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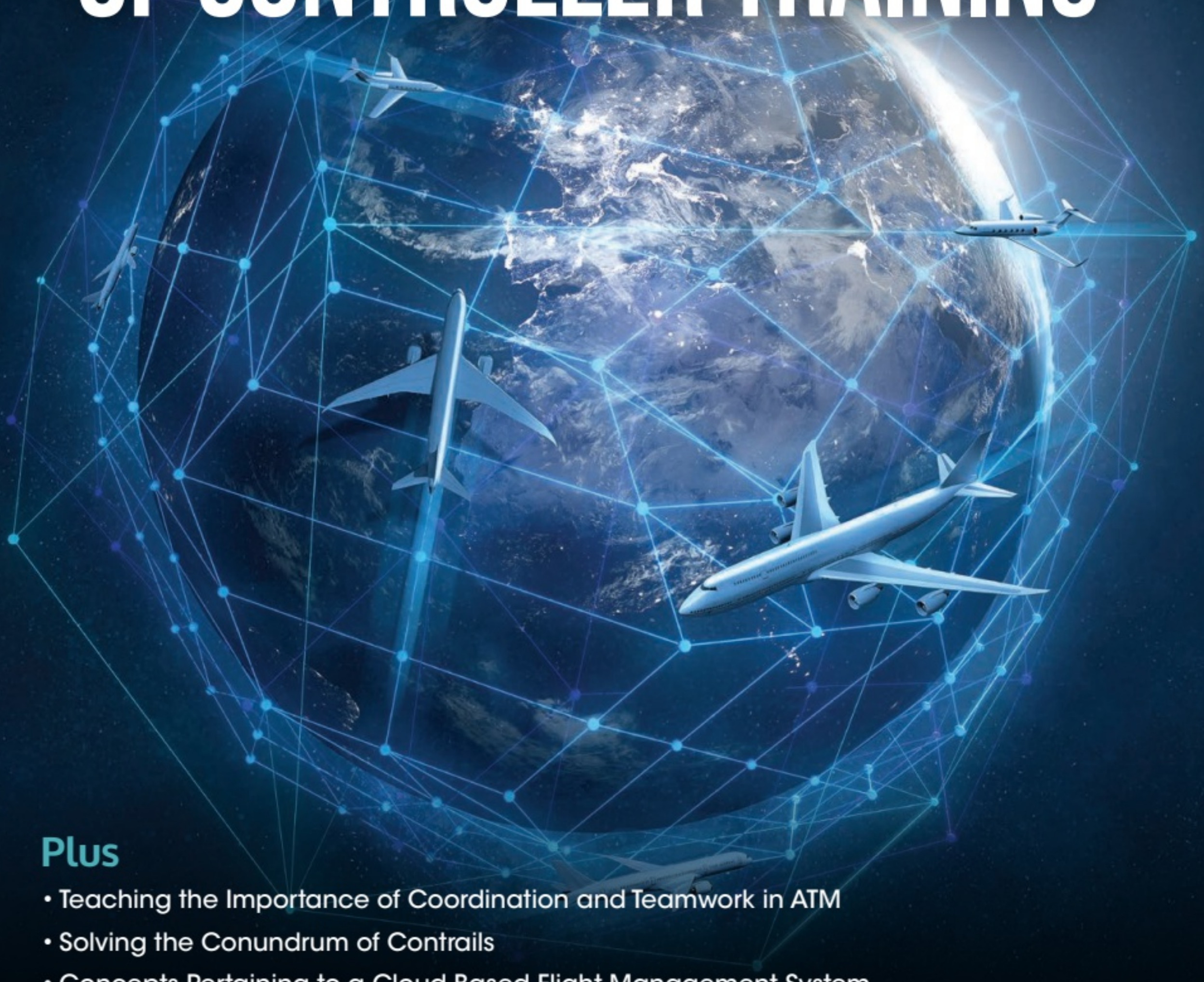
ALL-IN-ONE TRACKING OF CONTROLLER TRAINING



