INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
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ARLINGTON, VIRGINIA 22202-2884

REPORT
NO. 91-102

June 24, 1991

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR ACQUISITION
ASSISTANT SECRETARY OF THE NAVY (FINANCIAL MANAGEMENT)
ASSISTANT SECRETARY OF THE AIR FORCE (FINANCIAL MANAGEMENT AND COMPTROLLER)

SUBJECT: Report on the Audit of the Acquisition of the Tacit Rainbow Anti-Radiation Missile System (Project No. 0AS-0050)

Introduction

This is our final report on the audit of the Tacit Rainbow Anti-Radiation Missile System (Tacit Rainbow) for your information and use. We performed the audit from March through December 1990. The audit objective was to evaluate the acquisition management of the air-launched Tacit Rainbow system to determine if the system was being adequately readied for production and deployment. We found numerous management problems; however, this report contains no recommendations because DoD took action to cancel the Tacit Rainbow system in FY 1992. We are bringing the issues identified during the audit to your attention as lessons learned in the event the program is reinstated. Also, the issues raised may be of interest to other program managers. The Air Force is the lead Military Department for this joint Navy and Air Force program. The Air Force Joint Tactical Autonomous Weapons System Program Office (Program Office), Aeronautical Systems Division, manages the program. For FY's 1982 through 2000, the total estimated acquisition cost of the system was about $4 billion.

Scope of Audit

This economy and efficiency audit was conducted 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 deemed necessary. We reviewed eight program management elements including mission critical computer resources, integrated logistics support planning, configuration control, interfaces and integration, cost and schedule, contracting, program stability, and production preparedness. We

also included audit tests to address the potential for fraud and illegal acts. Our audit tests of the eight critical program management element objectives disclosed no indications of fraud or illegal acts. Enclosure 1 provides a summary of the four critical program management element objectives where controls were adequate. The remaining four objectives are addressed in the discussion section of this report. We reviewed accounting and program data for the period January 1980 through December 1990 to support the audit. We interviewed personnel involved in the acquisition of the Tacit Rainbow. The Technical Assessment Division of the Office of the Assistant Inspector General for Auditing provided assistance in evaluating the areas of contracting and configuration management. A list of the activities visited or contacted is in Enclosure 2.

Internal Controls

Internal controls were reviewed as were deemed necessary for the eight critical program management element objectives addressed during the audit. Internal controls for the objectives were determined from applicable DoD and Air Force directives, instructions, and manuals. The audit identified material internal control weaknesses in the areas of program stability, cost and schedule, configuration control, and contracting as defined by Public Law 97-255, Office of Management and Budget Circular A-123, and DoD Directive 5010.38. These weaknesses are discussed in the report, but are not reported as findings because of DoD's actions to terminate the Tacit Rainbow system. A copy of this report will be provided to the senior official responsible for internal controls within the Air Force.

Background

The Tacit Rainbow was to provide defense suppression for bombers, fighters, and standoff weapon systems. The Tacit Rainbow was to be launched from B-52G and F-16 aircraft, cruise to a designated position, loiter, search for preprogrammed threat emitters, and attack those emitters. The Navy planned to launch the Tacit Rainbow from the A-6 aircraft before it canceled its participation in the Tacit Rainbow program in April 1989. From January 1980 until March 1986, the program was managed under the "Special Access Required" security controls. In March 1986, the Deputy Secretary of Defense removed the Tacit Rainbow from Special Access security controls because he believed the program could be adequately protected by using the Secret and Top Secret security structure.

In July 1981, the Air Force selected Northrop Corporation (Northrop) to be the sole source contractor for full-scale development of the Tacit Rainbow. In September 1981, the Air Force awarded Northrop cost-plus-incentive-fee contract F33657-81-C-2123, with a target cost of $110.9 million and a

target fee of $9.3 million, for Tacit Rainbow development. The development effort was to be completed by July 1983. In July 1986, the Air Force restructured the program to include updating the system specification required for A-6 and B-52 aircraft operational compliance, requiring contractor support of operational testing, and adding $160.6 million to the contract because of significant cost increases and technical problems. In the restructured contract, the Air Force established a cost cap of $372.2 million, which limited the Government's liability for all previous, and remaining, Tacit Rainbow development efforts. In January 1990, the Air Force competitively awarded Raytheon Company a $29.8 million fixed-price-incentive-fee contract with an award fee as a second source producer of the Tacit Rainbow.

