Memorandum of Understanding
between the
National Air Traffic Controllers Association
and the
Federal Aviation Administration

This Agreement is made by and between the National Air Traffic Controllers Association (hereinafter "NATCA" or "the Union") and the Federal Aviation Administration (hereinafter "the FAA" or "the Agency"), collectively known as the "Parties." It represents the Parties' agreement concerning the Implementation of the Capstone Demonstration Project at the Anchorage Air Route Traffic Control Center ("ARTCC").

Section 1. Prior to Initial Operating Capability ("IOC"), the Agency shall resolve to the satisfaction of the Union at the national level, Issue #3 as described in the "ATS Capstone Review for the implementation of Radar-like Services White paper," dated December 15, 2000, attached hereto.

Section 2. Prior to IOC, the Parties at the facility level shall jointly develop a transition plan and brief all affected bargaining unit employees ("BUE") on the plan.

Section 3. Prior to January 16, 2001, the Agency shall resolve, to the satisfaction of the Union at the national level, Issue #1 as described in the Capstone Review White Paper. The Agency shall discontinue the use of Capstone equipment and procedures if the issue is not resolved by that date.

Section 4. Prior to May 30, 2001, the Agency shall resolve, to the satisfaction of the Union at the national level, Issue #4, as described in the Capstone Review White Paper. The Agency shall discontinue the use of Capstone equipment and procedures if the issue is not resolved by that date. Additionally, if the issue is not resolved by that date, the Agency shall establish a work group consisting of two BUEs from each area of operation at ZAN to determine and resolve the impact on the facility, including, but not limited to, traffic management initiatives and staffing. The Agency shall provide "one-for-one" backfill overtime to replace the two BUEs from each area. Capstone equipment or procedures shall not be re-implemented at ZAN until all work group identified issues are resolved to the satisfaction of the work group.

Section 5. All BUEs shall be granted immunity for operational errors and/or operational deviations if the use of the Capstone procedures and services cause a distraction from the primary responsibility of separation of aircraft from other aircraft or airspace, from IOC to 60 days after operational readiness demonstration ("ORD").

Section 6. The Agency shall not install and/or activate any additional Ground Based Transceivers beyond the three (3) that are presently certified in the Bethel area without prior notification to and negotiation with the Union at the national level. The Agency shall not expand the geographical area in which Capstone equipment and/or procedures are utilized without prior notification to and negotiation with the Union at the national level.

Section 7. Within sixth (60) days of the execution of this Agreement, the Agency shall convene a meeting in a mutually agreeable location for the purpose of addressing and resolving existing and future automation enhancements at ZAN, including but not limited to, how ZAN receives, funds, and implements National Airspace System products such as the Enhanced Status Information System. The Agency shall provide duty time, travel and per diem for up to four (4) ZAN BUEs and up to four (4) other national Union representatives to attend the meeting. The Union shall designate its meeting attendees.

Section 8. The Parties at the facility level shall jointly develop DYSIM training problems that include radar/non-radar mixed environment operations. All affected BUEs shall complete said training within thirty (30) days of IOC. For employees unavailable due to leave or other absences from the facility, this training shall be completed not later than sixty (60) days after IOC. Said training shall not be pass/fail in nature.

Section 9. If either party at the facility level determines there is a safety or operational impact, they may terminate the use of Capstone equipment and procedures at any time.

Section 10. The Agency shall implement altitude sectorization Phase I (do not display traffic above x altitude) no later than August 30, 2001. Phase II (those items not covered in Phase I) will be implemented no later than January 30, 2002, per attached schedule. By February 28, 2001, the Agency shall convene a work group of no less that two (2) BUE from each Micro-EARTS facility and no less than two (2) other national Union representatives to complete the functional description narrative for this enhancement. The Agency shall provide duty time, travel and per diem for Union representatives to attend the meeting. This work group will also prioritize the national Micro-EARTS site delivery schedule (attached).

Section 11. The Agency shall provide duty time, travel and per diem for up to four (4) national Union representatives for a site visit to ZAN to observe ADS-B/Capstone operations and LAN upgrades. The Union shall designate its' representatives. This site visit shall occur no later than September 30, 2001.

Section 12. The Agency shall adhere to the attached "Micro-EARTS Site Deliveries" schedule. All upgrades described in the DSR CHI Upgrade MOU Addendum, dated January 22, 1999, shall be incorporated into DSR at ZAN beginning no later that October 31, 2001, with completion by August 30, 2002, unless otherwise determined by the work group in Section 10.

