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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D.C. 20548

B-201668

May 28, 1982

The Honorable Lawton Chiles
United States Senate

Dear Senator Chiles:

Subject: Examination of the Social Security Administration's Systems Modernization Plan (GAO/HRD-82-83)

In response to your March 9, 1982, request (see enc. I), we conducted a limited review of the Social Security Administration's (SSA's) Systems Modernization Plan (SMP). Our work addresses your questions concerning SMP's scope, level of detail, and completion milestones, and the associated resource provisions in the President's 1983 budget request.

Enclosures II, III, and IV of this report answer your specific questions and also respond to related concerns later raised by your office. Enclosure V discusses how the plan was developed and describes its key features. In conjunction with answering your questions, we are also making some general observations on SMP's strengths and potential obstacles to its successful implementation.

SMP GIVES SSA A LOGICAL APPROACH FOR SOLVING CURRENT ADP PROBLEMS

SMP seems to present a logical, systematic approach for solving SSA's pressing software, hardware, data management, data communications, and general automatic data processing (ADP) management problems. In this regard:

--SMP provides a vehicle for institutionalizing generally accepted systems development and modification standards. For example, it calls for establishing standards for program and systems documentation and data element definitions. It further calls for developing and using standardized program and system validation and testing methodologies.

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--SMP has strong support from the executive branch. The Commissioner of Social Security has played a major role in directing the development of SMP, and its successful implementation has received his strong personal support and commitment. In addition, SMP has received strong verbal support from the Department of Health and Human Services (HHS), the Office of Management and Budget (OMB), and the General Services Administration (GSA), and GSA's Federal Conversion Support Center will be assisting SSA in its software improvement activities. As we pointed out in a recent report 1/ to the Chairman, House Committee on Government Operations, concerning SSA's computer problems, strong support from these agencies is crucial to successful SMP implementation.

--SMP builds on already existing SSA systems plans where applicable. SSA might have adopted a "start from scratch" approach in developing SMP and not considered the results of extensive systems planning efforts in progress or recently completed. However, the staff which developed SMP considered the results of these planning efforts and used them selectively as a basis for developing key SMP segments.

--SMP should produce some tangible systems improvements quickly. Implementation of SMP is to be done by a phased, evolutionary approach (see enc. V) designed to produce specific tangible improvements in the early stages. For example, during the first 18 months of implementation, SSA expects to convert certain programmatic tape files to disk storage, thereby reducing some of the tape handling and associated costs and errors found in current ADP operations. Such tangible improvements should serve as a catalyst to users, systems personnel, and management to continue supporting SMP so that further improvements will be realized in later phases.

--SMP is dynamic and flexible. It is to be reviewed and revised annually. This will enable SSA to incorporate further systems improvements, not currently identified, into SMP implementation activities and make other adjustments as appropriate. This will, in effect, allow for considering alternative corrective actions on at least an annual basis, thus making this evaluation process a key element of SMP.

1/"Solving Social Security's Computer Problems: Comprehensive Corrective Action Plan and Better Management Needed" (HRD-82-19, Dec. 10, 1981).

In addition, our December 1981 report made a series of recommendations to help HHS and SSA develop and finalize an effective corrective action plan for solving SSA's systems problems. We believe that, in developing SMP, SSA has complied with the thrust of most of those recommendations. If SSA can implement SMP successfully, it should go a long way toward solving many of SSA's pressing ADP systems problems.

SUCCESSFULLY IMPLEMENTING SMP WILL REQUIRE SSA TO AVOID POTENTIAL PITFALLS

Despite SMP's attributes discussed above, there are a number of potential pitfalls which could prevent or substantially delay a totally successful implementation. These problems include:

--The continued slippage of key early actions. Even though SMP implementation officially began on March 2, 1982, three key management initiatives called for in the plan have not yet been completed: (1) appointing a Deputy Commissioner for Systems to oversee all the SSA systems activities, (2) finalizing the realignment of the organizational structure reporting to the Deputy Commissioner, and (3) hiring an integration contractor to establish a single point of responsibility for SMP implementation. We agree with HHS and OMB officials that completing the organizational structure and appointing a Deputy Commissioner must occur promptly to avoid major implementation delays. The Commissioner told us that, although SSA has been trying to fill the Deputy Commissioner position, SSA has had difficulty finding qualified, interested candidates. Although SSA has drafted organizational crossover charts reassigning existing personnel to the new organizational structure under SMP, these charts had not been finalized at the time of our work. In addition, it appears that it will be at least several months before a request for proposal for hiring an integration contractor will be released.

--There are risks in proceeding with a hybrid, untested systems modernization approach. According to SSA and GSA officials, a multifaceted, phased approach emphasizing software improvement (such as the one presented in SMP) has never before been accomplished at a major ADP installation. As they stated, SSA is the test case. The complexity and magnitude of SSA's ADP operations and the seriousness of its existing systems problems--such as apparent capacity saturation problems currently limiting program testing capabilities, which will impede software improvement efforts (see enc. II)--further increase these risks.

--The difficulties SSA continues to encounter in hiring highly technical and experienced systems personnel. In our view, SSA needs more highly skilled technical personnel than it currently has to effectively monitor and direct the performance of SMP contractors and prepare SSA for assuming management and control of the new software and systems these contractors are to develop. However, SSA continues to have difficulty in filling its highly technical systems positions and inadequate salaries appear to be a major reason that SSA cannot compete successfully with private industry in hiring such personnel (see enc. IV).

