

REPORT DOCUMENTATION PAGE

*Form Approved
OMB No. 0704-0188*

The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Executive Service Directorate (0704-0188). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ORGANIZATION.

1. REPORT DATE (DD-MM-YYYY)		2. REPORT TYPE		3. DATES COVERED (From - To)	
4. TITLE AND SUBTITLE			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S)			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER (Include area code)

UNCLASSIFIED



AIR FORCE CYBERWORX REPORT [19-005] #GAMEOFPHONES

DR. DANIEL PADGETT, AF CyberWorx
Lead UX Designer

CYNTHIA J. S. BROTHERS, Lt Col, USAF, AF CyberWorx
Project Officer

**DESIGN PROJECT CONDUCTED
23 SEP – 24 SEP 2019**

Produced with input from Joint Base Elmendorf-Richardson personnel.

Air Force CyberWorx™
2354 Fairchild Dr, Ste 4A41
USAF Academy, CO 80840
AFCyberWorx@usafa.edu | @AFCyberWorx | (719) 333-4278

The wording of the distribution statements specified by this Instruction may not be modified to accommodate additional distribution, such as distribution to foreign governments. Such release is outside the scope of secondary DoD distribution.

DISTRIBUTION STATEMENT A. Approved for public release: distribution unlimited.

UNCLASSIFIED

Executive Summary

04 OCT 2019

#GameOfPhones, AF CyberWorx, Air Force Academy, Colorado Springs, CO

Seven personnel from Joint Base Elmendorf-Richardson attended a two day design event at AF CyberWorx 23-24 September 2019 to explore potential solutions to a comms-out recall and accountability situation. Leadership directed the focus team to develop solutions with AF CyberWorx assistance that would lead to efficient, effective comms-out procedures that could be used in both natural and man-made crises using a wide range of technical and social resources. The team developed a series of potential solutions based on the AF CyberWorx human-centered design method complete with benefits, potential barriers, and potential steps to implementation for each.

Participants

- Lt Col Harding, 773 LRS
- MSgt Daigle, 673 ABW
- Maj Boyarski, 673 CS
- TSgt Way, 673 CS
- Lt Hines, 673 CES
- A1C Garcia, 673 CS
- Lt Jackson, 773 LRS

Background

Two earthquakes in quick succession – 7.0 and 5.7 – struck Anchorage, Alaska 30 November 2018 affecting Joint Base Elmendorf-Richardson (JBER). The last major earthquake in the area was in 1964. Most traditional communication methods were knocked out, leaving a single working cell tower and many damaged roadways. Personnel jammed base roads and area highways trying to escape and get to family members, causing hours-long traffic jams. Base leadership was unable to account for their personnel and verify operational capability for several hours after the earthquakes, highlighting the urgency for a better comms-out recall system.

Event Problem Statement

How might we account for and guide personnel and families when primary modes of communication are unavailable?

UNCLASSIFIED

The crisis situation affecting JBER during the 2018 earthquakes showed a failure in comms-out procedures. Leadership directed a focus team to explore potential short-term and long-term solutions concerning accountability and operational continuity. Identified situations included natural emergencies, man-made crises, and deliberate comm-down situations. An efficient, effective solution set for comm-down procedures needs to be implemented and exercised.

Identified Needs and Key Questions

- Rapid accountability both on and off JBER
- Two-way communication for accountability and operations
- Capability to determine and report status of infrastructure and communication

To help with determining if a potential solution met the needs associated with the problem, the team developed twelve key questions to answer. The quality and number of answers to those twelve questions determined whether the solution could be a success or a failure.

1. How are people guided according to this solution?
2. How are people accounted for? (Are we here? Are we safe? Who's missing?)
3. How can we transmit two-way information between personnel? What can we transmit?
4. Can we account for and guide family? If so, how?
5. What primary modes of communication are out? (Internet, cell, landline, LMR, SIPR?)
6. Why are comms down/degraded?
7. What devices does the user need to use?
8. What training or education is required?
9. How fast, efficient, and reliable is the information transmission?
10. Can we rely on outside organizations to assist? Which ones?
11. How much would it cost?
12. How long to implement?

Potential Solutions

1. A return to traditional strip-map/Google Map contingency plans with physical accountability.
2. Community networking utilizing metropolitan intercom/alert systems and coordination with local emergency agencies (which is currently in use in other locations).

UNCLASSIFIED

3. Drone usage for communications support (both secure and unsecure) and visual status of personnel and base infrastructure.
4. Use of staging areas with ACE kits and traditional roster and strip-map information with physical accountability and runners for communication.
5. Community “strategic partners” composed of locations with the greatest concentration of member dependents to lessen the time for dependent accountability.
6. Use of satellite phones for communication in emergency/contingent situations, especially for commanders and potentially for “strategic partners” and runners.
7. Use mobile communication methods (vans, etc.) to issue persistent bandwidth-restricted mass notification systems to personnel and families on base and in the local area until the situation changes or notification is acknowledged with a personal identification code.

