

New Orleans Flood Resilience Experiment

After Action Report



**Homeland
Security**

Science and Technology



NISC National Information
Sharing Consortium

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Executive Summary

On January 23, 2017, the U.S. Department of Homeland Security (DHS), Science and Technology Directorate (S&T), First Responders Group (FRG) sponsored the New Orleans Flood Resilience Experiment, in coordination with the city of New Orleans Office of Homeland Security and Emergency Preparedness (NOHSEP) and Greater New Orleans, Inc. (GNO, Inc.). The experiment was the first of its kind under the S&T Flood Apex program, which is aimed at applying new and emerging technologies to improve community resilience from flood disasters.¹

The experiment included participation from 37 stakeholders representing 14 state, local, non-profit and private sector organizations. During the day-long experiment, participants focused on the following key objectives:

- Strengthen risk hazard assessment process by populating a Threat and Hazard Identification and Risk Assessment (THIRA) and/or Hazard Mitigation Plan and identifying associated capabilities and resources for responding to a flash flood hazard;
- Evaluate the effectiveness of the Mutual Aid Resource Planner (MARP) tool to develop mutual aid resource plans with NOHSEP and its resource partners;
- Enable NOHSEP to further assess its Whole Community partnerships with other parishes and regional resource partners through standard information sharing practices that are replicable by other localities;
- Test and evaluate the process for operationalizing non-traditional or non-governmental information sources using the “citizens as a sensor” concept (e.g., Open for Service app, 311 and social media); and
- Explore NOHSEP's use of a digital volunteer support team (DVST) to aid with emergency response and preparedness.

Several notable achievements and highlights from the experiment include:

- Overall, participants were very interested in the MARP tool and NOHSEP committed to using the MARP for future planning efforts.
- NOHSEP established a DVST for the experiment, which proved capable at monitoring incoming social media content and submitting relevant reports to the Emergency Operations Center (EOC).
- The development of the Open for Service app expanded the essential services reporting process from previous efforts in Baton Rouge, and participants found this process and the resulting information extremely valuable.
- The information sharing and discovery process (via the Virtual USA widget) was intuitive to participants.

¹ DHS S&T Flood Apex program information is available at: <https://www.dhs.gov/science-and-technology/flood-apex>.

- The operations dashboards and experiment viewers (user-defined operating pictures) provided access to necessary information without information overload.

Based on the outcomes of the experiment, this report provides these recommended next steps:

- Fully implement the MARP in NOHSEP's environment to complement the development of new hazard mitigation plans and recovery plans;
- Continue developing and exercising the DVST team's role supporting the NOHSEP Situation Unit; and
- Engage with Louisiana Business Emergency Operations Center (BEOC), the National Incident Management Systems and Advanced Technologies (NIMSAT), and Essential Services representatives for training and coordination around the Essential Services process.

Acknowledgments

The partnership between the U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T) First Responders Group (FRG) and New Orleans Office of Homeland Security and Emergency Preparedness (NOHSEP) was critical to the success of the New Orleans flood resilience experiment. NOHSEP staff was committed to testing new concepts and technology, embracing the “art of the possible” and working through the stumbling blocks that sometimes occur with new technology.

Several other partners contributed to this experiment, including:

- Greater New Orleans, Inc. (GNO, Inc.): GNO, Inc. provided additional support with planning and logistics leading up to and during the experiment, including assistance with private sector outreach.
- National Information Sharing Consortium (NISC): The NISC provided access to their NISC member portal, enabling users to access information products shared by NOHSEP and other participants.
- Social Media Working Group for Emergency Services and Disaster Management (SWMGESDM): The SWMGESDM provided subject matter expertise on standing up a digital volunteer support team (DVST) and best practices for exercising/experimenting with social media.

Introduction

Purpose of this Document

The purpose of this After Action Report (AAR) is to document the core objectives, procedures and results of the New Orleans Flood Resilience Experiment (hereafter referred to as the experiment). In addition, this AAR provides recommendations and next steps based on observations during the experiment and direct input from participants throughout the planning stages.

Experiment Overview

The idea of an experiment focused on improving resilience to a flood event evolved from discussions among staff from the U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T) First Responders Group (FRG), New Orleans Office of Homeland Security and Emergency Preparedness (NOHSEP) and Greater New Orleans, Inc. (GNO, Inc.), which occurred during the RES/CON Global Resilience Summit in March 2016. DHS conceived this experiment as part of S&T's Flood Apex program, which applies new and emerging technologies to improve community resilience from flood disasters. The experiment would be the first test of DHS S&T-sponsored tools and technologies centered around two focus areas: mutual aid and social media.

Floods are a routine occurrence in New Orleans, which exists below sea level and is dependent on a network of levees and pumping stations to mitigate the constant threat of inundation. Normal rain events can cause short-term, localized street flooding; whereas larger flood events may take days or weeks for recovery. NOHSEP and partner agencies are well versed in managing flood events and have a good foundation that allowed them to address these events before they become serious. For example, agencies have prepared public messages that are sent to local news stations to help ensure that misinformation is not spread and to inform the public about the conditions of support mechanisms, such as water pumps in the city. While the city manages floods regularly and effectively, there is broad interest in evaluating new ways of planning for and approaching response efforts with new technology and processes.

The experiment was designed with input from stakeholders from NOHSEP and GNO, Inc. centered on a simulated large-scale flood hazard using a tabletop exercise format. The intent was not to test current operations and procedures, but rather to explore new tools and processes that could be used to better plan for and respond to large flood events. For this reason, the event was defined as an "experiment" rather than as an "exercise."

To address the core objective of building community resilience in relation to flood events, the experiment focused on two primary areas: evaluating new approaches to resource planning using the Mutual Aid Resource Planner (MARP) and using non-traditional sources of information for emergency response. Stakeholders from federal, state and local governments,

along with non-profit and private sector organizations, were involved in the planning and execution of the experiment to provide a Whole Community perspective.²

The overarching goal of the experiment was to work with local stakeholders to test processes and technologies developed with their input. Through this collaboration, the experiment developed best practices and lessons learned for future hazards mitigation, help with reducing flood fatalities and property losses and enhanced community-wide resiliency.

Experiment Objectives

- Strengthen risk hazard assessment process by populating a Hazard Mitigation Plan and identifying associated capabilities, resource requirements, and assisting resource partners;
- Evaluate the effectiveness of the MARP to develop mutual aid resource plans with NOHSEP and its resource partners;
- Enable NOHSEP to further assess its Whole Community partnerships with other parishes and regional resource partners through standard information sharing practices that are replicable by other localities;
- Test and evaluate the process for operationalizing non-traditional information sources using the “citizens as a sensor” concept (e.g., Open for Service App, 311 and social media) to expand the library of content to complement situational awareness; and
- Explore NOHSEP's use of a digital volunteer support team (DVST) to aid with emergency response and preparedness.

² FEMA Whole Community Approach information is available at: <https://www.fema.gov/media-library/assets/documents/23781>.

Experiment Design and Methodology

Participants

The experiment directly involved 37 participants from 14 federal, state, local and non-profit agencies and private sector companies, including:

- City of New Orleans Mayor's Office;
- NOHSEP;
- City of New Orleans Office of Information Technology and Innovation;
- Evacuteer;
- Sewerage and Water Board of New Orleans;
- GNO, Inc.;
- Louisiana National Guard;
- Louisiana Business Emergency Operations Center (BEOC) and National Incident Management Systems and Advanced Technologies (NIMSAT);
- DHS S&T FRG;
- National Oceanic and Atmospheric Administration/National Weather Service;
- Walmart;
- Pagoda Café; and
- Driscoll

Many additional stakeholders participated in planning meetings and discussions leading up to the experiment. During the experiment, the Open for Service app surveyed 15 businesses for their store or chain of store status (i.e., whether the business was open or closed).

