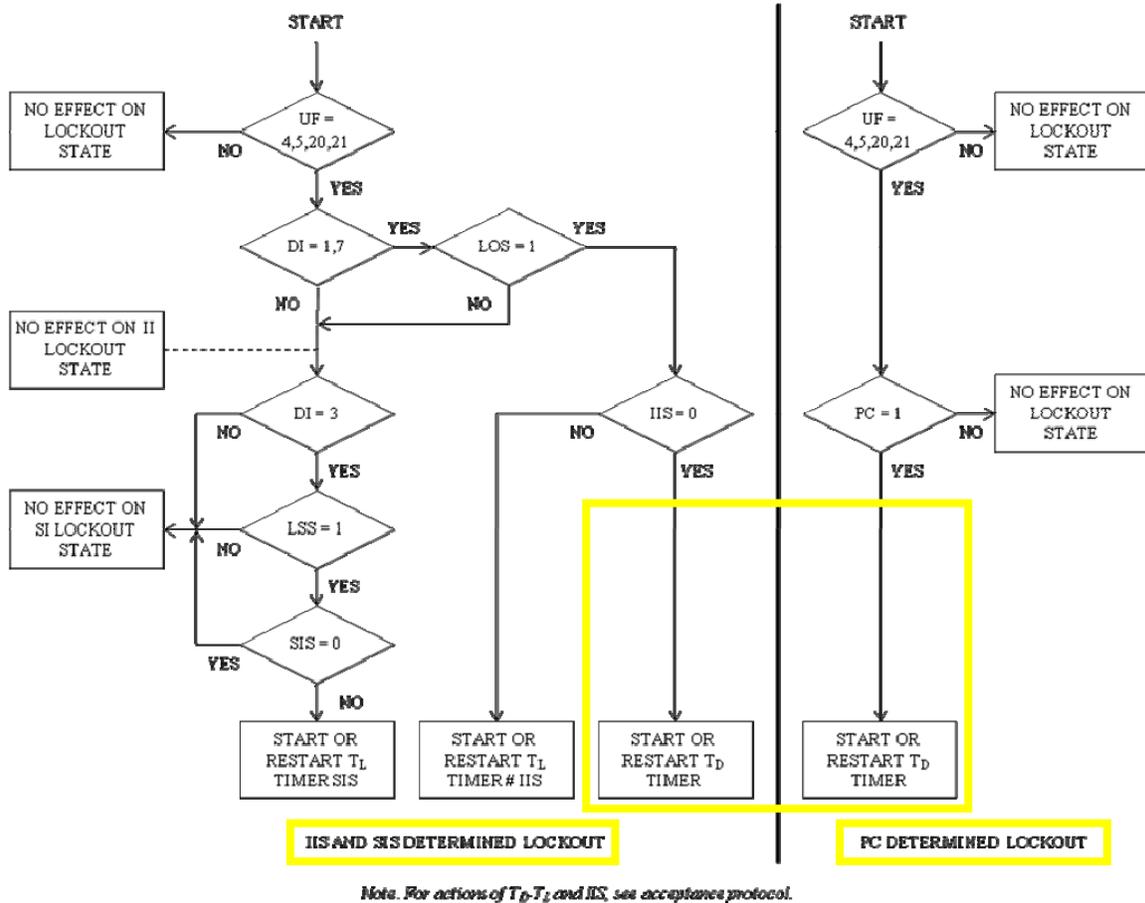


FIGURE 3-11: LOCKOUT PROTOCOL **Changes Highlighted**

4.0 Proposed Changes to ICAO Doc 9871

No changes are proposed to Doc 9871.

5.0 Proposed Changes to ICAO Annex 10 Volume IV

Changes for the following figure and paragraphs in ICAO Annex 10 Volume IV (A10V4) show existing material in black and proposed material highlighted.

In A10V4 paragraph §3.1.2.6.1.1, please make the following change from:

“The PC field shall be ignored for the processing of surveillance or Comm-A interrogations containing DI = 3 (3.1.2.6.1.4.1).”

To:

“The PC field values 2 through 7 shall be ignored and the values 0 and 1 shall be processed for the processing of surveillance or Comm-A interrogations containing DI = 3 (3.1.2.6.1.4.1).”

In A10V4 paragraph §3.1.2.6.9.1.1, please add the following note:

“Note 3.— Multisite lockout and non-selective all-call lockout are not mutually exclusive. Interrogators using multisite lockout protocols for ground station coordination may simultaneously use non-selective lockout. The non-selective lockout use may be to prevent Mode S transponder replies to ATCRBS-Only All-Call interrogations due to misinterpretation of the narrow P4 pulse as a wide P4 pulse.”

In A10V4 paragraph §3.1.2.6.9.2, please add the following note:

“Note 3.— Non-selective All-Call lockout and multisite lockout are not mutually exclusive. Interrogators using multisite lockout protocols for ground station coordination may simultaneously use non-selective lockout. The non-selective lockout use may be to prevent Mode S transponder replies to ATCRBS-Only All-Call interrogations due to misinterpretation of the narrow P4 pulse as a wide P4 pulse.”

6.0 Recommendation

The committee is invited to review the information presented in this Working Paper and make any further recommendations.