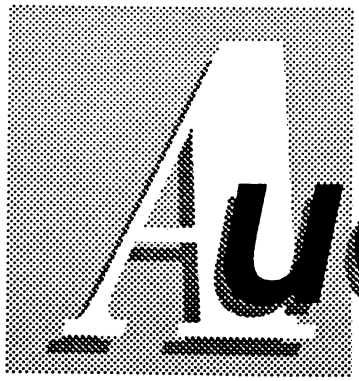

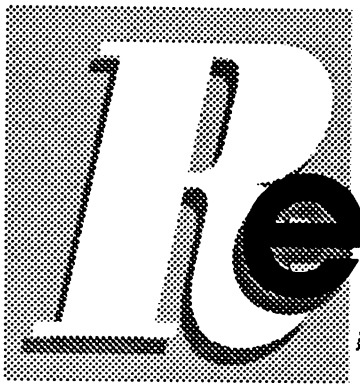

OFFICE OF THE INSPECTOR GENERAL

ALLEGED IMPROPER SOFTWARE DEVELOPMENT BY THE DEPARTMENT OF DEFENSE

Report No. 95-210

May 31, 1995

Department of Defense

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Acronyms

CASPR	Computer Assisted Statistical Process Reporting
DLA	Defense Logistics Agency
SPC	Statistical Process Control
STATMAN	Statistical Management

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

Report No. 95-210

May 31, 1995

MEMORANDUM FOR SECRETARY OF THE AIR FORCE
ASSISTANT SECRETARY OF DEFENSE (COMMAND, CONTROL, COMMUNICATIONS AND INTELLIGENCE)
DIRECTOR, DEFENSE LOGISTICS AGENCY

SUBJECT: Audit of Alleged Improper Software Development by the Department of Defense (Project No. 5RE-5004)

Introduction

We are providing this report to management for your information and use. We performed the audit in response to referrals from the Secretary of Defense and the Defense Logistics Agency (DLA), regarding a complaint made by Interaction Research Institute, Inc. (see Enclosure 1). The complainant alleged that the Air Force and DLA improperly developed and distributed statistical process control software and capitalized on the design and techniques used in software already commercially available from his and other companies. The complainant also expressed concern that DLA distributed statistical process control software to both public and private sector users at little or no cost. Additionally, the complainant stated that the person who developed the Air Force's Statistical Process Control (SPC) Software was no longer a Government employee and was privately marketing the software that had been developed at Government expense.

Audit Results

We did not substantiate the complaint that the Air Force and DLA improperly developed Government statistical process control software based on the design of the complainant's existing product. However, regarding DoD's free distribution of software, the Air Force and DLA provided Government statistical process control software to the public sector or to other Federal agencies at no cost. Government regulation encourages dissemination of software and other technical information through the National Technical Information Service, which charges a fee for products it distributes. Further, although the former Air Force employee was marketing the software that had been developed at Federal expense, the Air Force released all rights to its software in 1992; therefore, the actions of the former Air Force employee were not illegal.

Audit Objectives

The objective of the audit was to determine whether DoD improperly developed statistical process control software using the design and techniques of commercially available software. Additionally, we announced an objective to evaluate management controls as they applied to the audit objective.

Scope and Methodology

We discussed each of the concerns with the complainant. We interviewed the individuals who developed the DLA Computer Assisted Statistical Process Reporting (CASPR) software and the Air Force's SPC Software and reviewed available documentation, dated June 1990 through February 1995, related to the developed software. Based on interviews, we estimated the costs of CASPR and SPC Software developments. Enclosure 2 provides a chronology of events associated with CASPR development. We reviewed Federal and DoD requirements for sharing Government-developed software and for providing that information to the public. The Quantitative Methods Division, Office of the Assistant Inspector General for Auditing, provided technical assistance in comparing the functionality and operational attributes associated with the Government and commercial software products. Enclosure 3 lists the organizations we visited or contacted during the audit.

This economy and efficiency audit was performed from October 1994 through March 1995 in accordance with auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD. Accordingly, the audit included such tests of management controls as were considered necessary. We did not rely on computer-processed data or statistical sampling to achieve the audit objective.

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 periodically evaluate the adequacy of the controls.

