

Points for Consideration for DO-242A

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1. ADS-B Air-Ground Requirements: DO-242 addresses quantitative performance requirements only for air-air reception of ADS-B. In various MOPS development activities it is also very important to have guidance for air-ground performance as well. A significant difference between air-air and air-ground performance requirements seem to be the following:
 - a) Performance requirements will be much less dependent on reception range in the air-ground case than in the air-air case. In fact, performance requirements are more a function of the separation between given targets under surveillance almost independent of air-ground range.
 - b) Coupled with this, a significant difference between ADS-B and radar is the fact that with ADS-B, receptions between proximate targets may well be unregistered in time. With radar, proximate target updates are usually registered in time.

As a start in this area, we recommend WG-6 include A-G performance numbers based on providing *mutual* proximate target updates with probability equivalent to that provided by current terminal and enroute radars.

2. User Population Requirements: DO-242 operational coverage currently requires a minimum confidence level of 95% for exchange of information supporting an application of interest. Since user equipage features such as antenna gain and transmit power vary, we should acknowledge this in the MASPS requirements by also requiring that 95% of the relevant user population achieve the 95% information exchange confidence level.
3. Update Intervals: The summary of simulation results given in Table 3-4 for update requirements has led to confusion. A single linear curve showing a linear increase in the 95th percentile and 99th percentile (or coast condition) requirements would clarify these requirements. Details are provided by Jonathan Hammer.
4. Emulation of Transponder Functionality: Capstone experience has indicated an ATC desire to have ADS-B capable of emulating other transponder functions (e.g. IDENT). (see input from Anchorage Center)
5. Intent Information: The WG-6 proposal on TSR and TCR makes significant progress in defining the formats for these reports taking into consideration the sources for this information on the aircraft. We note however that conveying the proposed “full load” of a TSR and four TCRs has the potential to consume significant link bandwidth for any technique. It seems the concepts this data is intended to support are still not well

understood particularly for the downstream TCRs. In supporting all this data in a data link MOPS, it is critical to understand factors such as:

- a) Is the intent data to be used air-ground or air-air or both?
- b) Is the intent data to be used in the terminal area as well as the enroute domain?
- c) Can terminal area waypoints be defined arbitrarily by the pilot, or is it more likely they will be ATC-assigned or part of a published procedure?
- d) What fraction of the aircraft population would be engaged in transmitting TCRs in various numbers at a given time.

Answers to these questions will help determine things like the reception range and refresh rates needed, the maximum projection distance of TCRs required, whether the data is most appropriate for broadcast or two way data link communication, the granularity of waypoint data needed, etc. Given all these uncertainties and their importance in designing an efficient and capable data link--given the potential bandwidth load--we propose that DO-242 limit its scope to a simultaneous TSR and TCR+0. This will allow some operational experience with the new TSR/TCR formats to be gained without delaying link developments to accommodate and evaluate link designs containing additional waypoints. Also concepts for use of additional TCRs can be developed before committing them to a data link MOPS implementation

6. Addresses and Identification: Tables 2-2 and 3-8(b) are inconsistent in Call Sign requirements for conflict avoidance. Also, for reasons of security and privacy, consideration should be given in DO-242 A to supporting a capability for all users to operate with a temporarily assigned address—even those operating IFR. This would allow users to be identified only to ATC—by correlation of the temporary address with flight data. It would allow users to *de-identify* themselves to the general listening audience. This could be an important consideration to an increasing number of users as time goes on. Policy would dictate which form of address would be used, but the ADS-B system should preserve the technical option to go either way (permanent airframe, or temporary flight duration address). Procedures would need to be developed to generate and assign the temporary addresses as well as a way to easily correlate these addresses with flight data within the ATC system. One simple approach for generating and assigning these temporary addresses would be to have the ADS-B system randomly generate an address internally by using current position at start-up as the random seed. See the attachment for more discussion on this.