Plus

- Teaching the Importance of Coordination and Teamwork in ATM
- Solving the Conundrum of Contrails
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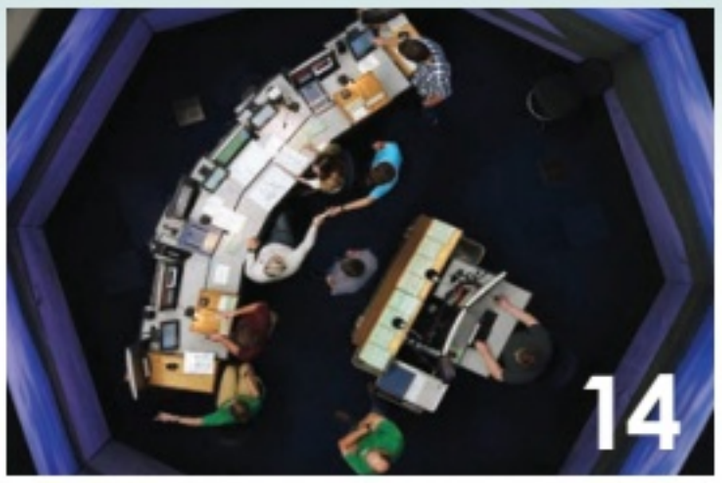

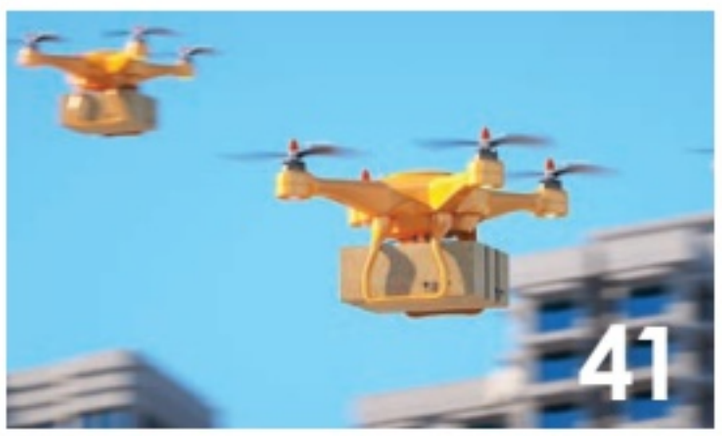

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ALL-IN-ONE TRACKING OF CONTROLLER TRAINING

By Charlie Bern, Volanno Project Manager, TEAM

The legacy electronic and paper-based tracking of the FAA air traffic controller training is being brought into the internet era with a comprehensive new, web-based application.

The new TEAM system replaces 14 outdated legacy electronic systems that followed no standardized pattern with a modernized, unified framework. This allows a single entry to populate the TEAM database for use throughout the FAA's training management organization.

The FAA and NATCA are now implementing TEAM nationwide after incorporating enhancements in the latest software build by relying on input from local facilities. The program electronically tracks, documents, and retains all training records and forms, team meetings, and plans as outlined in FAA Order JO 3120.4R Air Traffic Technical Training. The program simplifies On-the-Job Training Instruction (OJTI) for air traffic controllers.

Data is entered into the system once and the task is complete, without any further workload. The new system allows for on-the-job training to be signed off immediately after completion rather than waiting up to 90 days for the sign-off to be processed, as was the case with legacy systems. It's a whole new way of tracking the FAA's controller training in an extremely simplified way. What used to take three months now takes three minutes.

Andrea White works at Volanno, the contractor for TEAM. She joined the company following a career as an FAA air traffic controller and remembers all too well how things used to happen in "slow motion" when she worked as an FAA controller for 30 years, and as a contract training specialist in Arkansas for five years.

