

COMPETITIVE ASSESSMENT

# Wildland Forest Fire Information Communication

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Ran An | Maisie Howard | Joan Williams | Fontayne Wong

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# Research Overview

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As wildland fires increase in frequency and severity, successful management becomes paramount to minimizing environmental, human, and economical impact. Wildland fire management relies on effective communication of critical information between many people across multiple agencies, both in public and private sectors. In our initial primary research, we identified the importance of tracking personnel and resources for safety and operational decision-making to carry out an effective wildland fire response.

There are a variety of existing products and services to address this need for resource tracking and access to critical information. We assessed the competitors in this report from the perspective of the categories below.

## TECHNOLOGY

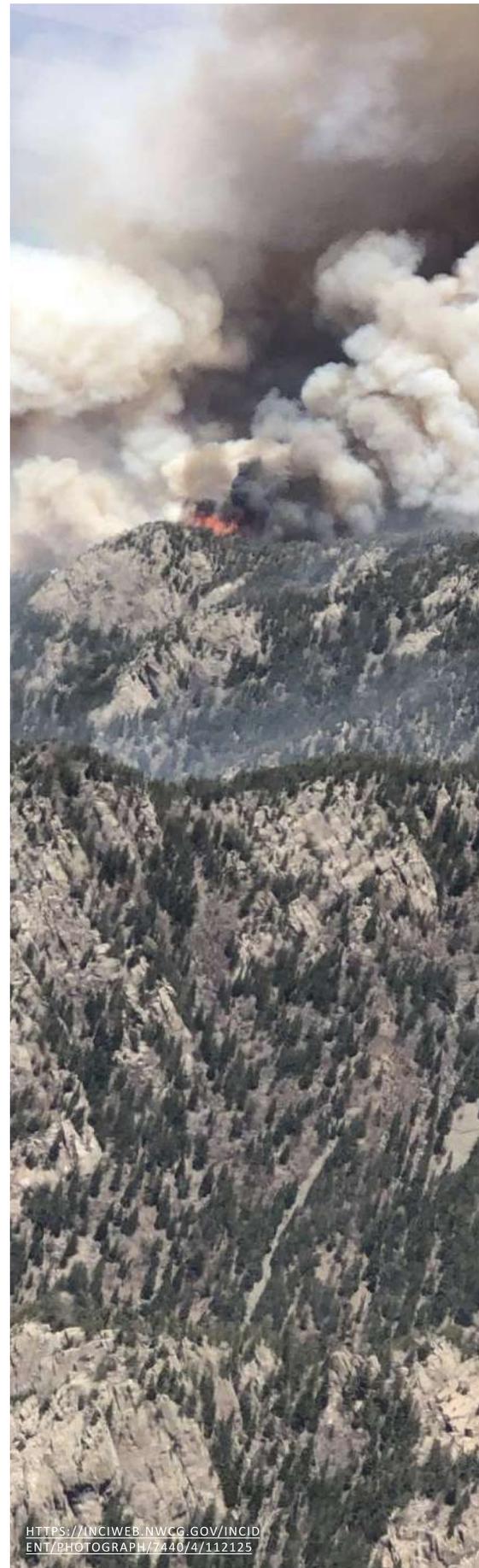
Some communication processes are still paper-based with information being verbally shared through radio transmissions, which can be slow and inefficient. We want to understand what types of technologies are currently being used to streamline the communication process, how they address issues of connectivity and data transmission, the platforms being used, and the maturity of the product and/or service.

## SITUATIONAL AWARENESS

Situation awareness is a responder's ability to perceive and assess the current events around them to make decisions and predict the future consequences of those decisions. Developing and maintaining situational awareness is difficult during a fire incident because of the dynamic nature of fire behavior. We assessed competitors on their ability to support situational awareness by providing information such as location tracking, real time updates, and fire, weather, topographic information to access how well competitors address these informational needs.

## COMMUNICATION & OPERATIONAL SUPPORT

Tactical operations and decision-making relies on the effectiveness of communication of critical information between and across different teams and agencies. We want to explore the different modes of communication, the data that is being collected, and identifying people who have access to the information. Additionally, we want to assess whether there are functionalities for allocating resources and assisting with pre-planning.



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# Competitor Profiles

We selected the following products and services based on their tracking capabilities to help us analyze features that may be pertinent for tracking fire personnel and resources.

## ATAK



**Description:** An android situational awareness application that enables real-time collaboration among responders in the field and command centers.

**Relevance:** Some of our participants said they utilized ATAK to develop situational awareness and felt that this tool should be implemented at a wider scale.

## AXON RESPOND

**Description:** Uses Axon products to passively feed location and data to software platform that displays everything on a map.

