

Working Group 6
 RTCA DO-242A ADS-B MASPS
 Minutes of 6th Meeting held at Boeing Corporation, Seattle, WA
 July 16-19, 2001

The attendees included:

Tom Foster, Rockwell Collins	Steve Heppe, ADSI, Inc.	Stuart Searight, FAA / ACT-350
Jerry Anderson, FAA / AIR-130	Gary Livack, FAA / AFS-400	Ken Staub, Trios Assoc.
Richard Barhydt, NASA Langley	James Maynard, UPS AT	Tony Warren, Boeing Air Traffic Mgmt.
Jonathan Hammer, Mitre/CAASD		

Monday July 16, 2001

1. Tom Foster was unable to make the meeting, so the meeting began with opening remarks by Tony Warren welcoming the group to the Boeing facilities.
 - Stuart Searight mentioned he was worried about the lack of participation at Working Group 6 meetings, and expressed his concern that the group might not have the resources to complete DO-242A on schedule.
 - Tom Foster – who had joined the meeting via speakerphone - mentioned that the NIC/NAC changes we are considering are important to the other Working Groups within SC186. WG6 has been asked to produce a white paper of the proposed NIC/NAC changes to document these proposals and assist the document development being done by the other working groups.
 - Tony Warren mentioned that ARINC 718A Mark4 Transponders will include elementary and enhanced surveillance and DO-260 extended squitter. Tony expressed concern that a European buy of these transponders in the thousands raises the possibility that these transponders will NOT be DO-242A and DO-260A compliant. Jim Maynard, who has been attending the AEEC meetings stated that he senses the transponder manufacturers are planning on software upgrades once this round of document development is completed.

2. Review of Agenda. Tom lead a quick review of the agenda.

3. Review and Approve Minutes from last meeting. The minutes were approved without comment.

4. NIC/NAC/SIL
 - The tables put forth by Jim in the introduction of 242A-WP-6-03 were in general agreed to. It was mentioned, however, that it needs to be verified that this implementation will not cause any backwards compatibility problems with VDL-4 equipment.
 - Jim mentioned that – to the best of his knowledge - within the MASPS wherever NUC is mentioned, it correspond to either NIC or NAC. It was agreed that we will need to review the document and update each of these references.

- Tony reiterated his concern that there are potential problems with the Mark 4 characteristic transponders that might not be receiving vertical and horizontal order of merit values if not GPS equipped. If WG6 moves forward with current NIC/NAC proposals, DO-260 transponders – if not upgraded to DO-242A and DO-260A – will most likely be very limited in the number of applications they can support.
- Another problem is that there will not be any backwards compatibility for NIC/NAC, since “Version 0” equipment will not have a way to translate these codes into the original NUC definition. It was agreed that there was no foreseeable way around this problem, and that – with the possible exception of the 1090MHz people - this situation needs to be communicated with the rest of the avionics community ASAP.
- Tom wondered if we need to have an appendix in DO-242A that discusses how to map NUC to NIC/NAC and any possible ways to map NIC/NAC backwards to NUC.
- It was agreed that Jim’s proposal for the 1090 MOPS (242A-WP-6-03) will be the basis for DO-242A addressing NIC/NAC. The tables put forth in the paper’s introduction - which are slightly different than the tables developed by Tony and presented by Tom at the June plenary - will be the basis for the NIC and NAC definitions. Also, tables similar to Tables 2.2.3.2.7.3.6 A and B found in 242A-WP-6-03 will need to be developed specifically for the MASPS which show how the old NUC definition will map to the new NIC and NAC.
- Tony proposed that we need to formally inform SC181 on this work and request a response from them. The letter will ask if accuracy fields (EPA, Containment Radius) can be output on an avionics bus so that they can be used in ADS-B and if DO-229A GPS receiver’s outputs (HFOM, VFOM, HPL) satisfy the requirements of the RNP Navigation MASPS (DO-236A). [AI 6-1] Tony will draft such a letter that either Tom or perhaps Rocky Stone will send to SC181. This letter will also close Action Items 3-1 and 4-6.
- The NIC Table will replace NUC_p table.
- Next, the discussion moved towards exactly what needs to be included in the NIC/NAC white paper requested by the plenary. Topics for this paper include a brief history and justification on why NUC needs to be divided into these components, a capsulation of deliberations on this topic, and specific proposed changes to the MASPS.
 - Tony suggested that a WG4 white paper written 1-1½years ago on NIC/NAC would be a good place to start for a summation and history of the topic. He warned, however, that the discussion on justification of NIC/NAC might be insufficient and/or out of date. [AI 6-2] Tony Warren will dig up the WG4 paper and attempt to update it for our work.
 - [AI 6-3] Jim Maynard will work on incorporating his proposals for the 1090 MOPS into language and tables suitable for the MASPS.
 - [AI 6-4] Stuart Searight will search through the MASPS for all instances of NUC, integrity, and accuracy so that they can be reviewed by WG6 and evaluated as to what changes are needed.
 - It was mentioned that DO-260 does not fully distinguish whether integrity (HPL) or accuracy (HFOM) is being used in some instances. Tony Warren stated that we should stress in our NIC/NAC justification that no system should have so much ambiguity that it cannot be determined by the receiving ADS-B subsystem whether the data being transmitted is an accuracy or integrity component.