"There was tons and tons of paperwork, and everything went into a pumpkin-colored jacket, an iconic type of standard folder with paper training records for each controller the FAA has been using since 1974," White said. After she retired as an FAA controller, she became a trainer of controllers for a contractor. "I spent at least four hours a day putting training reports in one software program and then I had to repeat it to put it into another program. This is what it took to communicate with everyone in the FAA who wanted to know what was happening in training. With the new TEAM system, the same tasks take 45 minutes, leaving more than three hours to

U.S. Department of Transportation
Federal Aviation Administration

ATCT/ARTCC OJT
INSTRUCTION/EVALUATION REPORT

1. Name	2. Date	3. Scenario/Position(s)

4. Weather	5. Workload	6. Complexity	7. Hours
☑ VFR	☑ Light	☑ Not Difficult	
☐ MVFR	☐ Moderate	☐ Occasionally Difficult	8. Total Hours This Position
☐ IFR	☐ Heavy	☐ Mostly Difficult	
☐ Other		☐ Very Difficult	

9. Purpose ☑ OJT ☐ OJF ☐ Additional Scenario ☐ Instructional Scenario
☐ Evaluation Scenario ☐ Performance Assessment ☐ Certification ☐ Recertification
☐ Skill Enhancement ☐ Other

10. Routing

11. Performance

Job Task	Job Subtask	Observed	Comment	Satisfactory	Needs Improvement	Unsatisfactory	Simulation Training
A. Separation	1. Ensures separation	X					
	2. Provides safety alerts	X					
	3. Provides IFR/VFR Conflict Resolution	X					
B. Weather	4. Issues observed/reported weather.	X					
	5. Solicits/Issues PIREPs.	X					
	6. Issues hazardous inflight weather information.	X					
C. Coordination	7. Performs handoffs/pointouts.	X					
	8. Performs required coordinations	X					
D. Control Judgment	9. Applies good control judgment	X					
	10. Understands priority of duties	X					
	11. Provides positive control	X					
	12. Maintains effective traffic flow	X					
E. Methods and Procedures	13. Maintains aircraft identity	X					
	14. Strip posting is complete/correct.	X					
	15. Clearance delivery is complete/correct and timely.	X					
	16. Adheres to LOAs/directives	X					
	17. Provides additional services	X					
	18. Rapidly recovers from equipment failures and emergencies.	X					
	19. Scans entire control environment.	X					
	20. Maintains effective working speed	X					
F. Equipment	21. Maintains equipment status information	X					
	22. Understands/uses equipment capabilities	X					
G. Communication	23. Functions effectively as a radar/tower team member.	X					
	24. Communicates clearly and concisely	X					
	25. Uses prescribed phraseology.	X					
	26. Makes only necessary transmissions.	X					
	27. Uses appropriate communications method.	X					
	28. Gives complete and accurate relief briefings	X					
H. Other	29. Subtask Demo	X					

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do other things such as developing courseware for training classes."

Once White wrote a training evaluation for an OJTI session, she had to enter it into three different electronic systems and save the paperwork for a year. Once the trainee became a certified controller, she had to spend time shredding the now no longer needed training evaluations. Now such tasks can be done at the touch of a button with the report circulating to everyone who needs to see it. Training controllers is a critical task at the FAA because there is zero margin for error in operational ATC. Keeping track of when training has been successfully completed (or has to be continued to demonstrate proficiency) is vital for keeping the US air traffic system functioning safely and effectively.

"As a controller, I gave my training reports to supervisors for decades, but I never knew where they went," White said. Now she understands the big picture. "Being on the other side of the training department, I saw the immense work that went into recording all of my training. It was more than just filing the forms into a folder; it was recording them into three different programs. I had no idea that this data was used to provide statistical data that would affect the hiring and staffing process."

