

DOCUMENT RESUME

03994 - [B3194420]

[Operational Testing of the Army's Amphibian Vehicle Known as the LACV-30]. LCD-78-205; B-159407. November 11, 1977. 5 pp.

Report to Secretary, Department of the Army; by Robert G. Rothwell (for Fred J. Shafer, Director, Logistics and Communications Div.).

Issue Area: Facilities and Material Management: Federal Transportation of Things (704); Military Preparedness Plans: Transportation in Emergency Situations (804).

Contact: Logistics and Communications Div.

Budget Function: National Defense: Department of Defense - Military (except procurement & contracts) (051).

Organization Concerned: Department of Defense.

Authority: Army Regulation 70-38.

The LACV-30 (lighter, air cushion vehicle, 30-ton payload) is being considered as a replacement for existing Army amphibian vehicles. As such, its mission will involve various amphibious operations, including logistics-over-the-shore resupply. At present the Army has only two of the vehicles, one of which has been undergoing operational testing while the second has been undergoing developmental testing. The Army is considering acquiring 28 more LACV-30s at a total cost of more than \$110 million. Findings/Conclusions: Although the Army has an operational test and evaluation agency, that agency is conducting neither the operational test nor the operational evaluation of the LACV-30. The group handling the test is under the control of the Armor and Engineer Board, which is largely composed of persons on loan from the Transportation School, the combat developer of the LACV-30, and the Transportation Center, the eventual user of the vehicle. Reports on the tests will be submitted to the Training and Doctrine Command (TRADOC) rather than to the Chief of Staff. Neither TRADOC nor the Transportation School constitutes an independent test or evaluation agency, as required by Department of Defense Regulations. The current scope of the operational testing will not insure that the LACV-30 demonstrates certain required capabilities before a major procurement decision is made. Neither development testing nor civilian experience is a substitute for operational testing. (SC)



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UNITED STATES GENERAL ACCOUNTING OFFICE

WASHINGTON, D.C. 20548

LOGISTICS AND COMMUNICATIONS
DIVISION

B-159407

NOV 11 1977

The Honorable
The Secretary of the Army

Dear Mr. Secretary:

We are monitoring the operational testing of the Army's amphibian vehicle known as the LACV-30 (lighter, air cushion vehicle, 30-ton payload). Although the testing and evaluation is not yet complete, we are presenting concerns we have about the way in which the test is being carried out. Specifically, we question (1) whether the Army's operational testing and evaluation of the vehicle can be considered independent in the context of current DOD policies and (2) whether the scope of testing will be adequate.

The LACV-30, a military adaptation of a commercial air cushion vehicle, is being considered as a replacement for existing Army amphibian vehicles. As such, its mission will involve various amphibious operations, including logistics-over-the-shore resupply. We were told that the Army presently has only two of the vehicles. One has been undergoing operational testing at Fort Story, Virginia, and the other has been undergoing developmental testing at several locations. The Army is considering acquiring 28 more LACV-30s at a total cost of more than \$110 million.

LACK OF INDEPENDENT TEST AND EVALUATION

Current DOD regulations on testing and evaluation are an outgrowth of the increased emphasis in the early 1970s on insuring that new weapon systems meet the needs of operational users before procurement decisions are made. As a result, each military service has been directed to establish an independent agency, separate and distinct from the developing and using commands, to operationally test and evaluate new weapon systems and to report the results directly to the Military Service Chief or Defense Agency Director.

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This procedure is mandatory only for major acquisition programs, as designated by the Secretary of Defense (generally those with research and development costs of at least \$75 million or production costs of at least \$300 million). However, DOD regulations specify that the same principles are to be applied in the acquisition of systems, such as the LACV-30, that do not fall into the major program category.

The Army has an operational test and evaluation agency, but Army officials said it is conducting neither the operational test nor the operational evaluation of the LACV-30. The group handling the test is under the control of the Armor and Engineer Board. However, this group is largely composed of persons on loan from the Transportation School, the combat developer of the LACV-30, and the Transportation Center, the eventual user of the vehicle. The Transportation School will also make the operational evaluation of the vehicle. Both the Armor and Engineer Board and the Transportation School are subordinate agencies of the Training and Doctrine Command and, as such, will submit their reports to TRADOC, not to the Chief of Staff.

