



COLORADO

Center of Excellence for Advanced Technology Aerial Firefighting

Department of Public Safety

2018 Montrose Helitack TAK Deployment Report CoE-18-003.1

Purpose

This report describes the Team Awareness Kit (TAK) support provided by the Center of Excellence for Advanced Technology Aerial Firefighting (CoE) to Colorado Division of Fire Prevention and Control Montrose Helitack firefighters from July 3–9, 2018.

Overview

The CoE received a license from the U.S. Air Force Research Laboratory for the TAK app in the spring of 2018, allowing the CoE to commence operational deployments of the app. While the TAK app has applicability for a broad array of public safety missions, use of the app to improve coordination within wildland fire crews is of particular interest to the CoE.

A cache of Android smartphones, tablets, and charging accessories was purchased by the CoE to support TAK deployments with wildland firefighters. This cache also includes the goTenna Pro, which is a tactical mesh-networking radio that integrates with TAK and facilitates limited communication when firefighters are operating in cellular-denied environments, as well as Automatic Dependent Surveillance-Broadcast (ADS-B) receivers to track aircraft locations when Internet access is unavailable. The deployment with Montrose Helitack offered the first opportunity to experimentally deploy this equipment with wildland firefighters.

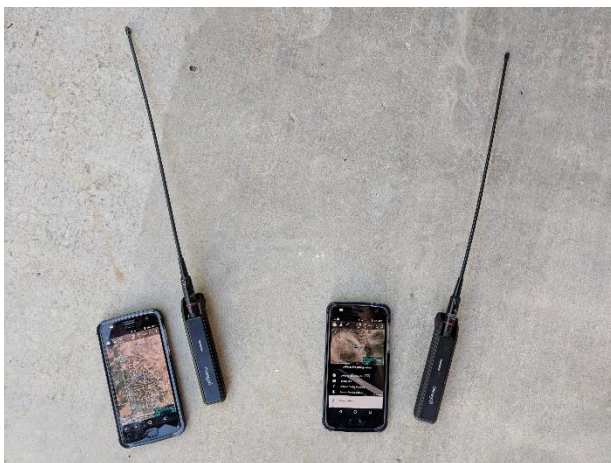


Figure 1—Pair of TAK devices and goTenna Pros



Figure 2—CoE TAK Support Cache

CoE Response

The CoE's Wildland Fire Technology Specialist detailed with the Montrose Helitack crew as a helicopter crew member and provided initial training on the TAK app to the crew during morning briefings. A portion of the crew had previously received an introduction to the app, but much of the crew was unfamiliar with the app. Phones and goTenna Pros were distributed to firefighters during morning briefings or when new missions were initiated.

Operations Summary

For the first few days of the deployment, the crew was focused on responding to new initial attack wildfires and worked out of their home base at the Montrose Regional Airport. While three fires were scouted by helicopter, no firefighters were actually deployed on those fires. Nonetheless, those early days provided the crew with an opportunity to track the helicopter during missions using both ADS-B and a TAK device onboard the aircraft.



Figure 3—TAK depiction of helicopter scouting for smoke

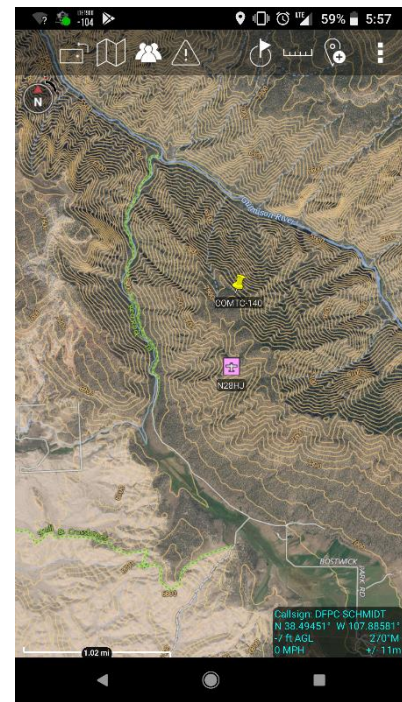


Figure 4—ADS-B location of helicopter

TAK has the ability to interface with the WildCAD data feed created by federal wildland fire dispatch centers, which allows app users to quickly see the location of new smoke reports plotted on their device. The U.S. Bureau of Land Management subscribes to a data feed that plots the locations of cloud-to-ground lightning strikes, which is made available to firefighters through the Colorado Wildfire Information Management System (CO-WIMS). The CoE received feedback that these lightning strike locations are extremely valuable to firefighters, so the CoE devised a method to export a shapefile of the strikes from CO-WIMS into TAK for viewing in the field.



Figure 5—Firefighters reviewing data after a flight



Figure 6—Navigating to an initial attack fire (note pushpins for WildCAD incidents and white dots for lightning strikes)

While investigating smoke reports, the crew also utilized TAK and the goTenna Pro to coordinate the chase truck convoy that follows the helicopter, as well as to maintain situational awareness on the status of the helicopter. The TAK devices in the truck convoy used both cellular connections to a TeamConnect TAK server and the goTenna Pro. When the convoy entered a canyon and the TAK server connection was lost, the convoy switched over to location tracking via the goTenna Pro without any manual intervention by the firefighters.