When White became a contract trainer, she worked with the Volanno team and the eight FAA facilities in the Memphis district, including towers, Terminal Radar Approach Control Facilities (TRACONs), and en route centers. This district became the beta test site for the new TEAM software designed to track all controller training in the FAA. These facilities were able to give feedback to the Volanno program manager and developers on what was working and what was not. TEAM was later expanded to include 31 additional facilities, increasing the total number to 39.

White then got involved in assisting Volanno on developing TEAM. The woman-owned small business is a big data analytics company with expertise in transportation. White helped the software developers understand the FAA's training requirements and mentored personnel in the Memphis district facilities in the use of TEAM. Eventually she volunteered to join Volanno to work as a training advisor because she was already answering TEAM questions from Memphis district facilities every day.

The development of TEAM started in 2017. Volanno, a company that specializes in intelligent transportation, including analysis and reporting of aviation metrics, assisted the FAA with strategic planning and TEAM roadmap development. The company collected requirements, built, tested, and deployed TEAM version 1.0 in six months. The FAA and NATCA worked together to set the requirements for TEAM, and NATCA has been involved all along in testing and implementing the system.

White helped the software developers understand the FAA's training requirements and mentored personnel in the Memphis district facilities in the use of TEAM.

"TEAM will create consistency throughout every facility as to how training is documented," said Scott D. Brown, FAA Policy and Requirements Team Manager (AJI-2410). "We have worked to make sure this updated version of TEAM aligns and is compliant with the new Air Traffic Technical Training Order, JO 3120.4R.

"While every facility uses the same training form, each facility may address those requirements a bit differently. We're working to align not only the recording of training to have a personnel record from hire to retire, but also to ensure that documenting the hours with training is consistent. TEAM is adding consistency, while also ensuring compliance with the Training Order so we can improve the training process for trainees and certified professional controllers in training."

NATCA is collaborating in all aspects of TEAM development and deployment.

Adonna Prior is the national NATCA TEAM representative. She works at the Las Vegas ATC tower. Prior is sharing information about the cloud-based software program with NATCA members across the country.

"Documenting training electronically provides a quicker, more-streamlined method for all participants in the training process to stay organized and on the same page," Prior said. "TEAM provides several features that allow the training team quick access to training forms, current training hours used or available, subtask strengths and weaknesses, and many other features on one easy-to-access space."

Recently a group of NATCA controllers and management subject matter experts made several changes in the latest TEAM software build to make features more user-friendly. This was after NATCA and the FAA