The team identified the main difficulties of the solutions as:

1. Monetary, in the case of solutions 3, 6, and 7.
2. Efficiency. Solutions 1 and 4 could take up to 24 hours for full accountability.
3. Cultural resistance. Low-tech, traditional methods go against the current tech-reliant mindset.
4. Community networking/coordination is feasible but requires effort and may take time to build.

Recommended Next Steps

1. Practice/enforce fail-safe low-tech/traditional solutions
2. Reinforce community outreach and networking
3. Build ACE (Agile Combat Employment) kits and refine for JBER use
4. Call to action through AF CyberWorx to industry tech partners for potential future solutions
5. AF CyberWorx can act as a connection agency between JBER and other bases/partners with similar concerns for networking and a broader knowledge base for additional future solutions. Real Example: AF CyberWorx is currently participating in an Air Force Academy cadet capstone project dealing with self-healing drone swarms which JBER leadership may be interested in participating as a stakeholder.

UNCLASSIFIED

Conclusion

The focus team from JBER refined the problem to include guidance and accountability of both personnel and family members during comms-out or comms-degraded situations. The potential solutions they discovered focused on human needs and were each analyzed for feasibility and viability with a series of key questions they developed through exercises which solidified the problem and helped the team more fully understand the situations real people would encounter in a crisis situation. By the end of the two days, the team had created seven potential paths forward, ranging from a return to basics and policy-driven procedures to utilizing new drone and mobile communication technology to quickly replace downed/degraded communication methods.

Introduction

CyberWorx

AF CyberWorx is a dynamic group that works with military stakeholders, industry specialists, and academia to improve and protect our nation, businesses, and lives. We look for prototypes, solutions, and knowledge that are valuable for both military and industry use. Team members address real problems in a goal-focused area using human-centered design to find the best solutions using current and future technology. The needs of the user are at the heart of each design through the entire project from problem discovery through design and prototyping to developing a path to implementation. AF CyberWorx uses innovative problem solving and design to create cultural change for optimum operational advantage.

Human-Centered Design

Human-centered design is an innovation-based problem solving method embraced by industry leaders such as Apple and Google yet often overlooked in the government sector. No matter the mission or problem, success is dependent on the individual end user. The AF CyberWorx multi-disciplinary approach focuses on the experience and needs of the end user to optimize both the problem set and the end solutions. To best achieve that focus, groups use tools and practices that break down the natural barriers found in organizations which impede the



CyberWorx considers the human element first then organizational viability and technical feasibility.

creativity, collaboration, and knowledge sharing vital to innovation. Military stakeholders, industry and academic experts, as well as Air Force Academy cadets come together in facilitated design thinking sessions to seek the right problems to address. This diversity leads to a wide range of perspectives working towards unique, intuitive solutions in a non-threatening environment. As a result, stakeholders get the opportunity to hear developed solutions to their difficult problems by Airmen and experts from industry and academia.

UNCLASSIFIED

AF CyberWorx considers human-centered design in more than just problem discovery and solution development. Each event and project is developed according to the needs of the stakeholders and project. Teams use methods of different lengths based on time sensitivity, participant availability, and AF CyberWorx capacity. A multi-day design sprint maximizes problem solving agility. In this method, field experts work with industry specialists to refine and define the problem, analyze case studies to troubleshoot, and develop solutions. Before they are done, team members outline the technical and policy developments needed to bring those solutions to realization. When applicable, a low-fidelity prototype is also developed to show proof of concept and for prototype testing. These design sessions provide warfighters and industry partners the ability to develop more than one solution for each problem while learning new problem-solving techniques which are effective because they refine the requirements by seeking out the right problem to solve to find meaningful, forward-looking solutions that will improve the efficiency and effectiveness of the people on the front lines whether they're in the business of war or economy.

The AF CyberWorx process taps a wide range of resources including strategic partners, available methods, and array of tools to create a unique process tailored specifically for each client. The team members for each session are chosen from a diverse group of industry and military stakeholders and specialists to define the problem in terms of “who needs what because of why?” The tools AF CyberWorx uses in each session are drawn from industry best practices for maximum effect in a short period of time. Each situation and challenge is unique and so gets a tailored set of tools to meet the needs of the client. The toolkit provides methods to quickly and easily reach that bottom line of what the end user needs to be effective.

By the end of the design session, the team identifies and refines the right problem. They develop a set of innovative, meaningful solutions. Each solution has a path to implementation. In the allotted time, more than clever ideas are formed. Positive, timely results appear as ideas become prototypes which are tested and evaluated until the stakeholders agree on a viable solution to implement. Ultimately, the AF CyberWorx process solves a specific human need that improves the warfighter mission.



#GameOfPhones

Leadership from Joint Base Elmendorf-Richardson (JBER) identified a failure in comms-out procedures as a result of the crisis situation during the 2018 earthquakes. A focus group of seven personnel attended a two day design sprint 23-24 September 2019 at AF CyberWorx to refine the problem, identify human needs, and explore potential solutions for an efficient, effective set of procedures. By the end of the event, the team developed a set of viable solutions with a wide range of technology and community involvement levels. AF CyberWorx can continue providing networking support for additional solutions from other locations and tech partners.