--SMP's apparent underestimation of the magnitude of corrective actions needed and the time frames and resources required to assure successful implementation (see encs. II, III, and IV). Although SMP seems to understate these items, it appears that key decisions based on more detailed analyses will be required before completion dates and required resources can be projected with reasonable accuracy.

--SSA continues to lack an agencywide long-range planning process, which could prevent SMP from responding adequately to future agency and program needs. We have reported on this situation several times in the past, most recently in our December 1981 report cited previously. In our view, systems improvements must not only solve current SSA systems problems, but also meet long-term SSA needs. The Commissioner recognizes the importance of this concept and is working toward having it implemented at SSA (see enc. II).

--The potential exists for major legislation to adversely impact SSA's systems modernization effort. It appears that resource limitations and budgetary constraints have inhibited SSA from providing for adequate systems flexibility in SMP to accommodate legislative changes requiring major systems modifications (see enc. II). Regarding current budgetary provisions, it is not clear whether SSA's fiscal year 1983 budget request will be adequate to cover early SMP activities (see enc. IV).

--The lack of adequate implementation monitoring by HHS. Although specific arrangements for monitoring SMP implementation are not described in it, SSA does intend to monitor its own progress in implementing SMP. In addition, GSA intends to review SSA's overall progress approximately every 6 months. However, we believe HHS should also monitor SSA's progress to ensure that the implementation is successful. In this regard, HHS has no specific plans for monitoring SMP implementation, despite the crucial importance of making

the plan work and the fact that the responsibility for overseeing SSA's systems-related activities is, as a result of the Paperwork Reduction Act of 1980 (Public Law 96-511), shared by SSA and HHS. 1/

Solving SSA's systems problems and responding adequately to future program and systems needs hinge on the dedicated efforts of SSA and the support of executive branch agencies to overcome these and other potential pitfalls.

CONCLUSIONS

By the end of SMP's projected 5-year implementation period, SSA can make major improvements in its automated systems through using modern ADP technology. It will probably take at least 7 to 10 years or longer, however, to fully implement all the improvements contained in SMP (see enc. III), and this will require the provision of needed funds for each year of SMP implementation, regardless of how long it takes (see enc. IV).

Thus, SMP presents a logical approach for modernizing SSA's ADP systems, and SSA has made a strong commitment to make it work. To do this SSA should proceed aggressively, but systematically in implementing SMP.

In proceeding aggressively, SSA needs to (1) finalize its realigned systems organization, (2) appoint a Deputy Commissioner for Systems, and (3) hire an integration contractor. To ensure the success of the software improvement effort, a key feature of SMP, quick action is needed to eliminate apparent capacity saturation problems now limiting the effective use of SSA's program testing systems (see enc. II).

In proceeding systematically, SSA needs to ensure that it adheres strictly to generally accepted systems development standards, as intended by SMP, to reduce the risks associated with an untested approach. To ensure SSA develops the best possible

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1/OMB Bulletin No. 81-21, dated June 8, 1981, requested the head of each Federal agency to submit to OMB a plan for conducting periodic reviews of the agency's information management activities, as required by the Paperwork Reduction Act. HHS' December 1981 revised plan covered review activities scheduled for fiscal year 1982, the first year of the information management review process under the act. This plan indicated HHS' intent to focus on the development of SMP and to review its contents, but made no mention of any efforts to monitor SMP implementation.

program and system testing capability, it should examine the merits of incorporating an integrated test facility concept into its planned Program Development and Test Facility system (see enc. II). In addition, SSA should use the annual SMP review/revision process to take care of such things as considering alternative corrective actions, adjusting completion milestones, and revising cost estimates (see encs. III and IV). SSA also needs to complete the structuring of its agencywide long-range planning process.

Although SSA and GSA plan to monitor SMP implementation progress, an ongoing HHS monitoring effort is also needed. Such an effort should be described in HHS' next submission to OMB discussing its plans for reviewing agency information management activities.

RECOMMENDATIONS TO THE SECRETARY OF HHS

We recommend that the Secretary direct the Commissioner of Social Security to:

--Expedite efforts to identify the causes of and eliminate the apparent capacity saturation problems now limiting the effective use of SSA's program testing systems.

--Follow the generally accepted systems development and modification standards to be established under SMP and not compromise them to meet any arbitrarily established completion dates.

--Use the annual SMP review/revision process to evaluate alternative corrective actions, adjust estimated completion dates, and revise resource requirements as appropriate.

We further recommend that the Secretary direct HHS' senior official for information resources management to begin and maintain monitoring of SMP implementation as part of HHS' continuing efforts to improve information resources management.

OBJECTIVES, SCOPE, AND METHODOLOGY

Our objectives were to (1) assess SMP regarding adequacy of scope, sufficiency of detail, and reasonableness of completion milestones, and the adequacy of the President's 1983 budget request to fund SMP activities and (2) develop additional data on SMP, as appropriate, in order to make general observations on its strengths and potential obstacles to successful implementation.

We conducted our work at SSA headquarters in Baltimore, Maryland; HHS and OMB headquarters' offices in Washington, D.C.; and GSA's Office of Software Development in Falls Church, Virginia.

