

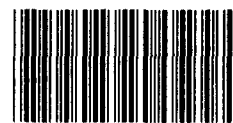
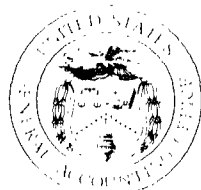
GAO

Report to the Chairman, Subcommittee  
on Procurement and Military Nuclear  
Systems, Committee on Armed Services,  
House of Representatives

May 1990

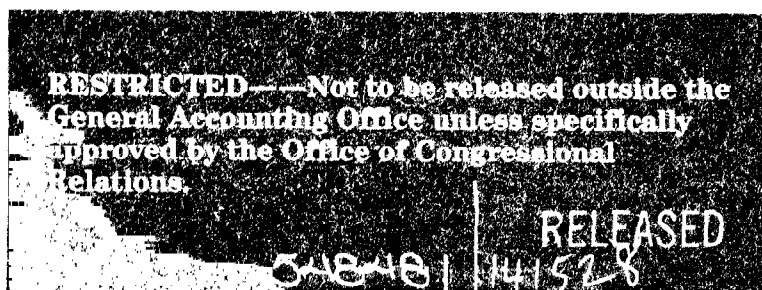
TACTICAL  
INTELLIGENCE

Army's Mohawk  
Surveillance Radar  
Program Restructure



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**National Security and  
International Affairs Division**

B-239081

May 11, 1990

The Honorable Les Aspin  
Chairman, Subcommittee on Procurement  
and Military Nuclear Systems  
Committee on Armed Services  
House of Representatives

Dear Mr. Chairman:

As requested, we reviewed the Army Mohawk surveillance system's (1) cost, (2) phase-out schedule, (3) planned upgrade, (4) alternatives to the upgrade, and (5) the status of other moving target surveillance systems. Although the Army recently terminated the planned upgrade, we are reporting the results of our analysis in case the schedules for other planned moving target surveillance systems slip and the Army reconsiders the Mohawk upgrade to cover the capability gap.

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**Background**

The Army requires a capability to track moving targets, provide their direction and speed, and to classify the targets as tracked or wheeled vehicles. A primary need for these capabilities is to provide targeting accuracies necessary for deep attack weapons, such as the Army Tactical Missile System. The Mohawk is the Army's only system providing moving target indicator (MTI) information on enemy force movements.

Mohawk employs OV-1D aircraft that were first fielded in 1959. It is a fixed wing, two passenger, twin engine, combat aircraft that uses a side looking radar to detect and report movement of enemy forces. The Mohawk system consists of 94 aircraft and 58 radars worldwide in active and reserve military intelligence battalions.

The Army had originally planned to retire the Mohawk fleet by the mid-to-late 1990s because the system was becoming old and difficult to support. Due to slippage in systems slated to replace Mohawk, the Army initiated upgrade and overhaul programs in 1986 to sustain Mohawk operation until 2005.

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**Results in Brief**

In 1986, the Army initiated two programs to sustain Mohawk operations through the year 2005. These were (1) an upgrade program for 34 aircraft and 38 radars at an estimated cost of \$224.4 million and (2) an aircraft overhaul and restoration program at an estimated cost of

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\$89 million. However, due to budgetary constraints, in January 1990, the Army (1) terminated the upgrade program, (2) curtailed the overhaul and restoration program for the last 29 aircraft, and (3) decided to phase-out Mohawk in 1997.

Because Mohawk's upgrade and operation costs to the year 2005 were projected to exceed \$1 billion, we examined less expensive alternatives to improving and maintaining Mohawk. Based on our review, we identified aircraft and radars that could potentially provide better capabilities at less cost in the same time frame as the upgraded Mohawk. The Army's January 1990 program changes eliminated the need for consideration of Mohawk alternatives at this time. However, if other planned follow-on systems slip and create a surveillance capability gap, the Army may consider the Mohawk upgrade again in the future.

