



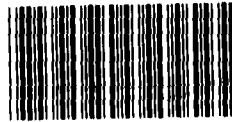
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RELEASED

B-213963

AUGUST 27, 1984

The Honorable Jack Brooks
Chairman, Committee on
Government Operations
House of Representatives



125124

Dear Mr. Chairman:

Subject: Additional Information on the Social Security
Administration's Management of Data Communications
Contracts with Paradyne Corporation (IMTEC-84-23)

In your August 8, 1984, letter (encl. II), you asked us to provide additional information to supplement our August 2, 1984, testimony before your Committee on our report, Social Security Administration's Data Communications Contracts With Paradyne Corporation Demonstrate the Need for Improved Management Controls (GAO/IMTEC-84-15). Specifically, you asked us to

- identify and compare the equipment Paradyne represented to the Social Security Administration (SSA) in its proposal, demonstrated prior to award, provided for acceptance testing, and later delivered for installation;
- assess the performance of Paradyne's systems from the time of installation to the present, as well as the impact on SSA's ability to effectively perform its mission;
- assess the accuracy and completeness of the MITRE Corporation's report on Paradyne's performance under the contract; and
- determine whether SSA officials or employees were aware that prototype systems using another manufacturer's equipment and an encryption device containing nothing more than blinking lights, were demonstrated by Paradyne prior to contract award.

In addition, members of your Committee staff asked us to determine whether Paradyne's alleged cash-flow problems were a factor in SSA's decision to purchase Paradyne terminals in fiscal year 1982.

Enclosure I contains our findings and objectives, scope, and methodology.

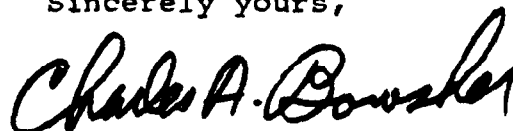
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Unless you release its contents earlier, we plan no further distribution of this report until 30 days from its issue date. At that time, we will send copies to interested parties and make copies available to others upon request.

Sincerely yours,



Comptroller General
of the United States

Enclosures - 2

ADDITIONAL INFORMATION ON SSA'S
MANAGEMENT OF DATA COMMUNICATIONS
CONTRACTS WITH PARADYNE CORPORATION

In the sections that follow, we discuss our objectives, scope, and methodology and address each of Chairman Brooks' concerns about SSA's terminal contracts with the Paradyne Corporation.

OBJECTIVES, SCOPE, AND METHODOLOGY

Our objective was to respond to concerns raised by the Committee Chairman on August 8, 1984. (See encl. II.) We performed our review in accordance with generally accepted government auditing standards, except that we did not obtain comments from SSA, Paradyne, or MITRE officials.

As part of our review, we examined SSA's Request for Proposal (RFP) and Paradyne's response to the RFP, interviewed SSA employees, and reviewed sworn statements (affidavits and depositions) on Paradyne's demonstration of equipment, analyzed depositions and SSA documents pertinent to acceptance testing, and examined material, supplied to us by Paradyne and SSA, identifying equipment that Paradyne installed in SSA field offices.

In assessing Paradyne's systems performance and the impact on SSA's ability to perform its mission, we conducted interviews with officials of the SSA Office of Systems and reviewed documentation from that Office. We did not independently verify the validity of the statistics on system performance provided by SSA.

In assessing the accuracy and completeness of MITRE's report on Paradyne's performance under the contract, we interviewed MITRE officials who performed the study and analyzed the scope and overall methodology of MITRE's efforts. We did not, however, independently verify the data upon which MITRE based its conclusions.

To find out if SSA officials and employees knew that Paradyne, in its equipment demonstration, used controller equipment other than that it had proposed and an encryption device containing nothing more than blinking lights, we obtained sworn statements from the following persons:

- Six of seven officials identified in a December 1980 SSA memorandum as serving on SSA's Source Selection Committee. The seventh--the former Director of both the Offices of Data Communications and Systems Engineering--did not respond to our telephone inquiries.

- Eight of the ten SSA employees identified by the SSA memorandum as being members of the Technical Evaluation Committee. One member is now deceased and the other--the Technical Chairman--was on vacation and could not be reached. We did, however, use information that this latter individual had previously provided in a deposition to the Securities and Exchange Commission.
- Four of the five SSA employees who attended the Paradyne demonstration. (The fifth individual was the Technical Chairman of the Technical Evaluation Committee discussed above.)
- Four employees who were from SSA's Division of Contracts and Grants Management and who played a role in the administration of the contract.

We also reviewed depositions of Paradyne employees who had helped develop the equipment or who had attended Paradyne's demonstration of the equipment.

Finally, in response to your concerns that Paradyne's alleged cash-flow problems were discussed during a 1982 SSA budget meeting held, in part, to discuss the purchase of Paradyne terminals, we obtained a sworn statement (affidavit) from each of the 12 attendees of this meeting.

We performed our work primarily at SSA headquarters in Baltimore, Maryland, during August 1984.

MAJOR DIFFERENCES EXIST AMONG EQUIPMENT
PROPOSED, DEMONSTRATED, AND DELIVERED FOR
TESTING BY PARADYNE

There are major differences among the equipment Paradyne described in its proposal, used at its pre-award operational capability demonstration, delivered for acceptance testing, and installed in SSA field offices. Paradyne offered the P8400 system (which was represented to be a fully developed system) in its proposal dated August 8, 1980. At its December 15, 1980, OCD Paradyne used a completely different processor/controller. Among other differences, this controller was based on a Digital Equipment Corporation (DEC) PDP-11 processor rather than a Zilog Z8000 processor, as had been proposed. At the acceptance test (beginning on April 30, 1981) Paradyne used newly integrated P8400 controller components and associated software, which still had serious defects. These problems carried over into field office operations in subsequent installations.

SSA solicitation required that proposed configurations be based on equipment announced and available for delivery

The SSA solicitation required that:

"E.10. The equipment and software proposed in response to this Solicitation Document must have been formally announced and available for delivery on or before the closing date of this solicitation and be capable of a pre-award Operational Capability Demonstration (OCD) as specified in Attachment III of this Solicitation Document. Demonstrations of prototypes are not acceptable."

