U.S. DEPARTMENT OF TRANSPORTATION

OFFICE OF INSPECTOR GENERAL

FAA Remains Several Years Away From a Standardized Controller Scheduling Tool

FAA

Report No. AV2019013

November 27, 2018

U.S. DEPARTMENT OF TRANSPORTATION
OFFICE OF INSPECTOR GENERAL

Highlights

FAA Remains Several Years Away From a Standardized Controller Scheduling Tool

Requested by the House of Representatives Committee on Appropriations

Federal Aviation Administration | AV2019013 | November 27, 2018

What We Looked At

The Federal Aviation Administration (FAA) employs over 14,000 air traffic controllers to operate 314 air traffic control facilities nationwide. As inefficient facility scheduling can lead to staffing issues and increased overtime costs, in July 2016, FAA and the National Air Traffic Controllers Association (NATCA) agreed to implement a commercially available tool, Operational Planning and Scheduling (OPAS), to standardize scheduling practices at all air traffic facilities. In 2017, the House Appropriations Committee directed OIG to review FAA's progress in implementing a controller scheduling tool and determine whether it is benefiting air traffic managers. Accordingly, our audit objectives were to (1) determine FAA's progress in adopting and implementing a scheduling tool and (2) identify any challenges that will need to be addressed to realize potential benefits.

What We Found

After 2 years, FAA's air traffic control facilities remain without a standardized scheduling tool. Upon reviewing recommendations from a joint FAA-NATCA workgroup, the Agency decided to use OPAS as a management-only tool, used by managers to create the basic watch schedule, and another system, Air Traffic Operational Management System (ATOMS), to capture the real-time work assignments of air traffic controllers. According to FAA officials, this requires the Agency to modify the scope of OPAS and develop its own daily scheduler, which has extended the project timeline. Thus, FAA remains several years away from deploying a scheduling tool. FAA also faces significant challenges before it can realize the benefits of such a tool. In the 8 years since OPAS was procured for testing purposes at a cost of $17 million, FAA has not established a finalized plan with the dates, system needs, potential risks, and costs of deployment. In addition, FAA's decision to partially implement OPAS and ATOMS increased the level of complexity, and the ATOMS scheduling capability has not been field tested. Training and deployment requirements may change over time. As a result, FAA does not know the final cost or how long it will take to deploy a scheduling tool for the controller workforce.

Our Recommendations

We made two recommendations to help FAA implement a standardized scheduling tool at its air traffic control facilities, and FAA concurred with both recommendations.

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U.S. DEPARTMENT OF TRANSPORTATION
OFFICE OF INSPECTOR GENERAL

Memorandum

Date: November 27, 2018

Subject: ACTION: FAA Remains Several Years Away From a Standardized Controller Scheduling Tool | Report No. AV2019013

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

To: Federal Aviation Administrator

The Federal Aviation Administration (FAA) employs over 14,000 air traffic controllers to operate 314 air traffic control facilities nationwide. Efficient workforce planning requires optimal schedules for controllers, since inefficient facility scheduling can lead to staffing issues and increased overtime costs. In July 2016, FAA and the National Air Traffic Controllers Association (NATCA) signed a collective bargaining agreement (CBA) to implement a commercially available tool, Operational Planning and Scheduling (OPAS),[1] to standardize scheduling practices at all air traffic facilities.

In a 2016 report,[2] we found that FAA lacked accurate and complete data on optimal scheduling practices and controller fatigue—factors that limit the Agency's ability to accurately predict how many controllers it needs at critical locations. Subsequently, in its report for fiscal year 2017,[3] the House Appropriations Committee directed our office to review FAA's progress in implementing a controller scheduling tool and determine whether it is benefiting air traffic managers at critical facilities. Accordingly, our audit objectives were to (1) determine FAA's progress in adopting and implementing a scheduling tool and (2) identify any challenges that will need to be addressed to realize potential benefits.

