

American Airlines

comes on board with Datastream 7i

Background

Celebrating its 75th year of service in 2001, American Airlines is an industry leader in airline travel. With its regional airline associate, American Eagle, American Airlines offers flights to more than 260 cities and 49 countries and services to over 103,000 customers on 4,100 daily flights.

As prescribed by the Federal Aviation Administration (FAA), safety and system efficiency are critical to securing the welfare of airline customers and reliable operations. One way American Airlines meets these high standards is through its American Airlines Flight Academy in the Dallas-Forth Worth area. With simulators ranging from the Boeing 777 and 737 to smaller aircraft like the Embraer ERJ145 and Saab 340B, the facility provides state-of-the-art training for new pilots and continuous training for current pilots.

The full-scale simulators are able to replicate the sensory experience of flying as well as test pilots with unique scenarios, such as inclement weather conditions and non-standard landing situations. This training helps new pilots train effectively under different flying conditions and helps current pilots practice skills they may not use in everyday flight scenarios.

The Challenges of Maintaining Flight Simulators

The American Airlines' Simulator Training Equipment Support (STES) group is responsible for all flight simulator maintenance and engineering, and they must ensure that every detail of the simulator experience emulates actual flying conditions. "If the aircraft's design changes, we have to follow suit to maintain fidelity, FAA compliance, and to train pilots properly," states Jim Tipton, manager of simulator operational support at the flight simulator facility. To accomplish this, American Airlines' technicians needed a solution to help them work with a variety of systems simultaneously, meet FAA regulations regarding how they recorded work, and become more efficient in how they performed maintenance.

The 107 simulator technicians and 8 engineers perform both scheduled and unscheduled maintenance on 34 flight simulators of various technologies and qualification levels at the facility. The technicians perform diverse jobs-everything from working on hydraulics systems to writing or modifying computer programs for the simulator itself. "The variety of tasks change from day-to-day depending on the condition of the simulators," explains Tipton. "Therefore, each technician has to be a 'jack-of-all-trades,' and having the right information available is indispensable."

The simulators have four basic systems that the technicians maintain, and every system requires a different set of skills. Each simulator has a host computer that runs the flight simulation program and simulates the aircraft's systems and handling characteristics. Another system provides the visual component of training by generating up to 180-degrees field-of-view all the way across the flight deck. A third system deals with the hydraulics that move the motion base of the simulator. In addition, a secondary hydraulics system, the control loading system, gives the pilot an accurate sense of what the airplane controls actually feel like during flight.



The full-scale replica of the flight deck is the heart of the simulator, and maintaining its configuration to match the aircraft is an FAA requirement. “The fidelity required inside the flight deck is very important. Everything the pilots see, hear, and feel must be the same as what they experience in the aircraft,” stresses Tipton. “Each simulator is tested four times a year to ensure it continues to meet the standards, and the FAA is present at one of those sessions to run both quantitative and subjective tests we have to match in the airplanes.”

Maintaining all these different systems is a daunting task, especially in terms of the state-of-the-art equipment that ensures a realistic flight experience. “The average cost of a new simulator is \$14 to \$15 million,” says Tipton. “Our annual maintenance budget, which is specifically for materials and supplies, is about \$800,000.”

“Our biggest challenge of maintaining the simulators was a lack of centralized information. We were using strictly paper-based systems to track our maintenance,” continues Tipton. “Each simulator has an individual maintenance log that we work from, and most simulators are in separate bays. If a technician wanted information, they had to go to each simulator and do the research by hand.”

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Jim Tipton,
Manager of Simulator
Operational Support,
American Airlines’ Flight
Simulator Facility

Solutions

Infor offered an asset management solution that would help American Airlines collect information in a manageable database, manage and track inventory, and perform and record tasks on the flight simulators with more efficiency. “We started looking at asset management solutions several years ago. Through the years, we stayed abreast of who was the best in the market place and the big players,” adds Tipton. “Datastream 7i was always at the top of the list and could address maintenance efficiency, FAA documentation requirements, inventory, and configuration.”

Having a system in place for scheduling preventive maintenance and handling everyday tasks helps ensure that American Airlines’ pilots receive the best possible training. The simulators are used an average of 18 to 20 hours per day and have to be working reliably to train the approximately 9,000 American Airlines’ pilot workforce. Each American Airlines’ pilot is required to come in-house for re-certification at least every nine months. If a pilot changes seats due to a seniority progression, American Airlines require them to come in for additional simulator training to learn their new position.

