MODERNIZING AIRPORT TERMINAL AND RUNWAY EFFICIENCY

A new flight management system is set to provide enhanced flight data, departure and gate information to the USA's largest airports

Stuart Weinstein, system architect, Leidos Transportation Solutions

Leidos and the FAA plan to debut a flight management system that will significantly reduce runway departure queues and allow for streamlined operations in air traffic control towers at busy airports nationwide.

Terminal Flight Data Manager (TFDM) will deliver electronic flight data as well as improved surface management tools for the terminal environment. The system will share data among controllers, aircraft operators and airports so they can better stage arrivals and departures, as well as manage traffic flow within terminal airspace for greater efficiency. Additionally, the surface departure management will improve gate departure efficiency for airlines by shifting queues of airplanes waiting for departure on a runway to allowing passengers to wait in the comfort of the terminal. The TFDM tools are far-reaching, not only improving the passenger experience with fewer delays and missed connections, but also lowering fuel burn and CO_2 emissions. These enhancements will accelerate improved surface situational awareness.

This scalable, site-adapted system replaces critical outdated systems as part of the FAA's Next Generation (NextGen) Air Transportation System modernization program. TFDM will transition legacy applications on custom hardware with new, lower-cost solutions that provide air traffic controllers and managers with the most up-to-date information on flights as they depart and land.

Leidos' role

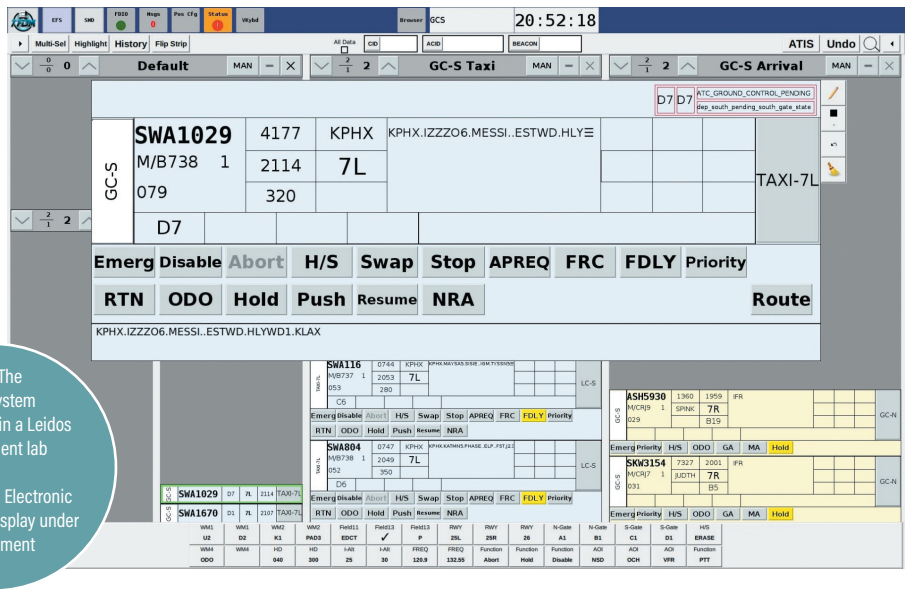
Leidos is the prime contractor and lead integrator working on the development and implementation of TFDM. The Leidos teams are performing critical activities needed to deliver the system, including program management, systems engineering, design and development, system integration and testing, adaptation, hardware production and site implementation.

Throughout the process of creating and implementing the new system, Leidos engaged with the National Air Traffic Controllers Association (NATCA) and the FAA to refine the systems to meet the FAA's safety and security standards. Additionally,

Leidos has established working group forums for discussions on all aspects of the controller experience. Similarly, the company is leading monthly external interface working group meetings to help coordinate all the data flowing into and out of TFDM with its data exchange partner programs.

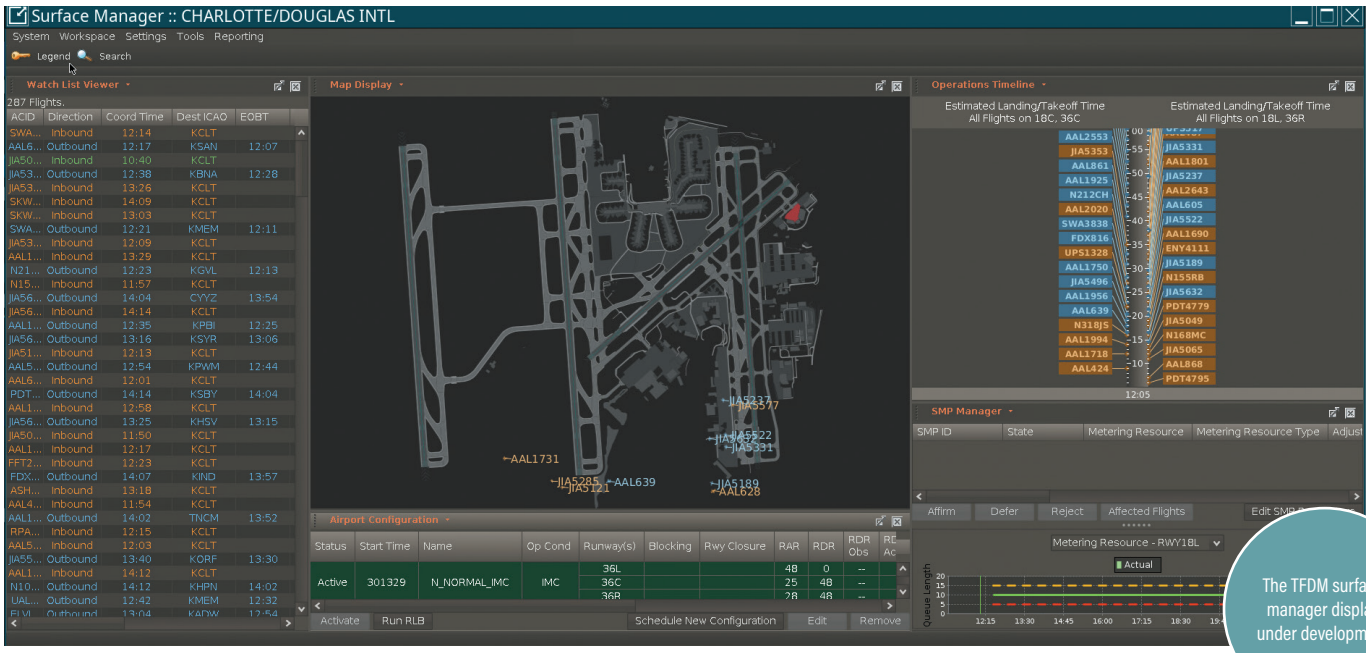
Benefits of the Terminal Flight Data Manager

