

Audit



Report

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OFFICE OF THE INSPECTOR GENERAL

ALLEGATIONS INVOLVING THE PROCUREMENT
OF THE HUNTER UNMANNED AERIAL
VEHICLE-SHORT RANGE SYSTEM

Report No. 96-111

May 7, 1996

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Department of Defense

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Acronym

LRIP

Low-Rate Initial Production



INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
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ARLINGTON, VIRGINIA 22202-2884

Report No. 96-111

May 7, 1996

**MEMORANDUM FOR ASSISTANT SECRETARY OF THE NAVY (FINANCIAL
MANAGEMENT AND COMPTROLLER)
DIRECTOR, JOINT STAFF
DIRECTOR, DEFENSE STRATEGIC AND TACTICAL
SYSTEMS**

**SUBJECT: Audit of Allegations Involving the Procurement of the Hunter Unmanned
Aerial Vehicle-Short Range System (Project No. 5CH-8017)**

Introduction

We are providing this report for your review. We performed the audit in response to allegations made in a complaint to the Defense Hotline. The complainant charged that the low-rate initial production (LRIP) Hunter Unmanned Aerial Vehicle-Short Range (Hunter) system did not conform to contract requirements, system operator safety was at risk, system reliability was inadequate, and the system had not been subjected to operational testing. Other allegations were that the Joint Tactical Unmanned Aerial Vehicle Project Office (Hunter Project Office) had understated the Hunter acquisition program funding requirements; accident investigations involving the Hunter were led by personnel who were not independent of the Hunter Project Office; and military users could not operate the system independent of the contractor, TRW, Incorporated (TRW).

Audit Results

The audit partially or fully substantiated the allegations that the LRIP system did not conform to contract requirements, operator safety was at risk, reliability was inadequate, and the system was never subjected to operational testing. The audit did not substantiate the allegations that the Hunter Project Office had understated the Hunter program funding, accident investigations were led by personnel who were not independent of the Hunter Project Office, and military users could not operate the system independent of the contractor.

This report does not contain recommendations for corrective action because in January 1996 the Under Secretary of Defense for Acquisition and Technology directed the termination of future Hunter system acquisitions.

The Hunter Project Office and the Naval Air Systems Command had not established a management control program for or performed management control reviews of the Hunter program. We are not recommending corrective action in this report because we did so in an earlier report, as discussed under the Management Control Program section in this report.

Audit Objectives

The overall audit objective was to determine whether the Hunter acquisition was being conducted in accordance with Federal and DoD regulations. The specific audit objective was to determine the merits of allegations made to the Defense Hotline. We also reviewed the management control program as it applied to the overall audit objective.

Scope and Methodology

Interviews and Documentation Review. We interviewed personnel and reviewed Hunter acquisition documentation at the Hunter Project Office, the Unmanned Aerial Vehicles joint project office, the Office of the Under Secretary of Defense for Acquisition and Technology, the Office of the Joint Staff, TRW, and the Defense Contract Management Command. We also reviewed documentation and correspondence dated from 1989 through 1996 related to contract N00019-89-C-0346, valued at \$500.7 million, for Hunter system prototype and production.

Audit Period, Standards, and Locations. We performed this economy and efficiency audit from August 1995 through March 1996 in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD. We included tests of management controls considered necessary. We did not rely on any computer-processed data, statistical sampling procedures, or technical experts to perform the audit. Enclosure 4 lists the organizations visited or contacted.

Management Control Program

DoD Directive 5010.38, "Internal Management Control Program," April 14, 1987, requires DoD organizations to implement a comprehensive system of management controls that provides reasonable assurance that programs are operating as intended and to evaluate the adequacy of the controls.

Scope of Review of the Management Control Program. We determined whether the Naval Air Systems Command (the Command), the Program Executive Office for Cruise Missiles and Unmanned Aerial Vehicles, or the Hunter Project Office performed vulnerability assessments and complied with requirements for management control documentation. We also determined whether the Command included the Hunter program in its 5-year management control plan.

Adequacy of Management Controls and Management's Self-Evaluation. The Hunter Project Office and the Command had not established a management control program for or performed management control reviews of the Hunter program. The Command's lack of a comprehensive management control program was reported in Inspector General, DoD, Report No. 96-028, "Implementation of the DoD Management Control Program for Major Defense Acquisition Programs," November 28, 1995. The report states that the

Command's management control program was inactive. We recommended in Report No. 96-028 that the Under Secretary of Defense for Acquisition and Technology revise Defense acquisition directives to include management control objectives, techniques, and assurance reporting requirements.

The recommendation was implemented in changes to DoD Manual 5000.2, "Mandatory Procedures for Major Defense Acquisition Programs and Major Automated Information System Acquisition Programs," and the new acquisition deskbook. Because of those initiatives and because future acquisitions in the Hunter program have been terminated, this report does not recommend establishing management controls for the Hunter program.

Prior Audits and Other Reviews

The General Accounting Office has issued five audit reports on the Hunter program since September 1990. Also, the Assistant Secretary of the Navy (Research, Development, and Acquisition) requested an independent assessment of the Hunter program in 1995. Enclosure 3 provides summaries of those audit reports and of the independent assessment.

