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UNITED STATES GENERAL ACCOUNTING OFFICE  
WASHINGTON, D.C. 20548

MISSION ANALYSIS AND  
SYSTEMS ACQUISITION DIVISION

MARCH 16, 1981

B-202188



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The Honorable Caspar W. Weinberger  
The Secretary of Defense

Subject: [Questionable Need for Product Improvements  
to the Army's VULCAN Air Defense System]  
(MASAD-81-21)

Dear Mr. Secretary:

As part of a review of air defense in the North Atlantic Treaty Organization's central region, we performed limited work on proposed product improvements to the VULCAN air defense system (PIVADS). This is a congressionally initiated program to enhance the near term readiness of air defense in the airborne and air assault divisions of the Rapid Deployment Force (RDF). Our work was limited primarily to discussions with officials at the Army headquarters and commands currently involved in the improved VULCAN program.

We have two concerns involving the need for the product improvement program which we believe should be addressed before a decision is made to improve the VULCAN system. Specifically (1) will it be effective against the representative threat and (2) can alternative systems satisfy the need? Accordingly, we recommend that you require the Army to fully justify the need for the improved VULCAN before the improvement program is allowed to proceed.

VULCAN SYSTEM

VULCAN was fielded in about 1967 as an interim short-range air defense system. According to the Army, the VULCAN system has very limited effectiveness. For VULCAN to be effective, the target must be hovering or flying a nonmaneuvering course toward the gun and be within a range of 1,000 meters. VULCAN provides only a low degree of suppression against maneuvering threats.

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VULCAN systems are expected to remain in the Army inventory through 1990, moving to the Reserves when they are replaced in the Active Forces. According to the Army's February 1980 Air Defense Program Plan, towed VULCANS in the airborne and air assault divisions were to be replaced by a new light-weight gun, to be fielded by 1990. The Army recently told us that it is currently planning to reduce the number of towed VULCANS in the air assault division from 4 batteries to 1 battery (from 48 to 12 fire units) by the end of fiscal year 1981.

#### PRODUCT-IMPROVED VULCAN

A product-improved VULCAN air defense system has been considered in Army studies as a possible alternative to the Division Air Defense Gun for the heavy divisions. Although the improvement effort has not yet been funded by the Army, modification kits have been developed by the manufacturers at their own expense and limited demonstrations have been performed. The proposed product improvements are intended to extend the effective range and improve reliability and availability characteristics of the towed VULCAN.

The Congress added funds to the fiscal year 1981 Department of Defense budget as a near term readiness initiative to upgrade the air defense capabilities of the airborne and air assault divisions of RDF. To complete development and testing, \$9.6 million was added to the Army's development program. Procurement funds were eliminated from the appropriation act until Army testing is completed and successful results are obtained.

On February 5, 1981, the Armament Materiel Readiness Command was tasked to come up with an operational effectiveness analysis and acquisition plan for the improved VULCAN. Until the plan is completed, by about May 10, 1981, estimates of the costs and the specific time frame for the improvement program will be uncertain. We understand that no development funds will be spent until the plan is completed.

#### OUR CONCERNS WITH THE IMPROVED VULCAN

Before the merits of the improved VULCAN can be evaluated, we believe the need for the program must be fully addressed by the Army, specifically (1) the effectiveness of the improved VULCAN against the representative threat and (2) alternative systems to enhance the near term readiness of air defense. The current Army analysis will not and was not intended to focus on these areas. We believe the Army should emphasize the following factors.

### System effectiveness against the threat

The Army has not completed assessing the threat to the airborne and air assault divisions of RDF. According to recent testimony of the Office of the Secretary of Defense, RDF is expected to face a less intense air attack in non-European theaters. Army officials have said the Warsaw Pact threat to central Europe should be used for RDF.

Also, increased range and lethality of the improved VULCAN have not yet been tested by the Army. Preliminary analyses show that the proposed product improvements (1) will extend the VULCAN's range with new ammunition, (2) enhance operability and tracking accuracy, and (3) reduce reaction time. However, the Army told us that the maximum effective range of PIVADS in contractor demonstrations has not been demonstrated. As a result, the effectiveness of these improvements against the representative threat to the airborne and air assault divisions of RDF remains to be proven.

### Alternatives to the improved VULCAN

In providing the funds to improve VULCAN, the Congress emphasized near term improvements to the airborne and air assault divisions of RDF. Improvements to VULCAN are only one way that air defense can be improved in the near term. For example, certain Army commands have recommended the STINGER system. We believe the Army should determine the most appropriate air defense system for these RDF divisions. As a minimum, the following factors should be considered for alternative systems.

#### Strategic mobility

According to recent testimony of the Office of the Secretary of Defense, strategic mobility for RDF is often of equal or greater consequence than battlefield effectiveness. Although VULCAN and STINGER are transportable in a C-130, allowing them to be airlifted with light airborne/air assault divisions of RDF, other alternatives may not be as transportable.

#### Timeliness

The Congress emphasized near term improvement because the Army had no plans to replace the towed VULCAN in the foreseeable future. Since then, certain Army commands have recommended STINGER pending the fielding of a new lightweight air defense artillery system.

We understand that the Army accelerated to fiscal year 1982 the deployment of STINGER to replace REDEYE in the air-borne division of RDF as a near term air defense improvement. STINGER continues to be scheduled for the air assault division in fiscal year 1985. A fielding date for the improved VULCAN has yet to be determined.

### Effectiveness

In considering STINGER as an alternative, several performance limitations of the basic STINGER should be addressed. For example, the degradation in the minimum intercept range should be considered. The minimum intercept range for the system is greater than the requirement. Also, as previously discussed, the effectiveness of the improved VULCAN has yet to be proven.

### AGENCY VIEWS

Opinions vary within the Department of Defense concerning the need for and the effectiveness of the improved VULCAN program. The Principal Deputy Undersecretary of Defense for Research and Engineering has stated that the improved VULCAN will be effective against the less intense air attack that Defense expects in non-European theaters. The U.S. Army Air Defense School favors interim retention of the VULCAN and its improvement program. Army headquarters officials support the improved VULCAN as long as the Congress provides the funds, saying that the improvement program will make VULCAN a more capable weapon system. The Army's Training and Doctrine Command opposes any improved VULCAN program, stating that even with the improvements it provides less than required increases in range and doubtful increases in effectiveness. The Army's Materiel Development and Readiness Command also believes that the improved VULCAN is not operationally effective even as an interim system and any decision to acquire PIVADS could adversely affect a decision to acquire a new lightweight air defense system.

### CONCLUSIONS

We believe that our concerns involving the need for the improvement program--the effectiveness of the improved VULCAN against the representative threat and alternative systems to accomplish the mission--should be addressed before a decision is made to improve the VULCAN system.

RECOMMENDATION


We recommend that you require the Army to fully justify the need for the improved VULCAN before the improvement program is allowed to proceed.

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As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the House Committee on Government Operations and the Senate Committee on Governmental Affairs not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report. We would appreciate receiving a copy of your statement when it is provided to the congressional committees.

Copies of this report are being sent to the Director, Office of Management and Budget; the chairmen, House and Senate Committees on Armed Services and Appropriations, House Committee on Government Operations, and Senate Committee on Governmental Affairs; and the Secretary of the Army.

Sincerely yours,

  
W. H. Sheley, Jr.  
Director