



How Technology was Used  
**in Response to Hurricanes  
Harvey and Irma**

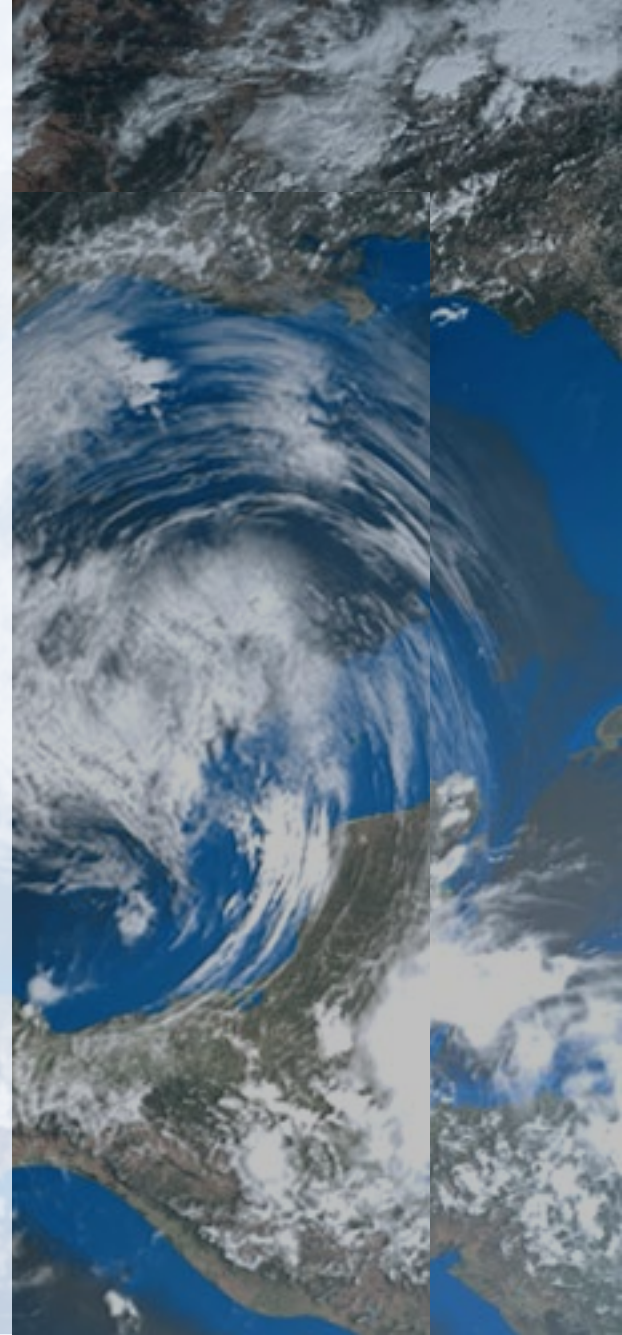
# Hurricane Harvey

When Hurricane Harvey started as a tropical wave that formed off the African coast in early August, little did we know it would be one of the most disastrous weather events in U.S. history.

On August 17, 2017, Harvey hit east of the Lesser Antilles, bringing heavy rain and gusty winds.<sup>1</sup> Over the next two days, Harvey made its way to the eastern Caribbean, causing an increase in advisories from the National Hurricane Center. Continuing to move northwest, Harvey made its way to Mexico, on August 23, it quickly reformed into a tropical depression.<sup>1</sup>

Within 56 hours, Harvey went from a tropical depression over the Gulf of Mexico to a Category 4 hurricane, making its next landfall on the Texas Gulf Coast on August 25, 2017. Harvey's slow movement from August 26-30 led to catastrophic flooding in Southeast Texas.<sup>1</sup>

Even as Harvey's winds died down to 40 mph in the last days of August, the storm had already caused devastating flooding with numerous flash flood emergencies being issued in both Texas, including the Houston metropolitan area, Texas' most populous city, and Louisiana.<sup>2</sup> Although Harvey downgraded into a tropical depression by August 30, it continued to generate a vast amount of rain in Texas, Louisiana and southern Arkansas. Harvey's final spate of rainfall, with wind gusts of 35 mph, swept across Tennessee and Kentucky before dissipating.