Planning Meetings and Training Webinars

The FRG support team facilitated three planning sessions (Table 1) to gather requirements from participants and discuss experiment design. This included an initial planning conference held at GNO, Inc., offices in October 2016, and mid-term and final planning conferences, held over teleconferences with presentations viewable via screen-sharing.

Table 1. Schedule of Training Webinars and Planning Meetings Leading up to the experiment

Date	Type	Topic
October 25, 2016	Planning Meeting	Initial Planning Conference
November 18, 2016	Training Webinar	Establishing Situational Awareness Using Essential Elements of Information and Review of the National Information Sharing Consortium (NISC) Member Portal
December 2, 2016	Training Webinar	Using the Mutual Aid Resource Planner
December 18, 2016	Planning Meeting	Mid-term Planning Conference
January 6, 2017	Training Webinar	Digital Volunteer Training for Social Media
January 13, 2017	Planning Meeting	Final Planning Conference / Dry Run
January 23, 2017	Tabletop Exercise	Experiment

In addition to the planning meetings, FRG held three training webinars between November 18, 2016, and January 6, 2017. The training sessions each provided a general review of the experiment, followed by training focused on the subject matter for that day. After each webinar, FRG emailed participants a copy of the presentation materials and a link for an online quiz to test their comprehension of the material. FRG recorded these webinars so participants who were not able to attend could access the presentation at their own convenience.

Experiment Conduct

Participants were provided with a playbook ahead of the experiment, containing the day’s schedule, a review of experiment objectives and design, and a master scenario events list (MSEL) identifying the specific play for each participating agency.

The experiment was conducted over the course of one day, from 8 a.m. to 4 p.m. Central Time (Table 2), and was divided into three main components: Mutual Aid Resource Planning, Early Response, and Response. Each of these sections, described in detail below, followed the same general format: the controller read the framing inject and demonstrated the technologies and processes for that section; participants engaged in experiment play; and, finally, a facilitator conducted a mini-hot wash discussion during which participants provided feedback.

Table 2. Experiment Schedule for Monday, January 23, 2017

Time	Section Focus
8:00 a.m.	Introductions and Pre-experiment Review
8:30 a.m.	1. Mutual Aid Resource Planning
10:00 a.m.	Framing Scenario Inject
10:30 a.m.	2. Early Response: Situational Awareness
12:00 p.m.	Lunch Break
1:00 p.m.	3. Response: Social Media, Digital Volunteers, Resource Requests and Essential Service Status
4:00 p.m.	Hot Wash

Mutual Aid Resource Planning

The experiment kicked off with a mutual aid resource planning tabletop discussion focused on defining the resource needs for a flash flood hazard. FRG established the baseline prior to the experiment, using planning documents provided by NOHSEP and other sources. These documents included a severe weather operations plan and the New Orleans Urban Area Security Initiative Threat and Hazard Identification and Risk Assessment (THIRA) (2012). The experiment used the Federal Emergency Management Agency's (FEMA) National Preparedness Framework (2016) to complement local operations plans.

The planning section of the experiment explored several unifying concepts including:

- [Resilient New Orleans;](#)
- Hazard Mitigation Plans;
- Emergency Operations Plan;
- THIRA Resource Planning;
- [Presidential Preparedness Directive 8; and](#)
- Whole Community Approach to Planning.

Planners, resource partners and observers engaged in a table-top discussion about the THIRA/Hazard Mitigation plan and reviewed the capability requirements for a flood scenario and the necessary resources required. Finally, there was an assessment of the assisting jurisdictions (resource partners) involved in the mutual aid resource plan, and participants used the MARP to adjust the plan by adding resource providers.

Early Response: Establishing Situational Awareness

The following framing scenario preceded the early response:

The National Weather Service (NWS) forecasts a severe weather system to pass through the Gulf Coast region on the morning of August 23, 2017 (simulated date). The strong, fast-moving system comes just two weeks after a slow-moving tropical system brought significant rainfall, raising the level of water tables. NWS issues a Flash Flood Watch due to the high likelihood of localized flash flooding in low lying areas on the morning of August 22 (simulated event date) which is then elevated to a Flash Flood Warning in the evening.

The initial weather event of the flood experiment initiated a series of activities, including:

- City raises activation level (first to Level 3, then to Level 2).
- City initiates alert/warning system to notify citizens and officials.
- City and partners begin to develop situational awareness based on predefined essential elements of information.

Simulated injects from the NWS and other sources helped shape the events for the experiment.

The goal of this session was to evaluate normal emergency operations after an event. Participants developed situational awareness of the event using interactive maps and

dashboards that provided insight into the current situation. They used this information to identify when the status of Essential Elements of Information (EIs) reached critical thresholds.

Response Phase

During the response phase, the pace of social media injects increased, which required NOHSEP to activate the DVST to support information gathering requirements. NOHSEP instructed the DVST to identify information falling into the following categories: rumor control and disinformation, transportation, life and safety, weather conditions and utility issues. The DVST submitted social media posts falling into one of these categories to the EOC using a standardized form (GeoForm) to input information shared over social media, and assisted the EOC in validating and de-conflicting information as necessary.

The Open for Service app used by the city during the experiment helped track the open or closed status of important local businesses that may be necessary in disaster response. For example, businesses that sold bottled water, food and cleaning supplies. The experiment used a two-channeled approach where it combined crowd-sourced data with authoritative information from business contacts, as well as digital volunteers. To achieve this, the experiment polled local business points of contact via email and/or phone (using existing Everbridge technology), and asked citizens to provide input through a public Open for Service website. The experiment made this website available to the public through regular city communication channels. The result was that the approach informed the public and officials of business status based on the best available information.

Participants sent injects involving local resource needs to the EOC, prompting the use of WebEOC to track issues. Afterwards, the group conducted a tabletop discussion on the mutual aid process. This discussion involved assessing resource needs, processing requests for assistance and managing deployments.

Enabling Technologies

Testing new technologies and processes was integral for the experiment. A complete list of technologies used during the experiment is included in [Appendix 1](#). Workflow diagrams that describe the processes tested are included in [Appendix 2](#). To help facilitate play during the experiment, participants were provided with access to the NISC's Battle Rhythm Manager tool and a simulated social media stream. These are described in the sections below.

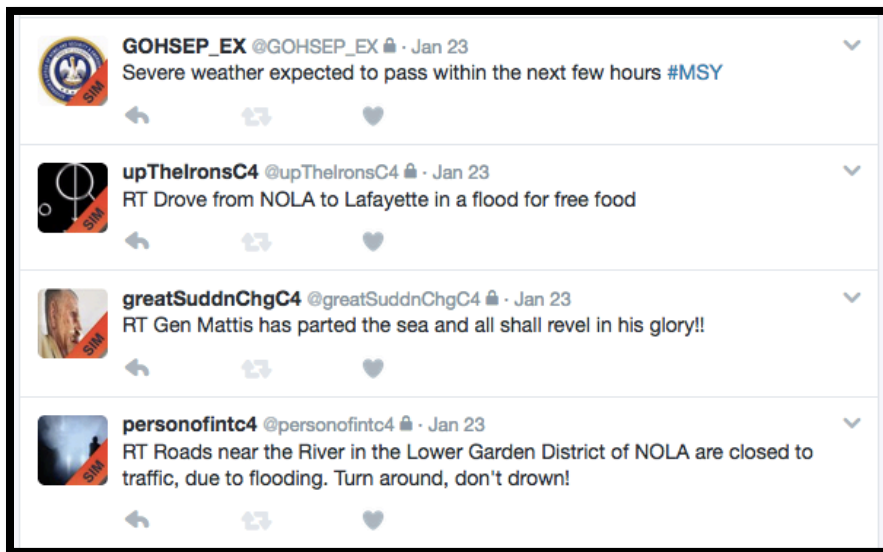
[Battle Rhythm Manager Tool](#)

The experiment provided pre-scripted injects from the MSEL to the participants using the NISC Battle Rhythm Manager tool, which drove the scenario for all participating organizations (see [Appendix 2](#)). The Battle Rhythm Manager, a tool developed by the NISC, helps coordinate exercise injects in a virtual environment, provide a checklist of steps for participants to follow for each inject and offer the ability for participants to provide "in-stride" feedback during the experiment.

