

Audit



Report

YEAR 2000 INITIATIVES AT THE ARMY
KWAJALEIN MISSILE RANGE

Report No. 99-046

December 4, 1998

Office of the Inspector General
Department of Defense

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Acronyms

KMR
Y2K

Kwajalein Missile Range
Year 2000



INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
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ARLINGTON, VIRGINIA 22202

December 4, 1998

MEMORANDUM FOR ASSISTANT SECRETARY OF DEFENSE (COMMAND,
CONTROL, COMMUNICATIONS, AND
INTELLIGENCE)
AUDITOR GENERAL, DEPARTMENT OF THE ARMY
DIRECTOR, TEST SYSTEMS ENGINEERING AND
EVALUATION

SUBJECT: Audit Report on Year 2000 Initiatives at the Army Kwajalein Missile
Range (Report No. 99-046)

We are providing this report for your information and use. We provided a draft of this report on October 26, 1998. Because the report contains no recommendations, written comments were not required, and none were received.

We appreciate the courtesies extended to the audit staff. Questions on the audit should be directed to Mr. Raymond A. Spencer at (703) 604-9071 (DSN 664-9071), or Mr. Thomas S. Bartoszek at (703) 604-9014 (DSN 664-9014). See Appendix C for the report distribution. Audit team members are listed inside the back cover.

A handwritten signature in black ink that reads "Robert J. Lieberman".

Robert J. Lieberman
Assistant Inspector General
for Auditing

Office of the Inspector General, DoD

Report No. 99-046

December 4, 1998

(Project No. 8AS-0032.17)

Year 2000 Initiatives at the Army Kwajalein Missile Range

Executive Summary

Introduction. This is one of a series of reports being issued by the Inspector General, DoD, in accordance with an informal partnership with the Chief Information Officer, DoD, to monitor DoD efforts to address the year 2000 computing challenge. For a listing of audit projects addressing the issue, see the year 2000 webpage on the IGnet at <http://www.ignet.gov>.

Audit Objectives. The overall audit objective was to determine whether the initiatives of the Army major range and test facility base at Kwajalein to address the year 2000 computer problems were effective and whether they complied with the DoD Year 2000 Management Plan.

Audit Results. Officials from the Army Kwajalein Missile Range initiated positive actions to correctly report the progress for three systems that we reviewed, update the cost estimate to implement Y2K corrections and report any adverse budget impacts, prepare a risk-management plan that includes a prioritized list of noncompliant systems, include independent verification of test planning and test results, and prepare a contingency plan. The audit results are detailed in Part I.

Management Comments. We provided a draft of this report on October 26, 1998. Because this report contains no recommendations, written comments were not required, and none were received. Therefore, we are publishing this report in final form.

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Part I - Audit Results

Audit Background

Because of the potential failure of computers to run or function throughout the Government, the President issued an Executive Order, "Year 2000 Conversion," February 4, 1998, making it policy that Federal agencies ensure that no critical Federal program experiences disruption because of the Year 2000 (Y2K) problem and that the head of each agency ensure that efforts to address the Y2K problem receive the highest priority attention in the agency.

The new target completion date for implementing mission-critical systems is December 31, 1998. The "DoD Year 2000 Management Plan," April 1997, also states the criteria for DoD Components to determine the appropriate Y2K phase for each system noted in the quarterly report. Target completion dates range from December 1996 through March 1999. Each system must meet defined exit criteria before proceeding into the next phase.

The Secretary of Defense issued a memorandum "Year 2000 Compliance" on August 7, 1998 stating that DoD is making insufficient progress in its efforts to solve its Y2K computer problem and that the Y2K problem is a critical national Defense issue. He also required that the Services and Defense agencies ensure updated accurate reporting of mission-critical systems and funding constraints for mission-critical systems with Y2K issues by October 1, 1998. The Deputy Secretary of Defense issued a memorandum, "Year 2000 (Y2K) Verification of National Security Capabilities," on August 24, 1998. The memorandum states that the Heads of each Service and Directors of Defense Agencies must certify that they have tested the information technology and national security system Y2K capabilities of their respective component's systems in accordance with the DoD Year 2000 Management Plan.

Public Law 105-271, "Year 2000 Information and Readiness Disclosure Act," October 19, 1998, is intended to encourage the disclosure and exchange of information about computer processing problems, solutions, test practices and test results, and related matters in connection with the transition to the Y2K.