**Relevance:** Tangential to our space with situational awareness and real time tracking/

## FIRESOENSE

**Description:** FiResponse is an all-in-one wildland fire management system that supports operational activities associated with resource tracking, incident response, and dispatch.

**Relevance:** This product is specially made to address issues faced fighting forest fires.

## IRWIN/IROC

**Description:** Wildland fire applications offered by the Office of Wildland Fire Service and the U.S. Forest service. IROC enables resource ordering and tracking and IRWIN integrates the exchange of information between multiple systems.

**Relevance:** Part of existing internal technology used by agencies in wildland fire management.

The competitors include both digital and physical products that are created by private companies and the federal government alike.

## AVENZA MAPS



**Description:** A collection of digital maps that can be downloaded offline for navigating in outdoor activities like hiking, climbing, and camping.

**Relevance:** Some of our participants indicated that they used Avenza on the fireground to help them navigate, take notes, and track their routes.

## CALTOPO

**Description:** Caltopo is a backcountry mapping tool. It contains tools to plan backcountry adventures including offline topographic maps and aerial imagery, slope angle shading, viewshed analysis, realtime SNOTEL and weather data, and many more options.

**Relevance:** It was originally developed for search and rescue work in California and later for the entire US.

## IAMRESPONDING.COM



**Description:** IamResponding.com is a one-stop life and time saving solution for first responders and provides a complete emergency notification and response system.

**Relevance:** Millions of dispatches have been processed, and more than 2 billion messages have been delivered to subscribers worldwide.

## RESPONDERX



**Description:** A tracking device that has self contained data transmission using hubs mounted to vehicles that can track personnel. Has a graphical interface to display the data.

**Relevance:** Physical tracking device made by firefighters for firefighters with corresponding software

# Evaluation Criteria

We evaluated each competitor on the criteria below from each of the main categories relevant to resource management and personnel tracking.

The criteria reflect critical requirements, differentiating features, and supplemental features that augment (but are not critical) to functionality.

## TECHNOLOGY

<b>TARGET AUDIENCE</b>	<b>DATA TRANSMISSION</b>	<b>CONNECTIVITY</b>	<b>PLATFORM</b>	<b>MATURITY</b>
What are the stakeholders using the platform?	What technology is used to track and transmit the data? (e.g., GPS, MANET, mesh networks, etc.)	What is the range of connectivity for the product/service? Can it be used in remote locations?	What platforms does the product support, such as desktop, iOS, Android, etc.?	How mature is the platform in the market? How long has the platform been in the market? How popular is the platform?

## SITUATIONAL AWARENESS

<b>LOCATION TRACKING</b>	<b>FIRE INFORMATION</b>	<b>WEATHER INFORMATION</b>	<b>TOPOGRAPHIC INFORMATION</b>	<b>REAL TIME UPDATES</b>
What locations does the product track? (e.g., personnel, fire structures, vehicles, etc.)	Does the product provide any fire information, such as fire history, fire activity, etc.?	Does the platform provide any weather information to users?	Does the product provide geographic and topographic information? (e.g., elevation, direction, roads, natural formations, etc.)	Does the product update in real time?

## COMMUNICATION & OPERATIONAL SUPPORT

<b>METHOD OF COMMUNICATION</b>	<b>USER ACCESS</b>	<b>DATA COLLECTION</b>	<b>RESOURCE ALLOCATION</b>	<b>PRE-PLANNING</b>
How are users communicating using the product/service?	Who has access to the platform?	What data is being collected, how is it being collected, and how is it being used?	Can the platform allow users to allocate resources?	Does the product/service have specific tools to assist pre-planning?

# Analysis



## ATAK (ANDROID TEAM AWARENESS KIT)

### DESCRIPTION

ATAK is a situational awareness tool that provides geospatial information, location sharing, communication, media sharing, measurement tools, and other collaboration features over geography. ATAK is a product within the TAK (Team Awareness Software) family, created by the United States Government (USG). It is designed to support the communication and coordination between multiple responders within and across different jurisdictions. It utilizes mobile mesh networks to deliver connectivity in off-grid areas and is interoperable with other TAK products.

### PAIN POINTS

- ATAK is only available on Androids. The iOS version is still current under development.
- ATAK is subject to the Export Administration Regulation (EAR) by the Department of Commerce because it's a United States Government (USG) owned product.
- Companies and agencies must be vetted for licensed use of the TAK software.
- Advanced training is required to establish standard operating procedures within an organization to effectively deploy proper use of the TAK software (e.g., symbols, naming conventions, etc.).
- Existing security measures like firewalls may impede data sharing between TAK servers hosted in different server environments.
- ATAK requires hardware to run on (e.g., server, mobile device, etc.).
- ATAK requires technical support to install and maintain the TAK software.
- ATAK lacks real-time weather information and requires an external plugin for this information.