We did not assess the adequacy of the management control programs at the DLA and Air Force organizations involved in developing the subject software because both of those organizations had been disbanded. Organizational documentation related to the management control programs either no longer existed or was unavailable for review. For that same reason, we did not assess the adequacy of management's self-evaluation of controls.

Prior Audits and Other Reviews

There have been no published reports, prior audits, or other reviews of improperly developed statistical process control software during the last 5 years.

Background

Statistical Process Control Software. Managers use statistical process control procedures to evaluate and improve production performance by measuring production variances and identifying when variable attributes go beyond predefined boundaries. Statistical process control software uses statistical techniques to calculate variances from established standards and presents those variances in graphical formats. DoD quality assurance specialists often use statistical process control software as a tool in monitoring the development and manufacture of items for DoD.

Air Force and DLA Software Development Efforts. In 1990, the Air Force Logistics Command and DLA evaluated various statistical process control software for Component-wide usage. Those efforts resulted from a recognized need to evaluate manufacturing productivity and quality through the use of statistical process control techniques. Because those techniques require lengthy evaluations and analyses using statistical formulas, Air Force and DLA quality assurance managers decided to develop statistical process control software that could be used on personal or other small computers. To meet its requirements, in 1991, DLA elected to upgrade an existing software package that had been originally developed in 1990 by an employee of the DLA Defense Contract Management District, Philadelphia.

Using Software Developed by DoD Components Versus Obtaining Commercial Software. Federal and DoD policies advocate the use of commercially available automated data processing services and products when they meet the needs of the user and are cost-effective. Air Force and DLA managers elected to develop statistical process control software because they believed it was more cost-effective to develop the software for Component-wide use than to buy commercial software. However, cost-benefit analyses validating those beliefs and justifying internal software development were not available to us. The Air Force and DLA organizations that made the development decisions had been disbanded, and related documentation had been destroyed or could not be located. We estimated that the Air Force spent about $200,000 to develop the SPC Software and that DLA spent about $50,000 to upgrade existing software.

Role of the National Technical Information Service. Subpart 201-24.201 of the Federal Information Resources Management Regulation encourages Federal agencies to use the Federal Software Exchange Program, which is administered by the National Technology Information Service. The primary purpose of the Federal Software Exchange Program is to encourage Federal agencies to share software they have developed. The basic function of the National Technical Information Service is to act as a clearinghouse for the collection and dissemination of nonclassified and nonproprietary technical information,

including software. Accordingly, software developed by or for Federal agencies and submitted to the Federal Software Exchange Program is made available through the National Technical Information Service to other Federal agencies, industry and business, and to the general public.

Discussion

In June 1994, the president of a small business, Interaction Research Institute, Inc., wrote similar letters of complaint to various DoD officials and members of Congress. He expressed concern that the Air Force and DLA had developed statistical process control software that was based on the design and techniques of his company's copyrighted® statistical process control software, STATMAN: Statistical Management® (STATMAN). Of greater concern, however, were DoD and Federal Government information distribution practices, which he believed constituted unfair competition to his company. Each of the concerns and our audit results follow.

Concern 1. The Air Force and DLA used STATMAN in the design and development of their statistical process control software. Additionally, the DLA software used the exact techniques as the version of STATMAN reviewed by DLA in 1989.

Audit Result. We did not substantiate the concern that the Air Force and DLA improperly based their software on the STATMAN design. We compared SPC Software and CASPR (the software developed by the Air Force and DLA, respectively) with the complainant's STATMAN software. We concluded that the three software packages were functionally equivalent, but we identified no unique operating characteristic or statistical processes in STATMAN. All the software packages were based on statistical functions and processes that were widely known and published in the statistical process or quality control fields.

We could not substantiate the concern that the DLA software used the exact techniques as the 1989 version of STATMAN. We could not substantiate that concern because:

- Interaction Research Institute, Inc., did not provide a copy of the 1989 version of the STATMAN software. Instead, Interaction Research Institute, Inc., gave us a version of the STATMAN software that contained numerous computer program files that were created in 1990.