Section 13. If the Agency fails to meet any required date(s) in this agreement, the Agency shall convene a meeting, one for each missed date, within 7 days of each required date, at ZAN for the purpose of personally explaining to bargaining unit representatives why the Agency was unable to meet their obligations as agreed to in this agreement. ATP-1, AOS-1 and AUA-600 shall personally attend each meeting.

Section 14. All issues expressly delegated to the Parties at the facility level by this Agreement for negotiation shall be negotiated and resolved in accordance with the provisions of Article 7 of the CBA.

Section 15. This agreement constitutes no waiver by either Party of any right guaranteed by law, rule, regulation, or contract.

Section 16. This Agreement may be re-opened by mutual agreement of the Parties in accordance with the provision of Article 7 of the CBA.

Section 17. The Parties shall meet at the end of the Capstone Demonstration Project to determine the feasibility of continuing this MOU.

FOR THE UNION:

Wade Stanfield

FOR THE AGENCY:

J M Griffith

Date: 12/27/00

Settlement Agreement
between the
National Air Traffic Controllers Association
and the
Federal Aviation Administration

This Agreement is made by and between the National Air Traffic Controllers Association (hereinafter "NATCA" or "the Union") and the Federal Aviation Administration (hereinafter "the FAA" or "the Agency"), collectively known as the "Parties." It represents the Parties' settlement of the Union's Unfair Labor Practice concerning the DSR CHI Upgrade MOU Addendum, dated January 22, 1999 at the Anchorage Air Route Traffic Control Center ("ZAN").

The Agency shall provide 60 credit hours to each bargaining unit employee ("BUE") at ZAN. In return, the Union shall withdraw all Unfair Labor Practices associated with this agreement.

In addition, for Sections 4, 8, 10, and 12 of the NATCA/FAA MOU concerning the Implementation of the Capstone Project at the Anchorage Air Route Traffic Control Center, if the agency commitment is not adhered to, each BUE shall receive 16 credit hours for each occurrence. It is expected that the parties will bargain all local issues in good faith and in sufficient time to meet all dates.

FOR THE UNION: Wade Stafield

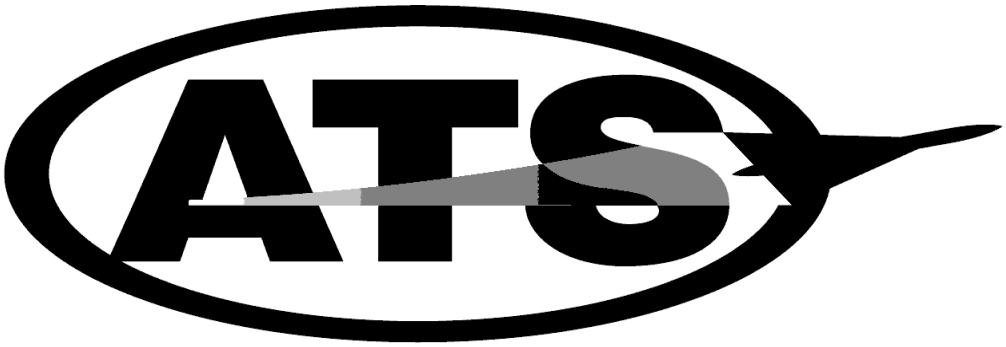
FOR THE AGENCY:

Date: 12/27/00

ATS Capstone Review

For the Implementation of Radar-like Services

White Paper



December 15, 2000

ATQ-CAP-WP01-01-F

Lisa Bee
Capstone ATS Test Team Lead

Document Change History

Document Version	Date	Description
ATQ-CAP-WP01-01-D-01	11/20/00	Initial Draft
ATQ-CAP-WP01-01-D-02	12/5/00	Initial Tech Edits
ATQ-CAP-WP01-01-D-03	12/7/00	Revisions/tech edits/Added cover page
ATQ-CAP-WP01-01-D-04	12/13/00	Added text for sections 2,4,5,6,7,8
ATQ-CAP-WP01-01-D-05	12/13/00	Tech Edits; added Appendix A
ATQ-CAP-WP01-01-D-06	12/14/00	Tech edits; acronym clean up
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ATQ-CAP-WP01-01-D-08	12/14/00	Tech edits
ATQ-CAP-WP01-01-D-09	12/15/00	Added “DRAFT”; ATQ/EER tech edits
ATQ-CAP-WP01-01-F	12/15/00	Final document for signature

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Appendix A Capstone Review Areas

Appendix B Acronym List

1.0 PURPOSE AND SCOPE

The purpose of the Air Traffic Services (ATS) Capstone Review conducted by the Capstone ATS Test Team was to independently identify potential operational issues in support of a decision to implement Capstone Radar-like Services. The review was based on documentation and information provided by representatives of the Capstone program. This White Paper encompasses the results of the Capstone ATS Test Team's review, which was conducted from November 18 through December 15, 2000.

