Integration of 4D Airline Operation Control Systems into NextGen and the NAS, Phase I Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)

ABSTRACT

WxOps patent pending OpsTablet(TM) software and 4D geospatial data are used by Hawaiian Airlines to achieve unprecedented Airline Operation Control (AOC) in a geobrowser-based Common Operating Environment (COE). Dispatchers and pilots coordinate flight operations in real time using identical Google Earth based visualizations on desktops and tablets both on the ground and in the cockpit during flight. Google has unilaterally deprecated critical functionality which causes the latest versions of the Google Earth application to be unsuitable for FAA regulated flight operations. Additional unilateral changes to Google licensing terms are impacting applications for international transportation, particularly for flight operations in Asia. WxOps has anticipated the need for an alternate geobrowser, and has tested NASA World Wind open source components for critical functionality needed at Hawaiian. NASA World Wind provides the equivalent or superior performance for critical functions when compared to Google Earth. WxOps proposes to enhance and harden NASA World Wind open source to achieve and potentially exceed the equivalent of Google Earth best practices. This includes the introduction of a COM API software interface for coupling of NASA World Wind with WxOps OpsTablet(TM) and other flight operations software. A successful outcome will provide a reliable geobrowser capability which can serve transportation community applications in the years to come without fear of deprecation by an uni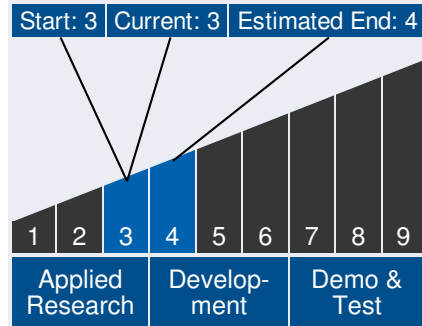nterested commercial interest. WxOps proposes to: A. Evaluate NASA World Wind Open Source for geobrowser equivalent of current geobrowser (Google Earth). B. Prototype a World Wind based Application that demonstrates critical and required Common Operating Environment (COE) functionality. C. Build a support community including Commercial Airlines Associations for continued support. D. Share the COE Application with the support community.

SPACE TECHNOLOGY

Image Not Available

Table of Contents

Technology Maturity

Start: 3	Current: 3	Estimated End: 4

1	2	3	4	5	6	7	8	9
Applied Research			Develop-ment			Demo & Test		

Management Team

Program Executives:
- Joseph Grant
- Laguduva Kubendran

Continued on following page.

Some NASA technology projects are smaller (for example SBIR/STTR, NIAC, STRG, and Center Innovation Fund), and will have less content than other, larger projects. Newly created projects may not yet have detailed project information.

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ANTICIPATED BENEFITS

To NASA funded missions:

Potential NASA Commercial Applications: NASA World Wind based Application that is equivalent to Google Earth and made freely available is extraordinarily useful for AOC Community which is using geobrowser-based Common Operating Environment (COE). From a human factors perspective, the geobrowser COE provides for better communication, better situational awareness and a common display of resources in the current operational environment. The same application can also display the data after a flight for SMS, forensics, record keeping and training. Focusing on aviation, the proposed World Wind Application can be used to support Field Missions for atmospheric research, including CAT, volcanic plumes and radionuclides. Other Missions supported include UAV Research Applications, Air Traffic Control and Routing Optimization, Air Safety and Cockpit Integration.

To the commercial space industry:

Potential Non-NASA Commercial Applications: NextGen and NAS investment has been one-sided, with funds directed to the regulatory side of the system. Future NextGen and NAS operations will be a partnership of regulatory and commercial/private interests. The geobrowser based Common Operating Environment (COE) enables the users (and data/information providers) to best utilize data and information. An open source geobrowser Application which is freely available to all users provides a level playing field to promote innovation and growth. Focusing less on the database and more on the software, the proposed NASA World Wind Application provides a basis for reliable and sustained operations in regulated environments. Since this geobrowser can continue operations without connectivity to the internet, coordinated aviation operations can be supported in remote polar and trans-Oceanic

