A Brief Overview of Emergency Response Surveys

By Cali DeCastro

When natural disasters such as hurricanes or national emergencies like the collapse of the Francis Scott Key Bridge in Baltimore occur, the top priority is always preserving life to the extent possible and recovering those whose lives were lost to return them home to their families. Following the rescue efforts comes managing environmental impacts, re-opening ports for vessel traffic, and rebuilding infrastructure which was destroyed in the event, among other important tasks. This article provides a brief overview of a typical response effort, with an emphasis on the surveying aspect.

The People

Disaster response is a coordinated multi-agency endeavor. Some of the roles and responsibilities of key players in the United States during disaster response are highlighted below. Of course, this isn't all-inclusive, and every situation is unique and requires different levels of involvement from each of these different agencies.

United States Coast Guard

- Captain of the Port: On-scene coordinator.
- Leads search and rescue/recovery operations.
- Establishes and lifts port access restrictions.
- Conducts overflights (search and rescue, damage and contamination assessments).
- Repositions aids-to-navigation.

USACE

- Oversees efforts to reopen Federal ports and waterways.
- Structural assessment and engineering support.
- Debris management.
- Hydrographic and topographic surveying.

NOAA

- NOAA Aircraft
  - > Hurricane reconnaissance provides info on the location, intensity, and wind field of the system, determine if a tropical cyclone has formed, collect Doppler radar and dropsonde data.

    - After hurricane/disaster - conducts damage and contamination assessment via collection of high-resolution imagery.
- Navigation Response Teams
    - Verifies aids to navigation and provides information to USCG.
    - Identifies and reports dangers to navigation (DTONs).
    - Conducts assessment and clearance surveys via hydrographic and topographic surveying as required to re-open ports.

FEMA

- Provides Federal support during disaster response, including funding, coordination and planning, operational expertise, deployment of resources, and medical assistance when the disaster overwhelms the capacity of state and local authorities.

National Guard

- Clears roads.
- Delivers vital supplies and equipment.
- Supports local law enforcement.
- Conducts search and rescue operations.

State and Local Authorities (including state and local police, emergency management, natural resources/environmental protection, transportation, etc.)

- First responders for incident victims.
- Determines necessity to declare state of emergency.
- Establishes, communicates, and enforces access restrictions and detours (i.e., “no fly” zones, road closures, etc.).
- Disseminates information to local community.
- Conducts initial environmental assessments and damage mitigation.

NAVSEA/SUPSALV

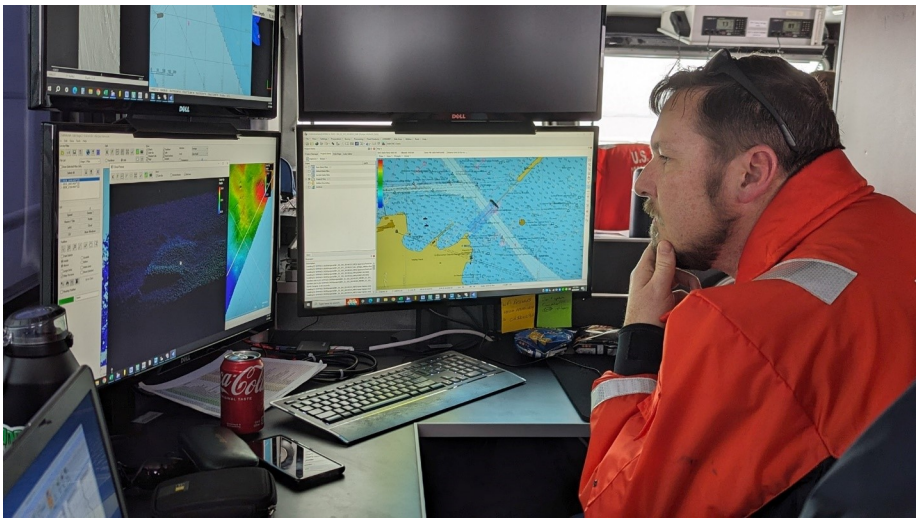
- Hires contractors including divers and salvage teams.