[1] FAA procured the OPAS tool in 2010.
[2] *FAA Continues To Face Challenges in Ensuring Enough Fully Trained Controllers at Critical Facilities* (OIG Report Number AV-2016-014), January 11, 2016. OIG reports are available on our website: https://www.oig.dot.gov/.
[3] House of Representatives Report 114-606 (June 7, 2016).

We conducted this audit in accordance with generally accepted Government auditing standards. Exhibit A details our scope and methodology. Exhibit B lists the entities we visited or contacted.

We appreciate the courtesies and cooperation of Department of Transportation representatives during this audit. If you have any questions concerning this report, please call me at (202) 366-0500 or Marshall Jackson, Program Director, at (202) 366-4274.

cc: The Secretary
DOT Audit Liaison, M-1
FAA Audit Liaison, AAE-100

Results in Brief

FAA has made minimal progress in implementing a standardized, automated tool to develop efficient schedules for air traffic controllers.

In July 2016, FAA and NATCA agreed to implement OPAS, a commercially available tool that aims to optimize scheduling practices. After 2 years, however, FAA's air traffic control facilities remain without a standardized tool. In early 2017, FAA and NATCA established a joint workgroup[4] to coordinate implementation and program support for the tool. The workgroup identified a number of updates to OPAS—such as changes to overtime modules and shift guidelines—to meet new work rules in the CBA. The workgroup also presented several options,[5] one of which was to use OPAS along with another system under development, Air Traffic Operational Management System (ATOMS), to capture the real-time work assignments of air traffic controllers. In September 2017, FAA decided to deploy OPAS as a management-only tool—used by managers to create the basic watch schedule[6]—and ATOMS to track controllers' daily work activities. However, according to FAA officials, managers will not be able to use OPAS to track how daily changes to controller schedules impact overtime and shift coverage. FAA officials stated the Agency needed to modify the scope of OPAS and develop its own daily scheduler, which extended the project timeline. As a result, though FAA and NATCA agreed to implement OPAS in July 2016, FAA remains several years away from having and using a scheduling tool that can develop optimal schedules for controllers.

FAA faces several significant challenges before it can realize the benefits of a standardized scheduling tool for the controller workforce.

FAA lacks a comprehensive plan that outlines how the Agency will deploy the scheduling tool. Specifically, FAA does not have a plan for when it will (1) complete its negotiations with NATCA regarding the implementation of ATOMS, (2) modify ATOMS to include scheduling capability, (3) deploy ATOMS at all facilities, and (4) train controllers how to use the new tool. Currently, FAA and NATCA are negotiating a Memorandum of Understanding (MOU) to address the ATOMS implementation. Still, it has been 8 years since OPAS was procured for testing purposes at a cost of $17 million, and 2 years since the CBA was signed. Yet FAA does not have a finalized plan that lists the dates, system needs,

[4] The workgroup was comprised of six members—three members from FAA and three members from NATCA.
[5] The five options were (1) OPAS, (2) ATOMS, (3) OPAS and ATOMS, (4) ATOMS and develop an optimizer, and (5) ATOMS and change its name to OPAS.
[6] Defined as the days of the week, hours of the day, rotation of shifts, and changes in regular days off.

potential risks, and costs of deploying the scheduling tool at air traffic facilities. As a result, it is difficult for FAA to assess its own performance and to stay on track with development and implementation. FAA's decision to partially implement OPAS and ATOMS has increased the level of complexity, and what was expected to be an "off the shelf" acquisition has evolved into a customized effort with undefined capabilities, costs, and due dates. Furthermore, the ATOMS scheduling capability has not been field tested, and it is accompanied by additional risks—related to new requirements, programming, and training. For example, requirements may change over time, and the training and deployment schedule is currently unknown. As a result, FAA does not know the final cost or how long it will take to deploy a scheduling tool for the controller workforce.

We are making recommendations to help FAA implement a standardized scheduling tool at its air traffic control facilities.