### INSIGHTS/OPPORTUNITIES

ATAK addresses many opportunities we discovered during our primary research, including the ability to keep track of personnel in real time and providing connectivity in remote areas. This is enabled by its use of both native and non-native communication including cellular networks, wi-fi, and MANET that allows transmission of data regardless of the levels of receptivity.

In addition, ATAK allows communication among different levels of communities in a variety of different mediums. For example, the operator can choose to communicate user-to-user, user-to-select team, user-to-command post, and user-to-entire force. The operator can also manipulate and edit the map as they go by drawing on the map itself and overlay real time images and videos on top.

These features in ATAK provide us an overview of what functionalities should be considered in a platform to provide situational awareness in critical situations. Additionally, we can address the issue of connectivity by researching and implementing the technologies used to run the ATAK software. This means that our ideas does not have to be limited by connectivity. Rather, it confirms that existing technology does allow for connection in off-grid areas.

We can understand why ATAK is currently being used by some fire departments. However, we want to identify why it is not implemented nationally especially when it is a product created and financed by the federal government.

In the meantime, ATAK can provide the basis for our team to refine functions that are specific to the roles involved in firefighting. If we can leverage ATAK features to address specific needs and operations at the fireground with our stakeholders, we could offer a powerful alternative that may encourage more adoption and use among the fire community.

# Analysis

## ATAK (ANDROID TEAM AWARENESS KIT)

### EVALUATION METRICS

<b>TARGET AUDIENCE</b> Law enforcement, emergency medical service, military, personnel from other government agencies involved in public safety	<b>TOPOGRAPHIC INFORMATION</b> Includes both online and offline mapping. Heat maps, elevation tools, computed contour maps, viewsheds, routes with terrain information.
<b>DATA TRANSMISSION</b> Uses both native communication (e.g., cellular, wi-fi, etc.) and non-native communication (e.g., SATCOM, MANET).	<b>REAL TIME UPDATES</b> Can track where personnel, trucks, and aircraft in real time. Live aerial footage can be overlaid on maps.
<b>CONNECTIVITY</b> Yes, can be used in remote areas.	<b>METHOD OF COMMUNICATION</b> Collaborative mapping that allow drawing and pointing to locations of interests. Can chat, stream, and share files.
<b>PLATFORM</b> ATAK is specific to Androids, but the TAK server can communicate with other clients including Windows, Linux, and the Web.	<b>USER ACCESS</b> Encrypted data between user-user, user-teams, user-command post, or user-entire force.
<b>MATURITY</b> ATAK is the most mature product within the TAK family. It was created in 2010 and its base has grown rapidly especially among Depart of Defense programs.	<b>DATA COLLECTION</b> Responders can leave digital marks for their current route.
<b>LOCATION TRACKING</b> Can track locations of personnel, trucks, and aircrafts. Can mark personnel locations, sharing and history.	<b>RESOURCE ALLOCATION</b> Can draw on map where crews need to be sent, where to drop fire retardant, and add markers to indicate meeting and fueling stations.
<b>FIRE INFORMATION</b> N/A. Application does not include specific fire conditions.	<b>PRE-PLANNING</b> Can edit map to make plans for tactical operations.
<b>WEATHER INFORMATION</b> N/A. But can install a weather plugin.	

# Analysis

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## AVENZA MAPS

### DESCRIPTION

Avenza Maps is a mobile application that allows users to download offline maps for navigation outdoors, track their GPS locations, and record their routes. It was originally developed for people engaging in outdoor activities like hiking, climbing, and camping, but some industries have started to use it for their specific mapping purposes.

Avenza Maps users can access nearly one million different maps to download, which are created by different professional map publishers in the app's Map Store. It includes a variety of different maps including topographic, tourist, recreation maps. Users can also import their own maps and share it publically with other Avenza Maps users.

### PAIN POINTS

- Only allows view of one map at a time, forcing users to manually load an adjacent map if they reached beyond the parameters of the initial map.
- Requires users to download maps for a particular region before they go offline.
- Lack of synchronization because the data is stored locally, which means the data must be exported for it to be accessed.
- Inability to share dynamic data with team.
- Free version of Avenza Maps only allows users to download maximum of three maps before upgrading to a higher tier subscription that ranges from \$30 to over \$100 per device.
- Levels of detail in maps can be inconsistent because the maps are from third-parties.
- Some maps at the Map Store can be expensive.
- Location is indicated by a blue dot, but does not provide exact coordinates.