Simulated Social Media Feed

Increasingly, social media is recognized by emergency responders, governments and non-governmental organizations as providing a valuable, though sometimes difficult to manage, source of information during disasters. During the experiment, a DVST from Evacuteer was activated by the NOHSEP Situation Unit to provide support during the simulated flood event. These volunteers were instructed to monitor a simulated Twitter feed, meant to imitate the experience that digital volunteers typically see during a real-life disaster event. The simulated social media stream allowed the DVST an opportunity to interpret a constant flow of incoming information in real time, as illustrated in **Figure 1**. below.

Figure 1. Screenshot of Simulated Social Media Stream



The DHS S&T FRG support team created the social media feed using a Twitter inject engine, facilitated by scripting languages and the Twitter application program interface. Prior to the experiment, the team captured a series of tweets from a previous flood event (Baton Rouge, LA, in August 2016).³ The tweets were adjusted for locality and relevant content, and sequenced to fit within the timeline of the experiment. Nine private Twitter accounts were used to simulate input from private citizens, television stations and official government agencies. The use of private accounts ensured that only designated users (experiment digital volunteers) could receive and view the tweets, which insulated them from the public and prevented information leaks.

The Twitter feed was split into two segments:

- **Pre-Flood Event:** A baseline of social media “noise” was established, culminating in NWS alerts about an impending storm and a flood watch.

³ More information on the August 2016 Baton Rouge, LA, flood is available at: <http://www.weather.gov/lix/August2016flood>.

- Flood Event: NWS issues more warnings, along with re-tweets and observations from citizens and other parties, building to actionable reports regarding the effects of the flood.

Participants submitted tweets containing actionable content through the NOHSEP Digital Volunteer GeoForm, which facilitated reporting this information directly to the NOHSEP Situation Unit inside the EOC. For the purposes of the experiment, actionable content meant issues related to life and safety that were unable to be transmitted to 911, reports of damage or significant flooding observations, transportation-related issues, potential rumors or misinformation related to the event and other information requirements as identified by NOHSEP.

Experiment Evaluation

The planning team used four evaluation methods to assess the capabilities of participants and stakeholders to accomplish the experiment and provide meaningful results.

1. Post-Webinar Quizzes: Quizzes to capture comprehension of material and provide webinar attendees an opportunity to provide feedback to experiment planners.
2. Social Media Integration Maturity Model: The Social Media Integration Maturity Model measured NOHSEP's use of social media in disasters or emergencies against people and processes, governance, and technology concerns. FRG support staff evaluated NOHSEP before and after the experiment and Model results were also based on observations made by FRG support staff during discussions with the city of New Orleans Deputy Chief Information Officer, NOHSEP Planners, Evacueer staff, as well as a review of the NOLA Ready program.⁴
3. Observations During the Experiment: During the experiment, the FRG support team gathered observations, which included notes taken during the hot wash sections. The Battle Rhythm Manager "in-stride" feedback provided additional observations.
4. Post-Experiment Survey: Following the experiment, the team distributed a survey to participants to assess technology usability issues, understanding of the processes explored during the experiment and provide other comments and observations to the experiment design team.

⁴ From Concept to Reality: Operationalizing Social Media for Preparedness, Response and Recovery: <http://bit.ly/2m4kHgo>.

Results and Discussion


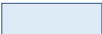
Social Media Integration Maturity Model Results

By most measures of the Social Media Integration Maturity Model, NOHSEP moved from Phase I to Phase II or III based on people and processes, governance and technology. The results are summarized in **Table 3** and discussed in detail below.

Table 3. Social Media Maturity Model - NOHSEP

Dimension	Integration Points	Phase One	Phase Two	Phase Three
1. People and Process	A. Adoption	General	General (Department Specific)	Required
	B. Training	Minimal	Externally Provided/ Optional	Internally Provided/Required
	C. Staffing	External Support	Part Time	Full-Time
	D. Memorandum of Understanding (MOU) Partners	Surge Support	Surge Support	Surge Support
	E. ESF Placement	Public Information Officer (PIO)	PIO/Intel	PIO/Operations (OPS)/Intel
	F. Digital Volunteers	Ad-Hoc	External/ Informal	Internal/Formal
2. Governance	A. Documentation	External Sources	Partial (Business Unit Only)	Full (Agency-Wide Strategy)
	B. Data Standards	None	Identified	Required
	C. Policies	None	Identified	Developed and Implemented
3. Technology	A. Information Products	PDF	PDF/Data Layers	WebMaps/ Dashboards
	B. Tools and Licenses	Free/Trial	"Lite" Versions	Purchases/Licenses
	C. Applications	Communications/Episodic Monitoring (Full EOC Activation)	Communications/ Partial Monitoring (All EOC Activations)	Communications/Full Monitoring (Ongoing)
	D. System Integration	No Integration	Partial Integration (Data Layers)	Full Integration via Common Operating Picture (COP)

Legend

 Capability pre-experiment  Capability during-Experiment

People and Process

- **Adoption:** The city of New Orleans has adopted social media as a core part of its communication and outreach work through the NOLA Ready program, which incorporates Twitter and Facebook. NOHSEP works with the mayor’s office to coordinate outreach to the public.
- **Training:** Training is an area of improvement for the city. The city requested official FEMA training on applying social media for disaster response but it has not yet been held.
- **Staffing:** Currently, NOHSEP does not have a dedicated internal social media team, rather, they rely on the mayor's office communication department to staff or provide that capability. During the experiment, participants explored the idea of using

volunteers from Evacuteer⁵ to provide on-call DVST for the NOHSEP Situation Unit. NOHSEP plans to draft a Concept of Operations (CONOPS) to formalize the Evacuteer role for social media support in the future.

- **MOU Partners:** NOHSEP has an agreement in place with Evacuteer to provide surge support during EOC activation. During the experiment, the partnership between Evacuteer and NOHSEP was successfully reinforced around support for the NOHSEP Situation Unit.
- **Emergency Support Function (ESF) Placement:** Currently, social media operations fall under the Mayor's Office Communications Department (ESF-15, External Affairs). The experiment successfully tested the concept of having the DVST staff the Situation Unit in support of operations during EOC activation, a broader role.
- **Digital Volunteers:** There is no formal DVST in place currently. The experiment tested expanding Evacuteer support to the City 311 system (current state) to include the EOC's Situation Unit. Work is underway to formalize this role.

Governance

- **Documentation:** The NOLA Ready program provides some information through their website about how the City approaches using social media. ⁶ They are working to address how 911-type calls for service would be handled via social media.
- **Data Standards:** The City of New Orleans has a methodology and approach for how to publish the content via the @NOLAReady Twitter account. In the experiment, however, there were no pre-identified information requirements for DVST to track during an incident. During the experiment, the DHS S&T Support Team expanded the data standard to various EEIs and social media topics for the DVST to track.
- **Policies:** NOHSEP is in Phase II, meaning that the implementation needs to be tested. Formalizing the EOC activation process and ways in which the DVST would operate in the future is a scheduled outcome of the experiment.