Prior Audit Coverage

Since 1986, the General Accounting Office (GAO) has issued two reports on the Tacit Rainbow system. In December 1989, GAO issued Report No. GAO/NSIAD-90-30 (OSD Case No. 8055), "Defense Acquisition Programs: The Status of Selected Systems." GAO reported on the status of the Tacit Rainbow system in the areas of requirements, schedule, performance, and cost. This report made no recommendations concerning the Tacit Rainbow system.

On March 8, 1991, GAO issued Report No. GAO/NSIAD-91-71 (OSD Case No. 8526), "ELECTRONIC WARFARE: Early Production of Tacit Rainbow Missile Not Warranted." GAO concluded that the Tacit Rainbow was not ready to begin the preproduction verification phase because the production configured system was not flight tested. Further, GAO found that the Air Force was planning to make an early commitment to Tacit Rainbow production without demonstrating satisfactory performance during operational testing. GAO recommended that the Tacit Rainbow preproduction verification phase be delayed and that the low-rate initial production decision be delayed until operational tests satisfactorily demonstrated Tacit Rainbow performance requirements. GAO also recommended that additional missiles needed for operational testing be provided under the development program until testing justified production of the Tacit Rainbow. DoD concurred with the recommendations but stated that implementation of the recommendations was moot because of the system's cancellation.

Discussion

The Air Force and the Tacit Rainbow program office had not effectively managed the Tacit Rainbow program to ready it for production and deployment. Specifically, the Air Force did not define Tacit Rainbow system requirements and assess system affordability and cost-effectiveness before making the 1981 decision to proceed into full-scale development of the Tacit Rainbow. Also, the program office did not perform an adequate

cost-benefit analysis before the Air Force decided to second source the Tacit Rainbow in 1985. In addition, the program office did not implement controls needed to effectively manage the program in the areas of cost and schedule, configuration control, quality assurance, contracting, voucher processing, and the internal management control program. These conditions occurred because the Air Force and program office did not adhere to policies and procedures established in the 5000 series of DoD directives for effectively managing major acquisition programs. We also concluded that the lack of Defense Acquisition Board (DAB) program oversight of the Tacit Rainbow system before 1986 enabled the Air Force to circumvent established acquisition policies and procedures. Without management controls, the Air Force and program office could not effectively exercise oversight and control over technical problems, schedule delays, and cost overruns that were experienced on the Tacit Rainbow system.

DoD Directives. DoD Directive 5000.1, "Major and Non-Major Defense Acquisition Programs," September 1, 1987,* established policies and procedures for managing Defense acquisition programs. With respect to program oversight, the Directive required that the acquisition authority review the status of an acquisition program at the Milestone II full-scale development decision point to ensure that the program has been sufficiently readied for the full-scale development phase of the acquisition process. The Directive also established the decision criteria and primary considerations to be reviewed by the acquisition authority during deliberations at this decision point. For most major acquisition programs, the Directive assigned the Under Secretary of Defense for Acquisition responsibility for convening DAB program reviews at milestone decision points and making acquisition recommendations to the Secretary of Defense. The Directive excluded "Special Access Required" programs from the definition of a major Defense acquisition program and the requirement for review by the DAB at acquisition milestone decision points. The Under Secretary of Defense for Acquisition has required that "Special Access Required" programs be subject to DAB oversight since 1989.

System Requirements. DoD Instruction 5000.2, "Defense Acquisition Program Procedures," September 1, 1987, states that system requirements are normally defined in the concept exploration and definition (Milestone 0) and concept

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* After completion of the audit in December 1990, DoD consolidated the acquisition requirements in DoD Directive 5000.1 and subordinate acquisition directives and instructions referenced in this report in DoD Directive 5000.1, "Defense Acquisition," February 23, 1991, and DoD Instruction 5000.2, "Defense Acquisition Management Policies and Procedures," February 23, 1991.

demonstration and validation (Milestone I) phases of the system acquisition process. The Tacit Rainbow program, however, was exempted from these two system acquisition phases and began at the 1981 full-scale development (Milestone II) decision point. Without these two acquisition phases, the Air Force did not clearly define the Tacit Rainbow operational requirement at the program start. A Joint Services Operational Requirement to clearly define Tacit Rainbow requirements was not issued until 1985.