## Facts: Hurricane Harvey

Landfall:

**August 25, 2017**

Disaster Declaration:

**39 Counties and 12 Parishes in 2 States**

Mandatory Evacuation:

**7 Counties**

Damage Estimate:

**\$65 - 190 Billion**



# Hurricane Irma

A little over two weeks later, a Category 5 storm, Irma, swept over U.S. islands, including Barbuda, Puerto Rico, Dominican Republic and Haiti, ripping off roofs, flooding coastal cities and knocking out power to more than 6.8 million people.<sup>3</sup> On September 10, Hurricane Irma downgraded to a Category 4 storm, making landfall over mainland Florida, battering populous cities such as Miami.

## Facts: Hurricane Irma

Landfall:

**September 10, 2017**

Disaster Declaration:

**42 Counties in  
2 States**

Mandatory Evacuation:

**6.3 Million People**

Damage Estimate:

**\$50 - 172 Billion**

## Making History

Harvey made its first U.S. landfall near Rockport, Texas, with 130 mph winds, qualifying it as a Category 4 hurricane. Harvey was the nation's first major hurricane since Hurricane Wilma in October of 2005.<sup>2</sup> Hurricane Harvey was less than an inch short of breaking the U.S. record for rain dropped by a hurricane or tropical storm.<sup>4</sup>

Hurricanes Harvey and Irma are the only Category 4 Atlantic storms to hit the United States in the same year, let alone within two weeks of each other.<sup>4</sup>

### Juvare in Action

The emergency management communities in the areas affected by Harvey and Irma were responsible not only for helping first responders, local hospitals and state and federal agencies manage resources and operational needs, but also for sharing critical, time-sensitive information before, during and after each of these storms.





### Solutions in Action

To create this transparency, teams used many types of cutting-edge technology to generate a common operating picture and deliver critical information exactly when and where it was needed. Collecting and disseminating vast amounts of critical information about affected areas, number of evacuees, locations of available resources and the nature of response operations, and making that information immediately available to decision makers, helped response agencies identify and act upon impending critical needs.

The number 1 priority from an emergency response perspective was to address emerging situations as quickly as possible by developing and maintaining situational awareness on a 24/7 basis.

Natural disasters of this magnitude always present a unique set of challenges, especially when it comes to deploying, configuring and understanding how to use applicable software, and, if necessary, making adjustments to established processes in a timely manner. Emergency managers are at the forefront of working through various imminent developments and making sure the right procedures and action plans are in place to supply the most effective relief mechanisms to all agencies involved, whether federal, military, state/local or public health.

EMResource	WebEOC	EMTrack
<p><b>Harvey</b></p> <p>Activated Incidents: <b>142</b></p> <p>Regions/Systems Participating: <b>28</b></p> <p>Resource Status Updates: <b>&gt;325,000</b></p> <p>Notifications Email: <b>&gt;285,000</b></p> <p>Web (Solution): <b>&gt;195,000</b></p> <p>SMS/Pager: <b>&gt;82,000</b></p>	<p><b>Harvey</b></p> <p>Number of Users (Discrete Logins): <b>&gt;140% increase</b></p> <p>Time Using Solution (Session Length): <b>&gt;85% increase</b></p> <p>Rate of Engagement (Interactions): <b>&gt;40% increase</b></p> <p>Total Board Entries: <b>&gt;580% increase</b></p> <p>Push Notifications: <b>&gt;5,000% increase</b></p>	<p><b>Irma</b></p> <p>Number of Users (Discrete Logins): <b>&gt;610% increase</b></p> <p>Rate of Engagement (Interactions): <b>&gt;270% increase</b></p> <p>Total Board Entries: <b>&gt;350% increase</b></p>
		<p><b>Harvey</b></p> <p>Activated Incidents: <b>4</b></p> <p>Regions/Systems Participating: <b>4</b></p> <p>Patients/Evacuees Tracked: <b>&gt;1,600</b></p>



## The Calm Before the Storm

Emergency preparedness work begins long before a storm makes landfall. Once it becomes evident that an area will be impacted, emergency managers immediately start to reach out to local and state agencies to determine what actions need to take place before the disaster descends.