We reviewed SSA's February 1982 "Systems Modernization Plan" and certain supporting documentation, and we interviewed SSA personnel (including the Commissioner of Social Security and members of his Systems Task Force) involved in developing SMP and the supporting material. In addition, we interviewed SSA staff responsible for budget and personnel matters as well as officials from HHS, OMB, and GSA, and reviewed documents they provided to us. We also contacted staff of the Office of Personnel Management and the Department of Labor's Bureau of Labor Statistics, and reviewed information on private sector ADP salaries contained in a number of published salary surveys.

Our work was performed in accordance with GAO's current "Standards for Audit of Governmental Organizations, Programs, Activities, and Functions." Because of time constraints, we did not review all elements of SMP in detail; instead, we concentrated on the portions dealing with software improvement, since SSA identified this as SMP's key element.

Since enclosures II, III, and IV each discuss the results of an individual segment of our work, each contains a separate section further describing the specific objectives, scope, and methodology associated with that segment.

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During the course of planned future work at SSA, we will assess SMP activities further.

Because of the Senate's tight schedule for considering fiscal year 1983 budget proposals, your office requested that we not take the additional time needed to obtain official comments from HHS. We did, however, discuss the report's contents with the Commissioner of Social Security and have incorporated his views where appropriate. As arranged with your office, unless you publicly announce 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 the Director, OMB; the Secretary, HHS; the Commissioner of Social Security; and other interested parties and make copies available to others upon request.

Sincerely yours,

Comptroller General
of the United States

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ABBREVIATIONS

ADP	automatic data processing
GAO	General Accounting Office
GSA	General Services Administration
HHS	Department of Health and Human Services
OMB	Office of Management and Budget
PDTF	Program Development and Test Facility
PIN	personal identification number
RSDI	Retirement, Survivors, and Disability Insurance
SMP	Systems Modernization Plan
SSA	Social Security Administration
SSI	Supplemental Security Income

ENCLOSURE I

ENCLOSURE I

United States Senate

COMMITTEE ON THE BUDGET
WASHINGTON, D.C. 20510

March 9, 1982

The Honorable Charles A. Bowsher
Comptroller General
General Accounting Office
441 G Street, N. W.
Washington, D. C. 20548

Dear Mr. Bowsher:

The Social Security Administration has recently announced a "Systems Modernization Plan" to meet criticisms of their computer and data processing systems made by GAO and other agencies. I would appreciate having your comments on their plan, and would like you to cover the following points:

1. Is the scope of the plan adequate to meet the problems which have been identified?

2. Has the plan been worked out in sufficient detail that Congress can be confident that SSA has the problem under control?

3. Are the completion times planned for the various phases of the plan realistic?

4. Does the President's 1983 budget request provide for adequate funds and personnel to solve SSA's data processing problems?

Please contact Rick Brandon of my staff at 224-0836 if you have any questions regarding this request.

Sincerely,

LAWTON CHILES

ENCLOSURE II

SSA'S SYSTEMS MODERNIZATION PLAN:

ADEQUACY OF SCOPE AND SUFFICIENCY OF DETAIL

OBJECTIVES, SCOPE, AND METHODOLOGY

We were asked to answer the following:

--Is the scope of the Systems Modernization Plan (SMP) adequate to meet the problems which have been identified?

--Has SMP been worked out in sufficient detail that the Congress can be confident that the Social Security Administration (SSA) has the problem under control?

In discussions with Senator Chiles' office, we were also requested to determine whether SMP provides adequate systems flexibility for accommodating future program changes which the Congress may legislate. In addition, we were asked to determine whether, in attempting to address its systems security problems in SMP, SSA has attempted to take advantage of the Department of Defense's knowledge and expertise in this subject area. In our view, these questions fall under the general categories of scope and detail, and thus they are addressed in this enclosure.

We determined that the issues of scope adequacy and sufficiency of detail should be addressed together because, in our view, a certain level of detail must be present to assess SMP's scope. Thus, we used the sufficiency of detail as one of our criteria for evaluating scope. In addition, we assessed scope in terms of how well the plan appears to address each of the four categories of SSA's systems problems cited in our report to the Chairman, House Committee on Government Operations 1/:

--Inadequate automatic data processing (ADP)-related planning.

--Improper development of and modification of systems and software which result in erroneous processing.

--Deficiencies in acquiring and operating ADP equipment.

--Failure to provide adequate privacy protection and security.

The discussion of scope and detail below focuses on each of these categories.

1/"Solving Social Security's Computer Problems: Comprehensive Corrective Action Plan and Better Management Needed" (HRD-82-19, Dec. 10, 1981).

ENCLOSURE II

SCOPE OF PLAN GENERALLY ADEQUATE, BUT SOME PORTIONS ARE NOT SUFFICIENTLY DETAILED

With one exception--the issue of systems security--we found the scope of SMP to be generally adequate to the extent there was sufficient detail to make a judgment. We noted that SMP was not intended to be detailed; rather it was to provide a general direction or strategy for SSA's systems modernization effort, with specific actions to be determined after further analysis is performed during the early stages of implementation. Nevertheless, we found certain segments of SMP provided more details than others, and our analysis below highlights the topics which we feel should have been discussed in greater detail.

