DEPARTMENT OF DEFENSE

AUDIT REPORT

UNATTENDED GROUND SENSOR SYSTEMS

No. 91-053 February 26, 1991

Office of the Inspector General

INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202-2884

February 26, 1991

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR ACQUISITION
ASSISTANT SECRETARY OF DEFENSE (COMMAND, CONTROL, COMMUNICATIONS AND INTELLIGENCE)
ASSISTANT SECRETARY OF THE ARMY (FINANCIAL MANAGEMENT)
ASSISTANT SECRETARY OF THE NAVY (FINANCIAL MANAGEMENT)
ASSISTANT SECRETARY OF THE AIR FORCE (FINANCIAL MANAGEMENT AND COMPTROLLER)

SUBJECT: Report on the Audit of Unattended Ground Sensor Systems (Report No. 91-053)

This final report on the Audit of Unattended Ground Sensor Systems is for your information and use. Comments on the draft were considered in preparing the final report and changes have been made where appropriate. We performed the audit from February through August 1990. The objective was to evaluate a DoD Hotline complaint alleging mismanagement, waste, and abuse in the acquisition of the Marine Corps Tactical Remote Sensor System (TRSS). Also, we evaluated management of the Army's Improved Remotely Monitored Battlefield Sensor System (I-REMBASS) and related internal controls. Program funding for the TRSS and the I-REMBASS total $119.6 million for FY's 1989 through 1994.

The Hotline allegation of Marine Corps mismanagement of the TRSS development was valid. Also, program duplication existed between the I-REMBASS and TRSS, and Marine Corps TRSS procurement funds were incorrectly used to fund research and development tasks. The results of the audit are summarized in the following paragraphs, and the details, audit recommendations, and management comments are in Part II of this report.

Classified portions of management comments have been deleted to facilitate reporting. Complete classified comments will be provided to authorized personnel on request.

The Army and Marine Corps have developed tactical unattended ground sensors with similar capabilities. Continued development will result in lost opportunities to economically procure larger quantities of equipment, additional support costs, and higher development costs. We recommended that the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) combine the Army and Marine Corps tactical unattended ground sensor system programs (page 3).

The Marine Corps obligated $849,979 of procurement funds for research and development for the TRSS program. As a result of the misapplication, the Marine Corps violated U.S.C., title 31, section 1301(a). We recommended that all obligations related to Military Interdepartmental Orders M95450-87-64014 and M95450-87-74013 be recorded against the Navy FY 1988 Research, Development, Test and Evaluation account; and, if funds are insufficient, deficiencies be reported in accordance with laws and regulations (page 9).

The Assistant Secretary of Defense (Command, Control, Communications and Intelligence) partially concurred with our conclusions and recommendation that the I-REMBASS and the TRSS programs be combined and not allowed to proceed as separate unattended ground sensor system programs. Because the Marine Corps needs to replace its Phase III Southeast Asia Operational Sensor System, the Assistant Secretary's action to create a Joint Unattended Ground Sensor System Program Office by October 1, 1991, and combine preplanned product improvements for I-REMBASS and TRSS is responsive and will avoid further program duplication.

The Assistant Secretary of Defense (Command, Control, Communications and Intelligence) and the Assistant Secretary of the Navy (Research, Development and Acquisition), responding for the Commander, Marine Corps Research, Development and Acquisition Command, partially concurred with our conclusion that Procurement, Marine Corps, funds were misused for TRSS research and development and that adjustments were required to Procurement, Marine Corps, and Research, Development, Test and Evaluation, Navy, accounts to correct the misuse. Based on management's comments, we have revised our recommendation to have the FY 1988 Research, Development, Test and Evaluation, Navy, account adjusted in lieu of the FY 1986 and FY 1987 accounts. The Assistant Secretaries did not concur with our conclusion and recommendation to prepare and process a deficient funds report if insufficient research and development funds existed after the adjustments were made. The Assistant Secretaries believed that the Department of Energy should prepare the required antideficiency reports since it was the activity responsible for the potential overexpenditure. We still consider this recommendation valid and request that the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) and the Assistant Secretary of the Navy (Research, Development and Acquisition) comment on the revised recommendation as well as reconsider their positions and provide further comments with completion dates to the final report.

DoD Directive 7650.3 requires that all audit recommendations be resolved promptly. Therefore, the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) and the Assistant Secretary of the Navy (Research, Development and

Acquisition) must provide final comments on the unresolved issues in this report within 60 days of the date of this memorandum.

The courtesies extended to the audit staff are appreciated. This report contains no monetary benefits (Appendix K). A list of audit team members is in Appendix M. Copies of this report will be distributed to the activities shown in Appendix N. If you have any questions on this audit, please contact Mr. Gordon Nielsen at (703) 614-6221 (AUTOVON 224-6221) or Mr. David Wyte at (703) 693-0497 (AUTOVON 223-0497).

Robert J. Lieberman
Assistant Inspector General
for Auditing

Enclosure

cc:
Secretary of the Army
Secretary of the Navy
Secretary of the Air Force
Comptroller, DoD
General Counsel, DoD

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REPORT ON THE AUDIT OF UNATTENDED GROUND SENSOR SYSTEMS

PART I - INTRODUCTION

Background

Unattended ground sensor systems are used to electronically detect the presence of personnel and vehicles and to monitor their movements. Sensor systems detect motion, sound, heat, and ferrous metal. When activated by an intrusion, sensors transmit a coded radio frequency message to a portable or base monitoring unit. The Assistant Secretary of Defense (Command, Control, Communications and Intelligence) is responsible for tactical unattended ground sensor systems.

The first tactical unattended ground sensor system was the Southeast Asia Operational Sensor (SEAOPS) system. Fielded in 1967, SEAOPS provided an "electronic curtain" to detect the movement of enemy troops and supplies into South Vietnam. As changes were made during the Vietnam conflict, SEAOPS evolved from a Phase I to a Phase III system. After the Vietnam conflict, the Army and Marine Corps retained Phase III SEAOPS in their tactical intelligence and combat doctrine.

In 1972, the Army established a system acquisition program to replace its Phase III SEAOPS. This program was identified as the Remotely Monitored Battlefield Sensor System (REMBASS), which had an estimated life-cycle cost of $250 million. In 1977, the Marine Corps decided to replace its Phase III SEAOPS. The Marine Corps planned to jointly participate with the Army in the procurement of REMBASS. The Marine Corps withdrew from the joint program in 1983 and began development of the Tactical Remote Sensor System (TRSS). The Marine Corps withdrew from the joint program because the Army REMBASS was too heavy, it lacked amphibious capability, and it was not air deliverable. In addition, test results did not satisfy Marine Corps detection requirements for tactical intelligence gathering. The Marine Corps wanted to develop an unattended ground sensor system that would be smaller, lighter, and more economical than the Army REMBASS. When TRSS development started in 1983, the Army had not initiated a program to reduce the size and weight of REMBASS system components. The TRSS consists of seismic, magnetic, and infrared sensors and a sensor monitoring set. Development of the air deliverable seismic intrusion detector is in-process. Marine Corps expenditures for TRSS from FY 1983 through FY 1997 are expected to total $128 million (Appendix A).

In FY 1987, the Army began development of an Improved Remotely Monitored Battlefield Sensor System (I-REMBASS). The primary difference between REMBASS and I-REMBASS is the reduction in size

and weight of system components. Components making up I-REMBASS are seismic, acoustic, magnetic, and infrared sensors; a radio repeater; and a portable monitor set. Program funding for the Army I-REMBASS and Marine Corps TRSS totals $148 million through FY 1993 (Appendix B).

Hotline Complaint. A December 1989 Hotline complaint to the Office of the Inspector General accused the Marine Corps of mismanagement, waste, and abuse in the acquisition of the Marine Corps TRSS. The complaint also alleged that termination of a research and development contract with Sandia National Laboratories (Sandia) resulted in TRSS program schedule delays and increased program costs (see Appendix C for details).

Objective and Scope

The audit objective was to evaluate the Hotline allegation of mismanagement in the acquisition of the Marine Corps TRSS. Specifically, we reviewed FY 1983 through FY 1990 Marine Corps TRSS program acquisition plans, requests for purchase, contracts, statements of work, pertinent regulations, cost and pricing analyses, technical evaluations, minutes of in-process review meetings, and correspondence. We also discussed the acquisition process and contract monitoring with contractors and Marine Corps personnel in the program office and field activities. We also evaluated overall management of the Army I-REMBASS to determine whether the system will satisfy mission needs and be procured cost-effectively. Internal controls were also evaluated to determine if ground sensor systems were being effectively and efficiently procured. Activities visited or contacted during the audit are listed in Appendix L.

This economy and efficiency audit was made from February through August 1990 in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD, and accordingly included such tests of internal controls as were considered necessary.

Internal Controls

In addition to the documents reviewed for the Hotline allegation, we also reviewed programing and budgeting documents, funding documents, acquisition planning documents, and contract and fund status reports. The internal controls applicable to the Army and Marine Corps acquisitions of unattended ground sensor systems were deemed to be effective in that no material deficiencies were disclosed by the audit.

Prior Audit Coverage

There were no prior audits in the last 5 years covering the subject audit.

PART II - FINDINGS AND RECOMMENDATIONS

A. Tactical Unattended Ground Sensor Systems

FINDING

The Army and Marine Corps have developed tactical unattended ground sensor systems with similar capability and technical characteristics. This occurred because the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) allowed independent development of the Tactical Remote Sensor System and Improved Remotely Monitored Battlefield Sensor System. If tactical sensor systems are allowed to proceed as separate programs rather than as a joint program, the Army and Marine Corps will pay higher research and development costs as product improvements are developed for each system. In addition, the Services will lose opportunities to economically procure larger consolidated quantities of equipment and incur higher support costs to maintain separate systems.

DISCUSSION OF DETAILS

Background. DoD Directive 5000.1, "Major and Non-Major Defense Acquisition Programs," dated September 1, 1987, provides that potential common use solutions must be considered to foster commonality and avoid redundant efforts when weapon systems are acquired. Common use solutions conserve resources by avoiding duplicate production, support and development costs.