Technology

- **Information Products:** Observations prior to the experiment showed ample evidence of integration of feeds into information products; however, social media integration was lacking. During the experiment, the FRG support team demonstrated how vetted and curated information from social media shared by the DVST could be incorporated into existing information products. Implementing this is planned future work.
- **Tools and Licenses:** The city of New Orleans and NOHSEP have access to a variety of applications directly or peripherally tied to social media, including HootSuite, ArcGIS, Everbridge and LAGAN-311. The GeoForms used by the DVST have been transferred to the NOSHEP ArcGIS group and can be accessed by city personnel in the future.
- **Applications:** Currently, there is no full-time or daily monitoring of social media activity. Participants tested integrating actionable social media posts into a NOHSEP COP during

⁵ More information about Evacuteer is available at: <http://www.evacuteer.org>.

⁶ NOLA Ready website is at: <http://new.nola.gov/ready>.

the experiment. Implementing these applications is under consideration to become a part of the Situation Unit for all EOC activations.

- **System Integration:** Currently, there is no system integration in place. Participants tested incorporating actionable social media posts from the DVST into the NOHSEP COP during the experiment. Implementing this is under consideration to be a part of the Situation Unit for all EOC activations.

Observations During the Experiment

The DVST, staffed by Evacuteer, was highly engaged in its role during the experiment. They were a valuable addition to the experiment and did a superb job of vetting the simulated tweets with minimal background and training. The experiment injected a total of 469 tweets into the simulated Twitter feed the day of the experiment, which included 46 marked as potentially actionable by the experiment design team (i.e., these messages were designed to be intercepted by the DVST). The DVST reported 31 (approximately 67 percent) of these to the NOHSEP Situation Unit using the DVST GeoForm. There were six duplicate and four triplicate submissions. While the DVST guidance told participants how they could check for duplicate submissions, participants likely did not take advantage of that feature during the experiment.

Battle Rhythm Manager In-Stride Feedback

- **COP:** Participants noted that being able to add additional data (e.g., Louisiana Department of Transportation 511 warnings/closures) into the COP via the vUSA widget and access experiment content (e.g., weather alerts) was useful. One participant indicated that the COP, while generally user-friendly, would take more time with which to become comfortable. Participants suggested making information about maps in the vUSA widget more readily accessible (e.g., by pop-ups). They also suggested being able to bookmark views for the client-side.
- **DVST:** The DVST made several recommendations related to the reporting GeoForm:
 - Make it easier to put in the critical information first;
 - Avoid subjective comments fields;
 - Add more logic (e.g., for road issues and to prompt DVST member to answer if a road is passable, impassable or partially obstructed); and
 - Include a local geo-coding system so that results are specific to the area of interest.
- **Battle Rhythm Manager Tool:** Participants noted that toggling between the *Information* page and the *Play* page in the Battle Rhythm Manager tool was awkward. Participants suggested these pages should be merged onto a single page in future iterations.

Post-Experiment Survey Findings

Prior to the experiment, most respondents indicated that they were not at all, or only slightly, familiar with mutual aid resource planning, the use of a COP or essential services reporting. However, following the experiment, respondents generally agreed that their understanding increased across all three areas. Of the tools tested during the experiment, respondents

indicated the GeoForms, operations dashboards and the Crowdsourcing Reporting app were particularly useful for increasing their situational awareness.

Other general feedback provided by participants through the post-experiment survey included:

- Additional training for participants prior to the experiment would have been beneficial.
- Participants noted the need for increased user-friendliness of the DVST reporting forms. Specifically, better mirroring the form to the source of information (e.g., Twitter).
- The DVST team members also expressed the need to test different form factors for tracking and recording social media traffic. Specifically, they used only city-provided desktops during the experiment and not equipment that the team would normally use, like cell phones, tablets etc.
- Regarding social media messaging, participants suggested the city look for local users with the largest audience or following on a social media platform, and recommended partnering with them directly to get critical information out. For example, a local news reporter, a politician, a musician or a TV star who has five million followers. The city should engage them directly and ask for their occasional assistance in dispersing critical information as a public service. This would amplify authoritative emergency messages from @NOLAReady or other government sources and put them in front of more people.

Recommendations and Conclusions

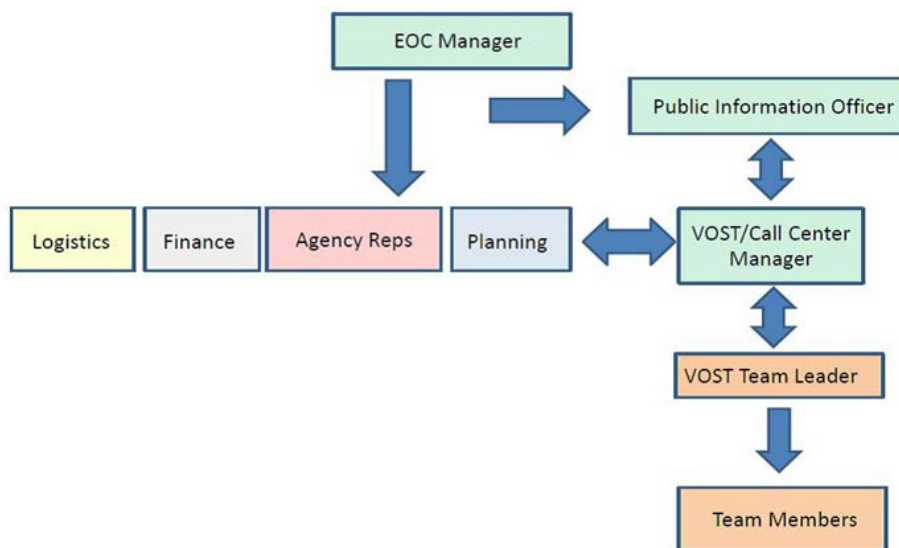
Recommendations

People-Focused Recommendations

Recommendation #1: Explore concepts—such as building a DVST and having citizenry act as sensors—that require complementary efforts within a community. For example, in New Orleans, the Mayor’s Office of Resilience and Sustainability and the Department of Information Technology and Innovation launched a campaign to raise digital literacy.⁷ This initiative is part of the broader 'Resilient New Orleans' strategy and complements this experiment's efforts to expand the reach of digital forms of alerts and communications. The city of New Orleans should continue these efforts and work towards greater collaboration in the future.

Recommendation #2: Update the NOHSEP Hazardous Weather Operations plan to incorporate the DVST. [Appendix 2](#) includes the workflow for the DVST, which the experiment tested when the EOC changed from Emergency Activation Level 3 to 2. NOHSEP should define where the Situation Unit falls within the EOC command structure and identify which personnel the DVST would support in future activations. The workflow tested during the experiment may need to be altered to fit real-life events. Alternate workflows for incorporating DVSTs into EOCs can be found in the Social Media Working Group’s report *From Concept to Reality: Operationalizing Social Media*.⁸ Figure 2 below offers another sample workflow.

Figure 2. Sample Workflow for Incorporating Virtual Operation Support Teams (VOSTs) into an EOC



⁷ The New Orleans digital literacy campaign is at: <http://www.nola.gov/resilience/digitalequity>.

⁸ This report is at: https://www.dhs.gov/sites/default/files/publications/SMWG_From-Concept-to-Reality-Operationalizing-Social-Media-508.pdf.

