EN ROUTE AUTOMATION MODERNIZATION (ERAM)
THE FUTURE OF AIR NAVIGATION

LOCKHEED MARTIN
Imagine airlines flying more efficient routes, saving fuel, reducing emissions, and staying on time even when storms intervene. Picture airports less congested and air traffic controllers able to do their jobs more effectively with greater cooperation among other aviation stakeholders, lighter workloads, and less stress.

Those are among the key benefits provided by current and future releases of En Route Automation Modernization (ERAM), a Federal Aviation Administration (FAA) initiative for which Lockheed Martin is the prime contractor. When it is fully operational, ERAM will transform the nation’s en route air traffic control automation system used at 20 FAA Air Route Traffic Control Centers that control aircraft flying at altitudes above 10,000 feet across the contiguous United States.

Supporting NextGen
ERAM is upgrading the National Airspace System (NAS) software and helping the FAA accommodate increased air traffic and new innovations. As the platform for next generation air traffic control initiatives, ERAM is replacing the existing en route air traffic control automation system that is more than 30 years old and can no longer be easily upgraded or expanded. Open, standards-based software is being built into a new, highly secure system architecture.

Doing More, Doing It Better
ERAM will serve as the backbone of the NAS, processing flight plan and surveillance data, providing communications support, and generating display data to air traffic controllers. Using ERAM, controllers at the Air Route Traffic Control Centers will be able to track an additional 800 aircraft, for a total of 1,900 aircraft at one time.

The new technology expands coverage beyond facility boundaries, enabling controllers to handle more traffic more efficiently. It also improves information security and provides the latest technology to handle performance based navigation and accommodate the newest and most sophisticated aircraft.

Air Traffic Management in 4-D
Among key ERAM technologies is an end-to-end, 4-dimensional trajectory model that predicts the path of each aircraft in time and space. This trajectory is the basis for coordination, control and strategic separation in the automation system. It allows flight operations to transition from today’s ground-based radar to much more accurate satellite-based automatic dependent surveillance broadcast (ADS-B) technology. That means aircraft can fly more efficient routes, helping airlines achieve their business goals.

In addition, integrating ERAM with ADS-B will enable closer spacing of aircraft, from a separation of five nautical miles to three—significantly increasing airspace capacity.

Transformation in Stages
ERAM enhancements have continued to be delivered and include:

- **Weather data integration.** Air traffic controllers will use information from weather systems to help pilots route away from storms, avoid turbulence, and give passengers smoother flights.

- **Conflict resolution.** Automated tools will help controllers detect potential conflicts and resolve them optimally. ERAM will let them see a bigger picture, beyond their area of responsibility, and choose the safest, most fuel-efficient resolutions.

- **Cockpit communication.** Datalink will let controllers and pilots share flight information. With pilots having the ability to downlink requests, controllers will be able to issue flight plan adjustments that help pilots avoid separation hazards, weather disruptions, and other complications in the most efficient manner for the airlines. The ultimate objective is to share the 4-D trajectory between the cockpit and the ground automation system.

- **Information sharing.** A System Wide Information Management (SWIM) system will allow ERAM, traffic flow management and other FAA systems to share data with each other, and share information with airline, military and other airspace users.

- **Airspace flexibility.** In case of weather disturbances that affect more than one sector, the system will allow airspace boundaries to be adjusted so the workload is better balanced across controllers.

- **Strategic flow management.** Data sharing between ERAM and traffic flow management (TFM) enables a better overall view of traffic flow nationwide. Controllers will be able to re-route aircraft, whether in flight or on the ground, for optimum efficiency and keep airports operating at capacity.

A Robust System
All this capability comes in a system that is more secure, more reliable, and easier to manage, maintain, upgrade and support. Considered a “huge step” by aviation industry experts, ERAM is the key component enabling the transformation of next generation air traffic control.