Until FY 1983, the Marine Corps was involved in a joint effort with the Army to develop the REMBASS as a replacement for the fielded Phase III Southeast Asia Operational Sensor System (SEAOPS). Because REMBASS could not meet operational needs, the Marine Corps began developing the TRSS. TRSS was to be smaller, lighter, and less costly than REMBASS as well as being air deliverable and operable aboard ships.

Concerned with possible duplication of effort, Congress directed the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) (the office responsible for DoD oversight of REMBASS and TRSS development) in 1986 to make a comparative study of the Marine Corps' TRSS and Army's REMBASS unattended ground sensor system programs. The Assistant Secretary made the study and concluded that REMBASS and TRSS have similar sensors and monitoring sets. System differences resulted from Military Department doctrines and concepts of employment. When compared to the TRSS, the Army's REMBASS was larger, heavier, not air deliverable, and inoperable aboard ships. The 1986 study concluded that the Army should complete the REMBASS procurement, and the Marine Corps should limit development and procurement of TRSS as currently configured. In addition, the study concluded that where the Army and Marine Corps identify new

sensor system requirements, they should be required to pursue a joint effort to maximize technology transfer.

Changes in operational requirements have dictated major modifications to improve REMBASS and TRSS, and, as a consequence, the systems have become very similar. Since the 1986 comparative study, however, the Assistant Secretary did not require either the Army or the Marine Corps to enter into a joint development effort when the Army started development of its Improved REMBASS (I-REMBASS) or when the Marine Corps began to make major changes during the TRSS development effort. Also, neither the Army nor the Marine Corps have been directed to jointly participate in preplanned product improvements to the I-REMBASS and TRSS that could duplicate planned improvements.

Improved REMBASS. In 1987, the Army downsized its REMBASS sensors and started a development effort to reduce the size and weight of radio repeaters and monitors receiving sensor signals. The Army started this effort because of operational needs identified by the Army Special Operation Forces for a lighter and smaller system than REMBASS. Also, the I-REMBASS was to be built to military specifications and be reparable. Sixteen Special Operation Forces battalions were planned to receive the I-REMBASS. The Army also planned to replace existing REMBASS assets with I-REMBASS sensors and monitors. The initial operating capability for the I-REMBASS is expected in 1993.

TRSS. Following the transfer of responsibility for the TRSS program development from Sandia National Laboratories to the Naval Avionics Center in February 1988, changes were made to the TRSS sensors to improve maintainability and to provide for interoperability with other sensor systems such as REMBASS and I-REMBASS. The Marine Corps' intent was that TRSS sensors would be disposable and not built to military specifications. However, after the transfer of program responsibility to the Naval Avionics Center, a decision was made by the Marine Corps to build TRSS sensors to military specifications and to make them reparable. Because of system changes, the initial operating capability for TRSS has slipped from FY 1989 to FY 1992, with planned production limited to an initial operating capability. The Marine Corps has provided funding to procure TRSS for only one of the four Sensor Control and Management Platoons that were to have the TRSS.

System Similarities. With the exception of the larger TRSS base monitoring equipment, the I-REMBASS and TRSS sensors, repeaters, and portable monitors have similar performance and technical characteristics, as well as similar physical characteristics. Furthermore, similar preplanned product improvements are planned for both TRSS and I-REMBASS. Improvements include development of sensors for imaging, radiation and chemical detection, aircraft detection, air and

artillery delivered sensors and radio repeaters, as well as relay equipment, recovery units for storing prior detections, and airborne communication relay equipment.

Performance Characteristics. Differences in performance characteristics were minimal. In a comparative test of the TRSS and REMBASS systems (Appendix D), the Material Test Division, United States Army Tropic Test Center, determined that the overall probability of detection for REMBASS was 0.87 and for TRSS was 0.92, on a scale of 1.0 for maximum probability of detection. For the overall probability of direction indication, REMBASS was 0.94 and TRSS was 0.82 on a scale of 1.0 for maximum probability of detection.

Technical Characteristics. The I-REMBASS and TRSS have the following similarities. They use similar types of sensors to detect sound and motion disturbances, metallic objects, and heat emissions. Their sensors communicate using the same frequency bands and transmission message codes. Except for minor differences, required environmental operating conditions are also similar (Appendix E).

Physical Characteristics. Differences in the size and weight of I-REMBASS and TRSS sensors, radio repeaters, and portable monitors are minimal. For example, since TRSS sensors have to be packaged with encoder transmitter units to perform similar I-REMBASS functions, TRSS magnetic sensor units could be reconfigured to match the 11.0 x 4.5 x 1.75 inch dimensions of the I-REMBASS magnetic sensor (Appendix F). Similarly, I-REMBASS magnetic sensors weigh 4 pounds each; whereas the TRSS magnetic sensors weigh 4.9 pounds each when the encoder transmitter unit is combined with the sensor (Appendix G).

Continued Development. Continued independent programs for I-REMBASS and TRSS will result in lost benefits derived from economic order procurement opportunities, higher support costs, and unnecessary duplicate development costs.

Procurement Opportunities. Benefits of procuring larger quantities will be lost when the Army and the Marine Corps buy similar equipment for I-REMBASS and TRSS, respectively. Combining similar I-REMBASS and TRSS sensor system equipment requirements, such as the seismic, magnetic, and infrared sensors and portable monitors, would result in larger quantities being procured at potentially lower costs. Combined, the Army and the Marine Corps plan to buy 2,026 seismic sensors, 1,008 magnetic sensors, 1,008 infrared sensors, 576 repeaters, and 1,008 portable monitors.

Support Costs. Supporting two separate sensor systems is inefficient and will result in additional costs. For example, instead of maintaining an inventory for common I-REMBASS and TRSS

sensor parts, two inventory systems will be needed to support separate equipment requirements. Maintaining stock levels for two inventory systems, rather than one, requires investments for parts with low turnovers to ensure availability regardless of demands. In addition, separate maintenance depots have to be established. As a result, duplicate investments in equipment, staffing, training, and work areas will be made to repair sensor systems. Projections to sustain I-REMBASS and TRSS for 20 years are $200 million and $50 million, respectively.

Duplicate Development Costs. Allowing the Army and Marine Corps to pursue planned product improvements would duplicate development costs. For example, both the Army and the Marine Corps plan to obtain an imaging sensor for the I-REMBASS and TRSS. Sandia National Laboratories developed a prototype imager before the transfer of the TRSS program to the Naval Avionics Center. Because Sandia National Laboratories did not provide the Marine Corps cost data for TRSS development, research and development costs cannot be determined for the imaging sensor. However, the Naval Avionics Center estimated that it will cost an additional $500,000 to complete the research and development for the imaging sensor. Allowing parallel development of imaging sensors would not be cost-effective and would not be in compliance with DoD Directive 5000.1.

Conclusion. Recognizing the need for commonality and interoperability, the Joint Tactical Command, Control and Communications Agency, in its November 1988 report, "Preliminary Assessment of Unattended Ground Sensor Systems," recommended that:

> It would be in the best interests of DoD if ground sensor systems were designed for maximum commonality of components and to the same set of interface parameters. Such designs would allow interoperability in unique ad hoc situations, and should result in lower development costs through use of standardized components, interfaces and message formats.

The Assistant Secretary of Defense (Command, Control, Communications and Intelligence) should revisit the 1986 decision, which allowed further independent development and procurement of REMBASS and TRSS, before further investments are made in I-REMBASS and TRSS preplanned product improvements. Rather than wait for the next generation of sensor systems, as concluded by the 1986 comparative study, we believe a decision needs to be made now to combine the Army and the Marine Corps tactical unattended ground sensor system programs. Continuing separate sensor system programs with similar capabilities and technical characteristics is inefficient and not cost-effective,

and it does not promote commonality and standardization, as provided for in DoD Directive 5000.1.

RECOMMENDATION FOR CORRECTIVE ACTION

We recommend that the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) combine the Army and Marine Corps tactical unattended ground sensor system programs.

MANAGEMENT COMMENTS

The Assistant Secretary of Defense (Command, Control, Communications and Intelligence) partially concurred with the recommendation to combine the sensor system programs, but only after the Army and the Marine Corps field their basic I-REMBASS and TRSS systems. The Assistant Secretary stated that a new Joint Unattended Ground Sensor System Program Office will be created with the Marine Corps as the lead Service. The new program office is expected to be in place and functioning no later than October 1, 1991, and will complete the production and fielding of I-REMBASS and TRSS as well as procure preplanned product improvements for both ground sensor systems.

AUDIT RESPONSE TO MANAGEMENT COMMENTS

The Assistant Secretary of Defense (Command, Control, Communications and Intelligence) action to create a Joint Unattended Ground Sensor System Program Office by October 1, 1991, and combine preplanned product improvements for I-REMBASS and TRSS is responsive and should avoid further sensor program duplication.

The complete text of the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) comments is in Appendix H. Our response to additional management comments is in Appendix J.

B. Procurement Funds

FINDING

The Marine Corps obligated $849,979 of procurement funds for research and development efforts. The Marine Corps allowed Sandia National Laboratories to use Marine Corps procurement funds because research and development funds available to the Sandia National Laboratories had been spent. Thus, the Marine Corps violated United States Code, title 31, section 1301(a), by obligating procurement funds of $849,979 for tasks that should have been funded from research and development funds. As a result, the Marine Corps will have to deobligate FY 1986 and FY 1987 procurement funds and obligate FY 1988 research, development, test and evaluation funds. If there are insufficient funds available for obligation, the comptroller must report such deficiencies in accordance with the Navy Comptroller Manual.

