

**FAA'S AIR TRAFFIC CONTROLLER OPTIMUM
TRAINING SOLUTION PROGRAM:
SOUND CONTRACT MANAGEMENT PRACTICES ARE
NEEDED TO ACHIEVE PROGRAM OUTCOMES**

Federal Aviation Administration

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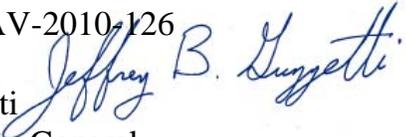
Memorandum

U.S. Department of
Transportation

Office of the Secretary
of Transportation
Office of Inspector General

Subject: **ACTION:** FAA's Air Traffic Controller Optimum Training Solution Program: Sound Contract Management Practices Are Needed To Achieve Program Outcomes
Federal Aviation Administration
Report Number AV-2010-126

Date: September 30, 2010

From: Jeffrey B. Guzzetti 
Assistant Inspector General
for Aviation and Special Program Audits

Reply to
Attn. of: JA-10

To: Federal Aviation Administrator

The Federal Aviation Administration (FAA) plans to hire and train nearly 15,000 new air traffic controllers through fiscal year (FY) 2018 to replace the large pool of air traffic controllers who were hired after the 1981 strike and are now retiring. In September 2008, FAA awarded a contract to the Raytheon Technical Services Corporation (Raytheon) to provide training support for new and existing controllers and to assist FAA in modernizing its controller training program. The contract for the Air Traffic Controller Optimum Training Solution (ATCOTS) is for a period of up to 10 years (with a 5-year base period and 5 option years) at a total potential cost of \$859 million.

Under terms of the contract, Raytheon provides classroom, laboratory, and simulator instruction; training support; course and curriculum development; and administrative and program support services at the FAA Academy and air traffic facilities nationwide. Key ATCOTS goals for controller training include reducing total cost and time, improving quality and consistency, and developing flexible training systems that can be adapted to new technologies—particularly those related to the Next Generation Air Transportation System (NextGen).

In January 2009, Representative Jerry F. Costello, Chairman of the House Subcommittee on Aviation, requested that we review the ATCOTS program. Chairman Costello stated that while ATCOTS could bring positive changes to FAA's training program, given its importance, a better understanding of the financial and contractual aspects is needed. Accordingly, our audit objectives

were to determine (1) whether effective management and contract controls are in place to ensure program goals are achieved and (2) if the program has improved training methods currently provided to the controller workforce.

We conducted this review between April 2009 and August 2010 in accordance with government auditing standards prescribed by the Comptroller General of the United States. Exhibit A details our scope and methodology. Exhibit B lists the air traffic facilities we visited or contacted.

RESULTS IN BRIEF

In designing and executing the ATCOTS program, FAA did not fully consider program requirements. As a result, FAA now faces significant challenges in achieving the program's goals. To date, the ATCOTS contract costs and fees have exceeded baseline estimates by 35 percent during the first year of the contract (from \$81 million to \$109 million)¹ and increased by 20 percent during the second year (from \$91 million to \$109 million). More importantly, those funds have only been sufficient to support existing training methods and procedures; innovations, such as pilot programs for new capabilities to reduce training time and cost, have not been implemented. This occurred for a number of reasons:

- During its acquisition planning, FAA did not fully address issues that could impact the contract outcomes. For example, FAA awarded the contract without mitigating staffing and cost risks identified during the source selection review. Specifically, Raytheon's proposal called for reducing instructor staffing levels by 30 percent during the first 3 years of the contract. FAA's management evaluation team identified this reduction as a high risk, indicating that there was a 60- to 80-percent likelihood that training needs would not be achieved due to the limited staffing hours proposed. However, FAA did not require Raytheon to update its staffing proposal.
- FAA awarded the contract without adequately defining its training requirements. The contract solicitation stated that bidders were expected to train approximately 4,000 developmental controllers annually and allowed for cost adjustments only if that number deviated by more than 10 percent. However, FAA underestimated its initial training requirements, including the number and types of controllers that Raytheon and other bidders of the contract were expected to train. During the first year of the contract alone, Raytheon estimated that about 5,620 controllers needed training—41 percent more than FAA originally estimated.

¹ According to FAA's computations, about \$7 million of increased costs (excluding fees) for Year 1 occurred because the actual labor rates paid by Raytheon were greater than those included in Raytheon's bid support.

- FAA did not initially implement adequate controls to oversee contractor services or to ensure that fees paid for performance were justified. While the ATCOTS contract contains an award fee and incentive fee designed to motivate contractor performance, FAA did not ensure these remained effective mechanisms to control costs as the contract evolved. For example, although FAA significantly increased the number of training hours the contractor was expected to provide, FAA did not revise the cost target to reflect this change. Since FAA never reestablished a realistic cost target based on changes in requirements for the first year until near the end of that year, the incentive fee was an ineffective mechanism for controlling costs. Further, FAA did not include performance measures for earning award fees that were related to the goals of the ATCOTS program, such as reducing the total cost of training. FAA also initially allowed the contractor to select the performance measures and data by which it would be evaluated for earning award fees and did not verify whether the measures would help meet the expected outcomes of the program.

FAA is taking actions to address many of the issues identified during our audit. For example, FAA has added additional program staff to oversee the contract and a new planning tool for evaluating the level of instructor staffing at air traffic facilities. FAA is also establishing training priorities to ensure that costs remain within the base estimates. However, unless there is a significant decrease in its current training requirements, it will be difficult for FAA to achieve the original ATCOTS program goals or any training innovations without significantly modifying the existing contract. We are making a series of recommendations for improving oversight of the ATCOTS contract.

BACKGROUND

In February 2008, FAA began soliciting offers for the ATCOTS contract to replace two separate contracts supporting the controller training program. On September 9, 2008, FAA awarded the contract to Raytheon. The performance-based contract consists of a 5-year base period, worth \$437 million, and two option periods (a 3-year period and a 2-year period), worth \$422 million. The contract includes an award fee for Raytheon meeting acceptable levels of performance related to training outcomes and quality metrics and an incentive fee related to the cost of the services provided. The ATCOTS contract also allows Raytheon to suggest improvements to modernize the controller training program in areas such as hardware and software modifications, curriculum development and delivery, web-based training, and technology enhancements. In addition, the contract includes an option to institute a pilot program that allows these proposed changes to be tested and validated before being implemented on a larger scale. While Raytheon is involved with nearly every aspect of controller training, FAA

retains control for the overall training program as well as for recruiting and hiring controller candidates, conducting performance verification at the FAA Academy, and conducting on-the-job training² at air traffic facilities.