Recommendation #3: Continue the dialogue started during the experiment by collaborating with GNO, Inc., the Louisiana BEOC, NIMSAT and other private sector partners. The dialogue should expand upon two concepts addressed in the experiment. First, to involve the Whole Community Approach to the planning process, as identified in the National Response Framework (2016). The Framework states:

"Those who lead emergency response efforts must communicate and support engagement with the whole community by developing shared goals and aligning capabilities to reduce the risk of any jurisdiction being overwhelmed in times of crisis. Layered, mutually supporting capabilities of individuals, communities, the private sector, NGOs, and governments at all levels allow for coordinated planning in times of calm and effective response in times of crisis."⁹

The opening vignette for the experiment explored the concept of Whole Community approach to resource planning, with an emphasis on expanding beyond government-owned assets. NOHSEP has committed to use the MARP for future resource planning efforts. As part of this, the NOHSEP hazard mitigation planner should pursue this key initiative, which will support better preparedness and resilience efforts in the greater New Orleans area. Tools the FRG provided during the experiment (and as leave-behinds), such as the MARP and vUSA widget, can complement any potential resource adjudication campaign that NOHSEP would undertake.

Secondly, the experiment tested the need for local businesses to contribute to the New Orleans community's shared situational awareness during the response phase with essential services reporting. Specifically, the experiment tested two processes for tracking store statuses using the Open for Service app, an authoritative process along with a crowd-sourced process. The first process involved surveying store owners or management to submit their respective store or chain of stores status—was the store open or closed? The second process involved sending a link to the public and the DVST requesting input on store statuses from their observations in and around New Orleans. This effort brought the private sector into the response effort in a new way that could be very beneficial to the public while also fulfilling the Whole Community approach.

Training Recommendations

Recommendation #1: NOHSEP and Evacuteer should work with their State Administrative Agency through the FEMA Emergency Management Institute to request official training for Evacuteer personnel serving as part of the DVST. The National Disaster Preparedness Training Center offers an excellent class, "Social Media for National Disaster Response and Recovery," for this purpose.¹⁰

⁹ The National Response Framework is at: <https://www.fema.gov/media-library/assets/documents/32230>.

¹⁰ The training course is at: <https://ndptc.hawaii.edu/training/catalog/8/#course-description>.

Recommendation #2: DHS S&T FRG should work with the city's new Hazard Mitigation Officer to learn how to use the MARP to develop new hazard mitigation plans. During the experiment, the MARP was tested by NOHSEP staff, which will use the MARP for future planning. NOHSEP recently hired a Hazard Mitigation Officer, who attended the experiment but who was not previously familiar with the MARP.

Recommendation #3: Include the DVST in future NOHSEP trainings and exercises to test activation procedures, processes for rumor control, and working with NOHSEP Situation Unit to re-posting content to the City's Twitter account @NOLAReady. Establish a working group to continue the dialogue between this disparate group of partners.

Technology Recommendations

Recommendation #1: DHS S&T FRG should work with the Social Media Working Group for Emergency Services and Disaster Management to improve the tools and capabilities provided to digital volunteers. The DVST identified several improvements to the GeoForm they accessed during the experiment, as well as to tools they wanted access to but did not have, such as a tool to help deconflict digital volunteer activities around social media reporting. Additionally, adding conditional logic to the DVST reporting GeoForm is recommended to make the reporting process more efficient and accurate.

Recommendation #2: NOHSEP should explore connecting their Everbridge alerting system with the Open for Service app to leverage the polling capability of Everbridge. Users of the Open for Service application identified several areas for improvement. This would enable NOHSEP to configure notification groups based on enrolled essential service representatives, and poll those businesses by email, text or phone to provide input on their store status. Additionally, the Open for Service app should include a capability to identify areas where the authoritative and crowd-source information does not match, and trigger an alert to the store representative when those cases arise. Participants also noted that business representatives should be able to include comments on changed hours of service, potential shortages or other commodity-related details. FRG should work with NOHSEP and NIMSAT to identify ways to improve the Open for Service App for future use.

Recommendation #3: NOHSEP should share existing situational awareness tools with partner agencies through group-level access on ArcGIS online. The experiment explored how NOHSEP and partner agencies could benefit from shared situational awareness using existing tools during an event.

Recommendation #4: The Battle Rhythm widget should continue to be used for future FRG exercises and experiments. The Battle Rhythm widget was successfully used during the experiment to help coordinate play and collect participant's in-stride feedback. The FRG should update the widget to make it easier to switch between the inject checklist and the in-stride feedback section.

Recommendation #5: The experiment demonstrated the ability to develop resource plans using the MARP. User accounts provisioned by the NISC could add flexibility in the resource planning process by enabling access to users that do not belong to an ArcGIS Online Organization.

Process Recommendations

Recommendation #1: Before implementing a DVST, NOHSEP should consult with the city's legal department on liability issues for digital volunteers, which can help determine how they will move forward with formally implementing the DVST. Legal explanations from the city's 911 call center may provide some guidance. For example, how is liability covered when a 911 call center receives an emergency call but the information turns out to be false? NOHSEP could work to replicate or adopt how the 911 call center covers liability in those instances, because that scenario is similar in a social media situation—someone has acted on inaccurate data.

Recommendation #2: In conjunction with NOHSEP and Evacuteer, the DVST should develop Standard Operating Procedures (SOPs) or a CONOPS, along with a Memorandum of Agreement (MOA) or MOU to sign in the event of activation for a disaster. These documents could be annexes to Evacuteer's current agreement with NOHSEP, to an existing city document or to a new document, depending on preference.

Recommendation #3: The DVST should develop and test alert activation and deactivation processes. During the experiment, members of the DVST were sent an activation alert, along with a link to the GeoForm and directions. The DVST and other participants identified a need to develop and test both the activation and deactivation processes before future events.

Recommendation #4: The city should pursue additional research and exercises on recovery issues. The experiment focused on the immediate operations and plans for responding to a flash flood; however, the city could pursue more research and practice on the recovery side of the mission space. This was noted during the recovery operations after the New Orleans tornado that occurred just after the experiment.¹¹

Conclusion and Path Forward

The New Orleans Flood Resilience Experiment provided a venue to test new concepts, such as having the EOC's Situation Unit work with curated non-traditional content (i.e., social media and private sector information) via the DVST in a no-fault environment. The use of a pre-scripted MARP tool had a positive effect on response by creating a living, easily-updatable plan. Together, pre-scripted mutual aid planning combined with the non-traditional information, strengthened the city of New Orleans' community preparedness and resilience for a flood.

A large part of the resiliency of a community is the network of people and organizations that form that community. The city of New Orleans has strong partnerships among government, non-profit and private sector organizations. However, there is always room to provide

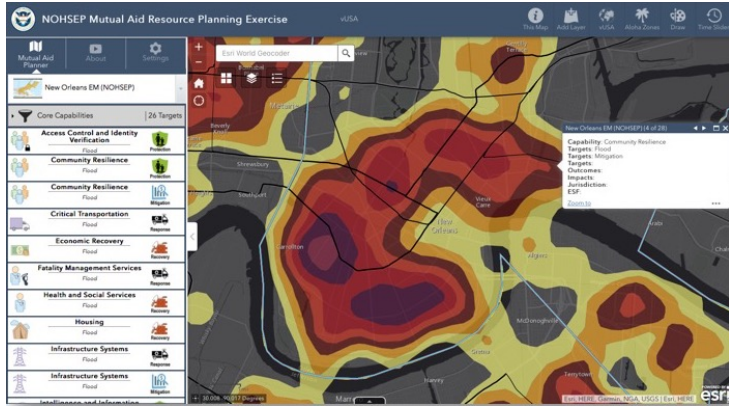
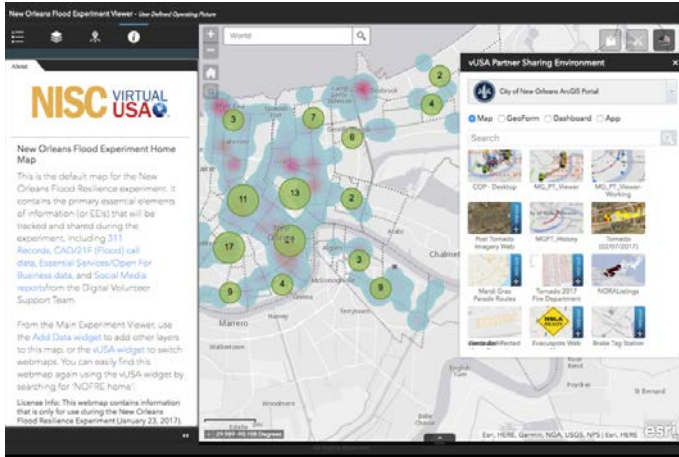
¹¹ Information on this event is at: <http://www.weather.gov/lix/neworleaneasttornado02072017>.

additional opportunities to engage with new or different community members and work together.