According to Northrop personnel, at the critical design review held in 1983, the Air Force was aware that the original configuration of the Tacit Rainbow missile did not satisfy the design requirements in the missile system specification. Regardless, the Air Force elected to continue with full-scale development with the provision that Northrop make design changes to correct identified design deficiencies. In 1985, Air Force concerns over missile design problems increased. As a result, the Air Force restructured the Tacit Rainbow program in July 1986 to require Northrop to develop a missile that would meet the system's specifications. In July 1987, the Air Force initiated a preplanned product improvement program to upgrade the missile design because the Tacit Rainbow system specifications did not satisfy the stated operational requirement. In our opinion, the Air Force could have more efficiently developed the Tacit Rainbow and expedited development efforts had it clearly defined the operational requirement before proceeding with the full-scale development decision.

Affordability and Cost-Effectiveness. The Air Force did not perform required affordability and cost-effectiveness assessments to support the continued development and subsequent production of the Tacit Rainbow missile. DoD Directive 5000.1 requires that system affordability assessments be considered at every decision milestone and during the annual planning, programming, and budgeting system process. In addition, DoD Instruction 5000.2, requires that a Cost and Operational Effectiveness Analysis Report be prepared to support the full-scale development decision. The Report is to assess the cost and operational effectiveness of the proposed system in terms of satisfying the mission need. At the full-scale development decision in 1981, neither an independent cost estimate nor a Cost and Operational Effectiveness Analysis Report was prepared to support the affordability and cost-effectiveness of the Tacit Rainbow missile. The program office was unable to provide an explanation as to why an independent cost estimate and a Cost and Operational Effectiveness Analysis Report were not prepared.

The Air Force was preparing its initial independent cost estimate and Cost and Operational Effectiveness Analysis Report in 1990, 9 years after the full-scale development decision. In October 1990, the program office used an 8-year missile overhaul cycle in estimating operating and support (O&S) costs for the

Tacit Rainbow system instead of using the system design requirement for a 5-year missile overhaul cycle. The system design requirement specified that depot level maintenance was required every 5 years to examine, maintain, and replace specified missile components. The program office was unable to supply us data to support the change from a 5-year to an 8-year missile overhaul cycle. We also noted that the program office and the Air Force independent cost analyst did not include support costs for the rotary launchers in the O&S cost estimates. As a result, the program office was understating required O&S costs.

Second Source Decision. The Air Force's decision to second source the Tacit Rainbow system was not supported by an effective analysis of potential costs and benefits. DoD Directive 5000.1 requires that a system's acquisition strategy be tailored to provide for competition in each phase of the acquisition process. Federal Acquisition Regulation (FAR), subpart 34.005-1, "Competition," requires that the program manager, throughout the acquisition process, promote full and open competition and sustain effective competition between alternative major systems and concepts as long as it is economically beneficial to do so. DoD Directive 4245.9, "Competitive Acquisitions," August 17, 1984, requires that the program manager use a cost-benefit analysis to support the economic decision to establish and continue maintaining price competition.

The Air Force was unable to provide documentation to show that an Independent Cost Analysis was performed when the decision was made to second source the Tacit Rainbow. In September 1989, the Air Force did complete an Independent Cost Analysis that showed estimated savings of $66 million from dual sourcing. However, factors such as program quantity reductions, schedule slips, depot cost, component commonality, funding, and component breakout were not adequately considered in the cost analysis. As a result, the Air Force's projected savings of $66 million may not have been realized from second sourcing the missile.

Also, the program office did not plan to accomplish operational tests of Raytheon's production version of the Tacit Rainbow missile before qualifying the contractor as the second source. DoD Directive 5000.3, "Test and Evaluation," March 12, 1986, requires that operational testing be conducted with production representative missiles to determine operational effectiveness and suitability before the decision to proceed with full-rate production is made. To qualify Raytheon as the second source, the program office planned to conduct five qualification test flights (developmental tests) of Raytheon built missiles that were to be identical to Northrop's version of the missile. The planned qualification flight tests would not have demonstrated that Raytheon was a qualified second source because Raytheon did not intend to build Northrop's version of the

missile in production. As a result, the planned qualification flight tests would not have provided the Air Force assurances that Raytheon's production version of the missile was operationally effective and suitable.