Background

In 2014, the National Academy of Sciences[7] found that schedule changes significantly affect the controller workforce and that FAA should prioritize its efforts to develop a tool capable of creating efficient controller work schedules. Similarly, in our 2016 report,[8] we recommended that FAA use the results of OPAS when conducting annual negotiations regarding controller work schedules at facilities. FAA agreed that it should develop a method to uniformly analyze the scheduling practices at facilities.

OPAS is a commercially available "off the shelf" scheduling system used by air navigation service providers in other countries, such as Australia, Canada, and Germany. It is intended to develop and maintain optimal schedules by allocating controllers to cover the demand (the number of positions needed per shift) efficiently. Currently, FAA's air traffic facilities do not have access to a standardized tool to assist in developing efficient schedules and use a variety of nonstandard methods to develop controller schedules. FAA's Controller Workforce Plan[9] shows OPAS can provide a common toolset that helps FAA facilities develop and maintain optimal schedules based on traffic, staffing, work rules, and controller qualifications. In July 2016, FAA and NATCA agreed to implement OPAS in a collaborative manner at all air traffic facilities.

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[7] National Academy of Sciences, *Transportation Research Board Special Report 314: Federal Aviation Administration's Approach for Determining Future Air Traffic Controller Staffing Needs* (2014).
[8] *FAA Continues To Face Challenges in Ensuring Enough Fully Trained Controllers at Critical Facilities* (OIG Report Number AV-2016-014).
[9] This is an annual report to Congress on the state of the controller workforce; it is developed by FAA's Office of Labor Analysis.

FAA Has Made Minimal Progress in Implementing a Standardized Controller Scheduling Tool

While FAA and NATCA agreed to implement OPAS 2 years ago, the Agency has made minimal progress in implementing a standardized scheduling tool. FAA officials stated the scope of OPAS had to be modified to accommodate the new CBA rules. As a result, FAA is several years away from using a standardized tool to help managers at air traffic facilities develop efficient schedules.

In June 2012, FAA and NATCA signed a MOU agreeing to test and evaluate OPAS as a primary scheduling tool at three facilities: Washington National Air Traffic Control Tower, Southern California Terminal Radar Approach Control (TRACON),[10] and Boston Air Route Traffic Control Center.[11] But 2 years later, in August 2014, NATCA cancelled the MOU, stating that discussions were no longer viable due to FAA's unwillingness to collaborate. By 2016, however, FAA and NATCA had agreed to implement OPAS in a collaborative manner at all air traffic facilities.

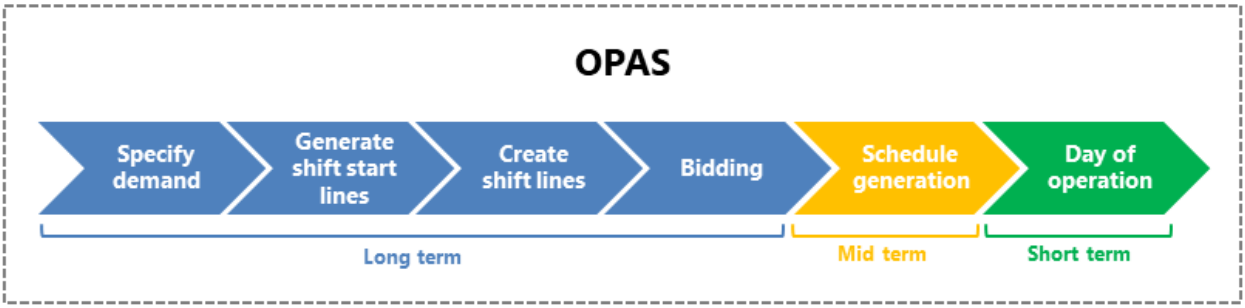
OPAS has three major scheduling components to help managers cover the number of controllers needed per shift during a given period (see figure 1).