Over 70,000 flights are managed by air traffic control towers every day in the USA. To meet this demand airports must leverage the most innovative systems and technology. With TFDM, multiple legacy systems will be replaced with a single, easily maintained platform. This



Left: The TFDM system being tested in a Leidos development lab

Right: TFDM Electronic Flight Strips display under development



The TFDM surface manager display under development

platform will provide improved predictability, collaborative decisions, environmental friendliness, real-time accuracy and improved safety.

TFDM is the culmination of concepts developed by the Surface Collaborative Decision Making (CDM) working group, which formed in 2006. The Surface CDM team brought together the FAA, ATCs, airlines, airport operators, vendors and academia. Together they developed a concept of operations to maximize the use of available airport and airspace capacity for the traveling public and the environment. With TFDM, these benefits include automatically updated flight plans and electronic flight strips for ATC. The surface metering tools generate less taxi time and fuel burn with increased reliability of connection for flight operators. This improves predictability and enables a more balanced use of airport resources for airport operators, fewer delays and more reliable flight schedules for passengers.

To help air traffic controllers manage the increasing load at busy airports, TFDM offers a number of assistive technologies. Electronic Flight Data (EFD) exchange and Electronic Flight Strips (EFS) will be installed in air traffic control towers across the US to replace paper flight strips. TFDM terminal data will be available to flight operators and other stakeholders through the TFDM Terminal Publication (TTP) service via the System Wide Information Management (SWIM) data exchange infrastructure. This Surface Collaborative Decision Making (S-CDM) tool will provide real-time schedules of all airplanes arriving and departing, which will support departure metering and improve traffic flow. TFDM will also integrate with other FAA traffic flow management systems to ensure alignment of all traffic flow management initiatives enabling complete gate-to-gate trajectory-based operations. Lastly, TFDM will replace multiple systems in the NAS through integration of their functionality into the system. This will achieve technology modernization, sharing of data and lower maintenance costs.

TFDM implementation

TFDM capabilities will be implemented incrementally in a phased approach throughout the life of the program. The implementation is now projected to begin at the first site in the fourth quarter of 2022.

The system will be deployed to a subset of NAS Air Traffic Control Towers (ATCTs) based on the operational needs and the impact of installation and of deployment. TFDM provides two configurations that consist of different levels of capabilities. Configuration A will provide the entire suite of TFDM capabilities to high-density airports including: EFD, EFS and the full suite of decision support tools providing surface scheduling, surface metering, airport resources management and runway load balancing. Configuration B will provide Electronic Flight Data alongside some limited capabilities in traffic flow data, airport resource management, and surface scheduling.

Additionally, the TFDM implementation strategy will consist of a multiple-build approach. The first deployment build is planned to achieve Initial Operating Capability (IOC) in the fourth quarter of 2022. It consists of processing EFD and EFS; processing traffic flow data; and partial airport resource management capabilities. The second deployment build is planned to achieve IOC in the fourth quarter of 2023. It consists of surface scheduling and surface metering, which provides users the ability to meter departure flights. The second build also includes additional airport resource management capabilities and advanced integration with the FAA's Time-Based Flow Management (TBFM) system.

Current phase

TFDM is being developed in close partnership with the FAA to ensure the new system meets the expectations and interoperability of the controllers, as well as the technicians and engineers who maintain it. Recently, Leidos hosted a number of FAA meetings with airlines and vendors to see firsthand how their data is used and the benefits they can receive through TFDM. Funded by the FAA, Leidos has set up a testbed where flight operators (airlines, vendors, airport authorities) can connect to a TFDM test system. There they can run real-time data and test applications that will interact with TFDM when the system goes operational.

Under TFDM, air traffic personnel will have access to proven technology that will improve overall travel efficiency. Leidos is proud to work with the FAA to advance what's important for the world's most complex airspaces. ❖