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## Mohawk Upgrade Program Changes

The Army initiated a \$224.4 million Multi Stage Improvement Program in 1986 to upgrade the avionics and engines of 34 aircraft and eliminate logistically insupportable components of 38 radars. As of January 1990, the Army had spent or obligated about \$31 million. The upgraded Mohawks were to be delivered between fiscal years 1990 and 1996. The Army also planned to phase out all nonupgraded aircraft and radars by 1997, and use the 34 upgraded Mohawks in Europe and Korea until the year 2005.

The Army awarded two Mohawk aircraft upgrade contracts, one in 1986 for a prototype and the other in 1989 for a preproduction model of the upgraded Mohawk aircraft. Together, these contracts totaled about \$36.1 million. In February 1990, the contracts were closed out after about \$20.5 million had been obligated on the prototype aircraft. No funds were spent on the 1989 contract before termination.

To initiate the radar upgrade, the Army awarded a \$10.5 million contract in December 1989 to develop and produce three upgraded radar models. This entire amount has been obligated. The Army planned to upgrade 35 additional radars under contract options. This would provide one radar for each of the upgraded aircraft as well as four spare radars.

In January 1990, the Army decided to cut future funding for the aircraft and radar upgrade. This included \$22 million in funds to upgrade the 35 additional radars. However, the Army did not terminate the contract to develop and produce the three upgraded models. According to Army

officials, the Army wants to have the developmental models available in case the MTI capability gap lengthens and additional radar upgrades are needed.

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## Aircraft Overhaul Program Changes

In addition to the upgrade, in 1986, the Army initiated an aircraft overhaul and restoration program for 111 aircraft, including 16 non-Mohawk aircraft used for electronic intelligence gathering. The overhaul and restoration program was to cost \$89 million, of which \$60 million was spent through December 1989 to overhaul 67 early model aircraft. In 1990, the Army plans to award a \$12 million contract to overhaul 15 additional early model aircraft. The Army has dropped plans to overhaul the 29 remaining aircraft, which were newer models, resulting in an estimated savings of \$17 million.

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## Our Assessment of Potential Alternatives

Prior to the Army's decision to delete funding for the Mohawk upgrade and overhaul, we evaluated alternatives to upgrading Mohawk. Our review indicated that a modified off-the-shelf alternative to the upgraded Mohawk would have been (1) less costly, (2) better performing, and (3) available within the same time frame. Based on our evaluation, the Mohawk life-cycle cost estimates used by the Army were incomplete and understated the cost of operating the Mohawk fleet.

Our analysis indicated that the Army could have saved over \$140 million through the year 2005 by purchasing a system employing modified off-the-shelf aircraft and radars rather than pursuing the Mohawk upgrade.

Our comparison with the upgraded Mohawk indicated that the off-the-shelf alternative would have (1) required fewer aircraft because of the longer flight endurance of modern aircraft and (2) better met Army ground moving target surveillance, tracking, and targeting requirements than the improved Mohawk. The improved range, location accuracies, and tracking capabilities of modern radars could better support targeting requirements for weapons such as the Multiple Launch Rocket and Army Tactical Missile Systems. Information available indicates the alternative system could have been fielded beginning in the mid-1990s.

The Army's 1987 and 1988 analysis of MTI options, both which recommended improving Mohawk, were not valid because relevant information was not included. For example, the Army's 1987 study omitted critical cost data, such as operations and support costs, which are much

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higher for Mohawk than the alternative systems. The 1988 study (1) did not consider an alternative radar, (2) doubled the flying hours required of the alternative aircraft, and (3) excluded key costs, such as aircraft fuel and radar operating costs after the year 2000, which were substantially lower for alternative systems.

The Army's plan to retire Mohawk by 1997 voided the need for further consideration of this modified off-the-shelf alternative. However, according to Army officials, the Army may again consider an upgrade program or other alternatives to providing MTI capability should the follow-on surveillance systems be delayed. If that occurs, the less expensive, more capable, alternatives would also need to be considered.

