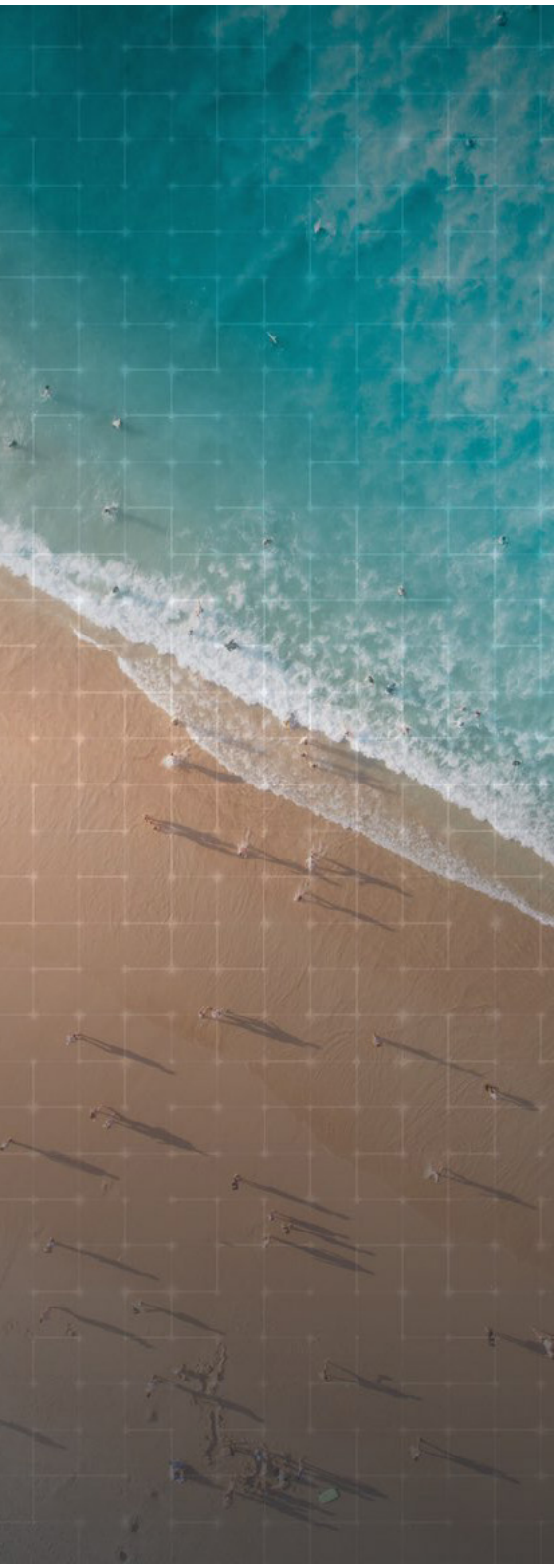


Mapware

CASE STUDY

Operation Bird's Eye: Mapware Leverages UAV Technology for Public Safety Operations in Sandwich, MA

Executive summary

In August 2019, Mapware, a leader in drone technology, was invited by local authorities to participate in a proof-of-concept operation along the Cape Cod, Massachusetts shoreline and the adjoining waterways and inlets.

In partnership with officials from the town of Sandwich, MA, Mapware successfully conducted several missions, demonstrating the value of UAV technology for search and rescue, shark patrol, coastal and environmental mapping, traffic monitoring, and incident response.

Operation Bird's Eye was a joint operation between the following organizations:

Mapware

Sandwich Fire Department

Sandwich Police Department

Sandwich Department of Natural Resources

U.S. Army Corps of Engineers

U.S. Coast Guard Station Cape Cod Canal

Challenge

Operation Bird's Eye was a joint effort coordinated by multiple local, state, and federal agencies to demonstrate the use and applicability of drones, or unmanned aircraft vehicles (UAVs), for public safety operations.

Due to recent high-profile shark sightings that had been occuring along the Cape Cod coastline and in local canal areas, these public safety exercises had particularly high operational value.

The multifaceted, proof-of-concept project had several areas of concentration. Exercises were created for each of the following:

- Search and rescue with real-time video feed to control/command center and deployed marine units
- Coastal monitoring for shark and sea lion activity
- Imagery of shoreline and coastal erosion issues
- Real-time video feed of choke points and high volume traffic areas for traffic management

Execution

On August 9-11, 2019, Operation Bird's Eye commenced. The Sandwich Fire Department Marine Units 1 and 2 worked in unison with the Mapware flight team, which included three Remote Pilots in Command (RPICs) and a visual observer (VO).