Contractors

- Divers - search and rescue, damage assessment.
- Salvage - demolition and debris removal including tugs, barges, cranes, etc.
- Surveyors - hydrographic surveys not covered by USACE or NOAA may be assigned to contractors.

THE TECHNOLOGY

A surveyor aboard USACE Survey Vessel CATLETT analyzes hydrographic survey data in HYSWEEP® Editor in the search for submerged vehicles at the site of the Francis Scott Key Bridge collapse.



The use of GPS, single beam, multibeam, side scan, and LiDAR technology is paramount for search and rescue operations, detection of obstructions, and waterway clearance surveys (to name a few), ultimately allowing ports to reopen and for first responders to bring victims home to their families.

At the heart of many of these survey operations is HYPACK®. When it comes to disaster response, the various uses of the HYPACK® software include:

- Survey planning and sensor integration.
- Chart display and vessel navigation.
- Survey coverage tracking.
- Real Time LiDAR and Multibeam monitoring via HYSWEEP® Survey and Real Time Cloud.
- Targeting.
- Data processing.
- Pre-and-post survey surface model comparison.
- Dredge volume calculations.
- Development of pre-and-post survey ENC charts to aid in safe navigation.

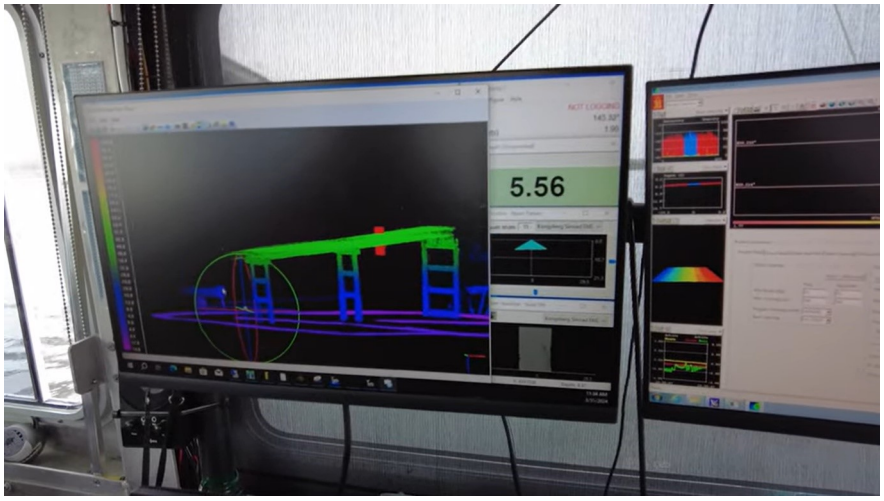
Take a look at these videos describing the survey work conducted at the Francis Scott Key Bridge utilizing the HYPACK® Software to collect, process, and analyze bathymetric and topographic data:

- NOAA Provides Vital Navigation Data in Wake of Francis Scott Key Bridge Collapse
- NOAA Surveys at the Key Bridge
- On Board the DAUNTLESS - USACE Philadelphia

Bringing the People and the Technology Together

The HYPACK Technical Support Team is here to support our customers, and we take special care to prioritize the needs of the users in the field conducting response operations when these emergencies occur. This includes assisting with your geodesy and hardware setup and integration, troubleshooting, and working with our team of developers to provide timely program updates for bug fixes and special use cases.

The surveyor aboard a NOAA Navigation Response Team measures the height at the center of two bridge piers in HYPACK® Real Time Cloud. The HYPACK® development team released a critical update which allows more precise targeting in Real Time Cloud to meet the emerging needs of the response team.



The Francis Scott Key Bridge collapse response is an ongoing effort; we are standing by to help and are only a call away!

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- A surveyor aboard USACE Survey Vessel CATLETT analyzes hydrographic survey data in HYSWEEP® Editor in the search for submerged vehicles at the site of the Francis Scott Key Bridge collapse:
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