

# NEW INSULATORS KEEP ANTENNA SYSTEM UP & RUNNING

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Photos by NAVFAC, SPAWAR San Diego Engineering Staff & NAS Brunswick NAA

Last November, the installation crew was cited in a Bravo Zulu message from Naval Network Warfare Command, which in part stated, "Conducting these actions concurrently resulted in an estimated savings to the Navy of more than \$750,000."

The Very Low Frequency (VLF) antenna system located at Naval Computer and Telecommunications Area Master Station Atlantic Detachment (NCTAMS LANT DET) Cutler, ME, exists to communicate with U.S. Navy submarines. The system is comprised of two tri-deco mono pole arrays. Each array is comprised of six panels.

These panels are suspended between 13,900-foot towers arranged in a star pattern for each antenna. The panels are electrically isolated from the ground utilizing safety core insulators, with a total of four insulators in each panel. Each tower has winches installed at its base which allows the antenna mechanics to lower each individual panel to the ground for maintenance.

In the mid 1990's the original insulators, each in excess of 30 years old, were replaced with oil-filled safety core insulators. Direct lightning strikes were causing a high rate of failure with the safety core insulators. Subsequently, Space and Naval Warfare (SPAWAR) Systems center, San Diego, made the decision to replace all of the safety core insulators with a new fail-safe porcelain string. The new fail-safe insulators were purchased in 2007 and the replacement of the safety core insulators commenced in the south antenna array in late July, 2008.

The new fail-safe insulator strings are approximately 57 feet long and comprised of 10 individual insulators. Each string must be assembled while in the field, utilizing heavy equipment and winches. A completed string weighs approximately 13,000 pounds. Conversely, the safety core insulators were 15 feet long weighing 3,000 pounds each.

The initial installation plan was developed by

NCTAMS LANT DET Cutler personnel with assistance from Naval Facilities Engineering Command and SPAWAR San Diego engineering staff.

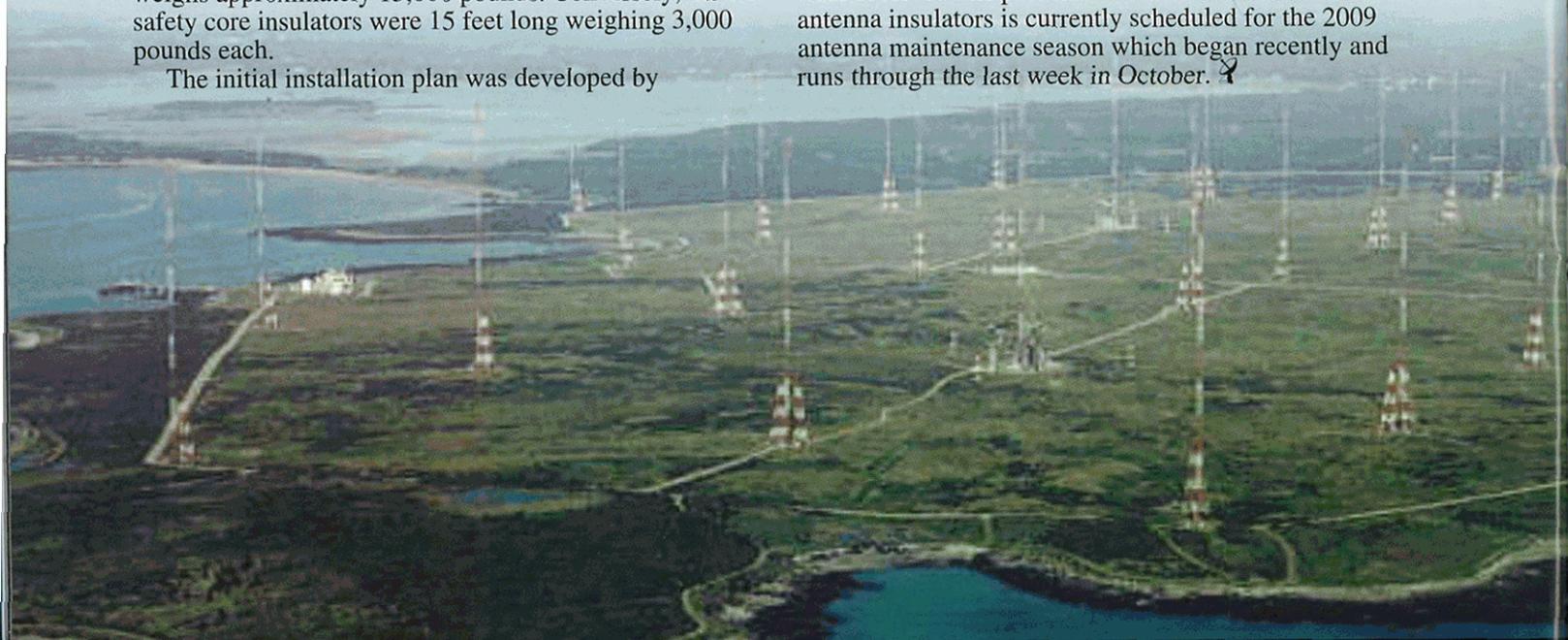
In the fall of 2007, the first of 24 insulator strings were assembled in the antenna field by the detachment's civilian antenna mechanics. The initial installation took 16 hours to complete. The procedure required 10 mechanics, two 15,000 pound winches, two category four cranes and one all terrain forklift, as well as numerous other pieces of heavy equipment.

