

## DOCUMENT RESUME

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Report to Rep. Philip E. Ruppe; by Fred J. Shafer, Director, Logistics and Communications Div.

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Budget Function: National Defense: Department of Defense - Military (except procurement & contracts) (051); General Science, Space, and Technology: Telecommunications and Radio Frequency Spectrum Use (258) .

Organization Concerned: Department of the Navy; Department of Defense.

Congressional Relevance: Rep. Philip E. Ruppe.

Authority: S. Rept. 95-129. S. Rept. 95-325.

The Navy is considering as an alternative to the proposed Michigan Seafarer a combined system of the present Wisconsin Test Facility and the proposed test facility for the Michigan Seafarer. The full-scale Michigan Seafarer as presently planned would use 2,400 miles of cable in a 4,000 square-mile area and would include the proposed K. I. Sawyer test facility. The Wisconsin Test Facility, at Clam Lake in northern Wisconsin, consists of a control center, a transmission station, two 14-mile cables aboveground, and one 14-mile cable underground. In present operations, only the aboveground cables are used in transmissions. The test facility proposed for the Michigan Seafarer consists of a control center and a transmission station, with an antenna of one 54-mile east-west cable and two (33-mile and 49-mile) north-south underground cables.

Findings/Conclusions: The alternative under consideration would not require expanding this facility, but the Navy would improve its quality and reliability by replacing the cables and operating with all three cables. All but about 5 miles of these cables would be located either on public lands or along existing rights-of-way. In comparison with the proposed full-scale Michigan Seafarer, the performance potential of the alternative is not as effective; however, the Navy considers it adequate for the basic needs. The estimated range of the alternative is less than the Michigan Seafarer's, but would cover areas that the Navy considers vital. The Navy estimates the costs of the alternative to be \$250-\$300 million, compared to about \$590 million for the Michigan Seafarer. Of this amount, about \$110 million is for the further research and development required wherever an extremely low frequency system is located, about \$56 million for receivers, and the remainder is for building the system. (Author/SW)



UNITED STATES GENERAL ACCOUNTING OFFICE

WASHINGTON, D.C. 20548

LOGISTICS AND COMMUNICATIONS  
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B-184833

October 7, 1977

The Honorable Philip E. Ruppe  
House of Representatives

Dear Mr. Ruppe:

On August 10, 1977, your office asked us to determine whether the Department of the Navy is considering using the existing Wisconsin Test Facility and a proposed facility at K. I. Sawyer Air Force Base, Michigan, as an alternative to the proposed Michigan Seafarer. Your office asked how the costs of such a combined system would compare with costs of expanding the Wisconsin Test Facility. You also asked whether the recently completed National Academy of Sciences' study would be applicable to the alternative, particularly that part dealing with the power requirements and effects, or would new studies be required. We discussed these questions with a Navy official and met with a representative from your office on August 24.

We advised your office that, while the Navy is concentrating its efforts on the proposed Michigan Seafarer, it is considering use of the Wisconsin Test Facility together with the proposed K. I. Sawyer Air Force Base test facility for the Michigan Seafarer. The Navy is not planning to expand the Wisconsin Test Facility, and has not estimated the costs of doing so. All aspects of the National Academy study are applicable to the alternative of using the combined Wisconsin and K. I. Sawyer facilities.

On August 25, you requested a report on: (1) how the alternative of using the Wisconsin Test Facility and proposed Michigan test facility would compare with the full-scale Michigan Seafarer in range, data rate, and cost; (2) why the Navy is not considering expanding the present Wisconsin Test Facility; and (3) why K. I. Sawyer Air Force Base is not the Seafarer test facility as part of the alternative rather than some other Federal area in the western Upper Peninsula, such as the Ottawa National Forest.

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In response to the Department of Defense (DOD) 1978 program and budget request, the Senate Committee on Armed Services reported (Report No. 95-129, May 10, 1977) that its investigations showed that an extremely low frequency communications system less capable than Seafarer may meet the operational requirements of submarines. The Committee's report encouraged DOD " \* \* \* to determine whether an ELF [extremely low frequency] communication system can be defined which will meet the essential requirements of a more survivable submarine force and which would use less land." The Committee encouraged the definition of a smaller system as a compromise approach to Seafarer. The Senate Committee on Appropriations (Report No. 95-325, July 1, 1977) concurred with the Senate Committee on Armed Services.

The House Committee on Appropriations reported (Report No. 95-451, June 21, 1977) that "The Navy should redirect its attention to developing alternative communications systems which will be more environmentally, operationally, and financially acceptable," and " \* \* \* that adequate time exists to develop less expensive and more acceptable alternative systems."

In view of the committees' reactions to the program and budget request, the Navy is considering alternatives to the proposed Project Seafarer.

