
Office of Inspector General
Audit Report

**Management Advisory on
Deployment Readiness Review**

Federal Aviation Administration

**Report Number AV-1998-041
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**U.S. Department of
Transportation**


Office of the Secretary
of Transportation

Office of Inspector General

Memorandum

Subject: **INFORMATION:** Management Advisory on
Deployment Readiness Review
Report No. AV-1998-041

Date: December 8, 1997

From: 
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Reply to: JA-10/x60500
Attn of:

To: Federal Aviation Administrator

I. INTRODUCTION

This management advisory discusses the best practices identified during our review of the Federal Aviation Administration's (FAA) Deployment Readiness Review (DRR) process which should be adopted and strengthened as part of FAA's new Acquisition Management System. By using checklists, relying on multidisciplined teams, and defining critical deployment readiness issues, FAA will increase its ability to successfully field and support the 131 Capital Investment Plan (CIP) projects being developed. These projects have estimated funding requirements of over \$13 billion for Fiscal Year (FY) 1998 and beyond.

Background

Formalized by a July 1990 order, the DRR process was a structured series of steps designed to assist FAA in fielding and supporting new products or systems. A DRR Program Manager oversaw the process for all CIP projects and was responsible for ensuring each project was ready to be integrated into the National Airspace System. DRR teams were formed for each individual project. The teams monitored the DRR process from scheduling delivery of project equipment to site(s) for test and evaluation to deploying the system.

Results-In-Brief

Although superseded by FAA's new Acquisition Management System, the DRR process contained practices that assisted FAA in fielding working CIP systems. These best practices included (1) using checklists, (2) relying on multidisciplined teams and specifying team members' responsibilities, and (3) defining critical deployment readiness issues and following up on those remaining open after approving deployment. For example, checklists were customized to focus on the significant issues impacting each deployment such as site preparedness, training, or logistic support.

On April 1, 1996, FAA's new Acquisition Management System superseded existing acquisition policies and procedures, including those covering DRRs. In June 1996, FAA issued Acquisition Reform Interim Guidelines (ARIG 96-2), "In-Service Review and Decision." The in-service review will, when fully implemented, replace the DRR process. For the most part, the prior practices can be transferred to the new Acquisition Management System without significant change. However, we found that the process needs to be strengthened to explicitly address two key elements necessary for successful deployment.

First, integration issues should be coordinated early in the procurement cycle. The DRR process did not provide mechanisms to ensure issues impacting other CIP projects were highlighted and exchanged between CIP projects early in the procurement process. For example, we found required remote maintenance monitoring capabilities were not always effectively planned to ensure installation concurrent with delivery of CIP projects in 1995 and 1996.

Second, contracting strategies should be adopted which minimize the purchase of units prior to successful deployment testing. We found that FAA contracted for multiple quantities and total system needs prior to successful completion of the DRR. For example, contracts were awarded for multiple units or total system needs prior to the deployment decision for 8 of 12 CIP acquisitions reviewed.

Recommendation and Management's Position

We recommended that FAA revise its Acquisition Management System in the following ways: (1) incorporate the best practices we identified including the use of checklists and followup processes for handling issues arising during in-service activities; (2) adopt integration planning tools;

and (3) use contracting strategies that limit production prior to successful system testing. FAA agreed with our recommendation and anticipates completing corrective action by December 30, 1997.

Scope and Methodology

We performed our review from May 1995 to December 1996 at FAA Headquarters including integrated product team (IPT) offices and the DRR Program Office. We visited CIP project test and delivery sites in FAA's Southern and Southwestern Regions; a contractor's plant in Florida; FAA's Logistics Center in Oklahoma City, Oklahoma; and FAA's William J. Hughes Technical Center in Atlantic City, New Jersey. In addition, we reviewed guidelines issued in June and December 1996 on the in-service review decision.

We conducted the review in accordance with Government Auditing Standards prescribed by the Comptroller General of the United States and included such tests as we considered necessary to provide reasonable assurance of detecting abuse or illegal acts.

We selected 12 CIP projects and analyzed the application of the DRR process. Exhibit A lists the CIP projects included in our review. We reviewed minutes of DRR team meetings, analyzed use of DRR checklists, reviewed outstanding DRR issues and action plans, analyzed DRR waivers and variances, and reviewed draft and final DRR reports. In addition, we contacted FAA personnel at test and delivery sites to follow up on the disposition of DRR issues. Also, we reviewed the integration process of these 12 CIP projects to determine whether developmental efforts were coordinated. We analyzed FAA's December 1996 draft CIP baseline to support the FY 1998 budget justifications. FAA listed 131 projects with estimated funding requirements for FY 1998 and beyond of \$13.3 billion.