To capitalize on the technologies and processes explored during the experiment, it will be key to fully incorporate these tools into operation plans and perform regular trainings and exercises. The DHS S&T FRG support team will continue to work with NOHSEP staff going forward and ensure that all the technology transition has occurred. As referenced in this AAR, there are many ways that the technologies and processes explored during the experiment can be modified based on user input to better support NOHSEP and its partners. This will need to be an ongoing effort by all organizations involved.

In closing, this experiment delivered on the goals for the experiment and DHS S&T's Flood Apex program by testing the concepts of mutual aid, social media monitoring and public-private sector partnerships in the context of a flash flood hazard. The structure of preparing for and conducting this experiment could be repeated in other communities and applied to other flood hazards. Additionally, DHS S&T FRG will share tools and lessons learned with the NISC to amplify the reach of this experiment series. To that end, it is recommended that all parties involved in work with the NISC should share the results and findings from this experiment via a webinar.


Appendix 1 - Technology Used or Referenced During the Experiment

Mutual Aid Resource Planner (MARP)	
Owner:	National Information Sharing Consortium (NISC), transitioned from U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T) First Responders Group (FRG) and deployed in New Orleans Office of Homeland Security and Emergency Preparedness (NOHSEP).
Intended Use	Participants were trained on this tool prior to the exercise, which helps state and local agencies create resource plans for specific hazards. The tool helps planners align to threats, hazards and core capabilities present in a state, local or regional Threat and Hazard Identification and Risk Assessment (THIRA) and make capabilities searchable and actionable.
Sub-technology	ArcGIS Online
	
NOLA Flood Experiment Viewer and Virtual USA (vUSA) widget	
Owner:	NISC (transitioned from DHS S&T FRG)
Intended Use	The NOLA Flood Experiment Viewer is based on Esri's WebApp Builder framework. It is a common operating picture (COP) that includes the vUSA widget. The widget provides participants the capability of searching multiple information products that can provide current-state situational awareness or present archived content from past activities.
Sub-technology	ArcGIS Online
	

Battle Rhythm Manager	
Owner:	NISC
Intended Use	This tool is used to keep the exercise on schedule and facilitate delivery of injects, access to detailed inject information and tools and capture in-stride feedback during the exercise.
Sub-technology	ArcGIS Online

Time To Event	Event Name	Scheduled Time	Info	Play
1 Hr(s)	Mutual Aid Resource Planning	10:30		P
2 Hr(s)	Pre-Flood: Early Warning and Baseline Situational Awareness	11:30		P
3 Hr(s)	Pre-Flood: Alert/Warning	11:45		P
3 Hr(s)	Flood Event: Initial Situational Awareness	12:00		P
5 Hr(s)	Flood Event: Early Response Activities	14:00		P
5 Hr(s)	Flood Event: Digital Volunteer Activation and Support	14:30		P
6 Hr(s)	Flood Event: NOLA Open for Business	15:00		P

GeoForm (Digital Volunteer GeoForm, 311 Reporting GeoForm)	
Owner:	DHS S&T FRG
Intended Use	The GeoForms were configured to allow trained digital volunteers to submit reports from social media to the EOC, as well as for members of the NOHSEP Situation Unit to submit reports to the simulated NOLA 311 system. Reports submitted through the GeoForms were accessible through Operations Dashboards and other viewers, and shared with NOHSEP partners.
Sub-technology	ArcGIS Online



NOLA 311 Data Entry Geoform

1. Enter Information

Incident Type (required)

Title

Details

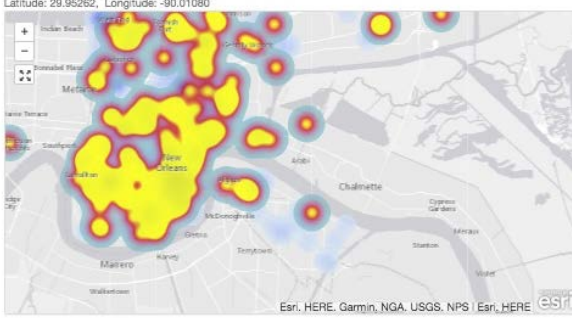
254 characters remaining

Address

2. Select Location

Specify the location for this entry by clicking/tapping the map or by using one of the following options.

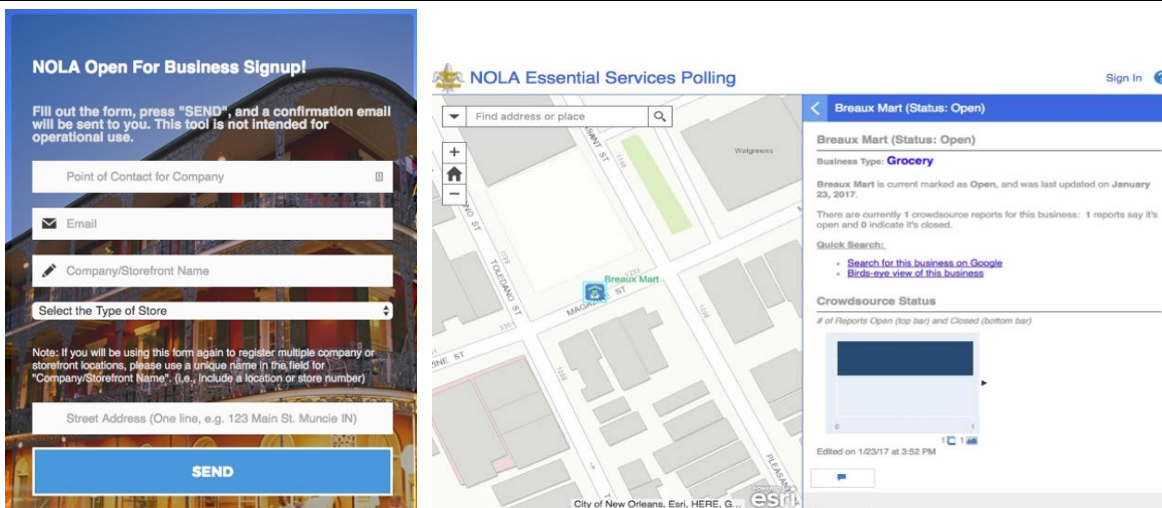
Latitude: 29.95262, Longitude: -90.01090