- The long-term (annual) component creates work patterns for controllers based on historical traffic data.
- The midterm (biweekly) component assigns controllers to specific work schedules that are posted 28 days in advance.
- The short-term (day of operation) component offers an overview of activities on any given day, including leave, overtime, briefing periods, and other duties (such as training or special assignments). These views are updated in real time as employees enter leave requests and make changes to their schedules.

In the long term, a scheduling tool like OPAS allows managers to determine the best shift start times to cover demand, and it creates work patterns for controllers based on air traffic data. However, the major benefit comes from the short-term component of the tool as it allows the managers to see how daily changes to the schedules, once published, will impact shift coverage and overtime.

[10] TRACONs guide aircraft as they approach or leave airspace near a primary airport.
[11] Air Route Traffic Control Centers guide airplanes flying at high altitudes through large sections of airspace.

Figure 1. FAA's Original Plan for Its Controller Scheduling Tool



Source: FAA's 2017 Controller Workforce Plan

FAA's Decision To Modify the Scope of OPAS Has Extended the Project Timeline

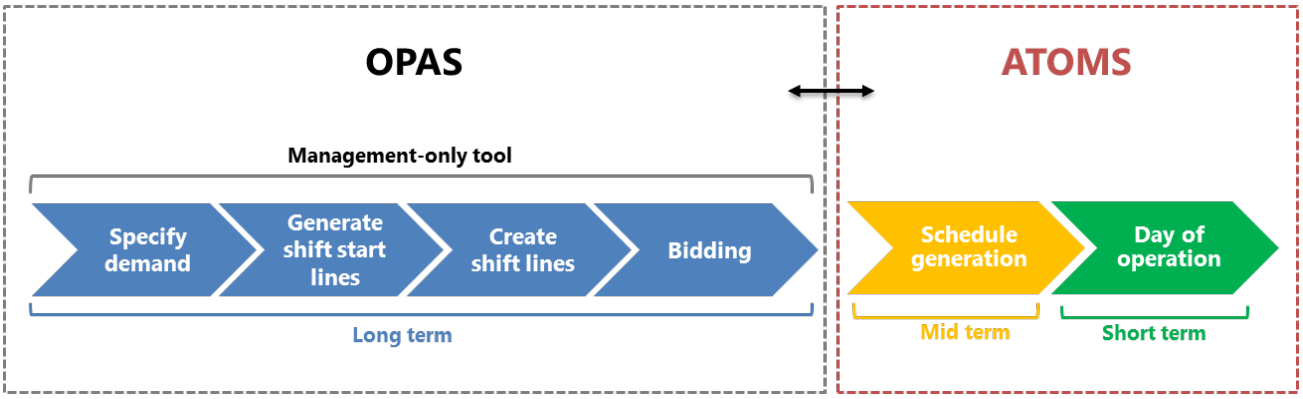
Consistent with the July 2016 CBA, FAA and NATCA jointly established a workgroup in February 2017 to coordinate the tool's implementation and program support. The workgroup identified a number of updates OPAS needed to meet the new CBA work rules. These updates included changes to existing overtime modules, shift guidelines, fatigue rules, and new access levels for air traffic controllers. According to FAA officials, without these updates, OPAS cannot develop controller schedules that meet the 2016 CBA requirements.

In September 2017, based on input from the workgroup, FAA decided to modify OPAS to make it a management-only tool, used by managers to create annual basic watch schedules. According to FAA officials, managers will not be able to use the partially implemented OPAS to obtain real-time updates on how daily schedule changes impact overtime and shift coverage. Additionally, FAA officials stated that controllers will not be able to use OPAS to view their daily schedules, request unplanned leave, or track other activities. Instead, FAA plans to rely on the two systems, OPAS and ATOMS, still under development, to plan and record controllers' work schedules.

Once ATOMS is deployed at air traffic facilities, FAA intends to use it to replace the current time-recording system, CRU-ART,[12] as well as provide a scheduling capability. According to Agency officials, the new system may need a two-way communication link with the OPAS tool (see figure 2) to help managers plan controller schedules. However, ATOMS will not be available before 2020 at the earliest, which is 10 years after FAA procured OPAS to test its ability to develop efficient schedules.