- The programs in the 1990 STATMAN version had been compiled into a format that could be read by computers, but could not be easily interpreted by humans. Accordingly, we could not compare the computer programming statements (instructions written in an English-like format) in CASPR and STATMAN to determine whether those programs used the same techniques.

Concern 2. The Air Force and DLA provided their software to both public and private sector users.

Audit Result. Although the concern was substantiated, we identified no Government or DoD policy or regulation prohibiting Federal agencies from sharing Government-developed software or from disseminating that software to the public. To the contrary, Federal policies and regulations encourage Federal agencies to share information and to make that information available to the general public.

The Air Force and DLA provided their software free of charge to both public and private sector users. From October 1991 to January 1993, the Air Force developer freely distributed SPC Software to all requestors. From May 1992 to January 1993, the Air Force Quality Institute, Maxwell Air Force Base, distributed SPC Software to all requestors. In January 1993, the Air Force Quality Institute provided SPC Software to the National Technical Information Service and performed no further distribution. DLA has provided copies of CASPR at no cost to all requestors since January 1992. As of March 1995, DLA managers were considering whether to limit dissemination of technical information, such as software, to DoD organizations.

Concern 3. Non-DoD employees can purchase the software at a very nominal fee through the National Technical Information Service.

Audit Result. The concern was substantiated, but it relates to the specific purpose of the National Technical Information Service. The National Technical Information Service is a nonappropriated (self-supporting) organization established by Congress to act as a repository for technical information and to make that information available to Federal agencies and to the general public. The organization's income is generated from the fees charged for information, and its services are provided on the same basis to both the public and private sectors. Since February 1993, the Air Force SPC Software has been available from the National Technical Information Service for $55. That fee is premised on reproduction and dissemination costs, and does not include SPC Software development costs. As of May 26, 1995, DLA had not provided CASPR to the National Technical Information Service; therefore, it is not available from the National Technical Information Service.

Concern 4. DLA rented a vendor booth in 1993 at a National Conference on Federal Quality to display and distribute CASPR free to all attendees.

Audit Result. The concern was substantiated, but as discussed under Concern 2, DLA actions were not contrary to Federal or DoD policy or regulation. In July 1993, the CASPR developer attended a Federal Quality Conference in Arlington, Virginia, at the request of the DLA Total Quality Office. At that conference, the developer demonstrated CASPR and provided free copies of CASPR software to requestors.

Concern 5. The Air Force SPC Software developer has retired and is marketing the Government product as "SPC Expert" under his company, Quality Software Design of Dayton, Ohio.

Audit Result. The concern was substantiated, but did not involve illegality. In November 1992, the Public Affairs Office, Department of the Air Force, released SPC Software to the public. A public release allows the software to be copied or redistributed without the permission of the Air Force. Therefore, the former Air Force employee considered the software as public domain software. In documents dated August 15, 1994, the former Air Force employee stated that he had developed a "clone" of SPC Software and named that software "SPC Expert." He stated that he distributed the cloned software at no cost to state, local, or Federal agencies and to academic institutions. The former Air Force employee licenses the software to commercial organizations for $40.

If you have questions on this audit, please contact Ms. Mary Ugone, Audit Program Director, at (703) 604-9529 (DSN) 664-9529 or Mr. James Hutchinson, Audit Project Manager, at (703) 604-9530 (DSN) 664-9530. The distribution of this report is listed in Enclosure 4. Audit team members are listed inside the back cover.

Robert J. Lieberman
Assistant Inspector General
for Auditing

Enclosures

Letter of Concern to the Secretary of Defense

IRI INTERACTION RESEARCH INSTITUTE, INC.

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OFFICE OF THE
SECRETARY OF DEFENSE

June 20, 1994

The Honorable William J. Perry
Secretary of Defense
1000 Defense Pentagon
Washington, DC 20301-1000

Dear Mr. Perry:

I am writing to request your assistance in a matter that concerns a violation of federal government policy. The issue involves deception and government interference with the free enterprise of commercial products. The violation is charged against the U.S. Air Force, the Defense Logistics Agency, and the National Technical Information Service.

