PROPOSAL

Coordinated Resource Management: A VCC Incident Response Dashboard

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I: Executive Summary

As a team of HCDE undergrads, we set out to propose a well defined addition to the VCC to encourage stakeholder buy in. Through multiple interviews, the complications behind resource management stood out to us and became our proposal focus. By this term, we mean the requesting and mobilization of traffic control equipment or personnel. We found that a lack of awareness of resource need can cause incident response delays—sometimes even bottlenecking the response and preventing further action.
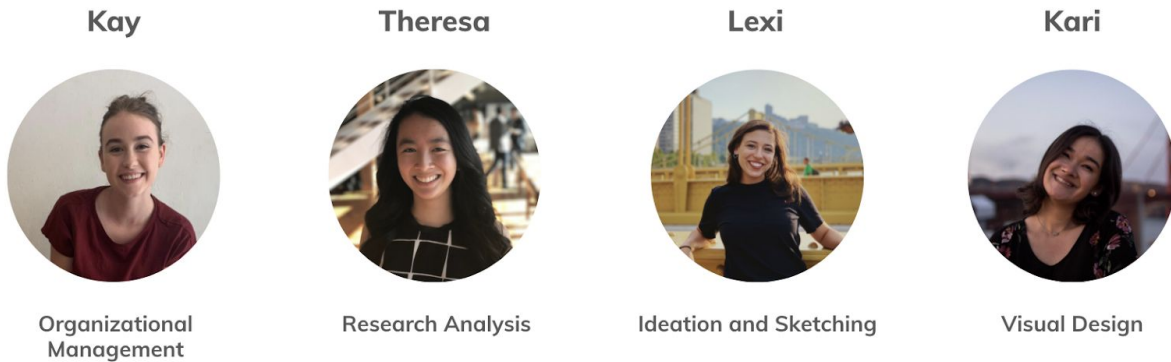
Recognizing that reducing lag meant a quicker incident response time, lessened commuter traffic time, and boosted morale for traffic agencies—our design goal was to create a shared awareness of resources that minimized lag. After rounds of ideation, we created resource management components that integrate into the VCC wireframes set to be released in September. The first component is a resource layer that builds off the existing Situation Map and can be toggled on the map to show deployed resources. The second component redesigns the existing Collaboration Spaces tab to scale to conversations about resources. The final component is the new Resources Tab. This tab has an action center to create and fulfill resource requests and a database that lists shared resources between agencies.

Resources can be fulfilled by all seven agencies in the action center, thus creating a faster resource fulfillment time. This system also does not override existing communication channels that responders value. Overall, this system reduces incident response time, fosters collective knowledge of shared resources, and increases resource situational awareness.

II: Context

As part of an undergraduate class in the Human Centered Design and Engineering (HCDE) program at the University of Washington, we were tasked with proposing a concrete addition to the VCC that would encourage stakeholder buy in and reduce the ambiguity of what the VCC could look like and do when implemented.

Our team consists of four members, each with different strengths.

Kay	Theresa	Lexi	Kari
Organizational Management	Research Analysis	Ideation and Sketching	Visual Design

With all of us acknowledging the complexity of the VCC and traffic/incident management, we knew that any proposal we created based on our own experiences and assumptions would be wildly inaccurate. Thus, we began our journey to a concrete VCC component with research.

III: Research and Background Knowledge

We had the opportunity to listen to several speakers across the agencies. In building this baseline understanding, we defined resources as traffic control equipment and personnel: variable message signs, cones, flaggers, etc. From this baseline, we developed five research themes to further explore during interviews: resources, jurisdiction, interagency collaboration, communication, and decision making.

We interviewed Captain O'Donnell (SPD, Head of the Traffic Section and member of the Steering Committee for VCC) and Tony Leingang (WSDOT, State Incident Management and Operations Administrator, TMC). Our interviews provided the following insight regarding current challenges and pain points:
- Although a responder may know which resources are at their disposal, it's uncertain whether these resources are currently available
- Jurisdiction conflicts can complicate relationships, resource sharing, and incident management

- Newer officers and employees lack knowledge about available resources that is usually obtained through experience
- Waiting on some resources can bottleneck the response, delaying activity until that resource arrives
- Lack of shared situational awareness between agencies can cause delays in receiving resources and conflict during incident response

IV: Opportunities for Design

From the current challenges, we found three business opportunities to design for. We can...
1. decrease incident response time and commuter wait time by reducing effects of bottlenecking and increasing situational awareness about interagency resources.
2. maintain a positive collaborative response environment by designing for clear communication and expecting jurisdiction complexities.
3. reduce the time and cost of employee transition by increasing collective knowledge.

