FINAL PROJECT PAPER

Development and Evaluation of a Hazard Dashboard for Army Reserve Facilities in the Southwestern United States

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TABLE OF CONTENTS

1. BACKGROUND

Natural disasters pose a significant threat to infrastructure throughout the United States. When you manage all the Army Reserve Division buildings in the Southwestern United States, you need to be aware of multiple potential natural disasters and weather hazards. For example, you need to be aware of spreading wildfires in Arizona at the same time as blizzard warnings in Oklahoma. My Army Division manages repair and maintenance contracts for over 130 facilities in California, Nevada, Arizona, New Mexico, Texas, Arkansas, and Oklahoma. It is important for us to stay informed of potentially hazardous weather so we can begin timely planning for repairs and maintenance.

Our facilities house Army Reserve Units, maintenance shops, and human resources centers. These are essential components of the Army Reserve. Loss of infrastructure or slow response can cause these units and resources to be unable to function for weeks to months. An up-to-date map of all the weather and natural hazards affecting this region will allow our division Commander and public works personnel to anticipate damage and develop an appropriate response plan. My project is to develop and evaluate a prototype webmap dashboard to provide this to my division.

2. LITERATURE AND CURRENT SYSTEMS REVIEW

The military has multiple mapping and tracking systems for use in different situations. Unfortunately, for my division, the systems that do exist are battlefield focused. My division needs functionality to track weather and natural disaster hazards in our region, manage or add relevant data layers displayed, and process data capabilities.

2.a. Existing Situational Awareness Systems

The most widely used system is the Command Post of The Future system (CPOF) (Global Info Tek, 2005; General Dynamics Mission Systems, 2024). This battlefield-focused system is designed to track small unit movement, enemy locations, and other significant activities. The CPOF goal "is to shorten the commander's decision cycle to stay ahead of the adversary's ability to react" (Global Info Tek Incorporated, 2005, 1). CPOF provides a commander with real-time locations of troops on ground. It provides troops with messaging capabilities to send reports between users. Users with a desktop workstation can take these messages and populate updated map data. This system is not available for use for my reserve division since it only allows for point data input with a few text fields of associated data rather than allowing for tracking large weather systems. In addition, this system does not have capabilities for data processing or allow us to load thematic map layers into the system.

Android Team Awareness Kit (ATAK) (Usbek, 2015; Flymotion, 2024) is another map tracking system utilized by the military. ATAK utilizes two-way communication between a user with an Android cellphone and a user with a desktop computer to track individual movement and send messages back and forth. Unlike CPOF, ATAK workstation users can upload SHP files to ATAK Maps. Base station users can also create line, point and polygon layers. Unfortunately, this system is not widely available for use with the Army Reserve. Also, ATAK does not have any data analysis or processing tools. Layers created by base station users only contain simple text data fields. Additionally, updating our dashboard would require us to download layers from authoritative sources and then upload them into

the ATAK map, since this process in ATAK cannot be automated. We want real-time or near real-time weather and hazard data in a dashboard.

The only existing military tool that comes close to meeting my division's needs is the Joint Engineer Common Operating Picture (JECOP). "The JECOP portal serves as a collaborative knowledge management tool that depicts network information on a map in order for end-users to quickly gather and analyze location data for purposes ranging from data summary and trend analysis to infrastructure planning and decision support" (Griffin, 2015, 1). JECOP is an ArcGIS Online dashboard managed by the Army GIS Center. It is a one-stop shop for hundreds of layers of data. JECOP contains all Reserve, Active Duty, and National Guard facility information for all services (Airforce, Navy, Army, Marine, Coast Guard). This dashboard contains hundreds of layers of data ranging from wildfires to flight paths, and proposed 2026 construction project sites. This system pulls data layers from authoritative sources with real-time or near real-time updates. JECOP has wildfire and reserve facility data. Some limitations with the JECOP system are that it loads data extremely slowly, it lacks weather and other up-to-date hazard data we need for our new dashboard, and there is no control over the data layers. We cannot easily add the new layers we need. We could submit a request to have the data added, but we would still be lacking data processing and analysis capabilities. Determining affected or in danger facilities would require us to select the needed layers in JECOP then manually zoom to all 130 of our facilities and note all possible hazards in those areas.

2.b. GIS in Situational Awareness of Natural Disasters and Weather Threats

Literature on mapping usage for military decision makers shows an understanding that map tracking provides valuable situational awareness to military commanders. However, current research is focused on expanding capabilities that are more like CPOF and ATAK than JECOP. It is focused on battlefield operations and increasing wartime commander information on soldiers in combat. It is not focused on developing general hazard or weather tracking systems for large areas or regions. Chmielewsik (2018, 2010, 2009) has written several papers focused on GIS systems development for military use. These systems are, in a sense, the next step for the CPOF and ATAK systems. These proposed systems provide more accurate and detailed soldier information to commanders, such as heads-up display technology. These systems would be of great benefit to commanders and small unit leaders in the heat of combat, but they will not help my division track weather and impacts to our facilities.

Björkbom et al (2013) and Sophronides et al. (2017) agree that a dashboard with mapped information is beneficial to hazard response and discuss how real-time mapped data can help decision makers plan and manage disaster response. Mapped data leads to quicker and more accurate decision making. However, these papers focus mostly on using map dashboards to track first responders during immediate disaster responses. In this way they are like the currently available military systems and the ones proposed by Chmielewsik. My division does not do immediate disaster response. We do not need to track immediate personnel movements within an affected building.

Ariyanto et. al. (2019) discussed the development of a GIS that utilized OpenStreetMaps and earthquake information to track potentially affected infrastructure. This system was an open system for civilians in Indonesia and was used to plan road trips or make travel arrangements. This system developed in this paper is like what I want to develop for my division, one that uses infrastructure

maps and hazard information to determine what infrastructure might have been damaged by a hazard. The success of Ariyanto et. al.'s system shows that webmap analysis of infrastructure affected by natural disasters is a worthwhile endeavor.

3. NEEDS ASSESSMENT AND USER TESTING

An initial needs assessment and test was conducted during the 2022 wildfire season. This assessment and testing were informal and only conducted by my then supervisor and me. It has been two years since this initial test. There is a new command team with new priorities and the Command Operations Information Center (COIC) has a completely new staff. The COIC is a subdivision of the division's operations center, which is responsible for processing information coming into and going out of the division. The COIC will be responsible for taking in hazard information requests and creating hazard information reports. The COIC will be the end-users for my prototype dashboard and report. I felt it was necessary when conducting the prototype dashboard testing to determine if there was still a need for the dashboard.