FAA DID NOT FULLY CONSIDER PROGRAM RISKS AND REQUIREMENTS DURING ACQUISITION PLANNING

Understanding requirements and mitigating risks are fundamentals of acquisition planning so that Government agencies can effectively measure a contractor's performance, ensure that future adjustments to programs are warranted, and limit cost increases. However, FAA did not take fundamental steps needed to accomplish this in planning and executing the ATCOTS acquisition, including mitigating risks that were evident during the source selection process and adequately defining the number of controllers who needed training. Those issues led to unforeseen changes in the contract's costs and services.

FAA Did Not Address Risks Its Source Selection Team Identified Prior to Contract Award

While FAA followed its Acquisition Management System (AMS) guidance to identify potential cost and staffing risks prior to contract award, it did not follow through—as also specified by AMS—to reduce those risks to an acceptable level. The risks that FAA's source selection team noted in the Raytheon proposal included the following:

- **Instructor Staffing Levels:** Raytheon's proposal called for reducing instructor staffing levels by 30 percent during the first 3 years of the contract. FAA's Technical Management Evaluation Team identified this reduction as a high risk, indicating that there was a 60- to 80-percent likelihood that training needs would not be achieved due to the limited staffing hours proposed. However, FAA never required Raytheon to update its staffing proposal. The ATCOTS Source Selection Board eventually lowered the risk, in part, because it could not definitively conclude that training needs would go unmet due to Raytheon's reduced staffing hours. The Board determined that specific Raytheon weaknesses, such as those identified within the transition plan and its spoke and hub services delivery structure, could be overcome. Further, the Board concluded that Raytheon's inability to demonstrate knowledge of how En Route Automation Modernization (ERAM) could impact training would also be overcome when FAA issued training requirements via a detailed Work Plan at contract award.³ Despite the risk initially associated with the proposed

² On-the-job training requires a Certified Professional Controller (or CPC) to observe and instruct trainee controllers individually as they work a control position at their assigned facility.

³ For year 1, Raytheon incurred 77,736 more hours than included in its bid estimate due to underestimated ERAM training requirements.

labor hours, FAA concluded that Raytheon's technical and management approach was ultimately the same as its closest competitor and decided to use lowest costs as the final determinate for awarding the contract.

- **Costs:** Raytheon's cost proposal was nearly \$358 million, or 29 percent lower than FAA's own independent Government cost estimate (IGCE).⁴ According to FAA guidance, a deviation of more than 15 percent from the Government's estimate requires FAA to address any estimated cost discrepancies. For example, an acceptable remedial action would have been to make Raytheon aware of any potential errors and ask for a revised proposal. However, FAA never took actions to remedy the discrepancy and awarded Raytheon the contract based on a proposal for fewer hours. Additionally, after the contract was awarded, the Office of Financial Controls—an independent review team reporting to FAA's Chief Financial Officer—recommended that the ATCOTS program office address the 29-percent cost difference between the cost proposal and IGCE. At the time of our review, however, the program office had not responded to the review team's recommendations.

FAA DID NOT ADEQUATELY DEFINE ITS TRAINING REQUIREMENTS

Problems with the execution of the ATCOTS contract were further compounded by poorly defined requirements. FAA's contract solicitation stated that bidders were expected to train approximately 4,000 total developmental controllers annually. It also allowed for cost adjustments only if the total number of developmental controllers in training per year deviated by more than 10 percent. However, FAA underestimated its initial training requirements, including the number and types of controllers that Raytheon and other bidders of the contract were expected to train. This included training for certified controllers transferring to different facilities that were not included in FAA's original baseline training estimate. These controllers, known as certified professional controllers in training (CPC-ITs), must train and certify at their new facilities before they are allowed to control air traffic at that location. During the first year of the contract, Raytheon estimated there were a total of 5,620 controllers who needed training, or 41 percent more than FAA originally estimated.⁵

FAA also did not have a sufficient method for updating its training requirements on an ongoing basis. The contract requires FAA to specify the training and administrative services it needs the contractor to provide through an Annual Work

⁴ The Government uses independent cost estimates to determine if contractors' bids are reasonable.

⁵ FAA disagrees with Raytheon's estimate, claiming there were only 4,375 total controllers in training during the first year of the contract. However, FAA's figure only includes those controllers in training as of the end of August 2009; it does not include those controllers who either completed or discontinued training prior to that date.

Plan (AWP), which is updated monthly by the FAA Academy and individual air traffic facilities. However, the ATCOTS program office did not provide clear guidance to air traffic facilities regarding how to submit the data or what types of training and administrative services should be requested. This led to wide variances in facility requests, including some facilities not requesting contract support even though they needed it.

The lack of clear requirements resulted in some facilities not receiving adequate—or, in some cases, any—support from the contractor. These included facilities with longstanding training support issues and those in need of training on new technologies, such as the following:

- **New York Center:** Facility managers stated that there were not enough contract instructors to meet the training needs of the facility, requiring them to pull 10 controllers from managing traffic to help conduct training, which resulted in increased overtime at the facility.
- **New York Terminal Radar Approach Control (TRACON):** Facility officials stated that the TRACON did not have enough contract support to train the developmental controllers assigned to the facility and did not anticipate receiving additional support. Unlike the New York Center, however, they stated that due to staffing issues, they could not pull controllers from managing traffic to help with training. This delayed training for developmental controllers in the facility’s lab by 5 weeks.
- **Denver Tower:** The facility was scheduled to receive a new training simulator last summer, requiring contract support to operate the simulator and build training scenarios for new controllers to practice. However, FAA and Raytheon officials at the facility stated that there were not enough contract instructors to meet current training demands and that, due to an instructor hiring freeze instituted by Raytheon, they were not scheduled to receive additional support to operate the simulator.

