The Honorable Lowell Weicker, Jr.
Chairman, Subcommittee on Labor,
    Health and Human Services, and Education
Committee on Appropriations
United States Senate

The Honorable William Proxmire
Ranking Minority Member
Subcommittee on Labor, Health and
    Human Services, and Education
Committee on Appropriations
United States Senate

The Honorable Lawton Chiles
United States Senate

Subject: Social Security Administration's Progress in
Modernizing Its Computer Operations
(IMTEC-85-15)

In your November 30, 1984, letter (encl. II), you asked us to report on (1) the flexibility\(^1\) of the Social Security Administration's (SSA's) computer system to handle legislative changes promptly and efficiently and (2) the security of the system. Related to these two issues, you also expressed particular concern about a shift in emphasis and direction of SSA's Systems Modernization Plan (SMP),\(^2\) whether the agency's existing system is adequately documented to permit the development of an improved new system, and SSA's failure to assign personal identification numbers to trace individual

\(^1\)In this case, "flexibility" means SSA's ability to change existing computer systems or build new ones promptly, accurately, and efficiently to respond to new legislation.

\(^2\)A major project to upgrade SSA's computer systems. (For details, see p. 3).
transactions. Finally, you asked that we investigate SSA's implementation of the 1099 reporting requirement\(^3\) as a "test" of the system's current legislative flexibility.

We found that SSA has made insufficient progress in improving the flexibility of its computer system to accommodate changes required to respond to new legislation. We also found that SSA's existing computer system is still vulnerable to fraud.

**COMPUTERS PLAY A SIGNIFICANT ROLE IN HOW SSA DOES ITS WORK**

SSA relies heavily on computers to help meet the needs of program beneficiaries and wage earners. In fiscal year 1984, SSA used computers to maintain records on about 250 million people, pay about $163 billion to about 39 million beneficiaries in two of its major programs, and record the earnings of about 60 million wage earners.

According to the 1982 SMP, SSA had historically been unable to keep up with rapidly advancing computer technology. The SMP noted that SSA's systems had become obsolete and difficult to maintain and adapt, and were vulnerable to failure. SSA's computer systems were also deficient in protecting funds from fraud and personal data from unauthorized use. System deficiencies were apparent in all aspects of SSA's automatic data processing (ADP) environment, including software and hardware. The potential and/or actual consequences of these system deficiencies included grave risk of failing to pay Social Security benefits to the public, inadequate responsiveness to legislative changes, exposure to risk of fraud and privacy violations, and inadequate services to the public. SSA cited examples of inadequate services to the public in the 1982 SMP: (1) delayed posting of earnings information for up to 3 years and (2) slow issuance of Social Security cards, with persons complaining of losing job opportunities because they did not get cards soon enough.

SSA's software problems, which seriously affected flexibility, were primarily a result of (1) the agency's longstanding practice of modifying existing programs only to the extent necessary to implement a given change, (2) a lack of redesign to take advantage of modern technology, and (3) an absence of adequate documentation. Consequently, SSA's

\(^3\)The 1099 project (which responds to Public Law 98-21, enacted April 20, 1983) requires SSA to issue annual reports to beneficiaries and to the Internal Revenue Service on its payments to beneficiaries, since such benefits can now be included in calculating taxable income.
software, as it existed in 1982, was enormously complex, inefficient, and expensive to maintain. These conditions made it difficult for SSA to respond to legislative changes promptly, effectively, and efficiently and to make necessary security improvements to its system.

SSA's ADP problems were compounded by outdated and unreliable computers and support equipment and by the equipment's inadequate capacity. As a result, SSA encountered production backlogs, expensive labor-intensive operation and maintenance of systems, and inadequate computer capacity for developing new systems.

In 1982, the Congress approved the SMP, and implementation was initiated. The SMP, an about $863 million project scheduled for completion in 1989, is expected to correct the agency's ADP problems, establish effective management practices, and install state-of-the-art technology. (The 1982 SMP identified the cost as approximately $500 million and the completion date as 1987.) According to SSA, the plan is also intended to restore SSA to a model of efficiency in systems operations and to enable SSA to respond promptly to new legislation, safeguard funds and personal data, and perform routine processing more quickly and more economically than it has in the past.