3.a. Initial Needs Assessment (2022 Wildfire Webmap)

In October 2021, I was assigned to the 63d Readiness Division's Command Information Operations Center. One of the tasks I was assigned was to create a weekly report of all wildfires in our region. This report was created with information from JECOP and a few other sites. I quickly realized I could synthesize most of this data onto one webmap. I spent about a month in the wildfire off-season creating a webmap that displayed the information for our wildfire report. This webmap was then used during the 2022 wildfire season to create our weekly wildfire report. During this time, I also noticed we would get questions about other weather hazards in our area and their effect on our facilities, but we did not have a method for tracking these hazards. We would check weather services and then send emails and make phone calls to every facility in an affected state. In fall of 2022 my supervisor and I decided to expand the wildfire webmap into a weather and hazards dashboard. We looked over the requests and reports we had created over the past year and decided what we wanted in our new dashboard:

- Realtime weather and natural disaster information in mapped layers
- Facility information in a mapped layer
- A mapped base layer with State borders
- Facility manager name and contact information
- Automatic data processing to quickly and accurately determine at risk facilities
- The ability to update and modify the dashboard in the future

3.b. Wireframe Testing

Both my previous supervisor and I have changed positions within the division since we tested the wildfire dashboard and decided to begin working on the hazard dashboard. Before I began to construct a prototype hazards dashboard, I wanted to determine if a need for the dashboard still existed, if the dashboard satisfied the current needs of personnel in the COIC, and if the proposed

report met current needs. I constructed a wireframe of my dashboard in PowerPoint to use for end user testing and a prototype hazard report.

Wireframe testing for my prototype hazard dashboard was conducted in March 2024. I conducted in person user testing with four personnel from my division's operations section. These personnel will be the end users of my dashboard. Four personnel are a sufficient number of testers to account for the majority of usability issues (Nielsen,1993 ,156). Because these positions have prescribed rank and job specialty requirements, I know these personnel provide a representative sample of potential future users of my dashboard.

Testers were brought into my office one at a time. They were given a computer with two monitors. One monitor displayed the wireframe (Appendix 1). When put in presentation mode the wireframe functions the same as the prototype hazard dashboard will function. The other screen displayed a prototype report (Appendix 2). Testers were read the instructions in Appendix 3. I asked them the questions on the user testing questionnaire (Appendix 4). They were not given any instructions on how to utilize the dashboard, except what was provided in the first page of the dashboard on the splash screen.
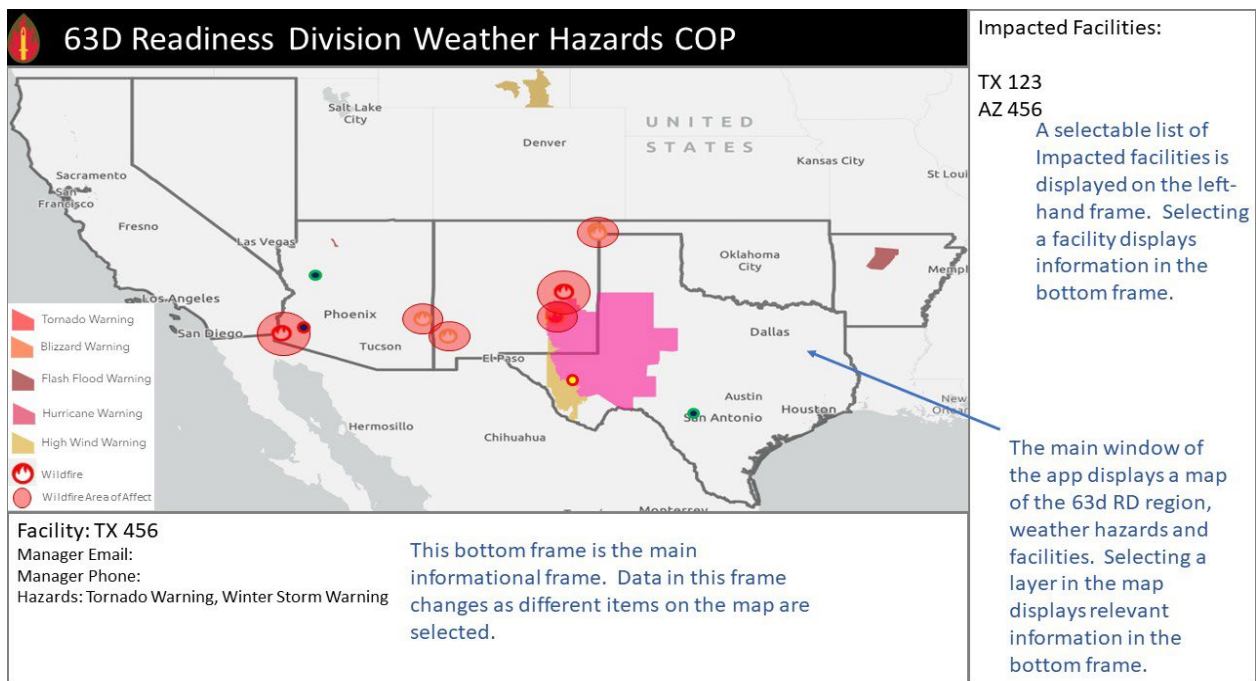

Image 1: Sample Dashboard Wireframe Page: This image displays the user interface and webmap for my GISystem. Selecting map features and facilities listed on the right will display information in the bottom frame. The wireframe is designed in PowerPoint to allow for interaction. The wireframe will respond similarly to the way the webmap will function once published.

3.c. Wireframe Testing Results

The results of each test can be seen in Appendix 5.

Needs Assessment: All four testers felt that there is a need for a hazard dashboard. The current command team is not asking for wildfire or hazard reports weekly, but they do ask for information when a large hazard is brought to their attention. Also, the United States Army Reserve Command (USARC) will ask for information on affected facilities when they become aware of a hazard. In both cases, someone in the COIC must take a workday away from their regular duties to collect all the information needed to answer the command team or USARC. If the dashboard and report were available, the COIC could quickly gather and relay this information. They may also consider creating and publishing the weekly report to prevent these sporadic requests from USARC and the command team.

Wireframe Functionality/Issues: Three out of four of my testers did not utilize the side panel when asked to find affected facilities. Three out of four testers did not utilize the bottom information panel. All three of these testers read the map legend and then checked the symbology on the map to determine affected facilities and hazards affecting these facilities. The information panel provides this information. It should be a faster and easier way to gather this information. Testers not utilizing the information panel suggests they were not aware of all the information provided in the panel. All testers had issues with the default hazard symbology being too similar to reliably differentiate between hazards. This resulted in three of the four reports having the wrong hazards listed for the affected Texas facility.

Report Testing: All testers felt the prototype report would be useful when paired with the prototype dashboard. Two of the four testers felt the report lacked vital information. Testers suggested that information related to the number of personnel that work in an affected facility and their work status should be displayed in the information panel, e.g. 300 personnel, facility closed, 100% telework. Testers also suggested that we add a column to the report showing the number of Army Reserve Soldiers in an affected area. This data can be added to the report, but it cannot be added to the prototype dashboard since it is controlled information from a secure site.

Tester Suggestions and Planned Adjustments: The symbology for the hazard layer will be updated to make it easier to differentiate between hazards. I will be updating the splash screen that displays when the page loads to explain usage of the side panel and information panel. In the future I will be looking into adding a guided walk through of the site functionality when it is first loaded. I will add ZIP code information for the facilities in the info panel. I cannot add the number of soldiers living in an area to the dashboard, but adding the ZIP code information will make it easier to get soldier data from our secure site. The weekly report prototype will be updated to contain columns for facility employee numbers, work location, and facility status.

