



U.S. DEPARTMENT OF TRANSPORTATION
Office of Inspector General

Audit of a Major Acquisition Program for Transitioning to GPS Supported Air Traffic Control – Automated Dependent Surveillance Broadcast

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Background



- Central to FAA's Next Generation Air Transportation System (NextGen) program is transitioning from **radar to ADS-B, a GPS-supported system**, for air traffic control.
- ADS-B requires:
 - installation of a nationwide network of more than 600 ground-based, tower-mounted radio stations.
 - integration of ADS-B data from the radio stations into FAA's air traffic control systems.
 - every aircraft equipped with ADS-B avionics.



Air Traffic Services - Surveillance (Transitional)

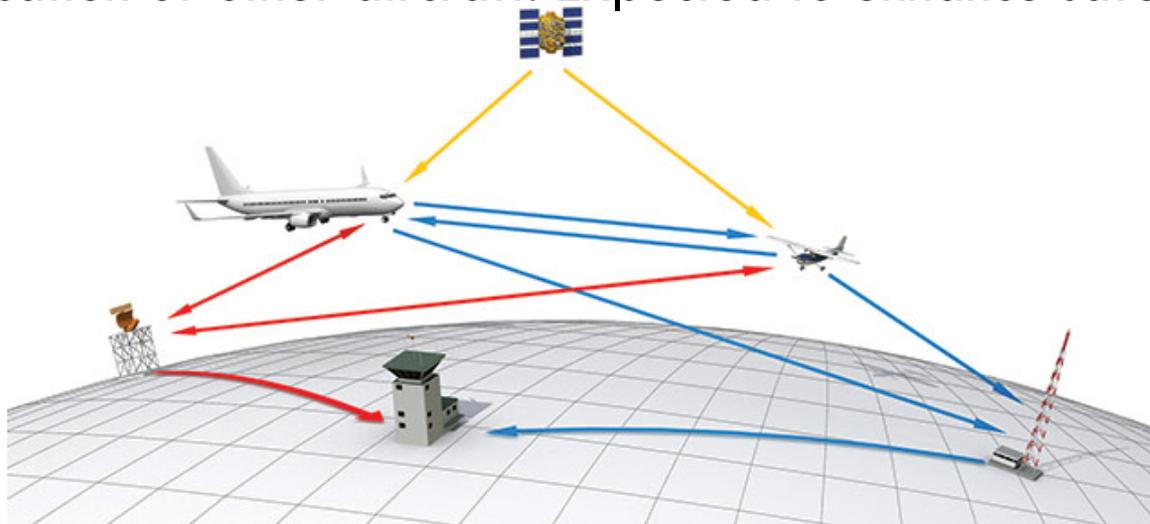


Federal Aviation
Administration



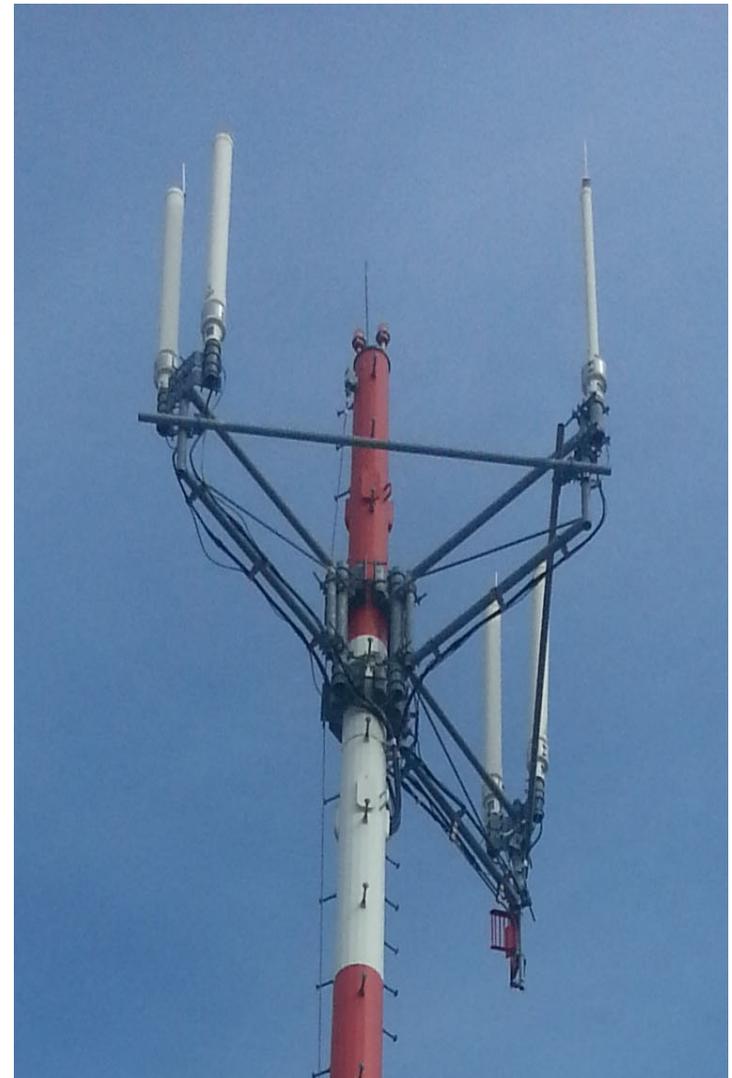
Background

- ADS-B consists of two services, one current and one future:
 - **ADS-B Out** allows equipped aircraft to broadcast flight position data to controllers on the ground via ADS-B radio stations. Expected to improve aircraft tracking where radar cannot reach (e.g., oceanic coverage).
 - **ADS-B In** will display flight information in the cockpit, such as the location of other aircraft. Expected to enhance safety.



Background

- FAA awarded 2007 contract to ITT Corporation for \$1.8 billion to develop and deploy ground infrastructure and start broadcasting services.
- Estimated total life-cycle cost through 2035: **\$4.4 billion.**
- As required by the contract, the contractor installed a nationwide network of ground-based radios, which became operational in May 2014.



Prior Audit Reports

- **October 2010: FAA Faces Significant Risks in Implementing the Automatic Dependent Surveillance–Broadcast Program and Realizing Benefits**
 - The contract comingles the costs of capital assets (i.e., development and deployment of towers and radios) and operating costs into a category called “Subscription Fees,” which are paid monthly.
 - As a result, it will be difficult for FAA to identify the capital and operating costs incurred or billed under the contract.
- **September 2014: ADS-B Benefits Are Limited Due to a Lack of Advanced Capabilities and Delays in User Equipage**
 - Only 3 percent of major air carrier aircraft will be equipped with ADS-B avionics by end of FY 2014. Aircraft are not required to equip until 2020.



Prior Audit Reports

- **September 2014 Report (cont.):**
 - Although FAA had not conducted end-to-end testing, and insufficient aircraft were equipped to determine whether ADS-B was meeting requirements, FAA accepted ground stations and services.
 - Since FAA does not own or operate the system, it relied primarily on the contractor for monitoring.