DISCUSSION OF DETAILS

Background. U.S.C., title 31, section 1301(a), requires that funds be used only for the programs and purposes for which the appropriation is made. U.S.C., title 31, sections 1341(a) and 1517(a), prohibit any officer or employee from making or authorizing an obligation in excess of the amount available in an appropriation or in excess of the amount permitted by agency regulations. Navy Comptroller Manual, volume 3, paragraph 032010, provides procedures to ensure that adjusting entries are immediately recorded to correct the misappropriation entries or charges and to ascertain if a violation of U.S.C., title 31, sections 1341(a) and 1517(a), exists. When violations of U.S.C., title 31, sections 1341(a) and 1517(a) occur, Navy Comptroller Manual, volume 3, paragraphs 032010 and 032011, provide procedures for advising the next higher echelon of the violations and for filing required reports. Navy Comptroller Manual, volume 7, paragraph 075401, requires that operational systems development be funded with research and development funds. The Navy Comptroller Manual defines operational systems development as research and development efforts for logistical and operational employment of a system. DoD Directive 5010.38, "Internal Management Control Program," dated April 14, 1987, requires that each DoD Component implement an internal management control program to ensure that obligations comply with applicable law.

TRSS Equipment. In April 1987, using Military Interdepartmental Orders M95450-87-64014 and M95450-87-74013, the Marine Corps obligated FY 1986 and FY 1987 Procurement, Marine Corps, funds of $651,531 and $198,448, respectively. Sandia National Laboratories (Sandia) was to use the funds to procure 37 items of TRSS equipment in support of its subcontract

with BDM Corporation for integrated logistics support. Sandia's subcontract with BDM Corporation called for integrated logistics support for TRSS and did not require the procurement of TRSS equipment. Therefore, this tasking should have been funded with research and development funding as defined by Navy Comptroller Manual, volume 7, paragraph 075401. The following explanations were provided on the usage of funds.

Program Office. The program office believed that the Procurement, Marine Corps, funds for FY's 1986 and 1987 were for development specifications (B level) and production specifications (C level) for TRSS. The program office's explanation was partially correct. Sandia made a proposal to BDM Corporation for the development and production level specifications. However, Sandia never provided funds to BDM Corporation because Sandia never finalized the proposal. Sandia told BDM Corporation that Marine Corps funds were not available to execute the additional tasks.

Marine Corps Research, Development and Acquisition Command Comptroller. The Marine Corps Research, Development and Acquisition Command Comptroller stated that the description of work in funding documents for the 37 items of TRSS equipment was a clerical error. Initially, the 37 items were to replace Phase III Southeast Asia Operational Sensor (SEAOPS) equipment, but the documents were not withdrawn when the program office decided not to buy the 37 items of SEAOPS equipment. The Comptroller believed the funds were used to produce related integrated logistics support for the Phase III SEAOPS. However, the integrated logistics support statement of work in the BDM Corporation contract was for TRSS and made no provision for production-related Phase III SEAOPS integrated logistics support.

Sandia. In a letter to the Commandant of the Marine Corps, dated January 1988, Sandia admitted that FY 1986 and FY 1987 Procurement, Marine Corps, funds were expended for TRSS research and development tasks. Sandia stated that it took this action because all research and development funds were obligated and that it needed to "borrow" to keep critical program activities in progress. Rather than take action to recover Procurement, Marine Corps, funds expended for FY 1988 research and development efforts, the Marine Corps allowed Sandia to expend the remaining Procurement, Marine Corps, balances to pay for research commitments.

Conclusion. As a result of Marine Corps inaction to control its funds, $849,979 in appropriated FY 1986 and FY 1987 Procurement, Marine Corps, funds were expended for TRSS research and development tasks. This action resulted in a violation of U.S.C., title 31, section 1301(a). To correct the improper obligation of funds, adjustments need to be made to obligate the

proper funds. If available Research, Development, Test and Evaluation, Navy, fund balances are insufficient, the Comptroller must report such deficiencies in accordance with Navy Comptroller Manual, volume 3, paragraphs 032010 and 032011.

RECOMMENDATION FOR CORRECTIVE ACTION

We recommend that the Commander, Marine Corps Research, Development and Acquisition Command, deobligate FY 1986 and FY 1987 procurement funds of $849,979 related to Military Interdepartmental Orders M95450-87-64014 and M95450-87-74013 and record all obligations against the FY 1988 Research, Development, Test and Evaluation, Navy, account. If Research, Development, Test and Evaluation, Navy, funds are insufficient, report such deficiencies in accordance with Navy Comptroller Manual, volume 3, paragraphs 032010 and 032011.

MANAGEMENT COMMENTS

Both the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) and the Assistant Secretary of the Navy (Research, Development and Acquisition), responding for the Commander, Marine Corps Research, Development and Acquisition Command, partially concurred that FY 1986 and FY 1987 Procurement, Marine Corps, funds of $849,979 identified to Military Interdepartmental Orders M95450-87-64014 and M95450-87-74013 should be deobligated and that Research, Development, Test and Evaluation, Navy, funds should be obligated for the improper charges. The Marine Corps will correct the funds' misapplication by deobligating the FY 1986 and FY 1987 Procurement, Marine Corps, accounts and by obligating the FY 1988 Research, Development, Test and Evaluation, Navy, account rather than FY 1986 and FY 1987 Research, Development, Test and Evaluation, Navy, accounts, as recommended in the draft report. The Assistant Secretaries did not agree to make required antideficiency reports if funds are not sufficient to implement the recommendation. The Assistant Secretaries believed that the reports must be performed by the Department of Energy (Sandia National Laboratories). As the executing activity, Sandia was responsible for determining that sufficient research and development funds were available for incurring obligations.

AUDIT RESPONSE TO MANAGEMENT COMMENTS

The action by the Marine Corps to correct the misapplication of procurement funds by making adjustments to the FY 1988 Research, Development, Test and Evaluation, Navy, account and the FY 1986 and FY 1987 Procurement, Marine Corps, accounts is responsive. After further analysis of the Sandia National Laboratories' Reports on Reimbursable Orders to the Marine Corps, we have revised our recommendation to have the FY 1988 Research,

Development, Test and Evaluation, Navy, account adjusted in lieu of the FY 1986 and FY 1987 accounts. However, the Assistant Secretary of the Navy (Research, Development and Acquisition) reason for not reporting insufficient funds after adjustments are made was not responsive. We disagree with the Assistant Secretary's rationale for not making the required reports if sufficient FY 1988 Research, Development, Test and Evaluation, Navy, funds do not exist after account adjustments are made. We believe antideficiency reports should be processed by the Marine Corps and Navy. Therefore, we request that the Assistant Secretary of the Navy (Research, Development and Acquisition) reconsider his position in the final report comments and provide an action date when the antideficiency reporting process will be completed.

The complete text of comments from both the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) and the Assistant Secretary of the Navy (Research, Development and Acquisition) are in Appendixes H and I. Our response to specific management comments is in Appendix J.

DEVELOPMENT AND PROCUREMENT FUNDING FOR THE TACTICAL REMOTE SENSOR SYSTEM (FY 1983 THROUGH FY 1997)

Fiscal Year	Research, Development, Test and Evaluation	Procurement, Marine Corps	Total
1983	$ 2,589,694	$ 0	$ 2,589,694
1984	1,541,269	0	1,541,269
1985	9,416,248	0	9,416,248
1986	3,664,984	651,531	4,316,515
1987	2,024,338	198,448	2,222,786
1988	5,210,668	3,204,534	8,415,202
1989	4,450,857	12,862,969	17,313,826
1990	1,867,000	4,779,000	6,646,000
1991	2,931,000	2,658,000	5,589,000
1992	3,115,000	19,341,000	22,456,000
1993	2,603,000	18,000,000	20,603,000
1994	2,587,000	15,051,000	17,638,000
1995	2,500,000	663,000	3,163,000
1996	2,500,000	678,000	3,178,000
1997	2,500,000	893,000	3,393,000
TOTAL	$49,501,058	$78,980,482	$128,481,540

DEVELOPMENT AND PROCUREMENT FUNDING FOR TACTICAL UNATTENDED GROUND SENSORS (FY 1989 THROUGH FY 1993)

Program	FY 1989 AND PRIOR	FY 1990	FY 1991	FY 1992	FY 1993	TOTAL
ARMY:						
I-REMBASS 1/	$ 4,410,000	$3,971,000	$11,087,000	$17,444,000	$10,191,000	$ 47,103,000
MARINE CORPS:						
TRSS 2/	45,815,540	6,646,000	5,589,000	22,456,000	20,603,000	101,109,540
TOTAL	$50,225,540	$10,617,000	$16,676,000	$39,900,000	$30,794,000	$148,212,540

1/ Improved Remotely Monitored Battlefield Sensor System
2/ Tactical Remote Sensor System

HOTLINE COMPLAINT REVIEW OF TACTICAL REMOTE SENSOR SYSTEM

Background. The acquisition strategy for the Marine Corps Tactical Remote Sensor System (TRSS) program acquisition was to expedite replacement of an aging and obsolete ground sensor system called the Phase III Southeast Asia Operational Sensor System (SEAOPS). The Marine Corps' strategy was to use the Department of Energy's Sandia National Laboratories (Sandia) to develop the TRSS and the Naval Avionics Center to produce initial system hardware. However, Sandia's efforts were terminated in February 1988, and responsibility for TRSS development was given to the Naval Avionics Center.

Hotline Complaint. The Office of the Inspector General received a Hotline complaint in December 1989 that alleged waste and abuse in the acquisition of the TRSS. The complaint stated that the Marine Corps' termination of a research and development contract with Sandia resulted in TRSS program delays and increased program costs. It was also alleged that the Marine Corps' inability to manage the TRSS acquisition, rather than Sandia's program management, caused the program delays and cost growth. It was further alleged that information was withheld from the Marine Corps and DoD management officials to cover up program deficiencies and prevent possible program termination.

Evaluation of Hotline Complaint. The acquisition strategy for the TRSS was not defined to ensure program stability and competition. As defined by Marine Corps Order P5000.10, "Systems Acquisition Management Manual," planning is the framework by which an acquisition program is controlled. Program managers did not conduct meaningful long-range planning or prepare realistic budget estimates for the TRSS program. Also, requirements and cost baselines were not established, and strategies were not developed to achieve the Marine Corps' desired operating capability.