Inadequate ADP-related planning

We consider SMP itself as evidence that SSA is making progress in planning for solving current ADP problems. However, there was still no agencywide long-range planning process established at SSA at the time of our review. Although this issue is broader in nature than just the ADP subject area and thus should not be addressed as part of SMP, it is still important to SMP development because such long-range planning is a prerequisite to effective strategic ADP planning.

In discussing this issue with the Commissioner of Social Security, he told us that he agrees conceptually with our views on comprehensive long-range planning and fully intends to have SSA establish such a process. He said that SSA should soon complete analyzing options for structuring the process organizationally, as we recommended in our December 1981 report. 1/

Improper development of and modification of systems and software which result in erroneous processing

In our view, the systematic processes to be established under SMP--which are to produce such criteria as software documentation standards and generally accepted testing and validation methodologies--should adequately address SSA's problems in developing software and systems if these criteria are strictly followed. Nevertheless, systems development and software improvement under SMP hinge on extensive testing and validation, beginning early in SMP and continuing throughout its life. Such testing and validation cannot be performed until SSA resolves apparent ongoing capacity saturation problems in its Test and Time Sharing Facility systems, which are, to a large degree, negating the substantial capacity increases made to those systems in recent months. This problem is not adequately addressed in the plan. However, SSA is currently attempting to identify its causes and potential solutions.

1/See footnote on page 2.

In discussing software testing, SMP provides that during its later stages a Program Development and Test Facility (PDTF) will be built to replace the Test and Time Sharing Facility systems, but few details on the features of this replacement system appear in it. SMP, however, does recognize the need for environmental testing, which simulates the actual operating condition in which the software will run. An effective way to perform such testing is through an integrated test facility--which features special software that allows test transactions to be entered into the regular, live production stream. With the assistance of SSA personnel, we established such a test facility within SSA's Supplemental Security Income (SSI) computerized system in 1977, and it has proven to be an extremely effective testing method.

In discussing the testing methodologies envisioned for the PDTF, SSA systems officials told us that the integrated test facility concept had not been considered thus far, but agreed that it was worthy of serious consideration. Based on the successful past use of the integrated test facility concept at SSA, we believe SSA should consider incorporating such a concept into the PDTF. This could be thoroughly evaluated as part of the PDTF pilot project scheduled for completion during the second year of SMP implementation.

Regarding internal control weaknesses in SSA programmatic systems and software, SMP does not specifically describe how such weaknesses are to be identified, prioritized, and corrected; this is to be determined later after further analysis. Thus, we could not evaluate how effectively SMP implementation will deal with this problem. We would note, however, that many internal control weaknesses have already been identified in past studies and, in our view, should be prime candidates for early consideration and correction.

SMP provides for extensive use of contractors to carry out the software improvement effort. This should help reduce some of SSA's personnel deficiences which contributed to its past software development problems.

Deficiencies in acquiring and operating ADP equipment

We believe that SSA's acquisition of ADP equipment should gradually improve under SMP. Using contractors to assist in identifying hardware requirements and writing justifications, as provided in SMP, should help improve areas where SSA has been weak in the past. In addition, SMP calls for code compatible hardware acquisitions during plan implementation to avoid the need for a costly software conversion. This will also ensure that the current ability of major SSA systems to communicate with each other, as required for current daily operations, will not be lost. In the short run, this approach will limit competition somewhat in

acquiring main frame computers, but it will permit relatively open competition when acquiring or replacing peripheral equipment (e.g., tape drives, disk drives, printers, etc.), which makes up a large portion of SSA's ADP equipment inventory. Further, improving and redesigning software, as called for in SMP, should allow SSA to gradually increase its use of fully competitive procurement procedures for all hardware acquisitions.

With respect to improving ADP operations, SMP provides for simplifying such operations by using more modern technology: for example, converting existing tape files to disk storage, thereby speeding up production processing and reducing the costs and errors associated with excessive tape handling. In addition, the increased training indicated in SMP for ADP operations personnel should further reduce operational deficiencies. SSA needs, however, to quickly resolve the current capacity problems on the Test and Time Sharing Facility systems.

Failure to provide adequate privacy protection and security

This, in our view, is the subject area where SMP needs the most improvement. SMP clearly acknowledges that SSA's automated files are not adequately protected against unauthorized access and alteration, leaving them vulnerable to fraud and abuse perpetrated by SSA employees. It does not, however, contain any details on how this problem is to be addressed; it merely states that corrective action will be taken. HHS has raised concerns over the lack of clarity in SMP regarding systems security, noting the need for early corrective actions to address some of SSA's systems security problems.

One particular shortcoming of SMP regarding security is the lack of a specific provision for incorporating a personal identification number (PIN) technique into SSA's telecommunications software in order to identify all users of the system and to trace all transactions entered into the system. The lack of such a specific provision in SMP concerned us for several reasons. First, the need for such a technique is longstanding and well documented; we first recommended its use in 1978. 1/ Secondly, misappropriation of funds through fraudulent use of the telecommunications network by SSA employees continues to occur. For example, in April 1982, the U.S. Attorney's office in Los Angeles, California, completed successful prosecution of an SSA field office employee who had fraudulently used the telecommunications network to steal more than $104,000 in SSI benefits. This was the third such case prosecuted by that office since 1980. In each of these cases,

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1/"Procedures to Safeguard Social Security Beneficiary Records Can and Should Be Improved" (HRD-78-116, June 5, 1978).

using PINs probably would have prevented the crimes; at a minimum PINs would have provided a means to quickly and easily identify and trace the fraud.

