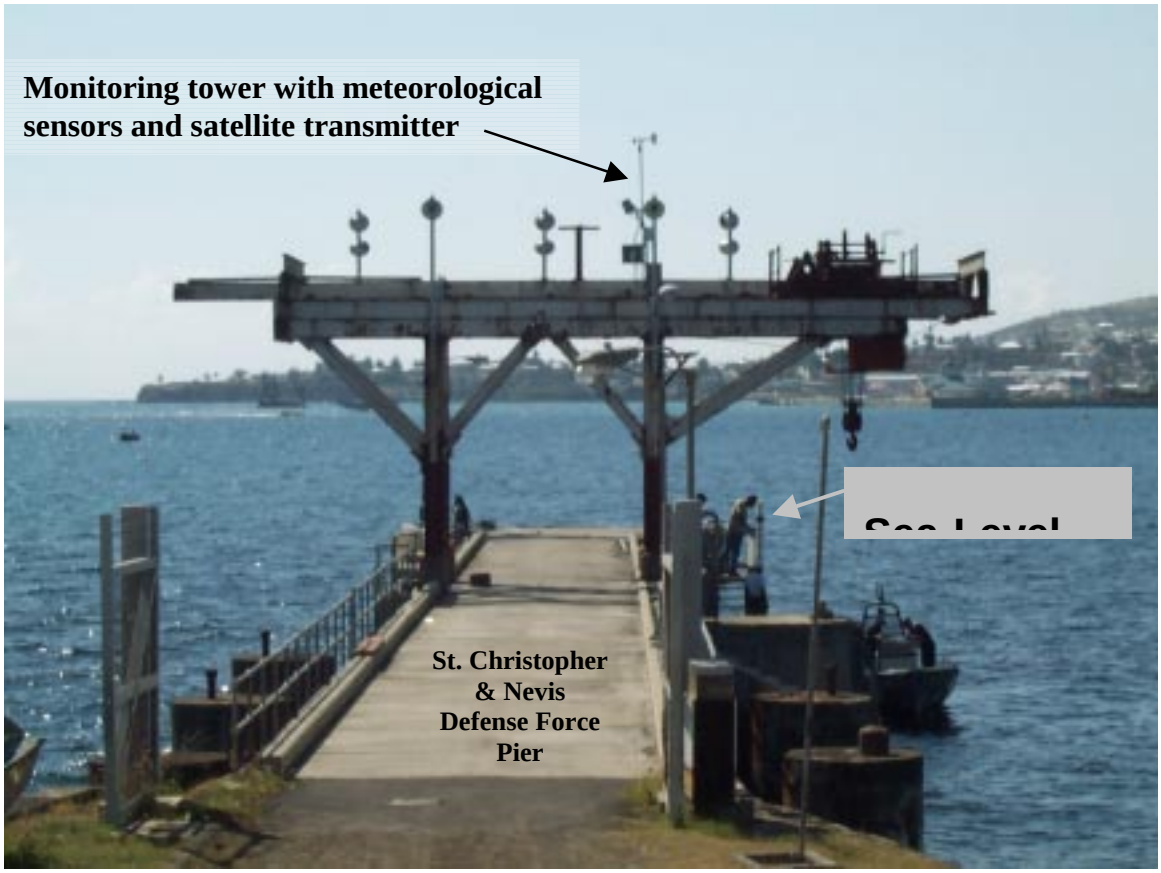
STRENGTHENING THE ST KITTS MONITORING STATION

(4th to 8th March 2001)

TRIP REPORT PREPARED BY:

RON LESLIE: Technical Officer, CIMH
LEE CHAPIN: ARNC, OAS



BACKGROUND

Since its installation, the St Kitts monitoring station suffered damage on two separate occasions as a result of annual storm surge activity. On each occasion, the St Kitts Authority had to make the decision whether to remove or not to remove the station in the event of a hurricane. They chose not to remove the station.
Had the station been removed, no damage would have resulted but other important issues would become relevant. These relate to:

1. What level of storm surge activity would be safe for the station to remain in place?

2. The constant uprooting and replacing the station may progressively weaken its ability to withstand even smaller storm activity.

