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AUDIT OF THE RECONNAISSANCE, SURVEILLANCE,
AND TARGETING VEHICLE PROGRAM

Report No. D-2001-115

May 8, 2001

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Department of Defense

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Abstract The Reconnaissance, Surveillance, and Targeting vehicle is a technological demonstrator program jointly funded by the Marine Corps and the Defense Advance Research Project Agency. The Office of Naval Research, acting for the Marine Corps, has responsibility for program execution while the Naval Surface Warfare Center and the Defense Advance Research Project Agency share technical management responsibility. The demonstrator program's objective is to evaluate the applicability of electric drive propulsion for a wheeled vehicle that can be internally transported in the Marine Corps Osprey aircraft (the MV-22). The demonstrator program is in the second of a two-phased development, with a total value of \$30.6 million for four vehicles for Navy and Marine Corps test and evaluation. If the options are exercised another \$38.6 million would be expended.		Monitoring Agency Acronym
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Acronyms

ATD	Advanced Technology Demonstrator
DARPA	Defense Advanced Research Projects Agency
IPT	Integrated Product Teams
NAPDD	Non-Acquisition Program Definition Document
NSWC	Naval Surface Warfare Center
RST	Reconnaissance, Surveillance, and Targeting
SECNAVINST	Secretary of the Navy Instruction



INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202-4704

May 8, 2001

MEMORANDUM FOR NAVAL INSPECTOR GENERAL

SUBJECT: Audit Report on Reconnaissance, Surveillance and Targeting
Vehicle Program (Report No. D-2001-115)

We are providing this report for review and comments. Management comments were not received in response to a draft of this report.

Management is requested to provide comments on this report that conform to the requirements of DoD Directive 7650.3. Management comments should indicate concurrence or nonconcurrence with the finding and recommendations. Comments should describe actions taken or planned in response to agreed-upon recommendations and provide the completion dates of the actions. State specific reasons for any nonconcurrence and propose alternative actions, if appropriate. We request comments from the Marine Corps Systems Command, the Office of Naval Research, and the Naval Surface Warfare Center by June 8, 2001.

We appreciate the courtesies extended to the audit staff. For additional information on this report, please contact Mr. Raymond A. Spencer (703) 604-9071 (DSN 664-9071) (rspencer@dodig.osd.mil) or Mr. Roger H. Florence at (703) 604-9067 (DSN 664-9067) (rflorence@dodig.osd.mil). See Appendix B for the report distribution. The audit team members are listed inside the back cover.

A handwritten signature in cursive script, reading "Thomas F. Gimble", is positioned above the typed name.

Thomas F. Gimble
Acting
Deputy Assistant Inspector General
for Auditing

Office of the Inspector General, DoD

Report No. D-2001-115

(Project No. D2001AB-0020)

May 8, 2001

Audit of the Reconnaissance, Surveillance, and Targeting Vehicle Program

Executive Summary

Introduction. The Reconnaissance, Surveillance, and Targeting vehicle is a technological demonstrator program jointly funded by the Marine Corps and the Defense Advance Research Project Agency. The Office of Naval Research, acting for the Marine Corps, has responsibility for program execution while the Naval Surface Warfare Center and the Defense Advance Research Project Agency share technical management responsibility. The demonstrator program's objective is to evaluate the applicability of electric drive propulsion for a wheeled vehicle that can be internally transported in the Marine Corps' Osprey aircraft (the MV-22). The demonstrator program is in the second of a two-phased development, with a total value of \$30.6 million for four vehicles for Navy and Marine Corps test and evaluation. If the options are exercised another \$38.6 million would be expended.

Objectives. The objective of the audit was to evaluate the Navy's acquisition planning and development for Reconnaissance, Surveillance, and Targeting vehicle technology demonstrator program. We reviewed system requirements, program coordination, and the use of the other transaction authority.

Results. Office of Naval Research and Marine Corps Systems Command officials did not establish exit criteria and a technology transition plan for the Reconnaissance, Surveillance, and Targeting vehicle advanced technology demonstrator program. In addition, the potential exercising of options in the other transaction agreement would result in an unauthorized initial production decision. As a result, the Office of Naval Research and Marine Corps officials did not properly plan for the potential introduction of the RST vehicle or emerging technology(ies) into existing systems. Also, the possibility exists that the Navy would exceed its authority for other transaction agreements by exercising options for production of 39 more vehicles. For details of the audit results, see the Finding section of the report.