2.0 DESCRIPTION OF RADAR-LIKE SERVICES

Initial Capstone plans include the installation of government-furnished Global Positioning System (GPS)-driven avionics suites in up to 150 commercial aircraft serving the Bethel/Yukon-Kuskokwim delta area in and around Bethel, Alaska. The Automatic Dependent Surveillance - Broadcast (ADS-B) information from the GPS avionics will be used to provide surveillance information to Air Traffic Controllers at the Anchorage Air Route Traffic Control Center (ARTCC) (ZAN). ADS-capable software is currently running on the operational system. The scheduled date for Capstone Radar-like Services to begin is January 1, 2001.

Capstone Radar-like Services enable Air Traffic Controllers to use ADS-B surveillance information to provide service to pilots in the Bethel, Alaska area. ADS-B provides the Controller with position, identification, and altitude information for ADS-B equipped aircraft. Compatible data link transceivers installed at strategically located ground sites receive the ADS-B frequency for ADS-B messages from equipped aircraft flying in the area. These messages are forwarded to ZAN for processing and display to the Controller.

3.0 CAPSTONE ATS TEST TEAM

The ATS Capstone Review was planned, conducted, and documented by the Capstone ATS Test Team. Members include Air Traffic (AT), Airway Facilities (AF), Operations Systems (AOS) personnel, and AT union representatives.

The Capstone ATS Test Team membership consists of:

Name	Organization	Responsibility
Lisa Bee	ATQ-3	ATS Test Team Lead
Russ Biehl	Anchorage ARTCC	ZAN AT Supervisor
Tim Crowley	Anchorage ARTCC	ZAN NATCA Representative
Mark Dill	ARN-100	NATCA Representative
Keith Dutch	ATP-410	ATP Representative
Tom Elledge	SA-TSU	ZAN AF Representative
Boyd Francisco	Minneapolis ARTCC	ZMP AT Supervisor
Clarence Goward	AAL-530	AT Alaska Region Representative
Ann Olson	AOS-443	ZAN AOS Representative

Support personnel for the ATS Capstone Review include:

Name	Organization	Responsibility
Huan Nguyen	ATQ-3	ATS Test Team Backup Lead
Joe Daniele	EER Systems Inc.	Technical Support Lead
John Layno	EER Systems Inc.	Technical Support
Jeanne Trapani	EER Systems Inc.	Technical Editor

4.0 REVIEW DOCUMENTS

The following documents were used to support the ATS Capstone Review:

Requirement and Implementation Documents

- Minimum Aviation System Performance Standards for Automatic Dependent Surveillance Broadcast (ADS-B): RTCA/DO-242 (RTCA), 2/19/98
- Capstone Program Plan, Version 2.0: Capstone Program Management Office, 3/10/00
- Joint Government/Industry Roadmap for Free Flight Operational Enhancements: RTCA Select Committee, 8/98
- FAA Administrator to Alaska Air Carriers Association President Letter: AOA-1, 1/3/00
- Capstone Interim Design Specification: Capstone Program Management Office, 5/29/00
- Capstone ADS-B IFR Service Transition Plan: ZAN-510, not dated
- Technical Standard Order, Airborne Supplemental Navigation Equipment using GPS, TSO-C129a: ACE, 2/20/96

System Architecture Documents

- System Architecture Description for Capstone Communications: AAL-512, 3/24/00
- Capstone Interface Control Document (ICD) for the Ground-Based Transceiver (GBT) to the Micro-EARTS Gateway: SA-TSU, 11/13/00

Procedures Documents

- Draft Air Traffic Control Procedures and Phraseology Associated with ADS-B at Anchorage ARTCC: ATP-1, Version dated 12/12/00
- Draft Procedures and Phraseology Associated with Capstone ADS-B for Aircraft Flown by xxxxxxx Airline in Alaska: AAL-1SC, not dated
- Flight Standards Service Recommendation to Authorize Anchorage ARTCC to Provide ATCS to Capstone ADS-B Equipped Aircraft Conducting Operations in Non Radar Airspace in the Bethel, Alaska area: AFS-1, 12/2000
- Separation Standards for the Use of ADS-B by Anchorage ARTCC: AFS-400, 7/20/00
- Interim ADS Procedures – Certification, Restoration, and Logging: AAL-470, 8/18/00