- Tony mentioned that we should also stress that there are very few applications that can function without a separate containment radius and other implications of not implementing these changes.
 - Table 22 was discussed to examine what changes will be necessitated by the NIC/NAC changes. Jim Maynard pointed out that his interpretation is that Table 2-2 does not have any requirements, but rather estimates future requirements for applications that had not been developed when DO-242 was written. It was agreed that this table needs to be clarified that it is documented assumed application requirements, and does not define requirements for an ADS-B system. It was agreed by everybody that Table 2-2 and the text passages throughout 2.2.2 referencing Table 2-2 need to be clarified that these are assumed application needs, and not ADS-B system requirements. (“summary of **expected or anticipated** needs” in titles; replace “R” with “ER” in table, a note stating to the effect “these are assumed requirements of applications and the development of these applications will potentially change these expected requirements”) [AI 6-5] Stuart Searight will review 2.2.2 to clarify that this material is not ADS-B requirements, but is rather “anticipated application requirements”.
 - Table 3-4 “ADS-B Report Accuracy, Update Period and Acquisition Range Requirements” was examined next. It was proposed that perhaps we should use the listed applications as representative of service levels which are being used in the ASA MASPS. It was agreed that we should not use service levels since the definitions are not fully defined, and that the concept of service levels in the ASA MASPS will be more encompassing than the equipage classes and capability class codes used in DO-242A.
5. Vertical NIC – While it was agreed to address this (IP33) in DO-242A, Ken Staub mentioned his concern that - while this information would be very useful - it might not be practical at this time since currently it is not really attainable to get vertical accuracy greater than 50 feet. It was also realized that the planned actions for IP39 were to forward it to WG4 for safety analysis and probable reconvening of the NIC/NAC subgroup. Given current timelines and workload of WG4, this probably would force a deferment of IP39. Finally, when the WG6 resources were examined, it also appears this topic might not be able to be addressed in DO-242A. It was proposed that perhaps this material needs to go into an appendix similar to the planned method of addressing TCPs and long-term intent. This will allow forward looking manufactures to build towards incorporating a vertical NIC. This discussion was tabled until Tom Foster can rejoin the meeting on Wednesday. (*For further discussion, see item #19 of these minutes: Telecon with ACM subgroup.*)

Tuesday, July 17, 2001

6. Discussion on Intent / TCP Changes
- The discussion began with Richard Barhydt presenting 242A-WP-6-10.
 - Steve Heppe voiced concern about some of the proposed intent parameters. Specifically, Steve pointed out that the resolution used must allow for interoperability among various ADS-B links and questioned how the frequency of transmissions for intent to require timely reception are to be derived. (Will this need to be based on probability of reception based on range?)
 - Tony stated he feels we need to reconsider our decision to remove material on single TCPs from the body of the MASPS.

