

# Communications Trends Reshape NavShips Communications R. and D.

By CDR W. W. Potter

*Branch Head, Ship Communications Branch  
Naval Ship Systems Command*

Recent trends in Navy communications have reshaped and sharpened the focus of ship communications research and development in the Naval Ship Systems Command. The trends, which can be divided into three general areas, are the quantitative documentation of communications problems, reorganization and restructuring within the Naval Material Command, and new research and development programs.

Quantitative documentation is the amassing of conclusive information through factual evidence, gathered under controlled conditions, on communications problems. It is the result of a concerted Navy-wide effort during the last several years. One of its main objectives has been to thoroughly document communications problems so that program change requests will stand up better under Department of Defense scrutiny.

Typical of the trend were the two fleet communications exercises, Baseline I and Baseline II, held in 1965 and 1966, which duplicated conditions now being experienced in Southeast Asia. They were organized by the Commander, First Fleet, to show the need of far reaching communications improvements.

Results quantitatively documented the fact that the fleet was not meeting established communications criteria, especially in terms of communications delivery time. They showed that unless something was done to update Navy communications equipment, the communications problem would become overwhelming as the volume of message traffic continued to grow.

Another example was the special, one-time requirements study group convened by the Chief of Naval Operations (CNO) early in 1967 to take a detailed look at Navy communications problems. The objective: to determine and rank in order the major problems facing naval communications today.

Results of the study list 26 areas of major Naval communications deficiencies. They range all the way from employment to functionally inadequate equipment

to the lack of detection resistance. They include lack of systems quality control and monitoring equipment, ineffective message handling techniques, and "black box" packaging.

All of these deficiencies may be quite obvious and many are not directly related to research and development. It is important to note, however, that the study did more than just identify the Navy's communication problems. It quantitatively documented them and ranked them in order.

This trend began in 1965 when an afloat communications program change proposal, submitted to the Secretary of Defense (DOD), was returned with a request for more documentation. DOD advised the Navy to do more work study and resubmit the proposal when there was a better grasp of the problems. They also stated that work-study analyses begun by the (then) Bureau of Ships indicated the Navy's whole communications doctrine should be rewritten.

In 1965 the Director of Defense Research and Engineering (DDR&E) terminated the large, integrated, ship communication R. and D. project, Southern Cross. They said it was more urgent to start a program to identify and rank in order the major problems facing fleet communications and they urged systematic, sensibly related attack be made on solutions to the problems.

## Baseline II Movie

Part of the documentation of the fleet communication exercise Baseline II was a movie. It is highly regarded by Navy communications officers and is available to interested persons. For information get in touch with CAPT Paul Lee, Afloat Communications Management Office, Naval Ship Engineering Center, Code 6171.

The second trend that has reshaped NavShips Communications R. and D. is one of reorganization and restructuring within the Naval Material Command. Major recent examples are the Naval Ship Systems Command—Naval Electronics Command division of communications research and development projects and the establishment of the Afloat Communications Management Office (ACMO) in the Naval Ship Engineering Center (NavSec).

The division of the former Bureau of Ships communications projects between NavShips and NavElex put all the R. and D. projects directly associated with shipboard communications in NavShips. These included the remnants of Southern Cross and an integrated submarine communication antenna project.

All other communications projects related to the general application of techniques to communications went to NavElex. These included the receiver project VERDIN and the program HARPY.

In NavShips the management of all engineering development R. and D. was assigned to technical groups in the Naval Ship Engineering Center while the management of advanced and exploratory development R. and D. remained in NavShips. To direct and coordinate this management as well as that of all advanced development communication related effort in the Command, NavShips formed the Afloat Communications Management Office (ACMO) in NavSec.

ACMO is the focal point of contact with the Chief of Naval Operations, Chief of Naval Material, and forces afloat on all shipboard communication matters. It is organized in five sections; systems integration management, research and development management, production management, work study, and submarine communications integration management.

With these sections together, all of the ships communications research and development elements in NavShips, with the exception of exploratory developments and interior communications, are under one roof. Also under the same roof are the production management (at least the monitoring and awareness of production contracts) and the work study effort which has provided excellent results in the search for better utilization of current facilities and personnel.

It is the responsibility of the ACMO systems integration management section to see that all efforts fit into a sensible program for the future. It is also their responsibility to see that NavShips is as responsive as possible to the fleet.

Another development which added weight to the need for the ACMO type management effort was the creation in DDR&E of the Joint Service Office in November 1966. This is a small office with one military representative from each of the four services. Its main

function is to oversee all DOD command, control and communication programs and requirements with an eye toward their multiservice applications.

All research and development command, control, communications programs which reach engineering development will have to be coordinated with JSO. Also, all large programs which reach production will have to have approval of JSO. NavShips is already meeting with JSO on development of a high speed teletype for a shipboard user terminal with a view toward coordination with other services.

The third trend is the new communications developments of 1967 which may come to fruition in the 1970s. It includes outgrowths of Southern Cross, the advent of satellites, and amphibious warfare communications.

Some of the outgrowths of the cancelled Project Southern Cross have evolved into a major, unique, advanced development effort. It is unique at least in the communications world in that part of the effort is a centralized management project for ship communications.