Test and Evaluation Documents

- Capstone Test and Evaluation Master Plan for ADS-B Radar-like Services, Version 4.0: Capstone Program Management Office, 10/1/00
- Draft Capstone ADS-B Evaluation Report: AUA-650; 11/30/00

- Draft Micro-EARTS Capstone Functional Description Narrative (FDN), Revision 8, Capstone Program Management Office, 11/1/00
- Draft Capstone Acceptance Test Plan: Capstone Program Management Office, 2/11/00
- Micro-EARTS Capstone Acceptance Test Report: Lockheed Martin for the FAA, 12/5/00
- Capstone Automatic Dependent Surveillance-B (ADS-B) Accuracy Memorandum: AUA-600, 6/12/00
- Initial Results Data Collection Effectiveness Pilot Comments and Interviewer Notes: University of Alaska at Anchorage, 9/00
- Capstone ADS-B Action Request System, ZAN N1800.2: ZAN-510, 11/7/00
- JTIDS/MIDS Interference Effects on UAT: ASR-200, 10/00
- UAA Baseline Report: University of Alaska at Anchorage, 2/00
- Capstone Ground Station ADS-B Coverage of N40: SA-TSU/CAASD, 11/5/00

System Assessment and Analysis Documents

- Draft Capstone Safety Engineering Report #1 – ADS-B Radar-Like Services: Capstone System Safety Working Group for ASY, 12/2/00
- Analysis to Support Approval of Special Navigation Use of the GPS in Alaska: MITRE, 9/97
- Air Traffic Activity; Bethel Tower: APO, CY2000

Certification Documents

- Capstone "Radar-Like Services" Certification Plan: UPS Aviation Technologies, 11/22/00
- Capstone STC Document, Version 4.0: UPS Aviation Technologies, 2/4/00
- UAT Frequency Assignment Letter: FAA and DoD, not dated

Training Documents

- Anchorage ARTCC ADS-B Training Program: ZAN-520, not dated
- ADS-B Training Status: ZAN-520, not dated
- AT Training Sign-in Sheet: ZAN-520, 11/27/00
- Air Traffic Technical Training, Order 3120.4J: FAA, 6/16/98
- ADS-B System Control for MCC: ZAN Airway Facilities CD-ROM, not dated
- Capstone GBT Maintenance Training Package: ZAN Airway Facilities CD-ROM, not dated

Maintenance Documents

- Interim Certification Requirements for ADS-B Ground-Based Transceiver (GBT) Apollo Model GBT 2000, AL N 6360.1: AAL-470, 8/16/00
- Maintenance of Radar Bright Display Equipment Replacement (RBDER)/Micro-En Route Automated Radar Tracking System (MEARTS), Order 6190.16B: AOS-440, 7/17/00
- Facilities and Equipment Maintenance Handbook – GBT, AL 6368.xx: FAA, not dated
- Integrated Logistics Support Plan for Capstone Communications Automatic Dependent Surveillance – Broadcast (ADS-B): Alaska Region, not dated

5.0 REVIEW METHODOLOGY

The review was divided into three phases: 1) development of Readiness Review Areas; 2) review of applicable Capstone documentation; 3) a series of Technical Interchange Meetings (TIMs).

The Capstone ATS Test Team identified review areas, which formed the basis for the review. The review areas were used to identify specific information needed to support a comprehensive review. The Capstone Readiness Review Areas are contained in Appendix A.

The Capstone Program Office and ZAN provided the Capstone ATS Test Team with the documentation identified in Section 4.0, including references applicable to each review area. The Capstone ATS Test Team reviewed the documentation to develop a thorough understanding of Capstone operations, functionality, system performance, procedures, training, supportability, and transition.

As a result of the documentation review, the Capstone ATS Test Team identified specific concerns requiring more detailed information. To obtain the information, the Capstone ATS Test Team conducted a series of TIMs at the Anchorage ARTCC. These TIMs were supported by representatives from the following organizations: the Regional Capstone Program Office; the Office of Air Traffic Systems Development; the Office of System Safety; the National Terminal Systems Engineering Office; the Spectrum Assignment Engineering Office; the Office of Communication, Navigation, and Surveillance; the Anchorage Certification Office; the Alaskan Regional AF Operations Branch; the Alaskan Regional AT Operations Branch; ZAN AT and AF operations; and the National Air Traffic Control Association (NATCA).