The SMP is divided into the following four programs, each of which includes tasks that need to be completed if SSA is to achieve the plan's established goals.

**Capacity upgrade:** Purchase computers and peripheral equipment to replace the inadequate hardware and to correct problems caused by insufficient and obsolete hardware.

**Data communications utility:** Build a modern telecommunications system that would make the automated systems interactive, thus providing quicker service to the public.

**Data base integration:** Move the data files from a slower recording medium (tape) to a faster one (disk); document, organize, and redesign SSA's data bases; and eventually move to a state-of-the-art environment in managing data, which would be more responsive to change and better protect the data.

**Software engineering:** Establish an incremental process through which SSA would first document and analyze its existing software and then develop new software and systems to replace inefficient software.
Generally, we believe the 1982 SMP approach was an excellent necessary first step toward achieving legislative flexibility and improved security; however, we found that the SMP needed improvement in some areas. Specifically, in 1982 we reviewed the SMP and concluded that it presented a logical, systematic approach for solving SSA's pressing ADP problems. We said that better software documentation standards and practices would address SSA's problems in developing software and systems if criteria for these standards and practices were strictly followed. We also observed that the SMP was not specific in how it would provide improvement in the areas of privacy protection and security. Foremost among our security concerns was the SMP's lack of a specific provision for incorporating a personal identification number into the agency's telecommunications software to identify all users and trace all transactions entered into the system. We concluded that using personal identification numbers could have helped trace and prevent crimes perpetrated by SSA employees.

Since our 1982 report, the Senate Appropriations Committee has asked SSA to take action regarding legislative flexibility and security. In Senate Report 97-680, dated December 13, 1982, for example, the Committee expressed concern that the SMP contained no flexibility to accommodate major legislative changes; it asked SSA to modify the SMP to provide for such flexibility. In the area of security, the Committee directed that SSA include improved security measures, such as issuing personal identification numbers to system users.

As recently as June 1984 (Senate Report 98-544), the Committee reiterated that it "remained highly interested in the...capacity of the system to accommodate legislative changes," and again directed SSA to provide a personal identification number for each transaction performed on the computer.

SSA planned to issue annual updates to the 1982 SMP to reflect progress and strategy in achieving its objectives. The latest revision, which is dated January 1985, revealed a shift in the agency's strategy for improving its software. Further, while both the 1982 SMP and the 1985 update mention increased ability to modify SSA systems and improved system security, neither is explicit about expected improvements.

4Examination of the Social Security Administration's Systems Modernization Plan (GAO/HRD-82-83, May 28, 1982).
OBJECTIVES AND SCOPE

Enclosure I details our objectives and scope, as well as describes our methodology. Briefly, our assessment took us into SSA's extensive computer system. However, we limited our work to assessing SSA's progress, primarily under the SMP, in making improvements in legislative flexibility and security. To that end, we evaluated the agency's overall progress with making its software more responsive to changing legislation, but we did not analyze in depth the more than 65 individual software-related tasks that were listed in the 1982 SMP. We assessed SSA's overall progress with documenting existing systems. We also evaluated the degree to which the 1099 project tested SSA's ability to respond to new legislation. In ADP systems security, we focused our review on SSA's progress in assigning personal identification numbers for individual transactions.

We performed our work in accordance with generally accepted government auditing standards. Although we sought the views of responsible SSA officials during the course of our work, at your request and due to time constraints, we did not ask SSA to review and comment officially on a draft of this report.

MORE IMPROVEMENTS NEEDED IN LEGISLATIVE FLEXIBILITY AND ADP SECURITY

As shown in the 1982 SMP, SSA needed to significantly improve its computer system (both hardware and software) to better respond to legislative changes and provide system security. Our current assessment of SSA's progress since 1982 disclosed the following:

--SSA has made significant progress in addressing and overcoming its hardware deficiencies, primarily by acquiring new computers and converting its data files from tape to disk.

--The goals of modernizing data communications and data base management have been delayed.