Audit Background

The Hunter system is a small, fixed-wing aircraft piloted remotely from a ground control station. Each Hunter system includes 8 aircraft and 28 pieces of ground support equipment. The primary mission of the Hunter system is to relay near-real-time video and telemetry information to battlefield commanders from target areas as much as 150 kilometers away.

The Unmanned Aerial Vehicles Master Plan prepared by the joint project office states that the Hunter systems were to provide the battlefield commanders with reconnaissance, surveillance, and target acquisition intelligence an average of 16 hours of every 24-hour period. The Hunter capabilities were to include recognizing moving targets, providing electronic intelligence, serving as electronic countermeasures (decoys), providing communications intelligence, jamming communications, providing laser target designation, detecting mines, and relaying communications data. The range of the Hunter could be increased by relaying commands and imagery between forward and rear aircraft. The aircraft were to operate from unimproved short runways.

The Hunter system acquisition strategy was to maximize the use of non-developmental technology to ensure minimum technical risk and quick fielding of a tactical system. The Hunter system acquisition began with a formal request for proposal for a short-range unmanned aerial vehicle in March 1989. On September 15, 1989, the joint project office awarded firm-fixed-price contracts to McDonnell Douglas Missile Systems Company and Israeli Aircraft Industries. Each contract was for the development and delivery of two prototype Hunter systems for technical evaluation and limited-user tests conducted by U.S. military personnel.

The joint project office chose Israeli Aircraft Industries as the contractor for the Hunter system after evaluating the prototype short-range unmanned aerial vehicle technical evaluation and limited-user test results. In December 1992, TRW novated the contract; that is, it assumed the contractual and financial responsibilities of the contract from Israeli Aircraft Industries. Before the contract was novated, TRW was a major subcontractor of Israeli Aircraft Industries.

In January 1993, the Defense Acquisition Board approved the award of a contractual action for seven LRIP Hunter systems (56 air vehicles) at a cost of \$169.7 million. As of December 1995, the Government has accepted five systems.

The Hunter system was designated as a Defense acquisition category 1D program. The next acquisition phase for the Hunter system was to obtain the Defense Acquisition Board approval for production (acquisition milestone III).

Total projected life-cycle costs for the Hunter program were \$6.3 billion. From FYs 1989 through 1995, DoD spent \$808 million on the technical evaluation of the Hunter systems, the LRIP systems, and the Joint Tactical Unmanned Aerial Vehicles training center.

On January 31, 1996, the Under Secretary of Defense for Acquisition and Technology terminated future Hunter system acquisitions and transferred \$984.7 million to other Defense program priorities.

Discussion of Allegations and Audit Results

Allegation 1. A Hunter system was accepted that failed to meet minimum performance specifications. The Government bought the first of the seven LRIP systems knowing major performance deficiencies existed that made the system clearly fall short of contractually defined requirements. The system has numerous hardware shortages that history shows that the contractor will never satisfy.

Audit Results. The allegation was partially substantiated. The DoD accepted five LRIP Hunter systems that did not conform to contract requirements and that required contractual waivers for acceptance. The contracting officer determined that the Government was only entitled to consideration for system hardware that did not conform to minimum contract requirements. The contractor had not resolved numerous acceptance actions, some involving hardware shortages and nonconforming items in the systems that DoD accepted.

DoD Acceptance. The contracting officer issued 34 contractual waivers to prevent acceptance delays because the 5 systems did not conform to the contract specifications. Enclosure 1 details each contract waiver purpose, effect on the system, subsystem affected, and corrective action.

The table shows the specifications waived and number of waivers issued.

Hunter System Contract Waivers

<u>Specification Waived</u>	<u>Number Issued</u>
Performance (Ground Support Equipment)	4
Performance (System Hardware)	5
Performance (System Software)	3
Performance (Rocket Assist Takeoff)	13
Workmanship (Prohibited Material)	4
Workmanship (Product Process Compliance)	5
	<u>34</u>

The corrective actions on 29 of the 34 waivers consisted of either:

- using the item as-is because no qualified source for the product existed that met the requirement,
- changing the contract specifications or incorporating an engineering change, or
- incorporating planned system upgrades.

Officials planned to complete actions on 5 of the 34 waivers during March and June 1996.

The Hunter Project Office also approved 257 engineering design changes and 125 specification changes to the LRIP systems that affected contract requirements or resolved specification inconsistencies.

Consideration. The contracting officer determined that only 7 of the 34 waivers issued were because of system hardware not conforming to the Government's minimum requirements and that the Government was entitled to consideration. The contracting officer did not obtain monetary consideration or decrease the contract value negotiated. For four waivers, the contracting officer determined that the hardware was usable as is with no degradation in operational capability. However, the contractor would be required to correct the hardware for future system procurements. The contracting officer negotiated an extended warranty for two waivers for production process workmanship and included a waiver related to the system's built-in-test capabilities in a June 1995 settlement agreement between the Government and the contractor. The agreement settled all outstanding disputes on the Hunter program from contract award to the date of the agreement. The contractor also agreed not to pursue a \$9.8 million potential equitable adjustment claim against the Government involving the LRIP system. The agreement also released the Government from further liability attributable to any Government actions or inactions occurring from September 15, 1989, to November 9, 1995.