TRADOC officials interpret the term "independent," as used in DOD regulations, to mean only that the same agency should not do both the test and the evaluation of a system. They said that it is customary for TRADOC to have jurisdiction over operational testing of less-than-major systems and that, in such cases, the test and evaluation agencies need not submit their reports directly to the Chief of Staff. These officials also told us that they interpret the phrase "developing command," as used in DOD regulations, to mean only the command responsible for material development. Thus, they contend that TRADOC's responsibility for combat development of the LACV-30 does not preclude it from also being responsible for operational testing and evaluation.

We believe, however, that the intent of the DOD regulations is to insure that operational tests and evaluations are made by agencies that do not have a vested interest in the development or use of systems being considered for procurement. Regarding the LACV-30, we believe that neither TRADOC nor the Transportation School constitutes an independent test or evaluation agency. For example, the Army's requirement for an air cushion vehicle was identified and validated in a study made for TRADOC by the Transportation School. Thus, the Army agency that originally proposed acquisition

If the vehicle is now responsible for assessing the vehicle's operational effectiveness and suitability.

LIMITED SCOPE OF OPERATIONAL TESTING

Our other concern is that the current scope of operational testing will not insure that the LACV-30 demonstrates certain required capabilities before a major procurement decision is made. For example, Army officials said operational testing will not include tests of the vehicle's capability to operate

--in plunging surf up to 8 feet high,

--in winds up to 50 miles per hour,

--in temperatures as low as minus 40 degrees Fahrenheit,
or

--over vertical obstacles up to 3 feet high.

Transportation School officials told us that these required operating capabilities will undergo development testing and that the results will be used in the operational evaluation of the LACV-30. They pointed out that these capabilities will not be operationally tested because Fort Story lacks the necessary environmental conditions. For example, the maximum predictable plunging surf at Fort Story is 2 to 3 feet and the coldest temperature ever recorded in the Norfolk area was 2.5 degrees in 1875. Last winter the low was 5 degrees on January 17, 1977, and the average temperature was 28.4 degrees.

Other capabilities will not be operationally tested because of the desire to avoid duplicating development tests or the lack of approval to perform potentially hazardous tests, such as operating in very high winds. The officials added that operational testing of the LACV-30 is not as extensive as normal because the vehicle is a military adaptation of a commercial item and that civilian experience can thus be used in the operational evaluation.

We believe that neither development testing nor civilian experience is a substitute for operational testing. Development testing is usually done by the developing agency to insure that the engineering design and development process is complete and that the system meets specifications. This testing may be done in laboratories or under controlled

conditions different from the operating and environmental conditions under which the system will be used. In contrast, operational testing is done to estimate the system's operational effectiveness and suitability, as well as its military utility. Furthermore, these tests are to be done under realistic operating conditions with the type of personnel expected to use and maintain the system.

Experience in the civilian sector may also have been acquired under conditions far different from those expected during military operations. It is doubtful that civilian experience with a version of the LACV-30 was obtained under the types of conditions encountered during military amphibious operations. Similarly, the skills of civilian operators and maintenance personnel may not have been comparable to those of their military counterparts.

BASIS FOR REQUIRED CAPABILITIES

We discussed the required operating capabilities of the LACV-30 with Transportation School officials. There appears to be a basis for each requirement.

The capability to operate in plunging surf up to 8 feet high was based on an environmental analysis made in six geographical areas worldwide that were considered typical of areas where logistics-over-the-shore resupply operations might be performed. In these areas surf less than 5 feet high occurred 56 percent of the time, surf 5 to 8 feet high occurred 21 percent of the time, and surf more than 8 feet high occurred 23 percent of the time. Accordingly, it was decided that the LACV-30 should be able to operate in surf up to 8 feet high.

Concerning climatic capabilities, Army Regulation 70-38 specifies what is required. The formula for determining exact requirements is complex but basically dictates that equipment be required to operate in extreme climatic conditions if it is expected to operate in such conditions more than 1 percent of the time. In the case of the LACV-30, application of AR 70-38 dictated that the craft be capable of operating in winds up to 50 miles per hour with gusts up to 60 miles per hour, and in temperatures as low as minus 40 degrees Fahrenheit.

The capability to clear 3-foot vertical obstacles was considered necessary to permit the LACV-30 to clear common obstructions, such as embankments and logs.

Although there is a basis for each capability requirement, there is some question whether logistics-over-the-shore operations could be carried out under the severest conditions contemplated by the requirements. The requirements should be stringent enough to insure performance, but if they are too stringent, they should be modified.

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We would appreciate being advised of the Army's position on these matters and of any actions planned.

A copy of this letter has been sent to Representative G. William Whitehurst, at his request.

Sincerely yours,



for P. J. Shafer
Director