#### Alternative Under Consideration

The Navy is considering as an alternative system the possibility of tying the present Wisconsin Test Facility with the proposed test facility for the Michigan Seafarer.

The full-scale Michigan Seafarer as presently planned would use 2,400 miles of cable in a 4,000 square-mile area and would include the proposed K. I. Sawyer test facility.

The Wisconsin Test Facility, at Clam Lake in northern Wisconsin, consists of a control center, a transmission station, two 14 mile cables above-ground, and one 14 mile cable under-ground. In present operations, only the above-ground cables are used in transmissions. The alternative under consideration would not require expanding this facility, but the Navy would improve its quality and reliability by replacing the cables and operating with all three cables.

The test facility proposed for the Michigan Seafarer consists of a control center and a transmission station on K. I. Sawyer Air Force Base, with an antenna of one 54 mile east-west cable and two (33 and 49 mile) north-south underground cables. All but about 5 miles of these cables would be located either on public lands or along existing rights-of-way.

These two independent systems, about 163 miles apart, would be linked by leased telephone lines or a microwave relay station, to assure proper phasing of the signals. The Navy considers the linking to be a technical matter and not a serious problem.

On September 15, 1977, the Navy published a supplement to the Draft Environmental Impact Statement on the Seafarer extremely low frequency communications system. That supplement provides a description of the alternative proposal to use the two test facilities.

In comparison with the proposed full-scale Michigan Seafarer, the performance potential of the alternative is not as effective; however, the Navy considers it adequate for the basic needs. The estimated range of the alternative is less than the Michigan Seafarer's, but would cover areas that the Navy considers vital. The transmission data rate of the alternative would be slower than the Michigan Seafarer's, but the Navy considers it adequate.

The Navy estimates the costs of the alternative to be \$250-300 million, compared to about \$590 million for the Michigan Seafarer. Of this amount, about \$110 million is for the further research and development required wherever an extremely low frequency system is located, about \$56 million for receivers, and the remainder is for building the system. We did not review these cost estimates.

#### Expansion of Wisconsin Test Facility

According to a Navy official, expansion of the Wisconsin Test Facility is not planned as either an alternative to Seafarer or part of the alternative of using it with the proposed Michigan Seafarer test facility.

In a memorandum to the Secretary of the Navy, dated January 10, 1973, the Secretary of Defense stated:

"Test facility operation should be continued at the present site in Wisconsin but no further major installations should be made at the site or elsewhere within Wisconsin."

A Navy official informed us recently that this directive precluded expansion of the Wisconsin Test Facility in the past. He acknowledged that this directive could have been overruled by any succeeding Secretary of Defense, but none has chosen to do so. According the February 1977 Seafarer Draft Environmental Impact Statement,

"\* \* \* concern for acceptance [of an extremely low frequency system] by the state of Wisconsin justified investigation of other potential sites for an operational system."

On February 26, 1975, the World Wide Military Command and Control Systems Council reported that:

"The \* \* \* Council recognizes \* \* \* the economic advantage of potential sites in the Laurentian Shield geologic area in the US adjacent to the Great Lakes. The Navy should give careful consideration to any such site proposed by the members of Congress and/or the governor representing that site \* \* \* [as a location for Seafarer]."

An invitation for such consideration has not been extended to DOD by representatives of the State of Wisconsin.

#### Selection of Site at K. I. Sawyer Air Force Base

According to a Navy official, K. I. Sawyer Air Force Base was initially chosen as the location for the Michigan Seafarer test facility because the control center would have to be in a secured area and the Air Force has extensive security at the base. To avoid duplication of security, the Navy chose the base rather than some area in the Hiawatha or the Ottawa National Forest. The base would not have to be expanded to accommodate Seafarer, because it has space for the necessary buildings and personnel and such services as an exchange and commissary. A study of the compatibility of Seafarer with the Air Force mission at the base showed that Seafarer would not interfere with Air Force operations.


The Navy has not studied other areas of the Upper Peninsula for a location of the alternative test facility, since studies in the K. I. Sawyer area had been completed, and the base can accommodate the system.

According the Seafarer Draft Environmental Impact Statement, if the test facility's control center and the transmission station were located at the base, the Government would not have to purchase land and could obtain support services from the Air Force. Also, because of the higher ground conductivity, location of a facility in either the Hiawatha or the Ottawa National Forest would require more cable than an antenna in the K. I. Sawyer area. Conductivity of the ground has a major bearing on the effectiveness of a system.

At your request, we did not obtain written agency comments. The matters covered in the report, however, were discussed with a Department of the Navy official.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 14 days from the date of the report. At that time we will send copies to the Department of Defense and the Department of the Navy and make copies available to others upon request.

Sincerely yours,



F. J. Shafer  
Director