Background

Two earthquakes in quick succession – 7.0 and 5.7 – struck Anchorage, Alaska 30 November 2018 affecting JBER. The last major earthquake in the area was in 1964. Most traditional communication methods were knocked out, leaving a single working cell tower and many damaged roadways. Personnel jammed base roads and area highways trying to escape and get to family members which caused hours-long traffic jams. Base leadership was unable to account for their personnel and verify operational capability for several hours after the earthquakes, highlighting the urgency for a better comms-out recall system.



AF CyberWorx and JBER leadership conducted a discovery call 13 September to identify key points needing attention and develop an initial problem statement: **How do we better complete accountability during comms-out or comms-degraded events?** Additional points of interest included accountability of dependents, initial scoping, and concerns about continuity of operations. Leadership expressed a desire to consider both natural emergencies and deliberate comms-out situations such as during a cyber or terrorist attack.

UNCLASSIFIED

Participants

The seven personnel involved in the event represented a range of experience, responsibilities, and viewpoints. Participant rank included A1C up to Lt Col from Communications Squadron, wing staff, CE, and logistics to present a wide sampling of current squadron thinking on emergency accountability and continuity. No industry partners were invited to this particular event. The team expressed the desire for connection to industry and possibly academia for additional options.



Team members brought a wide range of insight and experience to the session, giving diverse perspectives leading to unique solutions. The AF CyberWorx approach helped the solution-oriented process by running team members through different scenarios to achieve the best possible solutions. The diversity of the team gave value by breaking down traditional military and organizational barriers, allowing all viewpoints to be shared and heard. With potential networking with industry partners and locations with similar concerns in the future, additional or improved solutions may be developed.

UNCLASSIFIED

Problem Statement

How might we account for and guide personnel and families when primary modes of communication are unavailable?

The focus team analyzed the initial identified statement of “How do we better complete accountability during comms-out or comms-degraded events?” from a human-centered perspective. From that analysis, they developed a list of questions to test potential solutions for scope and applicability. Initially, the list contained seven fairly broad questions:

1. What does it mean to lead people?
2. What does accountability mean? Are we here? Are we safe?
3. Can we transmit information between personnel?
4. How do we account for family?
5. What primary modes of communication are out? Internet, cell, landline, LMR?
6. Why are comms down/degraded?
7. What devices does the user need to use?

These questions gave the team a better understanding of the problem Arctic Spark wanted solved and gave a way to determine what counted as success or failure in a solution idea.

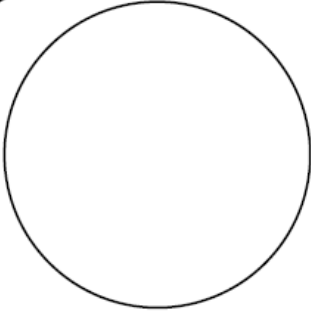
After identifying personas and their needs, the problem statement was refined into the final state, allowing the sprint questions to also refine into twelve focused questions which better analyzed each solution for applicability and feasibility. The final questions were:

1. How are people guided according to this solution?
2. How are people accounted for? Are we here? Are we safe? Who’s missing?
3. How can we transmit two-way information between personnel? What can we transmit?
4. Can we account for and guide family? If so, how?
5. What primary modes of communication are out? Internet, cell, landline, LMR, SIPR?
6. Why are comms down/degraded?
7. What devices does the user need to use?
8. What training or education is required?
9. How fast, efficient, and reliable is the information transmission?
10. Can we rely on outside organizations to assist? Which ones?
11. How much would it cost?
12. How long to implement?

Personas and Needs

The focus team broke down into two smaller groups. Each identified and built a persona to represent the personnel with direct responsibility in a situation involving the problem statement. Able Andrew represented a squadron commander needing to keep track of reported accountability and act appropriately to maintain operations. Eager Erin represented a newer officer in charge of collecting and sending accountability up the chain. Each represented different levels of reliance on technology, but both accurately showed JBER's current lack of a refined and exercised comm-out procedure.

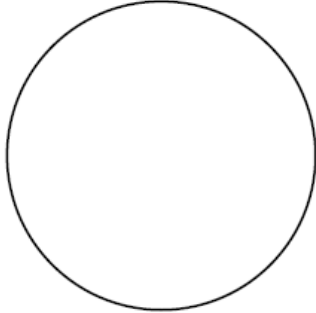
Each team developed a set of needs statements in the form of "[person] needs a way to [action] because currently [situation/difficulty]" based on the personas to better understand what the people involved in the situations need and why.