Acquisition Strategy. The Marine Corps' acquisition strategy did not comply with Defense Federal Acquisition Regulation Supplement (DFARS), paragraph 17.5, "Interagency Acquisitions Under The Economy Act," when Sandia began TRSS development. The DFARS provides that DoD agencies may place orders with another agency for supplies or services, if the head of the requesting agency or a designee determines that it is in the Government's interest to do so. The Marine Corps did not determine whether available commercial sources could develop and produce TRSS. As a result, the Marine Corps lost an opportunity for competition.

New Start or Product Improvement. TRSS should have been established as a new start instead of a product improvement. Marine Corps Order P5000.10 defines product improvement as a configuration change to an existing weapon

system or item of equipment. Such improvements may be evolutionary changes to improve combat effectiveness and to extend the useful life of a system. The Marine Corps' TRSS Required Operational Capability statement required development of "...an advanced tactical remote sensor system capable of continuous, all-weather detection, location determination, and monitoring of enemy activity within an Amphibious Objective Area." As indicated by the Required Operational Capability statement, a new system was required to replace the Phase III SEAOPS rather than change the configuration or add equipment to an existing system. In contrast, when the Army developed and procured its Remotely Monitored Battlefield Sensor System (REMBASS) to replace its Phase III unattended ground SEAOPS, it defined the system acquisition as a "new start."

Programming and Budgeting. The Marine Corps started developing the TRSS without determining system acquisition costs, as required by DoD Directive 4245.3, "Design to Cost." Instead of developing new estimates for TRSS development, the Marine Corps based program estimates on previous cost estimates of $21 million for procurement of the Army REMBASS as a replacement for the Phase III SEAOPS and reprogrammed research and development funds of $21 million. In January 1984, the Marine Corps asked Sandia to provide cost estimates for TRSS development. However, Sandia provided no cost estimates in December 1984 when it provided its assessment of what should be developed.

After receipt of the Sandia TRSS assessment, the Marine Corps redefined the TRSS system requirements. Differences between the Sandia planned system and the redefined Marine Corps requirements are provided in the following table.

System Requirements

	Sandia	Marine Corps
Seismic Intrusion Detector	600	200
Magnetic Intrusion Detector	60	100
Infrared Intrusion Detector	60	100
Air-Delivered Seismic Intrusion Detector	360	60
Imaging Sensor	0	100
Radio Frequency Relay	40	45
Portable Monitor	40	88
Sensor Monitor Control	0	11
Special Test Set	3	4
General Test Equipment	0	1

Although requirements changed, basic procurement costs as of August 1985 remained at $5 million for one Marine Corps Sensor Control and Management Platoon to be equipped with TRSS or a total of $20 million for four Sensor Control and Management Platoons. Costs for spares, test sets, and training were an additional $2 million.

During equipment development, the Marine Corps did not know how much effort Sandia was expending on each project task. As a federally funded research and development center, Sandia claimed that it was not required to provide costs by project task. Furthermore, because of the Marine Corps' indecisiveness, Sandia expended funds for a sensor monitor control van that was not fully developed. The Marine Corps terminated development of the van when it decided that a smaller mobile unit was needed to carry TRSS monitoring control equipment. Also, the Marine Corps later terminated Sandia's involvement in the TRSS program entirely.

Termination of Sandia Effort. From FY 1983 through FY 1988, Sandia expended over $15 million for TRSS with the Marine Corps providing minimal oversight and accountability. Because research and development funds were not expended as required by regulations, the Navy Comptroller made a decision in the fall of 1987 to suspend TRSS funding. Navy Comptroller Manual, volume 7, paragraph 075402, requires that budgeted research, development, test and evaluation funds be expended during the initial year of availability. As a result, the Marine Corps requested Sandia to account for expended funds. Also, the Marine Corps requested Sandia to provide detailed estimates of additional funding requirements, by specific work task. Sandia would not accept this change in management direction. Because the Marine Corps was unwilling to "guarantee" sufficient annual funding (full funding) at the beginning of a fiscal year, the Marine Corps and Sandia, by mutual consent, severed their relationship in February 1988.

Follow-on TRSS Program. Significant changes were made to the program when the Marine Corps transferred the responsibility for TRSS development to the Naval Avionics Center (NAC) and changed TRSS system requirements. Specifically, sensor equipment would be built to Military specifications and standards and would be reparable rather than disposable. Also, the equipment that Sandia developed to relay sensor detections (repeater) had to be replaced by a relay assembly and a signal data recorder that would accommodate an imaging sensor being developed. Because of the program restructuring, the Initial Operating Capability of TRSS was delayed from FY 1989 to FY 1992.

These changes resulted in a significant program cost growth. TRSS estimated costs from FY 1983 through FY 1997 are expected to total $128 million, three times the 1984 amount of $42 million that the Marine Corps estimated to spend for developing and procuring the system. Production cost for one Sensor Control and Management Platoon escalated from $5 million to $29 million. Because of TRSS cost growth, the Marine Corps determined that it could equip only one of the four Sensor Control and Management Platoons (SCAMP).

Conclusion. The Hotline complaint regarding mismanagement of the TRSS acquisition was valid, but we found no indication that information was intentionally withheld in order to cover up program deficiencies or to prevent program termination. As required by Department of Defense Directive 5000.1, "Major and Non-Major Defense Acquisition Programs," the Marine Corps did not conduct meaningful, realistic long-range planning; estimate, program, budget, and fund the TRSS program realistically; and establish a TRSS program baseline. Marine Corps inability to manage the TRSS acquisition caused program slippage and increased cost. In addition, the Marine Corps objective of replacing aging and obsolete Phase III SEAOPS sensors with TRSS by 1989 has not been met. Accordingly, the Marine Corps estimates equipment readiness for the four existing SCAMP platoons at less than 50 percent. Marine Corps planning calls for equipping only one of the four SCAMP platoons with the TRSS.

COMPARISON OF PERFORMANCE CHARACTERISTICS [1]/

Overall Effectiveness	REMBASS/ I-REMBASS [2]/	TRSS [2]/
Probability of Detection - P(D)	0.87	0.92
Probability of Classification - P(C)	0.77	N/A
Probability of Direction Indication	0.94	0.82
Probability of Detection Versus Distance (Meters)	Using Vehicle and Personnel Targets	
0 to 20	0.94	0.96
21 to 35	0.50	0.86
40 to 59	0.42	0.84
	Using Vehicle Targets Only	
60 to 79	0.98	1.00
80 to 89	0.75	0.99
over 100	0.07	0.60
Probability of Detection by Site and Target Type		
Jungle/Personnel	1.00	0.96
Jungle/Pack Mules	1.00	0.98
Soft Soil/Personnel	0.96	1.00
Gravel Road/Personnel	0.73	0.85
Gravel Road/Pack Mules	1.00	0.95
Gravel Road/Vehicles	1.00	1.00
Probability of Target Detection by Site and Direction		
Jungle/Personnel	0.90	1.00
Jungle/Pack Mules	0.95	0.99
Soft Soil/Personnel	0.76	0.76
Gravel Road/Personnel	0.78	0.98
Gravel Road/Pack Mules	0.98	0.99
Gravel Road/Vehicles	0.96	0.99

1/ Excerpted from "Final Status Report on Evaluation Test of Unattended Ground Sensor Systems," prepared by the Material Test Division, United States Army Tropic Test Center, APO Miami 34004-5000, dated August 1987.
2/ The maximum probability of detection is 1.0.

TECHNICAL DESCRIPTION OF SELECTED GROUND SENSOR SYSTEMS

Environmental Characteristics	REMBASS I-REMBASS [1/]	TRSS [2/]
Altitude		
Operational	0 to 15,000 feet	-1,300 to 15,000 feet
Nonoperational	0 to 35,000 feet	-1,300 to 40,000 feet
Temperature		
Operational	+120 F	+149 F
Nonoperational	+160 F	+149 F
Operational	-35 F	-22 F
Nonoperational	-70 F	-71 F
Solar Radiation	355 BTU/Ft2/Hr. [3/]	355 BTU/Ft2/Hr. [3/]
Humidity	5 to 100 percent	N/A
Rain	Operate in rain	N/A
Immersion Proof	3 feet of water for 2 hours	3 feet of water for 2 hours
Sand and Dust	35 knot winds in fine sand and dust while operating	N/A
Salt Atmosphere	Resistant to marine atmosphere and salt fallout over land	Salt fog
Fungus	Withstand fungi in humid areas	Withstand fungi in humid areas
Rough Handling	Military vehicle and air transportation	Military vehicle and air transportation
Electromagnetic Interference	Military Standard 461	Military Standard 461

1/ Remotely Monitored Battlefield Sensor System/Improved Remotely Monitored Battlefield Sensor System
2/ Tactical Remote Sensor System
3/ British Thermal Units per square foot per hour

PHYSICAL DIMENSIONS OF SELECTED GROUND SENSOR SYSTEMS

Equipment	TRSS 1/ (in Inches)	I-REMBASS 2/ (in Inches)
Seismic/Acoustic Sensor	2.8 x 2.5 x 1.7	11.0 x 4.5 x 1.75
Infrared Sensor	5.6 x 3.6 x 2.0	11.0 x 4.5 x 1.75
Magnetic Sensor	6.1 x 2.5 x 1.6	11.0 x 4.5 x 1.75
Imager	9.0 x 6.0 x 4.0	3/
Encoder/Transmitter	5.9 x 5.5 x 3.4	4/
Sensor Monitor System	96.0 x 96.0 x 120.0	5/
Portable Monitor	9.5 x 3.0 x 2.5	3/
Repeater	13.6 x 6.0 x 4.4	15.5 x 5.5 x 2.0

1/ Tactical Remote Sensor System
2/ Improved Remotely Monitored Battlefield Sensor System
3/ Imager and Portable Monitor have not been developed for I-REMBASS
4/ Encoder/Transmitter is packaged with I-REMBASS sensors
5/ In development

WEIGHT OF SELECTED GROUND SENSOR SYSTEMS

Equipment	TRSS 1/ (Pounds)	I-REMBASS 2/ (Pounds)
Seismic/Acoustic Sensor	0.6	4.0
Infrared Sensor	1.2	4.0
Magnetic Sensor	0.9	4.0
Imager	6.0	3/
Encoder/Transmitter	4.0	4/
Sensor Monitor System	2,800.0	5/
Portable Monitor	5.0	5.0
Repeater	14.0	6.0

1/ Tactical Remote Sensor System
2/ Improved Remotely Monitored Battlefield Sensor System
3/ Imager has not been developed for I-REMBASS
4/ Encoder/Transmitter is packaged with I-REMBASS sensors
5/ In development

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

COMMAND, CONTROL,
COMMUNICATIONS
AND
INTELLIGENCE

13 NOV 1990

MEMORANDUM FOR INSPECTOR GENERAL, DEPARTMENT OF DEFENSE
ATTN: DIRECTOR, ACQUISITION MANAGEMENT
DIRECTORATE

SUBJECT: Response to Inspector General Report

This memorandum provides our response to the Department of Defense Inspector General's (DoD IG) Draft Report on the Audit of Unattended Ground Sensor Systems (UGS)(Project No. OAS-8005), dated 13 September 1990.