--SSA has made insufficient progress in improving its software. Contrary to its recognition (in the 1982 SMP) of the need to redesign its software in a three-level evolutionary approach, SSA (as disclosed in the 1985 SMP update) is now pursuing a different, potentially higher-risk approach to software improvement. As part of this new direction, the agency no longer plans to perform in-depth documentation of its existing programs and is beginning major system redesign efforts without having implemented software standards.
The 1099 implementation, while completed on time, required SSA to create a new system and only partially demonstrates an improved capability to respond to legislative changes that require modifying existing computer systems.

SSA's automated systems remain vulnerable to fraud, although some security improvements have been made.

Each of these issues is discussed in the following sections.

Varied progress in certain areas of the SMP

SSA has realized varying levels of progress in three of the four programs included in the 1982 SMP: the capacity upgrade program, the data communications utility program, and the data base integration program. The fourth, the software engineering program, is the most critical to legislative flexibility and system security and is discussed on page 7.

In the capacity upgrade program, we found that SSA has met most of its objectives of replacing the inadequate hardware and correcting related problems. In the data communications utility program, SSA has completed most of its planned tasks; however, according to an SSA official, a delay in the purchase of communications processors is possibly causing the delay of other SSA projects that depend on the new data communications utility. Regarding the data base integration program, SSA has successfully converted the data files from tape to disk and has done so approximately on schedule. This conversion will enhance overall system responsiveness. SSA has also made significant progress in gaining control over the existing data base. However, a recently issued solicitation for contractors to design the new data base architecture was found to be overly ambitious by the industry--a number of firms refused to bid, and the request for proposal was withdrawn. An SSA official advised us that SSA expects to reissue a data base solicitation soon. We believe that this may delay the redesign.

Little improvement in SSA's ability to incorporate legislative change into existing systems

For SSA to respond to continuing Subcommittee and GAO concerns about promptly, accurately, and efficiently handling new legislation or changes in existing legislation, it must have adequate hardware capacity and quality software. Although SSA has succeeded in upgrading its hardware under the capacity upgrade program, it has made little progress in improving its ability to respond to legislative changes that require software modifications to existing systems. This situation has occurred primarily because the agency has not achieved its software improvement goals as outlined in the 1982 SMP.
of Standards publications define quality software as being well-documented, structured, and modular. Quality software provides easier recognition and accomplishment of any changes needed, particularly those resulting from new legislation.

Regarding well-documented software, the SSA Commissioner observed in 1981 that the lack of adequate documentation for SSA's programs hampered systems personnel in their effort to understand and modify the agency's software. The Commissioner identified three problems that SSA faced because of this weakness: (1) increased cost for additional computer time needed to operate inefficient software, (2) expensive software maintenance costs, and (3) limited ability to modify existing programs when changes were needed.

The 1982 SMP highlighted the importance of SSA's need to document its existing software to make the software easier to change and to build a strong foundation for designing and building new systems. To accomplish these goals, the fourth program of the SMP--the software engineering program--was established to improve the software environment. Under this program, SSA would document and analyze its existing software and then develop new software and systems to replace the inefficient software.

The 1982 SMP software engineering program consisted of three major levels to be completed by 1987. In level one, the agency planned to develop software standards. Once standards were completed, SSA planned, in level two, to improve its existing software to meet the established standards. Further, as part of the level-two effort, SSA intended to completely document all existing programmatic software. After completing the first two levels, SSA planned to build new systems that would take advantage of the new technology and improve system performance. In our 1982 report, we generally agreed with the concept but concluded that the 1987 completion date was optimistic.

The 1985 SMP update disclosed, and our analysis confirmed, a significant redirection in SSA's approach to software improvement. We found two major changes in the agency's approach. First, SSA modified its overall approach by initiating system redesign efforts (level three) before completing the standards planned in level one and the improvements planned in level two. Second, according to SSA, it decided not to fully document all existing software programs (an original level-two objective) because of resource limitations and other higher priority work.

By redirecting its approach, SSA appears to have reversed its stated 1982 SMP objective of "documenting its existing software to make the software easier to change and to build a strong foundation for designing and building its new system."
We believe that this new approach carries high risk and could result in SSA's continuing to have a software system that cannot adequately respond to legislative changes. Under the new approach, SSA will risk not correcting the software deficiencies that the 1982 SMP identifies as the basic cause of SSA's computer problems.