3.d. Prototype Adjustments After User Testing.

After dashboard prototype testing several adjustments will be made to the prototype dashboard and report: Symbology for the hazard layer will be updated, an updated splash screen and guide for the dashboard will be created to highlight data in the side panel and info pane. The prototype report will have additional columns added for facility status, work force status, and total number of workers.

3.d.1. Hazard Layer Symbology Updates

All testers had issues with the symbology for the hazard layer in the prototype dashboard. The default colors for tornado, blizzard, flash flood and hurricane warnings in the hazard layer are very similar.

Image 2. Initial prototype legend which shows tornado, blizzard, flash flood and hurricane warning symbology. The colors of these symbols are similar enough it caused issues for all four prototype testers.

A major contributor to this issue is that the hazard layer contains 123 unique IDs. Each ID has its own symbology. I will work on correcting this issue by reducing the number of displayed hazards. The hazard layer contains unique IDs and symbology for some hazards that are not necessary for my division to track, e.g. 911 telephone outage, child abductions, and hazardous seas warning. By combining the symbology for similar hazards and eliminating non-relevant hazards the total number of Unique IDs that need symbolization can be reduced from 123 to 12 relevant hazards. This will reduce the need to reuse colors or use similar colors in my prototype dashboard's symbology. I utilized colorbrewer2.org to find a 12 class symbology scheme that would suite the hazards layer's qualitative data.
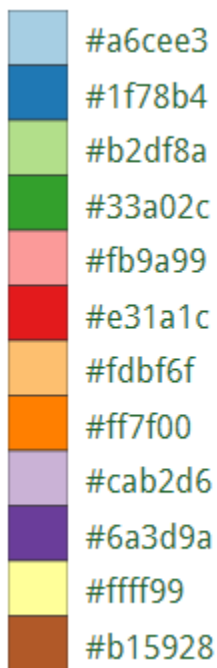

Image 3. 12 class qualitative symbology from colorbrewer2.org. This is the color pattern that will be used for the prototype dashboard hazard symbology.

3.d.2. Dashboard Guide Updates

      The wireframe contains a splash screen that explains the usage of the dashboard. It explains the side panel, info panel and how to use them for gathering information. It also explains the on click functionality of the dashboard. Each tester was instructed to read the splash screen, then let me know when they were finished reading and ready to being the testing. Each tester confirmed they had read the splash screen and were prepared to complete the testing. Despite reading the splash screen 3 of the 4 testers did not use the side panel during testing, and they did not use the info div to gather information on what hazards were affecting what facilities. To solve this issue, I will add a more in-depth splash screen which highlights each div, while it provides information on the div's usage and data contained in the divs.
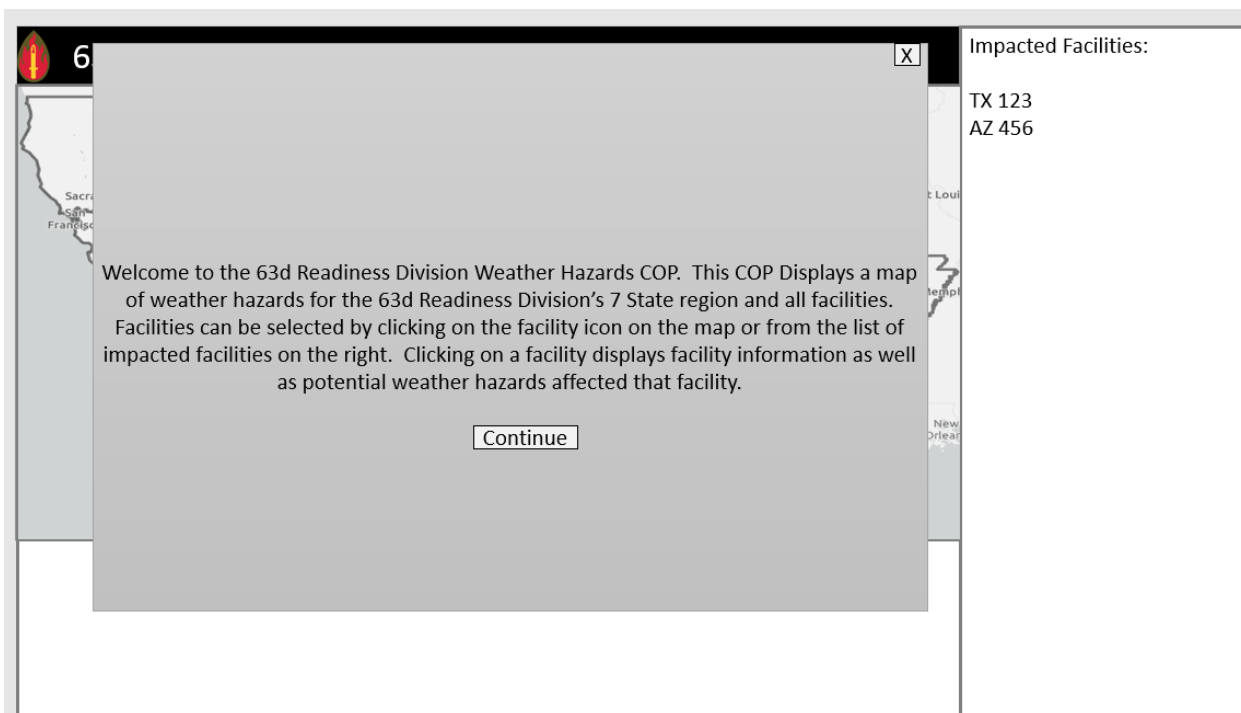