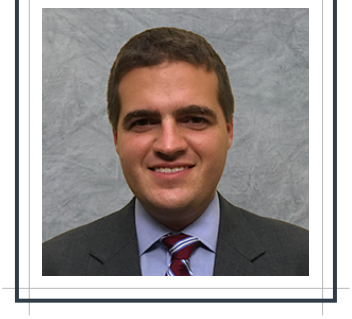
Mapware deployed with four UAV quadcopters (drones): Phantom 4 Pro 2.0, Mavic 2 Pro, Inspire 1, and Inspire 2.

Administration and logistics

All exercises and real-world incidents were coordinated by the following personnel:

Fire Chief John Burke
Sandwich FD
On-Scene Commander

Greg Kiser
Mapware
Executive Officer, Operations |
Remote Pilot in Command (RPIC)



Nathan Sullivan
Mapware
RPIC

Daniel Chu
Mapware
RPIC

Operational planning and meetings were hosted at the Sandwich Harbormaster office conference room. Communications were provided via Sandwich Fire Department handheld (H/T) radios and Mapware Cobra two-way (H/T) radio systems.

Coordination was maintained with the U.S. Coast Guard, U.S. Army Corps of Engineers, and the Air Traffic Control Tower (ATC) at Joint Base Cape Cod. Flight ceiling for all UAV flights was 400 feet and below, per FAA Part 107 regulations.

Results

Mapware successfully completed several missions, demonstrating the value of UAV technology for the following use cases:

Search and rescue

Mapware conducted multiple successful search and rescue/rapid response exercises with Sandwich FD Marine Units 1 and 2.

In one set of exercises, Mapware determined and marked the location of a “man in the water” (mannequin) via UAV and provided the location to Marine Units for pick up/rescue. Each UAV flight reduced response time by a significant margin from the time it would ordinarily take a Marine Unit to locate a person in the water, respond, and arrive at the location for rescue.

In another exercise, Mapware demonstrated that UAVs can be used for the delivery of a personal flotation device (PFD) to the victim/mannequin in the water. UAVs are also viable means of delivering critical medical supplies (EpiPen, tourniquet, etc.) to a victim in the water, as well as delivering radio/communications devices to Marine Units.

Aerial drone training was held August 10, 2019 at the Sandwich Marina and the town's beaches. The Sandwich Fire Department is seeking grant funding to purchase drones, which would also be used by the DPW, Natural Resources, Harbormaster and Assessing departments. Photo by Mark Snyder

Shark monitoring

During this exercise, no shark activity was present near the surface along the flight path of the UAV.

It is possible that sharks were present at a depth not clearly visible from the UAV, but this exercise demonstrated that surface-level activity could certainly be detected — sea lion activity that was noted by a participating Marine Unit was also located by the UAV.

Photogrammetric environmental mapping

Mapware conducted UAV flights to capture hydrographic data on coastline changes (including effects of erosion, both storm related and natural) and create detailed maps of previously unmapped marshland.

Sandwich fire personnel talk with Mapware staff during drone training on August 10, 2019. Photo by Mark Snyder

Daniel Chu of Mapware of Daytona Beach, Florida demonstrates how to pilot one of the drones being sought by the Sandwich Fire department. Photo by Mark Snyder

Sandwich personnel expressed optimism that the resulting maps would greatly aid in familiarity with the terrain and for rescue planning — the marshland was a very popular kayak route where people frequently got lost or stranded with medical issues.

Traffic management and live video

UAV flights provided real-time livestream video of traffic flow, congestion, and choke points in the Cape Cod/Sandwich area, as well as alternate routes. For emergency responders, these alternate routes provide critical opportunities to get into and out of high-traffic areas in order to render aid and assistance.

Fuel spill response

In addition to the planned exercises, Mapware responded within minutes to a fuel spill at the local marina in order to provide live video coverage and detailed images of fuel spill response and environmental cleanup operations via UAV.

Authorities noted the high-definition image and video collection, which allowed personnel to define the “sheen” of the fuel in the water. Personnel aboard the responding Marine Units could not see the sheen from the surface view, and they were very appreciative of the overhead live video, which gave a clear picture of how far the fuel spill was spreading within the marina.

Conclusion

The overall goal of Operation Bird's Eye was to assess the potential of UAV technology to improve the efficiency of search and rescue, shark patrol, coastal and environmental mapping, traffic monitoring, and incident response operations.

From completing planned exercises to assisting with an unexpected fuel spill, Mapware successfully demonstrated to officials in the town of Sandwich, MA that UAVs are valuable tools for public safety.

Learn more about Mapware

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