Attachment III of the solicitation specified the intent of the OCD and, among other things, permitted an exception to the employment of actual testing in order to validate each requirement:

"Contractor must demonstrate that the proposed equipment can perform each of the mandatory requirements . . . In lieu of testing specific items where complete results may be difficult or impractical to obtain, the contractor may submit (with Government approval) a written detailed description of analysis in place of the actual test."

Amendment I, in referencing to section E.10., clarified the circumstances under which written analysis would be acceptable:

"This paragraph is intended to assure the government that apparent technically responsive vendors are capable of meeting the needs of the government. The Operational Capability Demonstration (OCD) is not meant to impose upon the vendor excessive pre-award costs. The government does not intend that new products be developed to satisfy the requirements of the RFP. The attempt is to go to the market to acquire products which have proven marketability and to the extent possible, are 'off the shelf' items. Therefore, the government requires that the hardware proposed be previously announced as being included in the vendor's product lines, or readily available from its suppliers, and available to the general user. As a result, demonstration of prototype devices is not acceptable. For the purposes of the OCD, if modifications or enhancements to existing products would be difficult or impractical to test, the vendor may submit (with Government approval) a written description of analysis in place of the actual test as stated in Attachment III."

Major components varied at
different stages of procurement

On the basis of sworn statements by persons working for Paradyne before and during its OCD, SSA documentation, and information supplied to us by Paradyne, we have identified major equipment components Paradyne represented in its proposal, demonstrated at its OCD, provided for Phase I acceptance testing, and currently utilizes in field installations. The results of this comparison are summarized in the following table.

COMPARISON OF MAJOR COMPONENTS PROPOSED, DEMONSTRATED, SUBMITTED FOR PHASE I
ACCEPTANCE TESTING, AND INSTALLED BY PARADYNE CORPORATION

Major components	August 8, 1980-- proposal ^{1/}	December 15, 1980-- OCD ^{2/}	April 30 - June 19, 1981-- Phase I acceptance test ^{5/}	April 5, 1984-- Equipment installed ^{7/}
-Processor/Controller:	Paradyne P8400 (Zilog Z8000 MPU)	DEC PDP-11 processor	Paradyne P8400 (Zilog Z8000 MPU)	Paradyne P8400 (Zilog Z8000 MPU)
Operating System	PIOS (UNIX-based) ^{6/}	Coherent ^{6/}	PIOS (XENIX-based) ^{6/}	PIOS (XENIX-based) ^{6/}
Programming languages	Z8000 assembler "C" COBOL	"C" COBOL	Z8000 assembler "C" ^{8/}	Z8000 assembler "C" COBOL ^{9/10/}
Disk Drive	Model 8421 ^{3/}	DEC Model RX02	Model 8421 ^{3/}	MODEL 8421 (C. Itoh/Toshiba Corp.; Siemens Corp)
Card Cage	^{3/}	DEC	^{4/}	Central Data Corp.
-Data Encryptor	Model 2811 ^{3/}	Oral presentation and representation (not demonstrated)	P-2811 (3 encryptors) ^{2/}	^{11/}
-CRT	PDS-270	PDS-270	^{4/}	PDS-270
-Printer	Model 8482 ^{3/}	^{12/}	Model 8482 (Tally)	Model 8482 (Tally)

- ^{1/} Represented by Paradyne in its initial submission to SSA on August 8, 1980.
^{2/} Based on sworn statements, affidavits, and interviews taken by the REC, Paradyne, and GAO.
^{3/} Equipment listed in proposal but not attributed to an original equipment manufacturer (OEM).
^{4/} Could not be identified by GAO research.
^{5/} Based on SSA and Paradyne document.
^{6/} UNIX was developed by Bell Laboratories; Coherent and XENIX are different variants of UNIX.

- ^{7/} Based on Paradyne-supplied information. GAO could not verify.
^{8/} COBOL not provided.
^{9/} Provided by Paradyne but not installed in field (at SSA's discretion).
^{10/} By this point in time, Paradyne had provided programming languages in Z8000, "C" and COBOL.
^{11/} Encryptors returned to Paradyne in October 1983.
^{12/} Based on documentation, printer type unknown.

Paradyne proposed P8400 as existing
and fully developed

Paradyne submitted its initial proposal to SSA on August 8, 1980. This proposal offered a P8400 processor/controller subsystem that utilized a Zilog Z8000 processor that was to run under Paradyne's Interactive Operating System (PIOS). (PIOS was described in Paradyne's proposal as in existence and as being based on the UNIX operating system.) Additional software was to be provided to permit the unit to be programmed in Z8000 assembler, "C" (a higher level program language), and a version of COBOL. The proposal also listed, among other components of its controller subsystem, a card cage and disk drive (no manufacturer was identified). The proposal also listed, among other subsystems, a Paradyne model PDS-270 terminal, a model 8482 printer, and a model 2811 encryptor.

Paradyne stated that its system met all the solicitation requirements--these included being announced and available for delivery at the time of Paradyne's submission. Paradyne also stated in its proposal that: "The system processor has been developed with performance, reliability . . . and expandability as its design goals. All of these goals were achieved" (Emphasis added.)

Paradyne demonstrated equipment at OCD
that it did not propose, submit
for acceptance testing, or install

On the basis of sworn statements and affidavits by a former Paradyne employee, a Paradyne consultant, and SSA officials, we believe that the following description accurately depicts what components Paradyne used during its December 15, 1980 OCD.

Paradyne demonstrated a system that used a DEC processor running under Mark Williams Company's "Coherent" operating system, which supported the "C" and COBOL programming languages. The processor/controller also utilized a DEC disk drive and card cage, among other DEC components. SSA officials believed that Paradyne demonstrated the P8400 controller unit it had proposed. Paradyne-manufactured CRTs were utilized. It appears that Paradyne made an oral presentation of its proposed encryptor, but it is unclear whether Paradyne represented the encryptor device as being fully operational.¹³ Paradyne has conceded that the encryptor was not functional at the time of the OCD.¹⁴

¹³Discussed in detail on p. 23.

¹⁴Defendant Paradyne's Responses to Plaintiff Securities and Exchange Commission's Request for Admissions, Securities and Exchange Commission v. Paradyne Corporation, Civil Action No. 83-351-Civ-T-10 (USDC, Middle District of Florida).