Kwajalein Missile Range. The Kwajalein Missile Range (KMR) facilities are located on the Army Kwajalein Atoll in the Republic of the Marshall Islands. The KMR is owned by the Government and operated by Raytheon Systems Engineering (Raytheon). The KMR mission is to support operational and developmental testing of theater, strategic, and ballistic missiles, including exo-atmospheric ballistic missiles. KMR also supports space operations and experiments for near-earth and deep-space surveillance, satellite tracking, and foreign-launch coverage. Raytheon maintains Kwajalein's test and evaluation systems and provides all its infrastructure requirements. In addition, the Massachusetts Institute of Technology Lincoln Laboratory, which is a federally funded research and development center, provides technical advice and consultation on test and evaluation systems.

Audit Objectives

The overall audit objective was to determine whether the KMR planning and management to address the Y2K computer problems were effective and whether they complied with the DoD Year 2000 Management Plan. Specifically, we determined whether KMR resolved and reported on date-processing issues for potential Y2K-related system failures that could affect its test and evaluation activities. See Appendix A for a discussion of the scope and methodology and a summary of prior coverage.

Finding A. Army Kwajalein Missile Range Year 2000 Reporting, Cost Estimating, and Risk Assessment

The KMR actions to resolve and report on systems having potential date-processing issues are improving. KMR officials agreed to revise the monthly report to DoD, update the cost estimate to make systems Y2K compliant and the budget impact on funding, and prepare a risk-management plan that includes a prioritized list of systems. These actions occurred because we identified that three systems lacked a Y2K assessment of mission-critical subsystems, that Y2K cost estimates and the budget impact were outdated, and that KMR did not have a risk-management plan with a prioritized list of affected systems. As a result, KMR officials moved the three systems back to the assessment phase; initiated actions to update cost estimates and their impact on the budget; and develop a risk-management plan that included a list of prioritized systems.

Y2K Monthly Report

A June 19, 1998, memorandum from the Assistant Secretary of Defense (Command, Control, Communications and Intelligence) requires DoD Components to submit monthly Y2K status reports to DoD and the Office of Management and Budget. The reports allow them to oversee and monitor the DoD compliance effort, identify and prioritize risks, and solve Y2K problems quickly, because, if erroneous information goes unrecognized, computers and weapon systems may fail, and the problem will perpetuate through interfaces and other automated information systems.

Assessment-Phase Requirements

In his role as DoD Chief Information Officer, the Assistant Secretary of Defense (Command, Control, Communication, and Intelligence) issued the DoD Management Plan, Version 1.0, April 1997. The DoD Management Plan states that each Component is to gather and analyze information to determine the size and scope of the Y2K problem and determine which, if any, system components must be replaced, repaired or retired. A complete assessment of a system must be completed before it can proceed to the next phase. In addition, the DoD Management Plan requires each Component to develop a Y2K cost estimate to repair existing systems, to report any budget shortfalls to higher command authority and to prioritize the systems to be fixed through a risk-management plan.

Finding A. Army Kwajalein Missile Range Year 2000 Reporting, Cost Estimating and Risk Assessment

The DoD Management Plan, For Signature, Draft Version 2.0, June 1998, accelerated the target completion dates for the renovation, validation, and implementation phases. The new target completion date for the implementation phase is December 31, 1998.

Progress Reported

Of the 12 test and evaluation systems that we reviewed at the KMR, the Army incorrectly reported the progress of the Target Resolution and Discrimination Experimental Radar System, the Mobile Radar Search 36 System, and the Kwajalein Mobile Range Safety System in solving the Y2K problem.

Target Resolution and Discrimination Experimental Radar System. The radar is a dual frequency radar used to support data collection on L and S bands for reentry vehicles and space objects. The system has 43 subsystems of which 4 are mission critical and have not been assessed by KMR.

Mobile Radar Search 36 System. The radar collects data on the C band for reentry vehicles and satellites. The system has six subsystems. The KMR has not assessed the subsystem that contains 13 separate mission-critical elements.

Kwajalein Mobile Range Safety System. The system is a ship-based, mobile safety system designated to support launch operations at remote locations. It has seven subsystems, five of which are still being assessed.