After reviewing the 1985 SMP update, the General Services Administration expressed similar concerns about the software engineering program. General Services cited a lack of proper priority given to software, a lack of central software focus, and a lack of understanding about the nature of software problems. It further concluded that one reason for SSA's software modernization problems was that SMP management did not understand the causes of the problems and therefore could not define their solution. Specifically, General Services observed that the current plan for redevelopment was "unrealistic" and "dangerous without instituting a proper software environment", and recommended that SSA (1) establish a single focus for software activities, (2) not pursue new programs until its software program was under control, and (3) accord software technology more priority. General Services cautioned that the de-emphasis of up-front investments in software would result in continued problems in controlling and maintaining existing software, higher risks, and greater delays in fielding the new system.

The 1099 implementation does not necessarily demonstrate an improved ability to modify existing software

The Social Security Amendments of 1983 (Public Law 98-21), enacted on April 20, 1983, provided for taxation of the Social Security payments of beneficiaries whose income exceeded certain thresholds. As a result of the law, SSA was required to, beginning in January 1984, record payments made to beneficiaries and provide annual reports of total payments both to beneficiaries and to the Internal Revenue Service. The first annual reports under the new law were issued in January 1985. This was a significant legislative change, but accomplishing the change did not sufficiently test SSA's ability to modify existing systems because it was accomplished principally by new development. Specifically, to implement the new law, SSA had to build a new data base to accumulate beneficiary payments, build new computer programs, and modify those existing programs that involved beneficiary payments. SSA delivered information about benefit payments (the objective of the 1099 requirement), on schedule, to approximately 40 million beneficiaries with relatively few complaints about the reports' accuracy.

We believe that SSA's actions in responding to the requirements of the 1099 legislation emphasize the trade-off required by an agency attempting to overcome an obsolete computer environment. According to SSA officials, to develop
and test software programs and place them into production to implement the legislation, SSA had to divert about 40 highly experienced computer programmers from other assignments, including the SMP. These personnel, therefore, were prevented from working on SMP software improvements and redesign projects. Determining the true extent of the legislation's impact on the SMP is difficult because we were unable to assess exactly how much effort was diverted from the SMP projects. As stated in our 1982 report, SSA officials told us that any major legislative change enacted during SMP implementation would adversely affect SMP efforts. Other SSA officials recently told us that new legislation could still negatively affect SMP efforts. We believe that, until SSA creates a proper software environment, however, it will not have the flexibility to efficiently and effectively implement the requirements of some new legislation.

SSA's automated systems remain vulnerable to fraud

To effectively exercise its stewardship over the Social Security trust funds, SSA must ensure that the funds are administered in a manner that reduces vulnerability to fraud, waste, or abuse. The Privacy Act of 1974 requires SSA to protect the privacy, confidentiality, and integrity of personal data collected and maintained on about 250 million individuals. Even though SSA has improved its audit trail, it can take additional steps to strengthen security.

Information security in a computer environment must be approached from this perspective: each function in the environment requires a separate set of controls that collectively must operate as a total system of controls. Without these controls, there is the potential for fraud. SSA has a nationwide system with numerous field offices in which fraud could be committed by many people who directly or indirectly come in contact with the system.

We believe that one effective control technique for improving systems integrity and deterring and detecting fraudulent or abusive activity is the use of a personal identification number. Such a device facilitates identification of employees who were involved in processing transactions and controls who is permitted access to data files and operational processes.

In response to our 1982 report and to subsequent Committee directives, SSA has established a technique called "log-on/log-off"--an automated audit trail by which all transactions that enter data into the system can be attributed to a particular individual's personal identification number. Although this was the extent of our 1982 recommendation, we now see the need to go further and create an expanded transaction audit trail. This requires being able to trace authorization,
as well as data entry, and to require authorizers of transactions to certify them. The present identification number does not (with the exception of one system that processes emergency payments) provide information regarding the identity of the SSA employee who authorized the transaction.