Capstone system capabilities and system requirements were discussed to address each review area and the specific concerns identified by the Capstone ATS Test Team during the documentation review phase. Discussions covered aspects such as system performance, functions, test and evaluation activities, system safety assessments, system evaluations, training, procedures, and implementation planning. The following test, assessment, and evaluation reports were used to support the TIMs:

- Micro-EARTS Capstone Acceptance Test Report
  Lockheed Martin for the FAA, 5 May 2000
- Draft Capstone ADS-B Evaluation Report
  AUA-650; 30 November 2000
- Capstone Automatic Dependent Surveillance-B (ADS-B) Accuracy Memorandum
  AUA-600, 12 June 2000
- Draft Capstone Safety Engineering Report #1 – ADS-B Radar-Like Services
  Capstone System Safety Working Group with ASY, 2 December 2000
- UAA Baseline Report
  University of Alaska at Anchorage, February 2000
- JTIDS/MIDS Interference Effects on UAT
  ASR-200, October 2000
- Capstone ADS-B Action Request System, ZAN N1800.2
  ZAN-510, 7 November 2000
- Initial Results Data Collection Effectiveness Pilot Comments and Interviewer Notes
  University of Alaska at Anchorage, September 2000

6.0 POTENTIAL OPERATIONAL ISSUES

As a result of its data review and the TIMs, the Capstone ATS Test Team identified the following potential operational issues. These issues are not listed in priority order.

Issue 1: Under certain known conditions, the Micro-En Route Automated Radar Tracking System (MEARTS) track processor has bonded the tracks of two aircraft that were within 3 nautical miles of each other, resulting in a single target being displayed for the two aircraft. When the data source from one aircraft is ADS-B, the data source from the other aircraft is a transponder beacon code, and the data from either of the sources is not correlated, the targets bond. In this case, the data block associated with the bonded track will indicate an incorrect beacon code. A software build that includes a correction for this problem is scheduled for installation in January 2001.

Issue 2: There is currently no effective process in place to resolve incorrect aircraft International Civil Aviation Organization (ICAO) address assignments. During installation of the equipment in the aircraft, there have been instances where aircraft have been assigned incorrect ICAO addresses or the ICAO address has not been set.

- If the data source for two aircraft is ADS-B and the aircraft have identical ICAO addresses, the tracks will bond and one of the data blocks will drop from the Controller's display.
- Incorrect ICAO addresses have resulted in disruption to the traffic presentation on aircraft multifunction displays.

Issue 3: Instances have occurred where data blocks have swapped between two aircraft as they crossed within 3 nautical miles of each other. This results in misidentification of aircraft. A software build that includes a correction for this problem is scheduled for installation prior to Jan. 1, 2001.

Issue 4: Currently, the MEARTS Control Room Local Area Network (LAN), the Display System Replacement (DSR) display drivers, and the DSR processors are operating at capacity, and will not support additional growth, including anticipated growth associated with ADS-B. As a result of increased data generated by each ADS-B report, adding approximately 55 simultaneous ADS-B tracks to the average radar load will exceed the LAN capacity. When capacity is exceeded, the LAN will slow down, and display information will deteriorate at all Controller workstations. This will result in display data such as mapping, target information, and data blocks being dropped.

Issue 5: The full Remote Maintenance Monitoring capability cannot be implemented until the Capstone Communications and Control Server (CCCS) has been installed. Without the CCCS, there is no capability to provide two-way communications for Ground-Based Transceiver (GBT) Monitor and Control (M&C). A limited GBT monitoring capability is in place, but there is no control capability. The full M&C capability is a requirement to achieve the Operational Readiness Date (ORD) in accordance with an AAL-400 Division Directive.

Issue 6: ATC Procedures have not been finalized. Controllers cannot use ADS-B for separation or to provide ATC services without approved procedures. In addition, the approved ATC Procedures are required in order to complete AT training.

Issue 7: Procedures for ADS-B outage notification have not been finalized. Outage notification procedures are needed to ensure proper Notice to Airmen (NOTAM) dissemination. Coordination is ongoing to ensure that the procedures are finalized and personnel are trained to properly disseminate the ADS-B outage NOTAMs.

Issue 8: The ZAN transition plan for ADS-B operations does not support a safe and orderly transition. Descriptions of transition areas such as training, certification, roles and responsibilities, timeframe, and contingencies do not contain enough detail to provide adequate guidance to all personnel involved in the transition.

Issue 9: AT Supplemental training has not been provided for ADS-B radar-like service procedures, ADS-B service area coverage, and loss or degradation of service. Until this training is accomplished, AT cannot safely or effectively implement ADS-B services.