We discussed our concerns in this area with the Commissioner of Social Security. He told us that SSA does intend to aggressively pursue correcting its ADP security problems as part of its systems modernization effort. Nevertheless, he agreed that SMP was not sufficiently detailed regarding systems security and suggested that perhaps an addendum to it covering systems security would be warranted. During our discussion, it was noted that the only technical barrier to incorporating a PIN technique into the telecommunications system was the lack of adequate host computer capacity. The Commissioner agreed that such a technique is needed, assured us that it would be adopted, and directed the Office of Systems to include the PIN concept in determining capacity requirements for the computer replacement procurements now in process.

No SSA contact with the Department of Defense for systems security advice and assistance

SSA systems personnel told us that in compiling SMP and its supporting documents, they had not contacted the Department of Defense to discuss its experiences with systems security techniques and methodologies that might be appropriate for SSA. At the time of our work, however, SSA officials were considering engaging the National Research Council 1/ to perform a major study of SSA's automated data security needs.

SMP PROVIDES LITTLE SYSTEMS FLEXIBILITY FOR ACCOMMODATING LEGISLATIVE CHANGES

SMP provides little systems flexibility for accommodating program changes resulting from future legislation, but this was probably unavoidable due to resource limitations and budgetary constraints. The governing strategy upon which SMP was based requires that new applications or program redesign be restricted during software improvement activities because of limited resources and the possibility of otherwise losing management control of the software. SSA officials told us that current legislative proposals have been factored into SMP, but they believed that any major legislative change during SMP implementation would have a substantial adverse impact on SSA's systems modernization efforts.

1/The principal operating agency of the National Academy of Sciences and the National Academy of Engineering.

ENCLOSURE III

REASONABLENESS OF COMPLETION MILESTONES IN SSA'S SMP

OBJECTIVES, SCOPE, AND METHODOLOGY

We were asked to answer the following question:

--Are the completion times planned for the various phases of SMP realistic?

Although we also considered the data base integration activities described in SMP to answer this question, we concentrated primarily on software engineering efforts, considering the nature of the tasks required in relation to the time probably needed to perform them.

In considering the nature of the required tasks, we reviewed SMP segments on software engineering, certain General Services Administration (GSA) publications on software improvement, and related information in a recent GAO report. 1/ We also discussed software improvement with the Systems Task Force, personnel from SSA's Office of Systems Development, and the head of GSA's Office of Software Development. In addition, we considered our own familiarity with the poor condition of some of SSA's software and the questionable reliability of some of SSA's data bases, based on our experiences during past audits.

In estimating the time probably needed to perform the required tasks, we assumed that software requiring extensive or complete redesign would have to pass through the phases of the system development and modification life cycle, as described in one of our prior reports. 2/ We went through a similar process in considering the nature of the tasks required to accomplish the data validation activities described in SMP. We also obtained estimates from GSA and SSA officials regarding how long it could take to complete all phases of the plan.

SUCCESSFUL COMPLETION OF PLAN ACTIVITIES IN 5 YEARS UNLIKELY

SMP is a corrective action plan covering a 5-year period and that period began for SSA on March 2, 1982. Although SSA can

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1/"Improving COBOL Applications Can Recover Significant Computer Resources" (AFMD-82-4, Apr. 1, 1982).

2/"The Social Security Administration Needs To Develop a Structured and Planned Approach for Managing and Controlling the Design, Development, and Modification of Its Supplemental Security Income Computerized System" (HRD-80-5, Oct. 16, 1979).

ENCLOSURE III

make major improvements in its use of modern ADP technology by March 1987, we believe it will probably take 7 to 10 years or longer to fully achieve the level of systems improvements described in SMP. We reached this conclusion because (1) personnel we interviewed, including SMP's authors, indicated it would not be completed in 5 years and (2) the magnitude of corrective actions needed has apparently been underestimated.

Personnel from SSA and other agencies feel SMP's schedule is ambitious

During our work we spoke with the Commissioner of Social Security and his Systems Task Force; numerous other SSA systems officials; and representatives from the Department of Health and Human Services (HHS), GSA, and the Office of Management and Budget (OMB). When we asked them whether they felt the completion times set in SMP were realistic, all but one told us that, in effect, SMP was extremely "ambitious" considering the 5-year time frame. (The other official told us the completion times were probably reasonable, in his view, but he acknowledged having heard others expressing their doubts.)

In discussing the differences between SMP and the set of individual systems improvement plans developed earlier by SSA's systems staff (see enc. V), an Office of Systems official told us that the only significant difference appeared to be in time frames. He explained that the individual Office of Systems plans collectively covered a 10-year period and that SMP incorporated almost all the activities those plans called for, but squeezed them into a 5-year time frame. Schedules contained in SMP seemed to support this statement. For example, during months 12 to 18, functional hardware requirements are to be defined for the total system, even though substantial hardware acquisitions are to have already occurred before and during this same time period. In our view, this scheduling overlap could have resulted from compressing a 10-year time frame down to 5 years.

