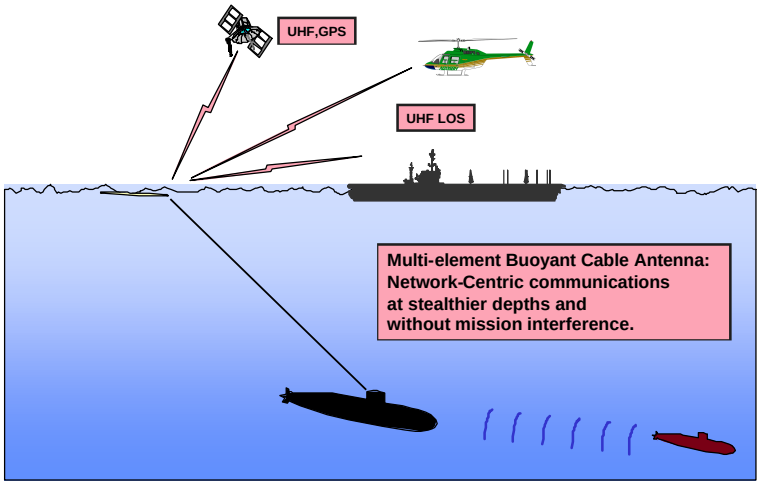
# Fact Sheet

***United States Navy***

Space and Naval Warfare Systems Command
Public Affairs and Corporate Communications
4301 Pacific Highway, San Diego CA 92110-3127
Telephone: 619-524-3432/3/4 FAX: 619-524-3469

# The Advanced Buoyant Cable Antenna Program

The submarine force has widely recognized the need for a robust communication capability while at speed and depth. Modern warfighting strategies require interoperable, real-time data exchange for joint operations. In order to participate effectively in the missions of the future, submarines must be able to communicate and exchange messages and other data with the afloat fleet, aircraft, and ground forces to enable a joint strike capability, collaborative warfare, surveillance and reconnaissance, and special warfare via IT-21 Net Centric Protocol.




The highest data rate method for a submarine to receive this type of data is via satellite. However, to obtain satellite communications capability today, it is necessary for a submarine to deploy a mast satellite antenna while at Periscope Depth (PD) – thus interfering with its primary undersea stealth mission.

The submarine fleet currently has a communications antenna that allows the submarine to receive message traffic while operating in a stealth posture: the Buoyant Cable Antenna (BCA). This antenna is a long floating wire that is towed behind the submarine. With this antenna, the submarine can receive broadcast transmitted by the Extremely Low Frequency (ELF) or Very Low Frequency (VLF) transmitters located on shore sites. Although reliable, the data can be received only at very slow rates – much slower than a good computer-modem telephone connection. The submarine can transmit through this antenna in the High Frequency (HF) band – but this is a "backup" function, and it does not provide the two-way high-speed data link that is needed for the Internet Protocol (IP) network-centric communication capability required for inter-operable tactical communications with the afloat fleet and aircraft.

The Advanced Buoyant Cable Antenna (BCA) seeks to field a BCA-like antenna that is operational for satellite communications. Potential applications include Fleet Broadcast UHF satellite communication services such as submarine advanced digital network services (currently provided via the UHF Follow-On (UFO) satellites), Global Positioning System (GPS) navigational data, L-Band commercial satellite, threat detection, and ISR.

The Multi-element Buoyant Cable Antenna (MBCA) is a technology demonstration for the Advanced BCA program. This program has funding for the design, building, and at-sea demonstration of an UHF satellite communications and GPS antenna. The at-sea demonstration is scheduled for the end of FY 02. The technical organizations involved in the effort include a team of Navy and University laboratories and a current

manufacturer of Fleet equipment: Naval Undersea Warfare Center (NUWC) – Newport, Massachusetts Institute of Technology Lincoln Laboratory (MIT/LL), Johns Hopkins Applied Physics Laboratory (JHU/APL), and Sippican Ocean Systems, Inc. Sippican is the manufacturer of the current BCA antenna and deployment system. This teaming arrangement provides a blend of academic innovation, Naval laboratory experience, and industrial pragmatism – with the goal of achieving the Fleet's requirements with an affordable and reliable implementation.

New antenna technology is being developed and tested in this design. An array of up to 12 individual UHF antennas is used with Adaptive Beamforming, a technique commonly used in acoustic surveillance and radar arrays, to achieve high-performance. New foam materials are being developed to keep the antenna afloat and protect it at depth while the submarine transits at speeds appropriate to the mission. The MBCA demonstration will show end-to-end IP connectivity at useful data rates.

The MBCA program is a joint program that evolved from two independent programs, the Office of Naval Research (ONR) and the Defense Advanced Research Projects Agency (DARPA). By combining the financial and technical resources of the two programs, a more useful and cost-effective product can be expected. SPAWAR PMW-173 has assumed Program Management of the MBCA program while technical program management is the responsibility of NUWC. MBCA is currently at the technology development phase of the program. The system will be designed and fabricated during the first two years, FY 00 and FY01; a demonstration is scheduled in the third and final year of the program (FY 02).