

Meeting Minutes
SC186 WG-2
4-5 May, 2004

The meeting was held at Trios Associates, Washington D.C.

Attendees

| | |
|-------------------------|------------------------|
| Andy Zeitlin (co-chair) | MITRE/CAASD |
| Ken Staub (co-chair) | Trios Assoc. |
| Roxaneh Chamlou | MITRE/CAASD |
| Jim Chen | FAA |
| Bill Harman | MIT Lincoln Laboratory |
| Stan Jones | MITRE/CAASD |
| Todd Kilbourne | Trios Assoc. |
| Gary Livack | FAA (AFS) |
| Bob Manning | L-3 Com Analytics |
| Kevin Mattison | FAA |
| Chris Moody | MITRE/CAASD |
| Tom Mulkerin | Mulkerin Assoc. |
| Ron Staab | Trios Assoc. |
| Rob Strain | MITRE/CAASD |

Andy reviewed the schedule for producing Rev. A to the TIS-B MASPS. The WG is aiming for an August completion in order to provide ample time for review and comment resolution prior to an October Plenary approval. It was decided to hold the next WG2 meeting June 15-16, again in Washington DC.

Gary reported that the Surveillance Advisory Circular being developed by FAA Certification and Flight Standards is close to a draft release for public comment. It will cover Airborne Surveillance Systems and Applications.

Remembering the WG4 issue paper on sensor registration, the WG agreed that the requirement should emphasize conformance to the WGS-84 coordinate system.

Gary inquired as to how extensively interoperability is supported by TIS-B. Andy replied that the Rebroadcast Function is expressly intended to provide interoperability between different data links, and that the ASA MASPS provides a means for different capability levels of avionics to interoperate and determine which applications are available to whom.

Chris and Stan discussed related actions of the Systems Engineering Council. They are addressing a Terminal Area infrastructure for the purpose of supporting an initial costing exercise. "Type A" sites will include an ASDE-X or ASDE-3 radar. Other site types will have either Mode S, another terminal radar, or no radar. ASA MASPS give surveillance requirements for ASA applications, but the latency requirements were judged too lenient for the GSA equivalents to ASSA and FAROA (surface surveillance). It was assumed

that the Broadcast Surveillance Ground System would extrapolate reports to Time of Applicability. Sites will be dual configured for both 1090 and UAT links. Major airports will have sector antennas for receiving 1090, and UAT would share these. Applications to be supported would be ASA Enhanced Visual Acquisition, Enhanced Visual Approach, ASSA, FAROA, and various GSA based on 3 nm terminal area separation out to 60 nm, and a PRM-like surveillance. This grouping is termed "Sprial-2", aimed at a 2007-12 timeframe.

The remainder of the meeting was devoted to discussion and review of the MASPS.

We resolved to maintain our focus of this revision on the Enhanced Visual Acquisition and Surface Situational Awareness applications, as was confirmed at the last two SC186 Plenary meetings. While requirements cannot yet be provided for support of more advanced applications, we will try to not preclude their introduction later.

The document already requires TIS-B messages to be distinguishable from ADS-B. For the case of a Rebroadcast, we did not find it necessary to distinguish it from fundamental TIS-B in a message. Since requirements already require the state vector to correspond to its TOA, and for the report to provide the various quality measures enumerated in ASA MASPS, no justification was evident for differentiating this type (in support of the initial applications).

For availability, we cannot justify any firm number for a requirement. Availability will be indicated in real time by a status message.

For continuity of service, we will need to decide between a user-based requirement or a ground-oriented system requirement.

The latency requirement for Fundamental TIS-B will be 2.1 seconds for Ground Surveillance Processing (except for targets closer to the radar than 5 nm (terminal) or 14 nm (en route)). The ASSA application may have more stringent requirements.

The WG agreed that both Fundamental TIS-B and Rebroadcast TIS-B should extrapolate position to the broadcast time, as described by Stan Jones in a paper. NAC_p will not be adjusted since the magnitude of extrapolated time is small (<3 sec for Fundamental TIS-B, <1 sec for Rebroadcast). An appendix must be developed to present an analysis justifying this approach. Future applications may treat the data differently.

A brief discussion of the latency budget and extrapolation follows these minutes. *[Note: read NAC for NUC.]*

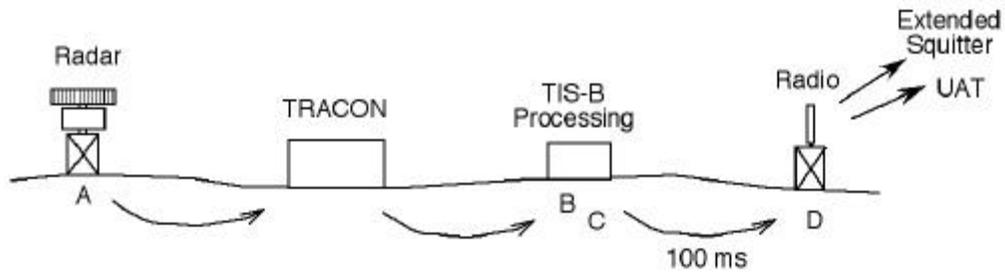
Jim Chen will assist in assessing tracker performance vs. target speed.

It was not decided how to write a requirement to update each track.

Resolution of Latency and Related Issues in TIS-B
4-5 May 2004, WG-2
Paper submitted by W. Harman

1. Propagation time can be neglected relative to the report time error values allowed in the ASA MASPS.
2. For Extended Squitter, Time-of-Applicability is defined to be the time of reception. Therefore latency = zero, by definition, and extrapolation before transmission is necessary.
3. In the ASA MASPS, Note 1 in 2.4.5.3.3.4 is confusing (although it is not a requirement).
4. For radar-based TIS-B, latency before transmission can be as high as 2.8 seconds. Therefore extrapolation by as much as 2.8 seconds is necessary.
5. For UAT, extrapolation is also necessary.
6. The value of NUCp transmitted will be calculated as follows:
 - (a) along-track NUCp = xxx
 - (b) cross-track NUCp = yyy

Note that item (6) is not yet completed.



| | | Terminal radar | Enroute radar | Re-broadcast |
|---|------------------------|----------------|---------------|--------------|
| A | Radar processing | 800 | 1500 | x |
| B | TIS-B surv. processing | 500 | 500 | x |
| C | TIS-B distribution | 200 | 200 | 200 |
| D | TIS-B transmission | 400 | 400 | 400 |
| E | TIS-B reception | x | x | 200 |
| | Comm, A to B. | 100 | 100 | 100 |
| | Comm, C to D. | 100 | 100 | 100 |
| | | 2100 ms | 2800 ms | 1000 ms |

Figure 1. Delays in Surveillance Data Prior to TIS-B Transmission
Values from Rob Strain.