Summary of Recommendations. We recommend that the Commander, Marine Corps Systems Command, update the non-acquisition program document, as required by Navy policy. We recommend that the Chief, Office of Naval Research, in concert with the Marine Corps, develop exit criteria that identify thresholds and objectives, and develop a technology transitioning plan for the Reconnaissance, Surveillance, and Targeting

vehicle or its emerging technology(ies). We also recommend that the Commander, Naval Surface Warfare Center, not exercise options under the other transaction agreement for this program.

Management Comments. Management comments were not received in response to a draft of this report issued on February 28, 2001. Comments to the final report are requested from the Commander, Marine Corps Systems Command; the Chief, Office of Naval Research; and the Commander, Naval Surface Warfare Center. Comments to the final report should be received by June 8, 2001.

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Background

History. The Reconnaissance, Surveillance, and Targeting vehicle (the RST vehicle) is a jointly funded program by the Marine Corps and the Defense Advanced Research Projects Agency (DARPA). The Office of Naval Research, acting for the Marine Corps, is responsible for program execution. The Naval Surface Warfare Center (NSWC), Carderock Division, and DARPA share technical management responsibility. The RST vehicle was being developed as an advanced technology demonstrator (ATD). The ATD program concept was to develop a wheeled vehicle that demonstrates electric propulsion and survivability technologies and that is internally transportable in the Marine Corps MV-22 aircraft (the Osprey). The RST vehicle has been in development since November 1997 under a two-phased effort. Phase one included the issuance of two other transaction agreements, to competing contractors, for the vehicle concept-design development. Phase two resulted in the selection of a design proposal and continued development.

Prototype Other Transactions. The development of the RST vehicle was acquired under the other transaction authority. In 1989, Congress enacted section 2371, title 10, United States Code (10 U.S.C. 2371), which authorizes the use of other transaction agreements for basic, applied, and advanced research projects. The National Defense Authorization Act of FY 1994, section 845, augmented the other transaction authority to allow its use for prototype projects that are directly relevant to weapons or weapon systems. That authority waives many of the Federal Acquisition Regulation contracting procedures. One of the reasons Congress granted the other transaction authority was to obtain research and development efforts from nontraditional Defense contractors and to pursue commercial solutions to defense requirements. Nontraditional contractors can participate at the prime or subcontractor level. The prototype other transaction authority can be used only for the development of a prototype. Procurement of prototype production items requires the use Federal Acquisition Regulation contracting procedures. The Under Secretary of Defense for Acquisition, Technology, and Logistics issued guidance in the "Other Transaction Guide for Prototype Projects," December 21, 2000. The authority to use other transactions for prototypes was extended until September 30, 2004.

The other transaction prototype authority was issued during both phases. The prime contractor for the RST vehicle is a traditional Defense contractor, General Dynamics Land Systems, with nontraditional contractors participating at the subcontractor level.

Objectives

The objective of the audit was to evaluate the Navy's acquisition planning and development efforts for the RST vehicle's demonstrator program. We reviewed system requirements, program coordination, and the use of the other transaction authority. See Appendix A for a discussion of the audit scope and methodology.

Transitioning of the Reconnaissance, Surveillance, and Targeting Vehicle Technology Program

Office of Naval Research and Marine Corps Systems Command officials did not establish exit criteria and a technology transition plan for the RST vehicle ATD program. In addition, the potential exercise of options in the other transaction agreement would result in an unauthorized initial production decision. These conditions exist because the Office of Naval Research did not adequately follow guidance issued by Assistant Secretary of the Navy (Research, Development, and Acquisition) concerning non-major defense acquisition programs. As a result, the Office of Naval Research and Marine Corps officials did not properly plan for the potential introduction of the RST vehicle or emerging technology(ies) into existing systems. Also, the possibility exists that the Navy would exceed its authority for other transaction agreements by exercising options for production vehicles.

Mission Need

The RST vehicle was being developed to be internally transportable in the Osprey tilt-rotor aircraft, and by helicopters and larger aircraft. The goal of the ATD program was to evaluate the feasibility of advanced technologies in a small vehicle that include sensors, command and control systems, and survivability technologies while retaining the capability to modify the vehicle for different missions. The Marine Corps would use the vehicle or its emerging technology(ies) to perform the reconnaissance, surveillance, and targeting during the daytime and nighttime missions, in climatic conditions suitable for wheeled vehicles. Internal transportability of the RST vehicle in the Osprey was a mission need that is not available in existing vehicles.

