

Commercial Sounder Solves Navy's Part Obsolescence Issues

COTS Solution Harnesses the Power of Technology for the Warfighter

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Supportability is not an uncommon topic of discussion for U.S. Navy equipment configured with 1960s technology. This is a particular area of concern for the AN/UQN-4,4A sonar sounding set, which has been the Navy's standard depth sounder for more than 35 years and is installed on most U.S. Navy surface ships and several foreign navy ships. Part obsolescence and outdated electronic technology have driven the U.S. Navy's Program Executive Office (PEO) In-Service Organization to find solutions for the ever-growing problem of supportability.

For example, the AN/UQN-4,4A uses diode transistor logic-integrated circuitry and electro-sensitive chart paper, both of which have long been replaced by more modern technology. The focus on part obsolescence issues began in the late 1980s. The Diminishing Manufacturing Sources program at the Naval Surface Warfare Center (NSWC) Division Crane was subsequently implemented to help identify those electronic parts that were at risk. The combination of lifetime buys for those hard-to-find parts, validation testing of replacement parts manufactured under a different process and component remanufacturing has contributed to the increased ownership cost of the legacy system.



Knudsen Engineering 320N navigation echosounder and 320N remote indicator.

In an effort to offset these high parts costs, consideration was given to the recovery of assets from decommissioned ships for parts cannibalization. However, decommissioned ships that are available for foreign transfer do not allow for the removal of AN/UQN-4,4A equipment, thus limiting potential future asset recovery. Without cannibalization, continued support for existing systems initially projected through the year 2015 will be in jeopardy.

Commercial Alternatives

The obvious solution for the AN/UQN-4,4A supportability issue was to replace it with a commercial off-the-shelf (COTS) depth sounder. A consolidated effort between PEO, NSWC Crane and the Naval Undersea Warfare Center (NUWC) Division Newport has been underway for the last eight years to find a suitable replacement candidate.

Work began in 1998 by soliciting industry to demonstrate potential COTS replacement depth sounders at the NSWC Division Crane Glendora Lake Facility. Seven companies demonstrated eight different depth

sounders. Depth sounders from two companies were selected for further evaluation based on their performance at Glendora.

In the summer of 2000, with the help of NUWC Newport, the two top candidates were installed onboard the *Carolyn Chouest*, along with an AN/UQN-4, and tested on a trans-Atlantic round-trip voyage using the Navy standard 12-kilohertz transducer. This test narrowed the suitable COTS depth sounder replacement candidates down to one, the Knudsen Engineering Ltd. (Perth, Canada) 320M precision echosounder. The 320M performed on a level equal to or better than the AN/UQN-4.

Since the trans-Atlantic test, NSWC Crane has been working closely with Knudsen Engineering to try to develop a plug-and-play replacement for the AN/UQN-4,4A. The AN/UQN-4,4A has many unique interfaces not supported by any commercial product. Not supporting all AN/UQN-4,4A interfaces would result in costly modification to interfacing systems, and make the COTS depth sounder much less acceptable and useable in the fleet.

Meeting Navy Requirements

Knudsen Engineering agreed to modify the 320M to better serve the Navy's needs for navigational depth sounding. The result was a Knudsen Engineering 320N navigation echosounder that is configured with a touch screen for set-up, operation and echo-


gram display, and a hard drive that records and stores depth data and supports all AN/UQN-4,4A unique interfaces essential in replacing the AN/UQN-4,4A.

The 320N was installed under a Navy Temporary Alteration in the spring of 2002 onboard the USS *DeWert* for fleet evaluation. The *DeWert* used the 320N exclusively for three months to verify proper operation of the depth sounder under actual Navy shipboard conditions. The performance of the 320N was equivalent to that of the AN/UQN-4,4A, and the ship's crew judged the system a "suitable replacement" for the AN/UQN-4,4A. In March 2005, the first two permanent installations of the 320N took place on the Navy's Self-Defense Test Ship and the U.S. Coast Guard cutter *Mellon*.


The 320N complies with all Baseline 2 (full AN/UQN-4,4A equivalency) requirements, meaning that it supports all AN/UQN-4,4A electrical interfaces and operating environments.

