

### ASSAP MOPS Group Meeting Minutes #5

The attendees included the following:

Last Name	First Name	Organization
Bachman	Larry	FAA/JHU APL
Branch	Allen	FAA/AIR-CERT
Chamlou	Roxaneh	MITRE/CAASD
Conway	Sheila	Boeing
Eich	Tom	ACSS
Plummer	Steve	FAA
Sleight	Randy	FAA/JHU APL
Thomas	Dave	FAA/L-3 TITAN
Walker	Don	Honeywell

#### **DAY 1:**

The ASSAP MOPS group meeting, on 09 January 2007, started at 9:10 AM (Mountain Standard Time). Roxaneh started the meeting with introductions and reviewing the proposed agenda.

1. The proposed agenda was accepted with no changes (Reference ASSAP-WP10 - 01).
2. The last group telecon minutes were reviewed and approved (Reference ASSAP-WP10-02).
  - a. The minutes were reviewed regarding action items for Don Walker since he was not present at the last telecon. Roxaneh suggested that the assumptions section of the ASSAP MOPS should include a short discussion regarding the acceptable use of DO-260 (version 0) reports. Don Walker suggested that the specific requirements for these reports will be defined in each of the application sections.
  - b. **Action Item #70 (Don Walker):** Don Walker attended the last SC-209 conference where Bill Thedford mentioned that the probability for a receiver to receive duplicate addresses is  $10^{-6}$ . Don Walker has an action item to gather more background information (e.g. paper, presentation) from Bill Thedford at the next SC-209 conference.
  - c. Don Walker suggested that the assumptions section should not contain any discussions regarding deviations from the ASA MASPS requirements since they are handled and documented via issue papers. But he suggested that a section discussing velocity limitations should be included in the assumptions section.
  - d. **Action Item #71 (Don Walker):** Last year the ASSAP group received a draft copy of a SCRSP document “Standards for traffic displays that include ACAS tracks” prepared by Ken Carpenter. Don Walker has an action item to contact Ken Carpenter at the next ICAO meeting in regards to the status of this document.

3. The review of the ASSAP MOPS schedule and status was led by Roxaneh (Reference ASSAP-WP08-06, ASSAP-WP09-09). ASSAP group activities are currently on schedule.
4. The ASSAP group reviewed the “CDTI & Traffic Applications” document in preparation for the joint meeting with the CDTI group planned for Day 4 (Reference WP09-04). The following questions were captured along with the CDTI group responses from Day 4:
  - a. ASSAP Question - How will the CDTI group handle existing patents for traffic symbology? Tom Eich mentioned that the CDTI group plans to include examples of traffic symbology in Appendix of the CDTI MOPS document for guidance purposes only.  
CDTI Group Response – The CDTI group is currently not addressing existing patents for traffic symbology. At a later point, the release process of the CDTI MOPS should address existing patents.
  - b. ASSAP Question – Is it beneficial for the flight crew to know which traffic are capable of providing CD protection? If so, then ASSAP will transmit to the CDTI which traffic is valid for CD.  
CDTI Group Response – The CDTI group requested that ASSAP transmits to the CDTI which traffic is valid for CD. They believe that showing which traffic is capable of providing CD protection is valuable to the flight crew. The ASSAP group has agreed to provide this information.
  - c. ASSAP Issue - Page 6 of the presentation contains a table depicting various NACp thresholds for validating traffic for each application. The ASSAP group is concerned about this causing a large number of traffic symbols to represent all of these cases. A small number of traffic symbols are desired.  
CDTI Group Response – The CDTI group understands and agrees that a small number of traffic symbols are desired.
  - d. ASSAP Issue - Don Walker proposed a deviation from the ASSA MASPS which currently degrades and invalidates traffic based on 30 and 60 degrees of uncertainty. He suggested that all traffic should be considered valid unless their reported NACp < 4 (1NM). An issue paper will be written.  
CDTI Group Response – The CDTI group did not see any issues at this time.
5. The ASSAP group reviewed the “CDTI Symbol Set Rules” document in preparation for the joint meeting with the CDTI group planned for Day 4 (Reference WP09-05). The following questions were captured along with the CDTI group responses from Day 4:
  - a. ASSAP Question - How will the CDTI symbol rule sets be incorporated into the CDTI MOPS document? Will they be guidance only or will the manufactures be required to implement one of these limited rule sets? The ASSAP group is concerned about this limitation. The ASSAP group

suggested some basic performance based requirements instead of these rule sets.