We contacted the contractor for one CIP project to determine the impact of delays caused by open DRR issues. DRR issues are considered open until the action plan, developed to resolve the issue, has been completed. Finally, we analyzed the contracting strategy used to obtain needed quantities of CIP equipment.

II. ANALYSIS AND RECOMMENDATION

FAA's new Acquisition Management System is an evolving system, and the guidelines governing deployment planning and in-service reviews have not been finalized. By maintaining past DRR practices that worked well, and incorporating other practices inherent to successful CIP equipment deployment, FAA has the opportunity to ensure its new Acquisition Management System provides the mechanisms to successfully field and support CIP equipment.

Best Practices in DRR Process Should Continue in Acquisition Management System

The DRR process contained practices that assisted FAA in fielding working CIP systems. These best practices included (1) using checklists, (2) relying on multidisciplined teams and specifying team members responsibilities, and (3) defining critical deployment readiness issues and following up on those remaining open after approving deployment. For the most part, the prior practices can be transferred to the new Acquisition Management System without significant change. In other instances, the practices, while necessary for successful deployment, should be strengthened before adoption in the Acquisition Management System.

Checklists. Checklists were used on all 12 CIP projects reviewed and were customized to focus on the significant issues impacting each deployment such as site preparedness, training, or logistics support. However, to further enhance the effectiveness of checklists under the Acquisition Management System, they should be expanded to provide the IPTs an enhanced mechanism to oversee deployment planning. Although the interim in-service review guidance addresses checklists, it does not contain a generic checklist.

In December 1996, FAA issued a draft revision to the Acquisition Management System which proposes to provide generic checklists for use by IPTs. When finalized, this proposal to provide the checklists on FAA's internet pages, will provide standardized guidance while allowing IPTs the flexibility to tailor the checklist to meet the specific needs of their projects. FAA expects to have this completed by December 1997.

Multidisciplined Acquisition Management System and Team Member Responsibilities. The DRR teams were comprised of multidisciplined representatives from various Headquarters program offices and field activities. Responsibilities of the various DRR team members and others

associated with the readiness review process were well defined. Under the Acquisition Management System, the IPTs are comprised of multidisciplined staff from both Headquarters and field units. However, specific guidance on team members' responsibilities for deployment activities should be established.

Handling Issues Arising From the In-Service Process. In completing the checklists in conjunction with the DRR process, issues dealing with technical manuals, training, spare parts, maintenance capability, and integration with other systems often arose which required FAA's attention to assure fully successful fielding of CIP equipment. Program managers categorized issues as either deployment-critical or not deployment-critical. A deployment-critical issue is one where resolution is essential to the successful deployment of the system.

The Director, Airway Facilities Service, could decide to deploy a system although DRR issues remained open. However, action plans were required which defined the criteria and target dates for closing the open issues. FAA prepared a quarterly DRR Post Deployment Open Issues and Action Items Report, to assist in monitoring the status of open issues and action items. However, FAA did not always use the information to seek timely closure of open items, and the report did not always reflect updated information.

Our analysis of the Action Items Report showed that open issues were not closed timely. The Action Items Report as of April 30, 1996, showed 51 percent of open issues for the 42 active DRR projects were not closed by the established date. For 8 of 12 CIP projects we reviewed that had completed the DRR process, 7 had overdue open DRR issues.

We also noted that the data on disposition of DRR issues were not accurate. Our analysis of 12 CIP projects identified issues reported as closed on the DRR checklist; however, the issues remained open at FAA field sites. We found that input from test site personnel and other users was not fully considered. This limited FAA's ability to use its new equipment and caused DRR issues to remain unresolved at field sites.

For example, DRR training issues for the Low-Level Windshear Alert System Network Expansion were listed as closed on the checklist but were not resolved at field sites. The checklist for this system required a sufficient number of personnel be trained in a timely manner to operate, maintain, and support the system consistent with the delivery schedule. According to the DRR checklist, this issue was closed on June 15, 1995.

However, during March 1996, FAA personnel at one site stated that air traffic controllers who would be using the system had not been trained. At another site, FAA indicated that although personnel were trained, the training was provided 2 years prior to our March 1996 site visit, and the system had not yet been delivered.