 - Separately, FAA was developing its own monitoring system for ADS-B, but it lacked capability to fully assess and report on ADS-B performance and additional development was required to improve the system.



September 2017 Audit Report

- **September 2017: Greater Adherence to ADS-B Contract Terms May Generate Better Performance and Cost Savings for FAA**
- Reflecting results of prior reports, audit objectives were to determine whether:
 1. the ADS-B contract provides FAA the **ability to monitor** whether the contractor is providing required ADS-B products and services
 2. FAA's procedures are adequate for determining whether **payments to the contractor are reasonable.**



September 2017 Audit – Summary of Findings

1

Although the contract provides FAA the ability to monitor whether contractor is providing required ADS-B products and services, FAA has made only limited use of these provisions

2

While the contract contains provisions that can help FAA ensure payments are reasonable, FAA did not effectively use these contractual tools

3

FAA missed opportunities to ensure prices were reasonable when awarding the contract



Limited Performance Monitoring and Testing, and Acceptance of Partial Systems

Only 3 of 7 Performance Criteria Monitored

	Metric	Definition
➔	Availability	The probability of the service performing its required function.
	Capacity	The ability to process and output service reports for all received messages.
	Coverage	The service provided throughout a specified service volume(SV) taking into account traffic densities and interference.
	I n d e p e n d e n t Validation	The ability to independently determine the location of a target within the required time.
	Integrity	The probability of the service introducing a system target error.
➔	Latency	The processing delay between the time of reception of a message at the system receiver and the reception/transmission of the corresponding message at the Service Delivery Point (SDP).
➔	Update Interval	The time between successive position reports sent to each SDP for a specific aircraft/vehicle.



FAA Accepted Service After Limited Testing

- ADS-B needs to run continuously to meet requirements, but the Implementation Service Acceptance Test (ISAT) provided only a snapshot of performance.
- ISAT did not test integrity at each service volume (SV). Integrity was only tested at the contractor's facility.
- FAA limited ISAT tests for coverage to 5,100 feet above surface; the contract defines coverage as up to 60,000 feet. FAA stated broader testing was cost prohibitive.
- FAA did not conduct flight tests during ISAT to verify ADS-B coverage for terminal SVs, that is, around airports.