### INSIGHTS/OPPORTUNITIES

Although Avenza Maps' main value proposition is its ability to view maps offline regardless of cellular or internet access, the biggest drawback is that it requires users to download the map prior to arriving in an off-grid area. This means that people have to know where they are going and plan a general route. However, if the person walks off the edge of a downloaded map, the application becomes meaningless. This is acceptable for recreational use, but may pose a risk for incomplete data because fire behaviors change rapidly and responders may not know ahead of time where the fire will end up.

In addition, the user's location is indicated by a blue dot, which does not provide any other information like coordinates that could help others find them. Our solution needs to consider how to provide the location of personnel and resources in a data-rich and meaningful way.

However, some features of Avenza Maps seem valuable for firefighting in terms of collecting data. For example, it has the ability to record users' tracks, drop placemarks, and add geotagged notes and photos to marked areas. We learned that during large fire incidents, there are people assigned roles to collect data about the fire conditions, which is then reported back to team to help make the next decision forward.

# Analysis

## AVENZA MAPS

### EVALUATION METRICS

<b>TARGET AUDIENCE</b> People who hike, bike, climb, camp, or engage in other activities that requires a map outdoors.	<b>TOPOGRAPHIC INFORMATION</b> Measures elevation changes, speed and distance of a journey.
<b>DATA TRANSMISSION</b> Uses wi-fi or cellular data when there is a connection. Uses device's built-in GPS (mobile or tablet) when offline.	<b>REAL TIME UPDATES</b> Tracks personal movement with GPS that includes speed and elevation statistics.
<b>CONNECTIVITY</b> Yes, can be used in remote areas.	<b>METHOD OF COMMUNICATION</b> Share routes and shapefiles. Mark places of interests with a pin. Create and manage a geofence.
<b>PLATFORM</b> Available on iOS, Android, and Windows smartphones and tablets.	<b>USER ACCESS</b> Free and Plus tiers are for recreational individual use who have access to public maps and their own routes. Pro and Enterprise tiers are for professional, academic, and government use that can be shared among the team.
<b>MATURITY</b> Mature. It was released in 2013 and has since expanded for commercial and professional use that requires a paid subscription.	<b>DATA COLLECTION</b> Distance traveled, total time, average speed, and elevation changes. Saved placemarks, tracks, measured areas, and recorded data on the track.
<b>LOCATION TRACKING</b> Ability to locate and mark user on the map online and offline with exact GPS coordinates.	<b>RESOURCE ALLOCATION</b> N/A. Application does not allow users to allocate resources.
<b>FIRE INFORMATION</b> N/A. Application does not provide fire information.	<b>PRE-PLANNING</b> Possibly. Ability to record characteristics and photos attached to any placemark or tracked routes, which can be used to document fire conditions used for planning.
<b>WEATHER INFORMATION</b> N/A. Application does not provide any weather information.	

Avenza Maps - Discover Hiking, Recreation, Topographic & Park Maps With Offline Use on iOS and Android. (2021). Retrieved May 21, 2021, from Avenzamaps.com website: <https://www.avenzamaps.com/>

MAPS.ME. (2021). Slant - MAPS.ME vs Avenza Maps detailed comparison as of 2021. Retrieved May 21, 2021, from Slant website: [https://www.slant.co/versus/3754/26606/~maps-me\\_vs\\_avenza-maps](https://www.slant.co/versus/3754/26606/~maps-me_vs_avenza-maps)

# Analysis

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## CALTOPO

### DESCRIPTION

CalTopo is a backcountry mapping tool created for first responders from search and rescue, wildland fire, law enforcement, and any other organizations that require mapping and data management. Some features include offline topographic maps, aerial imagery, slope angle shading, viewshed analysis, real-time SNOTEL and weather data.

The product has three main features. First, it offers different layers of the map to allow numerous unique views. Layers can be customized, overlaid, and tweaked to fit users' specific needs.

Second, it provides tools for backcountry mapping applications, including drawing and measuring tools, profiles of terrain and elevation for evaluating a route and making a detailed plan, slope angle shading for assessing winter travel risks, and many other custom overlays and layers.

Third, its CalTopo app allows seamless sharing between the web and mobile of CalTopo users and users of other apps.

### PAIN POINTS

Connectivity is the main pain point for Caltopo. When users leave a network area or go into airplane mode, they can't see the base layers unless they have downloaded layers already. In this case, they have to print out the digital map with the base layers and any map objects they added before going into an area without cellular networks, which may be inconvenient to users.

### INSIGHTS/OPPORTUNITIES

CalTopo is a powerful and dynamic tool for creating and using highly customized maps. It is a set of digital maps that allow users to add and store location-based data to these maps.

The information a single base map can provide is very limited and it would be impossible to put all the types of information that anyone would want to use onto just one map. Thus, CalTopo provides the opportunity to view dozens of types of maps and overlays, and allows customization by stacking layers or creating users' own base layers.