System Acceptance. The contractor had not resolved numerous acceptance actions, some involving hardware shortages and nonconforming items in the systems that DoD accepted. As of January 26, 1996, 174 (26 percent) of 636 actions were unresolved. The Government withheld \$1.6 million from payment for the five systems until the actions were resolved. Each system was accepted under warranty provisions and included the contractor's letter of commitment to resolve the actions.

Allegation 2. System software capabilities did not meet basic contractual requirements. The system could not meet minimum operational requirements without a major block improvement to the system computer hardware and software. The contractor was not held to the contract performance requirements, and no consideration was ever received.

Audit Results. The allegation was substantiated. The system computer capabilities did not meet contractual requirements. The system computer hardware requires an upgrade to meet contract specifications. The system software was determined to have numerous software problems that could result in damage to the Hunter aircraft. Consideration for the computer capability not conforming to contract requirements was part of a June 1995 settlement agreement between DoD and TRW.

System Computer Hardware. In December 1993, the contracting officer provided a letter of direction to TRW concerning the computer processor capability of the LRIP Hunter system. The letter stated that the computer hardware and software did not comply with contract specifications. In May 1995, the contractor requested a computer resource capability waiver so the systems could be accepted. The project manager approved the waiver, and the contracting officer incorporated it into the contract. The waiver relaxed the system specification for computer hardware processing speed and throughput. The systems required hardware and software upgrades to achieve the computer capability that the contract required.

System Computer Software. The contractor attributed a Hunter aircraft accident that occurred on October 31, 1994, to problems in the system software. The accident resulted in suspension of all Hunter flights until March 1, 1995. The Army Missile Command performed an independent verification and validation analysis of the system software. The verification and validation was a visual inspection and analysis of the critical software codes for the system. The analysis identified 12 catastrophic and 46 critical software configuration problems that could result in damage to an aircraft. During system five acceptance testing, from July 9, 1995, through August 9, 1995, the Hunter Project Office observed software problems that it attributed to configuration of datalink software and prior revisions to software that affected air vehicle speed indications.

A September 25, 1995, Command review determined that the Hunter system contained eight different computer software languages, all of which were antiquated. In addition, the eight software languages were limited by the inadequate processor speed and memory capability of the Hunter system.

The Hunter Project Office planned to incorporate a software revision into the system to resolve the software problems identified by the Army independent verification and validation analysis process.

Consideration. The computer capability waiver was included as part of the June 1995 settlement agreement between the Government and the contractor. The purpose of the agreement was to resolve contract issues between the contractor and the Government for the LRIP systems.

Allegation 3. The safety of both contractor and military operators was put at risk. The Hunter system experienced nine crashes because of system failures, not because of operator error, as crash investigations had concluded.

Audit Results. The allegation was substantiated. The safety of the operators and others in the vicinity of Hunter system flights was at risk because accidents involving the aircraft had occurred. However, no evidence existed of injuries resulting from Hunter aircraft accidents.

Since July 18, 1991, the Hunter program had sustained 26 accidents that resulted in damage to the aircraft.

- Twelve accidents resulted in total loss of the aircraft.
- One total aircraft loss occurred October 31, 1994, which led to grounding all Hunter aircraft flights for 120 days by the Government flight representative. The contractor subsequently attributed the aircraft accident to problems in the software configuration for the system.
- Three aircraft accidents, two of which were total losses, occurred between August 22, 1995, and September 14, 1995, which led to the grounding of all Hunter flights. The Hunter Project Office attributed two of the three accidents to failures of the aircraft aileron servos. The aileron servos control the aircraft's lateral movement.

The Hunter Project Office and the contractor data on LRIP Hunter system accidents indicate that the crashes resulted primarily from failed hardware and software components rather than from operator error.

Allegation 4. System reliability was inadequate and did not meet contractual specifications. The system did not meet contractual requirements for reliability, availability, maintainability, and built-in-test. The system failed to meet criteria defined in the operational requirements document. The Government did not seek consideration.

Audit Results. The allegation was substantiated. The Hunter system did not meet five of nine contractual requirements for reliability, availability, maintainability, and built-in-test. Soldiers who operate the Hunter system and military instructors said that the Hunter system was unreliable.

System Reliability. The first-article test conducted in October 1995 showed that the system did not meet the following reliability, availability, and maintainability contract and operational requirements:

- logistics mean time between failures,
- organizational mean time to repair,
- organizational maximum time to repair,
- direct support mean time to repair, and
- direct support maximum time to repair.

The logistics mean time between failures was assessed by the Hunter Project Office at 3.4 hours during the first-article test. The operational requirements for the system specify a 4-hour logistics mean time between failures. The 3.4 hours reflect an upward trend from a projected 2.9 hours logistics mean time between failures for the first-article test.

A comparison of reliability, availability, and maintainability test results from the technical-evaluation test to the limited-user test showed an unfavorable increase of the categories (time to repair) used to judge the repair maintainability of the Hunter system. Unfavorable repair maintainability results continued to increase from the limited-user test to the first-article test.