Cost and Schedule. The program office did not require Northrop to comply with Cost/Schedule Control System Criteria (C/SCSC) in DoD Instruction 7000.2, "Performance Measurement for Selected Acquisitions," June 10, 1977, and related reporting requirements in DoD Instruction 7000.10, "Contract Cost Performance, Funds Status and Cost/Schedule Status Reports," December 3, 1979. DoD Instruction 7000.2 states that it is general DoD policy to require that C/SCSC be included as a standard requirement in selected contracts, including cost-plus-incentive-fee contracts, for major weapon systems undergoing development. DoD Instruction 7000.2 also states that the Government will review contractors' C/SCSC systems during various phases of the contracting process to ensure compliance with C/SCSC requirements. DoD Instruction 7000.10 requires that Cost Performance Reports be applied to all contracts that require C/SCSC. The monthly contractor Cost Performance Report provides DoD acquisition oversight personnel with:

- contract cost/schedule status information for use in making and validating management decisions,

- early indicators of contract cost/schedule problems, and

- effects of management actions taken to resolve problems affecting cost/schedule performance.

The program office applied Cost/Schedule Status Report (C/SSR) requirements to the Tacit Rainbow contract rather than applying the more stringent C/SCSC and Cost Performance Report requirements. C/SSR requirements are not as detailed as C/SCSC requirements and are not subject to an independent Government validation for compliance with system reporting criteria.

Air Force acquisition oversight personnel could have more effectively monitored and implemented appropriate corrective actions to control the significant cost and schedule problems experienced on the Tacit Rainbow program had the program office applied C/SCSC and Cost Performance Report requirements to the Tacit Rainbow development contract.

Configuration Control. DoD Directive 5010.19, "DoD Configuration Management Program," October 28, 1987, requires that the lead Military Department develop and document configuration management procedures in a jointly approved plan on configuration management. Rather than develop a jointly approved Navy and Air Force plan on configuration management, the Air Force relied on in-house operating instructions and Northrop

configuration management plans for configuration control. A joint configuration management plan was needed to ensure that configuration management issues related to the entire weapon system were addressed to minimize program risks. A joint configuration management plan was needed to address issues, such as differences between Navy and Air Force requirements, differences between Northrop and Raytheon configurations of the Tacit Rainbow, and commonality between the air and ground launched Tacit Rainbow missiles. By developing a joint configuration management plan, the program office could have minimized program risks in configuration control and interface with the various aircraft platforms.

Quality Assurance. The Government quality assurance representatives at the Northrop office were not adequately monitoring the contractor's compliance with MIL-Q-9858A, "Quality Program Requirements," March 8, 1985, to ensure that Northrop's quality assurance program was effective and economical. MIL-Q-9858A requires that Northrop's quality assurance program ensure adequate quality control throughout all areas of contract performance; provide for the prevention, detection, and positive correction of discrepancies; and determine the effects of deficiencies. Further, Northrop was to maintain and use quality assurance cost data as a management element of the quality program. In this respect, there was nothing to indicate that Northrop was using its quality records and reports as a basis for management action to improve the quality program and reduce quality assurance costs.

Northrop's failure to fully implement MIL-Q-9858A has contributed to Tacit Rainbow quality problems. For example, in October 1990, the contracting officer's cure notice cited Northrop for a ". . . history of failure to conduct adequate failure analysis and take positive corrective actions to prevent recurring deficiencies in workmanship . . . ." In this regard, the Government quality assurance representative had not reviewed and used quality cost reports to exercise program oversight or provided the reports to the program office. This condition contributed to the program office expending additional resources in 1989 to perform a cost of quality review at Northrop. In conclusion, Northrop's implementation of an effective quality program could have reduced Government Tacit Rainbow costs and influenced the quality of the missiles used in tests.