 <ul style="list-style-type: none">● Civil Engineer Squadron Commander● Rank: Lt. Colonel● Age: 40● Family: 3 children <p>"We have to be able to account for our people even if infrastructure is damaged."</p>	<h3>PERSONA: Able Andrew</h3> <p>The Civil Engineering Squadron Commander of a joint-base. His top priority is the safety and readiness of his squadron. He understands the comm out procedures well b/c of training and believes them to be helpful up to a point but wishes there were better communication solutions available in the case of an emergency.</p> <p>Is somewhat familiar with technology and the capabilities used in other industries which makes him frustrated that his base isn't utilizing hi-tech solutions in case of emergencies, believing that other industries are using these solutions. As a consumer he keeps his tech pretty simple and uses an I-Phone that is a few years old.</p> <p>If the base's cell tower were to be destroyed in a disaster the size of his "Uh-Oh Moment" would be _____huge_____.</p>
--	--

UNCLASSIFIED

The needs statements recognized for Able Andrew included:

1. Able Andrew needs a way to rapidly contact 100% of unit personnel because currently someone has to visit all residences; needs to be faster than driving to visit everyone.
2. Able Andrew needs a way to disseminate and establish deliberate comm out because currently there is no understanding of when to stop using NIPR/cell/landline/LMR.
3. Able Andrew needs a way to receive and disseminate orders/tasks/guidance because currently he has an unknown mission requirement.
4. Able Andrew needs a way to contact members across “the bridge” because currently there is only one bridge [that may go out in an emergency].
5. Able Andrew needs a way to re-establish two way comms because currently there is no PACE/COOP plan to re-establish comms.
6. Able Andrew needs a way to ensure mission critical operations are still operational and personnel are ok because currently they cannot communicate with everyone.
7. Able Andrew needs a way to determine capability of unit infrastructure and personnel because currently he is unable to determine the current state.
8. Able Andrew needs a way to establish/record accountability for family members because currently we rely solely on a network run program.
9. Able Andrew needs a way to verify infrastructure integrity because currently he knows nothing and cannot ensure building safety.

	<h3>PERSONA: Eager Erin</h3>
<p>Background</p>	<p>She is a high-achiever ready for promotion in her career field of Utilities Systems. She wishes she was closer to her boyfriend who lives across the country, but makes time every day to talk on Google Hangout.</p>
<ul style="list-style-type: none">● Job: Utilities Systems● Rank: 1st LT● Age: 23● Family: Serious relationship-long distance.	<p>Erin has not seen any combat or been part of any catastrophe such as a natural disaster. Erin's familiarity with the current comm out procedure is _____zero!_____. She knows it's important to be ready for anything but sometimes finds herself losing focus on the job at hand.</p>
<p>"I wish I was given more responsibility."</p>	<p>If Erin were to lose access to her cell phone in the face of an emergency or disaster, her "Uh-Oh Moment" would be pretty massive. She will need to be reached out to with what to do next.</p>

The identified needs statements for Eager Erin were:

1. Eager Erin needs a way to be accounted for because currently comm is out.
2. Eager Erin needs a way to communicate with shift lead (to identify course of action and severity of earthquake damage) because currently comm is out and she has no experience.
3. Eager Erin needs a way to safely get home because currently roads are closed.
4. Eager Erin needs a way to identify they are in a comm out scenario because currently they don't know.

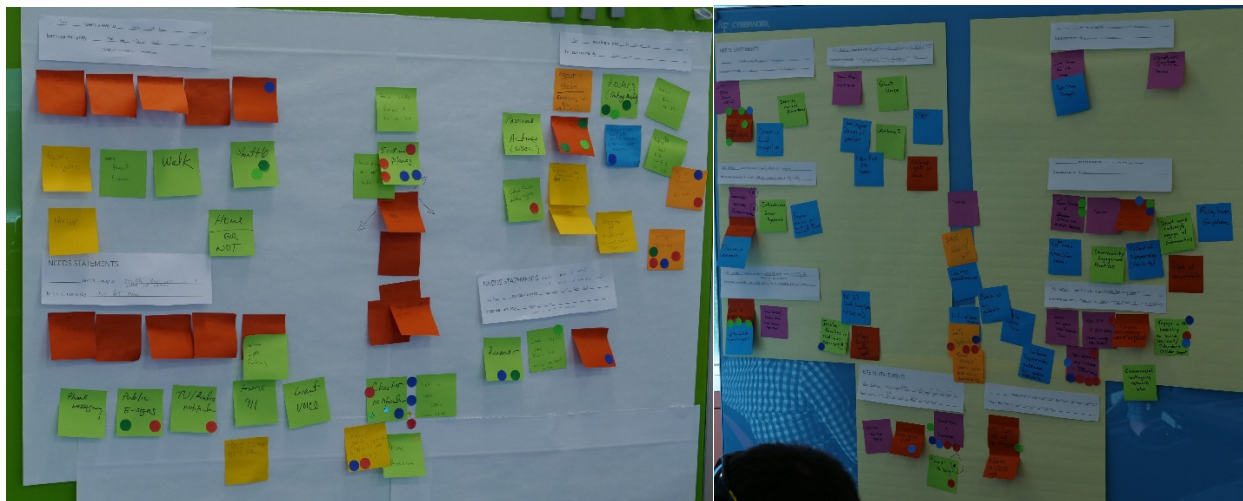
The identified needs statements, based on the personas, showed a need for rapid accountability despite possible downed communication and transportation, two-way communication for accountability and operations, and capability to determine the status of infrastructure and communication in both a natural and deliberate comm-down situation – the same

UNCLASSIFIED

concerns identified by leadership in the discovery call. With the personas and needs statements, the team more fully understood the needs of the problem.