CDTI Group Response – At this point, the CDTI group plans to limit manufacturers to these rule sets. They are concerned about allowing too much flexibility. The CDTI group plans to have the certification group comment on this issue.

- b. ASSAP Comment – In general, ASSAP does not see a problem with Rule Set 1 and 2. The ASSAP group did not understand how Rule Set 3-5 provide traffic validation in regards to each specific application.

CDTI Group Response – These rule sets are still under development and would like to address questions later.

6. The ASSAP group discussed degraded traffic conditions based on application criteria defined in Table 2-3 of the ASA MASPS. Selected and Coupled traffic was also discussed. Below are some notes that Don Walker captured during these discussions. The ASSAP group is still undecided if degraded conditions are required for any of the applications, including EVAcq and ASSA/FAROA.

*Notes prepared by Don Walker*

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*It is unclear how degraded symbology, as a function of reported accuracy or integrity, will improve the pilot's situational awareness. Using a degraded symbol to represent a coasted target may have more tactical value, but should be an option. Removing degraded symbology significantly reduces the number of symbols thus simplifying the presentation.*

*ASSAP Rule Set Proposal*

*ASSAP will send target information to CDTI. ASSAP will indicate that target information is good/degraded/invalid using EVAcq limits.*

*If implemented, ASSAP will indicate that target information is good/degraded/invalid using ASSA/FAROA limits. CDTI will use these limits to depict traffic on the surface map if available. If a surface map is not available, CDTI may choose to depict traffic using the EVAcq limits as a fall back.*

*If implemented, ASSAP will indicate that target information is good/invalid for CD. If implemented, ASSAP will indicate that target information is good/invalid for EVApp. This deviates from DO-289 in that it does not define a degraded mode for EVApp or CD.*

*ASSAP will send target altitude relative to own ship. ASSAP will calculate this using pressure altitude. If pressure altitude for own ship or target is invalid, relative altitude may be calculated using Height Above the Ellipsoid for both ships. The implication is that CDTI may use this to filter the ASSA/FAROA display.*

*A selected/highlighted target will have additional information sent to CDTI by ASSAP. The additional information consists of Flight ID, Emitter Category, Ground Speed, Range, Closure Rate. CDTI will send the selected/highlighted target to ASSAP.*

*A coupled target will have application specific information sent to CDTI by ASSAP. Coupled targets' data is sent to CDTI even when they are not selected/highlighted. CDTI will send a list of targets coupled to applications to ASSAP. The status of the application depends on the validity of the source data and operational parameters. CDTI may need to send operational parameters for an application to ASSAP. For example, CDTI may send a time in trail target for a Merging and Spacing application. A target whose operational parameters are all met is considered an Engaged target. Engaged is a proposed concept from ARINC-735B.*

*What do you do with the application limits if you don't implement degraded status? Our proposal is for ASSAP to tell CDTI that a target is either valid or invalid for a particular application. This determination would be based on the invalid threshold, not the degraded threshold. For Enhanced Visual Approach, this means that a target with a NACp = 6 would be valid as opposed to degraded. The applications that we currently view as not needing a degraded status are EVApp and CD. We are planning on sending degraded information for EVAcq and ASSA/FAROA.*

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## **DAY 2:**

The ASSAP MOPS group meeting, on 10 January 2007, started at 9:05 AM (Mountain Standard Time).