We partially concur with findings A and B and recommendations A and B in the DoD IG report. We partially concur with the internal control weaknesses described in the subject report, although actions were being taken to rectify the problems when they become apparent. However, the report makes broad statements suggesting that a mistake was made in not jointly developing the Army and Marine Corps UGS systems. We do not believe that that is the case, as is explained in the attachment. In addition, we take exception to some of the statements made in finding A of the report. The attachment provides detailed comments on those areas in which we disagree with the DoD IG auditors.

Charles A. Hawkins, Jr.
Deputy Assistant Secretary
of Defense (Intelligence)

Attachment

DoD IG DRAFT REPORT - DATED SEPTEMBER 13, 1990
(PROJECT NO. OAS-8005)

"DRAFT REPORT ON THE AUDIT OF UNATTENDED GROUND SENSOR SYSTEMS."

OASD (C3I) COMMENTS

* * * * *

FINDING A

Final Report
Page No.

(U) FINDING A: Tactical Unattended Ground Sensor Systems. Finding A states that the Army and Marine Corps are independently developing tactical unattended ground sensor (UGS) systems with similar capability and technical characteristics. According to the DoD IG report, this situation occurred because the Assistant Secretary of Defense for Command, Control, Communications and Intelligence (ASD(C3I)) allowed independent development of the Tactical Remote Sensor System (TRSS) and Improved Remotely Monitored Battlefield Sensor System (I-REMBASS). Also, Finding A states that if tactical sensor systems are allowed to proceed as separate programs, the Army and Marine Corps will pay higher research and development costs, lose opportunities to economically procure larger quantities of equipment, and incur higher support costs. Finding A concludes that OASD(C3I) should revisit the 1986 decision that allowed further development and procurement of REMBASS and TRSS. Further, it suggests that a decision needs to be made to combine the two Service UGS programs now. Finally, it closes with the premise that, "Continuing separate sensor programs with closely similar capability and technical characteristics is inefficient and not cost-effective; and does not promote commonality and standardization as provided for in DoD Directive 5000.1."(pp. 5-14/DoD IG Draft Report) 6

(U) RESPONSE: Partially Concur. The OASD(C3I) allowed separate tactical UGS programs in the Army and the Marine Corps because there are fundamental differences between the two programs. Both programs have been continuously monitored by OASD(C3I). In addition, the Army and the Marine Corps have maintained continuing dialogue and liaison in order to utilize equipment which meets each Service's requirements. We believe the decision to continue separate Service UGS programs was a correct one. Furthermore, we do not believe that this decision was inconsistent with the results of the study conducted in 1986 at the request of the House Permanent Select Committee on Intelligence (HPSCI). The study concluded that that each Service UGS program fulfills distinct and separate requirements, concepts of operation, and missions. While it is

true that the Army and the Marine Corps are independently developing tactical unattended ground sensor systems with some similar technical characteristics, we do not concur that these two systems have a similar capability. There are several reasons why we take this position.

(U) First, both systems are being developed to satisfy Service unique operational requirements. Those requirements have driven the development of two separate systems with different capabilities. One system, TRSS, is designed to satisfy the Marine Corps Required Operational Capability (ROC) for expeditionary and amphibious operations, while the other system (I-REMBASS) was designed to satisfy the Army's 1987 ROC as it applies to special operations forces. The Marine requirement calls for an UGS system which can be employed during all phases of an amphibious operation including operations from aboard amphibious shipping during preassault or advanced force operations. Moreover, TRSS has both hand emplaced and air delivered remote sensors while I-REMBASS sensors must be hand emplaced. Further, TRSS has a storage and retrieve capability as well as a real time signal relay capability from a location ashore to sensor monitoring equipment located in ships at sea, including an over the horizon capability. The bottom line is that I-REMBASS does not satisfy the Marine Corps operational requirement for a UGS system, and TRSS does not satisfy the Army's SOF UGS requirement. If the decision had been made in 1986 to stop work on REMBASS and TRSS and begin work on a new UGS system to satisfy both Service's requirements, it is unlikely that the new UGS system would be fielded by now.

(U) Another area in which the two Services differ with regard to UGS systems is in their concepts of operation. There are two major differences in their respective concepts. First, the Army has sought to reduce the human discriminating factor in identifying targets detected by REMBASS sensors. This goal was pursued through the development and fielding of the seismic/acoustic "classifying" remote sensor. Using detected seismic and/or acoustic energy, this sensor automatically discriminates between personnel and vehicles. Further, it was intended to classify vehicles as wheeled or tracked. The Army believes that this automation of the target classification process has separated the analyst from the classification process, and thereby, has improved reporting timeliness. The Army believes this development is a major evolutionary upgrade from the SEAOPS or Phase III sensor system which preceded REMBASS. I-REMBASS uses the same operational concept. On the other hand, the Marine Corps concept considers the trained analyst as the critical part of the target identification process. For example, the Marines believe that the integration of all the data from seismic, magnetic, infrared, and imaging sensors is an essential element in the classification process. The trained Marine analyst is the integrating mechanism by which this occurs. Both sensor systems were designed and developed

around these separate Service concepts. Although both systems are interoperable, each one functions differently.

(U) The third major difference between the Services is in sensor employment concepts. Both Services view the emplacement of a sensor string as mission and site dependent. The Army concept calls for the hand emplacement of sensors and repeaters. I-REMBASS is a downsized version (lighter and smaller) of the Army's fielded Remotely Monitored Battlefield Sensor System (REMBASS). Although numbers of sensors and repeaters used are situation dependent, in general, the Army concept of employment for I-REMBASS calls for a string of three sensors. I-REMBASS sensors types are: seismic/acoustic (classifier), magnetic, and infrared. On the other hand, TRSS will incorporate seismic, magnetic, infrared, and imaging sensors. The imaging sensor will provide an additional target classification capability to the system. Generally, the Marine concept of employment calls for five to six sensors in a string which includes some redundancy in certain sensors to improve reliability. For increased reliability, two sensors can be attached to one encoder transmitter unit (ETU). Relays are used to provide signal connectivity between the remote sensors and the monitoring equipment. Although these two UGS systems share two common types of sensors, they use different relay and monitoring equipment which has been developed to satisfy each Service's unique requirements.

(U) We do not concur with the inference that independent development of the TRSS and I-REMBASS programs was a mistake. On the contrary, we believe that these two programs have led to the development of two distinct systems which support Service unique requirements. When REMBASS/I-REMBASS and TRSS are compared (Table 1), both systems share the following common operational characteristics: real time monitoring, worldwide deployment, all-weather use, day/night use, hand-emplaced, surveillance capable, intelligence collection, target development, and not affected by battlefield obscurants. Unique characteristics to I-REMBASS are: target classification by sensor, requirement for artillery delivery (not in development at present), and physical security applications. Conversely, unique characteristics to TRSS are shipboard monitoring, airborne interrogation and relay, non-real-time monitoring, air-delivery of sensors and relays, target classification by the operator, and support for over the horizon assault capability. When I-REMBASS and TRSS are compared for equipment commonality (Table 2), the antenna set is the only common piece of equipment. The magnetic sensor, and infrared sensor of both systems are packaged differently, but are interoperable and share common technology. I-REMBASS unique equipment includes: seismic/acoustic sensor, sensor monitoring set, repeater, and monitor/programmer. On the other hand, TRSS unique equipment includes: a daytime imaging sensor, air delivered seismic sensor, seismic sensor, portable monitor, signal data recorder, sensor monitoring system, airborne relay, and ground relay.

Operational Characteristics	TRSS	I-REMBASS
Real time monitoring	X	X
World wide deployment	X	X
All-weather use	X	X
Day/Night use	X	X
Hand-emplaced	X	X
Surveillance capable	X	X
Intelligence collection	X	X
Target development	X	X
Not affected by battlefield obscurants	X	X
Target classification by sensor		X
Requirement for artillery delivery		X
Physical security applications		X
Shipboard monitoring	X	
Airborne interrogation & relay	X	
Non-real-time monitoring	X	
Air-delivery of sensors and relays	X	
Target clasification by operator	X	
Support for Over-the-horizon assault	X	

Table 1. Operational Characteristics

Both systems have some similar technical characteristics, but their capabilities are not similar.

(U) We do not concur with the statement, ". . . if tactical sensor systems are allowed to proceed as separate programs, the Army and Marine Corps will pay higher research and development costs, lose opportunities to economically procure larger quantities of equipment, and incur higher support costs." Essentially, the R&D expenses for both TRSS and I-REMBASS have already been paid. SOCOM R&D funding for I-REMBASS expires in FY 1992, and TRSS has programmed only $10.1 million for RDT&E for FY 1991 to FY 1994. Both programs are nearing the end of the R&D cycle and are entering the Procurement phase. In fact,

Equipment	Common	Inter-operable	I-REMBASS Unique	TRSS Unique
Antenna set	X	X		
Magnetic sensor		X		
Infrared sensor		X		
Seismic/acoustic sensor		X	X	
Sensor monitoring set		X	X	
Repeater			X	
Monitor/Programmer			X	
Daytime imaging sensor				X
Air delivered seismic sensor		X		X
Seismic sensor		X		X
Portable monitor				X
Signal data recorder		X		X
Sensor monitoring system		X		X
Airborne relay		X		X
Ground relay		X		X

Table 2. Equipment Comparison

cancellation of these programs and the start of a new joint UGS program would cause RDT&E costs to rise not decrease. While it may be true that procurement of larger quantities of common UGS equipment would be more economical, it is more important that the equipment procured satisfies the Service operational requirement. While we concur that higher support costs are likely with separate TRSS and I-REMBASS systems in service, we feel that this cost will be minimal, and is justified by the Service requirements.