Officials at KMR stated that all three systems were in the renovation phase in the August 1998 monthly report to DoD, despite the continued assessment effort to determine whether the mission-critical subsystems are date dependent and Y2K compliant. In September 1998, Army officials agreed to move all three systems back to the assessment phase until they completed their Y2K assessments. See Appendix B. The reclassification will provide an accurate reflection of the systems' Y2K progress in the monthly status report to DoD. Accordingly, we are not making a recommendation.

Cost Estimate, Budget Impact, and Risk Management

The Army did not update its cost estimate to fix all affected systems, did not identify budget shortfalls, and did not prepare a risk-management plan.

Y2K Cost Estimate and Budget. In March 1998, the Army obtained from Raytheon a cost estimate to repair or replace noncompliant systems. Raytheon identified 19 systems, which included test and evaluation and infrastructure systems, with a total estimated renovation cost of \$2 million. Each system used a different cost estimating technique. For example, the Kwajalein Mobile Range Safety System included no labor costs but a material cost of \$50,000,

Finding A. Army Kwajalein Missile Range Year 2000 Reporting, Cost Estimating and Risk Assessment

while the Advanced Research Projects Agency Long Range Tracking and Instrumentation Radar included labor costs of \$588,000 and material costs of \$100,000.

Beginning in August 1998, the Army required the contractor to identify the actual Y2K costs incurred. As of September 1998, Raytheon reported \$109,000. The costs incurred before September 1998 were not identified as Y2K costs. On its monthly report to the Army Space and Missile Defense Command, the Army reported the \$2 million as the impact affecting its budget.

The estimate was not current and complete because it was inconsistent in application, it did not include all costs associated with making systems compliant, it did not include all costs incurred to date, and it did not include additional costs needed to complete the Y2K effort. Without this information, the KMR cannot accurately compute budget shortages that may occur, report them to the next higher authority within the Army, and fix high priority systems with the funds available.

Risk-Management Plan. The Army did not prepare a risk-management plan after it prepared the cost estimate. All systems reported to the Army Space and Missile Defense Command, the parent organization of the KMR, were identified as mission-critical or non-mission-critical. The Army made no ranking within these categories. Without a risk-management plan that includes a prioritized list of systems, the KMR cannot prepare a valid plan to fix its Y2K noncompliant systems. This may result in not fixing the prioritized mission-critical systems with the available funding.

After we informed Army officials that its cost estimate for making systems Y2K compliant was outdated, its budget shortfalls were unknown, and it had no risk-management plan, the Army took immediate action. KMR officials agreed to prepare an updated estimate for noncompliant systems, to identify any budget shortfalls to the Army Space and Missile Defense Command, and to prepare a Y2K risk-management plan that includes a prioritized list of systems affected by Y2K. See Appendix B. Accordingly, we are not making a recommendation.

Finding B. Army Kwajalein Missile Range Year 2000 Testing and Contingency Planning

KMR officials took positive steps to assign an independent agent to review test plans and analyze the results to ensure that test and evaluation systems will be Y2K compliant. KMR officials also agreed to prepare a contingency plan by March 1999 for mission-critical systems that would not be Y2K compliant by December 1998. These conditions occurred after we notified KMR officials of the independent verification and contingency plan requirements. As a result, there is increased confidence in the range test plans, test results, and the continued functions of the systems after 1999.

Independent Verification and Contingency Plan Requirement

The "DoD Year 2000 Management Plan, For Signature, Draft Version 2.0, June 1998, states that the Office of Management and Budget requires all system tests to be independently verified. In addition, the DoD Management Plan states that contingency plans prepare for unanticipated disruptions and failures of systems necessary for operations. The contingency plan must include a wide range of workarounds that will enable Components to carry out their mission. The DoD Management Plan requires a contingency plan by March 1999 for mission-critical systems that will not be Y2K compliant by December 1998.

Testing

Of the three joint test activities intended to demonstrate and validate the KMR test and evaluation system Y2K compliance, KMR did not include independent verification of test plans and the test results.