Newly integrated P8400 delivered
for acceptance testing

By the time of Phase I Acceptance Testing (beginning on April 29, 1981), Paradyne had developed an operational P8400 system that utilized a Z8000 processor. However, the P8400 processor/controller was not completely debugged. To develop the PIOS operating system, represented as being in existence in Paradyne's August 8, 1980, proposal, Paradyne utilized a recently adapted version of the XENIX operating system, adapted to its P8400 configuration by the Microsoft Corporation under an agreement dated March 5, 1981. As of mid-May 1981, when acceptance tests were suspended, the XENIX adaptation still contained significant defects. Paradyne terminals failed the first 10 days of Phase I Acceptance Testing; after halting the tests in mid-May, testing was resumed on June 1, 1981. (See IMTEC-84-15, app. II, p. 16-17.)

Paradyne apparently had implemented the Z8000 assembler and "C" on its P8400 system by Phase I Acceptance Testing. Paradyne estimated that it would provide a COBOL compiler by July 10, 1981.

By the time Phase I Acceptance Testing had begun, Paradyne had completed construction of five encryptors, three of which were delivered to SSA and two of which Paradyne retained for backup purposes. Paradyne provided a letter certifying that the encryptors utilized the approved National Bureau of Standards Data Encryption Standards algorithm, and complied with the passive threat mode of FED-STD 1026 and requirements of FED-STD 1027. (SSA retained the three encryptors until September 1983, when they were returned to Paradyne. However, SSA never implemented encryption in its field office operations.)

Currently installed P8400 configuration
is substantially identical to what was proposed

In an April 5, 1984, letter to GAO Paradyne described the components and their manufacturers in the systems utilized in SSA field operations. These components are now substantially identical to the components Paradyne had originally proposed on August 8, 1980, as being already in existence at that time.

Terminal replacement did
not meet solicitation requirements

On the basis of the material reviewed, we believe that:

--Paradyne's proposal represented the P8400 as an already developed system.

- Although components of the P8400 existed on August 8, 1980, Paradyne did not have the integrated P8400 controller described in its proposal available for delivery at the time of the solicitation closing date (August 8, 1980), as required and as had been represented by Paradyne.
- Paradyne did not have the functioning P8400 controller described in its proposal available for OCD on December 15, 1980. Paradyne demonstrated a controller at the OCD that was based on components that were substantively different from what it had proposed; SSA officials were not aware of this substitution.
- The Paradyne P8400 was not a developed system until some time after adaptation of the operating system was initiated in March 1981.
- Paradyne did not have a functional encryption device that met SSA encryption requirements available for delivery at the time of the solicitation closing date (August 8, 1980).
- At the OCD, Paradyne did not have an operational encryption device.

PERSISTENT PERFORMANCE PROBLEMS
PLAGUED PARADYNE TERMINAL SYSTEMS
AND IMPAIRED SERVICE TO THE PUBLIC

SSA experienced persistent performance problems with its Paradyne terminal systems for at least two years after initial terminal installation, adversely affecting service to the public. To a large extent, solving these problems required Paradyne to modify the controller and associated software.

According to a document prepared by SSA's Office of Data Communications, significant problems were recognized by SSA technical personnel during acceptance testing and immediately after initial Paradyne installations began in the Baltimore, Maryland, area. The Paradyne terminals encountered significant performance problems during acceptance testing and, in fact, failed the first 10 days of acceptance testing. Acceptance testing was suspended and the performance requirements of the acceptance testing were renegotiated. Paradyne attempted a variety of technical "fixes" to correct these performance problems. For example:

- Paradyne delivered a modified memory board to SSA for testing in late July 1981. SSA testing indicated that this modified board did reduce the frequency of equipment

malfunctions and modification of previously installed field terminals began in August 1981.

--In early October 1981, Paradyne informed SSA that it had identified two additional causes for the equipment malfunctions the agency had been experiencing: (1) a timing problem with the central processing unit and (2) a problem with the floppy disk controller. Modifications to this equipment once again provided improved performance--but equipment malfunctions persisted.

During the spring of 1982, SSA's Office of User Requirements and Validation (OURV) visited a cross section of SSA field offices in an attempt to better understand the extent of problems experienced by SSA regional and district offices during terminal installation. OURV found that some of the serious problems experienced a year earlier during terminal acceptance testing remained a problem. Specifically, OURV found continuing problems with Paradyne-supplied controllers, printers, operating system diskettes, and card readers. OURV also reported problems with Paradyne maintenance--apparently Paradyne service personnel were initially untrained and were learning at SSA's expense. OURV concluded that the users of the originally installed terminals were dissatisfied with their performance, noting that all field offices and other users need to have data communications equipment which performs in a consistently satisfactory manner.

A December 1983 study conducted by SSA's Deputy Associate Commissioner for Systems Operations indicates that the Paradyne system did not begin to consistently meet the contractual 98 percent-availability requirement until April 1983. This study confirmed that SSA had experienced significant problems with the Paradyne equipment since it was first installed. Problems requiring corrective reboots (the reloading of the operating program into a system that has failed or malfunctioned during operation) arose immediately after initial installation and persisted through at least October 1983.

In attempting to correct the performance problems SSA was experiencing, Paradyne made numerous modifications to the hardware and software delivered with its terminal systems. SSA's Deputy Associate Commissioner for Systems Operations pointed out that as a result of these modifications, 21 terminal versions were installed at SSA locations within the first year and 25 different versions have been installed to date. As many as 8 versions were being installed or retrofitted¹⁵ within a given 30-

¹⁵Modified or changed in order to incorporate improvements into equipment, i.e., terminal systems, already in operation.

day period,¹⁶ and as many as 17 versions existed in the network at one time.

Paradyne's efforts to correct terminal operating problems have led to improved system performance. Analysis performed by SSA's Deputy Associate Commissioner for Systems Operations suggests that this improved performance is significant. Controller performance has improved dramatically since the most recent modification to the terminal system software. Since the fifth version of software was installed during October 1983, controller failure rates have improved significantly and terminal reboot rates have steadily improved. Reboots have declined from as high as 21,000 per month nationwide (when about 700 Paradyne terminals had been installed) to about 7,600 during July 1984 (when approximately 1,800 terminals were in use). Further, according to the Deputy Associate Commissioner's calculations, the Paradyne equipment has consistently met the contractual 98-percent availability requirement since April 1983.