Analyzing the Needs

The teams brainstormed potential solutions to the needs statements, welcoming all ideas no matter how commonplace or outlandish. This developed a pool of ideas to analyze for what might mitigate the problem and fulfill the needs identified for the personas. From there, the teams recombined to vote on the ideas.



Each team member received ten votes: three “passion” votes for what they individually felt passionate about, three “ease” votes for what would be the easiest to implement, three “impact” votes for which idea would have the greatest impact, and one “innovation” vote for which idea was the most innovative. Each member could place their votes however they chose on the ideas, including placing all on the same sticky note containing their chosen idea. The goal behind it was to gain consensus and find which ideas most resonated with the group while identifying ease, impact, and innovation.

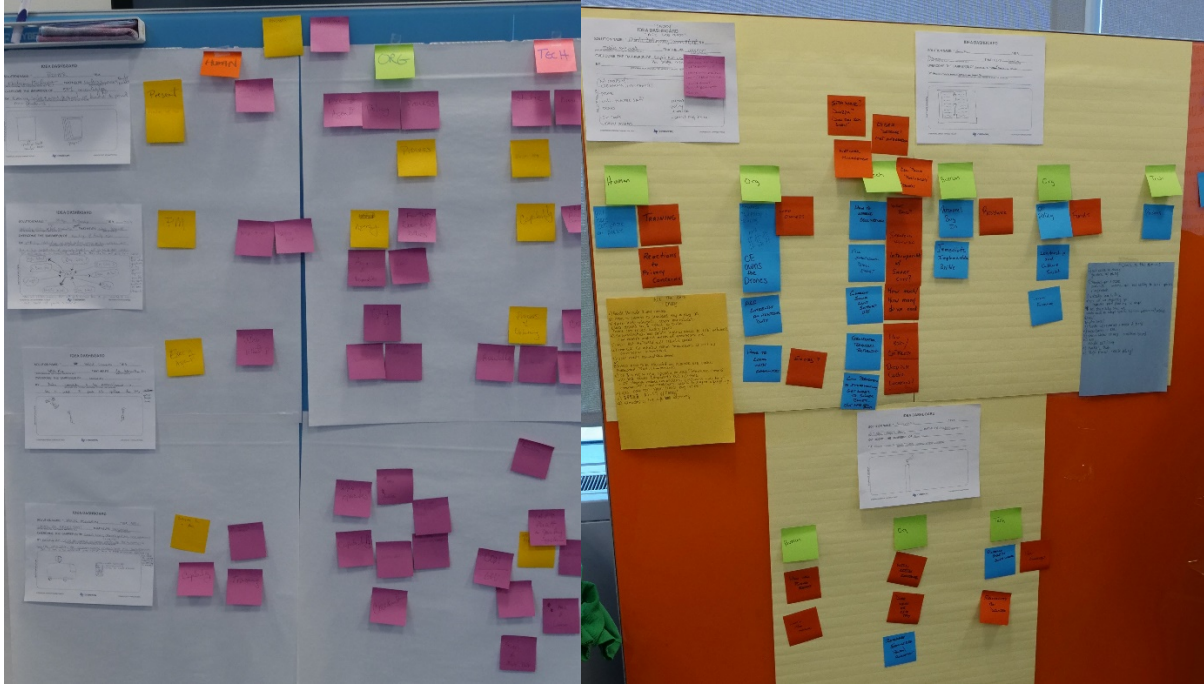
The teams combined the highest voted solutions with similar ideas into sets then fleshed them out onto an idea dashboard associated with specific needs. The highest voted ideas were:

- Cluster notifications with “cell on wheels” capability
- Duty Rosters with low-tech, traditional methods of accountability
- Satellite phones
- Community networking with city-wide mass notifications and strategic partnerships

UNCLASSIFIED

- Use of Drones for various functions from comm networking to visual status verification

Other ideas which the team agreed deserved consideration were including families in exercises (high impact and innovative) and staging areas with ACE kits across the single access bridge (easy to implement).