1. The ASSAP group discussed issues regarding the availability of velocity accuracy (NACv) from traffic:
  - a. Don Walker mentioned that the GPS community has not committed to transmitting a HFOM rate parameter. The tables in DO-260A and STP MOPS used to derive NACv from NACp may not be representative of the actual sensors. This issue needs to be addressed with WG3 (Tom Pagano is the WG3 chair).
  - b. Don Walker suggested not using NACv for any of the velocity accuracy requirements currently defined for the ASA applications. He also suggested possibly using the target's rate based on change of position to validate the target's velocity values. These values will be used to calculate closure rate and ground speed for the EV Approach application.
2. The CDTI group requested an explanation/example on how ASSAP plans to validate traffic for two of the applications. Roxaneh created the following flow

charts to demonstrate these conditions for EV Approach and ASSA/FAROA. The flow charts contain two tables that separate requirements from Table 2-3 of the ASA MASPS into system characteristics versus parameters contributing to the determination of the application's state of good, degraded, or invalid. The first flow chart for EV Approach represents the requirements per Table 2-3. The second flow chart for EV Approach represents the requirements if the degraded conditions were removed. Items in red are remaining issues. The ASSA/FAROA flow chart only represents the requirements per Table 2-3. The ASSAP group is also considering removing the degraded conditions for the ASSA/FAROA application.