Advanced Technology Demonstrator Program

The concept of an ATD program is to potentially introduce weapon systems or technologies to operating forces sooner than has been historically experienced. An ATD could be a new weapon system or a technology for an existing weapon system(s). The ATD program develops a prototype of the proposed new technology for evaluation and testing prior to consideration of introducing the technology to a weapon system(s) or operating forces. ATD programs identify and reduce technology risks and define the operational suitability in a quasi-operational environment.

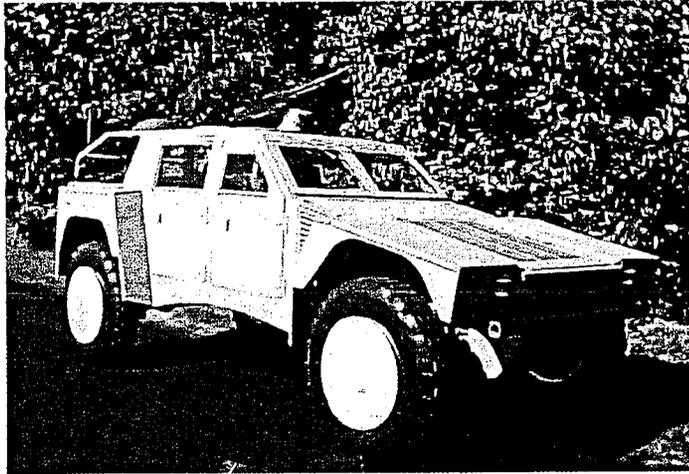
Navy Program Guidance

The RST vehicle was designated a non-acquisition science and technology program in the Non-Acquisition Program Definition Document (NAPDD 97-1) approved on February 2, 1998. NAPDDs are science and technology programs that are managed in accordance with guidance issued by the Assistant Secretary of the Navy (Research, Development, and Acquisition), "Implementation of Mandatory Procedures for Major and non-Major Defense Acquisition Programs and Major and Non-Major Information Technology Acquisition Programs," (SECNAVINST 5000.2B), December 6, 1996. The NAPDD 97-1 is the initiating and control document for the RST vehicle. The SECNAVINST 5000.2B states that NAPDDs are valid for 3 years and are required to be revised or revalidated to justify a program's continuation. The Navy guidance is applicable to the RST vehicle and as a result the NAPDD-97-1 should have been revised or revalidated because it has exceeded the 3-year development period. The RST vehicle ATD began prior to approval of the NAPDD-97-1 (in February 1998), when DARPA issued the phase one solicitation in July 1997 and the other transaction agreement in November 1997. To comply with Navy policy the Marine Corps should resubmit NAPDD-97-1 for revalidation.

Vehicle Development

A concerted effort was expended in developing four demonstrator vehicles during the two-phase process through the use of integrated product teams. Also, the contractor reported significant progress in the vehicle's development.

Two-Phase Process. The RST vehicle has been in development since 1997 when DARPA initiated the first phase of a two-phase development. The first phase involved two competing contractors responsible for developing proposed designs for the vehicle. The first phase other transaction agreement, over a 13-month period, had a total agreement value of \$6 million. The second phase began with the selection of one of the proposed designs and the fabrication, testing, and demonstration of four demonstrator vehicles. The second phase was for 39 months with an initial valued at \$22 million. Subsequently, two risk-reduction modifications, with a total value of \$2.6 million, were awarded for vehicle weight reduction, battery and electronics improvements, and additional testing. The contractor used the Government-generated RST vehicle system specification document for vehicle performance specifications. This document was developed after review of several other vehicle specifications. In phase two, the contractor was required to deliver two vehicle configurations (two vehicles per configuration) for continued Navy and Marine Corps testing. The two vehicle configurations are a cargo version and a reconnaissance version; the reconnaissance version is shown on page 4.



For Osprey internal transportability, folding suspension was designed to narrow the vehicle width to enter and exit. The RST vehicle was also being designed to withstand the shock and vibration experienced during operations across all terrain and climate conditions, making it necessary for the design to include a robust suspension system, shock mounting modules using commercial-off-the-shelf components, and all tie-downs necessary for Osprey transportability.