(U) Fourth, on pages six and seven of the report, we nonconcur with the conclusions which the DOD IG drew from our 1986 REMBASS and TRSS Program Review Study, and the inference that the OASD(C3I) failed to take the proper action in response to changes in the TRSS and REMBASS programs. Specifically, the 3

study did not conclude that ". . ..the Marine Corps should limit development and procurement of TRSS" as stated on page six of the report. On the contrary, it stated that, "In many ways TRSS is an improvement on REMBASS in terms of air delivery and in those technologies to reduce sensor and relay size, weight, and cost. REMBASS will not satisfy Marine Corps needs. Our R&D initiative to finish TRSS is small and clearly worth the investment." Clearly, the intent was to continue the TRSS program. Second, the statement on page six that, ". . . all future tactical remote sensor systems should be developed under a joint Army and Marine Corps program" is also incorrect. In fact, the study recommended that, "Should the Army or Marine Corps identify new remote sensor system requirements beyond those included in their current programs, they should be required to pursue a joint effort to maximize technology transfer." Third, on pages six to seven, the statement, "The Assistant Secretary directed the Army and Marine Corps to jointly participate in the development of a follow-on system to REMBASS and TRSS to be fielded in the FY 2010 time frame" does not appear anywhere in the study, nor in any other document signed by the ASD(C3I) according to our records. 3

(U) On page seven, we nonconcur with the statement that, "Changes in operational requirements have dictated major modifications to improve REMBASS and TRSS, and as a consequence the systems have become very similar operationally and technically." Previously, we have shown that there are more differences than similarities between the two systems. However, a few more points need to be made. First, the operational requirements for TRSS have not changed, they are the same today as they were in 1986. The Marine Corps Required Operational Capability (ROC) for TRSS is dated 1977. An updated USMC ROC has been written, but is in staffing. Conversely, the Army's current ROC for REMBASS is dated 1 May 1987, and includes the 1987 requirement for Army Special Operations Forces. In the Army's case, it is true that operational changes have dictated modifications to improve REMBASS. In 1986, the Army already had a P3I effort underway to downsize REMBASS components. Therefore, SOCOM decided to program money for I-REMBASS to fill this SOF operational requirement. Although I-REMBASS is an improvement on REMBASS in size and weight of components, it still does not come close to meeting the Marine Corps UGS requirement. Previously, we drew a comparison in capabilities between TRSS and I-REMBASS. Based on that comparison, our conclusion is that the two systems are certainly not similar operationally and technically. However, certain system components may have some similar technical characteristics. 4

(U) The Army and Marine Corps have been cooperating with each other to ensure that both systems are interoperable to the maximum extent possible. For example, both systems use the same set of interface parameters which was implemented in 1989 by an engineering change proposal (ECP) to Security Equipment Interface Working Group (SEIWG) specification 005A.

Furthermore, both systems use compatible message formats so that I-REMBASS monitoring equipment is able to read out TRSS sensor activations and vice versa. Recently, General Electric (GE), the I-REMBASS contractor, developed the software necessary to take the TRSS message formats and display them on a dot-matrix I-REMBASS display monitor. Both program offices interact with each other on a regular basis, and periodic meetings are hosted by OASD(C3I) to ensure cooperation and interoperability. In short, OASD(C3I) has been providing management oversight over intelligence related UGS programs since their inception.

(U) The auditors state that they are unable to quantify any cost savings which may be achieved by their recommended actions, but they assume that the government will financially benefit from the creation of a joint UGS program at this time. In some cases, a joint program can end up being more costly than the programs it replaced because, frequently, it is necessary to develop systems which are capable of satisfying broad multi-Service and agency requirements. Therefore, joint programs do not necessarily equate to financial benefit for the government.

(U) Finally, an administrative error in the report needs to be corrected. In various places throughout the report such as on pages 5, 6, and 13 etc., the report refers to the "Assistant Secretary of Defense for Communications, Command, Control and Intelligence." This title is incorrect and should read, the "Assistant Secretary of Defense for Command, Control, Communications and Intelligence." 3 and 6

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RECOMMENDATION A

(U) RECOMMENDATION A: The DoD IG recommended that the Assistant Secretary of Defense for Command, Control, Communications and Intelligence combine the Army and Marine Corps tactical unattended ground sensor system programs. (p. 13/DoD IG Draft Report) 7

(U) RESPONSE: Partially Concur. Combining the Army and Marine Corps UGS programs means the creation of a new joint UGS program. OASD(C3I) intends to create a new Joint Unattended Ground Sensor Program with the Marine Corps as the lead Service functioning under the Navy Service Acquisition Executive. This fully integrated Joint Program Office (JPO) will be staffed by all participating Services, and will be directed by a program manager assigned by the lead Service. Participating Services may perform some program functions on behalf of the JPO, but not for a separate service program. An MOA between the Marine Corps and other participating Services will be drafted outlining the integrated JPO responsibilities. In addition, a Program Manager's Charter will be drafted in coordination with OASD(C3I), and the participating Services. Suspense dates for

these actions have not yet been determined, but we intend to have the UGS JPO in place and functioning by no later than October 1, 1991. OASD(C3I) will provide management oversight over the Joint UGS Program through the Director, Tactical Intelligence Systems.

(CLASSIFIED PARAGRAPH REMOVED)

(U) We intend to complete the production and fielding of TRSS and I-REMBASS under the new Joint UGS Program. Stopping the TRSS and I-REMBASS programs at this time is not appropriate for the following reasons:

(U) First, it would drastically slow down the fielding of critically needed equipment to Marine and Army Special Operations Forces. Both programs have nearly completed RDT&E work and are either in procurement or are about to begin procurement. For example, TRSS sensors are now in initial production at the Naval Avionics Center (NAC), in Indianapolis, Indiana. The first sensors will be delivered to the Second Sensor Control and Management Platoon (2nd SCAMP) at Camp Lejeune, N. C. in FY 1991. The first end-to-end test of the system will occur there in FY 1991. TRSS IOC is scheduled to occur in the second quarter of FY 1992. Large scale procurement of TRSS equipment will begin in FY 1992. SOCOM I-REMBASS procurement begins in FY 1992. We do not want to delay the procurement and fielding of both TRSS and I-REMBASS to the Services. Currently, the Fleet Marine Force is operating with a degraded Phase III Southeast Asia Operational Sensor System (SEAOPS). SEAOPS is old, worn out, and needs to be replaced immediately. The Marine Corps cannot wait for a new joint UGS system which is likely to be years away, it needs TRSS now. In comparison, the Army completed procurement of REMBASS in 1987, and has fully fielded the system to its Light Divisions. Currently, the Army's Special Operations Forces are not equipped with a UGS system, but they have stated an operational requirement to acquire one. I-REMBASS will fill this need. It makes little sense to delay procurement and fielding of these fully developed systems in order to initiate development work on a new system which would be capable of satisfying both Service's requirements at some future date.

(CLASSIFIED PARAGRAPH REMOVED)

(U) Next, OASD(C3I) considers the I-REMBASS program to be a preplanned, product improvement effort to the REMBASS program and not a new program start. Currently, funding for the I-REMBASS effort is provided by the Special Operations Command (SOCOM) with program eleven money. The total amount of RDT&E money programmed for I-REMBASS from FY 1989 to FY 1992 is $6.6 million. SOCOM procurement funds for the effort total $52.6 million from FY 1992 to FY 1995. The SOCOM objective is to field I-REMBASS to Army Special Operations Force battalions. Although the Army is considering I-REMBASS as a replacement for its existing REMBASS systems fielded to its light divisions, the Army has not programmed money for I-REMBASS. Based on the small amount of RDT&E money expended for I-REMBASS, it is clear that I-REMBASS is not a program new start. It is simply an improvement in size and weight over the REMBASS system components.

(U) Finally, we have not acted counter to the recommendations made in the 1986 REMBASS and TRSS Program Review Study. OASD(C3I) does not feel that the SOCOM UGS requirement was sufficient justification for forming a new joint UGS program when it was clear that the ongoing I-REMBASS P3I effort would answer their requirement. Further, we are promoting increased interoperability and commonality between TRSS and I-REMBASS. We intend to require that any P3I sensor component which meets the requirements of both systems will be procured by both services. Both programs have been doing a commendable job in working together. An example is the I-REMBASS antennae set which the Marine Corps will procure for use with TRSS. In addition, both program offices are cooperating in the research and development of new remote sensors such as the imaging sensor, aircraft detection sensor, chemical warfare (chemical warfare (CW)) detection sensor, and others. In our view, the 1986 study validated the requirement to continue the TRSS and REMBASS programs to completion.

* * * * *

FINDING B

(U) FINDING B: Procurement Funds. Finding B states that the Marine Corps obligated $849,979 of procurement funds for research and development efforts. Allegedly, the Marine Corps allowed Sandia Laboratories to use Marine Corps procurement funds because research and development funds available to the laboratory had been spent. It concludes that because of Marine Corps inaction to control and oversee its funds, Marine Corps Procurement funds were expended for TRSS research and development tasks. Further, it finds that the Marine Corps violated United States Code (U.S.C.) title 31, section 1301(a) by obligating procurement funds of $849,979 for tasks that should have been funded from research and development funds. To correct the improper obligation of funds, the report says, "adjustments need to be made to obligate the proper funds." Thus, the DoD IG finds that the Marine Corps will have to deobligate FY 1986 and FY 1987 procurement funds and obligate FY 1986 and FY 1987 research, development, test, and evaluation funds. If Navy RDT&E fund balances are insufficient, the comptroller must report such deficiencies in accordance with Navy Comptroller Manual, volume 3, paragraphs 032010 and 032011. 9 - 11
(pp. 15-19/DoD IG Draft Report)

(U) RESPONSE: Partially Concur. We concur with the finding that procurement funds were used for research and development efforts. However, based on the information provided in the report, we are not convinced that the obligation of procurement funds for RDT&E purposes was the result of Marine Corps inaction to control and oversee its funds. Rather, we believe that the Department of Energy (Sandia Laboratory) is at fault for any possible misappropriation of DoD funds.

