

**Figure 4: NextGen Research & Demonstration Activities
(FY09-FY13)**

FY 2009

3D Path Arrival Management

- This project is a first step toward 4D trajectory operations in the arrival domain. In laymen's terms, this capability at high density airport will provide a means to achieve highly accurate, predictable and fuel efficient routes which will decrease controller and pilot workload, decrease adverse environmental impacts (emissions and noise) while potentially enhancing airport throughput. Apart from the capability itself, the major product from this project is a complete specification for a 4D trajectory synthesizer based on the NASA En route Descent Advisor which generates the route for the aircraft to fly. This route is then loaded into the aircrafts automation for execution.

4-D Flight Management System (4-D FMS)

- Demo 4-D FMS Trajectory Based Operations (TBO) to reduce pilot and Controller workload and environmental impact.

International Air Traffic Interoperability (IATI)

- Demonstrate potential benefits for oceanic trajectory optimization in terms of fuel savings and emissions reductions through partnerships and collaboration with the international aviation air navigation service providers (ANSPs), airlines and government agencies. Initial demonstrations being conducted with the Atlantic Interoperability Initiative to Reduce Emissions (AIRE) project.
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International Flight Data Object (IFDO)

- Perform research and demonstrations leading to proof of concept and early implementation of NextGen capabilities such as International Flight Data Object.

Net Enabled Operations (NEO)

- NEO is a network information technology program with a set of spiral developmental efforts (until 2012) directed at developing / leveraging an innovative, effective and efficient system-to-system operational architecture, with supporting procedures to provide the FAA and its interagency partners with an agile, highly connective network for net centric shared situational awareness.

Oceanic Trajectory Based Operations

- Demonstrate potential benefits for oceanic optimization procedures. Partnerships and collaboration with the international aviation air navigation service providers (ANSPs), airlines and government agencies.

Staffed NextGen Towers (SNT)

- Field demonstrations will serve to validate the SNT concept and system(s) for the two phased implementation.

Surface Trajectory-Based Operations Project

- Conduct demonstrations and operational evaluations of future NextGen surface capabilities at Memphis, New York (JFK) and Orlando airports.

Tailored Arrivals (TA)

- In the final form, a Tailored Arrival (TA) is a comprehensive method of planning, communicating, and flying highly efficient, thus environmentally friendly, arrival trajectories from cruise altitudes to the runway threshold. Implementation of TAs at selected coastal airports is planned to occur by early FY-11. These initial trans-oceanic arrival operations are considered to be an early implementation strategy to realize immediate operational benefits in efficiency and reduced environmental impact.

Unmanned Aircraft Systems (UAS)

- Utilize advanced capabilities of UAS community as test for exploring future 4-Dimension (4-D; latitude, longitude, altitude and time) trajectory based concepts and examine potential concepts for wide-spread integration of UAS into future NextGen environment.

FY 2010

3D Path Arrival Management

- Continue flight deck centric and air traffic control centric simulation

4-D Flight Management System (4-D FMS)

- To be determined based on development efforts
- Initial human-in-the-loop simulations

International Flight Data Object (IFDO)

- Research and Demonstrations continues
- Potential to begin Pacific demonstrations

Net Enabled Operations (NEO)

- As determined from planning in FY-09

Oceanic Trajectory Based Operations

- Initial ADS-B In-trail Procedures, Pre-departure 4-D oceanic trajectory management, Web enabled Collaborative Trajectory Planning (CTP) and Oceanic Air space Management

Staffed NextGen Tower

- Complete field site preparation and field demonstration

Surface Trajectory Based Operations

- Follow-on spiral demonstrations/evaluation focused on enhancements to surface 4-D Trajectory Based Operations, including taxi conformance monitoring

Tailored Arrivals (TA)

- Resolve issues surrounding implementation and begin transfer of project to implementation / operational organization

Unmanned Aircraft Systems (UAS)

- Potential for 4-D TBO demonstrations in an operational environment

FY 2011

3D Path Arrival Management

- Complete technical transfer of decision support tools

4-D Flight Management System (4-D FMS)

- Continue proof of concept demonstration/simulation from FY-11

Net Enabled Operations (NEO)

- As determined from planning in FY-09 and FY10

Oceanic Trajectory Based Operations

- Continuing ADS-B In-trail Procedures, Pre-departure 4-D oceanic trajectory management, Web enabled Collaborative Trajectory Planning (CTP) and Oceanic Air space Management

Staffed NextGen Tower

- To be determined

Surface Trajectory Based Operations

- Follow-on spiral demonstrations / evaluation focused on enhancements to surface 4-D Trajectory Based Operations

Tailored Arrivals (TA)

- Begin full-time operations of TAs at selected costal airports (with oceanic arrivals) around the US

Unmanned Aircraft Systems (UAS)

- To be determined based on 4-D TBO demonstrations in an operational environment

FY 2012

3D Path Arrival Management

- Further refine the decision support tool and support investment decision activities. Complete concept of use document

4-D Flight Management System (4-D FMS)

- Initial implementation

Net Enabled Operations (NEO)

- As determined from planning in FY-09 and FY10

Oceanic Trajectory Based Operations

- Continuing ADS-B In-trail Procedures, Pre-departure 4-D oceanic trajectory management, Web enabled Collaborative Trajectory Planning (CTP) and Oceanic Air space Management

Staffed NextGen Tower

- To be determined

Surface Trajectory Based Operations

- Follow-on spiral demonstrations / evaluation focused on enhancements to surface 4-D Trajectory Based Operations

Tailored Arrivals (TA)

- Begin full-time operations of TAs at selected coastal airports (with oceanic arrivals) around the US

Unmanned Aircraft Systems (UAS)

- To be determined based on 4-D TBO demonstrations in an operational environment

FY 2013

3D Path Arrival Management

- ERAM/TMA implementation

4-D Flight Management System (4-D FMS)

- Continue proof of concept demonstration from FY-12