Building maps using objects opens up the options of many features such as:

- Creating a route that you can then view with different base layers
- Determining the length and elevation profile of a route
- Sharing plans with your friends
- Marking things you find during your adventures
- Calling out dangerous areas to avoid

The way CalTopo is designed gives us a lot of inspirations. When building a platform with complicated implementation, it is critical to ensure the compatibility, flexibility, and scalability of each component. CalTopo gives us an excellent example by separating the base layers and maps objects users can create. In this way, users can construct a variety of combinations of base layers and maps objects to better serve their different needs.

# Analysis

## CALTOPO

### EVALUATION METRICS

<b>TARGET AUDIENCE</b> First responders; recreationalists to plan, navigate and return home safe from their backcountry adventures	<b>TOPOGRAPHIC INFORMATION</b> It has rich topographic information displayed through map layers and map overlays.
<b>DATA TRANSMISSION</b> Satellite, cellular network	<b>REAL TIME UPDATES</b> Real-time data such as Sno Tel Sites, water gauges, and weather stations are provided.
<b>CONNECTIVITY</b> Users need to have cellular network to use it, but it supports offline navigation.	<b>METHOD OF COMMUNICATION</b> No verbal communication is supported, but collaborators work on the same map.
<b>PLATFORM</b> Desktop, iOS, Android, GPS-device compatible, printout	<b>USER ACCESS</b> It is a customer facing product, so anyone can access it. A map link can be generated to share among people as well.
<b>MATURITY</b> It was a hobby project in 2010 but has become more and more popular. Many firefighters and recreationalists use it now.	<b>DATA COLLECTION</b> Map overlays show content such as slope angle shading, land management agencies, motor vehicle use, and weather.
<b>LOCATION TRACKING</b> N/A. Application does not track personnel or any other type of resources.	<b>RESOURCE ALLOCATION</b> N/A. Application does not provide tools for allocating resources.
<b>FIRE INFORMATION</b> It provides fire activity and history information.	<b>PRE-PLANNING</b> N/A. Application does not assist with pre-planning.
<b>WEATHER INFORMATION</b> Detailed weather information is presented. The map has a layer of forecasts, including weather shading, wind plot, weather grid, and avalanche.	

# Analysis



## FIRESPONSE

### DESCRIPTION

FiResponse is an all-in-one enterprise wildland fire management system that provides decision-support and operational management capabilities across the entire incident life cycle for interagency use. It provides incident management, resource management and tracking, and situational awareness tools and is part of a larger suite of products by Technosylva, a provider specializing in wildland fire solutions with GIS-functionality.

Resource management and tracking features include:

- Inventory management, availability, and scheduling of equipment and personnel by regions/ districts
- Tracks personnel utilization time
- Activation and mobilization of resources
- Dispatch module
- Grouping of staff and equipment into crews, strike teams, mobilization
- Automatic calculations of distance and ETA
- Real-time tracking of resources using Automatic Vehicle Locator (AVL), AFF, and GPS technology using SPOT Trace & Gen3 equipment
- Viewing of incident and resources on GIS map
- Rule-based alerts and notifications for personnel

Other incident management and situational awareness features include:

- Interactive map for incident mapping and updates by coordinates, GPS, landmarks, or address
- Incident history and reconstruction for reports
- Integration with existing agency systems such as IRWIN and with other Technosylva products for fire behavior analysis, peer-to-peer field communications, weather data, and training

### PAIN POINTS

It is difficult to assess this application as we do not have access. A publicly posted contract with the vendor reveals a cost of \$850,000 for 60 months.

The contract indicates that continuous service and support must be provided by Technosylva to maintain the platform throughout. Real-time tracking of resources here also depends on additional subscriptions to equipment vendors for SPOT Trace and Gen3 equipment.

### INSIGHTS/OPPORTUNITIES

FiResponse is one of few off-the-shelf systems designed and developed specifically for wildland fire tracking, and is offered in conjunction with a set of enterprise tools to manage all wildland fire needs. Its tailor-made approach to wildland fires has garnered it contracts with certain agencies and states. It is unclear if its customers have access to existing interagency data systems and why they choose to contract with FiResponse instead. FiResponse is designed to allow for integration with existing agency platforms such as IRWIN, a requirement noted in the contract we reviewed - it is clear that interoperability between systems is unnegotiable for interagency collaboration.

The ability to group staff and equipment into crews and strike teams, and rule-based alerts and notifications for personnel are interesting features that allow for better pre-planning before an incident occurs. Pre-planning has come up in our research as a key factor in preventing the escalation of wildfires from small incidents to large disasters. Predictive functionality based on historical data (e.g. estimates of ETA of resources) and easy reporting of incident history can both facilitate adequate pre-planning.