Issue 10: AF automation and Maintenance Control Center (MCC) training has not been completed. Training for the MCC is developed and partially complete. Training for the automation personnel is being developed and is scheduled for December 18-22. Without completion of training, the system cannot be certified for use.

Issue 11: Implementation of ADS-B will result in additional AT workload associated with providing radar-like services. There has been no formal analysis to determine the extent of the impact. ZAN personnel have discussed potential short- and long-term solutions; however, there are no agreed-upon contingency plans or procedures in place.

Issue 12: Implementation of ADS-B will result in additional certification activity and hardware maintenance for both ARTCC AF personnel as well as field technicians. New equipment includes twelve remote GBT sites as well as equipment installed at ZAN, and staffing levels have not increased to support the additional maintenance requirements. There has been no analysis to determine the extent of the impact.

Issue 13: A risk assessment to enable ZAN to load the MEARTS software during the Holiday Maintenance Alert Moratorium has not been completed. The MEARTS software that is scheduled for installation on December 27, 2000, contains Initial Operating Capability (IOC)-critical enhancements. The risk assessment is necessary to obtain approval of the ZAN Risk Mitigation Plan.

7.0 CAPSTONE ATS TEST TEAM COMMENTS

In addition to the potential operational issues identified in Section 6.0, the Capstone ATS Test Team made the following observations:

Comment 1: The Radar Bright Display Equipment Replacement (RBDER) Mode, which is the backup radar processor for MEARTS, does not provide for ADS display.

Comment 2: Terminal AT personnel have not been provided with ADS-B familiarization training.

8.0 RECOMMENDATIONS

As a result of its review, the Capstone ATS Test Team makes the following recommendations:

Establish a process to ensure that identified track bonding issues are briefed to AT, documented and tracked, and repaired. This process should be in place to support the installation and testing of MEARTS software upgrades scheduled for January 15, 2001. In addition, provide ongoing support to ZAN to identify and resolve software deficiencies.

Implement an effective process to quickly correct known problems with aircraft ICAO address assignments.

Perform and document a rigorous capacity analysis to determine the MEARTS/DSR system capacity. Based on the results of the analysis, develop a detailed implementation plan to ensure that system capacity is not exceeded as a result of the implementation of radar-like services.

Develop and implement the full RMM capability prior to ORD.

Complete the Air Traffic Procedures, the ZAN Transition Plan, training, and coordination with affected organizations prior to the implementation of radar-like services.

Prior to the implementation of radar-like services, complete an analysis of AT workload associated with ADS-B operations, and develop contingency plans and procedures to address the impacts. In addition, prior to system expansion beyond the Bethel GBT site, complete an analysis to determine the AF workload associated with future GBT deployments, and complete a plan to address workload impacts.

Complete the risk assessment and approve the Risk Mitigation Plan prior to loading the operational software on the developmental system scheduled for the week of December 18.

APPENDIX A

CAPSTONE READINESS REVIEW AREAS

1.0 SYSTEM ARCHITECTURE

1.1 Availability

1.1.1 Is the GPS signal availability and integrity suitable for air traffic control separation and services?

1.1.2 Is the Capstone system and component availability suitable for air traffic control separation and services?

a) Component redundancy

b) Single point of failure

c) Sustained loss of Capstone service as a result of power interruptions and failures

1.1.3 Is the Universal Access Transceiver (UAT) signal availability and integrity suitable for air traffic control separation and services?

1.2 Maintainability

1.2.1 Can the Capstone system be maintained effectively to support system availability?

a) No disruption in service

1.2.2 Are the ADS-B data recording processes in the Micro En route Automation Radar Tracking System (MEARTS) effective?

a) Data playback

b) Data analysis

1.2.3 Is the process for second-level maintenance support effective for the MEARTS, Ground Broadcast Transceivers (GBTs), and routers?