The Hunter Project Office agreed that an unfavorable trend for repair maintainability of the Hunter system occurred. However, because technical-evaluation, limited-user, and first-article tests were of short duration, the test results may not reflect the system's long-term averages for the time to repair.

Built-in-Test. The built-in-test capability did not conform to contract specifications. TRW obtained a waiver from the contracting officer, which enabled the Hunter Project Office to accept the five LRIP systems delivered. Built-in-test provides the Hunter system an internal capability to detect and isolate faulty components for replacement. To obtain the waiver, the contractor had to perform a built-in-test analysis and verification of existing capability. The built-in-test verification results showed that the Hunter system did not meet contract requirements. The current system built-in-test capability of 62 percent for isolation of a mission-critical fault to a single line replaceable unit does not meet contract specifications. The requirement is 86 percent. The March 1995 independent assessment of the Hunter system reported that the system computer processors did not contain the necessary software to interrogate the built-in-test points for failure detection and isolation.

A computer processor upgrade is required to correct the built-in-test capability. The Hunter Project Office was pursuing enhancements for the Army contact test set (external test equipment) to perform the system built-in-test externally. The enhanced test equipment would meet the minimum operational requirements, but would not conform to contract specifications.

The Hunter Project Office determined that the Hunter system would require hardware and software upgrades to the air vehicle, the ground control station, and the launch recovery station to fully meet the specification requirement. The Hunter Project Office stated that the enhanced test equipment provides an advantage over the built-in-test equipment. The enhanced test equipment allows the system operator to detect, isolate, and check air vehicle faults without relying on the ground control or launch recovery system.

User Opinion of the Hunter System. We interviewed 10 soldiers of an operational unit for the Hunter system and 16 military instructors trained by the contractor. The soldiers provided their opinions concerning the Hunter system reliability and operation.

The soldiers expressed a lack of confidence in the airworthiness of the aircraft. The soldiers believed that the Hunter system:

- was unreliable,
- lacked a full accompaniment of personnel required, and
- was too complex and not reasonably supported.

The military instructors stated that the system is as safe as the operator, but had technical problems with the system software and aileron servos.

Allegation 5. The technical tests were done in a controlled, sterile environment and any advertised results were not representative of the system's true capabilities and real limitations. The system was never subjected to test scenarios that replicated the true conditions the hardware would encounter. Credible operational tests have never been accomplished.

Audit Results. The allegation was partially substantiated. The prototype Hunter systems were subjected to limited operational testing, but the LRIP systems were not subjected to any operational testing.

Prototype System Testing. The Hunter Project Office subjected the two prototype systems to technical-evaluation and limited-user tests. The technical-evaluation test provided limited flight performance testing and limited environmental qualification to identify system deficiencies. The technical-evaluation test results showed that the prototype system did not fully meet contract requirements. The limited-user test provided a limited demonstration of the system's potential to meet the tactical commander's requirements for operational effectiveness and suitability. However, the test limitations relating to test location, logistics supportability, training, survivability, and electromagnetic interference precluded the limited-user test from providing a full evaluation of the Hunter system capability. The limited-user test identified system problems with engine durability, relay capability, software, and interoperability.

LRIP System Testing. The Hunter Project Office did not subject the LRIP systems to any operational tests. The Hunter systems have not undergone

operational tests since the July 1992 limited-user test was performed on the prototype systems. Also, the limited-user test did not include a full evaluation of the required operational capabilities.

The Hunter Project Office scheduled the LRIP systems for an operational exercise in October 1994. However, because numerous technical problems delayed the Hunter system acceptance, the Hunter Project Office replaced the exercise with a user demonstration scheduled for October 1995. On September 27, 1995, The Defense Airborne Reconnaissance Office delayed the user demonstration because of the grounding of the Hunter system aircraft.

Allegation 6. Funding was not adequate to execute program requirements. The projected costs for hardware, support, upgrades, operations, and management exceeded the monies available in the program objective memorandums. Erroneous budget estimates were passed to the appropriate DoD organizations to ensure program continuation.

Audit Results. The allegation was not substantiated. The Hunter Project Office FYs 1995 through 2001 program objective memorandum showed that the procurement and attrition hardware costs do not exceed the projected funding (Enclosure 2). The program objective memorandum supported the current project office acquisition plan. However, the projected funding required for the FY 1997 research, development, test, and evaluation effort does exceed the funding projected in the program objective memorandum. Hunter Project Office officials stated that the funds would be made available from other Defense Airborne Reconnaissance Office resources or by decreasing the scope of the testing and support effort.

Allegation 7. Accident investigations involving the Hunter system were led by personnel who worked directly with the program or who had a vested interest.

Audit Results. The allegation was not substantiated. The accidents were investigated according to criteria established by the Military Departments. Because the Navy is the Executive Service for the Hunter program, the accidents involving the Hunter systems in the custody of the Hunter Project Office were investigated according to requirements in Chief of Naval Operations Instruction No. 3750.6Q, "The Naval Aviation Safety Program," March 27, 1991. The accidents that occurred after the systems were transferred to the Army were investigated according to requirements in Army Regulation 385-40, "Safety Accident Reporting and Records," December 1, 1994.

Allegation 8. Soldiers could not operate the Hunter system independent of contractor support.