In addition, Raytheon organizes its personnel at terminal facilities under a “hub and spoke” system to take advantage of the geographical proximity of facilities, allowing Raytheon personnel to provide services at multiple locations. For example, contractor personnel at the Cleveland, Ohio, Tower hub can provide training and support services to smaller facilities in Akron, Columbus, Mansfield, Toledo, and Youngstown. However, some terminal facilities under Raytheon’s hub and spoke system were not receiving any training or administrative support. These facilities included the following:

- **John F. Kennedy (JFK) Tower:** Under Raytheon's staffing model, the JFK Tower was supposed to receive contract support from personnel located at the New York TRACON. However, because the TRACON did not have enough contract support to meet its own training needs, the Tower was left with no training support, even though 50 percent of its workforce was developmental controllers.
- **Las Vegas Tower:** The Las Vegas Tower was not receiving support despite the fact that it is in the same building as the Las Vegas TRACON, which was receiving support. While the Tower's management officials had not requested Raytheon's services, their understanding was that the Tower was not under the ATCOTS contract, so it could not receive service.
- **Akron/Canton Tower:** At the time of our review, half of the 26 controllers employed at the Tower were new controllers in training. Despite this, the facility did not receive any Raytheon support from the Cleveland Tower and planned to use two of its own controllers to conduct classroom training.

FAA's Underestimated Requirements Resulted in Increased Contract Costs and Reduced Services

Because FAA underestimated its training requirements, Raytheon requested an equitable adjustment to the contract and implemented a hiring freeze for additional instructors and other personnel at FAA facilities. FAA eventually agreed to the equitable adjustment, increasing the first year cost and fees of the contract by 35 percent—from \$81 million to \$109 million. The second year amount also increased from \$91 million to \$109 million, an increase of 20 percent. To partially offset these cost increases and in anticipation of fewer controller retirements, FAA and Raytheon agreed to further service reductions. FAA stated that it also made this decision because there were 28 percent fewer retirements from the controller workforce in FY 2009 than the Agency had projected (520 actual retirements versus 726 projected retirements). Therefore, FAA will reduce the number of new controllers it will hire for FY 2010, from 1,702 to 1,027 (a drop of nearly 40 percent), and will also reduce the number of introductory training classes at the Academy.

As a result of this reduction in new controller hiring, coupled with a limit on the program's funding, in January FAA and Raytheon reduced the contractor's full-time equivalent (FTE) employees at the FAA Academy and air traffic facilities by nearly 350. Most of the reduction took place at individual facilities, where 251 FTEs were reduced, with the majority of the cuts occurring at en route centers. As shown in table 1, some facilities lost more than half of their Raytheon support.

Table 1. Examples of Raytheon Service Reductions at Select Air Traffic Facilities

| Facility | Previous Contractor Staffing Level (FTEs) | New Contractor Staffing Level | % Adjustment |
|--------------------|---|-------------------------------|--------------|
| Minneapolis Center | 22.7 | 6.0 | -73.6% |
| Seattle Center | 27.4 | 11.0 | -59.9% |
| Fort Worth Center | 26.9 | 11.0 | -59.1% |
| Chicago Center | 26.7 | 17.0 | -36.3% |

Source: FAA/Raytheon

Along with these reductions, FAA and Raytheon also redistributed training support and added staff to 39 facilities, including the JFK, Denver, and Las Vegas Towers. FAA is attempting to resolve future requirements issues by negotiating with Raytheon on ways to better determine its training needs and establishing training priorities to ensure that costs remain within the base estimates. FAA is also refining how its requirements will be communicated from the field to the contractor by providing additional guidance to facilities and implementing new oversight measures over the AWP. Finally, FAA implemented a planning tool that allows the Agency to evaluate instructor staffing at its air traffic facilities and make appropriate adjustments.

FAA'S OVERSIGHT CONTROLS AND CONTRACTOR PERFORMANCE MEASURES DID NOT ACCOUNT FOR SERVICES PROVIDED OR REFLECT PROGRAM GOALS

Effective management oversight ensures that the contractor provides quality services and that the program meets financial and outcome goals. However, FAA did not implement effective controls to oversee the contract or establish performance measures focused on program goals with justified award fees.

FAA Did Not Initially Have Effective Oversight of Services Provided

FAA did not initially have effective controls in place to monitor the quality of services provided by the contractor or to make modifications as needed. The contract requires FAA to conduct semi-annual evaluations of the quality of Raytheon personnel at the FAA Academy as well as individual air traffic facilities. While evaluations were being performed at the FAA Academy, most air traffic control facilities were not notified of this requirement until midway through the first year of the program. In addition, most of the facilities that then completed the evaluations did not send the results to the program office for review. This prevented the program office from identifying training and administrative problems and taking appropriate corrective actions.

FAA also did not have controls in place to ensure it received services as billed by Raytheon, such as requiring documentation for costs claimed. During the first year of the contract, the ATCOTS program office authorized payment for 11 contractor invoices, totaling \$45 million, without the FAA Academy verifying whether the services billed were actually provided. While the FAA Academy was subsequently provided with staff to review invoices, Academy officials stated that they could only verify work performed by Raytheon in the classroom or simulators. They could not verify billed hours that occurred either before or after this formal instruction took place because much of the contractor's class preparation was done outside the facility. As a result, Academy officials could only estimate whether the hours billed were reasonable. In addition, some air traffic facility officials stated that they were not reviewing contractor invoices at all and had not been instructed by the program office to verify whether the services for hours billed by Raytheon were actually provided.

Finally, FAA did not ensure there was enough qualified acquisition personnel to administer the contract. For example, the ATCOTS program office has seen significant turnover in its staff but did not fill key positions to oversee the contractor. Since April 2009, the program office has had three program directors. FAA is aware of the need for additional resources in the program office to effectively oversee the contract and is adding a program lead, a permanent contractor officer technical representative, and a quality assurance specialist.