1.2.4 Is the process for software support effective for the MEARTS, GBTs, and aircraft?

a) Software releases

b) Adaptation

1.3 Interoperability

1.3.1 Does the Capstone system effectively interface and operate with required systems and facilities?

a) FAA facilities such as ARTCCs (ANC Approach Control), ATCTs (Bethel Tower), etc.

b) MEARTS

c) Offshore Computer System (OCS) containing the flight data processor (FDP)

2.0 SYSTEM PERFORMANCE

2.1 Controller Display Accuracy

2.1.1 Is the ADS-B presentation information suitable for aircraft separation?

a) Aircraft position accuracy

b) As sole source of surveillance

c) As tertiary source of surveillance

2.1.2 With intermittent radar surveillance data (primary) and beacon interrogation data (secondary), is ADS-B surveillance information accurately depicted on the Controller workstation?

a) Aircraft position accuracy
b) Aircraft data block information
c) Correct target symbology
d) Appear on scope within established time parameter

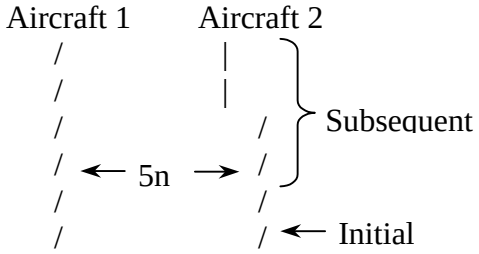
2.2 Cockpit Display Accuracy

2.2.1 Is the ADS-B surveillance information accurately displayed on the aircraft Multi-Function Display (MFD)?
a) Aircraft position accuracy
b) Aircraft data block information
c) Correct target symbology

2.3 Data Processing

2.3.1 Are the ADS-B targets and radar targets accurately correlated?
2.3.2 Are radar surveillance data and ADS-B surveillance data bonding algorithms effective?
a) Bonding algorithm accuracy
b) Unnecessary conflict alerts generated in the radar environment as a result of radar surveillance coverage loss and aircraft are tracked using ADS-B data

Example tracks where aircraft 2 loses radar and beacon and separation is lost:
(/ = radar track; | = ADS-B track)



2.3.3 Do flight strips include the correct identifier in the “remarks” field for ADS-B equipped aircraft?
2.3.4 Is conflict probe processing accurate?
a) MEARTS conflict detection algorithms applied correctly (e.g., prior to, or after radar mosaicing and ADS-B bonding)
2.3.5 Is Minimum Safe Altitude Warning (MSAW) processing accurate?
2.3.6 Can the systems (MEARTS, Capstone, Displays) effectively process the expected ADS-B aircraft equipage?
a) Interface links (e.g., LAN, satellite up/down link services throughput)
b) Processor capacity
c) System recording devices (e.g., CDR)
d) Display processing (e.g., display drivers)

2.4 Certification

2.4.1 Does the certification process ensure that the surveillance portion of the Capstone system meets the “critical” level of certification?
2.4.2 Does the certification process ensure that using Capstone operating frequency does not conflict with other systems and applications?

a) Impact on Capstone operations as a result of JTIDS/MIDS operations

2.4.3 Have the aircraft avionics been certified for IFR operations?

2.4.4 Has ADS-B data been certified as a source of surveillance for IFR operations?

a) Service certification

b) Equipment certification

3.0 DOCUMENTATION

3.1 Air Traffic Control Procedures

3.1.1 Do the Air Traffic Control operational procedures accurately and effectively incorporate Capstone functionality and services?

a) Aircraft separation standards between ADS-B equipped aircraft and non ADS-B aircraft

b) Aircraft separation standards between ADS-B equipped aircraft and ADS-B aircraft

3.1.2 Are the procedures for Capstone service outage notification to the Controller effective?

3.1.3 Has the appropriate organization (AFS) approved the use of ADS-B surveillance data for IFR separation?

3.1.4 Are the procedures to support the dissemination of Capstone system outage notification effective?

a) Flight Service Station (FSS)

b) Maintenance Control Center (MCC)

c) National Flight Data Center (NFDC)

3.2 Pilot Procedures

3.2.1 Are pilot procedures effective for safe and efficient use of Capstone services?

a) Operations bulletin for pilot training

3.2.2 Are the procedures for Capstone service outage notification to the pilot effective?

3.3 Certification Procedures

3.3.1 Are the Capstone system certification procedures accurate and effective?

a) Accurately defined certification parameters

3.3.2 Have the MEARTS certification procedures been accurately updated to include ADS-B processing and functionality?

a) Accurately defined certification parameters

3.4 Transition

3.4.1 Are procedures in place for the effective, safe, and efficient transition to providing Capstone services?

a) Proper notification to affected FAA personnel and pilots

b) Timely notification to affected FAA personnel and pilots

3.5 Manuals

3.5.1 Are maintenance manuals accurate?

a) Ground-Based Transceivers

b) MEARTS

c) Avionics
d) Other Capstone system components

3.5.2 Does the Integrated Logistics Support Plan (ILSP) adequately address all aspects of the Capstone system?

3.5.3 Are the procedures to validate that the correct ICAO address is loaded/stored into the aircraft avionics effective?