Image 4. *The initial wireframe splash screen, which provides information on the dashboard but does not walk users through the panels and their usage.*
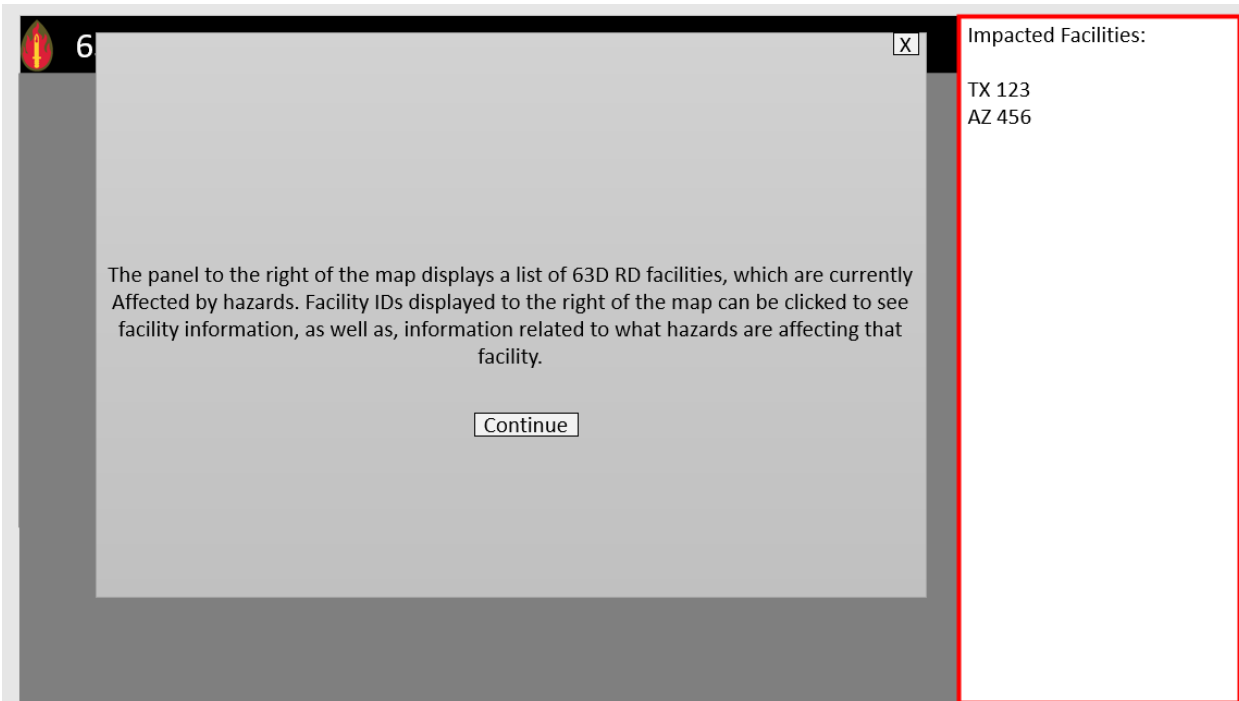
Image 5. New second splash screen, which highlights the side info panel and discusses its usage. This screen will display after the initial splash screen to highlight the side panel.
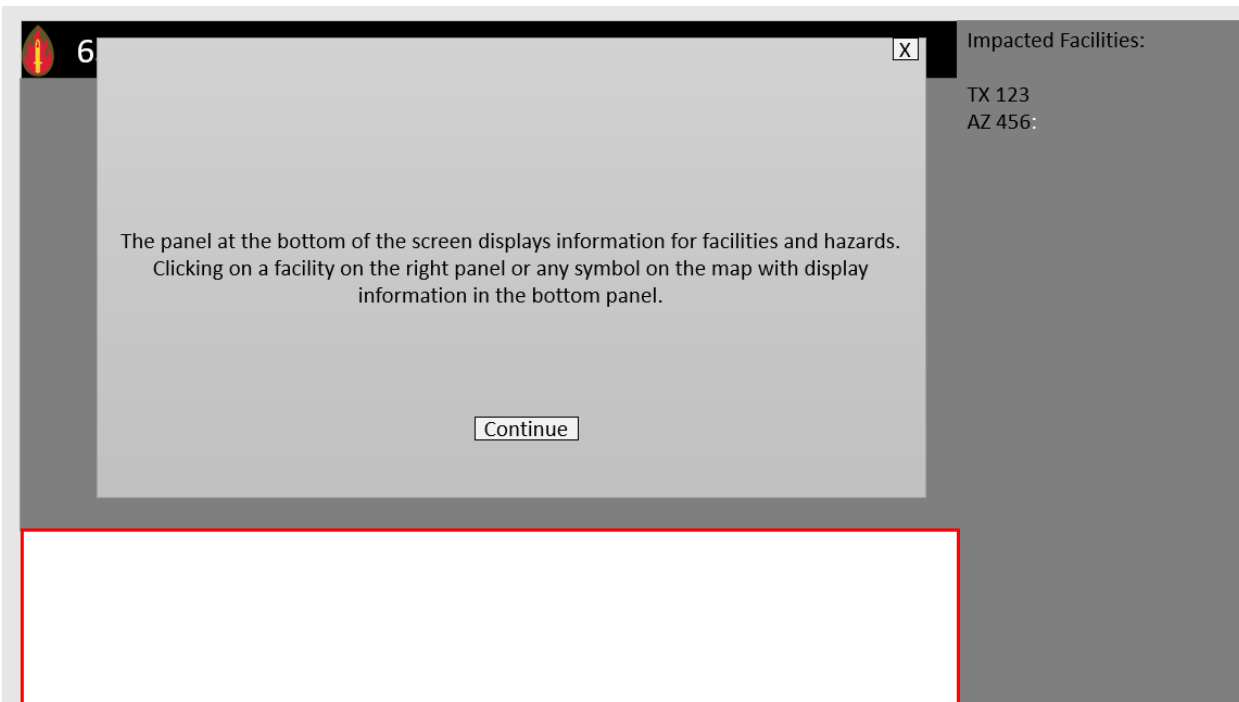

Image 6. New third splash screen, which highlights the bottom info panel and discusses its usage. This screen will display after the second splash screen to highlight the bottom panel.

3.d.3. Prototype Report Updates

The prototype report has been updated to contain more pertinent information related to our facilities statuses and the availability of the workers in the facilities. Testers suggested this is specific information our Commanding General has asked for in the past when requesting hazard report. A static legend was added to the right side of the report. There is a blank space created to the right of the map when it is pasted onto the report from the dashboard. Moving the legend here allows users to collapse the map legend the dashboard before screenshotting it. This prevents the legend from covering up potentially important parts of the map.