Audit Results. The allegation was not substantiated. The soldiers assigned to the Army's operational unit for the Hunter system and Army instructors trained by the contractor stated that they could operate the system independent of the support of TRW. However, we did not observe the soldiers operating the system because all Hunter flights had been suspended as a result of a September 1995 aircraft accident.

Decision to Terminate the Hunter Program

On October 13, 1995, the Joint Requirements Oversight Council recommended that the Under Secretary of Defense for Acquisition and Technology:

- terminate the Hunter program by allowing the current contract to expire in December 1995,
- place equipment already delivered in an inactive status and store it for use and disposal as determined by the Army, and
- reprogram savings realized from this approach to the Services for other warfighting priorities.

The Joint Requirements Oversight Council assessment of the unmanned aerial vehicles force mix determined that the close range and medium altitude endurance unmanned aerial vehicles would fulfill requirements assigned to the Hunter system.

On January 31, 1996, the Under Secretary of Defense for Acquisition and Technology issued an Acquisition Decision Memorandum with the following directives concerning the program:

- terminate the Hunter system acquisition by allowing the current contract to expire;
- cancel system upgrades for the Hunter program;
- provide one Hunter system to the Army for operations, concept refinement, and troop training;
- provide the required logistics support for the operational system;
- maintain the remaining Hunter systems in an inactive status and stored for use and disposal as determined by the Army;
- cancel the Hunter user demonstration;
- remove the Hunter program from the Major Defense Acquisition Program list; and
- distribute Hunter program funding in excess of the funding requirements for logistics support and troop training in accordance with the Intelligence Program Review Decision Memorandum of December 27, 1995.

We believe that the Under Secretary's decision includes actions that obviated the need for any recommendations for corrective action based on our evaluation of the Hotline allegations.

Management Comments

We provided a draft of this report to you on March 27, 1996. Because the report contains no findings or recommendations, written comments were not required, and none were received. Therefore, we are publishing this memorandum report in final form.

We appreciate the courtesies extended to the audit staff. For additional information on this report, please contact Mr. Garold E. Stephenson, Audit Program Director, at (703) 604-9332 (DSN 664-9332) or Mr. Charles M. Hanshaw, Audit Project Manager, at (703) 604-9256 (DSN 664-9256). We will provide a formal briefing on the results of the audit, if desired. See Enclosure 5 for the report distribution. The audit team members are listed inside the back cover.



David K. Steensma
Deputy Assistant Inspector General
for Auditing

Enclosures

Hunter System Contract Waivers

Number	Purpose	General Effect on System	Subsystem Affected	Corrective Action
RFW 028	Standard Shelter (Standardized Integrated Command Post System)	Ground Support Equipment Performance	Mission Planning, Ground Control, and Launch and Recovery Stations Shelters	Use as-is -- no standard shelter exists that meets specification requirements.
RFW 030	Relief of 80 Decibel Minimum Spurious Response Attenuation and Intermediate Frequency Rejection	Ground Support Equipment Performance	Mission Planning, Ground Control, and Launch and Recovery Stations Internal Communication	The Hunter Project Office approved a specification change that relaxed the spurious response attenuation and intermediate frequency rejection from 80 decibels to 74 decibels.
RFW 048A	Standard Shelter Nuclear, Biological, and Chemical Collective Protection Equipment and Gas Particulate Filter Unit	Ground Support Equipment Performance	Mission Planning, Ground Control, and Launch and Recovery Stations Environmental Survivability	Corrective action required a specification change because no gas particulate filter unit qualified source exists. Corrective action to be completed March 1996.
RFW 070	Small Unit Transceiver (AN/PRC-126) Conducted Susceptibility	Ground Support Equipment Performance	Mission Planning, Ground Control, and Launch and Recovery Stations Internal Communication	The Hunter Project Office approved a specification change that relaxed the spurious response attenuation and intermediate frequency rejection from 80 decibels to 74 decibels.
RFW 031	Parachute Extraction Rocket Assembly - Accept High Peak Thrust (extraction rocket exceeds thrust requirements)	Hardware Performance	Air Vehicle Emergency Recovery System	Use as-is -- no product exists that meets specification requirements.

Hunter System Contract Waivers

Number	Purpose	General Effect on System	Subsystem Affected	Corrective Action
RFW 056	Aircraft Dash Speed	Hardware Performance	Aircraft Performance	Use as-is -- the contractor's corrective action was to develop, integrate, and retrofit a heavy fuel engine with increased horsepower.
RFW 057C	Computer Resource Capability (Processing Speed and Memory)	Hardware Performance	Aircraft Digital Central Processing Assembly; Mission Planning, Ground Control, and Launch; and Recovery Mission Control Unit	Use as-is -- corrective action required system computer processor upgrade.
RFW 062A	Standard Shelter Noise Level	Hardware Performance	Mission Planning and Ground Control Station Noise Level	The contractor implemented an engineering change and retrofit of shelters. Corrective retrofit action for systems 1, 2, 6, and 7 was completed. Systems 3, 4, and 5 were undergoing corrective retrofit action.
RFW 065	Aircraft Engine Horsepower	Hardware Performance	Aircraft Engine Performance	The Hunter Project Office approved an aircraft engine horsepower specification change. The horsepower specification was relaxed from 65 horsepower to 60 horsepower.
RFW 060A	System Built-in-Test, System Built-in-Test Equipment	Software Performance	System Fault Failure Detection	The contractor enhanced external test equipment (Army contact test set) to perform built-in-tests. Corrective action to be completed in June 1996.