Equipment malfunctions adversely
affected SSA's field office
operations and public service

In assessing the overall impact of terminal performance problems, merely measuring the extent to which contractual performance standards (e.g., system availability) are met provides a limited picture of performance. Such an assessment should also consider the adverse impacts of excessive rebooting and equipment failures on SSA field office operations and the quality of service to the public.

Although the need for frequent rebooting to maintain terminal system operations can be considered somewhat less of a problem than outright equipment failure, it nevertheless indicates poor "terminal health." Frequent rebooting has adversely affected field office operations, especially in SSA's New York and Boston regions and in the downtown Seattle and Oakland offices. The New York Region, for example, complained in September 1981 that, of its seven field offices in which Paradyne equipment had been installed, three were experiencing an average of eight to ten reboots per day. This caused extra work and much frustration for field office personnel. On the basis of recent visits to SSA field offices, OURV reported in July 1982 that frequent rebooting was still a major problem in the New York Region.

16 June 1982.

Frequent rebooting has impaired field office operations in two ways. First, most offices visited by OURV in the spring of 1982 reported that the loss of data from the terminal screen was the largest problem associated with rebooting, requiring rekeying of all such data. The specific impact of this problem at one office was reported in July 1982, at which time the office manager estimated not less than 8 hours a day wasted at key stations. He indicated that an office employee would often spend considerable time keying and proofing a full page of claims input only to have it wiped out by rebooting before it could be transmitted.

The second problem resulted from the need to reboot at night, when field office terminals are unattended. Such occurrences interrupted the receipt of high-volume overnight print traffic (e.g., replies to queries) by field office terminals. When this occurred, the print traffic had to be stored and received in the mornings, making terminals unavailable to transmit data and delaying query responses. Although SSA systems personnel in agency headquarters indicated in early 1982 that this was not a major problem because most offices would receive their print traffic backlog in less than one hour, regional office personnel considered the problem to be more serious. The Boston Regional Commissioner reported that a loss of 1 hour of valuable morning data communications time ultimately affects an office's ability to process other workloads. Philadelphia regional personnel noted in August 1981 that an overnight outage may cause a one day backlog in claims processing. The Office of Systems Operations reported in June 1982 that recent terminal modifications had eliminated the overnight reboot problem.

While the need to reboot can be caused by factors other than faulty equipment (e.g., operator failure to follow specified data entry procedures), SSA has stated that the overall decline in the number of reboots being experienced throughout the network is due primarily to Paradyne's installation of upgraded hardware, software, and firmware.

Excessive downtime caused by inoperative Paradyne equipment has been a serious impairment to public service. Although agency records we reviewed did not provide a comprehensive nationwide view or quantification of how equipment malfunctions have impaired public service, they do provide descriptions of how operations at certain individual field locations, such as the two discussed below, have been impaired.

In February 1982 the manager of SSA's Tampa, Florida, tele-service center¹⁷ reported that its Paradyne equipment had experienced 5 separate failures in the previous 9 days and that during the most current week, the equipment had been completely down for almost 2 days. The manager explained that not being able to access the system had caused major problems for the center, resulting in an increased workload for a staff already performing at peak levels, poor service to the public, and an increased number of abandoned calls.

In July 1982 the manager of SSA's district office in Fayetteville, North Carolina, complained that his staff was losing countless hours trying to wait on and work with equipment that was "non-functional too often." Specifically, he noted that due to equipment outages, office personnel

- had accumulated a 4-day DODI¹⁸ workload backlog and were receiving numerous inquiries daily on non-receipt of account number cards (requiring up to 15 minutes each to try to explain why an account number is delayed);
- had been unable since mid-June to perform benefit verifications for social services and housing authorities;
- were losing processing time every day, leading to delayed payments and associated inquiries;

¹⁷SSA teleservice centers receive and respond to general telephone inquiries from the public on social security matters (e.g., requests for account number applications, coverage information, benefit estimates, etc.), freeing district and branch office personnel to concentrate on outgoing calls, in-person interviews, and workload processing. Personnel at these centers service over half of the U.S. population, and often are the first and only contact the public has with SSA. The 34 centers across the country handle about 350,000 calls per week.

¹⁸Acronym for District Office Direct Input, a modified input method for the Social Security card issuance process. Implemented in early 1982, DODI cut average card issuance time from 30 days to 10 days by eliminating the mailing of card application forms and associated documentation from district and branch offices to an SSA data operations center (which had then keyed in selected data and transmitted it via the data communications network to the central computer facility for processing). (The primary function of SSA's three data operations centers is the keying of hardcopy data--e.g., W-2 earnings statements--for entry into SSA's data communications network.)

- were unable to input changes of address and other post-entitlement events in a timely fashion, causing non-receipt of checks and re-reporting of such changes by beneficiaries; and
- could not, in cases where beneficiary telephone inquiries required a system query, respond quickly enough to prevent the beneficiary from making a second call, often resulting in two field office personnel working on the same question.

He stated that the public was frustrated with the office and his staff was frustrated with the system and "snapping at each other."

Equipment performance problems probably contributed to the delay in field office automation

The 1983 SSA decision not to enhance the Paradyne terminals to provide local processing capabilities, as originally planned under the agency's Systems Modernization Program, reflected a change in the agency's approach to meeting its field office automation objectives under systems modernization. Under the new approach, SSA no longer plans to use the Paradyne terminals to support local office automation. Milestones for automating manual field office operations and processes (e.g., district office case management control, preparation of claims applications and earnings record requests, and benefit payment computations) have been significantly extended, and the associated operational savings and improvements will be substantially delayed.