Image 7. *This is the initial prototype report. Testers were asked to complete this report with data from the wireframe as part of user testing.*
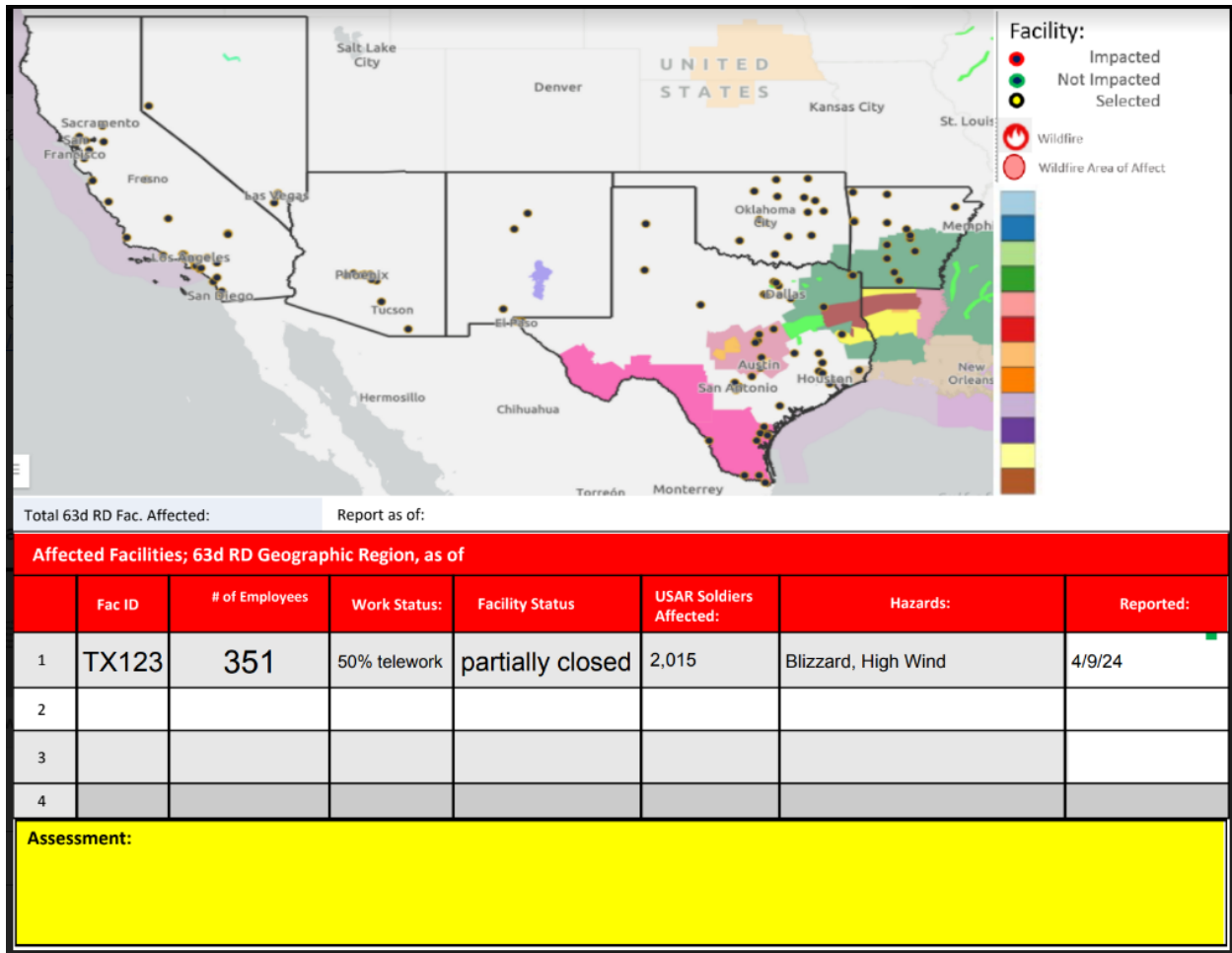
Image 9. *The updated prototype report. This report has been updated based on user feedback. A static legend was moved to the right side of the report to fill in the empty space and to allow the map legend to be collapsed. More facility, employee and soldier information has been added to the report fields.*

PROTOTYPE DASHBOARD CREATION

My prototype dashboard will be an online dashboard with a webmap and information panels to display relevant information about the hazards and facilities displayed in the webmap.

4.a. Software

I will utilize the Esri JavaScript API for the mapping needs of my prototype dashboard. My division does not have in-house programs or personnel who can code, nor do we have a budget to hire programmers or coders; therefore, we cannot take advantage of most of the benefits of a FOSS API such as leaflet. I will utilize HTML, CSS, Dojo JavaScript API for my dashboard. All the data layers for my webmap are hosted on the Esri REST server. ArcGIS Pro will be utilized to create the facilities data layer for my dashboard and to upload it to the ArcGIS Online Server.

4.b. Hardware

The only hardware requirements for this project are the minimum requirements to run ArcGIS Pro.

CPU: 2 cores, simultaneous multithreading

Platform: x64

Storage: Minimum: 32 GB of free space

Memory/RAM: Minimum: 8 GB

Dedicated (not shared) graphics memory: Recommended: 4 GB or more

(Esri 2024a)

4.c. System Architecture

The system architecture for this project is 3 tiered. The data layer consists of data from authoritative sources uploaded to Esri's ArcGIS online servers and my division's facilities layer, which my division creates and I will upload to the ArcGis online server. The Esri ArcGIS Online servers serve as our database. The software layer consists of Esri's JavaScript API, JavaScript, HTML and CSS. Esri's webservers will be utilized for the webserver in our software layer. The presentation layer is the end user facing layer that houses the prototype dashboard. The presentation layer allows end users to view and analyze data presented in the webmap on the dashboard. The presentation layer is the focus of this project.
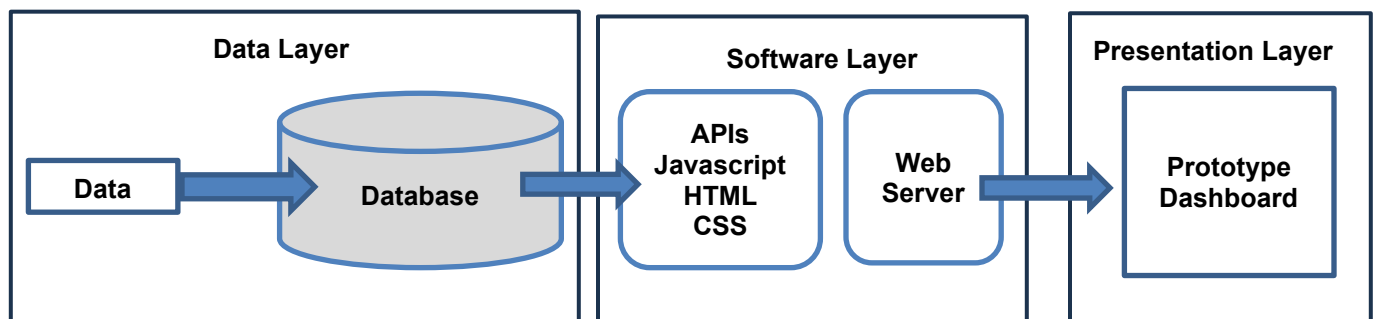

Figure 1. System architecture for my final project dashboard displaying the 3-tiered system architecture. The focus of this project is the presentation layer, which contains the prototype dashboard.

4.d. Dashboard Data

Dashboard data consists of basemap layers and thematic layers.

4.d.1. Basemap Layers

My basemap layer will be the Light gray Canvas Layer. This basemap helps make my thematic layers more easily visible while providing some geographic context to the layers. I will also use a state polygon layer with state name labels to symbolize the states in my region in a black outline. This is to help provide easily understood geographic context to the thematic layers (Esri, 2023a).

4.d.2. Thematic layers:

Current Wildfire Incidents

The source for this layer is the Integrated Reporting of Wildland-Fire Information Network (IRWIN) (Esri, 2014). It is updated every 15 minutes using the ESRI Aggregated Live Feeds methodology (2019). This point source layer provides information on wildfires in the United States. It will be used to determine if any wildfires are affecting or may have the potential to affect facilities. It also provides information regarding wildfire size, level of containment, number of residences destroyed and origin location. While this layer is point, the affected area has to be estimated via fire acreage and buffering.