In discussing procurement lead times, a GSA staff member told us that some acquisitions scheduled in SMP may be based on "best case" procurement scenarios while others can probably be completed within the scheduled time frames. Overall, however, he felt it will take SSA at least 7 years to accomplish all the improvements set forth in SMP.

Magnitude of required improvements apparently underestimated

We believe that in estimating completion times for SMP activities SSA underestimated the magnitude of corrective actions needed in at least two areas: software improvement and data validation.

ENCLOSURE III

SSA apparently assumed minimal software redesign

The software engineering concept to be undertaken by SSA has essentially not been implemented before. It is an incremental process in which existing software is documented and analyzed regarding its functional requirements, and evaluated to determine whether the way (1) the data are processed is to be changed or (2) the system does business is to be changed. This results in a wide array of possible improvement actions, ranging from the one extreme of making no changes at all to that of completely redesigning the software based on the functional specifications. In between the two extremes are such approaches as making the software more efficient by deleting unneeded code, modifying it to run on later generation computers, and adding or changing functions.

The functional specifications (for SSA, the software release specifications) drive this whole process, identifying which approaches should be used for which software and prioritizing the order of incremental improvements to be undertaken. A key assumption in this process is that the existing software is correctly processing the data; this enables testing integrity to be preserved in the existing system to measure performance of the improved system in terms of whether the new output is right or wrong.

In setting completion times for software improvement, SSA has apparently assumed that many if not most of its software improvement initiatives will fall on the "low activity" end of the improvement alternatives scale discussed above. SMP stresses that one of SSA's major software objectives is to retain as much as possible of SSA's existing large investment in working software to minimize new development risks. In this regard, the Systems Task Force told us that SSA is expecting to be able to salvage 65 to 70 percent of its existing software code.

We believe, however, that SSA's assumptions in this area are optimistic. Although some "easy" software improvements may be completed during the first 18 months of plan implementation, much of the effort will probably fall on the "high activity" end of the scale, as discussed below. In addition, no one really knows how much of SSA's software can be left as is, how much needs to be totally redesigned, or how much can be "salvaged." No studies analyzing SSA's existing 12 million lines of code to make these determinations have as yet been performed; they are scheduled for completion during the first 18 months of SMP implementation. Thus, it appears that SSA had no real basis upon which to project software improvement costs or completion milestones.

We believe that the inherent assumption that the existing software is correctly processing the data is not applicable for

much of SSA's software. Before the testing integrity of the existing software can be assured, errors not previously identified because of incomplete testing and validation (such as those we have previously detected in our reviews of the SSI and Retirement, Survivors, and Disability Insurance (RSDI) systems 1/) will have to be corrected, and thus, the requirements definition will have to be expanded to ensure that this additional but critical task is performed.

In addition to correcting erroneous code, we feel substantial design and programming efforts will have to be made to solve other key software problems we have previously identified and reported on at SSA. These efforts include

--eliminating current systems limitations (e.g., limitations in the Claims Automated Processing System prevent the system from processing more than a quarter of RSDI initial claims);

--meeting key user needs (e.g., incorporating changes into programmatic software to make management information available to field office users as a byproduct of regular systems operations, as we discussed in a recent report 2/); and

--adding software controls and audit trails (e.g., installing effective controls in the automated data exchange between the RSDI and SSI computerized systems, lack of which caused $13.5 million in erroneous SSI payments, as we reported 3/).

For these reasons, we believe the overall software improvement effort described in the plan could extend well beyond 5 years.

File cleanup tasks could be monumental

SMP calls for a data verification/validation/file cleanup effort to occur during the first 3 years of project implementation to correct erroneous and incomplete data in SSA's automated files.

1/See footnote on page 2.

2/"Social Security's Field Office Management Can Be Improved and Millions Can Be Saved Annually Through Increased Productivity" (HRD-82-47, Mar. 19, 1982).

3/"Flaws in Controls Over the Supplemental Security Income Computerized System Cause Millions in Erroneous Payments" (HRD-79-104, Aug. 9, 1979).

ENCLOSURE III

However, no one really knows how great an effort this will require because the extent of this problem has not been established. For example, in a recent report on the quality of data in SSA's automated name and number files, 1/ we pointed out that these files contain incomplete and inaccurate information, but that the extent of these problems is not known. Thus, the impact of these deficiencies on beneficiaries and on file operations cannot be measured.

We believe that data verification/validation/file cleanup efforts may well extend beyond the 3 years called for in SMP because of (1) the magnitude of the automated files and (2) actual or potential data validity problems of unknown magnitude in most of SSA's major data bases.

The magnitude of SSA's automated files is enormous. For example, the name and number files contain information on more than 260 million social security numbers issued since 1936, the Master Beneficiary Record file contains over 80 million records, and the earnings files maintained on workers contain more than 195 million records.

As noted above, we have found data discrepancies in the name and number files. We have also reported on erroneous data in automated SSI data files 2/ and that more than $69 billion in earnings have not been posted to workers' accounts. 3/ Furthermore, there are indications that erroneous data also exist in the Master Beneficiary Record file. For example, a 1980 SSA study indicated that erroneous or incomplete data in that file caused more than $42 million in incorrect Retirement and Survivors Insurance benefit payments during 1979. If such data discrepancies occur throughout SSA's automated files, identifying and correcting them could require more than 3 years.