SSA systems personnel have developed a new technical approach to providing field offices with local processing capabilities via the data communications network.¹⁹ They determined that this new approach was more in line with SSA's Systems Modernization Program, and would not only provide local processing capabilities cheaper and faster than by modifying the Paradyne terminals, but also offer more system flexibility. Systems

¹⁹SSA documents show that as early as February 1981 agency officials had identified a need to further study the question of which network component group (i.e. terminals, concentrators, etc.) would be used to provide the local processing capabilities.

officials therefore decided not to enhance the Paradyne terminals to provide processing capabilities at local offices.²⁰

Agency documents we reviewed concerning the rationale for this decision contained no specific statements that Paradyne equipment performance problems had any bearing on the decision. At about the time of the decision, however, agency systems officials were aware that the Paradyne equipment was experiencing significant operating problems. For example, a May 19, 1983, statement by SSA's Deputy Commissioner for Systems indicated that as of mid-April he had concluded that the Paradyne equipment was evidencing a significant systemic operating problem and he was personally not satisfied with the overall performance of the Paradyne terminal systems. In addition, between March 10 and May 10, 1983, the Office of Systems advised SSA's contract office that at least 43 different field offices across the country contained Paradyne equipment that had recently experienced levels of downtime considered excessive under the terms of the terminal contract.²¹

We believe that SSA's decision process for determining how best to provide local processing capabilities would have had to include the Paradyne terminal upgrade option among the alternatives. The reason: the upgrade option was actively being pursued up to the point of the decision not to use the Paradyne equipment for that purpose. Further, it is likely that, in considering the option, systems officials looked at how well Paradyne's equipment had been functioning, because doing so would be both logical and prudent in deciding whether or not the agency should invest substantial additional funds to enhance the Paradyne system.

²⁰We found no documentation providing a specific date on which this decision was made. It would appear, however, that it was finalized sometime between March 18, 1983 (at which time the agency was still stating its intent to upgrade the terminals to provide local processing capabilities) and May 10, 1983 (the date systems officials provided the rationale for the decision to SSA's Commissioner).

²¹These contract provisions (contained in paragraph G.4.8.2) state that if a rental machine becomes inoperative due to machine failure, and the total number of such inoperative hours exceeds 60 hours (between 8 a.m. and 5 p.m. local time, Monday through Friday, excluding holidays) over a period of 3 consecutive calendar months, the contractor shall--at the Government's option and at no additional cost--either (1) provide an on-site backup machine, (2) provide on-site technical support personnel, or (3) replace the malfunctioning machine.

Given that agency systems officials were aware of Paradyne equipment performance problems at about the time the decision was made (as described above), we believe these performance problems should have been, and probably were, taken into account in the decision to pursue a new technical approach for providing field office automation. These performance problems thus probably have contributed to the resulting delay in field office automation, as discussed below.

SSA is currently moving ahead with its alternative technical approach to field office automation. Utilizing the enhanced capabilities of its data communications network, SSA plans to pilot test automation of various local office terminal applications (including district office case management control, preparation of claims applications and earnings record requests, and benefit payment computations) no earlier than February 1985. SSA hopes to begin a phased implementation in all offices directly involved in the claims process in February 1986, with nationwide implementation expected by February 1988. This timeframe represents a slippage of approximately 3-1/2 years from the original target of September 1984, established in SSA's original modernization plan for automation of these initial local office terminal applications. Not satisfied with this completion schedule, the current acting Commissioner has begun new field office automation and management information initiatives, including the acquisition of personal computers, through which she hopes to accelerate field office automation objectives.

These delays in automating local field office workloads will cost SSA the anticipated savings in personnel costs for each year the agency's automation plans are delayed. An SSA budget justification document estimated yearly savings of 1,123 work years. In addition, delays in field office automation will likely delay anticipated improvements in SSA's capacity to service the public. For instance, SSA had planned that automation would allow SSA field representatives to quickly calculate estimated benefit payment amounts and provide this information to waiting clients. Under current procedures, estimating payment amounts sometimes requires SSA field workers to perform time-consuming, complex calculations and the results are not always timely. Similarly, the automated preparation of claims applications and earnings record requests is expected to speed up SSA's claims process.

MITRE's FINDINGS ON PARADYNE PERFORMANCE
ARE UNDERMINED BY DATA DEFICIENCIES

In May 1984, the MITRE Corporation issued its report on the reliability and maintainability of Paradyne equipment in the SSA's data communications system. MITRE evaluated the maintainability and reliability of the equipment and performance of contractor support services acquired from the Paradyne Corporation.

In addition, MITRE evaluated SSA's performance monitoring and record-keeping processes.

MITRE's evaluation disclosed serious deficiencies in SSA's performance data

MITRE's review of SSA's performance monitoring and record-keeping processes was thorough. MITRE made an initial sampling of source data collected from 55 of 1,300 field sites and found substantial inadequacies and inconsistencies in the field data when compared with data collected by the SSA central office in Baltimore. The inconsistencies in the initial data sample were so numerous that MITRE believed no supportable statistical inferences could be drawn. So, MITRE initiated a second analysis in late March 1984, using data from all 1,300 SSA field sites for the period July to December 1983. In this analysis, MITRE found numerous deficiencies and weaknesses in SSA's control over performance data (which are used to determine the equipment reliability) and contractor support.

The MITRE study's principal findings follow:

- In approximately 60 percent of all cases, Paradyne was responding to service calls within 4 hours of being notified of an equipment failure. Therefore, Paradyne was properly subject to credits called for under the contract in approximately 40 percent of the service calls.
- Approximately 65 percent of the equipment failures resulted in equipment being down 7 hours or less from the time SSA notified Paradyne of the failure. Thus, Paradyne was properly subject to credits called for under the contract for excessive unit down time in approximately 35 percent of the service calls.
- Average discrepancies of approximately 1/2 hour in service response time and 1/4 hour in unit down time per service call existed between SSA records and Paradyne records.
- SSA's central office did not provide adequate guidance or procedures to the field offices for verifying and validating contractor support and equipment performance data.

MITRE conclusions are compromised

The credibility of the conclusions reached by the MITRE study concerning Paradyne's performance are substantially compromised because SSA did not control or monitor the underlying performance data. MITRE found that 60 percent of the

source documents used to record equipment performance were illegible or missing and MITRE could not analyze the data.

When equipment failed, SSA notified Paradyne by initiating an Equipment Failure Report (EFR). SSA used a Field Service Report (FSR) to capture information on service calls. On the report, Paradyne recorded the time its field engineers arrived at the site to repair the equipment and the time the equipment was returned to service. Paradyne field engineers provided similar information to its headquarters using what is called a Return To Service (RTS) report.