V: Goal

We saw the biggest opportunity for value in decreasing incident response time and therefore commuter time. Thus, our goal was how we might build a shared awareness of resource availability and use in order to reduce lag during an incident.

VI: Product

After multiple rounds of ideation that considered many divergent ideas, we converged on a final system. Our product is a resource management VCC component to coordinate incident response. It is designed for use by dispatchers and higher level organization members of all agencies who make those resource decisions. The functionality is spread over 3 tabs:
1. Additions to the already existing situation map
2. Redesign of the already existing collaboration space
3. An additional "Resources" tab to facilitate resource sharing and mobilization

This system adapts to users current workflow, but *does not* override any communication channels they value, such as radio and phone calls.

VII: Main Wireframes

To supplement discussions of product specifics and new functionalities, we have included four main wireframes below. For more wireframes that include workflow details and interaction call outs, please visit our [annotated final wireframes](#). Because the Situation Map and Collaboration Spaces tab of our resource management components contain revised additions to the VCC, we have provided a before and after few of these edited components. The Resources tab, which is new, does not have a before image.

a. Situation Map

The situation map provides an overview of all incidents and relevant information on the landing page of the VCC. In our redesigned version of the situation map, a user can toggle a new map layer called 'resources'. By hovering over the cone icons that appear on the screen, a list of resources at the scene of each incident appears.

Redesigned Situation Map:

Overall Workflow Regarding Resources:
1. User can turn on the resources layer by clicking the resources checkbox under "Change Map Layers"
2. User can hover over each cone icon to see the resources currently in use at the scene and which agency they belong to

Previous Situation Map:
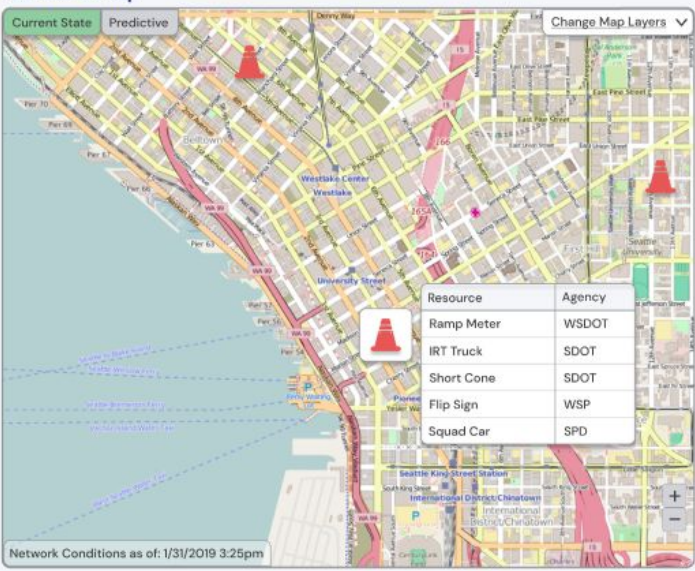
3:25PM - Situation Map - Incident Selected - Rollover Info

Virtual Coordination Center   ● Taylor Martell ∨

| Situation Map | CAD Logs | CM Plans | PopMo Communications | Collaboration Spaces | External Systems | ☰ |

Network Map

Current State | Predictive   Change Map Layers ∨

A213

Network Conditions as of: 1/31/2019 3:25 PM

Map Item Summary

A213 - Incident at I-5 SB, Exit 165B   Scene Not Verified

Crime Scene | HazMat | Fire | Fatality | Rollover | Comm. Vehicle | Other

Truck rollover blocking Union Exit

Source: 911 call (unverified)

Location: I 6 SB, Exit 165B   Lanes Open: 5/6 (3 mins ago)
Incident Type: Collision
Vehicles Involved: 2
passenger car, commercial truck   ✗ ↓ ↓ ↓ ↓ ↓
Elapsed Time: 00:05:46   Exit Exit SB SB SB SB HOV