Technosylva products are all GIS-based and include interactive maps for both incident and resource information in real time. The products demonstrate the power and methods of visually displaying complex, layered information such as that needed in wildland fire management.

# Analysis

## FIRESERVICE

### EVALUATION METRICS

<b>TARGET AUDIENCE</b> All people and agencies involved in wildland fires. Mobile app for emergency response users in the field.	<b>TOPOGRAPHIC INFORMATION</b> Yes, GIS-based platform with advanced mapping
<b>DATA TRANSMISSION</b> AVL, AFF, GPS for resource tracking.	<b>REAL TIME UPDATES</b> Yes, real-time data synchronization across all platforms
<b>CONNECTIVITY</b> Dependent on internet and cellular connectivity.	<b>METHOD OF COMMUNICATION</b> Through multiple platforms offered; integrates with GoTenna, a peer-to-peer communication network; integrates with other data systems
<b>PLATFORM</b> Multi-platform: applications available for desktop, web, mobile. Cloud or on-premise hosting.	<b>USER ACCESS</b> SSO integration; permissions based on organization and roles
<b>MATURITY</b> In use since 1998	<b>DATA COLLECTION</b> Input by users, integration with data from other systems, mobile app data uploads from the field
<b>LOCATION TRACKING</b> Yes, real-time resource tracking through AVL/ GPS with SPOT Trace & Gen3. GIS incident tracking.	<b>RESOURCE ALLOCATION</b> Extensive resource management, scheduling, allocation, mobilization tools
<b>FIRE INFORMATION</b> Yes, incident reporting and mapping, integrates with other products for real-time fire behavior analysis and simulations	<b>PRE-PLANNING</b> Incident history and reconstruction tools, rule-based alerts and notifications, staff management, BI dashboards for incident and resource status
<b>WEATHER INFORMATION</b> Yes, integrates with real-time weather data product (Synoptic & WeatherFlow)	

# Analysis



## IAMRESPONDING.COM

### DESCRIPTION

IamResponding.com is a one-stop life and time-saving solution for first responders and provides a complete emergency notification and response system.

IamResponding comprises features that can benefit every type of fire department. From sending incident and staffing recall notifications to unlimited mobile devices, mapping, communication tools and incident reporting, to tracking all members' certifications, training and attendance at events. People will know immediately who is available to respond to incidents, and will be able to get more complete, more effective and safer crews out faster. Operational tasks and decisions at the station will be streamlined, and tactical decisions on the scene will be more informed and tailored to who is actually responding to the incident.

### PAIN POINTS

Overall, the platform receives good ratings. However, there are some pain points users raised in the feedback session of app stores.

- Device compatibility. First responders request Apple watch integration of the platform.
- Limited features in the app. Dispatch orders can only be made through the web.
- Connectivity. Users complain that the connectivity restricts them from using the features in the app.
- Missing features. Users are requesting features including incident images, integration with social media, virtual pager, and live scanner audio.

### INSIGHTS/OPPORTUNITIES

IamResponding is a comprehensive platform with an emergency notification and response system. The platform is now used by 400,000+ people actively and has delivered 500 million+ messages.

In my opinion, three reasons are making the platform popular.

First, it significantly streamlines the communication among dispatch centers, incident commanders, firefighters, and other collaborative entities. All the information among these stakeholders is shared on one single platform and is transparent among them. This reduces a lot of communication burden.

Second, the real-time information lets incident commanders make smarter operational and tactical decisions. Incident commanders can see immediately who is responding to the incident, where they are responding, and when they will arrive. This helps compile more complete, more effective and safer crews faster.

Third, the platform is very reliable. IamResponding has a fully redundant network infrastructure. It is designed to provide 100% system up-time and has done so far for the past 6+ consecutive years. Even when any server maintenance is required, user sessions are seamlessly migrated to other IamResponding servers, with no user impact.

However, the platform is missing two critical parts of information. First, the information related to situational awareness is lacking. In addition, the system does not support any sharings of the images and videos to let other stakeholders monitor and understand the situation of the fire in real time.