Current Wildfire Perimeters

The source for this layer is the National Interagency Fire Center (NIFC) (Esri, 2014). It is updated every 15 minutes using the Esri Aggregated Live Feeds methodology (2019). This polygon layer shows the measured perimeter of a wildfire. Wildfires are not added to this layer until there is a measured perimeter for the wildfire. Therefore, this layer's information is slower to be updated than the current wildfire incidents layer.

Fire Incidents Buffer Layer

Since the wildfire incidents layer is a point data layer, I will use the GraphicsLayer function in the ArcGIS API to create a buffer to determine the range of wildfire impacts. This buffer will allow me to query for facilities within the affected or potentially affected area of a wildfire.

NWS Watches Warnings v1

Esri publishes the NWS Watches and Warnings Layer (2023b). This layer's data is collected from the National Weather Service through the RSS-CAP Warnings and Advisories: public alerts (2103). It is updated every 5 minutes using the Esri Aggregated Live Feeds methodology (2019). This layer provides data on all weather hazards in my division's area and will indicate whether a facility is in the warning area for any weather hazards, what type of weather hazard is a threat, and the severity of the weather hazard.

63rd RD Facilities Layer

This is a point layer with facility information that is created by our GIS analysts. It contains the use of our facilities and contact information for the managers of each facility. This layer will be compared against the NWS watches layer and wildfire data layers to identify affected facilities and give contact information for personnel in affected facilities.

5. DATA ANALYSIS METHODS

My project will mostly utilize the ArcGIS JavaScript query function. The query function searches a layer's attributes or location based on a specified SQL clause, and then it returns results that match the attributes specified in the clause. I will query the current wildfire incidents layer based on a set of predetermined criteria my division uses to track wildfires: under 50% contained, an area of over 70,000 acres, or a minimum of 1 residence destroyed. If a wildfire meets one of these criteria, it is tracked by my division.

Once these results are returned, the names of the wildfire results are compared to the names in the perimeters layer. This is done by using a JavaScript for loop (w3schools, 2024), which loops through each query result to compare the name of the wildfire in the incidents layer to the name of each wildfire in the current wildfires perimeter layer. If a match is found, then the point data in wildfire incidents layer is replaced with the center point for the current wildfire perimeters layer. This gives a more accurate center point for the wildfire, which is then used as the center point for my wildfire buffer layer. The wildfire incidents layer is based on the point of origin of the fire. As fires grow and spread, they tend to expand in a direction out from the point of origin. It is beyond the capabilities of this webmap to predict the direction of the fire spread. I utilize a buffer around the wildfire center point to represent the potentially affected area. The radius of the buffer will be based on wildfire acreage. It is calculated utilizing the following formula:

Buffer Radius = $\sqrt{}$(Fire Acres / 640) * 1.33

This formula is a heuristic my division has developed over the past 5 years while tracking wildfire activity in our region. While testing our wildfire webmap we determined this heuristic is a good fit for potentially affected wildfire areas.
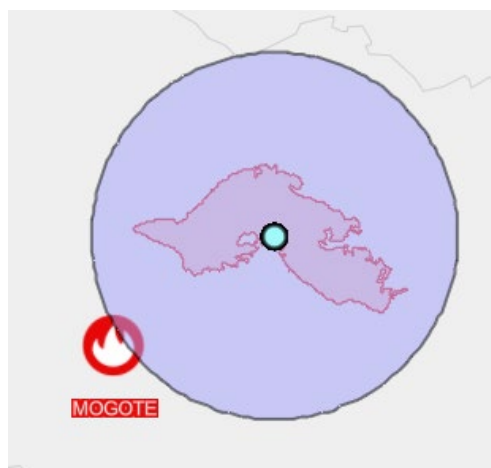

Image 2: This image displays the fit of a fire buffer from a recalculated fire center point versus the location of the fire point of origin. The fire buffer is the large blue circle. The fire perimeter is the red polygon. The recalculated fire center point is the teal point. The initial fire point of origin is the red fire symbol labeled mogote.

Once the wildfire buffer is created, I will utilize the spatial query method to determine which facilities intersect either the wildfire buffer or NWS watches and warnings layers. These results will be merged and then used to adjust the symbology in the facilities layer, showing a new symbology for at risk versus not at-risk facilities.

6. CONCLUSION

My main intent with this project is to develop and evaluate a prototype dashboard for my division to utilize to monitor hazards in our area. This map dashboard will allow my division to analyze hazards and plan and prioritize response efforts. As a secondary goal, I will show the value of webmaps and dashboards for our division's leadership. I am creating this dashboard because our GIS analysts do not have the time or licensing to create an Esri ArcGIS Online Dashboard. After seeing the value of this dashboard, the experience will lead to obtaining an Esri site license to create an ArcGIS Online Dashboard for this project. An ArcGIS Online Dashboard would be easier for our GIS Analysts to maintain once I leave my position with the division. It will provide longer-lasting benefit to the division. Additionally, there are three other divisions that manage other regions in the United States. Once this dashboard proves useful for our division, it could be used as a template to create dashboards for other divisions.

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APPENDIX 1: WIREFRAME

This is the wireframe for my prototype dashboard, which was used during end-user testing.

R_Johnston_finalWiref
rame.pptx

63D Readiness Division Weather Hazards COP

Facility:
- ● Impacted
- ● Not Impacted
- ○ Selected
- ▮ Tornado Warning
- ▮ Blizzard Warning
- ▮ Flash Flood Warning
- ▮ Hurricane Warning
- ▮ High Wind Warning
- 🔥 Wildfire
- ⬤ Wildfire Area of Affect

Impacted Facilities:

TX 123
AZ 456

Facility: AZ 456
Manager Email: john.smith.civ@army.mil
Manager Phone: 555-555-5555
Hazards: Wildfire, AZ Wildfire, Acres: 70,000, Residences Affected: 200

63D Readiness Division Weather Hazards COP

Facility:
- ● Impacted
- ● Not Impacted
- ○ Selected
- ▮ Tornado Warning
- ▮ Blizzard Warning
- ▮ Flash Flood Warning
- ▮ Hurricane Warning
- ▮ High Wind Warning
- 🔥 Wildfire
- ⬤ Wildfire Area of Affect

Impacted Facilities:

TX 123
AZ 456

Facility: AZ 222
Manager Email:
Manager Phone:
Hazards: None

63D Readiness Division Weather Hazards COP

Impacted Facilities:

TX 123
AZ 456

Facility:
- ● Impacted
- ● Not Impacted
- ○ Selected
- Tornado Warning
- Blizzard Warning
- Flash Flood Warning
- Hurricane Warning
- High Wind Warning
- 🔥 Wildfire
- Wildfire Area of Affect

Facility: TX 123
Manager Email: jane.smith.civ@army.mil
Manager Phone: 555-555-4444
Hazards: Hurricane Warning, High Wind Warning

63D Readiness Division Weather Hazards COP

Impacted Facilities:

TX 123
AZ 456

Facility:
- ● Impacted
- ● Not Impacted
- ○ Selected
- Tornado Warning
- Blizzard Warning
- Flash Flood Warning
- Hurricane Warning
- High Wind Warning
- 🔥 Wildfire
- Wildfire Area of Affect

