

# ADS-B MASPS DO-242A Working Group 6 Report

Presented at the RTCA SC186 Plenary  
Meeting  
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## ADS-B MASPS Revision A Status

- Targeting document completion to support April Plenary approval
- Significant change items have been communicated by White Papers providing justifications and details
  - Replacement of NUC with NIC/NAC/SIL
  - Enhancement of Intent/TCP requirements
- Detailed briefings prepared for this meeting
  - NIC/NAC/SIL changes
  - SV/MS/OC Report re-organization
  - Intent/TCP changes
- April approval potentially at risk due to limited amount of feedback on acceptability of proposed changes
- Need Plenary concurrence with planned scope of changes for Rev A

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## Issue Paper Summary

- Change Issue Papers (IP) used to document issues and considerations
- 50 Issue Papers submitted to date
  - 11 IP's closed by consolidating with - or being superceded by - other IP's.
  - 6 IP's rejected as out of scope of WG6 charter
  - 5 IP's deferred for consideration until later MASPS revision
  - 2 IP's withdrawn by author after WG6 review
  - 3 IP's yet to be reviewed by WG6
  - 23 IP's still being considered for inclusion in DO-242A (not all will get addressed in DO-242A)
- All WG6 materials can be found at <http://adsb.tc.faa.gov>

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## Major MASPS Changes

- Separating Integrity and Accuracy components of  $NUC_P$  (NIC/NAC) (IP's 8, 24, 39)
  - Change needed to allow receiving equipment to place an integrity bound and an accuracy bound around received surveillance data.
  - Navigation Integrity Category (NIC) will be in State Vector reports
  - Navigation Accuracy Category (NAC) and Surveillance Integrity Level (SIL) will be in the Mode Status reports
  - Considered backward compatibility impacts on current link MOPS and early fielded equipment
  - For more information refer to WG6 White Paper (242A-WP-10-02)

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## Major MASPS Changes

- TCP clarification and expanded definition of Intent Information (IP's 26, 11, 21, 31, 45)
  - Objectives of TCP/Intent changes are:
    - Address deficiencies in current MASPS definitions
    - Establish data structures to support future intent requirements
  - TCP definition will be expanded to include 2-D RNAV waypoints, 3-D and 4-D TCPs, and level-offs
  - Target State Reports (TSR's) will be used for Short term intent (i.e. target altitude, target heading/track angle)
  - Trajectory Change Reports (TCR's) will be used for multiple flight segment parameters and TCP's
  - For more information refer to WG6 White Paper (242A-WP-10-03)

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## Major MASPS Changes

- Re-organization of State Vector, Mode Status, and On-Condition Reports (IP 33)
  - Scope of changes are:
    - Address NIC/NAC and Intent related changes
    - Clarify data element definitions (including minimum range, resolution, bit requirements)
    - Clarify data rate requirements
    - Clarify data requirements by equipage class
    - Address ambiguities experienced by MOPS users
    - Improve readability of requirements
  - Impacts on MOPS still being assessed
    - Correction of mis-interpreted MASPS requirements
    - Changes to MASPS requirements traceability

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## Other Key MASPS Changes

- New On-Condition Air-referenced Velocity Report (IPs 9, 27, 28, 37)
  - Added support for broadcast of heading and airspeed
  - Aids in correction of wind related prediction errors
  - Identified as beneficial for in-trail spacing, separation assurance/sequencing, and flight path deconfliction applications
- Correlate requirements to range of acquisition and operation, not potential applications. (IP 47)
  - Tables 3-3 and 3-4 will be reworked to clarify that requirements are range dependant and not correlated to a limited set of example applications
  - Actual requirements won't change, but will be less ambiguous

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## Other Key MASPS Changes

- New requirements related to runway incursion alerting and surface operations (IPs 4, 14, 38)
  - A 4-bit aircraft size characteristic will be broadcast
  - Own position data will be correlated to a defined "navigation reference center" for higher NAC levels
  - Clarification of criteria for determination of airborne and on-ground states.
- Correction of Note 7 for Table 3-4 (IP 35)
  - Was interpreted by some as "alternative requirement" for 95% reception probability.
  - Current note is in conflict with Table requirements
  - Note to be revised to allow alternative means to satisfy requirement

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## Other Key MASPS Changes

- **Capability Class Codes (IPs 12, 32)**
  - Change “Class Codes” from an applications list to equipment capabilities
    - TCAS and CDTI capabilities to be broadcast
    - Growth for other CC codes is provided
  - Consistent with “service levels” concept proposed by WG4
- **Anonymous mode for ADS-B operations (IP 5)**
  - An address qualifier will be added to signify when 24-bit address is ICAO, anonymous, or other
- **Clarification of Aircraft/Vehicle Category codes (IP 6)**
  - Revised aircraft weight categories to harmonize with ICAO and US definitions
  - Added codes to identify point obstacle, cluster obstacle, and line obstacle

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## Response to Capstone Letter

- **Capstone program experience with using ADS-B for surveillance in non-radar airspace identified ADS-B MASPS improvements items**
  - Request for “IDENT” capability
    - Will be added in Rev A
  - Request for equivalent to transponder VFR(1200) code
    - Will be added in Rev A
  - Request for “ALTITUDE OFF” capability
    - ADS-B systems will typically utilize higher integrity altitude sources
    - Means to flag or report integrity of altitude sources is provided
    - Is a pilot controlled “ALT OFF” function still needed?

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## Response to Capstone Letter (cont)

- Controller display requirements
  - Basic data<sup>1</sup>: call sign, type a/c, altitude, speed - Provided
  - Identification (IDENT) feature - See above
  - Stop altitude squawk - See above
  - Emergency - Provided
  - Hijack - Provided
  - No radio - Provided
  - VFR(1200) - See above
  - Stand-by, i.e. no squawk - Not provided<sup>2</sup>

### Notes:

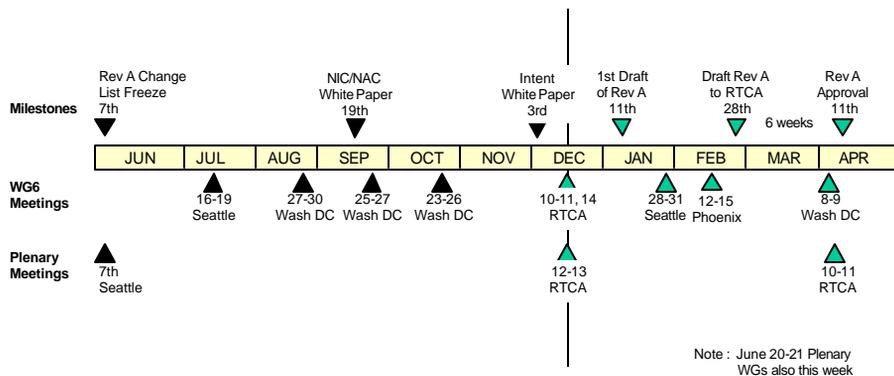
- <sup>1</sup> Some of these items are not directly provided by Mode C equipment
- <sup>2</sup> This operating mode addresses a unique problem with transponders and is not needed for ADS-B

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## WG6 ADS-B MASPS Development Timeline



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## WG6 ADS-B MASPS Future Meetings

- December 10-11, 14                      Rockwell Collins, Arlington, VA
- January 28-31                              Boeing, Seattle, WA
- February 12-15                            TBD, Phoenix, AZ
- April 8-9                                      RTCA, Washington DC

Note: Plenary Meetings                      December 12-13 @ RTCA  
    April 10-11 @ RTCA