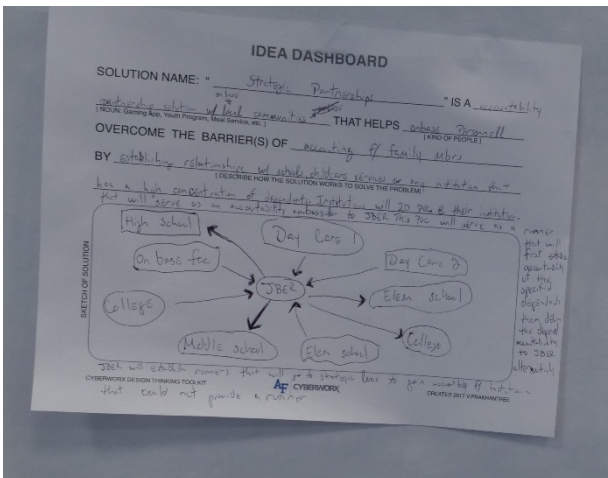


Idea dashboards take potential solutions found through brainstorming and give visualization in connection to a human need. The teams made seven idea dashboards from the needs statements and solution brainstorming. Team members used the H.O.T. model for each solution, identifying the known and unknown elements of human desirability, organization viability, and technical feasibility. The result was identification of focused known and unknown elements needing further research and exploration for each solution. Each dashboard was also analyzed in light of the twelve sprint questions to determine how well each solution addressed the problems specific to the topic.

- “Roster” is an electronic/hardcopy form that helps leaders overcome the barriers of 100% accountability by knowing where personnel are located to provide proper guidance.
 - Human desirability: People are familiar with the technology and procedures, but will personnel be willing to provide the form for readiness?
 - Organizational viability: There are no issues among the identified executive agent, policies, or processes as they exist today.

UNCLASSIFIED

- Technical feasibility: Static capability exists today, but the team does not know what mobile technology exists for rosters..
- Sprint question answers (refer to page 5 for questions):
 - People are guided with who people are and how to get to them.
 - Accountability is done through personal contact.
 - There is no two-way communication.
 - At this time, there is no way to account for family with this method.
 - This is feasible even if all modes of communication are out.
 - Question 6 is non-applicable to this solution.
 - Each user needs to know the policy and have training.
 - This method is slow but reliable as information is upchanneled.
 - Outside agencies cannot be relied upon.
 - This method has no appreciable cost.
 - This method would take a short period of time/it can be done now.
- “Strategic Partnerships” is an accountability partnership with the local community that helps on base personnel overcome the barriers of accounting for family members by establishing



relationship with schools, children’s services, or any institution that has a high concentration of dependents. Civilian institutions will identify POCs that will serve as an accountability ambassador to JBER. This POC will serve as a runner that will first establish accountability of the specified dependents then deliver this accountability to JBER accountability. JBER will establish

runners that will go to strategic locations to gain accountability for institutions that could not provide a runner.

- Human desirability: Will personnel be willing to trust the partnerships enough to wait for word of their dependents?
- Organizational viability: The agencies exist, but what will be the areas of responsibility, what legal issues will there be, and what further coordination needs to be done?

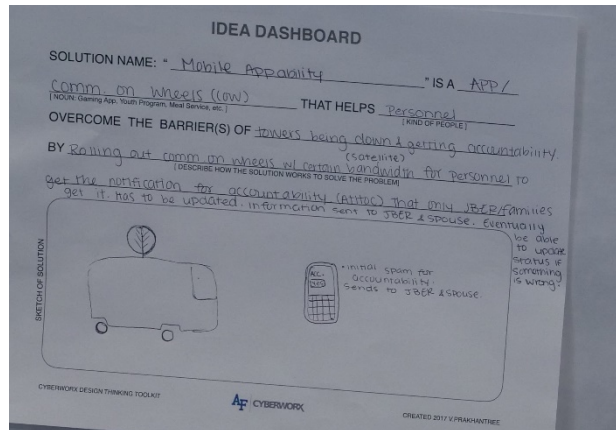
UNCLASSIFIED

- Technical feasibility: The capability already exists, but will the road conditions allow strategic partner runners in the event of an emergency?
- “Satisfied Communication” is a satellite phone that helps Able Andrew and Eager Erin overcome the barriers of communication by providing communication to key personnel and runners to stay in contact and push information up and down the chain.
 - Human desirability: The necessary executive agents are already in place, but who would get what technology to enable the solution?
 - Organizational viability: How many phones are needed and is that number sustainable?
 - Technical feasibility: The process of obtaining the phones is already known, but are the phones available? What’s the cost of using them? Is that cost sustainable? Are they user friendly?
 - Sprint question answers (refer to page 5 for questions:
 - People are guided according to policy and verbal communication.
 - Accountability is obtained through verbal acknowledgement and runners.
 - There is two-way communication between everyone that has a satellite phone.
 - Family can potentially be accounted for if a runner or strategic partner with a satellite phone is used.
 - This method is feasible with all modes of comms-out.
 - Question 6 is non-applicable here.
 - Each user needs a sat phone.
 - Each user needs minimal training on use of the phone.
 - The use of satellite phones will be very fast and efficient, but the reliability is to be determined with more information.
 - Unsure if outside agencies can be relied upon with this method. Perhaps strategic partners mentioned in the previous solution?
 - Cost is prohibitive. A couple thousand dollars per phone depending on quality. There’s also the question of cost of usage/bandwidth.
 - This method could take months to implement completely.
- “Mobile Appability” is an app/comm on wheels that helps personnel overcome the barriers of towers being down and getting accountability by rolling out comm on wheels with certain

UNCLASSIFIED

satellite bandwidth for personnel to get the notifications for accountability (ad hoc) that only JBER members and their families get. Information has to be updated. Eventually members and their families will be able to update their status if something is wrong.