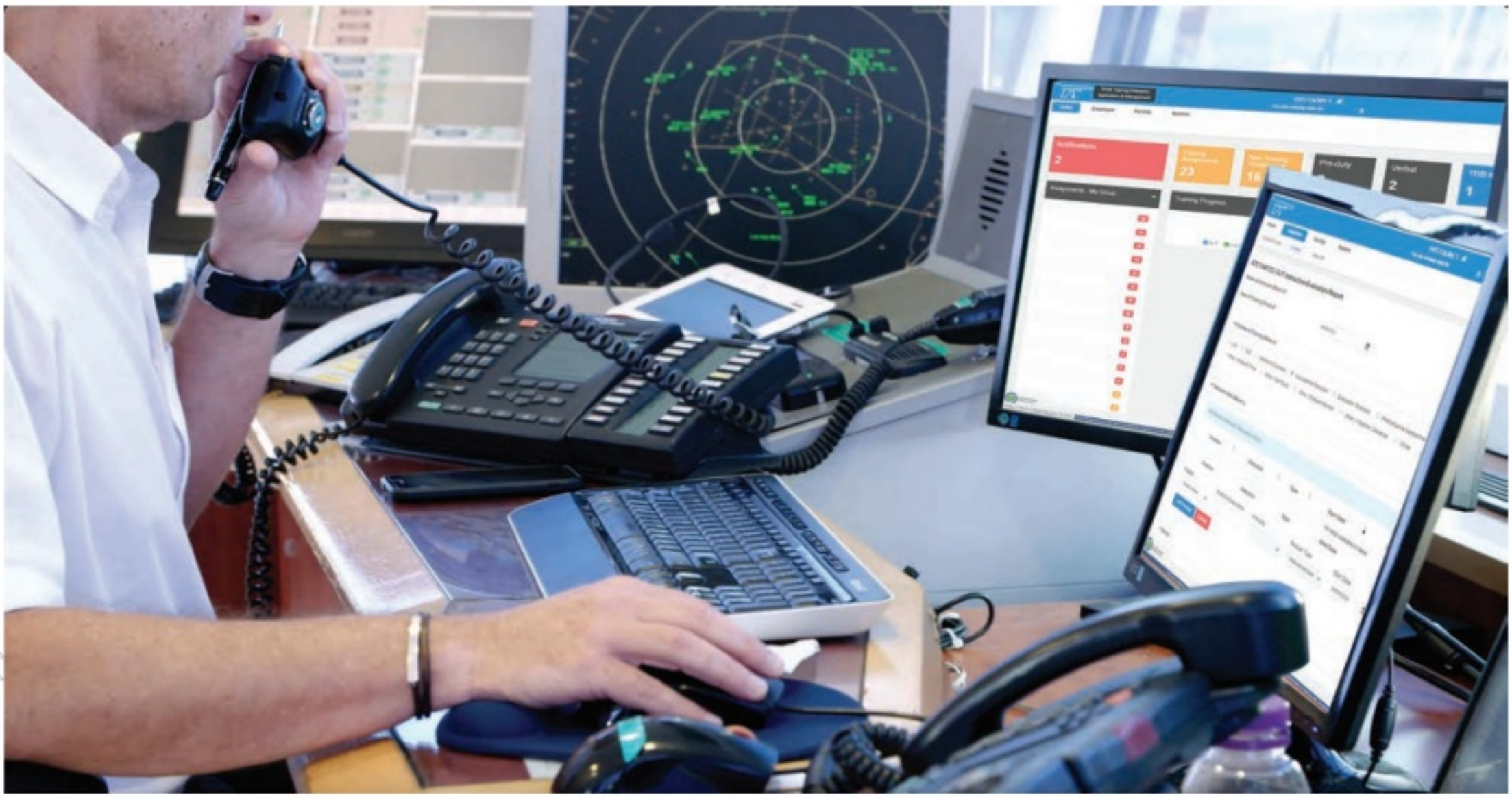

Photo courtesy of TEAM

gathered information from local facilities and from users across the country.

"The build that will be available for national rollout will include many of these updates and enhancements," Prior said. "The TEAM program subject matter experts agree that TEAM is an invaluable tool for the current users and for all who will eventually use the program."

Subject matter experts also agree that while the current build incorporates many improvements, opportunities for additional enhancements will be identified once the program is fielded nationwide.

One key to the efficient development of software to handle all the complexity of the FAA's training requirements and reporting was the use of Agile Scrum methodology. Agile techniques improve communications on a development team and bring clarity to goals, tasks at hand, and acceptance criteria. Mistakes, when they happen, are corrected quickly with open lines of communication.

The term 'scrum' originated in rugby; in the game it involves players packed closely together with their heads down as they try to get possession of the ball. It's an entirely appropriate term used in Silicon Valley when applied to the development of software. There are daily stand-up meetings to monitor task completion and solve problems. Scrum aptly describes an Agile software development process used to track project specifics, highlight challenges, and bring solutions to the fore. In short, scrum has worked on many major software development projects in Silicon Valley, and it worked well for Volanno in developing TEAM Build 1.0 for the FAA in just six months. The development team worked in two-week cycles, monitoring task completion and running demonstrations at the conclusion of each cycle.

Volanno developed TEAM as a web application using Hypertext Preprocessor open scripting language and ensured compliance with web accessibility standards. More than 14,000 personnel will use the TEAM application nationwide. There is a waterfall schedule to roll out the program to 274 additional FAA ATC facilities at a rate of about 10 per week. This includes en route centers, TRACONs, super TRACONs, towers, and Alaska Flight Service Stations.