**EV Approach**

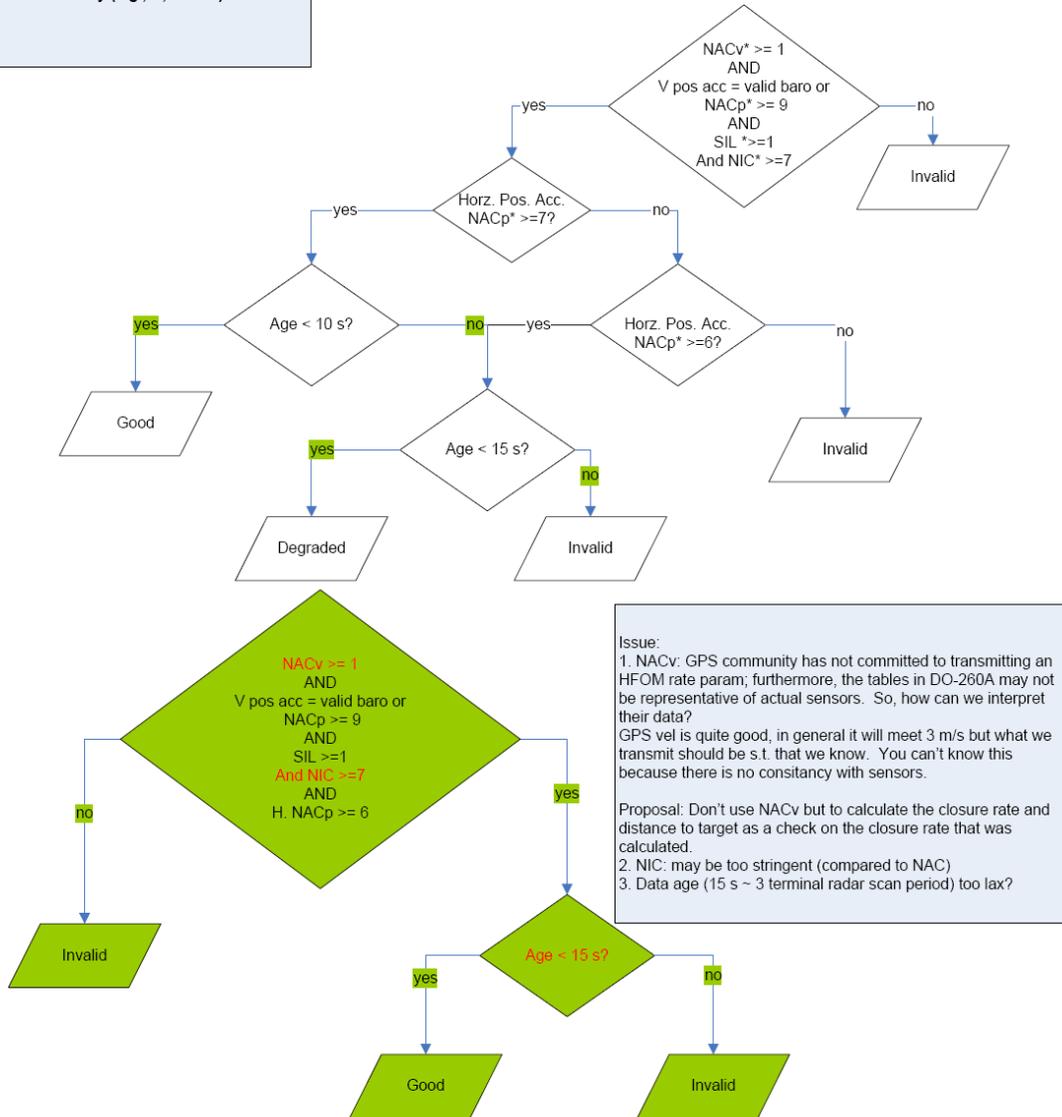
**Characteristics**

- 4. N/A
- 6. N/A
- 9. N/A
- 10. Max Delay to indicate NIC Change = 25 s
- 11. Update Interval = 3 s (d), 5s (max)
- 12. N/A
- 13. Update Interval Conf. = 99%
- 14. Time Report Acc.(95%) = 1 s
- 15. Max. Latency (e.g., pos, vel) = 6 s
- 18. Coverage Vol. = H: 10 NM, V: +/-3,500
- 19. N/A
- 20. Max. Latency (e.g.,ID, Status)= 30 s

**Parameters Contributing to Good/Degraded/Invalid**

- 1. Horz.Pos.Acc. = 0.1 NM (NACp >=7)\*
- 2. Horz. Pos. Acc. – Degraded Perf. = 0.3 NM (NACp >=6)\*
- 16. Max.Data Age Until Degraded = 10s
- 17. Max.Data Age Until Dropped = 15s
- 3. Horz. Vel Acc. = 10 m/s (~19 kts) (NACv >=1) \*
- 5. Vert. Pos. Acc. = Baro or VEPU < 45 m\*
- 7. Integrity Containment Risk = 10^-3/hr\*
- 8. Horz. Integ. Bound = 0.2 NM (NIC >= 7)\*

