The Incorporation of an Airline Operations Center Capability into the NIEC
October 26, 2011

Introduction

The NextGen Integration and Evaluation Capability (NIEC) has been operational for over a year, hosting a multitude of projects. As the NIEC continues to progress, one of the new suites under development is a realistic depiction of an Airline Operations Center (AOC). The AOC of a major airline is composed of many operators working in shifts around the clock. These operators are responsible for adjusting the airline schedule based on aircraft assignments, crew services, departure slot assignments, and flight schedule in response to external factors such as airport capacity restrictions, equipment failures, and weather. One of the primary operating positions is the Dispatcher, who is responsible for preparing and filing flight plans, making decisions on alternate destinations and fuel loads, and releasing and following flights from departure to destination. The planned layout in the NIEC is a generic representation of the Dispatcher position at a typical AOC.

Background

Sponsors from Washington D.C. toured the NIEC over the past year, providing positive feedback, and indicating the need for an AOC representation in the NIEC. In order to determine the capabilities to be developed, Aeronautical Operations Center Simulator documents from the Oceanic Research and Development Studies Office and Seagull Technology, Incorporated were reviewed. Research was conducted, and it was determined that there is no real standard for an AOC, but there is a commonality to the tasks that an AOC performs. Discussions were held with in-house En Route and Terminal Air Traffic Control Subject Matter Experts (SMEs). The SMEs provided the basis for the design and implementation of tools that a Dispatcher at an AOC needs.

Implementation

The AOC Dispatcher position is designed on two 30-inch monitors situated near the Multi-purpose Area in the NIEC. It can connect to any simulation running in the NIEC, and is fully integrated with DESIREE (Distributed Environment for Simulation, Rapid Engineering, and Experimentation). DESIREE is an in-house code-based system that provides the simulated air traffic and emulates the Graphical User Interface used in most air traffic control systems, facilitating a realistic environment for projects. It has an interface with the Target Generation Facility (TGF), allowing it to display the TGF-generated track data, and supply either voice or DataComm to the TGF-piloted aircraft. Site-specific xml adaptation files are used to populate the fields throughout the AOC.

One monitor for the AOC Dispatcher position displays several informational screens, such as:

- DataComm – text-based messaging between the Dispatcher and specific aircraft

- Flight Planner – displays all aircraft; the Dispatcher may select a specific ACID, or airline specific flights; information includes the ACID, route, aircraft type, arrival and departure fixes

- Maintenance – displays tail-specific information, such as fuel level, zero fuel weight, and gross weight; development is underway to provide links for each online aircraft maintenance manual

- NOTAMs – Traffic Notices to Airmen for specific airports

The other monitor is an integrated and realistic representation of a Traffic Situational Display (TSD), providing the following pull-down menus on a map of the United States:

- Display Legend – shows a text display on the TSD, configured to user preferences, such as highlighting selected airports and their associated colors

- Map Overlays - Range Rings for a selected fix or airport
    - select map overlays with labels for all domestic pacing airports, NAVAIDs, fixes, ARTCCs, TRACONs, airways, Special Use Airspace (Alert, MOA, Prohibited, Restricted, Warning)
    - Runway Layout – layout of the runways at each of the pacing airports

- Flights – Select Flights – allows the user to show arrivals and departures at airports, with the option to display data blocks, destination, show route (list of fixes), draw route (actual line of route), and filter – the capability to filter and then display the user requested items such as ACID, fix, sector, ARTCC, airport, airway, flight level
    - Show Flight Count – shows the totals of the Select Flight menu
    - Find Flights – specifies an ACID or group of ACIDs to display

- Examine Alerts – monitors arrivals and departures based on capacity and demand at each airport

- Weather – Select Weather – displays different weather selections, including the NOWRAD Legend (weather radar showing the different levels of precipitation), the CCFP Legend (convective activity forecast choices), Lightning, Tops (top of the cloud cover), Jet Streams (upper winds)
    * weather may be streaming WARP data or stored weather scenario

- Reroute – Create Reroute – shows a route around the FEA/FCAs (Flow Evaluation Area, Flow Constraint Area)

- FEA/FCA – Create FEA/FCA – creates a polygon around weather (dynamic or

static)

- Tools – Database Commands – CAPL – Request Capacity Data – requests the arrival and departure rates at an airport; the Capacity Reply screen provides these with times

Additionally, the TSD is reconfigurable to highlight and display specific Airline Company information, such as flights and capacity.

Future Plans

The TSD portion of the AOC will be a high-fidelity representation including all current capabilities of the system today. Future enhancements will include such tools as ASH and Planned Military Activity (UAS testing). The integration of the DESIREE code-based AOC into the NIEC allows for any additional functionality and support for NextGen projects and simulations. This capability will co-exist with the ability to interface with actual AOCs, should a project require it.