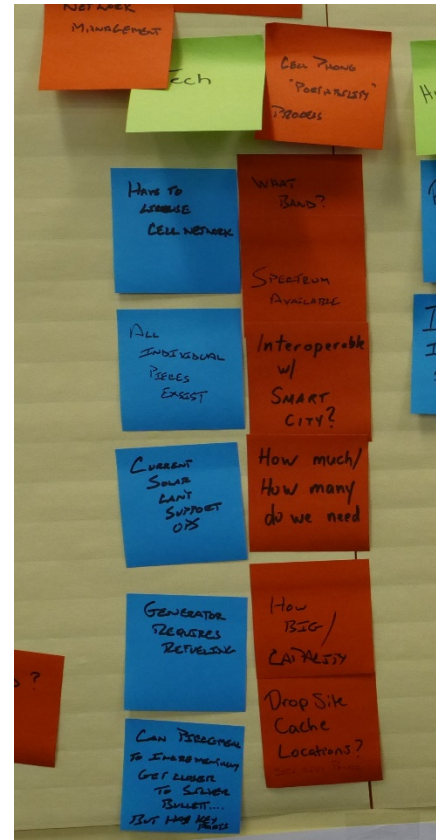
- Human desirability: Most people already have a phone, but are spouses currently in ad hoc? What is the capability and training needed for this method?
- Organizational viability: Is there money available to design and implement this? Who would operate the vans? How many and what size vans would be needed? Who would authorize the release of the vans? What capabilities are needed? Are they sustainable? What coordination is needed for this solution?
- Technical feasibility: Though mobile vans are already available in some agencies, little is known about them by the focus group. What is the reliability of this methods? Does it need an information push to the operating system? Is it sustainable? How user friendly would the interface be? What is the area of coverage for each van? How big are the vans and their equipment?
- “ACE the Base/Caddy” is a mobile network that helps everyone overcome the barriers of rapid two-way contact, disseminating information and guidance, verifying infrastructure, contact across the bridge, family accountability and status by having an ACE kit consisting of an LTE antenna, power source, wifi, drones, sim cards, and an internet connection during comms-out situations.
 - Human desirability: People will already have a cell phone on them, but will they need any training to connect to the caddy? Will there be reactions about privacy concerns?
 - Organizational viability: This method requires new policies and training. The kits will require a quantity of money. CE would potentially own the drones, but who would own the process and kits? ACE ownership is currently an additional duty. This method would require some coordination with the local communities.
 - Technical feasibility: There were many concerns and questions regarding licensing of the cell network, interoperability with “smart city” or “smart base” functionality, cyber and



UNCLASSIFIED

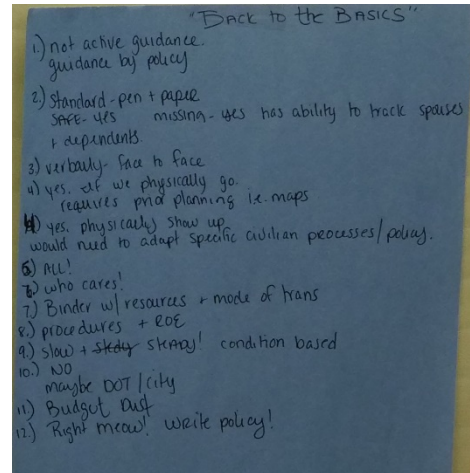
information security and management, and needs for the kit for long-term viability (refueling generators, etc.).

- Sprint question answers (refer to page 5 for questions):
 - People would be guided through 2-way communication.
 - PMC in regards to standard day-to-day operations.
 - Information can be transmitted via voice, text, and internet. It will be slower but reliable depending on the capability and quality of the equipment used.
 - Family accountability will be circumstantial. This method does allow access to an LTE network to publish various means of emergency messages.
 - This method will work with all modes of communication down since the caddies will rebuild capability.
 - This method could be used for both intentional comm-down and emergency situations.
 - Users need a compatible phone.
 - Users need to be educated on limitations such as network use, passwords, etc.
 - If money is not an issue, speed is no issue. Comms will be slower but reliable otherwise. If staging mobile umbrellas, timeliness will be a concern depending on exact conditions, access to staged equipment, etc.
 - Outside organizations can be relied on such as the FAA, FCC, DOT, state/local agencies, etc.
 - Cost is very prohibitive.
 - This method could be implemented within 12 months or less without licensing. Potential for longer implementation time.
- “Back to Basics” is an emergency plan that helps Able Andrew overcome the barriers of accounting for personnel by having information about a roster of personnel to refer to.
 - Human desirability: There may be resistance to a low-tech method, but personnel should buy-in to this method and its immediate implementation possibility.