1

Hunter System Contract Waivers

Number	Purpose	General Effect on System	Subsystem Affected	Corrective Action
RFW 064C	Tactical Communication Module Subscriber Equipment Mission File Transfer	Software Performance	Console Application Processor Operational Software	Contractor software engineering change. The corrective action to be completed in March 1996.
RFW 075A	Computer Software Documentation	Software Performance	System Software Documentation	The Hunter Project Office to perform a software documentation verification after completion of software revision verification and validation in March 1996.
RFW 032C	Rocket Assist Takeoff Thruster Separation Velocity	Rocket Assist Takeoff Performance	Rocket Assist Takeoff Booster Rocket	Use as-is -- no product exists that meets specification requirements.
RFW 033C	Rocket Assist Takeoff Non-propulsivity	Rocket Assist Takeoff Performance	Rocket Assist Takeoff Booster Rocket	Use as-is -- no product exists that meets specification requirements.
RFW 034C	Rocket Assist Takeoff Booster Rocket Slow Off Response	Rocket Assist Takeoff Performance	Rocket Assist Takeoff Booster Rocket Insensitive Munition Requirement	Use as-is -- no product exists that meets specification requirements.
RFW 035C	Rocket Assist Takeoff Booster Rocket Fast Off Response	Rocket Assist Takeoff Performance	Rocket Assist Takeoff Booster Rocket Insensitive Munition Requirement	Use as-is -- no product exists that meets specification requirements.
RFW 036C	Rocket Assist Takeoff Booster Rocket Bullet Impact Response	Rocket Assist Takeoff Performance	Rocket Assist Takeoff Booster Rocket Insensitive Munition Requirement	Use as-is -- no product exists that meets specification requirements.

Hunter System Contract Waivers

Number	Purpose	General Effect on System	Subsystem Affected	Corrective Action
RFW 037C	Rocket Assist Takeoff Booster Rocket Fragment Impact Response	Rocket Assist Takeoff Performance	Rocket Assist Takeoff Booster Rocket Insensitive Munition Requirement	Use as-is -- no product exists that meets specification requirements.
RFW 038C	Rocket Assist Takeoff Booster Rocket Sympathetic Detonation Sensitivity	Rocket Assist Takeoff Performance	Rocket Assist Takeoff Booster Rocket Detonation Sensitivity	Use as-is -- no product exists that meets specification requirements.
RFW 039C	Rocket Assist Takeoff Booster Rocket Cadmium Plated Parts	Rocket Assist Takeoff Performance	Rocket Assist Takeoff Booster Rocket	Use as-is -- no product exists that meets specification requirements.
RFW 046	Rocket Assist Takeoff Booster Rocket Hydrostatic Pressure Test Omission (Head Cap)	Rocket Assist Takeoff Performance	Rocket Assist Takeoff Booster Rocket Head Cap Hydrostatic Pressure Requirement	Use as-is -- the contractor revised technical drawing specification to include hydrostatic testing for future booster rocket requirements.
RFW 047	Rocket Assist Takeoff Booster Rocket Hydrostatic Pressure Test Noncompliance (Nozzle Housing)	Rocket Assist Takeoff Performance	Rocket Assist Takeoff Booster Rocket Nozzle Housing Hydrostatic Pressure Requirement	Use as-is -- the contractor revised technical drawing specification to include hydrostatic testing for future booster rocket requirements.
RFW 049	Rocket Assist Takeoff Booster Rocket Painting of Shipping Container	Rocket Assist Takeoff Performance	Rocket Assist Takeoff Booster Rocket Shipping Container Color	Use as-is -- the contractor is to supply future booster rocket containers to specification requirements.
RFW 068	Rocket Assist Takeoff Booster Rocket Minus-25 Degrees Operating Temperature	Rocket Assist Takeoff Performance	Rocket Assist Takeoff Booster Rocket Thruster Performance (Low Temperature Extremes)	Use as-is -- no product exists that meets specification requirements.

Hunter System Contract Waivers

Number	Purpose	General Effect on System	Subsystem Affected	Corrective Action
RFW 069	Rocket Assist Takeoff Booster Rocket Container Vibration Failure	Rocket Assist Takeoff Performance	Rocket Assist Takeoff Booster Rocket Performance Failures (Vibration)	Use as-is -- the contractor will improve future container packaging material and label the delivered containers for careful handling, temperature restrictions, and booster motor inspection requirements.
RFW 042	Nickel Coating on Aluminum Base	Use of Prohibited Material	Datalink system Modules	Use as-is -- the contractor did not indicate corrective action on the waiver. Future system production would not require this waiver.
RFW 053B	Chemical Coat Finish for Aluminum	Use of Prohibited Material	Standard Shelter	Use as-is -- the contractor revised technical drawing. Future system production would not require this waiver.
RFW 054B	Use of Teflon Insulated Silver Plated Wire	Use of Prohibited Material	Mission Planning, Ground Control, and Launch and Recovery Stations (Shelters) Cable Assembly	Use as-is -- the contractor took corrective action with the subcontractor. Future system production would not require this waiver.
RFW 066	RTV Material Prohibition (Corrosive Type Sealant Material)	Use of Prohibited Material	Multi-Mission Optronic Stabilized Payload Gyro Cable Assembly	Use as-is -- the contractor revised technical drawing. Future system production would not require this waiver.
RFW 055B	Soldering in Accordance With Military Standard 454 Versus Military Standard 2000, Task G	Production Process Compliance	Mission Planning, Ground Control, and Launch and Recovery Stations Shelters	The contractor revised technical drawings to reflect the correct workmanship standard.

