RTCA Special Committee 186, Working Group 3
EUROCAE WG-51, SG-1

ADS-B 1090ES MOPS Maintenance

WG-3 Meeting #26
SG-1 Meeting #3
Joint Session

RTCA Headquarters, Washington DC
31 March – 3 April 2009

Garmin's Response to Action Item 25-07 Regarding Uncompensated Latency

Kurt Schueler
Garmin International

Summary
This Working Paper addresses the response to Action Item 25-07 from Garmin International to the issue of Uncompensated Latency.

Garmin International's Response to Action Item 25-07, Uncompensated latency

Working Paper 1090-WP25-11R1 presents the uncompensated latency of a 'T=0' ADS-B transmitter in terms of compensation within the box, and does not consider clock or other errors that could contribute to the uncompensated latency. If it is assumed that the +/-100 ms uncompensated latency is allocated to the resolution of extrapolation and scheduling the output, some additional uncompensated latency should be allocated to clock and other errors.

Clock errors: clock errors are due primarily to the resolution of the clock used. Section §2.2.8.4.2 allows up to a 20ms clock step for the TOA in ADS-B reports for the receiver. That is probably excessive for the transmitter. Garmin recommends a maximum of 5 ms. This error is only applicable on the side of receiving the GPS data, as subsequent extrapolating and transmit will align on the clock. The clock resolution of 5 ms also allows for sufficient jitter on the transmit side (§2.2.3.3.2.2), although the current MOPS does not specify the resolution of the uniform distribution.

Time Stamp error: TOA error can be introduced by software that inputs data based on a buffer being periodically processed. A reasonable task rate for this processing is 25 ms. Again, this error only occurs on the side of receiving the data.

Conclusion:

Garmin recommends adding +/-30 ms to the uncompensated latency allowance for a T=0 transmitter to account for input processing and clock resolution.