[12] CRU-ART is used by air traffic facilities for recording the time used by air traffic controllers.

Figure 2. FAA's Revised Plan for Its Controller Scheduling Tool



Source: OIG analysis of FAA documents

FAA Faces Significant Challenges Before It Can Realize the Benefits of a Standardized Scheduling Tool

FAA must address several significant challenges before it can implement a standardized scheduling tool for the controller workforce at all of its facilities. We focused on four challenges for the purposes of this report. Specifically, the Agency has not yet (1) negotiated the agreement with NATCA regarding the implementation of ATOMS, (2) modified ATOMS to include a scheduling capability, (3) deployed ATOMS at all facilities, (4) trained the controller workforce how to use the new tools. Furthermore, FAA lacks a comprehensive plan that outlines its approach to these challenges. (See table for key issues that require FAA management's attention.)

Table. Challenges and Key Issues Faced by FAA

Challenges	Key Issues
Negotiate MOU with NATCA	• Complete negotiations with NATCA regarding implementation of ATOMS
Modify ATOMS to include a scheduling capability	• Stabilize the requirements • Manage ATOMS project scope and requirements to limit change requests
Deploy ATOMS at all air traffic facilities	• Establish a deployment schedule • Meet all milestones until delivery date
Train controllers how to use the new tool	• Develop training curriculum • Set milestones for training controller workforce

Source: OIG analysis of FAA documents

FAA's Modifications to ATOMS Will Further Delay Implementation and Training

Originally FAA planned to use ATOMS to record controller shifts, work activities, airspace responsibility, leave, training, and breaks. In September 2017, the Agency decided to modify the ATOMS scope to include a scheduling capability, and is currently negotiating a MOU with NATCA to address deploying the tool at the Nation's air traffic facilities. However, the modification to ATOMS will be accompanied by risks that require management attention. Specifically, FAA has not developed new requirements for ATOMS, which will extend the project timeline; a two-way communication link between OPAS, as the management-only tool, and ATOMS, as the controller scheduling tool; and a plan for training over 14,000 controllers to use ATOMS. The Agency has trained managers at 34 of the largest facilities on the management-only tool, which it plans to use to negotiate the 2019 basic watch schedule. However, while the FAA's Controller Workforce Plan showed that OPAS can help develop and maintain optimal schedules, the ATOMS scheduling capability has been neither defined nor field tested. As a result, the timing for its implementation and its ability to track controller productivity and reduce operation costs at air traffic facilities nationwide remains unclear.

FAA Does Not Have an Effective Plan for Developing and Deploying Its Controller Scheduling Tool

It has been 2 years since the CBA was signed, yet FAA does not have a finalized plan for deploying a controller scheduling tool at its air traffic facilities. Without an effective plan, it is difficult for FAA to assess its own performance and stay on track with development and implementation of the tool. In addition, FAA's decision to partially implement OPAS and ATOMS has increased the project's level of complexity, and what was expected to be an "off the shelf" acquisition has evolved into a developmental, customized effort with uncertain milestones for completion, undefined costs and system requirements, and insufficient efforts to assess and mitigate risks associated with the increased complexity. Thus far, FAA has spent $17 million on OPAS and approximately $5 million on ATOMS. In July 2018, the Agency planned to spend an additional $1.6 million on OPAS and $18.5 million to modify and implement ATOMS—for an estimated total cost of $42.1 million through fiscal year 2022. In addition, FAA has not yet assessed

whether the benefits gained by deploying the customized controller scheduling tool will outweigh these costs.

Efficient schedules are a critical aspect of workforce planning since inefficient facility schedules can lead to excess staffing or increases in overtime. Due to FAA's decision to implement both OPAS and ATOMS, the Agency's ability to implement optimal controller schedules remains years away from realization.