PROBLEMS ASSOCIATED WITH UNDERESTIMATED COMPLETION MILESTONES

Several problems can be associated with underestimated completion milestones. First, there is the danger of SSA attempting to meet the milestones anyway by taking shortcuts, as has happened in the past in SSA's development of new systems (e.g., shortcuts in developing the SSI computerized system contributed to $1 billion in erroneous benefit payments during the first 2 years of the program) and its modification of existing systems (e.g., shortcuts

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1/"Complete and Accurate Information Needed in Social Security's Automated Name and Number Files" (HRD-82-18, Apr. 28, 1982).

2/See footnote 3, page 10.

3/See footnote on page 2.

ENCLOSURE III

in modifying the RSDI automated system in late 1981 resulted in more than 10,000 student beneficiaries receiving late checks because their payments were erroneously suspended). Also, in attempting to extend contractor support to cover a plan life longer than 5 years, SSA could encounter contracting difficulties. In addition, we believe underestimated milestones similarly cause projected implementation costs to be understated, as discussed in enclosure IV.

ENCLOSURE IV

ADEQUACY OF THE PRESIDENT'S 1983 BUDGET REQUEST IN PROVIDING FOR SSA'S SMP

OBJECTIVES, SCOPE, AND METHODOLOGY

We were asked to answer the following question:

--Does the President's 1983 budget request provide for adequate funds and personnel to solve SSA's data processing problems?

In discussing this question with Senator Chiles' office, we were also requested to assess SSA's personnel requirements for SMP implementation compared to personnel available. As part of this assessment, we were to compare the salary levels paid by SSA with those necessary to recruit and retain sufficient systems staff.

We interviewed officials from SSA, HHS, and OMB responsible for budget and personnel issues, and we contacted officials from the Office of Personnel Management and the Department of Labor's Bureau of Labor Statistics to discuss salary scales for Federal ADP personnel. We also reviewed selected SSA and HHS documents, including SSA's fiscal year 1983 budget justification, biweekly Office of Systems staffing reports, and an outline of major SSA training initiatives for ADP personnel. In addition, we reviewed 7 survey publications containing information on salary scales of various ADP positions in private industry and selected positions in the Federal Government. We tried to compare these data with specific salary scale information covering current ADP positions in SSA. We found, however, that the salary survey data were not sufficiently detailed or statistically reliable to make meaningful detailed salary comparisons between the Federal Government (SSA in this case) and private industry. Nevertheless, based on these data, we were able to make some general observations regarding how Federal ADP salaries compare with those offered in private industry.

ADEQUACY OF BUDGET REQUEST FOR 1983 UNCLEAR

We could not determine conclusively whether SSA's fiscal year 1983 systems budget request of $142.6 million--covering ongoing ADP/telecommunications operations, but excluding personnel costs--would be adequate to implement SMP. The fiscal year 1983 budget request also provides for 2,600 full-time personnel for SSA's Office of Systems (at an estimated cost of $66.2 million) and for 384 positions in the Office of User Requirements and Validation (at an additional cost of $12.1 million), some of which we believe

may be transferred into SSA's new systems structure under SMP. This request was prepared before SMP was finalized, so it may not fully cover SMP costs in fiscal year 1983. To cover such additional costs (estimated in SMP to be $22 million 1/) SSA officials have been considering submitting a budget amendment. At the time of our work, however, the amendment had not been finalized, and a breakdown of the proposed additional costs was not available. Such a breakdown is needed to determine whether an amendment will be needed and the amount thereof.

Other budgeted funds may be available for SMP

The administrative expense section of the proposed budget request appears to provide some flexibility for fully funding SMP. It requests (1) use of the $50 million contingency reserve--originally approved by the Congress as a hedge against unanticipated and uncontrollable workload increases--for ADP and telecommunications projects, supplies, and contractual services not anticipated in the budget estimates and (2) carryover authority of unobligated balances on a no-year basis for ADP/telecommunications leases, purchases, or contracts for modernizing SSA's systems. These provisions could cover some or all of added SMP costs.

Total SMP costs are probably understated

We believe the estimated total costs of implementing SMP ($479 million) are understated. Actual costs will be higher, in our view, because:

--SMP does not provide enough time to complete the tasks identified, as discussed in enclosure III. The old rule "time is money" applies here, since contracts would likely have to be extended or renegotiated and SSA personnel costs would similarly increase. In addition, the program and administrative cost savings referred to in SMP would not be realized as quickly.

--Not all training costs have been allocated to SMP, according to SSA personnel. Although total training costs are currently unclear, SMP indicates the costs will be substantial.

If the total estimated SMP cost has been understated, then future SSA budget requests may have to make up the difference. Nevertheless, full funding of the actual costs, whatever they might be, will be needed each year to ensure overall success.

1/According to an SSA official, this does not include any provision for funding a Federal pay raise during fiscal year 1983.