Systems Testing. The KMR planned four different operational tests for all critical range assets to collect data and verify that the Y2K solutions implemented at Kwajalein work as expected in various mission environments. The tests will include a series of resetting the time on the master timing system and on the individual system clocks at the data collection system computers. Time will be reset at various dates beyond the year 2000. The first test, K6487, will include a joint multi-Service launch system simulation. The second test, K6488, will test joint satellite tracking with all systems participating. The third test, K6489, will test the system's ability to acquire, track, and record data on a meteorological rocket that will be launched from Kwajalein. The fourth test, K6490, will perform regression testing on Y2K issues not resolved during the previous tests. The Army plans to conduct the tests during October and December 1998. Army officials indicated that they would not include

Finding B. Army Kwajalein Missile Range Year 2000 Testing and Contingency Planning

independent verification of the tests because they were being conducted in a manner similar to a mission not requiring independent observation. Without independent test verification, the results of test plans and tests performed on converted, replaced, and renovated systems may be questionable.

After we informed Army officials of the requirements for independent verification, they agreed to include the Massachusetts Institute of Technology Lincoln Laboratory as the independent test verification agent. See Appendix B. The Lincoln Laboratory is a federally funded research and development center located at Kwajalein to provide technical advice and consultation to the Army. Officials at KMR agreed to request the Lincoln Laboratory to review the test plan and the data generated from the four tests. This action will help to provide confidence in the test plan and test results on systems affected by Y2K. Accordingly, we are not making a recommendation.

Contingency Planning

Army officials informed us that because they planned to have all systems compliant by December 1998, none of the 32 test and evaluation systems or the 25 infrastructure systems at Kwajalein had a contingency plan. Without a contingency plan for noncompliant systems, the KMR cannot plan for unanticipated disruptions and failures of systems necessary for operations.

We informed Army officials of the need for a contingency plan. They agreed to implement a plan for each mission-critical and mission-critical support system after the range-wide tests are completed in December 1998. See Appendix B.

Conclusion

We commend the KMR for taking prompt action to include independent verification of the test planning and execution and to prepare a contingency plan for noncompliant mission-critical systems. These actions will all help to ensure that no mission-critical or mission-critical support systems at Kwajalein are adversely affected by the Y2K problem. They also will help in solving and reporting on system Y2K status. As a result, DoD officials will have an independent review of the tests planned and results in achieving compliance to the Y2K. In addition, DoD officials will have a contingency plan for mission-critical noncompliant systems. Because management took corrective action during the audit, no recommendations are necessary.

Part II - Additional Information

Appendix A. Audit Process

This is one in a series of reports being issued by the Inspector General, DoD, in accordance with an informal partnership with the Chief Information Officer, DoD, to monitor DoD efforts to address the Y2K computing challenge. For a listing of audit projects addressing this issue, see the Y2K webpage on IGnet at <<http://www.ignet.gov>>.

Scope

We reviewed the Army's KMR located in the Republic of the Marshall Islands. We reviewed 12 of 32 testing and evaluation systems at the Army KMR.

DoD-wide Corporate Level Government Performance and Results Act Goals. In response to the Government Performance and Results Act, the Department of Defense has established 6 DoD-wide corporate level performance objectives and 14 goals for meeting these objectives. This report pertains to achievement of the following objective and goal:

- **Objective:** Prepare now for an uncertain future.
- **Goal:** Pursue a focused modernization effort that maintains U.S. qualitative superiority in key warfighting capabilities. (DoD-3)

DoD Functional Area Reform Goals. Most major DoD functional areas have also established performance improvement reform objectives and goals. This report pertains to achievement of the following functional area objective and goal:

Information Technology Management Functional Area.

- **Objective:** Provide services that satisfy customer information needs.
- **Goal:** Upgrade technology base. (ITM-2.3)

General Accounting Office High-Risk Area. In its identification of risk areas, the General Accounting Office has specifically designated risk in resolution of the Y2K problem as high. This report provides coverage of that problem and of the overall Information Management and Technology high-risk area.

Methodology

Audit Type, Dates, and Standards. We performed this economy and efficiency audit from June through September 1998, in accordance with auditing standards issued by the Comptroller General of the United States, as implemented by the Inspector General, DoD. We did not use computer-processed data to perform this audit.

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

Management Control Program. We did not review the management control program related to the overall audit objective because DoD recognized the Y2K issue as a material management control weakness in the FY 1997 Annual Statement of Assurance.