4.0 TRAINING

4.1 Air Traffic Controller Training

4.1.1 Have the Controllers received sufficient operational procedures training?
a) Aircraft separation standards between ADS-B equipped aircraft and non ADS-B aircraft
b) Aircraft separation standards between ADS-B equipped aircraft and ADS-B aircraft
c) Difference between radar and ADS-B environment
d) Aircraft contact and communications
e) Aircraft identification procedures and equipment capabilities
f) Symbology identification

4.1.2 Have the Controllers received sufficient training on all available ADS-B functionality?
Altitude, velocity, and surveillance data in the radar environment
Altitude, velocity, and surveillance data in the nonradar (ADS-B) environment

4.1.3 Have the Controllers received sufficient training to address loss or degradation of ADS-B service?
a) Detect ADS-B service interruptions/outages
b) Determine if ADS-B data is corrupt/incorrect
c) Provided with a suggested course of action and impact of those actions

4.1.4 Have appropriate ATC facilities received adequate familiarization with Capstone services?
a) NOTAM processing
b) Flight plan processing
c) ADS-B radar-like services

4.2 Airway Facilities Training

4.2.1 Have the technicians received sufficient and adequate training to effectively operate the system?

4.2.2 Have the technicians received sufficient and adequate training to effectively perform first level maintenance?

4.2.3 Have AOS personnel received sufficient and adequate training to effectively provide software support?
a) Site adaptation parameters
b) Data reduction and analysis tools
c) GBT radios in the field (AOS-200 @ OKC)

4.2.4 Has the SMO received sufficient and adequate field support training?

4.3 Pilot Training

4.3.1 Have the pilots received sufficient operational procedures training?
4.3.2 Have the pilots received sufficient ADS-B functionality and service training?

5.0 COMPUTER-HUMAN INTERFACE (CHI) and WORKLOAD

5.1 Flight Information Services – Broadcast (FIS-B)

5.1.1 Does the supplemental Flight Information Services – Broadcast (FIS-B) information (graphical weather maps, METARs, SIGMETs, TAFs, NOTAMs, PIREPs, etc) displayed on the MFD cause interference with pilot operations?
a) Distracting to the pilot
b) Mask aircraft surveillance data

5.2 Workload

5.2.1 Will the implementation of Capstone ADS-B services increase Controller workload?
5.2.2 Will the implementation of Capstone ADS-B services increase AF technician workload?
5.2.3 Are the procedures to manage an increased workload effective?

6.0 SERVICE and SYSTEM SAFETY

6.1 Does the system present any safety hazards?

6.1.1 Personnel
a) Maintenance
b) System Operators
c) Users
6.1.2 System Security

7.0 TEST & EVALUATION ACTIVITIES

7.1 Development Test

7.2 Operational Evaluations/Tests

7.3 Site Acceptance Test

7.4 Safety Engineering Assessment

7.5 Other

APPENDIX B

ACRONYMS

AAL	Alaskan Region
ADS-B	Automatic Dependent Surveillance –Broadcast
AF	Airway Facilities
AOA	Office of the Administrator
AOS	Operations Systems
ARTCC	Air Route Traffic Control Center
AT	Air Traffic
ATCS	Air Traffic Control Specialist
ATP	Air Traffic Planning and Procedures
ATQ	Office of Independent Operational Test and Environment
ATS	Air Traffic Services
CHI	Computer-Human Interface
CCCS	Capstone Communications Control Server
DoD	Department of Defense
DSR	Display System Replacement
FIS-B	Flight Information Services – Broadcast
GBT	Ground-based Transceiver
GPS	Global Positioning System
ICAO	International Civil Aviation Organization
ICD	Interface Control Document
IOC	Initial Operating Capability
JTIDS	Joint Tactical Information Distribution System
LAN	Local Area Network
M&C	Monitor and Control
MCC	Maintenance Control Center
MEARTS	Micro-En Route Automated Radar Tracking System
MIDS	Multifunctional Information Distribution System
NATCA	National Air Traffic Controllers Association
NOTAM	Notice to Airmen
ORD	Operational Readiness Date
RBDER	Radar Bright Display Equipment Replacement
RMM	Remote Maintenance Monitoring
STC	Supplemental Type Certificate
TIM	Technical Interchange Meeting
UAA	University of Alaska, Anchorage
UAT	Universal Access Transceiver
UPS AT	UPS Aviation Technologies
VFR	Visual Flight Rules
ZAN	Anchorage ARTCC
ZMP	Minneapolis ARTCC