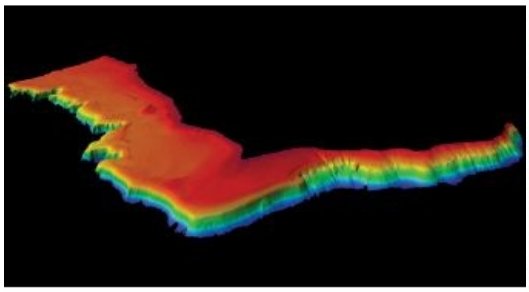
Hydrographic Surveying in the Wake of Hurricane Irma



Phil Payne gives a personal account of his experience in the Caribbean at the time of Hurricane Irma. He reminisces on the usefulness of basic techniques when the latest systems are, for whatever reason, not available, especially after being in the eye of one of the most powerful hurricanes ever recorded, and thinks that in the circumstances he is justified to say that no two days are the same.

Organising equipment contracts, the hire of a suitable vessel, and bringing people together in a foreign country is never an easy task, but come September last year I was ensconced in the starboard forward cabin of a 47 foot power catamaran with the survey equipment all installed and humming away nicely. The backdrop was the island of Montserrat where I had joined the boat a week or so into the survey of its west coast. With impressive sunsets, generally calm seas and the occasional pod of dolphins to keep us company, the standard 12 hour working days were some of the most pleasant I have ever spent surveying.

The Calm before the Storm

The boat was fitted with the latest multi-beam sonar and high accuracy GNSS/IMU positioning system which enabled us to provide full coverage of over 52km^2 within a couple of weeks. This also included an extension to the south of the island to cover a scientifically important pyroclastic flow from the SoufriÑre Hills Volcano that had devastated the southern half of the island during the mid to late 1990's, a period when multi-beam and GPS were just starting to become common place in the hydrographic survey world.

With a successful survey of Montserrat completed, see figure 1, we rose early to make the journey to Tortola in the British Virgin Islands where we had a further months worth of work to complete a survey of the Sir Francis Drake Channel, the main passage through the British Virgin Islands. After a visit to the previously set up tide gauge to confirm it was still operational, we set about data collection in the waters to the north of Peter Island. While we were aware of a powerful hurricane heading for the Caribbean, their paths are notoriously difficult to predict, we were hopeful that it would still turn north and miss the island by a suitably safe distance.

Some 5 days later we pulled into the Marina, where we had hired the boat from, a full day before Hurricane IRMA was due to pass, still some distance to the north of the island. The local staff seemed calm as they went about securing all the vessels and allocating us rooms in the adjoining hotel. With the Hurricane still due to head north of the island, but a large storm surge expected, it was a close call. As we retired to our shared room, our mobile phones and tablets working overtime to access the various forecast centres that were slowly converging on the stark truth, that the hurricane was not turning north, but indeed was going to pass directly overhead. As the skies darkened and the wind speeds increased, I managed one last phone call, an interview for the BBC, before the internet went dead.

The Aftermath

As the hurricane passed, myself, Paul Aldersley (UKHO) and Ian Andrew's (Andrew's Survey) emerged from our room to try and locate our vessel with a view to getting back up and running as quickly as possible to assist in ensuring safe passage for local vessels as well as any potential aid relief efforts. Unfortunately, our optimism as to the state of the boat was soon dashed literally against the rocks as after some searching we found her over 200m away from where she had been secured, one half on an embankment and the other half submerged, see figure 2. With an expectation of the hurricane to pass north of the island, we had removed the majority of the equipment, but left the pole mount and cabling in-situ to allow a quick remobilisation. A quick look at the pole made it very clear that we would not be remounting the multi-beam anytime soon, on this or any other vessel.

A day spent with the Governor, the initial UK Military presence and local disaster relief coordinators soon made it clear that with communications between the islands being sporadic at best, anything we could do to open up ports, jetties and other coastal facilities would be invaluable, so while Ian, our survey engineer was dispatched to the local radio station to assist in getting it back broadcasting, myself and Paul went about setting ourselves up as best as possible.

Reverting to Basics

An as yet unnamed boat that had surveyed the hurricane almost unscathed, was kindly lent to us by the Moorings, which came with its own navigation suite including wide area differential GPS and single beam echo sounder along with a local skipper. We had started

constructing a sweep out of rope, fishing line and divers weights (all recovered from the wreckage of the marina), but the equipment available on the boat undoubtedly saved us many hours trying to put together a technique that has always been a challenge to all but the most worked up survey teams. Instead a lead-line was constructed and measured out using a 0.5m scale on top of the boat's cool box, as the one thing we couldn't scavenge was a tape measure (our own being underwater on the original boat). The lead-line provided a crude calibration for the single beam as well as allowing us to provide soundings along jetties where the boat was unable or we were reluctant to take it. In place of an online system to collect regular positions and soundings I employed an old fashion technique known as paper and pen.

The positions and corresponding depths, taken approximately every 10 seconds along with photographs and positions of those buoys and other navigation markers that had survived the hurricane, were recorded. These were typed up into an Excel spreadsheet to be sent back to the UKHO. Overnight the UKHO processed, checked and included the information onto special chartlets of the area, which I was able to take to the Disaster Management Teams the following morning to assist in the planning and movement of people and stores. Having initially turned down flights off the island a couple of days after the hurricane, 10 days later, with the main areas of interest completed, and the relief effort gaining momentum we finally flew home.

Continued Support

As I write this article I have just received news that a UKHO contracted follow up survey, conducted under the Overseas Territories Seabed Mapping Programme, has just been completed. The data once processed and validated will be used to further improve the navigational safety of all vessels operating in the area. By helping to free up the waterways, I am grateful that I was able at the time, and am still involved in some small part in the huge rebuilding effort still ongoing in the British Virgin Islands and numerous other islands in the Caribbean hit by Hurricane's Irma and Maria. My thoughts remain with the local communities who continue to rebuild their homes, lives and livelihoods.

This article was published in Geomatics World March/April 2018

https://www.gim-international.com/content/article/hydrographic-surveying-in-the-wake-of-hurricane-irma