(U) First, it appears that the Marine Corps took appropriate action to ensure that procurement funds were properly applied. Apparently, Sandia Labs was incorrect in assuming that the Acquisition Support Group (ASG) had the authority to approve the application of funds in contradiction to the instructions on the funding documents in question. Therefore, in this case, it appears that the Marine Corps did not allow Sandia National Laboratories to use the procurement funds for Research and Development purposes, but that Sandia misappropriated the funds without approval from the proper authority.

(U) Second, there is little evidence presented in the report to suggest that Marine Corps inaction and failure to oversee its funds resulted in the expenditure of procurement funds for R&D tasks. Over the course of approximately two years, working with the Department of Energy (DOE)/Sandia on TRSS became a difficult and frustrating experience for the Marine Corps. Specifically, the Marine Corps found that Sandia failed to report expenditures on specific tasks and activities, and did not respond to program direction. Finally, when the Marine Corps discovered that appropriate fiscal controls were ineffective in dealing with Sandia, it initiated action to terminate Sandia's involvement in

the TRSS program. It appears that the Marine Corps decision to terminate Sandia in 1987 was both appropriate and justified.

(U) Lastly, since an audit and financial report of TRSS related expenditures at Sandia was not undertaken, the actual expenditure or non-expenditure of Marine Corps Procurement funds by Sandia cannot be accurately determined. In fact, if a misappropriation of procurement money did occur, it is possible that the Department of Energy (Sandia) was at fault, and not the Marine Corps. However, because the DoD IG did not have the authority to pursue any wrongdoing by the DOE, the finding that the funds were misappropriated by the Marine Corps cannot be substantiated.

* * * * *

RECOMMENDATION B

(U) RECOMMENDATION B: The DoD IG recommended that the Commander, Marine Corps Research Development and Acquisition Command deobligate FY 1986 and 1987 procurement funds of $849,979 related to Military Interdepartmental Orders M95450-87-64014 and M95450-8774013 and record all obligations Fy 1986 and FY 1987 Research, Development, Test and Evaluation, Navy accounts. If research, Development, Test and Evaluation, Navy funds are insufficient, report such deficiencies in accordance with Navy Comptroller Manual, volume 3, paragraph 032010 and 032011. (p. 19/DoD IG Draft Report) 11

(U) RESPONSE: Partially Concur. Marine Corps records indicate that the actual work using the funds in question was performed in FY 1988. We concur with the Marine Corps proposal to solve this problem which is to deobligate the FY 1986 and FY 1987 procurement funds in question, and obligate FY 1988 Research, Development, Test, and Evaluation, Navy funds. The Marine Corps indicates action will be completed by 30 November 1990.

THE ASSISTANT SECRETARY OF THE NAVY
(Research, Development and Acquisition)
WASHINGTON, D.C. 20350-1000

06 DEC 1990

MEMORANDUM FOR THE DEPARTMENT OF DEFENSE ASSISTANT INSPECTOR GENERAL FOR AUDITING

Subj: DRAFT REPORT ON THE AUDIT OF UNATTENDED GROUND SENSOR SYSTEMS (Project No. OAS-8005)

Ref: (a) DODIG memo of 13 Sep 90

Encl: (1) Department of the Navy Comments

In response to reference (a), we have reviewed the subject draft report and generally concur in the recommendations.

The Marine Corps concurs that the two sensor programs should be combined, but only after the Marine Corps fields the basic Tactical Remote Sensor System (TRSS). The Marine Corps recommends that the programs be combined only for items beyond the basic systems.

The Marine Corps acknowledges the improper use of Procurement, Marine Corps (PMC) funds for a research and development effort. The appropriate accounting adjustments will be made to the PMC and Research, Development, Test and Evaluation, Navy (RDT&E,N) appropriations to correct the misapplication of funds by Sandia National Laboratories. However, the test for a potential violation of U.S.C. Title 31, section 1517 must be performed by Sandia National Laboratories vice the Marine Corps. It is incumbent upon the executing activity to ensure adequate funds are available to cover obligations they incur. Therefore, Sandia National Laboratories should ensure they have adequate funds available to cover the RDT&E,N obligation once the accounting entries are corrected.

Detailed Department of the Navy comments are provided as enclosure (1).

Gerald A. Cann

Copy to:
NAVINSGEN
NAVCOMPT(NCB-53)
CMC(FDR)

Department of the Navy Comments
on
OAIG(A) Draft Report of September 13, 1990
on
Audit of Unattended Ground Sensor Systems
Project No. 0AS-8005

FINDING A: Tactical Unattended Ground Sensor Systems. The Army and Marine Corps were independently developing tactical unattended ground sensor systems with similar capabilities and technical characteristics. This occurred because the Assistant Secretary of Defense for Communications, Command, Control and Intelligence allowed independent development of the Tactical Remote Sensor System and Improved Remotely Monitored Battlefield Sensor System. If tactical sensor systems are allowed to proceed as separate programs rather than as a joint program, the Army and Marine Corps will pay higher research and development costs, lose opportunities to economically procure larger quantities of equipment, and incur higher support costs.

Department of the Navy Position: Partially Concur. ASD,C3I allowed separate tactical unattended ground sensor systems in the Marine Corps and the Army because there are fundamental differences between the Army's Improved REmotely Monitored BAttlefield Sensor System (I-REMBASS) and the Marine Corps Tactical Remote Sensor System (TRSS) programs which justify their separate existence. Both programs have been continuously monitored by ASD,C3I. ASD,C3I conducts Inter-service/agency reviews to ensure maximum commonality of components and interface parameters, and to avoid unnecessary duplication of effort. In addition to this oversight, the Army and Marine Corps have maintained dialogue and liaison in order to use equipment which meets each Service's requirements; e.g., the TRSS use of REMBASS antennas. The decision to allow separate programs is consistent with the 1986 study conducted by ASD,C3I for the House Permanent Select Committee on Intelligence. The Study concluded that the two systems fulfill distinct and separate Service requirements, concepts of operation, and mission.

The respective requirement documents are:

Marine Corps - Required Operational Capability (ROC) No. INT 1.06, Tactical Remote Sensor System (TRSS) dated 4 Jan 1977.

Army - Required Operational Capability (ROC), for the Remotely Monitored Battlefield Sensor System (REMBASS), USATRADOC ACN 1337 Dated 29 December 1981.
Required Operational Capability (ROC), for the Remotely Monitored Battlefield Sensor System (REMBASS), revised 24 December 1986.
Remotely Monitored Battlefield Sensor System

Subj: AUDIT OF UNATTENDED GROUND SENSOR SYSTEMS (Project No. 0AS-8005)

(REMBASS) Required Operational Capability (ROC) and Preplanned Product Improvement (P3I) Annex.

Recommendation A. That the Assistant Secretary of Defense for Communications, Command, Control, and Intelligence take action to combine the Army and Marine Corps tactical unattended ground sensor system programs.

Department of the Navy Position: Partially Concur. I-REMBASS is in R&D, while TRSS is already in production with competitive procurements for Marine Corps equipment that incorporates unique designs. The sensor programs should be combined only after the Marine Corps fields the basic TRSS system. (The TRSS is currently in low-rate production at the Naval Avionics Center in Indianapolis, with IOC scheduled for early FY 1992.) I-REMBASS is programmed to begin production in FY 1992. Startup of a new joint program at this time would delay fielding of both TRSS and I-REMBASS to the Services.

Because there are more differences than similarities in the basic TRSS and I-REMBASS systems, the Marine Corps recommends that the programs be combined only for items beyond the basic systems. This would be most appropriate for such Pre-planned Product Improvements which meet the requirements of both Services. P3I include such items as the day/night imager, NBC sensors, and urban sensors.

FINDING B: Procurement Funds. The Marine Corps obligated $849,979 of procurement funds for research and development efforts. The Marine Corps allowed Sandia National Laboratories to use Marine Corps procurement funds because research and development funds available to the laboratory had been spent. Thus, the Marine Corps violated United States Code (U.S.C.) title 31, section 1301(a) by obligating procurement funds of $849,979 for tasks that should have been funded from research and development funds. As a result, the Marine Corps will have to deobligate FY 1986 and FY 1987 procurement funds and obligate FY 1986 and FY 1987 research, development, test and evaluation funds. If there are insufficient funds available for obligation, the comptroller must report such deficiencies in accordance with law and regulation.

Department of the Navy Position: Partially Concur. The Marine Corps concurs with the finding that procurement funds were used for research and development efforts. However, the Marine Corps disagrees that the Marine Corps allowed Sandia National Laboratories to use Marine Corps procurement funds because research and development funds available to the laboratory hadbeen spent.

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On 28 April 1987, Request for Contractual Procurement (RCP) M95450-87-74013 and M95450-87-64014, citing Procurement, Marine Corps funds of $198,448 and $651,531 respectively, were sent to the SANDIA Budget and Resources Management Division, Department of Energy, POB 5400, Albuquerque, NM 87115 (CODE: ATRP). These funds represented the incremental funding of Sandia National Laboratories Contract No. 95-7001 for the procurement of 37 Tactical Remote Sensor Systems (TRSS). To maintain control of these funds, the last paragraph of the RCPs contains the following phrase:

> "The Purchasing Activity is not authorized to deviate from this purchase request without prior approval from the Deputy Chief of Staff for Installations and Logistics (LMB). Authorized deviations will be confirmed by amendment to the purchase request. Direct all requests for deviation to the Commandant of the Marine Corps (LMB), Headquarters, U.S. Marine Corps, Washington, DC 20380-0001."