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## Follow-On MTI Systems

The Army plans to use several systems under development to provide MTI capabilities when Mohawk is retired in 1997. These systems include the Joint Surveillance and Target Attack Radar System (JSTARS), unmanned aerial vehicles (UAV) with an MTI sensor, and potentially, an aerial common sensor system that could provide MTI data for multiple users.

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## JSTARS

The purpose of JSTARS, a joint Army and Air Force program, is to detect and locate moving and fixed targets deep in enemy territory and provide greater MTI surveillance coverage and targeting capability than Mohawk. JSTARS consists of 22 aircraft and 97 mobile ground stations and will cost an estimated \$8 billion to acquire. JSTARS was initially scheduled to provide MTI capability about 1990, but because of technical problems and testing delays, initial operational capability is now scheduled for 1997.

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## UAVs With MTI Capability

In 1994, the Army plans to buy a short-range UAV that will provide day and night surveillance coverage. The Army has a requirement to add MTI identification capabilities to UAVs in the future. UAVs will augment JSTARS by providing surveillance information in areas that JSTARS will not cover. In 1992, the Army intends to begin development of improved sensor payloads for the short-range UAV, which may include an MTI sensor.

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## Aerial Common Sensor

The Army's long-range conceptual plans include potentially placing several intelligence gathering sensors with a suite of common sensors. This

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system will be the Army's multipurpose airborne electronic mission system beyond the year 2000, and could include MTI functions, communications and electronic signals intelligence, and electronic warfare capabilities.

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## MTI Gap May Be Longer Than Expected

A gap in Army MTI capabilities will occur because Mohawk is scheduled to be fully retired by 1997, the same year JSTARS is to begin operations. This gap results because, although JSTARS is scheduled to begin operations in 1997, it will take several more years before it is fully operational worldwide. According to Army officials, the Army is prepared to absorb this risk until JSTARS becomes fully operational, provided no further slippage occurs.

However, JSTARS' initial operational capability date could potentially be delayed beyond 1997. Delays could occur because of the potential for development, testing, or funding problems. Army officials said that if JSTARS is delayed, the Army will review other alternatives for providing MTI coverage until JSTARS becomes operational. The alternatives discussed included less Mohawk flying hours to prolong aircraft life, re-initiating the Mohawk upgrade program, or the potential use of technologies now under development.

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## Scope and Methodology

We interviewed Army officials and contractor representatives and reviewed documents to assess (1) the Army's current plans to upgrade the Mohawk aircraft and its radar, (2) the procurement, testing, and modification of an off-the-shelf alternative source of MTI data, and (3) the status of follow-on MTI systems. We reviewed Army evaluations of Mohawk supportability issues, documents justifying the need for the Mohawk improvements, and studies examining other potential MTI sources.

Our work was done primarily at Army's Aviation Systems Command, St. Louis, Missouri; Communications and Electronics Command, Fort Monmouth, New Jersey; and the Office of the Deputy Chief of Staff for Operations and Plans, Washington, D.C. We also contacted the Department of the Army Audit Agency, Alexandria, Virginia, and met with various aircraft and radar contractors.

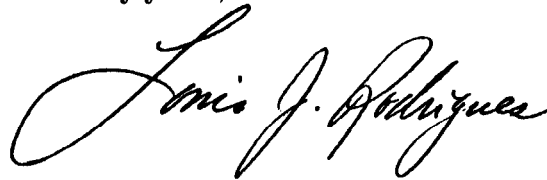
Our review was performed from August 1988 to January 1990 in accordance with generally accepted government auditing standards.

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Unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies to the Secretaries of Defense, Army, and Air Force and make copies available to others upon request.

Please contact me at (202) 275-4841 if you or your staff have any questions concerning the report. Other major contributors to this report are listed in appendix I.

Sincerely yours,

A handwritten signature in cursive script that reads "Louis J. Rodrigues". The signature is written in black ink and is positioned above the printed name and title.

Louis J. Rodrigues  
Director, Command, Control, Communications,  
and Intelligence Issues





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# Major Contributors to This Report

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