SSA's computation of the service response time and unit down time associated with a service call and the aggregate availability of the equipment is made on the basis of entries made in the SSA data base (referred to as TRIDE). However, these entries are made by Paradyne personnel, indicating the time their field engineers arrived at the SSA site and the completion time of the service call.

MITRE had difficulty using SSA's copies of the FSRs and correlating the FSRs with Paradyne's entries in the SSA data base. In this regard, MITRE noted the following problems with SSA's procedures for completing FSRs:

- FSRs frequently were not filled out completely.
- Times recorded in the FSR frequently differed with times recorded in the RTS.
- There was no formal verification of the information Paradyne entered into the TRIDE data base with the official record (FSR) of the service call at the field site.
- The field site was not given a copy of the RTS to compare with the FSR.

MITRE noted additional problems attributed to Paradyne personnel:

- Writing was unclear.
- Copies were unreadable (writer did not press hard enough).
- Erroneous information was written on the form (e.g., incorrect EFR numbers were found on some FSRs).

- Response time was not consistent with the mileage or travel time reported (i.e., short response time, long travel time reported).
- Multiple EFRs were covered by one FSR.
- Multiple FSRs were covering one equipment failure report where a second field engineer was involved. Only the principal field engineer's FSR should be filed at the field office.
- FSRs were filed for cancelled equipment failure reports.
- Information on the FSR was incomplete or missing.

MITRE concluded that ". . . changes to the original concepts and procedures concerning this reporting have effectively eliminated the Government's ability to assure the validity of the data." It further pointed out that "SSA has left itself vulnerable by putting the final entry of the service call data into the contractor's control without maintaining adequate audit procedures."

MITRE also found that the lack of controls adversely affected the data's integrity. Less than 40 percent of the equipment failure reports in SSA's data base could be matched with complete FSRs--even after applying extensive data matching and reconstruction techniques. Consequently, over 60 percent of the data in the SSA data base had to be omitted from MITRE's analysis. MITRE concluded that, even though the FSR data was being used as an analytical tool, the accuracy of the data was still questionable.

MITRE accepted SSA's aggregate availability calculations without performing a complete analysis

Although MITRE was requested to assess all performance measures, it did not calculate the aggregate availability rates for the 6 months under review, nor did it completely analyze SSA's aggregate availability calculations. Instead, MITRE relied on SSA's existing calculations, which indicated that Paradyne equipment had met a standard of 98-percent availability for the period under study.

We were told by a principal author of the study that MITRE decided not to analyze availability data because it believed

- the collection and processing of the detailed data needed to independently assess availability would be difficult to accomplish within the timeframe of the study, and

--a full analysis would not produce data significantly different than SSA's own calculation.

This latter point was based on MITRE's examination of an "unscientific" sample of the data associated with approximately 50 service calls which had indicated "sufficient" agreement with SSA availability calculations.

In our opinion, this limited assessment did not provide sufficient basis for MITRE's accepting SSA availability calculations, especially in light of the serious data problems discussed above and the complexity of the calculations involved.

This calculation is complicated because it is based on (1) a precise identification of the failed unit and (2) knowledge of the effect of the unit's failure on the operational availability of other components of the system. The complexity is illustrated by SSA's admission that initially it had been making these calculations incorrectly (overestimating availability). Further, MITRE reported that "there are potential areas of disagreement between SSA and Paradyne...which are related to the definitions of whether equipment that is 'down' is operable or not."

Confidence level ascribed by MITRE to its equipment performance estimates is inappropriate

Although the assessment of Paradyne's performance against the measures of "service response time" and "unit down time" are probably as accurate as possible, given the deficiencies in the available data, the level of confidence ascribed by MITRE to these estimates is inappropriate.

MITRE was required by the terms of its contract to assure, with 95 percent confidence, that each of its estimates was within 2 percent of the true (but unknown) values that the study was attempting to estimate. This means that the estimates would have to be calculated from a probability (statistical) sample. The estimates contained in the MITRE study are not based on a probability sample but rather on a reconstruction of a portion (40 percent) of the universe of the 4,964 EFRs and resulting service histories during the period July to December 1983. Because this is not a probability sample, the use of confidence level statements and sampling error statements is both inaccurate and misleading. The statements give the study's "estimates" an aura of credibility, which they do not possess.

Whether or not MITRE's "estimates" are representative of the missing data items is impossible to determine. However, MITRE's own analysis shows no basis for making the assumption that the

useable data items are representative of the missing data, and in fact, suggests that the contrary might more likely be true.²²

Given the inaccuracies in the data, the large amount of omitted data, and the lack of assurance that the omitted data is similar to the useable data, MITRE's estimates of service response time and unit down time, in our opinion, should be viewed as best available rough estimates.

MITRE study may be subject to misinterpretation

Some characterizations of MITRE's findings are misleading. For example, the MITRE report has been interpreted to mean that Paradyne is in compliance with the terms and conditions of the contract. The MITRE report, in fact, states that "the Paradyne equipment is in compliance with the terms of the contract the majority of the time. When they are not in compliance, SSA is taking the appropriate steps to assess penalties against the vendor." Further, the supporting analysis indicates that this conclusion refers only to the maintainability standards (response time and return to service) of the contract and that, in fact, Paradyne is not meeting the stated contractual performance standards in these areas on 35 to 40 percent of the service calls.

A summary of the issues which, in our opinion, may be misunderstood follows:

- The key factor accounting for the difference in the conclusions of the MITRE study and a December 1983 study conducted by SSA's Deputy Associate Commissioner for Systems Operations is the time periods covered by the two studies. The MITRE study refers only to the period July

²²MITRE noted FSRs indicating that no problem was found by the Paradyne field engineer (which therefore could be billed to SSA by Paradyne) were more likely to be checked for accuracy and completeness than all other FSRs. Since in those cases no problem was found, one might assume that, on the average, the unit was returned to service more promptly than the calls which required repair actions. MITRE also noted that calls requiring the visit of more than one Paradyne field engineer and/or necessitating a wait for the arrival of parts were especially prone to be dropped from their analysis, due to the difficulties of correlating multiple, often imperfect, FSRs with the single service incident. Thus, we have the possibility that some incidents with longer down times (multiple visits) were more likely to be dropped from MITRE's analysis than some with shorter down times (no problem found). This would bias MITRE's estimates.