3. Disturbing the station may interfere with some sensor measurement datum and alter the accuracy of the data produced.

Since there was a willingness to leave the station in place during a hurricane, a decision was made to harden the station so as to minimize the possibility of damage.

REQUIREMENTS TO HARDEN THE STATION

Hardening the station to withstand storm activity required:

1. Relocating the tower and tower based equipment to an elevation out of reach of wave action.

2. Sheltering the sea level sensor structure as far as possible and adding additional clamping hardware.

HARDENING TEAM

Hardening of the station was accomplished by Lee Chapin, OAS; Ron Leslie, CIMH; and Messrs. Rawlins and Martin from the St. Christopher & Nevis Air & Sea Ports Authority (SKNASPA). Mr. Martin recently graduated from the CIMH Instrument Repair Course and has been appointed technician for the station.

ACTIONS TAKEN IN HARDENING THE STATION

DISASSEMBLING THE STATION

The station was disassembled and removed from its location on a concrete pylon. During that process we managed to save all the hardware except the concrete embedded bolts that secured the tower to the concrete pylon.

PREPARING THE STATION FOR REASSEMBLY

Before re-installation, the components of the station (i.e. sensors, DCP, solar panel, GOES Antenna, metal tower, wiring, etc.) were examined and check for physical wear and tear. The Protective Well, including the Parallel Plate Assembly, was covered with much marine growth. During the station's existence, marine growth hardened and bonded itself to the Protective Well making its removal difficult and requiring much effort. The end of the Sounding Tube, where it enters the water, was also cleared of marine growth.
Additional hardware items (sensor cable, cable conduit, fasteners and other disposable items) were purchased locally to support the new installation.

RELOCATING THE STATION

The tower and tower-based equipment were moved to a new location on top of an abandoned overhead hoist straddling the pier. The disused metal hoist was in an advanced state of corrosion but still sturdy and solid enough to support the monitoring station. The sea level part of the station was placed below the metal hoist on a wooden structure that supports a stairway leading to the water surface. Because the DCP (on the tower) was now at a height much farther away from the water level unit additional conduit was used to extend and protect the sensor cabling between the water level unit and the DCP.

NEW SENSOR ADDED

Thermistor sensors to measure the air temperature within the Protective Well were added to the station for the first time.

SENSOR REPLACEMENT

A new Aquatrak Controller unit was installed in the DCP to replace the one that was sent for repairs sometime ago.

RE-LEVELING THE SEA LEVEL SENSOR

Because the sea level unit was moved to a new location, a re-leveling of the sensor relative to the primary benchmark was necessary: this was done by the SKN Survey Department.

RESTARTING THE SYSTEM

The System was powered-up at the end of the wiring process. On examining the sensor readings, it was observed that no data or bad data was coming from the wind speed unit, the sea level sensor and the water temperature sensor. These devices were further assessed and it was decided that replacements were necessary. The wind speed unit had developed a bad bearing.

NOTE: After returning from the hardening exercise, a new wind speed unit and a sea level sensor were sent to St. Kitts to replace the bad ones. A new water temperature sensor will be sent in due course.

ADDITIONAL ASSISTANCE

Mr. Robert Warner, Operations Manager of the St. Christopher & Nevis Air & Sea Ports Authority, provided the usual high standard of support to Component 1 activities. That included hotel reservations, transportation, site access and manpower.

The Coast Guard unit (landlord of the monitoring site location) gave us access to their workshop and facilities. That on-site resource to workshop tools, electric power and workspaces was critical to the success of our work.

RECOMMENDATIONS

1. That the access metal ladder on the hoist is strengthened or a new one put in place: to allow safe and easy climbing to the tower equipment.

2. That Mr. Martin is allowed further training to perform his role in maintaining the station.

ACKNOWLEDGEMENTS

We would like to thank the above individuals and Institutions for their valuable support and assistance in accomplishing our task.