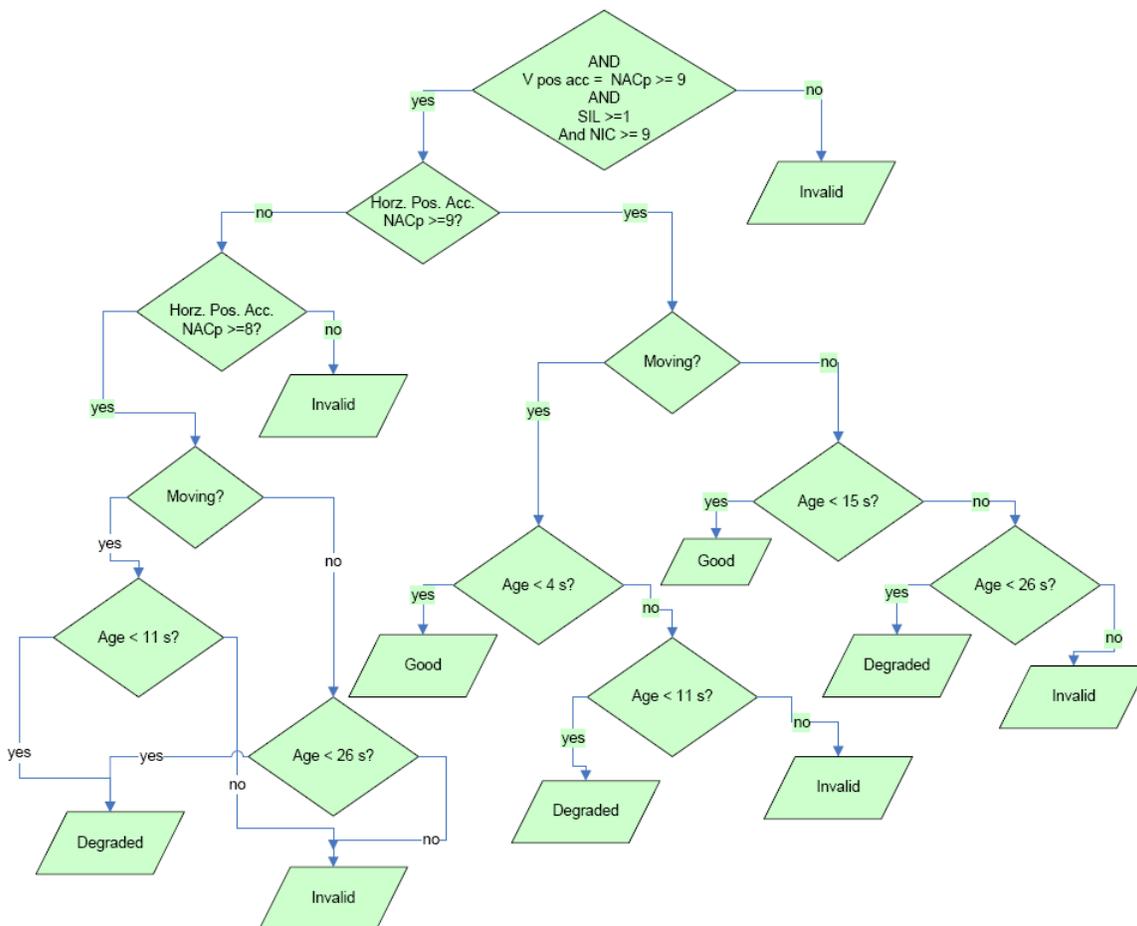
\* ownership and traffic requirements



**ASSA/FAROA**

Characteristics  
 4. Heading Acc. = 10 deg  
 10. Max Delay to indicate NIC Change = 25 s  
 Airborne, 36 surface non-moving  
 11. Update Interval (airborne or surface moving) = 2 s  
 12. Update Interval (stationary on surface) = 10 s  
 13. Update Interval Conf. = 95%  
 14. Time Report Acc.(95%) = 1 s  
 15. Max. Latency = 3 s  
 18. Coverage Vol. = H: 45 NM, V: +/-15,600  
 19. N/A  
 20. Max. Latency = 30 s

Parameters Contributing to Good/Degraded/Invalid  
 1. Horz.Pos.Acc. = 30 m (NACp >=9)  
 2. Horz. Pos. Acc. – Degraded Perf. = 92.9 m (NACp >=8)  
 16. Max.Data Age Until Degraded = 4 s (airborne and surface moving traffic),  
 11 s (surface non-moving)  
 17. Max.Data Age Until Dropped = 15 s (airborne and surface moving traffic),  
 26 s (surface non-moving)  
 3. Horz. Vel Acc. = 3 m/s (NACv =2)  
 6. Vert. Vel Acc. = 15 fps (NACv >=2)  
 5. Vert. Pos. Acc. = VEPU < 45 m ( NACp >= 9)  
 7. Integrity Containment Risk = 10<sup>-3</sup>/hr (SIL >=1)  
 8. Horz. Integ. Bound = 75 m (NIC >= 9)  
 9. Vert. Integ. Bound =112 m (NIC >=9)



3. The ASSAP group discussed the definitions of Selected, Highlighted, Coupled, and Engaged Traffic. The ASA MASPS contains definitions for Selected and Coupled Traffic.
  - a. Selected Traffic – Input from CDTI for ASSAP to send additional track information to the CDTI. ASSAP also uses this information for

- prioritizing tracks. The term “selected” seems confusing because coupled traffic can also be considered “selected”. Tom Eich suggested changing “Selected Traffic” to “Highlighted Traffic”. This is also consistent with the terminology being proposed for ARINC 735B.
- b. **Action Item #72 (Tom Eich):** The ASSAP group has agreed to refer to “Selected Traffic” as “Highlighted Traffic”. Tom Eich has an action item to create an issue paper since this is a deviation from the ASA MASPS.
  - c. Coupled Traffic – Input from CDTI for ASSAP to compute specific application data and send to the CDTI. ASSAP also uses this information for prioritizing tracks.
  - d. Engaged Traffic – Tom Eich mentioned that a new 3<sup>rd</sup> state “Engaged Traffic” is being proposed for ARINC 735B. The ASSAP group needs more background information before this state is considered for ASSAP and the CDTI.
4. AI#64: “Coordinate and propose degraded traffic and qualified traffic interface requirements between ASSAP and CDTI” was reviewed and presented by Tom Eich (Reference WP10-09):
- a. Tom Eich suggested that all traffic should be validated for each application and sent to the CDTI. For example, the display may decide to use either the EV Acquisition or ASSA/FAROA validation status for ground targets based on whether a surface map is available or not. The ASSAP group agreed to this approach.
  - b. Sheila Conway suggested that the CDTI may want to consider manually selecting the EV Acquisition application on-ground regardless if an airport map is displayed. This may be useful to verify aircraft positions heard over the radio, where they may have been removed from the CDTI due to the high quality thresholds required for ASSA/FAROA.
  - c. Don Walker suggested that the CDTI must receive own-ship lat/long from ASSAP to ensure that the CDTI is using the same source as the ASSAP surveillance tracking function. The ASSAP group agreed to this approach.
  - d. Application failure flags should be sent from ASSAP to the CDTI based on the availability and quality of own-ship data.