The effort is made up of the best portions of Southern Cross and is placed in four projects; three in advanced development, one in engineering development. The projects are Advanced Shipboard Communications, Electromagnetic Radiation Reduction, Ultrareliable Radio Frequency and Terminal Equipment, and Shipboard Communications Equipment.

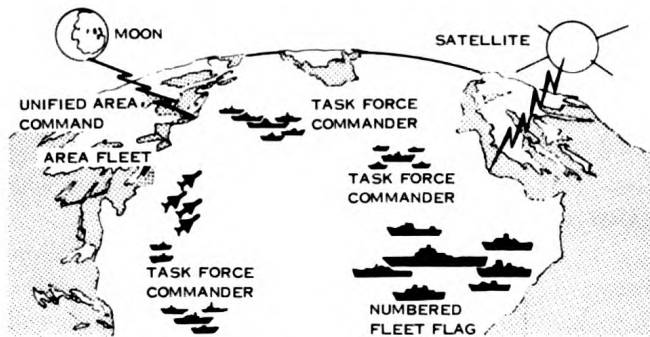
Advanced Shipboard Communications is the centralized technical management project. All design, specification writing, operations analyses, and studies, etc. for the other projects are done here. The other projects contain the more visible procurement contracts or specialized tests.

Another important new development affecting ship communications R. and D. is satellites. Satellite communication development includes both the Defense Communication Satellite Program (DCSP) and the Tactical Satellite Program (TACSAT).

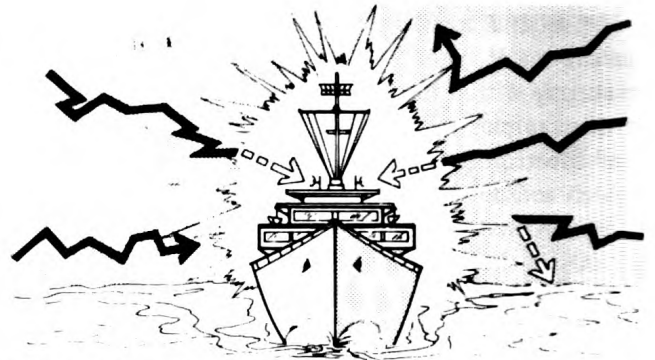
DDR&E predicted in 1965 that satellites would first supplement, then eventually replace HF and that the Navy must plan for this replacement. NavShips studies back-up this prediction. The command has conducted several preliminary investigations which leave no doubt that satellites will absorb the major burden of communications by the 1980s.

Satellites show every sign of providing the breakthrough that communications has been looking for. They will provide the breather that HF has needed for years and permit intelligent communication system planning for the future. Currently one high power HF transmitter after another is stuffed on board to meet increased requirements until every "rusty bolt" on board effectively blocks out all the ships' receivers.

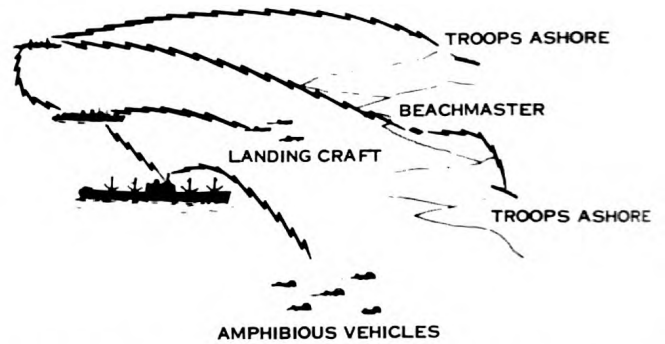
Some of the new communications developments of 1967 which may come to fruition in the 1970's.