- Some of the discussion lead to a difference in what is and what is not a TCP. Jim and Stuart both pointed out that it was this type of confusion that was a factor in the decision to move TCPs to an appendix and defer addressing them for a later revision.
- Tony reiterated his belief that Turn Radius will be an important data element in the future and that we need to reserve bits for it. Steve Heppie spoke out against Turn Radius stating that adding new data types should be avoided wherever possible, and that turn radius can be calculated if the beginning and ending points of a turn are known with the headings before and after the turn maneuver takes place.
- After some discussion on TCPs, Tony backed off his request to revisit keeping this information in the MASPS body and agreed to support placing it in an appendix with the long-term intent material.
- It was the consensus that we will move forward with short-term content and develop this material in such a way that it will allow to transition of use of TCPs and long-term intent.
- For the August WG6 meeting: [AI 6-6] Richard will have draft MASPS material for short-term intent, and [AI 6-7] Tony will have a draft appendix for long-term intent and TCPs.
- *For further discussion, see item #19 of these minutes: Telecon with ACM subgroup.*

7. Re-organization of SV and MS report elements.

- The status of this work on Tuesday was that not much has been done to date. (Though on Thursday Jim Maynard presented 242A-WP-6-11 which addressed SV and MS reports as well as NIC/NAC/SIL. *See minutes item #21 below.*)
- There will be a telecon at Noon (EDT) on Friday, July 27 at which the re-organization of SV and MS report elements will be discussed.
- Stuart wondered what might be done before the telecon and whom might do it so that we had some specific proposals to discuss during the telecon.
- Tony asked Jonathan if WG4's work on Service Levels in the ASA MASPS should be considered while we address this material.
- Jonathan stated he felt he would rather see bits reserved for service levels instead of capability classes. Everybody expressed concern that the ADS-B MASPS is being developed before the ASA MASPS.

8. Requiring On-Condition reports for all equipage classes.

- It was realized that this issue - while put in bold in the minutes from the May meeting - was not given any formal action items at the May meeting.
- What are the properties of an on condition report?? Should we be specifying transmission rates, conditions, and parameters, or simply say all equipages need to be able to transmit these reports??
- Richard noted that the only on-condition report considered in DO-242 is TCP+1. Some of the surrounding text probably will need adaptation to generic on-condition reports.
- Jim wondered if we define an initial series of on-condition reports, will it be necessary to have a capability-class code bit for each on-condition report type to announce the ability to broadcast that report??

- Richard stated that it is currently the plan to define 3 on-condition reports for transmission of intent information. These reports are: air-referenced vector, target altitude, and target heading/track.
- The group came to the conclusion that it is an empty requirement to require the capability of handling generic on-condition reports. Without having the definitions of specific on-condition reports, those reports will be meaningless to the receiving equipment.

9. Clarification of “Certified Navigation Center” requirements

- The group focused on Note 9 for Table 3-4 in which the phrase “certified navigation center of aircraft” is found.
- Heading will need to be transmitted so that position data - relative to the Navigation Reference point - can be combined with the aircraft size characteristic (see item #10 of these minutes) for use in map symbols and incursion algorithms.
- For each size code the navigation reference point will be such that a circle (or other shape?) of a given size will encompass all of the aircraft’s extremities.

10. Aircraft Size Characteristic

- Will probably be transmitted in Mode-status or On-condition report.
- If the size characteristic is large enough, position data will be required to be transmitted relative to the navigation reference point while on the ground.
- [AI 6-10] Ken Staub will draft specific MASPS changes that address Aircraft size characteristic (IP04) and navigation reference point (IP14).

11. Air-reference velocity vector

- This discussion took place simultaneously with the discussion on on-condition reports. (See item #7 of these minutes.)
- Conclusions: [AI 68] Richard will update his working paper from the May meeting on specific text for the MASPS on air-reference velocity vectors. [AI 6-9] Tony Warren will collect simulator data to justify this material.

Wednesday, July 18, 2001

12. Other Open Issue Papers

- IP01: Turn Indication – Tony saw two problems with this proposal. First, will turn indication be a useful item for any ADS-B applications?? Second, it is problematic at the MOPS level to develop proper thresholds and mechanisms to implement turn indicators. After some discussion it was agreed that Turn Indication is problematic and should NOT be a required ADS-B message element. This Issue Paper’s resolution is thereby accepted and will be included in DO242A.
- IP02: Altitude Rate Requirements – Steve Heppie asked if the proposal put forth by Tony Warren meant that “the best” altitude rate source must be transmitted, or “at least one” should be transmitted. It was wondered if Baro Altitude rate should be derived within ADS-B if there is no source for rate data. Jonathan felt it should be derived and broadcast.