Conclusion

Ensuring adequate workforce planning for the Nation's air traffic controllers depends on the development of efficient work schedules. FAA and NATCA agreed to implement a standardized controller scheduling tool that would achieve this goal of developing and maintaining optimal schedules. However, FAA's decision to use both OPAS and ATOMS to manage and schedule controllers has delayed implementation indefinitely, raising the estimated final cost of both tools to $42.1 million. Until FAA actually starts to use these scheduling tools, it will be unable to track controller productivity and reduce operations costs at the Nation's air traffic facilities.

Recommendations

To help FAA implement the standardized controller scheduling tools at its air traffic control facilities, we recommend that the Federal Aviation Administrator:

1. Develop an implementation plan for deploying a scheduling system for controllers that includes schedule milestones, system requirements, risk assessment and mitigation, and funding requirements.

2. Assess and quantify the expected benefits of a customized controller scheduling tool.

Agency Comments and OIG Response

We provided FAA with our draft report on September 13, 2018, and received its formal response on October 18, 2018, which is included as an appendix to this report. FAA concurred with both of our recommendations and provided completion dates for implementation. We consider these recommendations resolved but open pending completion of the planned actions.

In its formal response, FAA expressed concerns with certain aspects of the report, which we address as follows:

- First, FAA states we erroneously asserted that the Agency lacks a comprehensive plan for deploying the scheduling tool. As noted in our report, the Agency currently does not have a plan that lists the dates, system needs, potential risks, and costs of deploying the scheduling tool at air traffic facilities.
- Second, FAA disagreed with our statement that the Agency has made minimal progress in implementing a standardized scheduling tool. However, ATOMS, which the Agency plans to use for developing and optimizing controller schedules—a critical component of scheduling —remains in the design phase with no clear timeline for implementation.
- Finally, FAA stated that we have erroneously asserted that the Agency has not developed new requirements for ATOMS, noting that it had documented these requirements. However, in September 2017, FAA modified the scope of ATOMS to include a scheduling capability, and more than a year later, the Agency has not yet validated the requirements—due to pending negotiations with NATCA—which has impacted the project timeline.

Actions Required

We consider our two recommendations resolved but open pending completion of planned actions.

Exhibit A. Scope and Methodology

We conducted this performance audit between September 2016 and September 2018 in accordance with generally accepted Government auditing standards as prescribed by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

To determine FAA's progress in adopting and implementing a scheduling tool and identify challenges that must be addressed to realize potential benefits, we interviewed officials from the Agency's Office of Air Traffic Services, Office of Information Technology, Office of Labor and Employee Development, and Office of Labor Analysis. In addition, during our survey, we visited two local sites, Washington Air Route Traffic Control Center and Potomac TRACON, and interviewed facility operations and frontline managers at these locations.

We reviewed and analyzed the CBA with NATCA, as well as FAA policies, procedures, project status reports, recent Controller Workforce Plans, and other information related to the use of scheduling tools. We observed OPAS training for facility managers at the Mike Monroney Aeronautical Center in Oklahoma City. Finally, we reviewed the OPAS and ATOMS costs.

Exhibit B. Organizations Visited or Contacted

FAA Facilities

Headquarters

Office of Air Traffic Services

Office of Financial Services, Labor Analysis

Office of Information and Technology Services

Office of Management Services, Labor and Employee Development Directorate

Field Offices

Mike Monroney Aeronautical Center, Oklahoma City, OK

Potomac TRACON, Warrenton, VA

Washington Air Route Traffic Control Center, Leesburg, VA

Exhibit C. List of Acronyms

ATOMS	Air Traffic Operational Management System
CBA	Collective Bargaining Agreement
CRU-ART	Air Traffic Organization Resource Tool
DOT	Department of Transportation
FAA	Federal Aviation Administration
MOU	Memorandum of Understanding
NATCA	National Air Traffic Controllers Association
OIG	Office of Inspector General
OPAS	Operational Planning and Scheduling tool
TRACON	Terminal Radar Approach Control

