



Automated Flight Following uses Google Earth to equip Forest Service employees with better information and save operational costs

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Robert Roth

Forest Service program manager



ABOUT GOOGLE EARTH ENTERPRISE

Google Earth Enterprise connects geographic data to your people, work and processes by providing a fast and simple to use interface for non-specialist users to explore and interact with massive datasets of your own geospatial data. Asset tracking, marketing properties and site surveying are a few examples of the business processes that Google Earth Enterprise simplifies.

Data only gets used if people can find and consume it – and there’s not a better way to finding and visualizing it than with Google Earth!

For more information visit <http://earth.google.com/products.html>.

Background

The US Forest Service uses aircraft for a number of different missions, including operational personnel transport, forest rehabilitation, law enforcement support, aerial photography, and fire prevention and suppression. The agency owns about 30 aircraft and contracts with an additional 800 aircraft each year to support these missions.

Managing these resources – especially in times of high wildland fire activity – requires precise coordination between dispatchers in centers around the country and pilots, firefighters and other personnel in the field. Furthermore, different agencies at the federal, state and local government level can all get involved in responding to the same fire. Pilots from different agencies were not always initially communicating on the same channels, and dispatch centers often did not have data about the other agencies’ aircraft.

Communication between Forest Service employees, their counterparts at other agencies, and aviation contract pilots is always essential, especially during potential fire disasters when every second counts. Decisions must be made quickly and having accurate, up-to-date information can mean the difference between containing a fire and having it spread further causing additional damage.

Challenge

Previously, the Forest Service relied on a relatively low-tech and time-consuming system for coordinating its aircraft assets and firefighting crews. To coordinate aircraft availability, status, and tracking, pilots would radio in their positions every 15 minutes to a dispatcher who plotted locations on paper maps. Meanwhile, the agency equipped its firefighting personnel on the ground with paper topographical maps that were updated in the field with markers and shared with coordinating organizations and firefighters by fax or hard copy. The process was labor and time-intensive resulting in fragmented information not readily accessed in real time.

More complications arose any time the agency wanted to update map data because they had to request that the GIS department, whose staff specialty is advanced geospatial applications, generate a new up-to-date paper map.

“The primary means of redistribution was hard copy,” said Neil Flagg, AFF project leader with the Forest Service. “The field would submit information to the GIS department and creating a new map could take anywhere from a day to a week and by the time it made it back it would be too old to be useful.”

Solution

To address this challenge, the Forest Service developed a new tool to capture accurate real-time data in an easy-to-use application that is accessible to a larger group of users in a timely fashion. The tool, called the “Automated Flight Following” system (AFF), consolidates data transmitted by GPS devices on Forest Service and contracted airplanes and displays their real-time location in Google Earth. Other relevant GIS data created with ESRI can also be imported into the AFF system. For example, the Forest Service gets regularly updated shape files of temporary flight restrictions from the Federal Aviation Administration (FAA) and displays those in AFF as 3-D objects. Weather, road, and fire perimeter information from other agencies is similarly imported into AFF providing a comprehensive situational awareness view to a broad group of Forest Service employees and cooperators.

“All of our core corporate data is created with ESRI tools and shared as shape files,” said Robert Roth, Forest Service program manager for AFF, “but the end user wasn’t heavily involved in knowing where the data was, getting access to it, and viewing it. That revolution really came about with the incorporation of Google Earth”.

In addition to Forest Service employees, AFF is available to other natural resource agencies, which benefit from the intuitive, easy-to-use interface of Google Earth. In total, about 4,500 people use AFF including the Forest Service, Department of the Interior personnel, the FAA, and other federal agencies and state governments’ cooperators. AFF users can access the data from any desktop or laptop with a network connection via a secure, password-protected site. Satellite imagery allows rapid identification of features not easily done with a paper map such as fuel types and vegetation, and roads and natural barriers that could indicate areas of safe retreat for firefighters.

The result is a streamlined process that reduces the burden on the small team of GIS specialists and puts the information directly into the hands of the end users.

Results

The AFF initiative reduced burdensome manual processes allowing employees to concentrate on more mission-critical tasks and provided Forest Service employees in the field with better information and led to better federal and state interagency coordination. The system also reduced the labor-intensive work and cost of managing communications within field staff employees.

The project has saved the Forest Service money by directing resources more effectively by eliminating the need to manually update positions on charts. Fire managers are now more able to focus on more strategic and logistical issues and dispatchers and firefighters have access to better real-time actionable information which gives these employees better data on which to base their decisions.

The familiar user interface of Google Earth is also a benefit because it allows new system users to get started with little or no training time or costs.

“For just the Forest Service owned and contracted aircraft, a 1/2 percent improvement in operational effectiveness saves us \$875,000 per year,” said Robert Roth. “We think the improvement is several times that figure.”

Finally, AFF has allowed far more efficient information sharing among agencies. Allowing users across multiple agencies to share a common picture of the airspace in and around fire zones enhances cooperation and makes aerial firefighting operations safer for all involved.

The Forest Service is now exploring ways to leverage the capabilities of Google Earth and present fire specific data in the browser with Google Maps which also could be used on mobile devices by firefighters at any location.

With ESRI adding the ability to “save as” and import KML Google Earth and ESRI products, the systems are even more interoperable which is a big step forward for end users. The xml/kml standard is a key enabler for technology advancements.