FAA Accepted Service and Made Partial Payments for Incomplete Installations

- Contract states that installations should be complete before acceptance; partial deliveries should be separately priced.
- FAA accepted partially completed installations in at least 47 SVs, making \$29.8 million in partial payments that were not separately priced.
- This practice essentially advanced payments to the contractor before performance requirements were met. For example:
 - In Seattle, FAA began paying the contractor 75% of the monthly subscription fee, although testing identified 22 deficiencies—15 of which resulted from contractor initially delivering 20 instead of 29 radio stations.



FAA Did Not Ensure that Payments
Were Reasonable.

FAA Did Not Assess Potential for Fee Adjustments or Savings

- FAA made payments without assessing whether to adjust fee structure based on the actual infrastructure provided.
- For LA SV, 25 radio stations were planned, but contractor installed only 20. The contractor passed acceptance by sharing service from 5 radio stations from neighboring SVs. 25 stations for LA were billed, and fees for neighboring locations were not reduced.
- Sharing radio services allowed contractor to deliver far fewer radio stations than priced because radio stations were shared.



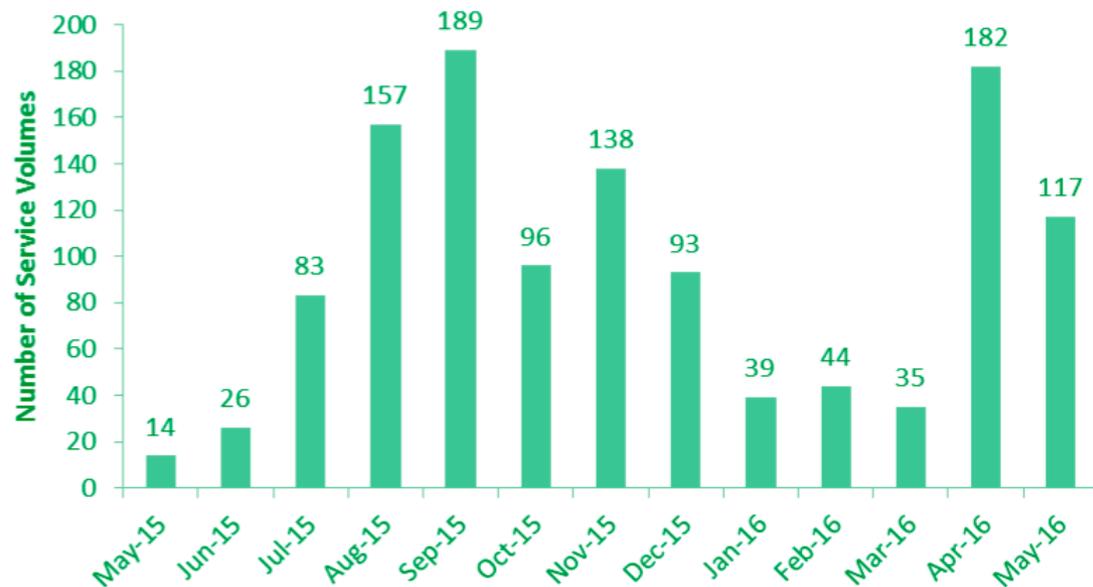
FAA Is Paying Subscription Fees Despite Performance Gaps

- FAA pays full monthly subscription fees even when minimum requirements were not met.
- FAA officials penalize the contractor for performance gaps by applying disincentives on an individual SV basis. However, disincentives are inconsequential. Overall, FAA paid 6.7% of 7% available for performance incentives on top of monthly fees.
- FAA's process for calculating disincentives may not capture all performance issues. For example, only 50 of 163 reported outages for July 2015 were included in the report used to compute incentives/disincentives.



Incentives Have Not Enhanced Contractor Performance

- FAA is incentivizing the contractor to meet minimum performance requirements. According to AMS and FAR, incentives should be structured to motivate a contractor to exceed the minimum requirements.
- ADS-B outages have fluctuated, despite incentives, which theoretically should produce upward trend.



Enforcing Contract Clauses Could Have Reduced Payments

- FAA has not enforced requirement that contractor separately track/bill for ADS-B infrastructure paid using subscription fees.
- Identifying historical pricing for radio stations can provide information for deleting/adding radio stations and prevent overpaying when modifying the contract price in the future.
- FAA accepted fewer radio stations than priced in the proposal. For example, contractor eliminated 70 stations at airport surface locations, yet FAA did not seek to adjust price
- **We estimate FAA could have paid over \$133 million in questionable costs** for radio stations priced in contractor's proposal but not required in the contract.