Management Team *(cont.)*

Program Manager:
- Carlos Torrez

Principal Investigator:
- Scott Shipley

Technology Areas

Primary Technology Area:
Communications, Navigation, and Orbital Debris Tracking and Characterization Systems (TA 5)
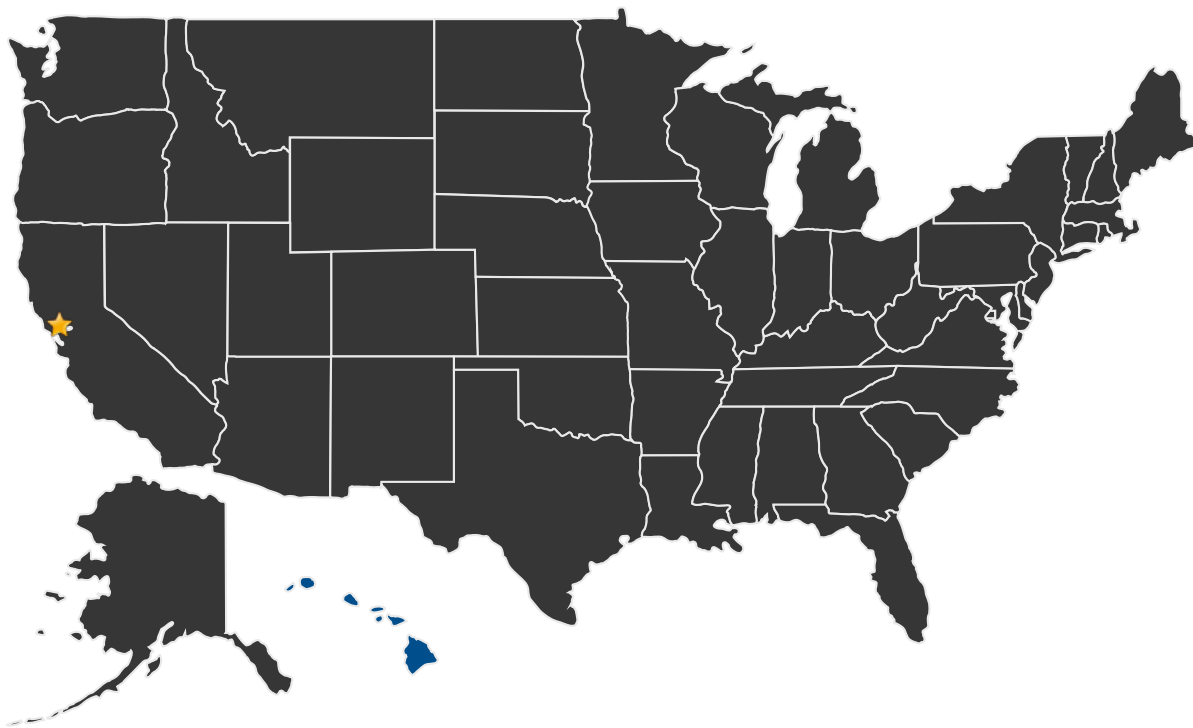
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regions. The proposed goals and results will impact and enhance AOC and commercial transportation efficiency and safety in the regulatory environment. The Phase 1 result will be shared with the AOC Community, which impacts Next Generation COE adoption at Hawaiian Airlines and other airlines, UAV Traffic Control and Routing Optimization, and Miltary applications likely limited to the United States due to EAR considerations.

U.S. WORK LOCATIONS AND KEY PARTNERS

■ U.S. States With Work   ⭐ **Lead Center:**
Ames Research Center

Other Organizations Performing Work:

- WxOps, Inc. (Honolulu, HI)

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PROJECT LIBRARY

Presentations

- Briefing Chart
    - (https://techport.nasa.gov:443/file/23618)

IMAGE GALLERY

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DETAILS FOR TECHNOLOGY 1

Technology Title

Integration of 4D Airline Operation Control Systems into NextGen and the NAS, Phase I

Potential Applications

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