Project Name: SOUTH TOTO ACOUSTIC MEASUREMENT FACILITY (STAFAC)

Organizations/People Involved:

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Navy's Atlantic Undersea Test and Evaluation Center, (AUTEC)
Naval Facilities Engineering Service Center (NFESC).
Sound and Sea Technology, Ventura, CA

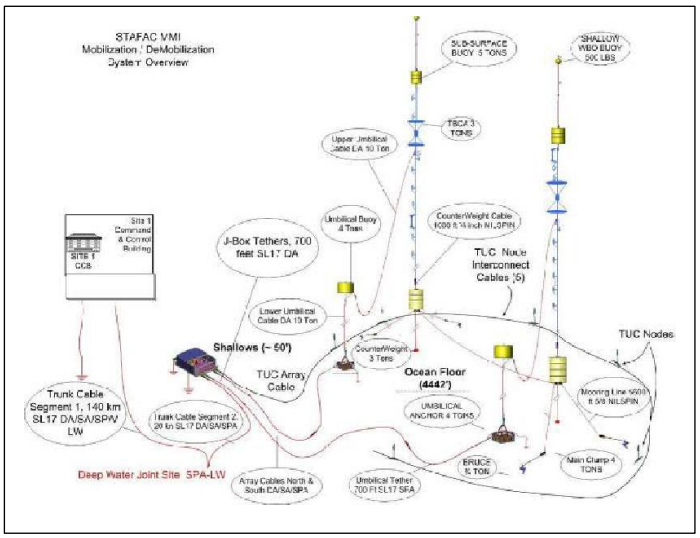
Date: 2005-2008; Installation was 2008

Project Summary:

The submarine radiated noise measurement systems operated by the US Navy in the Southern portion of the Tongue of the Ocean (TOTO), Bahamas was nearing their end-of-life and require replacement prior to FY09. This four-year program, beginning in FY05, replaces the existing surface ship deployed submarine radiated noise, high gain measurement systems with a fixed, bottom mounted, shore connected acoustic system installed in the same area. The main system infrastructure was installed in April through May of 2008, and the acoustic sensors were installed in July – August 2008. The Initial Operational Capability (IOC) for STAFAC is October 2008.

The Mechanical, Mooring, and Installation (MMI) Integrated Project Team, team comprised of personnel from the Naval Undersea Warfare Center (NUWC) in Newport, RI, Naval Facilities Engineering Service Center (NFESC) in Port Hueneme California, and Sound & Sea Technology (SST) in Ventura California were tasked to design, manufacture the mechanical components of the STAFAC system, and to install the entire STAFAC system, including the MMI and array components at AUTEC, Andros Island Bahamas.

The STAFAC System was configured as shown in the diagram to the right. The STAFAC In-Water Mechanical System comprises all bottom mounted telemetry and power cables, deep sea moorings, and related mechanical subsystems incorporated into the AUTEC land and sea sites. These included undersea power and telemetry cables, electro-optical-mechanical terminations; a shallow water mounting structure for a telemetry and power conversion Junction Box; instrumentation pressure vessels;



subsurface floats and suspension components; mechanical mooring cables, fittings, and assemblies; and bottom and counterweight anchors.

The STAFAC Arrays are fixed to the seafloor by a single four-point mooring, with two main mooring buoys connected by a “crosswire.” The mooring assembly anchors both sensor strings at a fixed seafloor location and maintains their lateral separation at the specified distance of 280 (+20 – 0) yards, and at a differential depth tolerance of less than 10 feet. The four-leg mooring is designed to hold two “false bottom” (main mooring) buoys as stationary as possible in all typical current profiles. Each buoy is made of syntactic foam with 12,000 lbs of buoyancy. A wire rope mooring line secures each anchor to each main mooring buoy. A “cross-wire” permanently holds the two main mooring buoys a fixed distance apart (to maintain accurate array separation). A plastic jacketed wire rope counterweight cable and a counterweight, consisting of stacked railroad wheels, was installed by passing the cable through a center hole in each main mooring buoy. A DELRIN stopper was fastened to the counterweight cable to mechanically adjust and set the depth of the array. This arrangement allows for easy lifting of the array for servicing, without moving the mooring or anchors and legs. The stopper enables the array to be automatically repositioned vertically when it is lowered back into its socket. All mooring legs are structural only, with no incorporated telemetry or power cables required. To provide fish-bite protection, the mooring lines and counterweight cables are 5/8-inch diameter NILSPIN Wire Rope. The cross-wire and interconnecting array wires are ¾ inch NILSPIN. Each array main mooring segment is anchored to the bottom of STOTO at a depth (referenced to the center of the arrays) of approximately 4400 feet. Main mooring clump weight anchors with Bruce drag embedment anchors were selected to resist the resultant vertical and horizontal reaction loads. The clump anchor resists the entire vertical component of the load and acts as a depressor for the Bruce anchor, which in turn provides all of the horizontal resistance.

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