FAA Used Ineffective Incentive and Award Fees

Motivating contractor excellence for performance-based acquisitions includes using monetary awards, such as incentive fees, to control costs. However, FAA did not adhere to its own contracting criteria or follow guidance from the Office of Management and Budget (OMB) when designing its incentive and award fees. These criteria emphasize that incentives should reward contractors for excellent performance in reaching key program goals and that this performance should be measured in terms of quality and timeliness in addition to controlling costs.⁶

In awarding the ATCOTS contract, FAA used an incentive fee to reward the contractor for keeping costs near or below the Government's established cost target for the first year of the contract. However, because FAA added a significant number of additional training hours after contract award, first-year costs far

⁶ According to FAA's AMS, award fees should be designed to motivate the contractor by offering additional profit for excellent performance in key areas that support the Government's desired acquisition outcomes. OMB guidance also requires that agencies consider an incentive for performance-based acquisitions that is most likely to motivate efficient and economical performance and that this incentive fee should be used when a cost target can be pre-determined and a formula can be used to adjust the negotiated fee over an established cost range. OMB guidance also stipulates that an award fee with performance measures designed to encourage economical performance should be considered when it is not feasible to determine objective cost targets to motivate the contractor through incentive fees.

exceeded the fixed target for earning incentive fees. Since FAA did not reestablish a realistic cost target based on the changes in requirements until near the end of the first year, the incentive fee was an ineffective mechanism for controlling costs. FAA awarded the contractor a portion of the incentive fees (1.5 percent) based on the actual requirements and associated costs incurred, for the first year of the contract even though the cost of the contract increased by 44 percent over original target cost.

In addition to using an incentive fee, FAA used award fees to motivate contractor performance. However, during the first year of the contract, FAA allowed the contractor to both establish the standards of performance required to earn the award fee and select the data by which the contractor would be evaluated.⁷ FAA's program officials were unfamiliar with implementing a performance-based contract and stated that while the contractor should have significant leeway when implementing its methodology, they intended to revise the performance measures for future performance evaluation periods. However, allowing the contractor to simply use its own measures conflicts with FAA contracting guidance stating that the Government should evaluate the performance measures before awarding the contract to ensure they are measurable and likely to improve the outcomes of the program.⁸

As a result, FAA rewarded Raytheon for training tasks that relied on significant FAA efforts to meet the threshold for receiving an award fee. For example, only FAA has the authority to conduct on-the-job-training, the quality of which impacts student pass rates. Although in evaluating this measure, FAA acknowledged its own "significant contribution" toward achieving the student pass rates, it awarded Raytheon 90 percent of the award fee pool set aside for meeting this measure. This conflicts with AMS guidance, which states that the contractor should not be rewarded for work performed by the Government.

In total, FAA awarded Raytheon 91.9 percent of the award fee pool available in the contract for the first year for measures that were not significantly related to improving performance or achieving desired outcomes of the program. For example, a key goal of the ATCOTS program is to provide training to all air traffic controllers regardless of their location. Yet, the performance measure for staffing, which was established by Raytheon, only requires the contractor to staff 95 percent of training facilities adequately.

Prior to contract award, FAA's internal review team warned that this 95 percent target would not ensure that hard-to-staff facilities received adequate training

⁷ The first evaluation period for computing award fees was 12 months (Contract Year 1). Subsequent evaluation periods are 6 months each.

⁸ FAA's AMS Procurement Guidance on Incentive Contracts.

support. However, FAA never changed this measure. As a result, several high-traffic facilities essential to the National Airspace System—such as New York Center and Denver TRACON—experienced significant instructor staffing shortages that compromised the training programs at each location. Despite these staffing shortages, Raytheon was able to demonstrate that it met the 95-percent standard, and FAA awarded 90 percent of the award fee associated with this measure. Table 2 shows our analysis of award fees paid for problematic performance measures during the first year of the contract.

Table 2. OIG Analysis of Award Fees Paid for Year 1 Measures

| Performance Measure (Weight) | Problems with Period 1 Performance Metrics | | | | % of Available Award Fee Paid ⁹ |
|--------------------------------------|--|---|---------------------------------------|-------------------------------------|--|
| | Inadequate link to program goals | Fails to motivate excellent performance | Inaccurate or incomplete data sources | Raytheon rewarded for FAA's efforts | |
| INSTRUCTOR STAFFING EFFICIENCY (35%) | ● | ● | ● | | 90.0% |
| INSTRUCTOR EVALUATION SCORES (15%) | ● | ● | ● | | 96.0% |
| STUDENT ASSESSMENT SCORES (10%) | ● | ● | | | 100.0% |
| STUDENT PASS RATES (15%) | | ● | ● | ● | 90.0% |
| TIME TO TRAIN (25%) | ● | ● | ● | ● | 90.0% |
| | | | | TOTAL | 91.9% |

Source: OIG analysis of ATCOTS contract

After negotiating with Raytheon, FAA revised the performance measures for the second evaluation period. However, the new measures still did not ensure that contractor performance was linked to the program outcomes, and some were so easy to achieve that they normally would not warrant a financial reward. For example, one revised performance measure allowed Raytheon to earn a financial award if as few as half of all developmental controllers at terminal facilities completed training on time. However, according to an FAA program manager, the percentage of terminal developmental controllers who complete training on time was historically higher than 50 percent. As a result, this measure requires

⁹ The ATCOTS Performance Evaluation Plan contains a provision that allows FAA to reassign up to 35 percent of the award fee pool per period for unilaterally directed tasks. FAA has not implemented the clause for any of the completed performance periods.

Raytheon to achieve a passing rate that is actually lower than the historical average and is not an incentive for accomplishing exceptional performance.

In total, half of the revised performance measures awarded Raytheon fees for mirroring the previous contractor's performance levels rather than encouraging it to improve upon historical performance. As a result, FAA may potentially award Raytheon 45 percent of the total award fee for meeting past performance levels, leaving little in the award-fee pool to encourage the contractor to exceed expectations.¹⁰

FAA recently finalized the performance measures for the third performance evaluation period, even though this finalization occurred more than halfway through that period. The ATCOTS performance evaluation plan requires that any changes to the performance measures be established at least 45 days before the start of an evaluation period. FAA claims that the performance measures for the third period show vast improvement over the prior two periods. However, except for two measures to improve cost efficiency, the proposed measures still do not adequately link to the desired outcomes of the program or motivate excellent contractor performance. For example, six of eight revised performance measures would award Raytheon for meeting basic contract requirements, such as management reports and other tasks, rather than assess whether the contractor measurably improves the quality and timeliness of the training. The performance measures include tasks such as:

- establishing a monthly Joint Risk Board tasked with monitoring and tracking program risks;
- delivering a new report on instructor time use for 16 separate instructor tasks—successful delivery results in “exceeds” for this measure; and
- incorporating FAA-supplied population data by site, defining algorithms into a model, and running the model to quantify student training volume.

All of the eight measures for the third period require additional work and must be funded directly through the contract rather than with the award fee, which is intended to motivate contractor performance.