1983 to December 1983. It does not address any aspects of the performance of Paradyne's equipment prior to July 1983. In addition, MITRE relied on the same data base (TRIDE) as the December 1983 internal SSA study in reaching conclusions on aggregate availability. (SSA's internal study reported aggregate availability rates from July 1981 through August 1983. It showed that the contract standard for aggregate availability²³ was not met consistently until April 1983. MITRE's study--using SSA's data--states that the aggregate availability standard was met from July 1983 to December 1983.)

--The MITRE study compares Paradyne's performance only to the service response time and unit down time measures explicitly stated in the contract. It does not address the more general (unquantified) performance standards set

²³Under the terms of the Paradyne terminal contract, total equipment availability is required to be not less than 98 percent during any calendar month. During those months when availability falls below the 98-percent level, the agency is entitled to monetary credits.

forth in modification 4 of Paradyne's contract and agreed to by Paradyne on a "best effort" basis.²⁴

--Performance against the contract requirements is not necessarily the same as performance against current or future SSA mission needs. In our report, Social Security Administration's Data Communications Contracts With Paradyne Corporation Demonstrate the Need for Improved Management Controls (GAO/IMTEC-84-15, July 9, 1984), we were critical of the agency's solicitation as not necessarily reflecting its functional requirements. Thus, it is quite possible for the vendor to meet the explicit terms of the contract completely without the installed equipment adequately meeting the agency's mission needs.

--As has been noted above, the MITRE study does not contain the unqualified endorsement that Paradyne is in compliance with the terms and conditions of the contract. Rather, MITRE found that Paradyne is failing to meet contract maintainability provisions in 35 to 40 percent of the service calls.

²⁴"It is agreed and understood that Paradyne Corporation will exert its best efforts to insure that the SSA is provided a performance capability at least as fast as that currently being provided by the existing SSADARS terminals including, but not limited to the following areas:

- a. Paging of multipage screens.
- b. Delivery and display of the mask to the terminal and delivery and display of the edited data returned to a mask.
- c. The testing of SSADARS system and terminal features which are not included in the specification, such as:
 - (1) production CRT masks, and
 - (2) production card formats.
- d. Terminal CRTs must have the capability to transmit single page or multipage data input messages in unformatted mode.
- e. Terminal printers be capable of receiving page and multipage output data messages transmitted from the host computers.
- f. Terminal printers and CRTs be capable of receiving single page and multipage administrative messages in unformatted mode."

SSA OFFICIALS BELIEVED THAT
PARADYNE DEMONSTRATED OR DESCRIBED
WHAT HAD BEEN PROPOSED

SSA's solicitation required each vendor to structure its own operational capability demonstration (OCD) to validate that the equipment proposed met SSA requirements. If the vendor's existing hardware and software components required enhancement or modifications to meet specific requirements which would make testing difficult or impractical, then the vendor was allowed, with government approval, to substitute written analysis for actual tests of the product's ability to meet those requirements. The Paradyne OCD was conducted on December 15, 1980 at the corporation's plant facilities in Largo, Florida. Five SSA employees observed the demonstration to validate that Paradyne's proposed equipment satisfied SSA's stated requirements.

SSA officials believed Paradyne
demonstrated its P8400 controller

The proposal submitted on August 8, 1980, by Paradyne in response to SSA's solicitation listed a model P8400 controller/processor. As part of the OCD, Paradyne was supposed to demonstrate the capabilities of the proposed controller equipment.

According to sworn statements,²⁵ SSA officials observing the OCD believed that Paradyne demonstrated the proposed model P8400 controller unit.²⁶ Yet a former Paradyne employee who worked on the model P8400 prototype project, in a sworn statement, testified that another Paradyne employee who had participated in the OCD said "We...really put one over on the boys from SSA," referring to Paradyne's substitution of DEC equipment for the P8400 controller (see p. 5) and other Paradyne actions at OCD.

On the basis of these sworn statements, we believe that the SSA officials who observed the OCD may not have been aware that Paradyne had demonstrated controller equipment it had not proposed. Furthermore, SSA officials would have had great difficulty detecting such a substitution.

No evidence that Paradyne
demonstrated an encryption device

Paradyne had proposed an encryption device that implemented the National Bureau of Standards (NBS) Data Encryption algorithm and complied with other federal telecommunications standards. The

²⁵All testimonial information presented hereafter is based on sworn statements.

²⁶One of the five SSA officials could not remember.

data encryption device was an optional deliverable in SSA's solicitation document; that is, it was mandatory that the competing vendors propose a data encryption device, but optional that SSA take delivery on the device. The competing vendors were required to demonstrate all equipment proposed by exercising the equipment or substituting written analysis.

On the basis of sworn statements of the five SSA officials observing the OCD, we find no evidence that Paradyne demonstrated its proposed encryption device by exercising it.²⁷ Two of the SSA officials stated that Paradyne provided a technical presentation on the capabilities of the encryption device, but did not demonstrate it. Both of these officials saw a picture and/or an actual cabinet which indicated what the device would look like. One SSA official stated that the OCD checklist showed that the encryption device satisfied SSA's requirements. Two SSA officials did not remember whether the encryption device was or was not demonstrated.

The five SSA officials provided conflicting statements about whether Paradyne represented the encryption device as being operational. One SSA official stated that the device was not represented as being operational during OCD. He further stated that "a technical discussion regarding the particulars of how the device would be built using commercially available subcomponents constituted the demonstration." One SSA official stated that the encryption device was represented as being operational. He stated that "Based on the [Paradyne] presentation given, it was in my mind I understood that Paradyne has or at that point in time had a working encryption device. The only thing that they didn't have was NBS certification...." When referring to a discussion with members of the OCD team about the possibility that Paradyne would not have an NBS-certified encryption device by the delivery time, he stated "If not, I have a recollection of them [Paradyne] stating that they would provide the Motorola encryption device if it was not ready [NBS-certified] by that time." Another SSA official stated he thought the device was operational. The fourth SSA official stated that he did not recall whether the Paradyne proposed encryption device was operational during the OCD. And the fifth SSA official did not know whether the device was operational because he did not remember seeing the device during the OCD.