To achieve the full benefits of new CIP projects, FAA should ensure IPTs continue to use and monitor a status report of open deployment issues with action plans and target dates. The Acquisition Management System guidance should include processes for maintaining accurate information on all open issues existing after a deployment decision is made and following up on and closing out open deployment issues. IPTs should also adequately coordinate the status of open deployment issues with all affected personnel, including users at field sites, before closing open issues.

Further Enhancements to the Acquisition Management System In-Service Decision Process

In reviewing FAA's deployment of CIP projects, we identified that the existing DRR process did not sufficiently address two key elements necessary for successful deployment. These are ensuring (1) integration issues are coordinated early in the procurement cycle and (2) contracting strategies are adopted which minimize the purchase of units prior to completion of successful deployment testing.

Integration Issues. Integration of the various CIP project components required to make the total system operational was not always effective. The DRR process did not provide mechanisms to ensure issues impacting other CIP projects were highlighted and exchanged between CIP projects early in the procurement process. For example, in 1987, FAA established the requirement for all national airspace subsystems to have some degree of remote maintenance monitoring. However, we found required remote maintenance monitoring capabilities were not always effectively planned to ensure installation concurrent with delivery of CIP projects in 1995 and 1996.

As IPTs become more experienced with the Acquisition Management System, consideration of integration issues at the earliest stage of the acquisition process should improve. The Acquisition Management System should be expanded to provide IPTs with tools to assist in this process. For example, the regional notebook developed by the Terminal Automation IPT appears to be one method of improving integration

planning, and thus achieving successful deployments. The regional notebook is an agreement between the IPTs and the regions which defines timeframes, responsibilities, and addresses interdependencies with other systems.

A preliminary draft of the notebook, issued in August 1996, describes automation system transitions from Automated Radar Terminal Systems to Standard Terminal Automation Replacement System. It includes regional and Headquarters responsibilities, equipment requirements, and interdependencies. The IPT philosophy for the Standard Terminal Automation Replacement System is to identify other interdependent systems that could potentially affect implementation in terms of technical and schedule impacts to assess associated risks and to plan to mitigate the impacts and risks.

Contracting Strategies. We found that FAA contracted for multiple quantities and total system needs prior to successful completion of the DRR. When problems were identified during the DRR, FAA incurred additional costs to retrofit needed changes to purchased systems or incurred storage costs for systems which were produced but could not be deployed.

Contracts were awarded for multiple units or total system needs prior to the deployment decision for 8 of 12 CIP acquisitions reviewed. For example, FAA ordered 64 Very High Frequency Omnidirectional Range/Distance Measuring Equipment systems at a unit cost of \$299,000 and 57 Tower Data Link Services systems at a unit cost of \$136,000 before the final DRRs.

This contracting strategy did not minimize the risk to the Government. For example, between the Air Route Surveillance Radar-4 contract award in July 1988 and November 1993, FAA ordered 41 systems at a unit cost of \$6.7 million. Due to problems identified during the Independent Operational Test and Evaluation, the final DRR approving deployment was not held until November 2, 1995. Since total needs were contracted for, the contractor continued to manufacture the equipment while problems with the test units were being resolved. In May 1995, the contractor submitted a claim of \$1.22 million to FAA for storage of the equipment. Subsequent negotiations resulted in FAA awarding the contractor about \$450,000 for storage.

The interim in-service review and decision process requires that test data be provided to the proper FAA entity with decision authority for those

systems selected for Independent Operational Test and Evaluation. These tests and evaluations are conducted to assess the operational effectiveness and operational suitability of a system. The interim in-service review guidance also states that systems will not be shipped to operational sites prior to the in-service decision. These are positive steps. However, not all systems will be subject to Independent Operational Test and Evaluation. As of April 1997, only 21 CIP projects are scheduled for this type of testing.

To limit FAA's contractual liability, the Acquisition Management System should also include guidance on contracting strategies which (1) permits acquisition of only a limited quantity of initial units, (2) requires adequately testing these initial units, and (3) permits purchasing the remaining quantities only after a satisfactory product is accepted. FAA has adopted a similar acquisition strategy for its Operational and Supportability Implementation System. The acquisition strategy for this project specifies that incremental numbers of systems will be acquired through the use of contract options and the first option would not be exercised until after successful completion of operational test and evaluation. This acquisition strategy provides FAA the flexibility to stop production when supportability and operational deficiencies are identified.

