U.S. Department of Transportation

Office of the Secretary
of Transportation
Office of Inspector General

Memorandum

Subject: **ACTION**: Management Advisory on Weaknesses With Site-Specific Deployment Requirements and Specialist Training for STARS

Date: August 14, 2014

From: Matthew E. Hampton
Assistant Inspector General for
Aviation Audits

Reply to
Attn of: JA-10

To: Federal Aviation Administrator

To support the Next Generation Air Transportation System (NextGen) goal to enhance air traffic capacity and reduce delays, the Federal Aviation Administration (FAA) is deploying the Standard Terminal Automation Replacement System (STARS) to modernize the automation systems that controllers rely on to manage air traffic. As part of its plan to implement STARS as the single automation platform throughout the National Airspace System, FAA is currently working to install STARS at 11 large terminal facilities for $438 million. In May 2013, we reported that STARS was at significant risk of cost and schedule overruns and that the system could ultimately fall short of providing promised capabilities for controlling takeoffs and landings—the most critical phases of flight.[1] Despite acknowledging these risks, FAA continued the inaugural deployment of STARS at the Dallas/Fort Worth (DFW) Terminal Radar Approach Control (TRACON) facility.

Following the issuance of our report, we conducted an in-depth review of a hotline complaint we received regarding STARS deployment at the DFW TRACON. This review prompted us to look further into FAA's progress implementing the program. As a result of this examination, we determined that the risks we identified in our earlier report remain—risks that warrant your attention. Notably, FAA has yet to stabilize STARS software requirements—a recommendation we made in our 2013 report. While FAA planned to stabilize requirements at all 11 sites by June 2014, it has now extended this date to September 2014. Further, FAA has not determined the site-specific capabilities needed or when they will be implemented. Until requirements are stabilized, full deployment of STARS at DFW and TRACONs

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[1] *FAA's Acquisition Strategy for Terminal Modernization Is at Risk for Cost Increases, Schedule Delays, and Performance Shortfalls* (OIG Report No. AV-2013-097), May 29, 2013. OIG reports are available on our Web site at http://www.oig.dot.gov/.

nationwide will continue to be at risk of cost and schedule overruns. Because STARS is on the critical path to introducing NextGen capabilities, these risks also impact the long-term viability of NextGen.

Questions about the adequacy of FAA's training and certification of technical operations specialists raise additional concerns about the Agency's management of STARS deployment. The complainant asserted that FAA did not properly certify DFW TRACON's technical operations specialists on the STARS system because FAA did not offer a site-familiarization package as part of the training to its specialists prior to certifying them. According to FAA, site familiarization training is not a required part of the STARS training program. However, site familiarization training is important because DFW TRACON and the other remaining sites have unique characteristics that impact the use of the STARS system to help controllers manage air traffic.

BACKGROUND

In the mid 1990s, FAA launched a series of efforts to increase capacity and modernize and standardize terminal systems for managing air traffic within a 50-mile radius of airports.

- In 1996, FAA awarded a $953 million contract to develop and deploy STARS at 172 TRACON facilities and towers.

- From 1998 to 2003, after cost overruns and delays with the STARS contract, FAA developed and deployed the Common Automated Radar Terminal System (CARTS), an interim solution, for an estimated $239 million.

- From 2004 to 2008, FAA initiated a new three-phased approach to terminal modernization. The first two phases deployed STARS at 52 sites and upgraded CARTS at four sites—at a cost of $1.4 billion.

- In 2010, FAA began the current and final phase of its terminal modernization efforts, which plans to replace CARTS with STARS at 11 large TRACONs, including 7 of the largest and busiest in the Nation, by 2017.

- In December 2011, FAA approved $438 million through 2015 to deploy STARS at the 11 TRACONs. FAA also plans to deploy STARS at 97 small sites, with an additional cost of $462 million through 2019.

Our May 2013 report raised concerns about the reliability of FAA's cost and schedule for its current terminal modernization effort. We also reported that STARS deployment was at risk for performance shortfalls due to a lack of stable requirements.

Accordingly, we recommended that FAA develop specific, pertinent, and focused requirements for transitioning to STARS.

FAA HAS NOT STABILIZED STARS SOFTWARE REQUIREMENTS

According to FAA, DFW TRACON achieved initial operating capability (IOC)[2] for STARS on April 3, 2013, and is operating the system continuously with CARTS used only in a backup capacity. However, software requirements remain unstable, and during deployment, FAA identified 46 additional requirements that will be needed to ensure STARS provides at least the same capabilities as CARTS at this site. FAA also determined that meeting the unique needs of the other 10 sites requires more enhancements or modifications than originally planned. According to FAA, it is revisiting its process to identify, stabilize, and track each TRACON's unique STARS requirements. Although the Agency originally planned to establish firm requirements by June 2014, it is now planned for September 2014.

Stabilizing STARS requirements has been a longstanding problem. In 2011, FAA conducted a detailed analysis that compared STARS with CARTS in an attempt to nail down the requirements. At that time, FAA identified a total of 68 requirements needed to ensure that STARS met or exceeded CARTS's capability at DFW TRACON. However, since this initial analysis, the number of requirements has increased. Specifically, FAA's risk mitigation tests of STARS software indicates that as of February 2014, 114 requirements are now needed—including the 46 that FAA identified during initial deployment.