Est. Time Needed	For	Provided By

Congestion Engine Predicted Time to Clear Incident: 2h

CAD Logs | CM Plans | PopMo Comms. | Join Collaboration Space

Incident Alerts   **Congestion Alerts**

A213 - Incident   A211 - Travel Time Delay

                         A212 - Abnormal Traffic Flow

                         A213 - Travel Time Delay

                         A214 - Travel Time Delay

b. Collaboration Spaces
The collaboration space facilitates conversations about mobilizing resources and any additional communication. We redesigned the collaboration space to build on the functionality of the current design, but more easily scale to include more people in a collaboration space. It shows chats chronologically to accurately represent the overall response, and highlights resource requests.

Redesigned Collaboration Spaces:

Overall Workflow Regarding Resources:
1. Users receive notifications of resource requests from the resources action center. These notifications will appear to everyone in the collaboration space.
2. Then, users can fulfill the request by clicking the "Fulfill" button.
3. Users must confirm their action by clicking "Confirm".
4. Once a request has been accepted, the notification grays out.

Previous Collaboration Spaces:

c. Resources tab

Our team designed an entirely new tab for the VCC, the resources tab. The resources tab has two subsections: the action center and the database.

Resources - Action Center

The action center is the area under the resources tab where a user can request resources. When a user adds a resource to 'Active Requests', a request for that item is sent out in the collaboration center. This process keeps all agencies in the loop about what is needed and what has already been mobilized.

3:25PM – Resources – Action Center
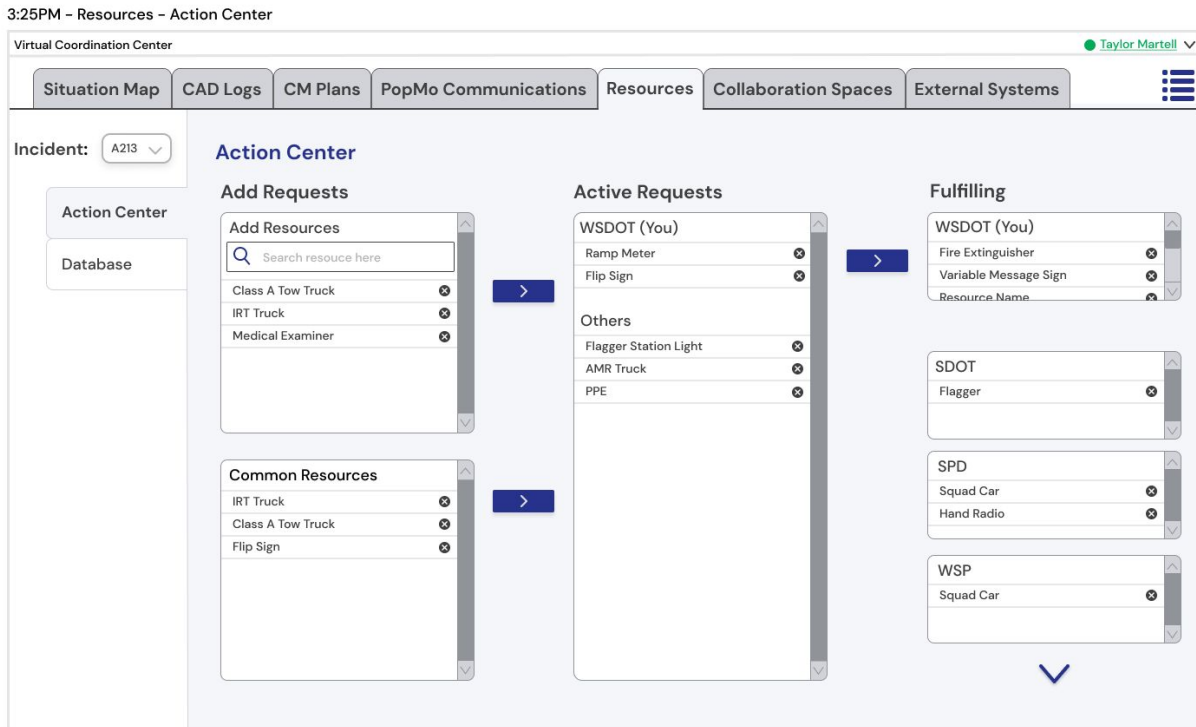
Overall Workflow:

1. Users can search for resources under 'add resources.
2. Users can move resources from 'Add Resources' and 'Common Resources' to 'Active Requests'. This action sends out a resource request notification in the collaboration center.
3. When this request has been fulfilled, the resource will be moved from 'Active Requests' to the fulfilling agency's list.