Additionally, four performance measures use “input factors,” a type of evaluation criteria that FAA award fee guidance warns is less desirable than other types of performance measures.¹¹ Input factors require the contractor to complete

¹⁰ FAA has not yet provided us with the actual incentive and award fees provided to Raytheon for Award Fee Period 2.

¹¹ FAA's Award-Fee Contracting Guidance, dated September 28, 2007, states that input factors are not always true indicators of the contractor's ultimate performance and so should be relied on with caution.

intermediate processes or procedures, which are not always true indicators of the contractor's performance in relation to the program goals. For example, one performance measure assesses whether the contractor can submit a quality management program and quality manual; this measure evaluates intermediate processes rather than the quality of the program itself. FAA's latest set of performance measures is not measurable or sufficiently designed to appropriately incentivize the contractor to improve the outcomes of the training program.

We estimate that \$22.6 million of funds could be put to better use by improving the award fee and incentive fee structures.¹² This includes \$11.9 million in award fees put to better use if FAA develops performance measures that relate to the desired outcomes of the program, such as improving training quality and reducing costs; motivates improved contractor performance; and establishes realistic performance targets. In addition, \$10.7 million in incentive fees can be put to better use if the Agency incorporates realistic and objective cost targets that will motivate the contractor to control costs.

Innovations to Controller Training Methods Have Not Been Realized

A key goal of the ATCOTS program is to develop new training technologies and procedures to meet the changing environment in which controllers operate. However, the \$859 million baseline cost of the contract does not include funding to make large-scale, technological improvements to the training program or to train controllers on future NextGen technologies, such as Required Navigational Performance (RNP/RNAV).¹³

Under terms of the contract, Raytheon is only required to mirror the services that were provided by previous contractors. The consolidation of two existing contracts into a single training contract was intended to enable the contractor to better integrate training activities and suggest ways to improve the training process. However, any change to the training program, such as developing a new training curriculum, requires FAA approval before implementation. Because of this clause, Raytheon has not expanded its training and administrative services beyond those offered by previous contractors. While Raytheon submitted five proposals for redesigning parts of the training program, FAA did not approve any of them due to the increasing costs of the contract and eliminated the planned pilot

¹² Detailed computations of the savings estimates are available upon request and are excluded from this report for proprietary reasons. The \$22.6 million estimate represents incentive and award fees (funds) that would be more effectively used by designing realistic cost targets based on actual requirements and by designing performance measures that are linked to the overall programmatic goals of the ATCOTS program. The incentive fee would encourage excellence in contractor performance by rewarding Raytheon for keeping costs near or below the target and meeting the ATCOTS strategic goal of reducing training costs. The award fee structures, based on measurable criteria for improving effectiveness and efficiency, would better achieve FAA's program goals for modernizing the training program.

¹³ RNAV and RNP provide a basis for designing and implementing flight paths that can enhance airspace capacity.

program for introducing new training techniques and technologies because it would have required costs outside of the current contract. FAA and Raytheon are discussing large-scale changes to the controller training program, such as redesigning the tower training curriculum. If changes are made, however, it would require expanding the current contract and would likely result in cost increases.

Unless there is a significant decrease in its current training requirements, it will be difficult for FAA to achieve the original ATCOTS program goals or any training innovations without significantly modifying the existing contract. As a result, before the end of the contract base period in 2013, FAA will need to (1) determine if the existing contract mechanism can be effectively modified to achieve ATCOTS program goals within the current estimate of \$859 million or (2) update cost estimates and requirements of its training needs and develop criteria for determining whether the Agency should exercise options in the contract. These actions will put \$422 million in option year funds to better use.

CONCLUSION

FAA faces significant challenges in executing its plans to hire and train 15,000 new controllers by 2018. ATCOTS is a critical component of this effort. Unless FAA exercises sound contract management practices and holds contractors accountable for achieving program outcomes, FAA runs the risk of failing in its efforts to maintain a sufficient cadre of well-trained, qualified controllers to safely and efficiently meet the growing demands of the National Airspace System.

RECOMMENDATIONS

We recommend that FAA:

- 1) Determine (a) if the existing contract mechanism can be effectively modified to achieve ATCOTS program goals within the current estimate of \$859 million or (b) update cost estimates and requirements for its training needs and develop criteria for determining whether the Agency should exercise options in the contract.

To adequately identify its ongoing training requirements and to provide sufficient oversight during the remaining base period, we recommend that FAA:

- 2) Evaluate Raytheon's staffing methodology to determine if facilities are receiving sufficient training and administrative support and develop an action plan for addressing those locations that need additional support.
- 3) Implement procedures to ensure that the Academy and facilities are properly entering training requirements into the Annual Work Plan.

- 4) Develop performance measures for award fees that directly link Raytheon's performance to improvements in the controller training program and goals of the ATCOTS program.
- 5) Develop improved and reliable performance baselines and benchmarks in formulas for computing award fees to better compare and measure the contractor's performance.
- 6) Implement internal procedures to require independent verifications of whether the contractor is achieving its performance measures.
- 7) Modify the contract to include incentive fees with predetermined cost targets based on accurately defined requirements; if this is not feasible, then include a performance measure(s) that provides an award fee for economical contract performance.
- 8) Ensure that the ATCOTS program office has enough qualified personnel to oversee the contractual, financial, and operational aspects of the program.
- 9) Develop a short- and medium-term "roadmap" detailing potential changes to its controller training program and the impact those changes will have on the ATCOTS contract. The roadmap should include the impact that NextGen and other modernization programs will have on training new and existing controllers.

AGENCY COMMENTS AND OFFICE OF INSPECTOR GENERAL RESPONSE

We provided FAA with our draft report on August 24, 2010, for comment and received FAA's response on September 17, 2010. In its response, FAA noted that it faced considerable challenges in implementing ATCOTS, including transitioning from a time-and-materials contract to a performance-based contract and underestimating the full scope of its training requirements. FAA also stated that it has put new processes and tools in place to improve the ATCOTS program and its controller training program. These include developing a resource surveillance tool and training priority index for each air traffic facility, revamping its formal processes for updating its Annual Work Plan requirements for controller training, and issuing task orders to transform the controller training program. These actions represent positive steps towards meeting ATCOTS goals; however, we agree with FAA's assessment that it is not clear whether these initiatives will enable the Agency to meet its training needs within the existing cost of the current contract.

