**The Waypoint Planning Tool: Real Time Flight Planning for Airborne Science**

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**ABSTRACT**
Airborne real time observations are a major component of NASA’s Earth Science research and satellite ground verification studies. For mission scientists planning a research aircraft mission within the context of meeting observatory objectives, it is essential to have up-to-date situational awareness of the weather conditions that affect the aircraft. Multiple aircraft are often involved in the NASA test campaigns. The coordination of the aircraft with, satellite overpasses, other airplanes, and the constantly changing dynamic relationships often determine the success of the campaign. A flight planning tool is needed to provide situational awareness information to the mission scientists and help them plan and modify the flight plans successfully.

Scientists at the University of Alabama Huntsville and the NASA Marshall Space Flight Center developed the Waypoint Planning Tool (WPT), an interactive software tool that enables scientists to develop their own flight plans (also known as waypoints) with point-and-click mouse capabilities on a digital map (Flight with real-time weather and vector data). The development of this Waypoint Planning Tool demonstrates the significance of mission support in responding to the challenges presented during NASA’s field campaigns. Analyzing and planning these campaigns helps identify best practices among new and experienced users, improving the relevant area of development. Studies show that the Waypoint Planning Tool has gone through three rounds of development and analysis process.

The development of this tool is directly affected by the technology advances in GIS/Mapping technologies. From the stand-alone Google Earth applications and simple KML functionalities to the Google Earth plugin and Java Web Start plugin on web platforms, as well as to the growing open source tools with new JavaScript frameworks, the Waypoint Planning Tool has set itself in line with the technology advancement. The newly created, cross-platform, modular designed JavaScript controlled Waypoint Tool is planned to be integrated with the NASA Airborne Sciences Mission Tool Suite. Adapting new technologies for the Waypoint Planning Tool increase its success in helping scientists reach their mission objectives.

This presentation will discuss the development process of the Waypoint Planning Tool and its corresponding flight campaign challenges, identify new information technologies, and describe the capabilities and features of the Waypoint Planning Tool with the most important ones from the user’s perspective and the resultant benefits to the science community.

**CAPABILITIES**
- Easily creates and edits, and publishes flight waypoints
- Provides situational awareness data, such as real-time satellite imagery, weather tracking, and flight plans, etc.
- Facilitates cooperation between multiple missions and multiple users
- Provides complete situational awareness of flight times and locations
- Provides situational awareness data and display capabilities for weather conditions
- New JavaScript based web applications developed

**SUMMARY**
Waypoint Planning Tool provides a convenient way to create and update flight plans using a point-and-click mouse interface.
- Assist in the coordination among multiple aircraft during pre-flight planning
- Real time data is used to help mission planners to make informed decisions
- Fast transfer of various users, including Mission Scientists, Mission Managers, Pilots, and others
- Enables multiple web applications, and can create multi-situated data as required
- Ensure flight safety and efficiency

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**CONTACTS**

**More Information**
For more information, please visit:
http://www.uah.edu/airs/wpt/