In the way of background, my wife and I established a small business in Fairfax, Virginia; engaged in research, training, and development, with an emphasis on process management and measurement. We developed the Marine Corps Leadership Evaluation and Analysis Program (LEAP) that was implemented world-wide by the U.S. Marine Corps in the 1970s. And, we have taught management courses at George Washington University since 1983. Since we incorporated in 1975, we have consistently employed from five to eight full and part-time support personnel.

During 1980 to 1983 we designed and developed a statistical process control (SPC) software program under the copyright, STATMAN: Statistical Management®. We have continued to develop the program in response to market needs, and have sold the product to both private and public organizations. Our government licensees include Army Air Systems Command, Naval Air Engineering Center, Naval Air Systems Command Headquarters, and Headquarters, U.S. Marine Corps. In addition, we are currently under contract to provide quality management training and material to Naval Air Systems Command. This information is provided to establish the creditability of our organization and of our products and services.

In 1988, the Department of the Air Force requested review copies of our statistical process control software (STATMAN), and our training material for various Air Force commands located throughout the U.S., including Wright-Patterson Department of Organizational Sciences and Quality Program Office. The Wright-Patterson group was requested to evaluate the software for Air Force-wide implementation. Throughout 1988 and 1989 our products and correspondence were sent on request to various Air Force personnel for review. Despite efforts to retrieve these products, some have never been returned.

In the summer of 1989, Warner-Robins Air Logistic Command purchased a STATMAN site license, along with our workbooks and training services in the application logic of the techniques offered in the software.

4428 ROCKCREST DRIVE · FAIRFAX, VIRGINIA 22032 · (703) 978-0313

In 1990 the Defense Logistic Agency, DLA-OQ Total Quality Office requested the software for review, as well as a financial quote for a DLA site license. In addition, members of DLA were sent to our public seminar to obtain a copies of the software, and acquire knowledge about the rationale behind its development and application.

During the period the Air Force and DLA were reviewing and analyzing our SPC software, they were apparently developing their own SPC software. By capitalizing on the design and development efforts of our product and similar software programs produced by other software firms, these government agencies were able to produce, at taxpayer expense, their own version of a product that was available commercially. The Air Force and DLA programs were eventually offered as competitive products to both public and private sector users.

In 1993 Wright-Patterson released their version of the program entitled, "Statistical Process Control (SPC) Software" through the Maxwell Air Force Base, Air Force Quality Center. This product is provided free to all claiming to be DoD personnel upon request, and is also made available through their shareware bulletin board via autovan or commercial modem.

For those not connected with DoD, the software can be purchased at a very nominal fee through the National Technical Information Service (NTIS). Thus, the software and unprotected code are supplied throughout the world at a cost that is six percent of the average price for similar software obtained through the commercial market.

Moreover, the civil servant who developed the Air Force SPC software has since retired, and is marketing this government product as "SPC Expert" under his company, Quality Software Design of Dayton, Ohio.

During the 1990-1993 time frame the Defense Logistics Agency developed and released their "Computer Assisted Statistical Process Reporting (CASPR)" program. This program offers the exact same techniques as the STATMAN program DLA reviewed in 1989. The CASPR program is managed by the DLA Information Management Center in Alexandria, Virginia. The program manager distributes the software free to any requester. DLA also rented a vendor booth at the 1993 National Conference on Federal Quality to display and distribute CASPR free to all attendees. There is no justification of this practice. Commercial competition is difficult enough.

The federal government's involvement in the entire "total quality management" movement was fostered with a "we can do it ourselves without commercial help attitude." The result has been the most extensive example of excess, plagiarism, and duplication of effort this country has ever known.

The use of federal government resources to conspire against, capitalize on the development efforts of, and compete against taxpaying commercial organizations is a gross violation of the public trust, and of the policies and principles upon which this county is founded. The government's activity in this case is tantamount to destroying the creative process and free enterprise system that have made

this country preeminent. Why should software developers risk initial development costs and invest in promotion, when government agencies are permitted to take product and code, and with public funds, produce their own version for free distribution?

Those involved blatantly disregard the rules and appear oblivious to the principles set forth in Office of Management and Budget Circulars A-76 and A-130. When confronted with these issues, government agents express an insolent "stop me if you can" attitude. This represents socialism by arrogance. It must be stopped.