### **DAY 3:**

The ASSAP MOPS group meeting, on 11 January 2007, started at 9:10 AM (Mountain Standard Time).

1. Roxaneh told the ASSAP group that she will no longer be the chair for the ASSAP group and that Jonathan Hammer will be the new chair. Roxaneh will be transitioning her responsibilities to Jonathan after this meeting.
2. The ASSAP group reviewed the Action Items from Day 1 and Day 2.

3. AI#2: “Verify the use and origin, either ASSAP or CDTI, of the tag / cross reference flag with the CDTI group” was reviewed and presented by Tom Eich (Reference ASSAP-WP10-05):
  - a. Tom Eich suggested that TCAS correlation is needed by the CDTI to support sourced based traffic symbology.
  - b. During the coordination meeting on Day 4 with the CDTI group, they requested that this information is “required” from ASSAP. The CDTI group will also use this information to show which traffic have TCAS protection. The ASSAP group agreed to send this information as “required”.
  
4. ASSAP to CDTI Data Issue Paper related to AI #55,56 was reviewed and presented by Tom Eich (Reference ASSAP-WP10-04):
  - a. Display Range / Map Scale and Display Orientation was changed from “optional” to “not required” since these parameters are not considered a minimal performance requirement for ASSAP.
  - b. **Action Item #73 (Sheila Conway):** Investigate the implications of using relative geometric alt for traffic when pressure alt is unavailable. Currently the ASA MASPS allows relative alt for traffic to be calculated by either pressure or geometric altitude.
  - c. **Action Item #74 (Sheila Conway):** ASSAP will send traffic vertical rate values to the CDTI. The CDTI will use this value to calculate traffic vertical sense (decreasing or increasing). For example, TCAS uses +/- 500 fpm for this calculation. The first source for vertical rate from traffic is GNSS based. This may be a problem since aircraft usually fly pressure. Sheila Conway has an action item to investigate if GNSS vertical rate is acceptable for this calculation.
  - d. **Action Item #75 (Ganghuai Wang):** The vertical rate from ADS-B is generally GNSS based. Ganghuai Wang has an action item to investigate if this will cause any problems with the CD alerting algorithms.
  
5. The ASSAP group created the following list of items to be discussed at the coordination meeting with the CDTI group on Day 4 (Issues and Questions generated by ASSAP are the highest priority):
  - a. Review of CDTI papers (Reference ASSAP-WP09-04, ASSAP-WP09-05).
    - i. The ASSAP group has generated a list of questions on Day 1 for the CDTI group regarding these papers.
  - b. AI#64: Coordinate and propose degraded traffic and qualified traffic interface requirements between ASSAP and the CDTI (Reference ASSAP-WP10-09).
  - c. AI#2: Verify the use and origin, either ASSAP or CDTI, of the tag / cross reference flag with the CDTI group (Reference ASSAP-WP10-05).
  - d. ASSAP to CDTI Data (ASSAP-WP10-04)
  - e. Application/ASSAP BITE

6. **Action Item #76 (Don Walker):** Don Walker has an action item to create a latency diagram from the target's position source to the receive side of the CDTI. This information will be used to create the ASSAP latency requirements in the ASSAP MOPS document.
  