In addressing our recommendations, FAA fully concurred with all but one. FAA partially concurred with recommendation 7, stating that it was not feasible to establish predetermined cost targets based on accurately defined requirements due to multiple factors outside the control of the ATCOTS program office, such as hiring freezes and class cancellations. However, as we recommended, FAA proposed including award fee performance measures beginning in the third period that will require more economical contractor performance each contract year.

ACTIONS REQUIRED

FAA provided acceptable actions and timeframes for recommendations 1, 4, 5, 6, 7, 8, and 9, and we consider them resolved but open until the planned actions are completed. For recommendations 2 and 3, FAA has already taken actions consistent with the recommendations, and we consider them closed.

We appreciate the courtesies and cooperation of FAA and Raytheon representatives during this audit. If you have any questions concerning this report, please contact me at (202) 366-0500 or Dan Raville, Program Director, at (202) 366-1405.

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cc: FAA Deputy Administrator
Anthony Williams, AAE-001
Martin Gertel, M-100

EXHIBIT A. SCOPE AND METHODOLOGY

We conducted this performance audit in accordance with Generally Accepted Government Auditing Standards prescribed by the Comptroller General of the United States. As required by those standards, we obtained evidence that we believe provides a reasonable basis for our findings and conclusions based on our audit objectives. The audit was conducted between April 2009 and August 2010, and included site visits to the FAA Academy in Oklahoma City, OK, 30 out of 295 Terminal Services facilities (Towers and TRACONs), and 7 out of 21 En Route Centers. A list of air traffic facilities we visited or contacted during this audit, which were judgmentally selected based on the geographic location of the facilities and number of developmental controllers at those sites, can be found at exhibit B.

To determine whether effective controls are in place to ensure that the training and financial goals of the program are met, we reviewed the ATCOTS contract and related documents to determine what contractual controls exist for the program. This included reviewing the contract terms and subsequent modifications, the contractual performance measures, and pre-contract award documents. We also interviewed officials from FAA Headquarters, including the ATCOTS program office, the Air Traffic Organization's Terminal and En-Route Services Branches, and pre-contract award review teams, as well as training and contracting officials from the FAA Academy to determine the specific controls that were implemented to oversee the program. While at the Academy, we also reviewed 11 invoices provided to FAA by Raytheon at the time of our April 2009 site visit, training plans, and evaluation forms to evaluate the controls over the program. In addition, we conducted site visits and interviewed FAA air traffic officials at air traffic control facilities (see exhibit B) to determine if effective controls were in place and properly working. Finally, we met with Raytheon officials to examine how FAA oversees their work and the interaction between the two organizations.

To determine how the training program will differ from what was provided the controller workforce, we reviewed the contract to examine what specific changes and costs are included in the contract as well as the procedures for making changes to the program. We also interviewed FAA and Raytheon officials from Headquarters, the FAA Academy, and at individual air traffic facilities regarding the progress made in changing the training program, as well as the service the contractor provides. In addition, during site visits to the FAA Academy and air traffic facilities we interviewed FAA and Raytheon officials and reviewed documentation provided by Raytheon to determine how controller training has changed at those facilities since the implementation of ATCOTS and whether these facilities were receiving adequate service from the contractor.

EXHIBIT B. FAA AIR TRAFFIC FACILITIES VISITED OR CONTACTED

| | |
|--------------------------------|-----------------------------|
| Potomac TRACON | Washington En-Route Center |
| New York En-Route Center | John F. Kennedy Tower |
| LaGuardia Tower | New York TRACON |
| Albuquerque Tower/TRACON | Albuquerque En-Route Center |
| Portland (OR) Tower/TRACON | Las Vegas TRACON |
| Las Vegas Tower | North Las Vegas Tower |
| Los Angeles En-Route Center | Los Angeles Tower |
| Southern California TRACON | Seattle TRACON |
| Seattle Tower | Santa Monica Tower |
| Burbank Tower | San Diego Tower |
| Santa Barbara Tower/TRACON | Tampa Tower/TRACON |
| Southwest Florida Tower/TRACON | Miami En-Route Center |
| Fort Lauderdale Tower | Cleveland En-Route Center |
| Cleveland Tower/TRACON | Canton/Akron Tower/TRACON |
| Toledo Tower/TRACON | Columbus (OH) Tower |
| Ashville (NC) Tower | Raleigh Tower |
| Charlotte Tower/TRACON | Denver En-Route Center |
| Denver TRACON | Denver Tower |

EXHIBIT C. REDUCTIONS IN RAYTHEON SUPPORT AT SELECT FAA AIR TRAFFIC FACILITIES

| Facility | Previous Contractor Staffing Level (FTEs) | New Contractor Staffing Level (FTEs) | Percentage Adjustment |
|----------------------------|---|--------------------------------------|-----------------------|
| Anchorage Center | 14.2 | 0.0 | -100% |
| Des Moines Tower/TRACON | 1.7 | 0.2 | -88.2% |
| Minneapolis Center | 22.7 | 6.0 | -73.6% |
| Seattle Center | 27.4 | 11.0 | -59.9% |
| Fort Worth Center | 26.9 | 11.0 | -59.1% |
| Kansas City Center | 16.7 | 7.0 | -58.1% |
| Cleveland Center | 17.2 | 12.0 | -55.9% |
| Houston Center | 20.5 | 10.0 | -51.5% |
| Baltimore-Washington Tower | 2.0 | 1.0 | -50.0% |
| Washington Dulles Tower | 1.8 | 1.0 | -44.4% |
| Portland (OR) Tower/TRACON | 1.8 | 1.0 | -44.4% |
| Washington Reagan Tower | 1.7 | 1.0 | -41.2% |
| Chicago Center | 26.7 | 17.0 | -36.3% |
| Atlanta Center | 37.1 | 29.0 | -21.8% |
| Los Angeles Tower | 8.5 | 7.0 | -17.6% |
| Oakland Center | 26.7 | 24.0 | -10.1% |
| New York Center | 27.4 | 25.0 | -8.8% |

Source: FAA/Raytheon

EXHIBIT D. MAJOR CONTRIBUTORS TO THIS REPORT

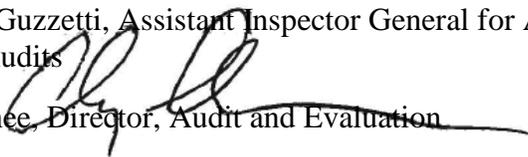
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| David Lahey | Auditor |
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| Andrea Nossaman | Writer/Editor |