The 320N meets operating temperature, electromagnetic interface and shipboard vibration and shock specifications. In addition, the 320N con-

Then...1965
AN/UQN-4



Now...2005
320N





- 1960's Technology
- Serious Supportability Issues
- Labor Intensive and Expensive to Overhaul
- Significant Parts Obsolescence
- Very High Replacement Part Costs for Critical Parts

- Cost Effective COTS Solution
- Available on GSA
- Supports ALL AN/UQN-4,4A Electrical Interfaces
- Meets EMI, Temperature, Shipboard Shock and Vibration Requirements
- Easy Installation on AN/UQN-4 Foundation
- Uses TR-331 or TR-355 transducer
- LCD Touch Screen System Control
- Windows Based Operation
- Internal Hard Drive Data Storage

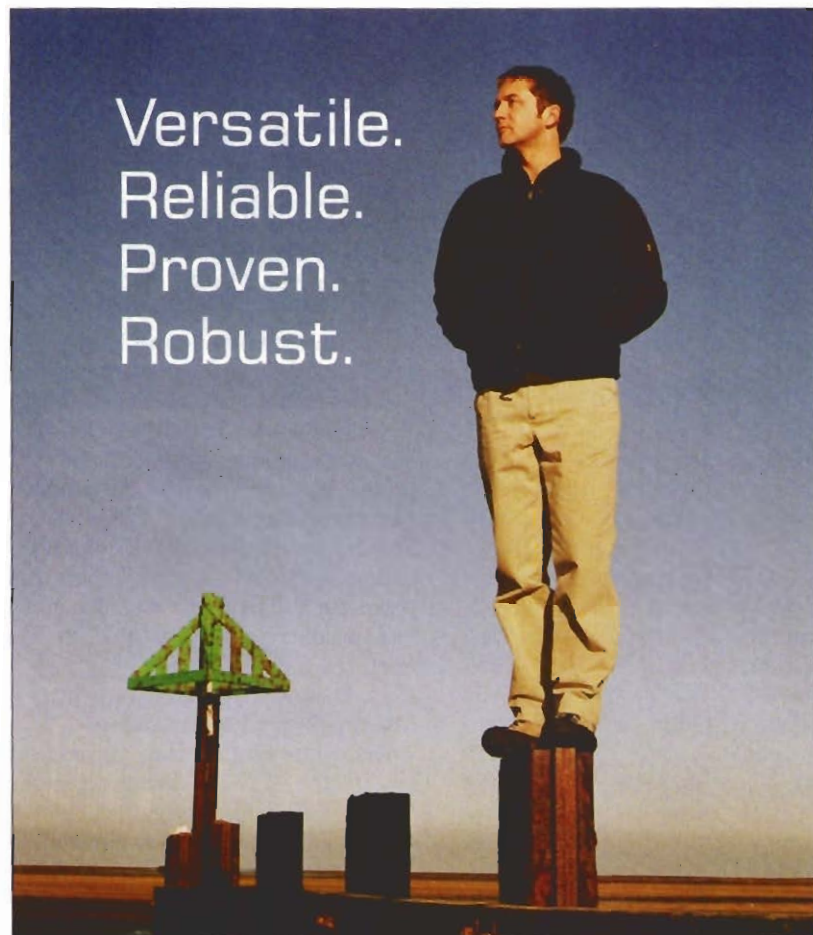
Comparison between the AN/UQN-4,4A and the 320N navigation echosounder.

forms to the Navy Oceanographer operational depth range requirement of 4,000 fathoms.

The 320N design incorporates state-of-the-art digital signal processing technology and operates with the lega-

cy system's standard 12-kilohertz transducer. The echosounder is also configured to support up to four remote indicators.

In addition, a significant product cost benefit is achieved, since the



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320N price (including installation) is much less than the average overhaul cost for the legacy depth sounder. Installation of the 320N on Navy ships can be accomplished utilizing simple adapter brackets mounted to the existing AN/UQN-4,4A foundation.

ILS Support

Integrated Logistic Support (ILS) certification (which addresses supply support, configuration identification, technical and maintenance support manuals, and training requirements) is a key element for U.S. Navy fleet installation of the 320N, and that process is near completion.

Two critical steps in the process that would allow for the installation of the 320N on Navy ships will be to determine the methodology that would authorize the 320N to become the new U.S. Navy program of record (navigation echosounder) and the development and approval of a ship change document (SCD) through the Navy Ship Maintenance program. The 320N SCD process can only move forward when both sponsor funds and installation schedules have been identified. *1st*

For more information on this subject matter, visit our Web site at www.sea-technology.com and click on the title of this article in the Table of Contents.

Arvids Plesovs is an electronics engineer at the Naval Surface Warfare Center Division Crane. He has been involved as an In-Service engineering agent for the AN/UQN-4 and 4A depth sounders since 1994. Plesovs has been the project leader of the commercial depth sounder evaluation, selection and customization taskforce since 1998.



Howard Herndon has been affiliated with the Naval Sea Systems Command Communication, Sonar, Depth Sounder and Surface Ship Antisubmarine Warfare Transducer programs for 25 years. After retirement from Naval Surface Warfare Center Crane in 1994, he formed his own corporation, Technical Services Consulting Inc. Most recently, Herndon has accepted a position at EG&G. He has been a part of the commercial off-the-shelf depth sounder evaluation process since 1999.



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