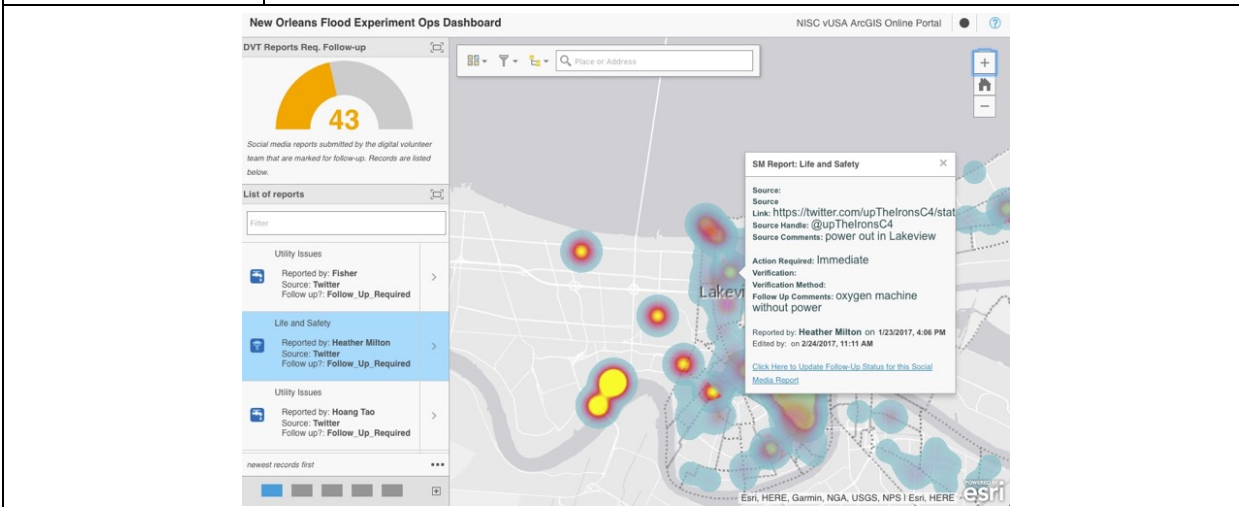
3. Complete Form

Add this information to the map.

Open for Service App	
Owner:	DHS S&T FRG
Intended Use	The Open for Service app included the following functions: 1) enabled representatives from the private-sector to self-register their businesses, 2) enabled NOHSEP to poll businesses by email so that they could report their status, 3) registered business representatives could report their store status and 4) the store status is reported.
Sub-technology	ArcGIS Online, PHP and MySQL

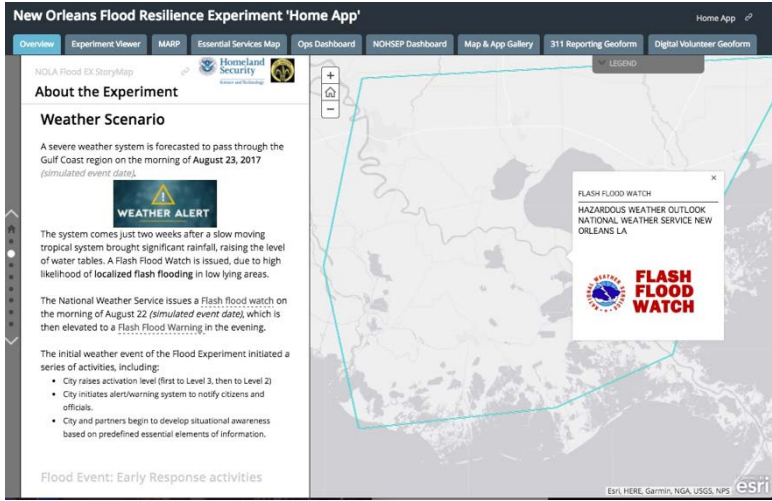


New Orleans Flood Experiment Ops Dashboard	
Owner:	DHS S&T FRG
Intended Use	Provide an overall status of key Essential Elements of Information for leadership to follow and act on.
Sub-technology	ArcGIS Online and Operations Dashboard App



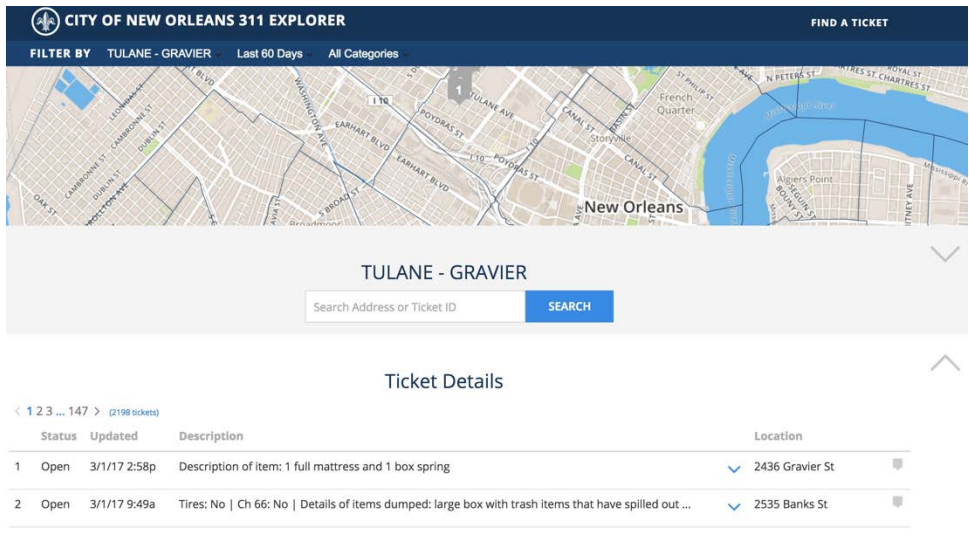
New Orleans Flood Experiment Home App

Owner:	DHS S&T FRG
Intended Use	A central destination for all experiment participants to come to for accessing and interacting with the various job aids produced for the experiment.
Sub-technology	ArcGIS Online and Esri Storymap Template

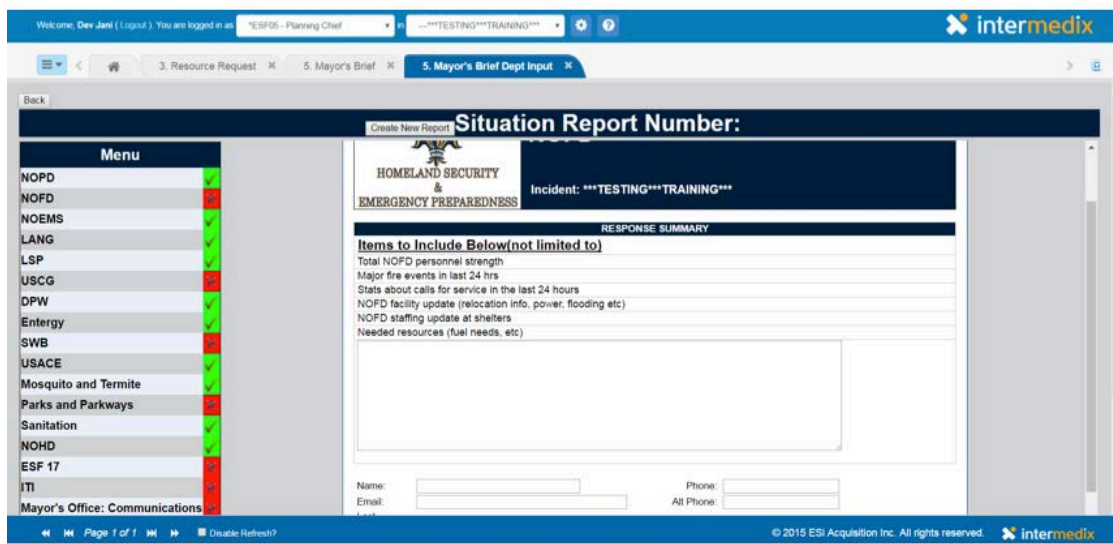


NOLA 311

Owner:	City of New Orleans
Intended Use	Lagan/NOLA 311 provides citizens of New Orleans with a way to access local government information and non-emergency services, as well as submit reports for non-emergency issues (e.g., clogged storm drains and down trees). This system is also used internally by city of New Orleans staff to assign issues to specific agencies. NOLA 311 is integrated with NOLA's Open Data Platform, data.nola.gov , to provide access to near real time and historical information.
Sub-technology	Lagan 311 and Socrata