I hereby request that all government agencies, including especially the Air Force Quality Center, the Defense Logistic Agency, and the National Technical Information Service, cease and desist further development, distribution, technical support, and sales of the products entitled, "Statistical Process Control (SPC) Software," and "Computer Assisted Statistical Process Control (CASPR)," or any similar products of the same nature.

It is requested that all "SPC Software" and "CASPR" products be recalled and purged from the files of all government and commercial organizations that have been supplied the products.

It is requested that all former agents who participated in the development, support, and distribution of these products be notified to cease and desist all support, distribution, and sales of these products under any name. The organization currently marketing "SPC Express" must be notified by the government that it is in violation of the law.

Moreover, it is requested that a full accounting of all agencies and individuals who have received copies of these products be provided, upon request, to any interested citizen.

Finally, it is requested that a full investigation be conducted by the appropriate federal agency to identify and reprimand responsible agents, and assure that similar violations do not occur again. What these government agencies have done is patently wrong. And, the practice must be stopped as soon as possible.

I have served this country as a Marine since 1954 in Korea, in Vietnam, and more recently was activated in support of Desert Storm. I would like to continue to fight for my country, not against it.

Very sincerely,

Thomas D. Affourtit
President

Chronology of Events Related to Development of Defense Logistics Agency Software

Date	Event
June 1990	Computer Assisted Statistical Process Reporting (CASPR) software submitted to the DLA Defense Contract Management District, Philadelphia, under the Model Installations Program (a DLA-wide program encouraging innovative ideas to increase the efficiency of DLA installations).
December 1990	DLA officials requested agency-wide participation in establishing a process action team to review software for use in DLA's Total Quality Management program.
January 1991	DLA officials requested that process action team members bring copies or information about the software programs used by their organizations.
March 1991	DLA officials met with the CASPR developer and proposed that the developer upgrade CASPR.
	DLA officials formally requested the developer's assistance in upgrading CASPR to meet DLA requirements for statistical process control software.
	DLA officials met with the developer to define requirements of CASPR.
May 1991	CASPR developer notified DLA officials of the costs for additional software tools needed to upgrade CASPR.
June 1991	DLA quality assurance staff identified numerous problems with the upgraded CASPR software.
July 1991	CASPR developer met with DLA officials to clarify and document requirements defined during the March 1991 meetings.
August 1991	DLA officials requested that the developer's time be extended to complete the CASPR upgrade.

Chronology of Events Related to Development of Defense Logistics Agency Software

Date	Event
September 1991	CASPR developer identified additional computer memory requirements to process the upgraded CASPR software.
October 1991	DLA officials met with the CASPR developer to discuss their evaluation of CASPR.
December 1991	DLA officials asked the developer to plan to correct the identified software problems and that the upgraded CASPR software be ready for release by January 1992.
January 1992	DLA formally distributed the upgraded CASPR software.
July 1993	DLA officials requested that the developer attend the Federal Quality Conference, Arlington, Virginia, to demonstrate the functional capabilities of CASPR.

Organizations Visited or Contacted

Office of the Secretary of Defense

Assistant Secretary of Defense (Command, Control, Communications, and Intelligence), Washington, DC

Department of the Army

Army Materiel Command, Alexandria, VA

Department of the Navy

Naval Air Systems Command, Arlington, VA
Headquarters, U.S. Marine Corps, Arlington, VA

Department of the Air Force

Air Force Materiel Command, Wright-Patterson Air Force Base, OH
  Air Logistics Center, Warner-Robins Air Force Base, GA
Air Force Quality Institute, Maxwell Air Force Base, AL

Defense Organizations

Headquarters, Defense Logistics Agency, Alexandria, VA
  Defense Plant Representative Office, King of Prussia, PA
  Defense Contract Management District Mid-Atlantic, Philadelphia, PA
Joint Interoperability and Engineering Organization, Defense Information Systems Agency, Arlington, VA

Non-Defense Federal Organizations

National Technology Information Service, Springfield, VA
Small Business Administration, Washington, DC

Non-Government Organizations

Interaction Research Institute, Inc., Fairfax, VA
Quality Software Design, Kettering, OH

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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

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This report was produced by the Readiness and Operational Support Directorate, Office of the Assistant Inspector General for Auditing, DoD.

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