Facility: TX 222
Manager Email:
Manager Phone:
Hazards: None

63D Readiness Division Weather Hazards COP

Facility:
- Impacted
- Not Impacted
- Selected

Tornado Warning
Blizzard Warning
Flash Flood Warning
Hurricane Warning
High Wind Warning
Wildfire
Wildfire Area of Affect

Impacted Facilities:

TX 123
AZ 456

Incident: Wildfire
Name: Barn Hill 24
Residences Affected: 2000
Area: 150,000 acres
Affected 63d Facilities:

63D Readiness Division Weather Hazards COP

Facility:
- Impacted
- Not Impacted
- Selected

Tornado Warning
Blizzard Warning
Flash Flood Warning
Hurricane Warning
High Wind Warning
Wildfire
Wildfire Area of Affect

Impacted Facilities:

TX 123
AZ 456

Incident: Flash Flood
Severity: Extreme
Affected 63d Facilities: None

63D Readiness Division Weather Hazards COP

Impacted Facilities:

TX 123
AZ 456

Facility:
● Impacted
● Not Impacted
○ Selected
Tornado Warning
Blizzard Warning
Flash Flood Warning
Hurricane Warning
High Wind Warning
Wildfire
Wildfire Area of Affect

Incident: Hurricane Warning
Severity: Moderate
Affected 63d Facilities: TX 123

63D Readiness Division Weather Hazards COP

Impacted Facilities:

TX 123
AZ 456

Facility:
● Impacted
● Not Impacted
○ Selected
Tornado Warning
Blizzard Warning
Flash Flood Warning
Hurricane Warning
High Wind Warning
Wildfire
Wildfire Area of Affect

Incident: High Wind
Severity: Severe
Affected 63d Facilities: TX 123

63D Readiness Division Weather Hazards COP

Impacted Facilities:

TX 123
AZ 456

Facility:
● Impacted
● Not Impacted
○ Selected
▰ Tornado Warning
▰ Blizzard Warning
▰ Flash Flood Warning
▰ Hurricane Warning
▰ High Wind Warning
🔥 Wildfire
🔴 Wildfire Area of Affect
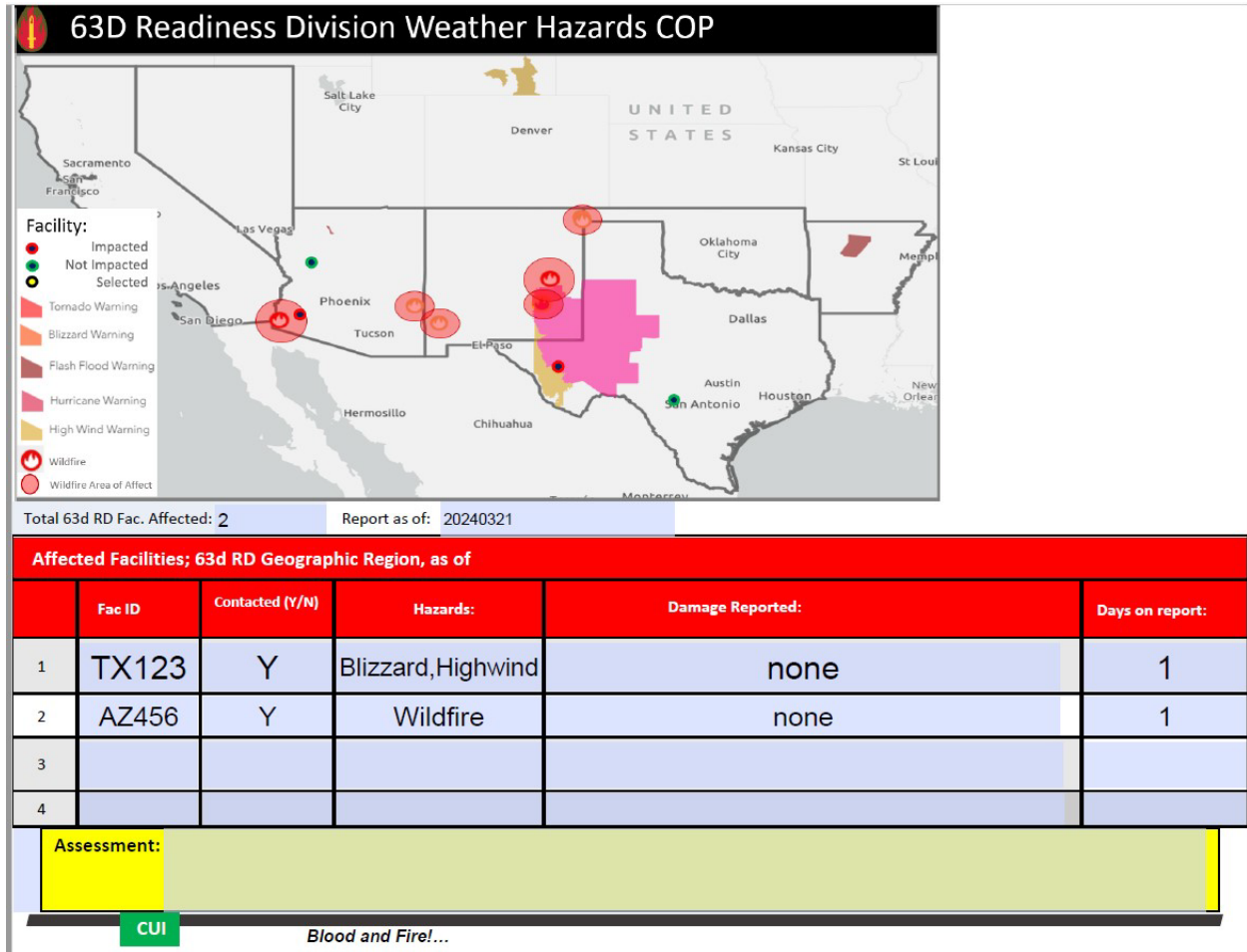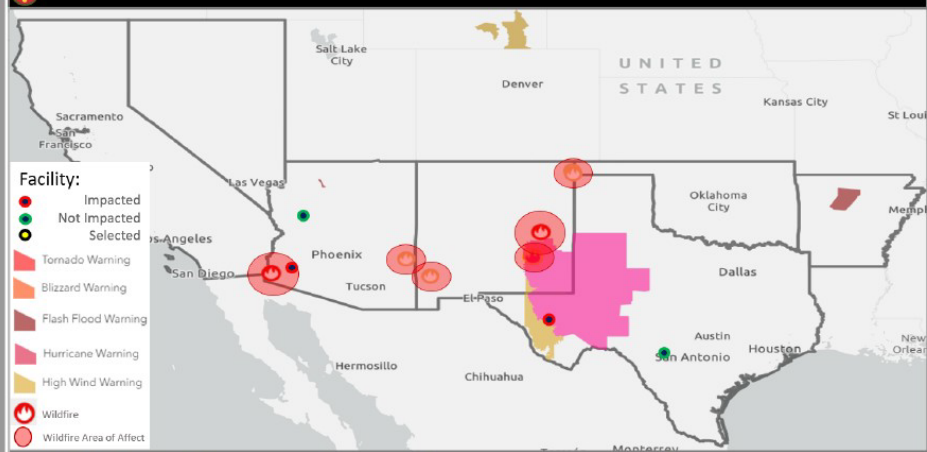
Incident: Wildfire
Name: AZ Wildfire
Residences Affected: 200
Area: 70,000 acres
Affected 63d Facilities: AZ 456

APPENDIX 2: PROTOTYPE HAZARD REPORTS

These are screenshots of the reports produced by the wireframe testers.