Resources - Database

The database is the area under the resources tab that catalogues all cross-agency resources. Its content is used to populate the Action Center and Collaboration Spaces during an incident. Outside of incident response, it serves as a reference point to increase awareness of the collective resources of the VCC.

3:25PM – Resources – Database

Resource	Agency	Count	In Use	Category
Ramp Meter	WSDOT	12	----	Signaling
IRT Truck	SDOT	05	A213	Vehicle
Squad Car	SPD	173	----	Vehicle
Hand Radio	SPD	125	----	Electronic
Flip Sign	SDOT	12	----	Signage
Class A Tow Truck	Lincoln Towing	5	----	Vehicle
Short Cone	WSDOT	----	A213	Bulk Tool
Flagger Station Light	WSP	15	----	Signaling

Overall workflow
1. Users can search for a specific resource, filter the database according to their chosen criteria, and scroll through the database to see the resources that match their query.
2. Users can update their agency's resources by clicking "Add / update entries." This button prompts them to upload the CSV file of their agency's resource list in order to update the database with their most current list.

VIII: Use Case

Following is a scenario for how users might interact with this interface to manage resources during incident response:

> A semi truck just collided with a car, blocking an exit lane on I-5. SPD needs a variable message sign ASAP to direct traffic to a different exit lane, and they don't know who can send them signs.

SPD calls the 911 dispatch center to request it. The dispatcher goes to the resources tab and searches for a variable message sign in the 'add requests' column. They add the resource to active requests, which sends out a notification in the collaboration space.

In the collaboration space, any agency can claim this request and mobilize the resource, in this case the message sign. For this example, let's say that a representative from WSDOT claims the request, and mobilizes the resource to the scene.

Once an agency has claimed the request, the resources tab will reflect this change. Rather than having variable message signs in the 'active requests' list, it will be moved under the heading 'Fulfilling' under WSDOT's list.

This process represents a shift that removes the burden on the responder to determine who to ask for a certain resource. Additionally, communication channels are broadened to all collaborative agencies to create a quicker resource fulfillment time whereas before they were isolated to one agency.

IX: Value

Each aspect of this solution will add value to the VCC as following:
1. Situation map: builds a shared situational awareness of which resources are deployed.
2. Redesigned collaboration space: key in maintaining agency communication, sharing updates regarding delays, and alerting dispatchers to allow for more rapid resource deployment.
3. Resources tab: decreases incident response time by enabling the collaborative dispatch of resources and building shared knowledge through the resource database.

X: Product Implementation

The proposed design could be implemented in early September as part of the situational awareness wave of the VCC. Our proposed features have been designed to integrate smoothly into the existing framework of the VCC and to operate with minimal friction.

At each step of this design process, we have intentionally considered the issue of technical feasibility. We acknowledge that some initial setup will be required in order to implement the resource database. In response, we determined a workflow by

which agencies could easily input information into the database-- they can simply upload a CSV file listing their current resources to the VCC. We have also focused on microinteractions, such as requiring two clicks to activate the collaboration space's "Fulfill" button (one to switch its text to "Confirm" and another to finalize the fulfillment), to ensure that every action is made intentionally and to minimize actions done in error.

XI: Future Steps

Our vision is that these proposed features will lead to a future where resources from all agencies of the VCC are integrated and eventually where partnerships with private agencies can be effectively leveraged as a part of this system.

In the future, continued development on these designs could involve the creation of a system to track accurate counts of available resources. Additionally, the politics around sharing resources is a potentially complex issue that is important to consider. We ultimately decided that this topic was not within the scope of our current design, but our research indicated that agreements like JOPS may effectively facilitate these sharing relationships. This topic could be further explored in close collaboration with agencies as the resource-related features of the VCC grow and develop.

XII: Conclusion

We have approached the design of this proposed resource management component of the VCC using a robust human-centered design methodology and thus believe our design has strong potential to reduce incident lag and foster agency partnerships.