Hunter System Contract Waivers

Number	Purpose	General Effect on System	Subsystem Affected	Corrective Action
RFW 058A	Workmanship on Commercial Off-the-Shelf Fiber Optics Communication Boards (Soldering, Quality, and Component Mounting Practices) Military Standard 2000A	Production Process Compliance	Fiber Optics Communication System and Datalink Interface Unit Hardware	Contractor took action with the subcontractor to correct deficiencies. All affected systems hardware was replaced.
RFW 059A	Military Standard 2000 Workmanship Epoxy on Component Leads	Production Process Compliance	Systems 1, 2, and 3 Printed Wiring Assemblies	Use as-is for systems 1, 2, and 3. Contractor took corrective action with subcontractor.
RFW 063A	Military Standard 2000 Workmanship Resistor Coloration	Production Process Compliance	System 1, 2, and 3 Airborne Data Terminal and Ground Radio Frequency Boxes	Use as-is for systems 1, 2, and 3. Contractor took corrective action with subcontractor.
RFW 067A	Part Marking (Primary and Secondary Component Identification Markings)	Production Process Compliance	All 7 LRIP Systems Component Marking and Identification	Open issue. Contractor and Government were working the issue with an estimated completion date in June 1996.

Funding for the Hunter Unmanned Air Vehicle-Short Range System for FYs 1996 Through 2001 Provided in the Program Objective Memorandum

Funding Requirements	Fiscal Years (\$ in millions)						Total
	1996	1997	1998	1999	2000	2001	
Research, Development, Test, and Evaluation:							
Requirements Funded	\$23.0 23.0	\$ 17.1 12.8	0 0	0 0	0 0	0 0	\$ 40.1 \$ 35.8
Procurement:							
Requirements Funded	60.0 60.0	203.9 203.9	\$180.1 180.1	\$171.3 171.3	\$164.7 164.7	\$173.2 173.2	\$ 953.2 \$ 953.2
Attrition Hardware:							
Requirements Funded	0 0	13.4 13.4	7.7 7.7	4.2 4.2	4.5 4.5	4.2 4.2	\$ 34.0 \$ 34.0
Total Requirements	\$83.0	\$234.4	\$187.8	\$175.5	\$169.2	\$177.4	\$1,027.3
Total Funded	\$83.0	\$230.1	\$187.8	\$175.5	\$169.2	\$177.4	\$1,023.0

Summary of Prior Audits and Other Reviews

Since 1990, the General Accounting Office has issued five reports that address the Hunter Unmanned Air Vehicle-Short Range program. In 1995, the Office of the Chief of Staff, Department of the Air Force, performed an independent assessment of the program for the Navy. The following summarizes each General Accounting Office report and the Air Force assessment.

General Accounting Office

Report No. NSIAD-95-161 (OSD Case 9949), "Unmanned Aerial Vehicles, Maneuver System Schedule Includes Unnecessary Risk," September 1995. The report states that the acquisition of the Hunter system as a non-developmental item clearly illustrates the adverse consequences of beginning production without having adequate assurance of satisfactory system performance. The DoD stated that the Hunter system underwent operational testing in the form of a limited-user test during June and July 1992. The Director, Operational Test and Evaluation, prepared an independent operational assessment in January 1993, recommending entry of the program into the LRIP phase.

Report No. NSIAD-95-52 (OSD Case No. 9822), "Unmanned Aerial Vehicles, No More Hunter Systems Should Be Bought Until Problems Are Fixed," June 1995. The report stated that the Hunter system is logistically unsupportable, and tests have identified serious performance problems. Further, the report tells of DoD plans to commit to full-rate production for the land-based configuration before determining whether the Hunter system can meet Navy requirements. The report recommended that the Secretary of Defense prohibit award of a second low-rate production contract until the Hunter system satisfactorily demonstrates that it is operationally effective and operationally suitable and will satisfactorily meet the requirements of the Army, the Marine Corps, and the Navy. The DoD maintained that a second low-rate production contract award was warranted to prevent a prolonged break in production deliveries and to retain skilled contractor employees.

Report No. NSIAD-94-65 (OSD Case No. 9526), "Unmanned Aerial Vehicles, Performance of Short-Range System Still in Question," December 1993. The report states that the system did not meet milestone decision criteria for proceeding into LRIP. The report recommended that an acquisition strategy be established that includes the demonstration of satisfactory performance in diverse, realistic operational environments before proceeding with further production. The DoD acknowledged that testing had not been done to ensure that all essential operational requirements were met.