Despite SSA's improvements in systems security, the agency is still vulnerable to fraud perpetrated by systems users. The Department of Health and Human Services' Office of Inspector General, for instance, issued a report in 1984 that reflects examples of continuing fraudulent schemes perpetrated by SSA employees with access to system processes and records:

--An SSA claims representative (by preparing and authorizing input documents) was convicted for filing claims for more than 20 fictitious people. The loss was estimated to be about $300,000.

--An SSA employee was sentenced to 3 years in jail for issuing Social Security checks to himself.

--Ten persons were arrested in a scheme to sell Social Security cards to illegal aliens. These 10 people, 4 of whom were current or former SSA employees, were charged with conspiracy to bribe SSA employees into issuing valid cards to illegal aliens.

An effective audit trail (as we recommend on page 12) should reduce both the occurrence of such cases and SSA's vulnerability in general. We believe a system that identifies transaction authorizers (in addition to the log-on/log-off technique) would deter fraud because of the following:

--A transaction authorizer must certify to the accuracy of transactions attributed to his personal identification number, thus permitting timely detection and elimination of unauthorized transactions. The log-on/log-off technique does not permit such detection.

--A perpetrator would have to know and use a legitimate personal identification number and would risk detection by the system feedback mechanism.

SSA recognizes the importance of establishing an audit trail capable of identifying transaction authorizers and plans to use such a technique in its future system. The agency, however, has taken no action to implement this type of personal identification number technique in its current operating environment (with the exception noted above). SSA contends that it would be too significant an undertaking to implement on a
system scheduled to be replaced. We disagree with SSA's position and believe that the continuing lack of an automated audit trail that identifies authorizers of transactions represents a security weakness that the agency must eliminate, in view of the length of time it must operate under its current system.

CONCLUSIONS

Since the SMP began, SSA has made varying degrees of progress in overcoming its computer system deficiencies. Although the agency has made good progress in overcoming its hardware deficiencies, it has not been able to meet its software improvement objectives. Moreover, the 1985 SMP update reflects a major shift from the agency's 1982 approach for overcoming a deficient software environment. As a result, SSA is now redesigning some of its software before thoroughly documenting and analyzing its existing system--a step that the 1982 SMP identified as necessary before SSA could start its redesign efforts.

We believe that the approach laid out in the 1982 SMP is basically a sound way to achieve SSA's software goals. We stated in our 1982 report that the SMP deadlines for complete implementation were overly optimistic. We are concerned that SSA has decided to abandon this approach without adequately reassessing the consequences of the new direction. An adequate reassessment, in our view, must include a comprehensive risk analysis to determine the appropriateness of altering the course established in 1982. Nevertheless, the basic fact remains that SSA will not achieve the desired legislative flexibility until effective implementation of the software program is completed.

In our view, SSA's implementation of the 1099 reporting requirement was not a complete test of the agency's ability to change existing systems because it was principally done by building new systems.

We believe that SSA's establishment of a "log-on/log-off" procedure has been responsive to GAO concerns and to Committee directives and has helped to improve security in the agency's automated systems. However, further corrective action is now needed. A process wherein authorizers must certify the validity of their transactions is necessary for an effective audit trail. Although agency officials point to their plans to

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SSA estimates that its replacement communications system will be available in the late 1980s. We believe, however, on the basis of numerous discussions with cognizant officials, that SSA will be using its current system exclusively or in conjunction with its new system for 7 or more years.
incorporate a complete identification and control system in the future, we are concerned that it may be 3 to 7 years before such a system is available. In the meantime, security weaknesses will continue.

RECOMMENDATIONS

We recommend that the Secretary of the Department of Health and Human Services direct SSA to do the following:

--Conduct a comprehensive risk analysis of the 1985 changes made in the SMP software engineering program. Such an analysis should (1) include a discussion about how this redirection will improve SSA's ability to more timely and efficiently complete the SMP software program, and (2) address possible risks associated with diverting resources away from documenting and improving existing systems, and with taking a less structured approach to software development.