# Analysis

## IAMRESPONDING

### EVALUATION METRICS

<b>TARGET AUDIENCE</b>	First responders, dispatchers, incident commanders, and mutual aid agencies	<b>TOPOGRAPHIC INFORMATION</b>	N/A
<b>DATA TRANSMISSION</b>	Internet connectivity	<b>REAL TIME UPDATES</b>	Live tracking of responding members and apparatus
<b>CONNECTIVITY</b>	It works under internet connectivity	<b>METHOD OF COMMUNICATION</b>	Text, chat, push notification, and email; Templates can be set up templates and future messages can be scheduled
<b>PLATFORM</b>	Web-based system, but has apps in iOS and Android platform as a companion feature to the system	<b>USER ACCESS</b>	First responders, dispatchers, incident commanders, and mutual aid agencies. Admin can control who has access.
<b>MATURITY</b>	It has 13+ year of service, 400,000+ active users, 500 Million+ messages delivered	<b>DATA COLLECTION</b>	Map overlays show content such as slope angle shading, land management agencies, motor vehicle use, and weather.
<b>LOCATION TRACKING</b>	Live location of responding members and apparatus, hydrant locations	<b>RESOURCE ALLOCATION</b>	System can send out incident and staffing recall notifications.
<b>FIRE INFORMATION</b>	Basic fire information from dispatch center, including location, venue, quadrant, district, priority, status, etc	<b>PRE-PLANNING</b>	Pre-plan documents can be upload right to the maps.
<b>WEATHER INFORMATION</b>	No, but users can update resources to the platform		

# Analysis

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## IRWIN/ IROC

### DESCRIPTION

Integrated Reporting of Wildland Fire Information (IRWIN) and Interagency Resource Ordering Capability (IROC) are both applications in a suite of wildland fire products offered by the Wildland Fire Information and Technology Program (WFIT), a team comprised from staff in the Office of Wildland Fire and U.S. Forest Service. They are internal applications offered and managed by the agencies managing wildland fires.

IROC is an application for placing, tracking, and managing orders of resources and supplies (including personnel) for all hazard incidents throughout the incident lifecycle. It provides real-time information on national availability of resources, tools for operational activities, and decision-support tools such as resource recommendations based on time-to-delivery, location, cost-effectiveness. The tool was implemented in 2020 to replace an older resource ordering system (ROSS) to increase operational effectiveness and efficiency across the interagency wildland fire community.

IRWIN facilitates data exchange and integration between other existing applications. It enables end-to-end reporting capability by minimizing redundant data entry, designating an authoritative data source, and improving consistency of data across both federal and non-federal agencies. IROC provides resource information to IRWIN, which integrates and provides access to that information to other services. IRWIN has a "Roll Call" tool that is used to manage the status of tactical resources for decision-making and allocation.

### PAIN POINTS

Assessment of pain points is limited due to restricted access to internal applications.

IROC needs to subscribe to reference and historical data from other systems, and only accepts validated and standardized data. There is a need to support legacy data systems that were replaced. IRWIN's real-time data updates may be impacted by environmental connectivity.

### INSIGHTS/OPPORTUNITIES

IROC and IRWIN are a part of a vision by the Department of the Interior and the U.S. Forest Service for an ecosystem of wildland fire technologies that serve the entire wildland fire community, regardless of the agency, department, and location in the U.S. The vision is for integrated and interoperable technology that serves business processes and operations and provides data and tools for strategic decision-making and tactical decisions in wildland fire management. This integration of different systems is paramount to efficiency, effectiveness, and safety from both a business and operational perspective. Siloed systems leads to duplication of work, redundant and conflicting data for reporting and decision-making, and inconsistency in communication and operations between different agencies who resort to the systems they are most familiar with. Using IRWIN to integrate and share data from multiple sources, having a single user interface regardless of organizational membership, and creating platform-agnostic systems (that can be used on mobile devices) enables consistent and up-to-date information for all involved in wildfire management. It is difficult to compete with an integrated set of internal tools that already exist.

IROC's ability to electronically order and disseminate orders across the entire incident lifecycle supports real-time availability and tracking of resources, especially for fires that cross multiple jurisdictions. A fascinating feature is that it uses current and historical data to make suggestions for procurement and mobilization of resources, informing the user what would be the best in value, or whether or not safety issues exist. These tools point to an opportunity to make data-driven decisions that may hugely impact effective allocation of limited resources, response times, cost of wildland fire fighting, and tactical decisions. Algorithms can reveal relationships and factors in the data that are difficult to identify and analyze with human cognition alone.