Consequently, the STARS deployment incorporates fewer capabilities than the CARTS system it aims to replace. According to FAA, the Agency collaborated with air traffic managers and controllers (including the National Air Traffic Controllers Association) at DFW TRACON to ensure the first deployment contained the most critical software functions for continuous operations. However, at least one more software upgrade is scheduled for August 2014 and contains numerous capabilities needed at DFW TRACON[3]—including an Automated Terminal Proximity Alert capability, an additional safety aid to alert controllers of loss of separation between aircraft.

The uncertainty at DFW TRACON has a cascading effect on the other 10 sites. For example, the additional STARS requirements indicated that the Northern California TRACON (NCT)—which was slated as the second STARS deployment site—would need more requirements than originally projected. The site was already a deployment challenge because of its 25 associated remote towers, the most in the National Airspace System. As a result, FAA decided to deploy STARS at NCT later in its

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[2] Initial Operating Capability (IOC) is the milestone in which controllers begin to use the system on a limited basis to manage traffic.
[3] FAA originally planned to deploy STARS at DFW TRACON in two software builds, but revised it to three in 2013.

schedule and to move up deployment at the Denver TRACON, which has fewer STARS requirements.

Ultimately, the risk of significant cost and schedule overruns remains. Through fiscal year 2013, FAA spent nearly $338 million of the $438 million approved baseline to implement STARS deployments at all 11 TRACONs. However, if FAA receives its budget request for fiscal year 2015 for STARS deployments at the 11 TRACONs, the Agency will exceed its baseline by $19 million. Moreover, these funds will only support STARS deployment activities through the fifth site.

FAA acknowledged that identifying, stabilizing, and validating STARS requirements has been problematic. According to FAA, it is revisiting its current requirements management process and establishing a mechanism to inform stakeholders of the impact of new requirements on STARS's costs and schedule. FAA initiated a process with users at several key sites to identify site-specific issues that will require additional work. In addition, FAA is facilitating workshops with subject matter experts to validate STARS requirements, develop an updated software estimate, and create a viable deployment schedule. However, FAA states that until it completes this process, it is unclear how many further software updates are needed at DFW TRACON or at any other site.

FAA DID NOT PROVIDE SITE-SPECIFIC TRAINING WHEN CERTIFYING TECHNICAL SPECIALISTS AT DFW TRACON

Prior to deploying new systems, FAA policy requires sufficient training and certification of all technical operations specialists, including those working on STARS, to perform maintenance activities. Although FAA conducted inaugural training[4] for STARS technical operations specialists,[5] one of DFW TRACON's technical specialists questioned whether the training was sufficient to certify technicians on how to support and maintain the system. The training and specialist certification were important steps in achieving IOC at the DFW TRACON. Six days after FAA granted certification authority to the technical specialists, FAA declared IOC at DFW TRACON.

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[4] The inaugural training was conducted between September and November 2012 at the FAA Academy in Oklahoma City, OK.

[5] On March 28, 2013, FAA certified STARS specialists at DFW TRACON and took over system maintenance responsibility from the STARS contractor.

In March 2013, a DFW TRACON employee filed a complaint through our and FAA's hotlines alleging that FAA had certified specialists on the installed STARS system without providing:

- a complete set of top-down drawings that show all external connections and pathways for external services to any of the three STARS systems, or

- site-specific "familiarization" training on these external connections and pathways.

In response, FAA stated that the training provided to specialists at the FAA Academy was successful based on positive feedback from a majority of training participants—in this case, seven of eight. FAA also stated that the Agency provided these specialists with supplemental STARS training onsite at DFW TRACON. According to the complainant's supervisor, FAA's training and subsequent certification of specialists complied with requirements outlined in FAA Order 3000.57.[6]

However, FAA's training did not include a site familiarization package, which would have identified all the site-specific details for implementing STARS at DFW TRACON.[7] According to the STARS supervisor, site familiarization training is not a formal procedure for certification, and no written site familiarization package is required. Regardless, the complainant noted that site familiarization training is important because DFW TRACON has unique characteristics that will impact the use of the STARS system to manage air traffic. Without a site familiarization package, it would be difficult for specialists to know how to maintain, troubleshoot, repair, and restore the system after failures. For example, the complainant stated that two specialists did not know how the DFW TRACON STARS system was tied to two remote air traffic control towers.

According to the FAA Order 3000.57, the first-level manager must endorse a technical specialist for certification authority after determining site familiarity and capability to perform work practices. Work practices include knowledge of facility reference data (including facility drawings). Given the wording of the order, the unstable STARS requirements at DFW TRACON, and the complainant concerns, a site familiarization package would promote a solid understanding of unique site characteristics and benefit the technical specialists who support and maintain the STARS system.

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[6] FAA Order 3000.57 "Air Traffic Organization Training and Personnel Certification," July 16, 2009. The requirements cited in this order include theory training at the FAA Academy, a demonstration of proficiency, endorsement by a first-level supervisor, and review by a second-level supervisor.
[7] These details include all the external connections and pathways to the installed STARS systems at the site.

We believe that your prompt attention to eliminating the risks related to unstable requirements and specialist certification would help expedite FAA's efforts to modernize air traffic control automation systems and rein in STARS's escalating costs. This management advisory will be posted on our Web site (www.oig.dot.gov).

We discussed these issues with FAA's Deputy Director of Air Traffic Systems and officials responsible for managing the STARS program. Thank you for your attention to these important issues. If you have any questions concerning this advisory, please feel free to contact me at (202) 366-0500 or Kevin Dorsey, Program Director, at (202) 366-1518.

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cc: FAA Deputy Administrator
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