Contract Type. The Air Force negotiated a "de facto" fixed-price type contract modification to complete full-scale development of the Tacit Rainbow. The contract was a cost reimbursement type contract with cost sharing provisions up to the "cost cap" of $372.2 million. At the "cost cap," the contract essentially became a firm-fixed-price contract where Northrop was expected to absorb all remaining costs to complete the work. Northrop's May 9, 1986, cost proposal to complete the

Tacit Rainbow development estimated that it would cost $100 million more than the $372.2 million "cost cap" to complete the development effort. When the Air Force negotiated the "cost cap," it believed that Northrop could complete the development effort within the "cost cap." On the other hand, Northrop believed that the cost would be higher than the "cost cap." Northrop exceeded the "cost cap" in early 1989. Since that time, Northrop has absorbed all costs incurred to complete the development effort. In December 1989, Northrop estimated that development costs would exceed the contract's $372.2 million "cost cap" by $100 million.

In January 1989, the Defense Federal Acquisition Regulation Supplement (DFARS), subpart 235.006, "Fixed-Price Type Development Contracts," was amended to require that a firm-fixed-price contract for development of a major system may only be awarded if:

- the level of program risk permits realistic pricing,

- the use of a fixed-price contract permits an equitable and sensible allocation of program risk between the Government and the contractor,

- the contracting officer determines in writing that the above two criteria have been met and that the fixed-price contract selected is appropriate, and

- the Under Secretary of Defense for Acquisition authorizes the use of a firm-fixed-price contract.

Although the DFARS did not prohibit the Air Force from establishing a "cost cap" in the Tacit Rainbow development contract, we do not believe that it was the most appropriate contract type for the development of a major system. We believe that, in the future, cost type development contracts that become "de facto" firm-fixed-price development contracts at the "cost cap" should be subject to OSD review and approval in accordance with provisions of DFARS, subpart 235.006.

Undefinitized Contract Actions. The contracting office overused undefinitized contract actions, which violated DFARS, subpart 217.75, "Undefinitized Contract Actions." The DFARS requires that the contracting office:

- limit the use of undefinitized contract actions to the maximum extent practicable;

- include a not-to-exceed price in undefinitized contract actions;

- include a definitization schedule in undefinitized contract actions that requires definitization of the contract action within 180 days after the issuance of the contract action or when 50 percent of the not-to-exceed price is expended by the contractor, whichever occurs first; and

- expend no more than 50 percent of the not-to-exceed price before definitizing contract action terms, specifications, and price.

In addition, FAR, subpart 16.102(c), "Selecting Contract Types," prohibits the contracting office from using cost-plus-a-percentage-of-cost type contracts.

The contracting office did not comply with the above requirements in issuing 31 contract modifications on Tacit Rainbow development contract F33657-81-C-2123 from September 1986 to May 1990. Specifically, 21 (68 percent) of the 31 contract modifications were undefinitized contract actions. Of the 21 actions, 20 were not definitized by the scheduled definitization date, including 18 actions that took over 180 days to definitize. In addition, the program office did not limit expenditures against the undefinitized contract actions before definitization. For 6 of the 21 actions, 100 percent of the estimated modification cost was obligated at the beginning of the efforts, and for another 8 actions, 75 percent of the modification cost was obligated before the modifications were definitized. Further, 5 of the 21 actions were complete when they were definitized. As a result, the program office effectively negotiated cost-plus-a-percentage-of-cost contract modifications. The program office overused undefinitized contract actions to a certain extent because it was unable to clearly define in the contract modification the additional work required.

As a result of the program office not controlling modification costs, Northrop was not given an incentive to control costs and was given "de facto" cost-plus-a-percentage-of-cost contract modifications in ensuing contract negotiations. These contract modifications were for a system development effort that was not within the scope of the "cost cap."

Contract Maintenance. The contracting office did not implement effective internal controls to ensure that contract F33657-81-C-2123 was adequately maintained. For example, the contracting office could not provide a listing of the contract's modifications to show that funds obligated on the contract were effectively controlled. In addition, contract modifications did not state, or, in some cases, inaccurately stated, the total amount of funds obligated on the contract. During the audit, a contract specialist loaned to the program office spent 3 months reconciling contract obligations and expenditures. As a result

of this reconciliation, the contracting office issued a modification to redefine contract target costs and prices and to increase funds obligated on the contract by $2.4 million. FAR, subpart 4.801, "Contract Files," requires that the contracting office establish files containing the records of all contractual actions. Also, documentation in the files is to constitute a complete history of the transaction for the purpose of supporting actions taken, providing a complete background as a basis for informed decisions at each step in the acquisition process, and providing information for reviews and investigations.