Additionally, the Marine Corps had been providing Sandia with Research, Development, Test, and Evaluation, Navy (RDT&E,N) funds for TRSS. The RDT&E,N funds were provided on numerous Orders for Work and Services (NavCompt Form 2275 (Rev. 8-81). On the reverse side of these forms, under Supplementary Items, is the phrase:

> "Amounts authorized by this document may not be exceeded. Additional funds, if required, will be requested from the activity cited in Block 8. Approval of such requests will be accomplished by the requesting activity through the issuance of an amendment to this document, appropriately reflecting the amount of additional funds being provided."

The point of contact in Block 8 was the Commandant of the Marine Corps (RD&S), Headquarters, United States Marine Corps, Washington, DC 20380-0001.

A letter, from Sandia National Laboratories, dated 19

January 1988, to the Commandant of the Marine Corps (Code INTO), and addressed to an individual within INTO, stated,

> "Please note that all R&D funding has been obligated, and we are currently "borrowing" from PMC funding in order to keep critical program activities in progress. This action was discussed and accepted by the ACG in advance."

The assumption by Sandia that the ACG (Acquisition Coordinating Group) had the authority to approve the application of funds in contradiction to instructions on the funding documents was in error. None of the funding documents provided to Sandia listed the ACG as the source of approval for deviations from the contacts. Therefore, the Marine Corps did not allow Sandia National Laboratories to use the procurement funds for a research and development effort; rather, Sandia misapplied the funds without the approval of competent authority.

Recommendation B: That the Commander, Marine Corps Research, Development, and Acquisition Command deobligate FY 1986 and FY 1987 procurement funds of $849,979 related to Military Interdepartmental Orders M95450-87-64014 and M95450-87-74013 and record all obligations against FY 1986 and FY 1987 Research, Development, Test and Evaluation, Navy accounts. If Research, Development, Test and Evaluation, Navy funds are insufficient, report such deficiencies in accordance with Navy Comptroller Manual, volume 3, paragraphs 032010 and 032011.

Department of the Navy Position: Partially Concur. The Marine Corps concurs with the requirement to deobligate the FY 1986 and FY 1987 procurement funds; however, Marine Corps records indicate that the actual work was performed in FY 1988. Therefore, the Marine Corps will obligate FY 1988 Research, Development, Test and Evaluation, Navy funds. Action will be completed by 30 Nov 1990.

AUDIT RESPONSE TO MANAGEMENT COMMENTS

This appendix details our response to specific comments from the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) and the Assistant Secretary of the Navy (Research, Development and Acquisition) on the draft report. The full texts of management comments can be found in Appendixes H and I.

FINDING A. Tactical Unattended Ground Sensor Systems

Management Comments. The Assistant Secretary of Defense (Command, Control, Communications and Intelligence) partially concurred with the draft report finding that the Army and Marine Corps tactical unattended ground sensor system programs be combined. Although recognizing that technical similarities existed between the Army's Improved Remotely Monitored Battlefield Sensor System (I-REMBASS) and the Marine Corps' Tactical Remote Sensor System (TRSS), the Assistant Secretary believed fundamental operational, system capability, and equipment differences between the two systems required separate Service sponsored programs and that their independent development to support Service unique requirements was not a mistake as inferred by the draft report. He discussed common characteristics and differences between I-REMBASS and TRSS and provided tables to support his position. The Assistant Secretary also stated that the Army and the Marine Corps maintained continuing dialogue to cross utilize sensor equipment.

Furthermore, because both Army and Marine Corps unattended ground sensor programs are in advanced phases of development, the Assistant Secretary believed that combining I-REMBASS and TRSS provide insignificant development cost avoidance opportunities and would further delay the replacement of aged Marine Corps Phase III Southeast Asia Operational Sensor Systems and Army REMBASS hardware.

The Assistant Secretary is taking action to create a new Joint Unattended Sensor System Program Office. The Program Office to be in place and functioning no later than October 1, 1991, will complete production and fielding of I-REMBASS and TRSS as well as jointly develop preplanned product improvements for both systems. In addition, the Assistant Secretary believed that misstatements were made in the draft report.

Audit Response. The Assistant Secretary's comments that operational, system capability and equipment differences exist between I-REMBASS and TRSS is partially correct. However, the Army and Marine Corps systems began to resemble each other when the REMBASS was downsized in FY 1987 and the Naval Avionics Center assumed development of TRSS in February 1988. Although differences exist, we believe sufficient operational, equipment

and performance similarities exist between I-REMBASS and TRSS to validate our conclusion to combine the programs before investments are made in product improvements for additional sensors.

Contrary to the equipment comparison table accompanying the Assistant Secretary's comments as well as demonstrated by our report Appendixes F and G, both I-REMBASS and TRSS have similar magnetic, infrared, and acoustic sensors and both systems have sensor monitoring systems. They perform similar system functions and appear to be equally effective in identifying targets as demonstrated by the performance characteristic appendix (Appendix D) of our report. In addition, the TRSS being developed by the Naval Avionics Center will not have shipboard monitoring capability and will not have airborne and relay capability as stated and indicated in the Assistant Secretary's comments. Furthermore, TRSS does not require a classifier as the I-REMBASS. TRSS has a daytime imaging sensor to identify and distinguish targets. When development is eventually completed by the Army and the Marine Corps, I-REMBASS and TRSS will have artillery and air deliverable sensors as correctly stated by the Assistant Secretary's comments. However, the I-REMBASS and TRSS sets initially delivered to the field will not include these sensors. TRSS as with I-REMBASS can be used for physical security applications. A commercial version of TRSS sensors and portable monitor have been developed by Sandia National Laboratories for perimeter security protection. Known as the Miniature Intrusion Detection System (MIDS), the Air Force has acquired several sets for physical security detection and monitoring. Both the Army and Marine Corps have plans to add additional sensors to their systems as product improvements. Sensors to be developed will be capable of transmitting night time images, detecting biological and chemical agents, and identifying differences in radiation levels. As demonstrated by our report, the development of one of these sensors, an imaging sensor, will cost more than $500,000.

Despite the Assistant Secretary's justifications for maintaining separate unattended ground sensor systems, he intends to create a new Joint Unattended Ground Sensor Program Office by October 1, 1991, to complete production and fielding of I-REMBASS and TRSS as well as initiate preplanned product improvements for both systems prior to the time established in his 1986 study to Congress. Where we believe other draft report differences existed, we clarified our report.

FINDING B. Procurement Funds

Management Comments. The Assistant Secretary of Defense (Command, Control, Communications and Intelligence) and the Assistant Secretary of Navy (Research, Development and Acquisition), responding for the Commander, Marine Corps

Research, Development and Acquisition Command, concurred that Procurement, Marine Corps, funds had been misapplied for TRSS research and development. However, both Assistant Secretaries believed that the Department of Energy (Sandia National Laboratories) rather than the Marine Corps was the cause of the fund misapplication and therefore responsible for reporting the potential violation of U.S.C., title 31, sections 1341(a) and 1517(a).

Audit Response. We maintain our position that the Marine Corps should report a potential violation of U.S.C., title 31, sections 1341(a) and 1517(a). To assign total responsibility for the potential antideficiency violation to Sandia National Laboratories, without the Marine Corps Research, Development and Acquisition Command assuming any responsibility as the authorized accounting activity is inappropriate. The use of Procurement, Marine Corps, funds was not adequately established by the Marine Corps' documentation. Furthermore, the Marine Corps Research, Development and Acquisition Command was aware that Sandia was in need of additional funds before January 1988, when Sandia notified the Marine Corps that procurement funds were being borrowed to fund research and development efforts. Attached to Sandia's June 30, 1987, Report on Reimbursable Orders (Navy Comptroller Form 2193) was a Sandia "Summary of 'Unspent' Funds" indicating that TRSS expenses would exceed available funds by $643,000. The summary concluded with a statement that "We have no extra money. We will overdraw badly without action." The June 30, 1987, Navy Comptroller Form 2193 was submitted to the Commandant of the Marine Corps.

SUMMARY OF POTENTIAL MONETARY AND OTHER BENEFITS RESULTING FROM AUDIT

Recommendation Reference	Description of Benefits	Amount and/or Type of Benefits
A.	This is an economy and efficiency as well as program result recommendation addressing duplication of ground sensor systems within DoD.	Overall monetary benefits (cost avoidance) cannot be quantified because the start of preplanned product improvement actions for unattended ground sensor systems has not occurred.
B.	This is a compliance with regulations and law recommendation to ensure that adjustments are made to correct the misapplication of procurement funds and reports are prepared if a FY 1988 Research, Development, Test and Evaluation, Navy, account fund deficiency exists as a result of the adjustment.	Nonmonetary.

ACTIVITIES VISITED OR CONTACTED

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition, Washington, DC
Assistant Secretary of Defense (Command, Control, Communications and Intelligence), Washington, DC
Assistant Secretary of Defense (Special Operations and Low Intensity Conflict), Washington, DC

Department of the Army

U.S. Army Belvoir Research, Development and Engineering Center, Fort Belvoir, VA
U.S. Army Communications-Electronics Command, Fort Monmouth, NJ

Department of the Navy

Naval Avionics Center, Indianapolis, IN
Naval Air Development Center, Warminster, PA
U.S. Marine Corps:
- Headquarters, U.S. Marine Corps
- Office of the Commanding General, Marine Corps Research, Development and Acquisition Command
- Director of Intelligence
- Second Surveillance, Reconnaissance and Intelligence Group, Camp Lejeune, NC

Department of the Air Force

Air Force Systems Command, Electronics Systems Division, Hanscom Air Force Base, MA
U.S. Air Force Office of Security Police, Kirtland Air Force Base, NM

Defense Agencies

Defense Nuclear Agency, Alexandria, VA
Director, Joint Tactical Command, Control and Communications Agency, Reston, VA

Department of Energy

Assistant Inspector General for Auditing, Washington, DC

Contractors

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