APPENDIX. AGENCY COMMENTS**Federal Aviation
Administration**

Memorandum

Date: September 17, 2010

To: Jeffrey B. Guzzetti, Assistant Inspector General for Aviation and Special Program Audits

From: Clay Foushee, Director, Audit and Evaluation 

Prepared by: Anthony Williams, x79000

Subject: OIG Draft Report: Air Traffic Controller Optimum Training Solution: Sound Contract Management Practices Are Needed To Achieve Program Outcomes

The FAA remains steadfastly committed to ensuring National Airspace System (NAS) safety and controller workforce viability. The Air Traffic Controller Optimum Training Solution (ATCOTS) contract provides a necessary supplement to FAA instructor and training resources. Since fiscal year 2005, consistent with the Controller Workforce Plan, the agency has hired more than 8,200 controllers. Over 4,400 of them are now fully qualified as certified professional controllers (CPCs). The Federal Aviation Administration (FAA) has successfully produced new controllers at the volume and speed described in the plan and replaced about 28 percent of the workforce with a new generation of fully qualified controllers - while maintaining exceptionally high certification standards.

The FAA faced considerable challenges in transitioning from two legacy Time-and-Materials programs to the FAA's first-ever Performance-Based contract for air traffic training. As noted in the report, Raytheon's proposal called for a 30 percent reduction in instructor staffing levels during the first year of the contract. However, to ensure operational safety and training continuity, the FAA prescribed contractor performance requiring a nearly one-for-one transition of contract staff. Also, because of a rapidly changing training environment, the FAA underestimated the full scope of training requirements. In addition, the contract explicitly required Raytheon to mirror previous training support levels and focus on program transition and not on large-scale learning transformation. While these issues contributed to higher-than anticipated costs, FAA's management focused first and foremost on maintaining system safety.

The FAA remains committed to achieving intended economies and efficiencies as it gains experience using this type of contracting mechanism in this context. FAA has put into place new processes and tools that position the agency for achieving these economies and efficiencies while improving the training process and outcomes. These efforts are responsive to many of the issues discussed in the draft report and could be more fully discussed in the Office of Inspector General's (OIG) final report. These include:

- Establishing the Technical Training Organization. The FAA hired a Vice President for Technical Training and is staffing the organization with highly qualified and motivated employees. These employees possess competencies such as business management, program analysis, communications, metrics oversight and project execution. The Air Traffic Organization (ATO) Technical Training also introduced a strategic framework for training and placed increased management emphasis on supporting customer requirements.
- Developing formalized processes. The FAA revamped - and in some cases, created - formal processes delineating how the agency determines and updates Annual Work Plan requirements for controller training, communicates changes to training requirements, adjusts staffing levels, coordinates facility visits, disseminates program communications and answers customer questions.
- Creating joint work groups. To improve collaboration and communication, the FAA formed a joint Risk and Opportunities Management Board and a joint Communications Working Group. These groups meet routinely to discuss matters from the contractor or from the government perspective and jointly work toward resolving the issues.
- Launching new work tools to monitor resources. The FAA developed a Resource Allocation Tool and training priority index for each air traffic facility. Also, the Resource Surveillance Tool allows facilities to independently (and on-demand) forecast or evaluate Raytheon's staffing methodology to determine if the sites are receiving sufficient training and administrative support.
- Improving Acceptable Performance Levels for Award Fees and realigning program metrics. The contract's requirement for continuous reevaluation of award fee criteria every six months ensures that the FAA retains the flexibility to adjust and improve contractor performance measurement over time. The FAA and Raytheon conducted in-depth discussions on the goals of the ATCOTS program and as a result, the contractor has aligned its goals and initiatives with the ATO Technical Training mission and strategic framework. Per the contract, the FAA continues to retain 35 percent of the award fee for metrics of its own choosing.
- Commissioning learning transformation projects. The ATCOTS Program Office spent the first and second contract years establishing processes and the framework for learning transformation projects. The FAA has issued task orders for the first programs under learning transformation and anticipates the initiatives will result in

reduced expenditures in the future and improved training effectiveness and efficiency. Transformation remains a key priority for Contract Year Three.

We understand the OIG's review team conducted much of its work during the contract's first year while the primary focus was on the formidable requirements of transitioning from the old contracts and not on training transformation. While it is not yet clear if the results of the initiatives listed above will enable the FAA to meet training needs within the existing budget parameters for the life of the contract, each of these steps are appropriate given the FAA's objectives and the constraints presented by the ATCOTS contract acquisition process.

The following comments are provided in direct response to OIG recommendations:

Recommendation 1: Determine (a) if the existing contract mechanism can be effectively modified to achieve ATCOTS program goals within the current estimate of \$859 million or (b) update the cost estimates and requirements of its training needs and develop criteria for determining whether the Agency should exercise options in the contract.

FAA Response: Concur. The challenges the ATCOTS Program Office successfully overcame during the first two contract years demonstrate that the existing contract mechanism provides an adequate framework to support air traffic training development and delivery as well as learning transformation. While costs have challenged the program office, and made it difficult to execute to the \$859 million baseline, the program office directed numerous initiatives to rein in costs and provide more effective vendor performance. The ATO Technical Training office initiated a number of transformation efforts such as redesigning Air Traffic Basics, TRACON Academy training and En Route facility training, that are intended to reduce costs while improving training outcomes. The FAA may re-baseline the contract if the increase in requirements becomes unsustainable, but cost increases under the government's direction should not be used to determine whether the FAA exercises its options in the contract. Instead, the decision on whether ATCOTS continues under the option years will be based on the government's satisfaction with contractor performance, which the FAA continues to evaluate through the Quality, Metrics and Risk programs. Estimated completion date: September 30, 2011.

Recommendation 2: Evaluate Raytheon's staffing methodology to determine if facilities are receiving sufficient training and administrative support. Develop an action plan for addressing those locations that are in need of additional support.

FAA Response: Concur. The FAA has completed actions that fulfill the intent of this recommendation. The ATCOTS Program Office developed a resource allocation tool and training priority index for each air traffic facility based on numerous factors that include air traffic complexity, staffing, training load and impact to the NAS. The FAA can use this data-based analytical tool to validate a facility's staffing request and enable the program office to easily and rapidly target resource allocation to ensure key needs are met. It is important to recognize that current and projected funding levels cannot fulfill all training requests at all facilities. The FAA can also employ the tool to validate Raytheon's staffing methodology and change requests. The program office also has procedures to redirect resources when warranted.