Examination of Table 3-4 in DO-242 inferred that if there was no rate source, it was not required to send this information. Jonathan said this was certainly not the intent of the MASPS. It was agreed that a suggested algorithm will be placed in the MASPS for rate derivation when no altitude rate source is available. It was then discussed whether all rate information should be derived, even if a rate source is available. It was agreed that altitude rate - whether there is a source for the data or not – is to be a required SV element. [AI 6-13] Jonathan will characterize the Kalman Filter algorithm used in his conflict detection simulation, perform more analysis and coordinate a telecon for the 2nd week in August to further discuss this topic. (This topic was re-visited on Thursday afternoon and the priority of altitude sources was discussed: geo inertial, baro, and derived.) [AI 6-19] Jonathan will draft MASPS revisions to 2.1.2.2.2 to reflect this discussion.

- IP03: Reporting Rates – Jonathan noted that Table 3-4 can be misleading because the update rates specified in the 1st 4 columns of the table should be more based on the range, and not the applications specified in the column headings. After some discussion it was agreed to accept the proposed resolution in IP#3 from Steve Heppe to change the numbers in the “Aid-to-Acquisition” column. Additionally, a new Issue Paper needs to be written discussing the problems in the MASPS with defining requirements by the applications and not the range of operations. This Issue Paper’s resolution is thereby accepted and will be included in DO242A.
- IP05: Anonymous Requirements – While the majority of this proposal was agreeable to everyone, a few aspects were questioned.
 - There was concern expressed about the phrase “shall not change for the duration of that anonymous operation”. It was felt that it should be allowable (required?) to reset these values for both Anonymous Call Sign and Anonymous Aircraft Address if duplicate addresses encounter each other in the same airspace. It was wondered if the text “(i.e., until the ADS-B avionics is reset or until the avionics is switched out of anonymous mode)” was intended to do just that. [AI 6-11] Ron Jones will modify this part of his proposal so that the ability to change the number while maintaining anonymity is required.
 - It was felt there are problems with the specific prefix “VFR” in the anonymous call sign. This string is reserved in “ITU call sign space” and consequently in “ICAO aircraft registration number space” for Canada. (Ron Jones disagrees with this assessment.) It was felt that there has to be approval of whatever string is put forth in the document, and that coordination and approval will be much easier if it comes from a string reserved for American use. It was recommended that Ron Jones needs to work within US to find suitable letter prefixes for call sign. It was also recommended that only 2 letters be used so that a fifth random digit can be used and thus decrease the probability of duplicate addresses occupying the same airspace. [AI 6-12] Ron Jones will seek approval for such a prefix.
 - Jim Maynard summarized the email traffic that occurred regarding whether the call sign should be 7 or 8 characters in length, and what the ICAO requirements are.
- IP06: Additional Aircraft/Vehicle Categories – Gary Livack reported that he would complete AI 5-15 (propose new aircraft/vehicles categories in 2.1.2.1.3) and send it to WG6 via email prior to the August meeting.
- IP13: Surface Transmission Rates – Gary Livack stated he will be attending a meeting on Friday, July 20 with SF-21 people and will inquire if they have or can conduct any analysis

that determines required minimum update rates for aircraft on the ground to support surface movement and runway incursion applications.

13. NIC/NAC/SIL White Paper – The drafted update by Tony Warren of the WG4 paper on NIC/NAC was reviewed. The specifics of that review will be incorporated into another update by Tony. Other highlights of the review were the agreement that NIC, NAC, and SIL will be in Mode Status reports and not the State Vector. A statement justifying this move (NUC is a state vector element) should be in the white paper. Some justification for this is that these values don't change often, and only when they change for the worse, do they need to be broadcast ASAP. [AI 6-14] Tony Warren will update the NIC/NAC white paper per the review at this meeting and distribute it by next Friday, July 27. [AI-6-15] Arrange a telecon to review Tony's updated paper for August 1, 1:00-3:00EDT.
14. Surveillance Concerns with DO-229C and DO-253A (WAAS & LAAS MOPS)
 - Tom Foster presented 242A-WP-6-08 and 242A-WP-6-09 which summarized proposed updates to the LAAS and WAAS MOPS. These documents do not require the output of Position/Velocity/Time (PVT) data, HPL, VPL, HFOM, or VFOM. All of the data elements are important to ADS-B, and Tom proposed that we get as broad a response as possible from the SC-186 community. [AI 6-16] Tom will develop letters in response to both DO-229C and DO-253A stating the needs and concerns of the ADS-B community.
15. Gary Livack joined the group by speakerphone. We discussed what the ACM group was discussing at their meetings being held in Chicago. TCPs and the broadcast of RA information were among the items of direct relevance to both groups. Also discussed with Gary were Issue Papers 6 & 13. (*See item 12 of these minutes for discussion on those IPs.*)

