

RTCA Special Committee 209

Working Group #1

Mode S Transponder MOPS Development/Maintenance

Meeting #1

RTCA, Washington DC

3 – 5 April 2007

**Rockwell Collins Response to Action Item 6-3
Transponder Reply Rate Capabilities**

**Robert Saffell
Rockwell Collins**

SUMMARY

This Working Paper summarizes the Rockwell Collins response to SC-209 Action Item 6-3 requesting the testing of the company transponders for reply rate capabilities.

After reviewing my discussion paper in regards to reply rate, the discussions at the TSG, and Action Item 6-3, the issue is that ICAO and ED-73B require (and Test) a continuous ATCRBS 15 pulse reply rate of 1200 per second.

The intent here is to demonstrate that the transmitter can sustain the rate prior to limiting. ICAO and ED-73 both apply limiting directly after the 1200 rate. The problem is that most vendors have implemented limiting to some degree or another and cannot readily test the 1200 rate. In order to do so, they have to disable the limiting which is then not the typical software or hardware operating in the box in the real environment.

As you know, DO-181X does not test at the 1200 continuous rate. Rather, it applies a rate of 500 per second for 100 milliseconds and that is what most transponders are currently TSOed to. So, the issue was for all vendors to verify that the 1200 rate could be sustained with limiting removed.

Rockwell Collins has disabled the limiting on both Air Transport Systems (TPR-901) and Business and Regional (TDR-94/94D) transponders and performed the 1200 rate test with 15 pulse replies.

Both sets of transponders easily passed the 1200 rate by a significant margin. To specify what that margin is would be company proprietary, and need not be disclosed. It should suffice to say that the transmitter designs can pass the 1200 continuous test and that all other requirements of DO-181X and DO-185X have been proven in prior TSO Submittals. Remember that the DO-185A tests of 120 long replies in 100 milliseconds is the worse case environment followed by the TCAS Throughput Testing.