For example, in May, ATO Technical Training successfully reallocated staffing to the Philadelphia district due to a documented and validated need for additional support. The FAA also designed a surveillance tool for field training managers and the Academy team that captures contractor hours (by month, by position, by site, by district, by service area) and provides an analysis that shows impact of staffing adjustments. Additionally, the program office has assigned tower and terminal radar approach control facilities to districts and has given district managers the flexibility to staff resources based on local requirements, taking into account FAA self-performance ability and unique operational circumstances, such as a new runway or an airspace reconfiguration, at the sites. Actions pursuant to this recommendation are considered complete.

Recommendation 3: Implement procedures to ensure that the Academy and facilities are properly entering training requirements into the Annual Work Plan.

FAA Response: Concur. The ATCOTS Program Office has implemented a more straight-forward process to communicate Contract Year 3 requirements in the Annual Work Plan as well as monthly updates. This process is documented, coordinated with the contractor and has been tested prior to the start of Contract Year 3. The program office continues to evaluate using automation, other databases, and the web to improve data entry of training requirements and continual resource monitoring. Actions pursuant to this recommendation are considered complete.

Recommendation 4: Develop performance measure for award fees that directly link Raytheon's performance to improvements in the controller training program and goals of the ATCOTS program.

FAA Response: Concur. Cost efficiency, completion of training transformation initiatives, individual competency, and training quality are all measures for award fees. These measures are linked to the program's Performance Evaluation Plan and are aligned with the ATO Technical Training strategic framework. The ATCOTS Program Office concurs and has already revised Period Four metrics (September 2010 to March 2011) to evaluate underlying processes and to better connect to program goals. The program office adjusts criteria for each six-month performance period based on focus areas determined by the FAA, and those measures were the key requirements at the time. The FAA's approach to revise award fees addresses two factors: (1) to define metrics for which the contractor is responsible, and (2) to adopt metrics that evaluate training efficiency and effectiveness that are quantifiable through gathered data, which the ATCOTS Program Office mandated during previous performance periods. Estimated completion date: September 30, 2011.

Recommendation 5: Develop improved and reliable performance baselines and benchmarks in formulas for computing award fees in order to better compare and measure the contractor's performance.

FAA Response: Concur. The ATCOTS Program Office redesigned its Acceptable Performance Levels for the third award fee performance period (March to September 2010) to include clarified expectations for computing award fees. Because the training dynamics

between contractor delivery of training and FAA self-performance vary across domains (Terminal, En Route, Academy) as well as location (e.g., Alaska compared with Southern California or New York), it is very difficult to separate the responsible parties when quoting global (or average) metrics. The ATCOTS Program Office is analyzing existing metrics to determine the best measures, baselines and benchmarks to compare and hold accountable contractor's performance in future performance periods. Estimated completion date: September 30, 2011.

Recommendation 6: Implement internal procedures to require independent verifications of whether the contractor is achieving its performance measures.

FAA Response: Concur. The FAA is currently collecting metrics in this area in order to refine data and measure contractor performance. The ATCOTS Program Office continues to build a robust Quality Assurance program that includes participation in Raytheon quality assurance site visits and audits, a joint risk and opportunities management program, semi-annual instructor evaluations and breakdown of instructor utilization by specific type of instruction. Also, to augment our existing voucher review process, the program office recently secured third-party cost and production audit assistance providing dedicated analyses to ensure direct and indirect costs paid under the ATCOTS contract are allowable and appropriate. These actions offer the potential to identify cost savings that could be redirected to fund training development and delivery. Estimated completion date: September 30, 2011.

Recommendation 7: Modify the contract to include incentive fees with predetermined cost targets based on accurately-defined requirements; or, if not feasible, a performance measure(s) that provides an award fee for economical contract performance.

FAA Response: Partially Concur. The contract's design provides incentive fees to drive cost performance and award fees to address training quality - a balance to ensure the contractor will not cut corners in quality to lower costs. It is not feasible to establish predetermined cost targets based on accurately-defined requirements due to multiple factors outside the control of the ATCOTS program management or the contractor that cause those requirements to fluctuate (such as hiring freezes, class cancellations and training progression). The ATCOTS Program Office included award fee performance measures to drive cost containment beginning with the third performance period (March to September 2010). In order for the contractor to receive a significant portion of award fees, it must ensure cost does not exceed baseline funding each contract year. Per the contract, the FAA continues to retain control of 35 percent of the award fee for metrics of its own choosing. Estimated completion date: December 31, 2010.

Recommendation 8: Ensure that the ATCOTS program office has sufficient number of qualified personnel to oversee the contractual, financial and operational aspects of the program.

FAA Response: Concur. Current staffing levels in ATO Technical Training have increased in recent months; however, staffing remains insufficient to support a performance-based cost-plus contract of this magnitude, scope and complexity. To partially mitigate this, the program

office has designated permanent program leads for quality, business management and contract oversight and boosted contract support staff to better handle both strategic and day-to-day program activities. ATO Technical Training considers ensuring the ATCOTS Program Office has adequate staffing levels with the right qualifications a priority. The organization will develop a staffing model to provide for a right-sized ATCOTS team. Estimated completion date: December 31, 2011.

Recommendation 9: Develop a short- and medium-term road map detailing potential changes to its controller training program, and the impact those changes will have on the ATCOTS contract. The road map should include the impact that NextGen and other modernization programs will have on training new and existing controllers.

FAA Response: Concur. ATO Technical Training has assigned a liaison specialist to be a consultant on NextGen projected training requirements and development issues. The ATO Technical Training liaison has also coordinated with all seven NextGen Program Element Activities on impact analysis of NextGen technologies on training procedures and NAS infrastructure (space and equipment requirements). To ensure that Technical Training strategies are aligned with NextGen short- and mid-term initiatives, ATO Technical Training developed a background paper outlining next steps needed to assess how NextGen and other modernization programs affect how the FAA trains new and existing controllers. The ATCOTS Program Office will communicate possible impact on ATCOTS training development and delivery strategies to the NextGen liaison. Estimated completion date: September 30, 2012.