Thursday, July 19, 2001

16. Backwards Compatibility White Paper – Tom reported that he has not finished a draft of this paper.
17. New Issue Papers
 - IP44: Data Source Issue Paper – Tony walked the group through his submitted Issue Paper on the proposed Appendix on Data Input and Data Source requirements to support broadcast of ADS-B parameters.
18. Telecon with ACM Group
 - Some members of the ACM subgroup of WG1 joined the meeting by speakerphone to discuss a few Issue Papers being considered for Revision A by WG6. Participants included Bob Hilb (UPS), Dave Witchey (United Airlines), and Martin Eby (Source Code Systems, Inc.).
 - Bob Hilb began the discussion stating that cost should be a factor in putting things into the system at this time regardless of the maturity of concept of operations. He feels strongly – as an airline representative - that it is less expensive to certify future changes or modifications than it is to certify major new functionalities. For these reasons, Bob feels that items such as broadcast of RA information, TCPs, and Vertical NIC should not be deferred because they

are not completely resolved, but should rather be included now and modified as needed in future MASPS revisions.

- IP12: TCAS RA Information –
 - It was reported as the current position of the ACM group that the only information their system would need is that an aircraft that is TCAS equipped is currently issuing an RA. This would allow the ACM system to issue any needed maneuvers only in the horizontal plane if it needs to issue a conflict resolution with a TCAS equipped aircraft experiencing an RA.
 - Jerry Anderson questioned what the requirements would be on the broadcast rate of this information. There was some discussion on whether this information might be transmitted in the state vector, or mode-status report. It was the philosophy of the ACM group that if the occurrence of an RA is considered part of the aircraft's state, and that information is broadcast at no less than the rate that the State Vector Report, that will be sufficient for the ACM system.
 - After a lengthy debate it was agreed that Bob Hilb would ask WG4 to examine the transmit/receive rate requirements to broadcast the fact that an ADS-B equipped aircraft is currently experiencing an RA.
- IP39: Vertical Integrity Bit –
 - VPL will be provided when available and some bits will be reserved to identify the integrity of non-GPS altitude sources (ex. single barometric with no integrity, or dual altimetry with cross-checking).
- IP21: TCPs –
 - This was wanted more in regards to cost of future certification, then to foreseen uses of TCPs by the ACM system.
 - Bob Hilb and Dave Witchey expressed their desire for formats and structures to be used to fill in TCP parameters even if not all of those fields are used.
 - Richard, Tony and some others will meet with a subset of WG1 August 15th and 16th at which there will be an attempt to find a TCP and short-term intent implementation agreeable to everyone. Bob Hilb will attempt to schedule an RTCA room for the meeting.

19. Still More Open Issue Papers

- IP29: Requirements for Geometric Altitude in SV Reports – It was surmised that the proposed revision to Table 3-5 “State Vector Report Elements” in Jim Maynard’s 242A-WP-6-11 would be found as an acceptable resolution for the closure of this Issue Paper. [AI 6-18] Steve Heppe will review the proposed Table 3-5 and provide feedback on his satisfaction that this material satisfies the closure of IP29.
- IP30: Clarifications of Definitions – Steve Heppe reiterated he felt “automatic” as it is defined as part of ADS-B should more closely reflect Webster’s current definition.
- IP32: Capability Code Definitions – While Capability Codes were discussed in conjunction with the Mode Status report requirements, this issue paper was not specifically discussed at this meeting.

- IP35: Verify Table 3-4 – While examining Appendix J, the Recommended Design Goal for alert times in the Collision Avoidance scenario depicted in Figure J-12 was discussed in detail. It is this design goal that was a strong basis for the 95% probability update rates. Jonathan recalled that the design goal of an alert time of 14 seconds was arrived at rather arbitrarily. It was decided, however, that simply lowering that goal was troublesome, since that would be another arbitrary action.

The final conclusion for a resolution to IP35 is to modify Note 7 by removing the formula and explaining that the 99th percentile received report update period is normative. And that other update period/receipt probability ratios could be acceptable subject to analysis. [AI 6-17] Steve Heppe will propose specific language for note 7 and distribute it via email.