Volanno uses open-source software tools and internal analysis engines to rate the software code before it is accepted. The analysis can spot bad practices such as hard-coded values or lengthy functions, and creates a Change Risk Anti-Pattern score. If the score is low, the software is automatically not accepted, and the developer is required to revise the work before a second analysis is conducted. Once accepted by Volanno, the code is evaluated by the FAA's product team before being made available to all end users. This approach has significantly decreased the number of software defects found and has allowed TEAM to run 99.995 percent of the time, except for planned outages.

With the automated tests, it takes just 19 minutes to exercise the majority of TEAM system functionality, including unit, integration, command line interface, and functional tests. This means the FAA doesn't have to solely rely on manual testing, which could take up to eight hours. TEAM now has 2,335 automated tests containing more than 62,000 assertions, which are being used to identify high risk areas that can be targeted for improvement during application upgrades.

Recently a group of NATCA controllers and management subject matter experts made several changes in the latest TEAM software build to make features more user-friendly.

Manual testing is still needed and required, but the automated tests can exercise over 82% of the application, saving time and money.

In a separate project, Volanno is providing Aviation System Performance Metrics data to the FAA to evaluate the performance of ATC systems. Numerous data sources provide information on more than 40,000 flights per day with data from the prior day being available by 7 a.m. to the FAA's executives.

Volanno was one of the first vendors to deploy a major application to the FAA's Cloud Services. TEAM leverages cloud technologies including Elastic Compute Cloud (a virtual server), Relational Database Service, S3 cloud storage, ElastiCache for microsecond latency, and Cloud Load Balancer. In addition, the company used Ansible playbooks to create blueprints for automation tasks for DevOps that combines software development and IT operations. The playbooks also fulfill documentation requirements.

White says undergoing controller training is not easy and change is hard – even changing the way training is tracked. For those doing the training and undergoing the training, there will no longer be a barrage of paperwork following completion of tasks thanks to TEAM. Now tracking of training will be handled by an all-in-one web application. White loves helping the software developers invent TEAM, and she loves mentoring the FAA training staff in the field who will be using it. She will be conducting video conferences in the coming months to teach the FAA field personnel how to use TEAM.

Now it will be possible for a manager at headquarters to see if a controller at Little Rock tower in Arkansas received a briefing to a change in the controller's handbook. If an evaluator wanted to look at briefing records in Dallas, Atlanta, and Seattle four years ago they would have had to go to those places and look through the "pumpkin jackets." Now the answers are just a few keystrokes away. That same person could also check whether all 400 employees at one large facility had received a required briefing. TEAM includes not only all the information in the pumpkin folder, but it also includes records of training plans, team meetings, instruction, and evaluation reports. Local training documents can be attached. It includes supplemental, refresher, proficiency, and informational briefing training records.

Other analysis with TEAM could be used for controller placement by seeing how many days it takes to certify at a particular en route facility versus at a tower or a flight service station. This could answer the question of whether more controllers need to be hired.

It will now be easy to track how a controller has been trained from "hire to retire."

What used to take three months now takes three minutes.

The records will also be readily available if needed during an accident investigation rather than having to wait for the topic to be researched in paper records.

When considering the FAA's controller workforce is the key to keeping the NAS the safest in the world, it is clear that it is time to bring the tracking of controller training into the modern era. NextGen transformation of the NAS will help move the system from tactical to strategic ATM as controllers learn new skills such as how to handle electric vertical take-off and landing air taxis, drones, commercial space travel, and autonomous aircraft, to name a few. The FAA is also moving to implement trajectory based operations (TBO) and greater use of performance based navigation, so controller training will have to accommodate lots of changes.

TEAM will pave the way for this NextGen future in training for the near term and for decades to come.