Program Integrated Product Teams. The development of the RST vehicle progressed substantially as a result of concerted efforts by the prime contractor, subcontractors, DARPA, and NSWC working together, and the establishment of an internal oversight process. The internal oversight of the RST vehicle included establishing a Board of Directors and five integrated product teams (IPTs), and NSWC and DARPA having overall technical management responsibility for vehicle development. The Board of Directors was composed of officials from General Dynamics, NSWC, and DARPA. The five IPTs included officials from General Dynamics and its subcontractors, NSWC, DARPA, Army Research Laboratory, Army Aberdeen Proving Grounds, and Army Waterways Experiment Station. The five IPTs were created to oversee significant functional areas that include electric drive and energy storage and management; survivability; command, control, communications, computers, and intelligence; test and evaluation; and automotive integration. The automotive integration IPT was responsible for overseeing cost and performance, mobility, Osprey compatibility for internal transportation, body and frame systems, vehicle auxiliary system, and pneumatics and vehicle suspension. The automotive integration IPT evaluated fuel tank requirements, rollover protection, vehicle hood latching systems, chassis weight, and corrosion prevention measures.

Contractor Progress. The developing contractor reported that the vehicle satisfied many operational requirements associated with the Light Strike Vehicle. The contractor reported that the vehicle is designed to be propelled by battery pack and electric motors; can maintain 65 miles per hour on hard level surfaces; can propel in the hybrid mode (power from an internal engine and

batteries), battery only with engine off, and engine only; can accommodate a complete payload including personal equipment, water and rations, communications equipment, personal and vehicle mounted weapons, ammunition, and mission equipment; can transit a ravine 30 inches deep; is transportable in the Osprey; is operable by personnel wearing night vision devices including dashboard lumination with the devices; operational in snow, ice, sand, dust, and rain environments for extended periods; and satisfies the Marine Corps logistics support. NSWC officials planned to demonstrate the RST vehicle capabilities upon delivery of two of the four vehicles at a Marine Corps exercise in the summer of 2001.

Continued Development

The Marine Corps NAPDD for the RST vehicle is limited as it provides no basis for estimating future program needs. The development of a technology transition plan between the Office of Naval Research and the Marine Corps would have provided the support necessary to justify the planning of future resource requirements.

NAPDD. The Marine Corps established an NAPDD for the RST vehicle program as required by SECNAVINST 5000.2B, and identified ATD program goals, milestone timelines, and funding profile through FY 2002. However, the program goals in the NAPDD lack specific development characteristics to ensure that the developer satisfies the users' requirements. For example, the NAPDD does not provide system, subsystem, and component goals, including desired levels of performance, reliability, maintainability, supportability, and software maintainability. In addition, the NAPDD for the RST vehicle does not provide for the program planning associated with a technology transition document. For example, the final milestone in the NAPDD for the RST vehicle identifies a Marine Corps program decision meeting in FY 2002. Although such an event is necessary, the NAPDD provides no guidance for planning future research and development or procurement funding requirements beyond FY 2002; therefore, the future of the RST vehicle or its emerging technologies is questionable because Marine Corps officials lack a basis for outyear funding requirements.

Technology Transition Plan. Continued development of the RST vehicle or the introduction of the technologies to other programs is uncertain because the Office of Naval Research did not establish a technology transition plan with the Marine Corps. Development of a technology transition plan should have been part of the RST vehicle ATD process because it would have documented the goals and objectives of the ATD or the emerging technologies. The technology transition plan should be established at the beginning of the RST vehicle ATD process, prior to contract award, and agreed upon by the developer and potential user(s) with subsequent revisions as the development progresses. The technology transition plan would have represented an agreement that identified the exit criteria and defined the system's goals, objectives, requirements; the developer's and users' responsibilities during the development process; the expected levels of performance; the contracting strategy; estimated cost, funding

requirements and expected sources; and the technology development schedule. The satisfaction of the requirements in the technology transition plan would mark the point when the technology is considered for transitioning into a formal acquisition program or introduction of emerging technologies into fielded systems and would have provided the basis for estimating future resource requirements.

Other Transaction Agreement

The NSWC contracting officials negotiated a prototype other transaction agreement for four RST vehicles that included risk reduction modifications valued at \$24.6 million. NSWC also negotiated three agreement options to acquire 39 additional vehicles at an estimated cost of \$38.6 million. Examination of NSWC program documentation and discussions with officials did not identify a plan for the additional vehicles, and the exercise of the options could give the appearance of initiating a low-rate initial production effort. Initiating a low-rate production effort would not only circumvent the acquisition review process but also exceed the authority granted for the use of other transactions for prototypes.