In terms of Hurricane Harvey and Irma, as soon as Juvare found out just how destructive these storms were likely to be, we reached out to WebEOC customers who have our software installed locally to assess server capabilities in the emergency operation centers (EOCs), making changes where necessary to reduce the likelihood of system slowdowns. This level of support ensured that each EOC could effectively manage the provision of airlift support, evacuee housing, security forces, search and rescue teams and room for supplies/equipment for both federal and state authorities.

We worked closely with our customers to ensure the appropriate crisis management solutions were implemented before the start of the storms. In addition, our technical and professional teams were readily available to provide on-the-fly system configuration assistance, emergency technical support and end-user training. Juvare brought to the table our insight into best practices, gleaned from years of experience in building and supporting response management solutions, and our willingness to provide assistance where needed.





# The Eye of the Storm

The technology used during Hurricanes Harvey and Irma provided situational awareness in impacted areas, improving incident management capabilities for key decision makers. During response to Hurricane Harvey, direct connection and dissemination of frequently updated and consistently shared information between EOCs, state emergency management agencies and federal responders proved to be highly effective. WebEOC<sup>®</sup>, EMResource<sup>®</sup> and EMTrack<sup>®</sup> equipped EOCs and emergency response agencies with robust collaboration tools that provided crucial insight and information, including:

- Hurricane patterns, tracks and impending threats
- Flooding impact on various areas
- Overall size of the growing evacuee and patient groups
- Shelter activations and capacity numbers
- EMS availability
- Tracking of state-supplied vehicles involved in evacuation patient transfers and repopulation
- Road closures and changes to hospital access routes
- Adjustments needed to statewide request management procedures
- Hospital bed and resource availability
- Specialty services availability, such as dialysis
- Healthcare facility infrastructure status and damage reporting



As Harvey evolved, impacted agencies were challenged with collecting and disseminating vast amounts of information, much of it critical to effective decision making. Responders used WebEOC, the crisis management tool of choice for most U.S. emergency management agencies, to respond in real time to rapidly changing needs. State and federal agencies immediately recognized the need to share information. Using one state's WebEOC Fusion® server, the agencies were able to connect their independent WebEOC systems in order to communicate critical information in real time. This direct connection of a state emergency management agency with federal responders was the first of its kind.

Responders also used WebEOC to submit and manage requests for assistance from communities and agencies. Broad adoption of this process resulted in efficient resource mobilization across the state. Federal agencies also employed this process, made possible by the established Fusion connection, which significantly enhanced their situational awareness. Harvey caused flooding at a rate rarely seen in the U.S., causing people to be displaced from their homes at an alarming rate. Emergency shelters were stood up to provide safe havens for relocated residents.

Emergency management teams helped facilitate information flow amongst these groups by using EMResource, a Juvare solution, to broadcast situational updates to key state and local partners, track the activation of regional operations centers and identify hospitals with compromised infrastructure or utilities. The solution was also used to query hospitals for bed and resource availability. Information about hospitals helped first responders understand which hospitals were deeply impacted so they could redirect patients to fully functional facilities. Responders used EMResource's sister solution, EMTrack, a web-based, multi-functional tracking solution, to track patients and evacuees as hospitals were closed and patients diverted. Our solutions also facilitated the identification and deployment of available transportation vehicles such as ambulance and helicopters, to assist with hospital evacuations and other patient transports.

Even as the response to Harvey entered a rhythm, on September 10, Hurricane Irma slammed into the U.S. on the other side of the Gulf. Here again, numerous Juvare customers were in the path of impact, including the counties where Irma made landfall and areas where storm surge caused unprecedented flooding.