# Analysis

## IRWIN/ IROC

### EVALUATION METRICS

<b>TARGET AUDIENCE</b> Interagency staff in wildland fire management across the country	<b>TOPOGRAPHIC INFORMATION</b> IROC - N/A IRWIN - Unknown
<b>DATA TRANSMISSION</b> Web/ Internet	<b>REAL TIME UPDATES</b> Yes, as long as connectivity is available for all related systems
<b>CONNECTIVITY</b> Dependent on internet access	<b>METHOD OF COMMUNICATION</b> Updates are seen and shared by users of the system/ platform. Integrated data shared via API.
<b>PLATFORM</b> IROC - Web-based (hosted on FedRamp cloud and ServiceNow application); PC and mobile access IRWIN - Amazon Cloud - West Coast Data Center	<b>USER ACCESS</b> IROC - Each user needs a unique key IRWIN - Unknown
<b>MATURITY</b> IROC - Implemented in 2020 IRWIN - Implemented in 2014	<b>DATA COLLECTION</b> IROC - Subscribes to reference data from other interagency systems and historical information IRWIN - Data from other systems via API
<b>LOCATION TRACKING</b> IROC - Yes, resource tracked across the nation IRWIN - N/A	<b>RESOURCE ALLOCATION</b> IROC - Yes, tracking and management, ordering, smart recommendations on allocation IRWIN - N/A
<b>FIRE INFORMATION</b> IROC - N/A IRWIN - Yes, integrates data from other systems	<b>PRE-PLANNING</b> IROC - Provides smart analytics and “what-if” scenarios for planning and decision-making IRWIN - Unknown
<b>WEATHER INFORMATION</b> IROC - N/A IRWIN - Unknown	

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# Analysis

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## RESPONDERX

### DESCRIPTION

The ResponderX Task Force Tracker product is made for wildland firefighters by wildland firefighters and is a wearable personnel tracker mounted on the head for the best reception. The tracker has a four week standby battery and is effective up to 20 miles from the hub and can be used without satellite broadcasting and communications. Has an automatic mesh network deployment, is independent of voice radio systems, and creates a secure mesh network for tablets and trackers. Command tablets receive the information without the need of internet connection and detects nearby incidents to join and can scale with more tablets on the fly.

### PAIN POINTS

Founded in 2015, it seems like it could be a more mature product, but it seems to have dropped off the map sometime after 2018 as it's social media stopped posting and there have been no more publications. Around 2018, it was getting a lot of good press and was hailed by the firefighting community as something that could be the next level of firefighting. If the company failed, why did it fail?

### INSIGHTS/OPPORTUNITIES

Since the TaskForce Tracker is made by wildland firefighters for wildland firefighters, we have the unique opportunity to understand exactly what they would want to build for themselves and get in their mindset on how they would solve their problems.

The tracker being mounted in the helmet is great because that allows for a better signal, as well as keeping them hands free since they are working with their hands all day. Being a completely passive tracker and not having to turn it on and off is important, as firefighters can easily forget with everything going on around them. Waterproof and fireproof is obvious, effective up to a 20 mile radius from the HUB (since firefighters can hike for miles to get to a fire), 4 week standby battery, and notification to IC of major falls is all perfect for wildland firefighters.

Having the vehicle be the HUB for trackers is particularly a good move, since everyone on the ground needs to get there. The fact that they use an automatic mesh network deployment that auto-syncs speaks to the fact that the people working on a fire are under serious psychological and physical pressure and they can't bother with setting things up and troubleshooting in the moment. To just have something "work" is paramount to success.

The "Command/Safety" tablet has time stamped events, specific views, locations of all the personnel and vehicles on a map, doesn't need an internet connection, and detects nearby incidents to join automatically, can automatically scale with more tablets on the fly, and change incident modes instantly, as well as track crews for tasking and rehab. This sounds like the wishlist of every firefighter we've talked to so far, so it's great to have that validated here in this product description.

We can take a lot from this product, not necessarily from it's success, but from the fact that it's built by wildland firefighters and also that it potentially failed.

# Analysis

## RESPONDERX

### EVALUATION METRICS

<p><b>TARGET AUDIENCE</b> Wildland Fire Agencies</p>	<p><b>TOPOGRAPHIC INFORMATION</b> Uses maps, does not specify level of detail.</p>
<p><b>DATA TRANSMISSION</b> Automatic mesh network deployment, secure mesh network for tablets and trackers</p>	<p><b>REAL TIME UPDATES</b> Does not specify, assume yes.</p>
<p><b>CONNECTIVITY</b> No data on how, except that it's an automatic mesh network</p>	<p><b>METHOD OF COMMUNICATION</b> Not included</p>
<p><b>PLATFORM</b> Physical device and tablet</p>	<p><b>USER ACCESS</b> Does not specify, can change incident modes instantly.</p>
<p><b>MATURITY</b> The company started in 2015, seemed to peak in 2018, and then dropped off suddenly.</p>	<p><b>DATA COLLECTION</b> Data collection from the tracker to the platform is passive.</p>
<p><b>LOCATION TRACKING</b> Yes, tracks the location of personnel and their vehicles.</p>	<p><b>RESOURCE ALLOCATION</b> No, does not help with resource allocation except for location tracking.</p>
<p><b>FIRE INFORMATION</b> N/A. Product does not provide information about fire conditions or behaviors.</p>	<p><b>PRE-PLANNING</b> Ability to see what is on the map with location data tracking</p>
<p><b>WEATHER INFORMATION</b> No</p>	