7. The ASSAP group reviewed Don Walker's application requirements for EV Acquisition and ASSA/FAROA, ASSAP MOPS Sections 2.2.3.3.2.1 & 2.2.3.3.2.2 (Reference ASSAP-WP10-03):
  - a. Own-ship position data latency requirements should be moved to the general requirements section.
  - b. **Action Item #77 (Sheila Conway):** Currently, only 36m has been allocated for own-ship position accuracy to support ASSA/FAROA. 65m has been allocated for the airport surface database. The ASSAP group would like to know what the typical accuracies for airport surface maps are. If the resolution is much lower than 65m then ASSAP would like to increase the accuracy allocation for own-ship position. Sheila Conway has the action item to check with Boeing regarding the typical database resolutions for airport surface maps.
  - c. **Action Item #78 (MITRE):** Need quantization values soon from MITRE. For TSO C129 and C145, quantization numbers are needed for NIC and NAC values between 5 and 9; total of 20.
  - d. Every one should be prepared to provide comments on the performance section at the next meeting.

#### **DAY 4:**

The ASSAP MOPS group meeting with the CDTI group, on 12 January 2007, started at 8:40 AM (Mountain Standard Time).

1. During the coordination meeting with the CDTI group, each group took turns asking questions. Note: The ASSAP group's questions and CDTI responses are located above in Day 1.
  - a. Currently the draft of the CDTI MOPS is planned to be completed by this September.
  - b. Roxaneh provided pertinent ASSAP files to Sehtu (e.g. ASSAP schedule, interface presentations, calculation of closure rate)
  - c. Tom Eich explained that ASSAP will send the best correlated track to the CDTI. If the best track is ADS-B or TIS-B, then ASSAP will also send a TCAS correlation tag. ASSAP currently does not plan to send the CDTI the TCAS track when an RA is active as required in AC120-86. The best track selection is based on a proposed reasonability check with TCAS position and meeting the EV Acquisition validation criteria. Taji is creating an issue paper regarding reverting to the TCAS track when a RA is active.

- d. Tom Eich asked if the CDTI group has a MOPS master file for the ASSAP group to access. Mike Petri will publish a copy of the CDTI MOPS master file with e-mail instructions.
  - e. Currently ASSAP does not interface with the Airport Surface Map database.
  - f. The CDTI group is expecting the following altitude data from ASSAP: Traffic Relative Altitude, Own-ship Pressure Altitude, and Own-ship Barometric Altitude. Currently, the CDTI is not expecting Own-ship Geometric Altitude or Traffic Relative Altitude based on HAE.
  - g. Barometric quality (BAQ) is not needed in the CDTI. ASSAP does not plan to send any quality information to the CDTI. Only traffic validation status for each application will be sent to the CDTI. ASSAP will use quality information to determine traffic validation for each application.
  - h. The ASSAP and CDTI group agreed that the North/East Velocity parameter in Table 3-16 of the ASA MASPS can be sent as Ground Speed.
  - i. The ASSAP and CDTI group agreed that the Emergency / Priority Status parameter in Table 3-16 of the ASA MASPS is an "optional" requirement from ASSAP to CDTI.
  - j. The ASSAP and CDTI group agreed that the Time of SV Estimate parameter in Table 3-16 of the ASA MASPS can be removed.
  - k. The CDTI group asked about the status of the TIS-B In-service parameter. Currently, this parameter is beyond ASSAP's scope.
  - l. The CDTI group asked if the CD application is on when own-ship is on-ground. ASSAP said that the CD application may be disabled below some determined AGL value.
2. Follow-on ASSAP group meetings are scheduled as follows:
    - a. March 27-30, 2007 at RTCA headquarters (located in Washington, DC)
    - b. June 5-8, 2007 at Rockwell Collins (located in Cedar Rapids, Iowa)
  3. Sehtu would like to attend the ASSAP telecons and he requested that they are not scheduled at the same time as the CDTI telecons.
    - a. CDTI Telecon Dates - Feb 15<sup>th</sup>, Mar 8<sup>th</sup>, Apr 19<sup>th</sup>, and May 17<sup>th</sup> (2PM Eastern)

Meeting ended at 12:35PM