UNCLASSIFIED

- Organizational viability: This method requires only a written policy which defines frequency (of updates and exercises) as well as a shift in leadership and culture. Are the funds available to put it in practice?
- Technical feasibility: Only printers are required.
- Sprint question answers:
 - People are guided by policy, not through active guidance.
 - People are accounted for through standard pen and paper.
 - Two-way communication in this method is only available through face-to-face verbal means.
 - Family members can also be accounted for but requires runners and previous planning via maps or other forms of information.
 - This works when all communications are out.
 - Question 6 is non-applicable to this method.
 - Users require a binder with resources and a mode of transportation.
 - Users require training in procedures and ROE.
 - Information is slow but steady; reliability is based on conditions.
 - This method cannot rely on outside organizations.
 - This method costs very little to nothing.
 - Implementation can begin as soon as the policy is written. Just do it.



UNCLASSIFIED

- “Loud Mouth” is a city wide mass communication system that helps Able Andrew overcome the barriers of rapidly providing guidance by creating a larger footprint for the Giant Voice system.
 - Human desirability: How will the general public react? What message will be voiced?
 - Organizational viability: This would require formalized policy and agreements. Will the local community cooperate? Does the USAF or city agree?
 - Technical feasibility: This technology already exists in other locations, but how would the systems connect, and what is the reliability post-disaster?

Solutions and Benefits

As the sprint reached the end of its allotted time, the group revisited the artifacts they had developed – the refined problem statement, sprint questions, needs statements, and potential solutions with analyses. They further refined the solution sets into developed, plausible scenarios with possible challenges and necessary steps to move forward. The end solution sets were very similar to the idea dashboard contents.

1. Back to the basics of using traditional strip-map/Google Map contingency planning with physical accountability.
 - This solution is not time-efficient. Accountability could take up to 24 hours to complete depending on conditions.
 - The cultural mind-shift away from tech-reliance to a low-tech solution may be difficult.
2. Community networking using city intercom/alert systems and coordination with local emergency agencies (which is currently already in use in other locations).
 - Community networking and coordination is feasible but requires effort and may take time to build.
3. Drone usage for communications support (both secure and unsecure) and visual status of personnel and base structure.
 - This solution is cost-prohibitive.



UNCLASSIFIED

4. Staging areas across the single-access bridge with ACE kits and traditional strip-map contingency planning using physical accountability and runners for communication.
 - Like solution #1, this solution is not time-efficient as accountability could take up to 24 hours to complete. Assistance from the ACE kit contents would mitigate this time. Conditions could still impact efficiency and effectiveness.
5. Community “strategic partners” composed of locations with the greatest concentration of member dependents to lessen the time for dependent accountability.
 - The same challenge presents itself here as solution #2. Networking and coordination is feasible but requires the time and effort to do properly.
6. Use of satellite phones for communication in emergency/contingent situations, especially for commanders and potentially for “strategic partners” and runners.
 - This solution is cost-prohibitive.
7. Mobile communication methods (such as vans, drones, etc.) to issue persistent bandwidth-restricted mass notifications to personnel and families on base and in the local area until the situation changes or notification is acknowledged with a personal identification code for accountability.
 - This solution is also cost-prohibitive though can be coordinated with existing agencies.

Recommended Next Steps

Through using a series of exercises intended to guide the focus team to a wide range of solutions to the right problem, the group identified potential solutions to JBER’s lack of set comms-out or comms-degraded procedures. The solutions vary from simple, back-to-the-basics “just do it” suggestions to procedures that will require a great deal of research, time, money, and training to implement. The suggested next steps are intended to show real results in as short a time-frame as possible to allow for the larger time-frame needed for some of the more technologically advanced solutions. Immediate steps that can be implemented with great impact for little or no money include:

1. Practice and enforce fail-safe low-tech/traditional methods such as strip-maps for physical accountability.
2. Build and reinforce community outreach and networking. This can also lead to some of the more time-intensive solutions suggested above.

UNCLASSIFIED

3. Build and refine ACE kits for JBER emergency use.
4. AF CyberWorx can put out a call to action to industry partners for potential technological solutions via a number of methods (CSO, virtual tech demo, etc.)
5. AF CyberWorx can act as a connection agency between JBER and other bases/partners with similar concerns for networking and a broader knowledge base for additional solutions.

Glossary

A1C	Airman First Class
ABW	Air Base Wing
ACE	Agile Combat Employment
AF	Air Force
CE	Civil Engineering
CES	Civil Engineering Squadron
COOP	Continuity of Operations Procedure
CS	Communications Squadron
CSO	Commercial Service Openings
DOT	Department of Transportation
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
HOT	Human/Organization/Technical need triad
JBER	Joint Base Elmendorf-Richardson
LMR	Land Mobile Radio
LRS	Logistics Readiness Squadron
Lt	Lieutenant
Lt Col	Lieutenant Colonel
NIPR	Non-Secure Internet Protocol Router Network
PACE	Primary, Alternate, Contingency, and Emergency
PMC	Partial Mission Capable
ROE	Rules of Engagement
SIPR	Secret Internet Protocol Router Network
USAF	United States Air Force