Recommendation

We recommend that FAA expand the Acquisition Management System to include the practices identified in this report as beneficial to successful CIP equipment deployment. These practices include use of checklists, defined product team member responsibilities for deployment activities, followup processes for handling issues arising during the in-service activities, adoption of integration planning tools, and use of contracting strategies that limit production until after successful testing.

Management Response

FAA concurred with our recommendation and stated a generic in-service review checklist will be centrally maintained and updated. In-service review specialists will coordinate with the IPT to identify, assess, and evaluate critical issues. FAA also agreed to modify its Acquisition Management System to provide guidance on contracting strategies that demonstrate operational suitability of agency products before authorizing full production. FAA anticipates completing these actions by December 30, 1997. A copy of FAA's written response is included as an Appendix to this report.

Action Required

Actions planned by FAA are responsive to the report's recommendation, and no further response is required. Your progress in implementing the corrective action is subject to the followup provisions of Department of Transportation Order 8000.1C.

We appreciate the cooperation and assistance extended by your staff during our review. If we can answer any questions or be of any further assistance, please call Alexis Stefani on x60500.

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CIP PROJECTS INCLUDED IN OUR REVIEW

- Air Route Surveillance Radar-4
- Gulf of Mexico Buoy Communication System
- Low-Level Windshear Alert System Network Expansion
- Low Power Tactical Air Navigation Antennas
- Medium-Intensity Approach Lighting System with Runway Alignment Indicator Lights
- Precision Approach Path Indicators
- Small Tower Voice Switch
- Tower Data Link Services
- Voice Switching and Control System (VSCS)
- VSCS Emergency Access Radio System
- Very High Frequency Omnidirectional Range/Distance Measuring Equipment
- Weather Message Switching Center Replacement

TEAM MEMBERS

The following is a listing of the major contributors on the management advisory on Deployment Readiness Reviews.

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U.S. Department
of Transportation
**Federal Aviation
Administration**

Memorandum

Subject: **INFORMATION:** Draft Management
Advisory Memorandum on Deployment
Readiness Reviews, FAA

Date: AUG 18 1997

From: Associate Administrator for
Administration

Reply to
Attn. of: AWilliams:
267-9000

To: Director, Office of Transportation
Program Audits, JA-10

This information is in response to the subject Office of Inspector General's (OIG) draft management advisory memorandum, dated April 24. The Federal Aviation Administration (FAA) comments and responses addressing the findings and recommendation in the report are as follows:

OIG Recommendation: FAA expand the Acquisition Management System (AMS) to include the practices identified in this report as beneficial to successful Capital Investment Plan (CIP) equipment deployment. These practices include use of checklists, defined integrated product team (IPT) member responsibilities for deployment activities, followup process for handling issues arising during the in-service activities, adoption of integration planning tools, and use of contracting strategies that limit production until after successful testing.

FAA Response: Concur. A generic in-service review (ISR) checklist will be centrally maintained, updated, and made available by the ISR group to all participants using the AMS Federal Acquisition System Tool (FAST). The ISR process will identify specific IPT members who have assigned implementation and integration responsibilities during deployment and transition of CIP equipment into the National Airspace System (NAS). ISR specialists will coordinate with the IPT lead to identify, assess and evaluate critical issues prior to the ISR decision. The enhancement of integration planning, within the purview of the ISR process, has been included above in the actions addressing ISR specialists interfaces with the multi-discipline teams, stakeholders, and the NAS Implementation Organization (ANI) Engineering Center. The estimated completion date is December 30.

Other Comments:

Contracting strategies that require limited production, followed by testing and acceptance before authorizing full production make sense when there is substantial uncertainty concerning product suitability or acceptability. However, such strategies require time and may in some instances delay the fielding of equipment unnecessarily. Other contracting strategies may achieve the same high level of confidence that our products are operationally acceptable, while shortening the time needed to field a new capability. For example, we may be able to determine the operational suitability of commercial solutions to mission need during source selection using operational capability demonstrations. And it may be prudent to buy nondevelopment hardware before an operational evaluation when development risk is related to software.

We will modify the AMS to provide guidance on contracting strategies that demonstrate operational suitability of agency products before authorizing full production. These strategies will provide flexibility so that a prudent balance is achieved between cost, schedule, and risk in the delivery of new products to the field. The estimated completion date is December 30.

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