On the basis of sworn statements of SSA officials, we find no evidence that Paradyne demonstrated (exercised) its proposed encryption device during the OCD. It appears that SSA accepted a technical presentation as satisfying the OCD's requirements. There is conflicting evidence as to whether Paradyne represented the encryption device as operational during the OCD. It should be noted that Paradyne's proposal described an operating encryption device that uses the NBS Data Encryption Standard algorithm.

²⁷Paradyne has conceded that the encryptor was not operational (see p. 5).

PARADYNE'S CASH-FLOW PROBLEM AS A FACTOR
IN SSA'S DECISION TO PURCHASE TERMINALS

The terminal system contract with Paradyne is a lease-with-option-to-purchase agreement--which provides that SSA will accumulate purchase option credits at a rate of 76 percent of monthly lease costs up to 80 percent of the purchase price of each terminal system. Under the contract, the maximum credits would be reached 24 months after the first terminal system was installed and operating (June 1, 1981) and would remain available until either SSA bought the terminal systems or the contract expires.

According to sworn statements made by SSA officials,²⁸ Paradyne's alleged cash-flow problem²⁹ was discussed in a June 24, 1982, meeting on the computer systems budget. One of the purposes of the meeting was to determine whether to exercise the lease-to-purchase option on Paradyne terminal systems. Twelve SSA officials attended the meeting, and 3 have stated that the cash-flow issue was brought up by the then Associate Commissioner for Systems Integration (hereafter referred to by his current title, Deputy Commissioner for Systems). The remaining participants, including the Deputy Commissioner, could not remember whether Paradyne's cash-flow problem was discussed. However, the Deputy Commissioner stated that he had heard of Paradyne's cash-flow problem from the Director of the Office of Systems Engineering,³⁰ but denies that Paradyne's cash-flow problem was a factor in the purchase decision.

Although Paradyne's cash-flow problem apparently was discussed, the primary factors discussed in the meeting to determine whether to purchase selected terminal systems were

- poor performance of the Paradyne terminal systems,
- substantial economic savings available to SSA by exercising the purchase option,

²⁸All testimonial information presented hereafter is based on sworn statements.

²⁹By exercising the purchase option, SSA would provide Paradyne with a large infusion of cash that would help reduce Paradyne's alleged cash-flow problem.

³⁰In February 1984, the Director of the Office of Systems Engineering was charged with attempting to extort more than \$400,000 from a California software company in return for assurances that the firm would be selected as a subcontractor on a \$4 billion software contract to be awarded by Paradyne. This activity allegedly took place during 1981 and 1982.

--difficulty of accomplishing the purchase before the end of fiscal year 1982, and

--availability of funds to exercise the purchase option in fiscal year 1982.

The decision reached by the SSA officials attending the meeting was to not exercise the lease-to-purchase option during fiscal year 1982. The decision was heavily influenced by poor terminal system performance. The Associate Commissioner for Systems Operations believed that, if SSA exercised its purchase option in fiscal year 1982, it would not have much leverage over Paradyne to resolve the performance problems.

Subsequent to the meeting, the Deputy Commissioner for Systems decided to purchase 841 leased terminals already installed in SSA offices for about \$15.9 million. He stated that the decision was made after receiving a supplemental appropriation in late August or early September 1982. He further stated that the purchase decision was made "after considering several factors which included a review of a financial analysis and the availability of funds given to me by the [SSA] financial people, the [SSA] contracts people, etc. on the pro's and con's of purchasing Paradyne terminals." The purchase order was signed by the Deputy Commissioner for Systems on July 27, 1982, and by the Director of the Office of Systems Engineering on July 13, 1982. The Associate Commissioner for Systems Operations, who strongly argued against purchasing the terminals because of performance problems, stated that he did not know the decision to purchase the terminals had been made until he saw the signed purchase order several weeks after the June 24, 1984, budget meeting.

We cannot determine whether Paradyne's cash-flow problem was a significant factor in determining when and whether to purchase the terminal systems. We can only note that the cash-flow problem was discussed at the June 24, 1982, budget meeting where the decision was reached not to exercise the purchase option during fiscal year 1982. The Deputy Commissioner for Systems, who allegedly brought up the cash-flow issue at the budget meeting, subsequently made the decision to purchase the terminal systems. He denies that Paradyne's cash-flow problem was a factor in the purchase decision. The purchase order was signed by both the Deputy Commissioner and the Director of the Office of Systems Engineering, who brought Paradyne's alleged cash-flow problem to the attention of the Deputy Commissioner.

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The Honorable Charles A. Bowsher
 Comptroller General
 General Accounting Office
 Washington, D.C. 20548


Dear General:

As you know, on August 2, 1984, the Committee held hearings on the issues addressed in your report on the Social Security Administration's (SSA) management of data communications contracts with Paradyne Corporation (GAO/IMTEC-84-15). During the hearing, it became clear that certain areas related to your investigation were not completely covered by the report. Since it is crucial that the Committee obtain a complete picture of what transpired during the solicitation, award and subsequent performance of the contract, these areas need to be more fully explained.

In this regard, I anticipate that the Committee will be preparing its investigative report on these matters in the very near future. To facilitate this effort, I am requesting that GAO provide the Committee with additional information absolutely no later than August 27, 1984. These include (1) the identification and comparison of the equipment Paradyne represented to SSA in its proposal, demonstrated prior to award, provided for acceptance testing, and subsequently delivered for installation; (2) an assessment of the performance of Paradyne's systems from time of installation to the present, including the impact on SSA's ability to effectively perform its mission; (3) an assessment of the accuracy and completeness of MITRE's report on Paradyne's performance under the contract; and (4) a determination of whether SSA officials or employees were aware that prototype systems, using another manufacturer's equipment and an encryption device containing nothing more than blinking lights, were demonstrated by Paradyne prior to contract award. Your assistance in fulfilling this request is appreciated.

With best wishes, I am

Sincerely,



JACK BROOKS
 Chairman