Voucher Processing. GAO's Assessing Internal Controls in Performance Audits, September 1990, requires the establishment of effective internal controls that would ensure that Defense Contract Audit Agency Resident Office approved payment vouchers are not altered by the contractor before submission for payment. Effective internal controls would also require that the contracting office submit original copies of Resident Office approved payment vouchers for payment to support that all amounts claimed were properly reviewed and approved. On the Tacit Rainbow program, the Resident Office returned approved vouchers, ranging from $400 to $4.2 million, to Northrop before payment. Also, the contracting office prepared a summary voucher that was sent to the paying office, rather than the Northrop vouchers. In one instance, Northrop billed and received payment twice for the same effort. The program office corrected this error. Although we did not find any additional adverse effects as a result of these internal control weaknesses, the potential existed for increasing the amount of a voucher after its approval and before it was submitted to the Finance Office for payment.

On September 20, 1988, we issued Report No. 88-202, "Program Management for the Development of the Endoatmospheric Nonnuclear Kill Vehicle." In this report, we also addressed the problem of the Defense Contract Audit Agency field office returning approved vouchers to contractors before payment. We believe that Headquarters, Defense Contract Audit Agency, should continue to emphasize to its field offices the need to send approved vouchers to the Finance Office for payment to preclude the possibility of contractor's altering vouchers or defrauding the Government.

Internal Management Control Program. The program office did not implement DoD Directive 5010.38, "Internal Management Control Programs," April 14, 1987. DoD Directive 5010.38 requires that DoD Components segment organizational operations into assessable units and then perform vulnerability assessments of the units to determine the susceptibility of a program to unauthorized use of resources, errors in reports and information, illegal or unethical acts, and adverse or unfavorable public opinion. Based on the results of vulnerability assessments, DoD Components are to schedule internal management control reviews to determine whether adequate control measures exist and are implemented to

ensure that programs are efficiently and effectively carried out in accordance with applicable law and management policy. In December 1989, the program office conducted its first internal management control review. Although the program office was aware of the internal management control review requirement, it was not apprised of the requirement to implement provisions in DoD Directive 5010.38. In the future, the Air Force should establish procedures that ensure that all programs, including Special Access Required programs, are not excluded from implementing the requirements in DoD Directive 5010.38.

Conclusion. Since 1989, the Under Secretary of Defense for Acquisition has required that "Special Access Required" programs be subject to DAB reviews as well as policies and procedures in the 5000 series of DoD directives for managing major acquisition programs. In this respect, we found that once DAB oversight began on the Tacit Rainbow system, significant effort was directed at resolving the program problems discussed above. Accordingly, we believe that future DAB involvement and oversight of "Special Access Required" programs should help preclude or reduce the impact of performance, cost, and schedule problems experienced on these major weapon system programs and therefore reduce program acquisition risks.

We provided a draft of this report to the addressees on May 20, 1991. This report does not include official recommendations that require written management comments; however, as a lessons learned report, implicit recommendations have been included throughout the report. Because no comments were required of management, none were received. This report identifies no potential monetary benefits. Any comments on this final report should be provided within 30 days of this memorandum.

The courtesies extended to the audit staff are appreciated. Audit team members are listed in Enclosure 3. If you have any questions on this audit, please contact Mr. John Meling at (703) 614-3994 (DSN 224-3994) or Mr. Sean Mitchell at (703) 614-0236 (DSN 224-0236). Copies of this report are being provided to the activities listed in Enclosure 4.

Robert J. Lieberman

Robert J. Lieberman
Assistant Inspector General
for Auditing

Enclosure

cc:
Secretary of Navy
Secretary of the Air Force

SUMMARY OF CRITICAL PROGRAM MANAGEMENT ELEMENTS WITH ADEQUATE CONTROLS

During the survey phase of the audit, we determined that additional audit work was not warranted in the following management elements. The Air Force was aware of these problems and had directed significant effort to resolve them.