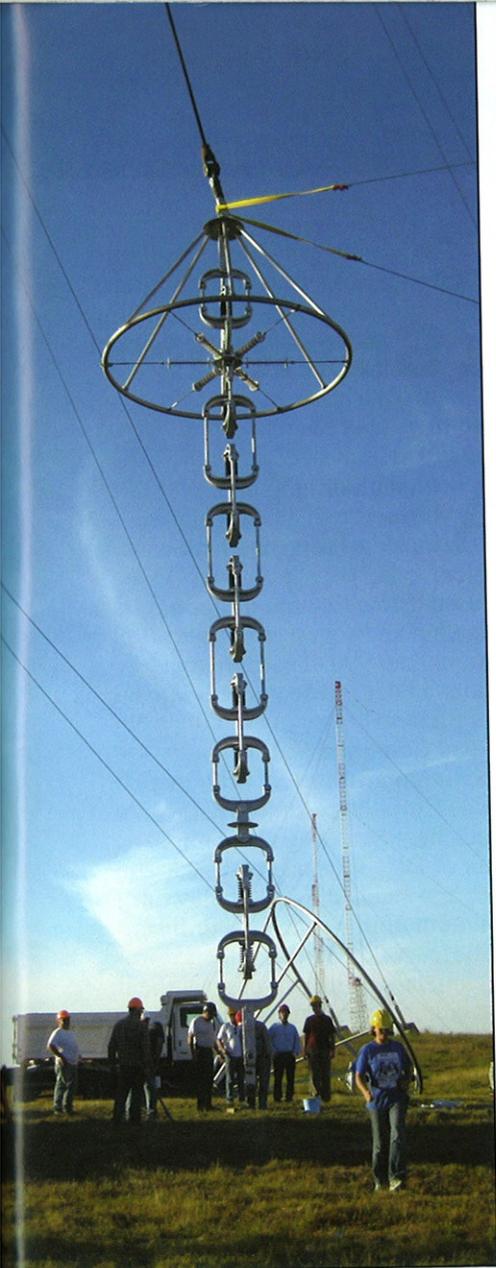
After installing the first string of insulators, the installation procedures were evaluated, utilizing Lean Six Sigma principles. The evaluation process continued throughout the summer, which allowed minor changes to be made to the installation procedures. This included preassembly of some of the smaller components of the new insulator string and pre-staging of equipment and materials the day prior to each insulator replacement. These procedures significantly shortened the amount of time required to install each string.

By the end of the maintenance season, the antenna mechanics were installing two strings per week, each taking nine hours to install. Even with the intricacies of each evolution, weight of the components and the numerous pieces of equipment utilized for each insulator change, there were no injuries sustained.

NCTAMS LANT DET Cutler antenna mechanics were able to complete all normal routine maintenance on both antenna systems -- approximately 13,000 man-hours total -- as well as installing 18 fail safe insulator strings in the south antenna during the 2008 summer maintenance season.

Insulator components for the north antenna system were received this past fall. Installation of the north antenna insulators is currently scheduled for the 2009 antenna maintenance season which began recently and runs through the last week in October.





(Background) NCTAMS LANT DET Cutler, ME. (Clockwise from left) Antenna Riggers assemble one of 10 insulator links that make up the fail-safe insulator chain. Riggers install a large corona ring located in the background. A completed fail-safe insulator string.