



Forging Future Flight: Aeronautics Research at the NASA Langley Research Center (Airspace Systems Research - Concepts and Technology Development)

The NASA Langley Research Center (LaRC)

Located in Hampton, VA, LaRC was established as the nation's first civilian-led aeronautics research laboratory in 1917. NASA Langley serves as a world leader in "cutting edge" aeronautics research. Approximately \$180 million was invested in aeronautics research at LaRC



(2011). In 2010 NASA Langley contributed \$946.8 million to the Virginia economy while supporting 8,624 jobs in the state of Virginia. In the Hampton Roads area in 2010, Langley contributed \$886.7 million to the local economy while supporting 7,962 jobs.

Aeronautics Research Directorate (ARD)

The ARD at NASA LaRC manages projects that support four programs: (1) Integrated System Research Program, (2) Fundamental Aeronautics Program, (3) Aviation Safety Program, and (4) Airspace Systems Program. Research activities are performed under the specific projects described later. The NASA LaRC ARD facilitates external partnerships to complement the agency's aeronautics mission.



NASAfacts

Airspace Systems Program (ASP)

Objectives of ASP:

- Reduce aircraft fuel consumption, noise, and emissions
- Accommodate projected growth in air traffic while preserving and enhancing safety
- Maximize flexibility and effectiveness in the use of airports, airspace, and aircraft
- Reduce travel times and travel-related delays

Concepts and Technology Development Project (Airspace Systems Program)

This Ames Research Center (ARC)-led project integrates work at ARC and LaRC. The work at LaRC includes research on technologies to enhance the safety of aircraft during surface operations, flight deck based en-route separation assurance, flight interval management of aircraft arriving to airfields with high traffic densities, and technologies to detect and mitigate the effects of aircraft wake turbulence.

Primary Goal: To develop, explore the practicality of, and mature innovative gate-to-gate concepts, algorithms, and technologies that enhance operations in the National Airspace System (NAS).

Technical Challenges:

- Increase efficiency and capacity of en route operations
- Increase efficiency and throughput of terminal operations
- Balance demand and capacity, impact of weather, and environmental impact
- Increase efficiency of surface operations

Recent Research Accomplishments:

- Tactical Runway Configuration Management algorithm and software transferred to the FAA.
- Developed Concept of Operation for Interval Management to Single Airport and under support to the FAA, developed core parts of the RTCA Safety and Performance Requirements (SPR) document for Flight-deck Interval Management (FIM).
- Developed and evaluated in Human-in-the-loop

simulations advanced flight deck based aircraft separation assurance concepts and technology, including Autonomous Flight Rules (AFR). Results and briefings were provided to the FAA.

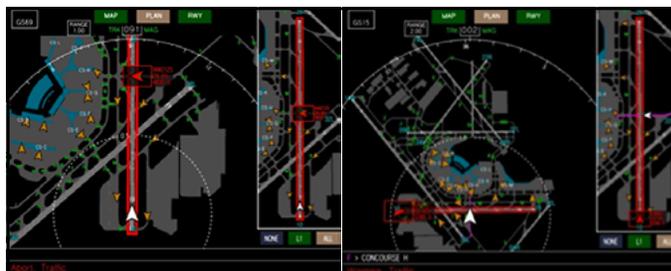
- Developed and evaluated in Human-in-the-loop simulations advanced flight deck based terminal area Interval Management concepts, algorithms, and displays – including technologies for Interval Management to parallel dependent runways.

LaRC Facilities and Capabilities Used in Research:

Air Traffic Operations Lab (ATOL)
Cockpit Motion Facility (CMF)



LaRC researchers are developing and studying concepts and technologies designed to enhance Tactical Runway Configuration Management (TRCM).



LaRC researchers are developing and studying concepts and technologies designed to improve the safety of surface operations.

National Aeronautics and Space Administration

Langley Research Center
100 NASA Road
Hampton, VA 23681
www.nasa.gov/centers/langley

www.nasa.gov

For more information about NASA LaRC aeronautics research, visit <http://aero.larc.nasa.gov/>

NASA Facts