--Implement an audit trail capability in the current operation system that identifies authorizers for all transactions. Further, the system developed to meet this requirement should provide feedback through which transaction authorizers are informed (after transactions have been entered into the system) of all transactions attributed to their personal identification numbers. Finally, those authorizers should be required to certify the accuracy of any transactions attributed to their personal identification number.

--Promptly report to the Committee (1) the results of SSA's risk analysis and (2) progress on implementing an audit trail.

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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.

Warren G. Reed
Director
OBJECTIVES, SCOPE, AND METHODOLOGY

Regarding legislative flexibility, our objective was to determine whether SSA has improved its computer hardware and software to the point that new legislation can be implemented promptly and efficiently.

We did not analyze in depth the more than 65 software tasks listed in the 1982 SMP. Rather, we evaluated SSA's overall progress in improving software. We also examined SSA's 1099 project to better understand how hardware and software improvements have helped the agency to meet its 1099 reporting requirement.

To assess SSA's progress in improving legislative flexibility, we interviewed officials in SSA's Office of Systems and compared the agency's 1982 SMP to the 1985 SMP update and analyzed the potential impact of the changes in approach identified in the software improvement area. We also assessed specific examples of SSA in-house and contractor software efforts. In addition, we met with officials identified by SSA as instrumental in implementing the 1099 legislation. To assess SSA's progress in making its systems easier to modify, we inspected selected computer programs. Additionally, we discussed the status of SSA's software management practices and software improvement efforts with selected SSA officials and software contractor officials, and reviewed documents including published SMP planning documents, project documentation, contract documents, and correspondence.

In the area of systems security, our objective was to determine whether SSA had assigned or intends to assign personal identification numbers on a transaction basis, as directed in Senate Report 98-544. We also examined steps taken by SSA to guard against fraudulent transactions throughout the automated systems.

To assess SSA's progress in security, we interviewed officials in SSA's Office of Systems and Office of Assessment and its Regional Security Officer, as well as staff members in Philadelphia, Pennsylvania. We reviewed security-related documents provided by these sources. Moreover, we met with officials of the Department of Health and Human Services' Office of the Inspector General in Baltimore, Maryland, and Office of Investigations in Philadelphia, Pennsylvania. Finally, we attended SSA's annual security conference in August 1985.

Our assessment also included (1) a limited review of related reports done by Health and Human Services' Office of Inspector General in January, February, and June, 1985; (2) an examination of SSA's March 1985 response to Senate Report 98-544; and (3) a review of an informal March 1985 summary of
SMP's status by a General Services Administration official who advised SSA on the original 1982 SMP.

We conducted our review at SSA Headquarters in Baltimore and SSA's Philadelphia Regional Office from December 1984 to August 1985.
November 30, 1984

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

Dear Charles:

For the past two years your agency has been monitoring the progress of the Social Security Administration’s Systems Modernization Plan for several committees of Congress, including the Labor-HHS-Education Appropriations Subcommittee. As you know, we have been particularly interested in two things: the flexibility of the computer system to handle legislative changes promptly and efficiently, and the security of the system.

The information GAO has provided the Subcommittee has been very useful in pursuing these issues. At this point, we feel that it would be helpful to have a formal report on each of these aspects. As per discussions with your staff, we would like to request briefings on the status of your findings in both areas during February, a report with recommendations by the end of April, and a similar report on flexibility by the end of June. A combined report is acceptable if received during the month of May.

There are several matters of particular concern to us at this point. SSA seems to be shifting its emphasis and direction in annual SMP revisions to the extent that Congress cannot monitor the progress of the original plan. In the area of security, the agency has not yet implemented the Personnel Identification Number (PIN) system on a transaction basis. As for flexibility, the existing system does not seem to be adequately documented to permit development of an improved new system. Implementation of the 1099 reporting requirement would seem to be a good “test” of the current legislative flexibility of the system. We request GAO to investigate these issues, and where possible, draw conclusions and make recommendations for the Subcommittee.

We appreciate your continued helpfulness in this regard.

Sincerely,

[Signature]

WILLIAM PROXMIRE
Ranking Minority Member

LOWELL WECKER, JR.
Chairman, Labor-HHS-
Education Appropriations
Subcommittee

[Signature]

LAWTON CHILES
United States Senator