20. NIC/NAC/SIL Change proposals – The group walked through 242A-WP-6-11. This paper is Jim Maynard’s first draft of MASPS changes addressing NIC/NAC/SIL and State Vector Report Content. [AI 6-20] The results of this review and the feedback given will be incorporated by Jim into an update that will be distributed as 242A-WP-6-11A. [AI 6-21] Ken Staub will examine heading accuracy requirements for aircraft on airport surfaces. [AI 6-22] Tony Warren will verify the accuracy of Note #3 on page 8 of 242A-WP-6-11.

21. Upcoming Meetings

- August 27-30, 9:00AM Monday – 3:00PM Thursday, at the Rockwell Offices in Arlington, VA.
- September 25-27, Washington D.C. area.
- October 23-26, Washington D.C. area.

22. Action Items

Action Number	Action Item Description	Assigned to	Status
6-1	Draft letter to SC-181 asking if accuracy fields can be output on an avionics bus so that they can be used by ADS-B and if DO-229A GPS receiver’s outputs (HFOM, VFOM, HPL) satisfy the requirements of DO-236A. (This will also close AI’s 3-1 & 4-6.)	Tony Warren	
6-2	Do preliminary update of WG4 paper on NIC/NAC and distribute it to group.	Tony Warren	Completed
6-3	Propose specific MASPS changes for NIC/NAC based on tables and material in 242A-WP-6-03.	Jim Maynard	Completed (242A-WP-6-11A)
6-4	Search entire MASPS for instances of “NUC”, “integrity”, and “accuracy” to assure NIC/NAC changes are complete.	Stuart Searight	
6-5	Clarify Tables 2-2 and 2-3 and all text referencing these tables. (This material is not ADS-B requirements, but is rather “anticipated application requirements”.)	Stuart Searight	
6-6	Update proposed specific MASPS language to address short-term intent information for the August WG6 meeting.	Richard Barhydt	
6-7	Draft appendix that will address long-term intent and TCPs for the August meeting.	Tony Warren	
6-8	Write specific MASPS changes for air-reference velocity vector and IP37.	Richard Barhydt	
6-9	Collect simulator data that will justify/support the MASPS IP37 changes.	Tony Warren	

Action Number	Action Item Description	Assigned to	Status
6-10	Draft specific MASPS changes that addresses Aircraft size characteristic (IP04) and navigation reference point (IP14).	Ken Staub	
6-11	Clarify or change wording in proposed MASPS changes for IP05 so that anonymous addresses will be reset if duplicate addresses are detected.	Ron Jones	
6-12	Get approval for reserving suitable prefix to be used for anonymous call sign and address.	Ron Jones	
6-13	Characterize the Kalman Filter algorithm used in his conflict detection simulation, perform more analysis and coordinate a telecon for the 2 nd week in August.	Jonathan Hammer	
6-14	Distribute updated NIC/NAC white paper reflecting review at meeting #6 no later than Friday, July 27.	Tony Warren	
6-15	Arrange telecon for Wednesday, August 1 from 1-3 EST to discuss the white paper update.	Tony Warren	
6-16	Develop and letters in response to both DO-229C and DO-253A stating the needs and concerns of the ADS-B community.	Tom Foster	
6-17	Propose specific language to replace the formula in note 7 of Table 3-4, and distribute it via email.	Steve Heppe	
6-18	Review the proposed revision of Table 3-5 in 242A-WP-6-11 and determine if it adequately resolves IP29 on the reporting of both geometric and barometric pressure altitude.	Steve Heppe	
6-19	Propose specific changes to 2.1.2.2.2 to reflect discussions on IP02.	Jonathan Hammer	
6-20	Update 242A-WP-6-11 to reflect WG6 walkthrough of initial draft of NIC/NAC/SIL and SV Report material	Jim Maynard	Completed. (7/24/01)
6-21	Examine to what accuracy does heading need to be recorded for aircraft on airport surface.	Ken Staub	
6-22	Verify the accuracy of Note #3 on page 8 of 242A-WP-6-11.	Tony Warren	
6-23	Author an Issue Paper requesting Table 3-4 be clarified by reorganizing it more by acquisition range than by applications.		
5-1	Write an Issue Paper documenting the issues and concerns related to passive ranging. This Issue Paper will <u>not</u> be addressed in Rev A.	Jim Maynard	
5-2	Summarize our discussions on IP2 and propose alternate resolution for using "best source" for altitude rate.	Tony Warren	Closed. (242A-WP-5-09)
5-3	Author a proposed footnote to the definition of ADS-B which talks to the link flexibility and protocol issues in response to the groups discussion on IP30.	Dan Castleberry	
5-4	Verify that the update to the formula in note 7 of Table 3-4 proposed in IP35 is consistent with the requirements defined in the table.	Jonathan Hammer	Closed. Superseded by agreed upon resolution to IP35 at July meeting.
5-5	Write an issue paper calling for an appendix describing the various data sources needed to support different levels of ADS-B functionality	Tony Warren	Completed. (IP44)
5-6	Develop possible straw-man resolutions for IP33	Richard Barhydt Jim Maynard Dan Castleberry	Partially addressed by 242A-WP-6-11
5-7	Formally pass on Issue Paper "New Livack 3" to WG4 for consideration and safety analysis.	Stuart Searight	