Mission Critical Computer Resources. The Tacit Rainbow has three primary software configuration items: seeker, mission computer and operational flight program, and mission planning system. The seeker software had successfully completed qualification and reliability testing and a functional configuration audit. The mission computer and operational flight program was developed and subjected to captive flight tests beginning in June 1990. The mission planning system was being developed to allow B-52 personnel to program the Tacit Rainbow before launch of the missile from the aircraft. Northrop experienced contract difficulties in developing the mission planning system, including a $1 million cost overrun, a 1-year schedule overrun, and technical problems. The program office was responding adequately to this problem by competing the completion of the mission planning system development effort.

Integrated Logistics Support. The Tacit Rainbow Integrated Logistics Support Plan adequately planned for logistics support, as required by DoD Directive 5000.39, "Acquisition and Management of Integrated Logistic Support for Systems and Equipment," November 17, 1983. We did note that missile storage sites had not been completely identified, which could affect the number of sites needed and related operation and support cost estimates. Also, deployment of the Tacit Rainbow may have been delayed by the site selection process because of the 5-year lead time required to obtain military construction funds.

Interface and Integration. In February 1990, the Air Force identified the F-16 as a carrier for the Tacit Rainbow. In this regard, the Air Force did not plan to perform compatibility tests of the Tacit Rainbow and the F-16 until 1993. Compatibility testing could not be planned earlier because additional test articles would not be available until 1993. This condition exposed DoD to cost risks if Tacit Rainbow missile compatibility and integration problems were identified on the F-16 and missile retrofits were required to correct the problems.

Production Preparedness. DoD Manual 4245.7-M, "Transition from Development to Production," September 1985, requires program managers to fund and execute a contractor developed transition plan, which is initially prepared no later than the start of engineering development and continually updated until rate production is achieved. A transition plan, which is a comprehensive management plan describing all production related activities that must be accomplished during design, test, and low-rate initial production, is needed to ensure a smooth transition from development to full-rate production. As of February 1990, Northrop had not prepared a comprehensive integrated transition plan because it was not included as a requirement in the development contract. Because of fiscal constraints, the program office was unable to add this requirement after the award of the development contract. Instead, the program office was deligently working with Northrop to ensure that Northrop adequately planned for the transition from full-scale development in Newbury Park, California, to production in Perry, Georgia.

ACTIVITIES VISITED OR CONTACTED

Office of the Secretary of Defense

Office of the Under Secretary of Defense for Acquisition, Washington, DC
Office of the Director, Operational Test and Evaluation, Washington, DC
Office of the Comptroller of the Department of Defense, Washington, DC

Department of the Army

Missile Command Representative, Wright-Patterson Air Force Base, Dayton, OH

Department of the Navy

Naval Air Systems Command, Washington, DC
Naval Weapons Center, China Lake, CA

Department of the Air Force

Office of the Secretary of the Air Force, Washington, DC
Air Force Systems Command, Andrews Air Force Base, MD
Strategic Air Command, Omaha, NE
Tactical Air Command, Langley Air Force Base, VA
Air Force Aeronautical Systems Division, Dayton, OH
Air Force Test and Evaluation Center, Albuquerque, NM
Air Force Flight Test Center, Edwards Air Force Base, CA
Air Logistics Center, Warner-Robins Air Force Base, GA
Air Force Audit Agency, Dayton, OH
Air Force Office of Special Investigations, Dayton, OH

Defense Agencies

Defense Contract Management Command, Resident Office, Northrop Corporation, Newbury Park, CA
Defense Contract Management Command, Plant Representative Office, Northrop Corporation, Hawthorne, CA
Defense Contract Management Command, Plant Representative Office, Raytheon Company, Burlington, MA
Defense Contract Audit Agency, Resident Office, Northrop Corporation, Newbury Park, CA

Contractors

Northrop Corporation, Newbury Park, CA
Northrop Corporation, Perry, GA
Raytheon Company, Andover, MA

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John E. Meling, Program Director
Gordon Nielsen, Program Director
Patricia Brannin, Project Manager
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Ken Arrington, Auditor
Nancee LaBute, Auditor
Raza Mughal, Auditor
Kimberly Archer, Editor
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House Subcommittee on Defense, Committee on Appropriations
House Ranking Minority Member, Committee on Appropriations
House Committee on Armed Services
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House Subcommittee on Legislation and National Security, Committee on Government Operations