63D Readiness Division Weather Hazards COP

Facility:
- ● Impacted
- ● Not Impacted
- ● Selected
- Tornado Warning
- Blizzard Warning
- Flash Flood Warning
- Hurricane Warning
- High Wind Warning
- 🔥 Wildfire
- ● Wildfire Area of Affect

Total 63d RD Fac. Affected: Report as of:

Affected Facilities; 63d RD Geographic Region, as of

	Fac ID	Contacted (Y/N)	Hazards:	Damage Reported:	Days on report:
1	TX123	Y	high wind, hurricane	N/A	1
2	AZ456	Y	Fire	N/A	1
3					
4					

Assessment:

CUI   *Blood and Fire!...*

63D Readiness Division Weather Hazards COP

Facility:
- Impacted
- Not Impacted
- Selected

Tornado Warning
Blizzard Warning
Flash Flood Warning
Hurricane Warning
High Wind Warning
Wildfire
Wildfire Area of Affect

Total 63d RD Fac. Affected: Report as of:

	Fac ID	Contacted (Y/N)	Hazards:	Damage Reported:		Days on report:
				Affected Facilities; 63d RD Geographic Region, as of		
1	Tx123		tornado warn/winter storm warn	high wind /tornado warning		1
2	AZ456		wildfire, az wildfire	70000 acres and 200 residence affected		1
3						
4						
Assessment:						

CUI   *Blood and Fire!...*
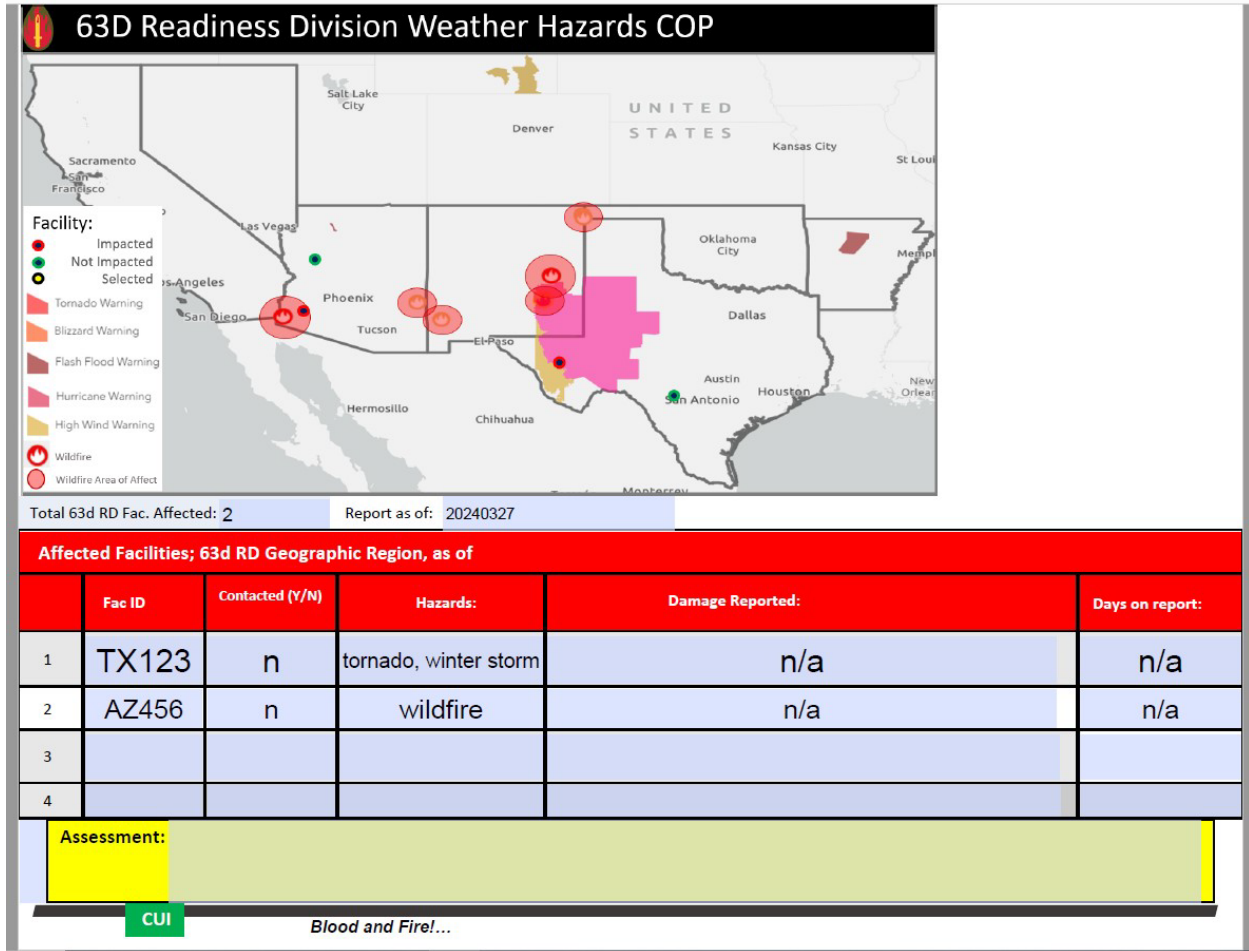
APPENDIX 3: USER TESTING INSTRUCTIONS

These are the instructions each tester was read before they participated in wireframe testing:

You are participating in an end user study to assess a proposed map dashboard for the 63d Readiness Division. This dashboard is meant to display 63D RD facilities which may be affected by weather and natural disaster hazards. This testing is meant to analyze the ease of use of the dashboard, e.g. how well you are able to navigate the dashboard and collect needed information without outside help or guidance. It is meant to analyze the provided information in the dashboard to determine if it provides sufficient and appropriate information. It is meant to determine if there is still a current need for this dashboard within the COIC.

The dashboard test you are using is a model built in PowerPoint, but it functions the same as the dashboard will function once it is created. The displayed information is limited to reduce the creation time of the model. Only a few facilities are displayed, and some information is repeated.

I will ask you to complete several tasks throughout this study. Please complete these to the best of your ability. Do not worry about wrong or repeated answers.

Please read the introduction on the screen to your right. Once you have finished, let me know and we will be being the testing.

APPENDIX 4: USER TESTING RESULTS

This is a scan of all 4 end-user testing questionnaires with notes.

results scan.pdf