Recommendations

1. We recommend that the Commander, Marine Corps Systems Command, update the Non-Acquisition Program Definition Document (NAPDD 97-1) for the Reconnaissance, Surveillance, and Targeting Vehicle, as required by Secretary of the Navy Instruction 5000.2B.
2. We recommend that the Chief, Office of Naval Research:
 - a. Establish exit criteria, in concert with the Marine Corps, that identify agreed-upon thresholds and objectives for the Reconnaissance, Surveillance, and Targeting Vehicle Advanced Technology Demonstrator program or its emerging technologies, including systems, subsystems, levels of performance, reliability, maintainability, supportability, and software maintainability.
 - b. Develop a plan, in concert with the Marine Corps, for transitioning the Reconnaissance, Surveillance, and Targeting Vehicle program or its emerging technologies from the development to the acquisition phase.
3. We recommend that the Commander, Naval Surface Warfare Center, not exercise any of the options for the 39 additional vehicles in the Reconnaissance, Surveillance, and Targeting Vehicle prototype other transaction agreement.

Appendix A. Audit Process

Scope and Methodology

Our examination of the RST vehicle development focused on system requirements, program coordination, and the use of the other transaction authority. We examined the program's documentation, reviewed contract files, and conducted interviews with responsible officials for the RST vehicle program, the Marine Corps, and the Army Tank and Automotive Command. We examined the use of the other transaction authority by examining the agreement to ensure proper use within the limited guidance issued by Office of the Secretary of Defense. We did not question the technical merits of the RST vehicle program. We did not use computer-processed data to perform the audit.

We performed this program results audit from October 2000 through January 2001, in accordance with auditing standards issued by the Comptroller General of the United States, as implemented by the Inspector General, DoD. We did not review the management control program because the audit focus was on one technology development program. However, the conditions identified in this report are attributed to the lack of management controls in that exit criteria or a technology transition plan were not established. The recommendations in the report will correct this management control weakness.

Contacts During the Audit. We visited or contacted individuals and organizations with DoD. Further details are available on request.

DoD-Wide Corporate Level Government Performance and Results Act Coverage. In response to the Government Performance and Results Act, the Secretary of Defense annually establishes DoD-wide corporate level goals, subordinate performance goals, and performance measures. This report pertains to achievement of the following goal and subordinate performance goal.

- **FY 2000 DoD Corporate Level Goal 2:** Prepare now for an uncertain future by pursuing a focused modernization effort that maintains U.S. qualitative superiority in key warfighting capabilities. Transform the force by exploiting the Revolution in Military Affairs, and reengineer the Department to achieve a 21st century infrastructure. **(00-DoD-2)**
- **FY 2000 Subordinate Performance Goal 2.4:** Meet combat forces' needs smarter and faster, with products and services that work better and cost less, by improving the efficiency of DoD acquisition processes. **(00-DoD-2.4)**

DoD Functional Area Reform Goals. DoD did not establish performance improvement reform objectives and goals for this functional area.

General Accounting Office High-Risk Area. The General Accounting Office has identified several high-risk areas in the DoD. This report provides coverage of the Defense Contract Management and the Defense Weapons System Acquisition high-risk areas. Although other transaction agreements are not considered to be contracts, we grouped the other transactions in this high-risk area because their purpose is similar to contracts. Because the RST vehicle is an ATD, this review provided coverage in the Defense Weapons System high-risk area because the ATD or the emerging technology could transition to defense weapon systems.

Prior Coverage

During the last 5 years, there have been no audits of the RST vehicle program. Five reports have been issued on the use of other transaction agreements. Unrestricted General Accounting Office reports can be accessed over the Internet at <http://www.gao.gov>. Unrestricted Inspector General, DoD, reports can be accessed at <http://www.dodig.osd.mil/audit/reports>.

General Accounting Office

GAO Report No. NSIAD-00-33 (OSD Case No. 1944) "Acquisition Reform, DoD's Guidance on Using Section 845 Agreements Could Be Improved," April 7, 2000

GAO Report No. NSIAD-96-11 (OSD Case No. 1074), "DoD Research, Acquiring Research by Nontraditional Means," March 29, 1996

Inspector General, DoD

Inspector General, DoD, Report No. D-2000-065, "Costs Charged to Other Transactions," December 27, 1999

Inspector General, DoD, Report No. 98-191, "Financial and Cost Aspects of Other Transactions," August 24, 1998

Inspector General, DoD, Report No. 97-114, "Award and Administration of Contracts, Grants and Other Transactions Issued by the Defense Advanced Research Project Agency," March 28, 1997

Appendix B. Report Distribution

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