Summary of Prior Coverage

The General Accounting Office and the Inspector General, DoD, have conducted multiple reviews related to Y2K issues. General Accounting Office reports can be accessed over the Internet at [HTTP://www.gao.gov](http://www.gao.gov). Inspector General, DoD, reports can be accessed over the Internet at [HTTP://www.dodig.osd.mil](http://www.dodig.osd.mil).

Appendix B. Department of the Army Comments



DEPARTMENT OF THE ARMY
UNITED STATES ARMY KWAJALEIN ATOLL / KWAJALEIN MISSILE RANGE
BOX 26, APO AP 96855-2626

September 4, 1998

Office of the Commander

Memorandum For Assistant Inspector General for Auditing, ATTN: DODIG/AUD/AM
(Mr. Thomas S. Bartoszek, CPA), Department of Defense, Room
600, 400 Army Navy Drive, Arlington, VA 22202

SUBJECT: DoD IG Y2K Audit Issues and U.S. Army Kwajalein Atoll/Kwajalein Missile Range (USAKA/KMR) Response

1. My Y2K personnel have briefed the Director, KMR on your findings with respect to USAKA/KMR's Y2K compliance status. I understand that you and your team have identified several areas in which we need to focus our attention in order to meet DoD requirements for Y2K compliance. The following is my understanding of your findings and recommendations to address those issues, and my response:

a. Phase of Y2K Cycle: It is my understanding that KMR has reported that we have 21 systems in the "Renovation" Phase, but your audit has found evidence that we actually have 18 systems in the "Renovation Phase" and three still in the "Assessment Phase". I will task my Y2K point of contact to submit to the Space and Missile Defense Command (SMDC), USAKA/KMR's parent command, that KMR has 18 systems in "Renovation Phase" and 3 systems in "Assessment Phase" to correct the information that will be submitted to higher levels.

b. Testing Strategy: I understand that you were pleased with our approach to do several range-wide tests to determine System level Y2K compliance. However, you have noted that KMR has not designated an Independent Verification and Validation (IV&V) organization, as required by the DoD and DA Y2K management plans, to review our testing methodology, test plans, witness tests and review data acquired from those tests. I will designate the Massachusetts Institute of Technology/ Lincoln Laboratories (MIT/LL) as our IV&V organization. MIT/LL is a Federally Funded Research and Development Contractor (FFRDC), is considered a not for profit organization and thus is ideally suited to support the government in such a task. KMR currently has contracted to MIT/LL to support the range in the modernization of equipment, making them very familiar with range operation and the role of RSE as the Government Owned and Contractor Operated (GOCO) range contractor who will plan and execute the Y2K tests.

c. Contingency Planning: I also understand that you have noted a deficiency in our compliance with the DoD and DA Y2K management plans' requirement for contingency plans for systems that will not be compliant by March, 1999. I will task the Director, KMR to develop Contingency plans for all mission critical systems and any mission

SMDC-KA-R
SUBJECT: DoD IG Y2K Audit Issues and U.S. Army Kwajalein Atoll/Kwajalein Missile
Range (USAKA/KMR) Response

critical support systems that do not pass the compliance testing scheduled to be completed December, 1998 and cannot be made compliant by March, 1999.

d. Cost to Complete and Risk Management: Additionally, I have been advised that you have noted a deficiency in our compliance with the DoD and DA Y2K management plans' requirement to provide to my higher command a cost estimate to complete for my Y2K compliance project. I will task KMR and USAKA Installation directorates to prepare a "Cost to Complete" (CTC) for our Y2K project. I will evaluate its impact to the USAKA/KMR budget and identify any budget shortfalls to SMDC. In association with this CTC, I will also task them to prepare a Y2K Risk Management / Risk Mitigation Plan that will include a prioritized list of the systems.

2. I hope that these measures will meet with your satisfaction and show my commitment to meeting the DoD and DA Y2K compliance requirements.


GARY K. McMILLEN
Colonel, Corps of Engineers
Commanding

Appendix C. Report Distribution

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 Information Officers, Policy and Implementation)
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Senate Committee on Armed Services
Senate Committee on Governmental Affairs
Senate Special Committee on the Year 2000 Problem
House Committee on Appropriations
House Subcommittee on National Security, Committee on Appropriations
House Committee on Government Reform and Oversight
House Subcommittee on Government Management, Information, and Technology,
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 Acquisition Management Directorate, Office of the Assistant Inspector General for Auditing, DoD.

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