Figure 7—Convoy of chase trucks

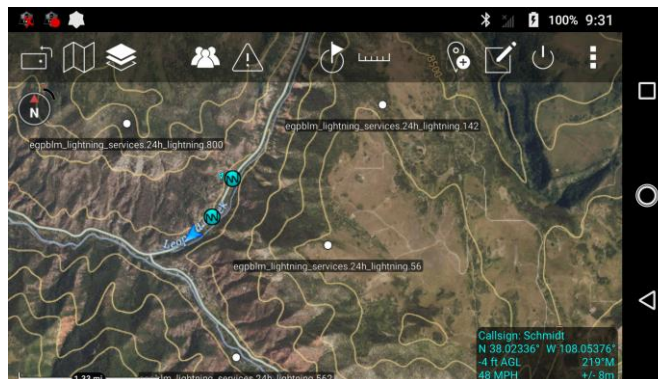


Figure 8—Vehicle location sent via goTenna Pro to TAK devices

On the morning of July 7, the helitack crew was assigned to assist in initial attack on the Tabeguache Fire in rural Montrose County on the Uncompahgre National Forest. TAK devices were distributed to the helicopter and chase truck crews. When the chase truck crew arrived at the fire, they were assigned to assist firefighters already on scene and attempt to delay the fire's spread as more crews traveled to the incident.

Two chainsaw teams and a squad boss trainee hiked in to the fire, which was burning in a steep canyon. Each team and the squad boss trainee had TAK and a goTenna Pro since there was zero cell phone service in the fire area. As the chainsaw teams worked, the squad boss trainee scouted the fire below them to size up the fire and establish priorities for the firefighters. The trainee found two spot fires that had developed across a retardant line that had been laid down earlier in the morning and used his goTenna Pro to transmit the locations of those spot fires to the chainsaw teams.



Figure 9—Initial fire behavior on the Tabeguache Fire

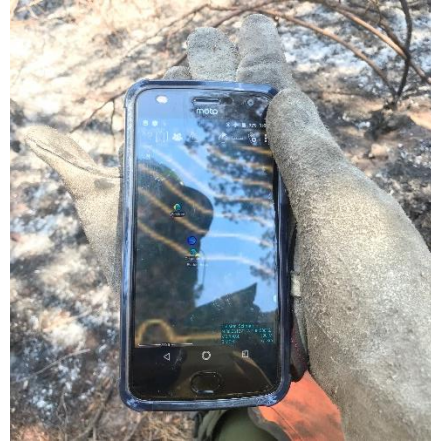


Figure 10—Receiving the spot fire location via goTenna

One chainsaw team began to navigate toward the spot fires to contain them, but at this point fire activity on the far side of the fire began to increase. Voice radio traffic was also increasing and radio programming issues made it difficult to reach the squad boss trainee. However, the chainsaw teams could see that the trainee was moving away from the spot fires back toward them, which provided substantial peace of mind as all firefighters began to fall back. The firefighters were then loaded into utility terrain vehicles (UTVs) in shifts and driven out from the fire to the H-2 staging area. The goTenna Pro was able to provide tracking information as firefighters were driven up and out of the canyon onto flat ground at the staging area.



Figure 11—Tracking firefighters during the move to H-2



Figure 12—UTVs extracting firefighters

Ultimately, the fire grew that day from 2 acres to over 500 acres and the crew fell back to the Hopkins Field Airport in Nucla to establish a helibase for air operations. That night, thunderstorms caused numerous lightning strikes around western Colorado and the next morning the crew was on high alert to respond to new fires, as well as to support the Tabeguache Fire. The lightning strike dataset was exported from CO-WIMS into TAK in anticipation of new fires.

At 1200 on July 8, a smoke report was called in for a new fire and the helicopter was launched. The smoke column was visible from the airport, so TAK's navigation features were not needed; however, it was interesting that the lightning data feed provided a spot-on location for the fire, but the dispatch center plotted a location 0.5 mile south of the actual fire. TAK and goTenna Pros were not deployed on the Wheeler Fire (i.e., the new incident) as its size remained at 2 acres and all firefighters were within shouting distance; however, the app was still useful in determining road access to the fire and establishing the identity of the landowner.

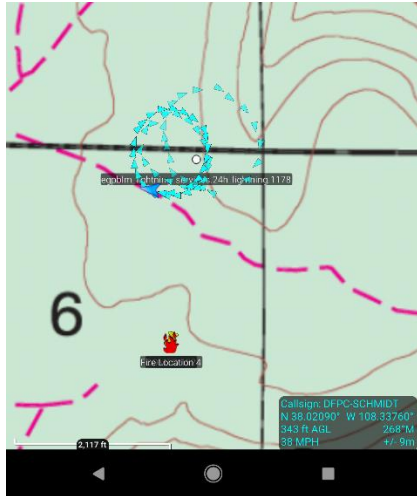


Figure 13—Helicopter Orbiting the Wheeler Fire



Figure 14—Wheeler Fire from the air

Conclusion

Working in conjunction with CO-WIMS and WildCAD data feeds, TAK provided a useful capability during this experimental deployment with Montrose Helitack. The system was able to assist in the dispatching of resources and the tracking of vehicles, aircraft, and firefighters on foot in remote areas, as well as allowing firefighters to collaboratively map features such as spot fires and staging areas.

Feedback received from firefighters during this deployment has been used to further customize the user interface of TAK for upcoming fire deployments and identify areas for future software development.