One of the first capabilities activated in Datastream 7i software by American Airlines concerned Preflight Inspections. During these daily inspections, the technicians go through preflight checklists and make sure everything, such as the instruments, lights, navigation systems, autopilot, and components, is working correctly. “These inspections are required by FAA regulations, and Datastream 7i’s preventive maintenance capabilities enable us to automatically roll out the preflight tasks every night,” says Tipton. “This helps the technicians quickly identify tasks they need to complete and gives us the ability to record the completion of those tasks as mandated by the FAA.”



In addition, American Airlines simulates fourteen different types of aircraft, and each simulator has its own distinct needs in terms of parts and supplies. “A 737 and MD80 are completely different simulators with nearly every component incompatible,” explains Tipton. “When we inventory our parts with Datastream 7i, it allows us to align each unique simulator with its components for more organized inventory practices.”

Configurability was a central feature that made Datastream 7i the right solution for American Airlines. “One of the reasons we selected Datastream 7i is because of the robustness of their product’s database,” states Tipton. “Flight simulation is a unique industry, and the configurability of Datastream 7i is robust enough to meet the needs of our specific environment.”

Datastream 7i allows American Airlines to add custom fields, rename existing fields on forms to match their industry terminology, and configure the software’s workflows to match their existing workflows and quality assurance requirements. The software’s sound database structure also serves as the foundation for a virtually unlimited repository of event and knowledge data about the simulators. For example, the software helps technicians create new maintenance items, review FAA restrictions, maintenance histories, and lost time as well as record training time, downtime, and session quality.

Results

Using Datastream 7i software, American Airlines’ STES personnel easily access simulator information and record their work for FAA inspections. The software also enables technicians to record what work they do in the field, eliminating the need to constantly update a paper-based system and ensuring that all work is documented to meet FAA regulations. In addition, Datastream 7i consultants created a Flight Instructor interface to American Airlines’ specifications for the easy review of the Simulator Maintenance Log and entry of new discrepancies by flight instructors. Unlike other companies who use an asset management system, the majority of the STES workload originates with discrepancies initiated by the flight instructor. There is no approval process for these discrepancies. The instructor interface allows STES to see its workload in real-time and gives instructors the ability to enter maintenance items as they occur.

Datastream 7i was matched to American Airlines’ design for a flight instructor interface. This interface replicates the current American Airlines E6 log, or pilot-reported discrepancies, and shows the instructor the current status of the machine, what FAA restrictions exist, the current maintenance tasks, what tasks were completed in the last thirty days, and any lost time incurred, shortening the data entry process considerably. Datastream 7i’s instructor interface also serves as a single-point communications tool that can broadcast important information to the instructor group, alert instructors to restrictions on training capabilities, and provide current and past views of the maintenance status and history.

“With the addition of the flight instructor interface, Datastream 7i provides the tools we need better than any other maintenance system on the market,” adds Tipton. “The amount of configuration is important, and Datastream 7i’s instructor interface will provide a major benefit to any operation of this nature.”



With Datastream 7i, the technicians are able to gather statistical data such as start-of-day dependability results, trouble calls, and project work referred to as Engineering Change Orders. The technicians also do statistical failure analysis that lets them know which parts of the simulator are failing most often, how long it takes to respond to problems, and what percentage of those problems can be resolved during an emergency maintenance session or must be deferred to a full maintenance session. Letting technicians know what work is eminent and how to handle future tasks helps save American Airlines time and money.

In addition, American Airlines incorporated Datastream 7i's Key Performance Indicators (KPIs) into the Simulation Quality Assurance Program (SQAAP), enabling them to measure how successful they are in meeting quality objectives on a continuous, real-time basis. "Datastream 7i enables us to consolidate information in a very accessible format. With a glance at the software's homepage, we get a snapshot of how we are performing and where we need to concentrate our efforts," says Tipton. "We need the ability to resolve issues quickly, and the availability of information from any computer in the building allows us to operate more efficiently."

Twenty-five percent of each Simulator's Approved Test Guide must be completed each quarter to conform to FAA regulations. Datastream 7i allows STES to track those tests from the time they are released through their completion, allowing technicians to record accurate test performance that can be used for future maintenance and to comply with the FAA requirements.

"With the software's tracking abilities, we have an accurate record of our actions to ensure FAA conformity, and we keep up with a lot of information vital to our operations, such as emergency maintenance tracking, FAA restrictions and discrepancies, and preflight inspection data," states Tipton. "In addition, Datastream 7i gives us the functionality to do self-discovered maintenance, enabling technicians to document maintenance tasks and their solutions in real-time."

With Datastream 7i, American Airlines' STES personnel have a powerful tool to help maintain a modern pilot-training center. Through its instructor interface and because of its configurability and asset management tools, Datastream 7i helps American Airlines keep their flight simulators working efficiently and effectively.



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