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**Tracking shelters and their populations became a serious challenge. Juvare helped in modifying an existing tracking network to ensure that, in addition to monitoring evacuees and patients, responders could track the size of evacuated groups.**

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In addition to aiding federal, state and local constituencies, emergency managers also played a large role in supporting public health efforts during these hurricanes. As hospitals started to experience the effects of flooding and power outages, there was an urgent need to evacuate patients to hospitals outside the impacted areas. State and local health services organizations and emergency medical task forces needed to communicate with hospitals, EMS teams, and other public health partners to receive information on bed availability, evacuation assistance needs, transport vehicle availability and overall patient surveillance.

Once more, Juvare personnel staffed the phones 24/7 and adapted solutions on the fly to enhance situational awareness and aid in response. As much as teams can try to prepare for disasters like these, there are always unexpected circumstances that can derail operations. These kinds of events require 24-hour maintenance and surveillance from team members, which is why Juvare was available for 24-hour support. We were prepared to assist with resolving any issues or errors with servers or overall technology so key decisions could continue to be made. Of utmost importance was ensuring those affected had the assistance they needed as quickly as possible.



## After the Storm

Looking back on response operations, we can clearly see there is a need for more end-user training in order to increase users' overall familiarity and comfort level with technology solutions—especially during high-stress emergency situations. We also found a great deal of value in witnessing how government and vendor teams functioned in real-life scenarios such as these. Through real-world applications, we learned about modifications and adjustments that could be made in the future to ensure our solutions operate even more effectively. As an example, our organization is planning to establish a team of trained professionals that will be ready to deploy to impacted areas for any type of event at any given time.

Throughout our team's time working with our customers during Hurricanes Harvey and Irma, we tried to provide a high level of engagement and responsiveness. Regardless of whether it was after hours or on weekends, we were committed to maintaining constant communication with our customers and offering continual and comprehensive customer support. Even now, while the storms may be over, there is still a need to continue response and recovery efforts. With thousands of evacuees still displaced by these storms, we will continue to work with our customers to track and manage these individuals, ensuring they have suitable shelter.

It will be many months, if not years, until the impacted areas are back to being fully functional, and the entire emergency management community will continue to play an active role in rebuilding efforts. All our Juvare emergency management teams will continue to stand with the affected areas and are willing and ready to assist in whatever way we can.

Well in advance of Harvey and Irma, Juvare and our customers put a great deal of thought into each solution's configuration and deployment. Recognizing that each disaster presents a unique set of challenges, we eagerly assisted our customers with making necessary adjustments in a timely manner.

Days after the disasters, our customers continued to use our solutions and technology to facilitate recovery efforts. They were used to track and manage evacuees, including those from affected Caribbean countries. When requested, Juvare personnel helped streamline access to data that was essential to recovery efforts. Juvare remained vigilant in supporting our customers' efforts in the aftermaths of these hurricanes and will continue to evaluate more innovative and streamlined processes to prepare for the disasters of tomorrow.





# Juware Helps Organizations Prepare, Connect, and Respond – Faster

At Juware, our mission is to strengthen and optimize information sharing to empower preparedness and response professionals to protect people, property and brands. Juware is the leading provider of emergency management and business resilience solutions.

Juware solutions provide the situational awareness for critical event management and daily operations, connecting your organization's data sources into a common operating picture that's configurable and easy to use. Corporations, healthcare facilities, higher education institutions, and government agencies alike can all use Juware solutions to improve communications and information management before, during, and after all types of critical events.

[Request a Demo](#)

1. Historic Hurricane Harvey's Recap. (2017, August 29). Retrieved November 01, 2017, from <https://weather.com/storms/hurricane/news/tropical-storm-harvey-forecast-texas-louisiana-arkansas>
2. Hurricane Harvey: Facts, FAQs, and how to help. (2017, September 21). Retrieved November 01, 2017, from <https://worldvision.org/disaster-response-news-stories/hurricane-harvey>
3. Gould, E.B. (2017, August 29). Rains from Hurricane Harvey broke 60 years of US continental records - here's why. Retrieved November 01, 2017, from <http://www.businessinsider.com/harvey-rain-rainfall-break-record-2017-8>
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