Summary of Prior Audits and Other Reviews

Report No. NSIAD-92-311 (OSD Case No. 9048), "Unmanned Aerial Vehicles, More Testing Needed Before Production of Short-Range System," September 1992. The report states that limited user test results did not adequately address critical system performance capabilities. Moreover, the testing was conducted in an environment not representative of that in which the system would be deployed. The report recommended deferral of further limited production until realistic operational testing provided reasonable assurance that the system would perform satisfactorily. The DoD maintained that the system had been thoroughly tested.

Report No. NSIAD-90-234 (OSD Case No. 8410), "Unmanned Aerial Vehicles, Realistic Testing Needed Before Production of Short-Range System," September 1990. The report states that the DoD acquisition strategy provides for testing in an environment not representative of the environment in which the system would be deployed. Further, full-rate production of the short-range system was to begin before verifying that the system can be modified to meet Navy requirements. The report recommended operational testing in diverse, realistic environments to provide reasonable assurance that the unmanned air vehicle would meet requirements before permitting limited production of the land-based unmanned air vehicle system. The report also recommended that the Short-Range unmanned air vehicle system production be limited until satisfactory performance of the Navy variant was demonstrated. The DoD maintained that an adequate demonstration of operational effectiveness and suitability could be accomplished without testing in all environments in which the system might be deployed.

Independent Assessment of the Joint Tactical Hunter Unmanned Air Vehicle Program

The Assistant Secretary of the Navy (Research, Development, and Acquisition) requested an independent assessment of the Joint Tactical Hunter Unmanned Air Vehicle program. On March 15, 1995, the Office of the Chief of Staff, Department of the Air Force, identified the following problems in its independent assessment:

- integration of the Hunter subsystems was not a non-development effort;
- United States and Israeli philosophies were in direct conflict for development and logistics;
- program management lacked clear lines of communication, responsibility, and management between the Government and the contractor;
- the lack of a systematic approach to software development hindered control, validation, and correction of software;
- the program was schedule-driven instead of event-driven;

Summary of Prior Audits and Other Reviews

- synergy was lacking between the Defense Contract Management Area Office and the project manager;
- program direction and program funding were not linked;
- system reliability needed to be verified before initial operational test and evaluation; and
- the system did not meet built-in-test requirements.

The independent assessment report recommended that Hunter program officials:

- establish a system baseline,
- realign the program schedule to allow sufficient time to accomplish the essential elements of the program,
- coordinate upgrade programs,
- create an integrated product team to review all functional areas, and
- create joint doctrine and training.

Organizations Visited or Contacted

Office of the Secretary of Defense

Strategic and Tactical Systems, Office of the Under Secretary of Defense for
Acquisition and Technology, Washington, DC
Defense Airborne Reconnaissance Office, Office of the Under Secretary of Defense for
Acquisition and Technology, Washington, DC

Joint Staff

Unmanned Aerial Vehicle Special Study Group, Joint Requirements Oversight Council,
Washington, DC
Requirements, Assessment, and Integration Division, Director for Force Structure,
Resources, and Assessment, Washington, DC

Department of the Army

Army Missile Command, Redstone Arsenal, AL
Unmanned Aerial Vehicles, Training and Doctrine Command System Manager, Army
Intelligence Center, Fort Huachuca, AZ
Company C, 304th Military Intelligence Battalion, Fort Huachuca, AZ
Company D, 304th Military Intelligence Battalion, Fort Huachuca, AZ
Huntsville Fraud Office, Army Criminal Investigation Command,
Redstone Arsenal, AL

Department of the Navy

Assistant Secretary of the Navy (Financial Management and Comptroller),
Washington, DC
Assistant Secretary of the Navy (Research, Development, and Acquisition),
Washington, DC
Program Executive Office for Cruise Missiles and Unmanned Aerial Vehicles, Naval
Air Systems Command, Washington, DC
Unmanned Aerial Vehicles Joint Project Office, Washington, DC
Joint Tactical Unmanned Aerial Vehicle Project Office, Huntsville, AL
Joint Tactical Unmanned Aerial Vehicle Project Field Office, Sierra Vista, AZ
Naval Audit Service, Arlington, VA

Organizations Visited or Contacted

Other Defense Organizations

Director, Defense Logistics Agency, Fort Belvoir, VA
Defense Contract Management Command, Fort Belvoir, VA
Defense Contract Management Area Office, Phoenix, Sierra Vista Field Office,
Sierra Vista, AZ

Non-Defense Federal Organization

National Security and International Affairs Division, General Accounting Office,
Washington, DC

Non-Government Organization

Unmanned Aerial Vehicle Flight and Logistics Center, TRW, Incorporated,
Sierra Vista, AZ

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Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Committee on Governmental Affairs
House Committee on Appropriations
House Subcommittee on National Security, Committee on Appropriations
House Committee on Government Reform and Oversight
House Subcommittee on National Security, International Affairs, and Criminal
Justice, Committee on Government Reform and Oversight
House Committee on National Security

Audit Team Members

This report was prepared by the Contract Management Directorate, Office of the Assistant Inspector General for Auditing, DoD.

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