Action Number	Action Item Description	Assigned to	Status
5-8	Copy ALL information from IPs 9, 27, and 28 into IP37 and close IPs 9, 27, and 28 with a reference to IP37.	Richard Barhydt Stuart Searight	Completed 6/27
5-9	Add references to "New Livack 2" of 242A-WP-5-02 within IPs 4, 6, 7, 13, 18, and 19.	Stuart Searight	Completed 6/27
5-10	Provided a better definition and justification for keeping Turn Indicators as required message element (IP01)	Jonathan Hammer	Closed. It was agreed to accept IP01 at the July WG6 meeting.
5-11	Organize a telecon to discuss Tony Warren's proposed alternate resolution for IP02 (AI 5-2)	Steve Heppe	Closed. Overcome by Events.
5-12	Present summary of groups discussions of IP03 and present them to WG4 at their June meeting	Richard Barhydt	Closed. Overcome by Events.
5-13	Perform and present analysis needed to determine minimum required rates requested in IP03.	Steve Heppe	Closed. (It was agreed that analysis present with IP was sufficient.)
5-14	Develop specific MOPS language to resolve IP05 based on paper presented by Ron Jones (242A-WP-5-03)	Ron Jones Bill Flathers	Completed. 242A-WP-6-02
5-15	Propose any needed additional aircraft/vehicle categories listed in 2.1.2.1.3. (IP06)	Gary Livack	
5-16	Provide briefing to group on current status of ACM work and its ConOps, in particular the planned use of broadcast TCAS RA information requested in IP12	Bob Hilb	Completed. (WG1 joined July WG6 meeting via telecon.)
5-17	Coordinate with SF-21 group to develop and present pertinent analysis on the necessary broadcast rates needed to support runway incursion. (IP13)	Gary Livack	
5-18	Rework titles of IPs to not include "Comments from 1090" or authors names.	Stuart Searight	Completed 6/27
5-19	For IP21, produce appendices that will capture original TCP MASPS material and discuss work envisioned with TCPs and Long-term Intent information.	Tony Warren	Closed. (Superseded by AI 6-7.)
5-20	Coordinate about work being done to resolve IP23 and IP32 regarding a way to map ADS-B capabilities, applications, features, and intended functions to the draft Advisory Circular on Guidelines to the Operational Approval for ADS-B Avionics.	Gary Livack Jim Maynard	
5-21	Notify John Gonda and Pedro Rivas of the agreed upon deferral of IP25.	Tom Foster	
2-15	Produce IP on protecting ADS-B services from other services provided by a shared data link	Tom Foster	
2-16	Write ad hoc group's response to issue #3 of IP7 that will put issue in broader context and serve as proposal to WG#4 for consideration in the ASA MASPS.	Dan Castleberry	
3-1	Formulate proposed requests of SC-181 regarding placing requirements on DO-236 (RNP) to provide inputs for ADS-B as it relates to NIC/NAC.	Tony Warren	
3-6	Write White Paper on backward compatibility subject	Tom Foster	
3-9	Write comments to IP15 explaining rationale for rejecting	Dan Castleberry	

Action Number	Action Item Description	Assigned to	Status
4-4	Write a note for Table 2-1a and 2-1b to address the independence of the accuracy and integrity values and to clarify the reference to DO-236A	Tony Warren	
4-6	Consult with Boeing navigation experts to obtain inputs on the MASPS definitions of navigation containment and integrity for consistency with RNP and GNSS standards	Tony Warren	
4-7	Provide IP on proposal for ADS-B requirements to address formation flight characteristics	John Gonda	Also see AI 5-21