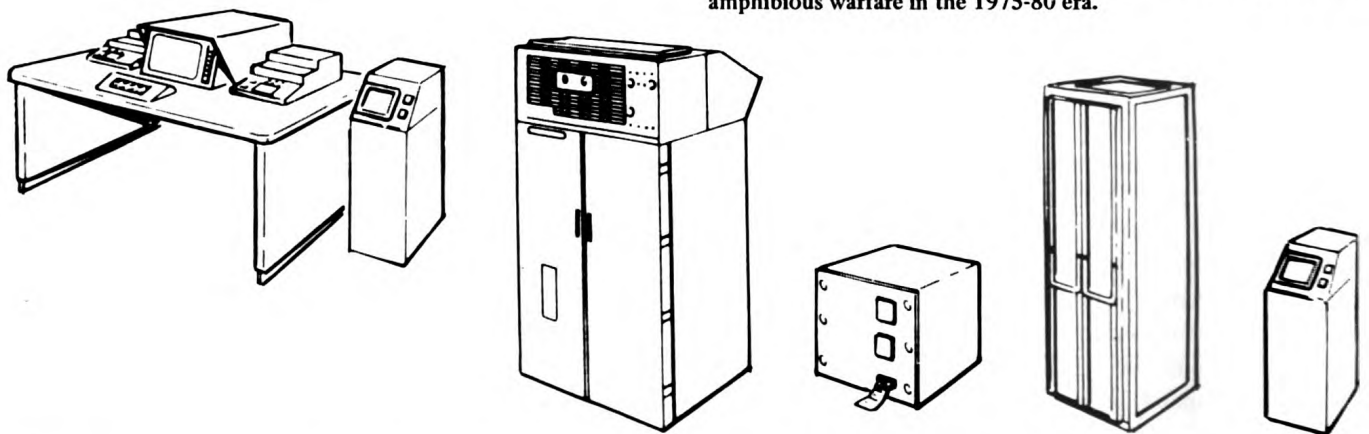
**ADVANCED SHIPBOARD COMMUNICATIONS**—This project, all the elements of which are shown in the drawing, is the centralized technical management project for the four major projects that evolved from the best portions of Southern Cross. Advanced Shipboard Communications provides identification, analysis, and rank ordering of fleet communication problems, analysis and design support for effective utilization and integration of Satellite Communication (Satcom) into the shipyard communication system, development of Message Processing Distribution System (MPDS) for CVA(N)-68, and performance requirements and design specifications for a Semiautomatic Circuit Performance Monitor. The project also provides performance specifications for a prototype communications system for Numbered Fleet Flagships (NFF) and other ship types, development of design and integration guidance and specification to provide Navy communications R and D management with technical information necessary to ensure the evolution of the present shipboard communication complex into an effective coherent communications system, and performance requirements and design specification for reliable, high performance RF and terminal equipments.



**ELECTROMAGNETIC RADIATION REDUCTION**—This project is designed to investigate causes of self-generated electromagnetic interference generated in ship's structures, develop methods for control or reduction of this interference, and develop specific antennas applicable to ship communications to satisfy system characteristics developed under the Advanced Shipboard Communications Project. The drawing shows present shipboard environment degradation.



**AMPHIBIOUS WARFARE COMMUNICATIONS**—This new R and D communications project, symbolized by the drawing, evolved in 1967 and encompasses all factors involved in the recent trends reshaping NavShips' communications R and D. It is a two year advanced development project to analyze and define communications requirements and interfaces for all phases of amphibious warfare in the 1975-80 era.



**ULTRARELIABLE RADIO FREQUENCY AND TERMINAL EQUIPMENT**—Highlights of this project, which like Advanced Shipboard Communications, and Electromagnetic Radiation Reduction, evolved from Southern Cross, are ultrareliable user terminals, MF-HF transmitting, and VLF-HF receiving equipment incorporating microminiaturization, solid state techniques, and provisions for the fault location, remote tuning selectivities, and overload characteristics required for shipboard operation. The equipment will consist of modular elements that can be applied flexibly to varying fleet installation needs. Various types of the equipment are depicted in the drawing.

A study to produce a plan for the phasing out of HF as satellites are implemented into the fleet has been undertaken by the Afloat Communications Management Office.

Justification must be produced to show how much of a role HF will play in ship communications and Nav-Ships must have a reasoned plan to substantiate requests for HF when dollars to pay for satellite terminal production get short.

A new R. and D. communications project is Amphibious Warfare Communications. It evolved in 1967 and encompasses most all of the factors involved in the three recent communication trends.

It is a two year advanced development project to analyze and define the communication requirements and

interfaces for all phases of amphibious warfare in the 1975-80 era.

Part of the project calls for submitting a plan for an engineering development program which will provide an orderly evolution from the communication equipment of today to that which will meet the defined requirements.

Gradual improvements will be introduced and tested in the fleet as they are developed, as per DDR&E direction. Direct coordination with the Army and Marine Corps every step of the way has, also, already been insisted upon by the Joint Service Office.

\* \* \*

---

## Two AE's Christened at Quincy

AE26 (*Kilauea*) and AE27 (*Butte*) were christened on 9 August 1967 at the Quincy Division of General Dynamics. They are the first of a new class of ammunition ships. The 564-foot vessels will be able to sustain speeds of about 20 knots. Each will displace about 17,490 tons and will be manned by a crew of 400.

The ships are intended to carry missiles and other ammunition to forward areas and then transfer their cargo to combatant ships while underway at sea. A distinctive feature of each ship is a Fast Shuttle Transfer System (FAST) which permits mechanized handling of missiles and other ammunition from stowage to offloading stations and then across high lines to the receiving ships.

The christenings were unusual in that they were performed by remote control. Because of the short duration of the high tide needed to move the ships from their construction basin, the sponsors would not have had time to board the ships, christen them and disembark. Therefore, the sponsors pulled lanyards that triggered christening devices aboard the ships to break the bottles of champagne.

Sponsor for *Kilauea* was Mrs. Michael J. Kirwan, wife of the Congressman from Ohio. Mrs. William Proxmire, wife of the Senator from Wisconsin christened the *Butte*. RADM Arthur R. Gralla, Commander of the Naval Ordnance Systems Command, was the principal speaker at the christening ceremony.

Twin ammunition ships *Kilauea* and *Butte* during double christening ceremonies at the Quincy Division of General Dynamics. Due to tide conditions, remote control devices were used to break the champagne bottles aboard the ships.



October 1967