FAA Missed Opportunities To Ensure Reasonable Price When Awarding Contract

FAA Did Not Sufficiently Examine Key Differences Among Competitor Proposals

- FAA did not sufficiently examine key differences between competitor proposals.
- FAA evaluated the bottom line prices for three competitive proposals; however, the three proposals varied significantly in approach—such as the number of radio stations and radio characteristics.
- The Contract Pricing Reference Guides state that when determining whether items being evaluated are sufficiently similar, the Government should consider quantity and capabilities, and make adjustments as appropriate.



FAA Did Not Document a Detailed Quantitative and Qualitative Review

- FAA did not document a detailed quantitative and qualitative review of the number of radio stations and infrastructure.
- According to support contractors, the number of radio stations proposed by the successful offeror was conservative—meaning the awardee may have proposed more radio stations than was needed.



FAA's Revised Independent Government Cost Estimate Relied on Contractor Assumptions

- FAA's revised IGCE relied on the successful contractor's assumptions. FAA's support contractor conducted a price evaluation after contract award, based on the assumption that 794 full-scale radio stations were needed (the number of stations specified in the successful bidder's proposal).
- FAA Acquisition Management System states that “an [independent cost estimate] must not be based on information furnished by any potential vendor that may be considered for award.



FAA Missed Opportunities To Ensure a Reasonable Price When Awarding the Contract

- OMB guidance: for long contracts with significant development, it may be impossible to accurately estimate costs to use a fixed-price from day one. Instead, OMB recommends modular contracting—such as using increments for acquisition phases—which can be successively priced.
- However, FAA used a “Grand Design” approach for delivering ADS-B over an 18-year period. The Agency relied on one contract award action—entirely priced on day 1 award.
- CLIN 001 of the contract was a cost-reimbursement type for about \$230 million and covered development and deployment at 5 test sites. FAA could have learned from testing to more accurately price remainder of contract to avoid overpaying.



Recommendations

Recommendations

To improve FAA's abilities to oversee ADS-B performance, manage the contract more effectively, and pursue cost savings where possible, we recommend that the FAA Administrator:

1. Require the contactor to report on all seven technical performance measures to provide FAA with the ability to determine whether all performance requirements are being met and contractually required products and services are being received.
2. To disclose the total cumulative costs for the contract, identify and report the potential range or maximum value of incentive fees payable under the contract, about \$78 million, when reporting to managers, Congress, and other stakeholders.



Recommendations

3. Modify the contract to clearly identify the differences between critical service specifications for ADS-B and the technical performance measures for ADS-B services that are used for computing incentive awards.
4. Conduct and document a review of incentive fee implementation to ensure that it motivates the contractor to exceed the contract specifications and also minimizes performance violations as stated in the H.7 clause. Consider adjustments to the incentive fee implementation as a result of the review.



Recommendations

5. Strengthen future acquisitions by adding or modifying guidance to AMS to incorporate concepts from the OMB Capital Programming Guide on considering the use of successive or incrementally priced contract, orders, or contract line items when acquiring or developing systems spanning many years. This guidance may be incorporated into planned guidance regarding the use of modular contracting concepts.
6. Enforce the H.33 clause to reveal capital asset cost and gain necessary pricing information for use in negotiating additions and enhancements to the ADS-B contract as has occurred on at least nine occasions previously.



Recommendations

7. Conduct and document an analysis to determine whether or not duplicate subscription fee payments are being made due to radio stations that support multiple service volumes.
8. Strengthen future acquisitions by expanding guidance in the AMS or the FAA Pricing Guide to: (1) better describe the process for (a) evaluating price reasonableness and (b) determining cost realism when evaluating proposals, to include a review of quantities and types of hardware proposed; and (2) include in existing oversight processes a check to ensure that independent government cost estimates and life cycle cost estimates are not established based solely on the awardee's proposal.



Recommendations

9. Strengthen future acquisitions by requiring that contracting officers and specialists in the Surveillance Contracting Branch keep hard and/or electronic back-up copies of contract file information in the contract file; keep the contract up to date, including modifications or changes such as partial acceptance, methodology for partial acceptance, pricing matrix adjustments, and other agreements created by correspondence outside the contract; and ensure that in Agency computers, a complete and accurate record of all contract actions and supporting documentation is established and maintained in real time.



FAA Response

- While FAA concurred with all of our recommendations, they disagreed with elements of our findings.
- FAA did not think we fully appreciated their innovative performance-based approach and over emphasized the flaws.
- We maintained that whatever the merits of the approach, it is still important to enforce contract provisions.
- We agreed on feasible actions to improve oversight of this significant contract despite these different viewpoints.



Questions?