WebEOC	
Owner:	City of New Orleans
Intended Use	WebEOC is an incident management system used by NOHSEP and representatives from local community, including other city agencies and boards, parish representatives and non-government organizations.
Sub-technology	WebEOC

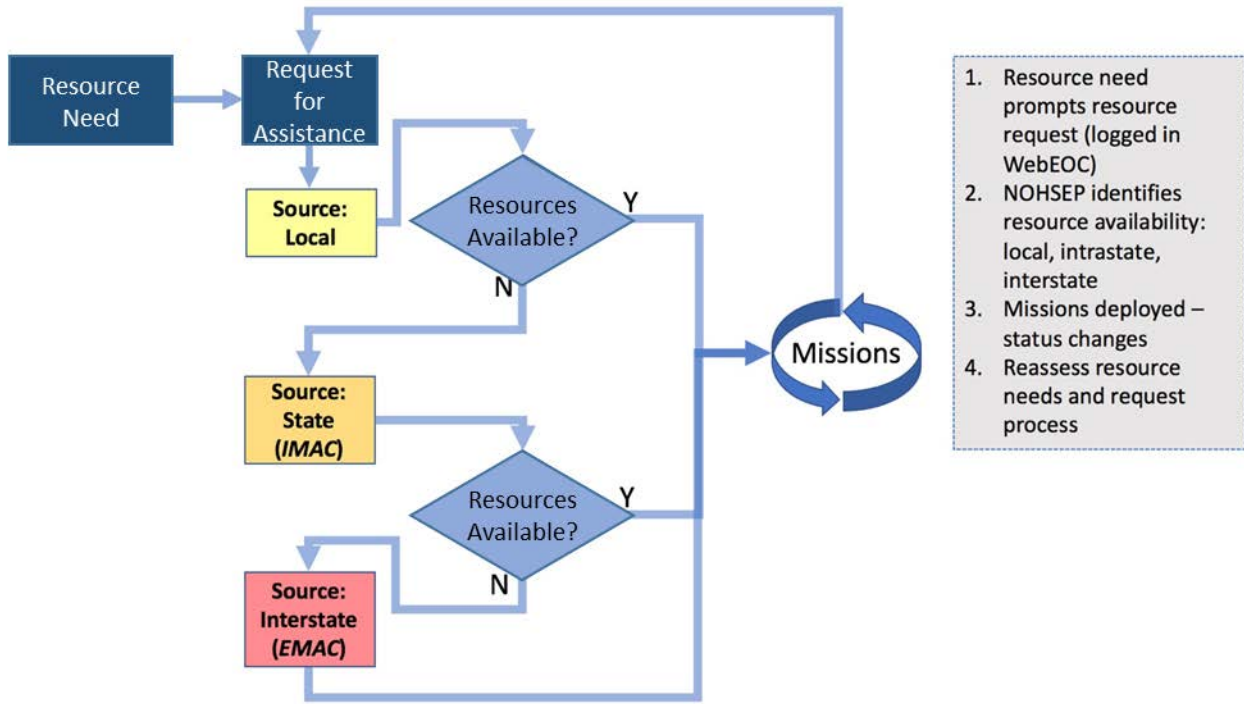


NOLA Ready	
Owner:	City of New Orleans
Intended Use	NOLA Ready is the City's public alerting system that is equipped to send messages to the public over a variety of channels, including: phone, email, Twitter, Facebook, Federal Emergency Management Agency Integrated Public Alert and Warning System – Emergency Alert System. It can also be used internally to alert specific groups (e.g., DVST) to activate during an emergency.
Sub-technology	Everbridge, Social Media Platforms (e.g., Twitter and Facebook)

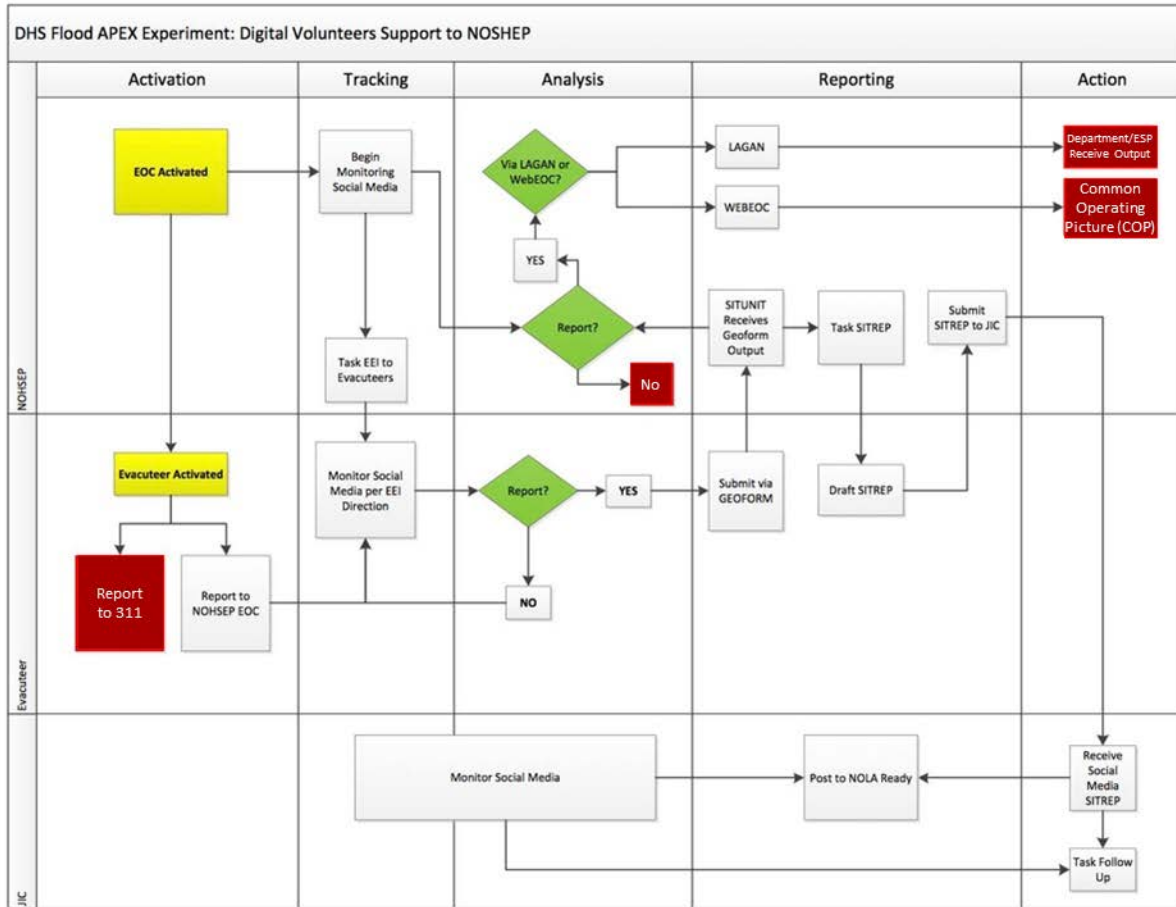


Appendix 2 - Workflows Tested During the Experiment

Mutual Aid Workflow



Digital Volunteers/Social Media Workflow



Essential Services Reporting Workflow