Exhibit D. Major Contributors to This Report

MARSHALL **JACKSON**	PROGRAM DIRECTOR
ADRIENNE **WILLIAMS**	PROJECT MANAGER
MARIA **DOWDS**	SENIOR AUDITOR
ALI **NAQVI**	ANALYST
TAMARIA **KELLY**	ANALYST
KEVIN **SIEBERT**	ANALYST
JANE **LUSAKA**	WRITER/EDITOR
SETH **KAUFMAN**	SENIOR COUNSEL

Appendix. Agency Comments

Federal Aviation Administration

Memorandum

Date: October 18, 2018

To: Matthew E. Hampton, Assistant Inspector General for Aviation Audits

From: H. Clayton Foushee, Director, Office of Audit and Evaluation, AAE-1

Subject: Federal Aviation Administration's (FAA) Response to Office of Inspector General (OIG) Draft Report: FAA's Controller Scheduling Tool Policies

The FAA successfully implemented the Operational Planning and Scheduling (OPAS) tool in December 2017. A workgroup (CWG), composed of various FAA offices and the National Air Traffic Controller Association (NATCA), evaluated the capabilities of OPAS and the Air Traffic Operational Management System (ATOMS), resulting in the plan to move forward with OPAS as a management tool and ATOMS for time-keeping.

Management at thirty-four air traffic control facilities currently utilizes OPAS to support the development and analysis of Annual Leave and Basic Watch Schedules at these facilities for Leave Year 2019. ATOMS is being developed to replace the existing time keeping system, Cru-Art.

As the Agency progressed through the approval process for ATOMS funding, a determination was made that feasibility and benefits analyses were warranted regarding the interface of the scheduling portions of OPAS with ATOMS. Those analyses are complete. The FAA's current plan envisions using the OPAS Management Tool for long-term schedule processes and ATOMS for short-term schedule management and time and attendance. While the FAA plans to utilize OPAS capabilities as much as possible in ATOMS, implementation of short-term scheduling will be delayed as these capabilities get integrated into ATOMS. The Agency plans to issue a notice to NATCA in October and begin the processes covered by Article 118 of the Agency's Collective Bargaining Agreement (CBA). Negotiations are expected to begin by mid-November.

The FAA believes the OIG has mischaracterized key aspects of the FAA's Controller Scheduling Tool Policies, resulting in some inaccurate findings. Our concerns include the following:

- The OIG erroneously asserts that FAA lacks a comprehensive plan that outlines how the Agency will deploy the scheduling tool. The FAA has developed internal cost estimates and a deployment timeline for the scheduling tools for the controller

workforce. FAA does have an implementation plan; however, until NATCA negotiations are completed, it cannot be finalized. ATOMS development is progressing in accordance with the scheduled CWG recommendations.

- We disagree with the OIG's assertion that the Agency has made minimal progress in implementing a standardized scheduling tool. The Agency has implemented OPAS to create work patterns for controllers, based on historical traffic data, at the nation's busiest thirty-four air traffic control facilities. ATOMS will be used to develop, optimize, and edit bi-weekly schedules. It also provides short-term (day of operation) functions.
- The OIG erroneously asserts that FAA has not developed new requirements for ATOMS, which will extend the project timeline. The FAA has requirements documented for ATOMS that will require validation efforts once negotiations begin this fall. A determination must be made regarding phases of implementation with the development or procurement of any system. The FAA will finalize these phases once negotiations have concluded.

Upon review of the two recommendations, the FAA concurs with both recommendations, to develop an implementation plan for deploying a scheduling system for controllers; and assess and quantify the expected benefits of a customized controller scheduling. We plan to implement both recommendations by December 31, 2019.

We appreciate this opportunity to respond to the OIG draft report. Please contact H. Clayton Foushee at (202) 267-9000 if you have any questions or require additional information about these comments.

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