ADEQUACY OF BUDGETED PERSONNEL PROVISIONS UNCLEAR

It is too early to tell whether SSA has provided for sufficient personnel in the fiscal year 1983 budget to implement SMP. This is not only due to the budget uncertainties discussed above, but also because no one has yet determined the number and skill levels of ADP personnel (those now employed as well as those that will need to be hired) required to implement SMP. At the time of our work, organizational realignment (personnel crossover) charts reassigning existing personnel from the Office of Systems and related offices (such as the Office of User Requirements and Validation) to the new organizational structure provided in SMP had not been finalized and released. In addition, the number of SSA personnel required to implement SMP is highly dependent on the number of contractor personnel ultimately employed, and these decisions have not yet been made.

Presently, SSA has filled about 2,300 of its budgeted 2,600 ADP personnel positions, permitting the hiring of about 300 additional personnel, most of whom would be assigned to implementing SMP. SSA officials told us, however, that they will probably continue having difficulty hiring the technically skilled personnel needed to modernize SSA's systems.

SSA recruiting efforts only partially successful

Because of strong competition from private industry, the overall annual attrition rate among SSA systems personnel during the 12- to 18-month period before June 1981 was about 15 percent. To combat these serious personnel shortages, SSA began a major recruitment effort in April 1981 by establishing a Systems Project Team within its Office of Management, Budget, and Personnel. The team was assigned the task of filling about 700 jobs. At that time, the Office of Systems had about 1,860 full-time permanent employees. To facilitate hiring, the Office of Personnel Management granted SSA direct-hiring authority in certain critical shortage areas and direct-examining authority for hiring in several other job categories.

Between April 1981 and April 30, 1982, SSA hired 379 systems personnel at the following grade levels:

Grade	New hires	Grade	New hires
GS-2	3	GS-9	20
GS-3	16	GS-10	-
GS-4	13	GS-11	40
GS-5	72	GS-12	94
GS-6	1	GS-13	20
GS-7	99	GS-14	1
GS-8	-		

Another factor which has helped reduce SSA's systems personnel shortage has been the slowdown in the economy, which has cut the previous attrition rate in half. For the 12-month period ending April 17, 1982, the attrition rate had dropped to 6.8 percent.

SSA salaries are not competitive for key ADP positions

Although SSA has had somewhat better success in recruiting and hiring personnel to fill applications programming positions, it continues to have problems in filling highly specialized job categories, such as systems programmers, computer scientists, computer systems analysts, computer specialists, and operations research analysts. According to SSA officials, the salaries SSA can offer are inadequate to attract many highly technical, experienced ADP personnel or college graduates with ADP backgrounds. Our general review of information on comparative ADP salaries in the Federal Government and private industry seems to support SSA's view.

Although these salary data were not adequate for making definitive comparisons by position and level of responsibility, they did indicate that Federal Government salaries are generally lower than private industry salaries at starting and upper level applications programming positions. For mid-level applications programming postions (GS-9 through 12, which composed about 40 percent of the 379 individuals SSA hired), Government salaries appear to be competitive with private industry.

For some highly technical positions, such as computer scientists or operations research analysts, however, the present Federal salary scale cannot compete with private industry at any level. For example, based on March 1982 job offers made to graduating computer science majors with undergraduate degrees, the average starting salary in private industry was $22,572; the highest Government starting salaries that can be offered are $12,854 (GS-5) or $15,922 (GS-7). We believe that filling these highly technical positions is critical to ensuring the success of SSA's systems modernization efforts under SMP.

In cases like this, where private sector pay rates for certain positions are so substantially above Federal pay levels that the Government's ability to hire and retain well-qualified individuals is impaired, Federal agencies may be able to offer higher minimum salaries under the special pay provisions of 5 U.S.C. 5303. SSA has not requested such authority, apparently because agency officials have felt they would have difficulty documenting the justification for such a request. 1/ If SSA

1/For positions at grades GS-11 or higher, SSA has authority to offer minimum salary rates above the first pay step of a grade to candidates having superior qualifications.

were to employ this provision, its recruiting posture might be improved somewhat. However, the salaries it could offer still might not be sufficiently competitive with the private sector to fill many of its highly technical ADP positions.

The issue of inadequate salaries also appears to be a negative factor being felt at the highest level within SSA's realigned systems structure. In discussing the difficulty he continues to experience in attempting to fill the position of Deputy Commissioner for Systems, the Commissioner of Social Security told us that the position requires the combination of management skills and data processing experience probably commanding an annual salary of $200,000 or more in the private sector. This position, however, offers the top Senior Executive Service salary--$58,500 annually.

Other constraints have impeded SSA efforts to hire ADP personnel

Other factors have hindered SSA's hiring of ADP personnel, according to SSA officials. These include the Government classification system, time-consuming Federal hiring procedures, and hiring freezes. According to SSA officials responsible for personnel matters, the Government classification system does not generally allow for hiring high-technology personnel at the GS-13 level and above without imposing a requirement that they serve as supervisors (some such individuals neither qualify as nor desire to be supervisors). The hiring process, even with SSA's expanded direct-hiring and direct-examining authority, takes a minimum of 3 to 4 weeks to complete after an application is received; private industry can hire immediately. Further, an HHS hiring freeze imposed at the beginning of fiscal year 1982 on outside hiring has also slowed down SSA's recruitment efforts, even though SSA has received limited exemptions to hire ADP personnel.

Still another factor which agency officials believe has hindered SSA's ability to attract qualified graduates for its ADP jobs is SSA's antiquated ADP environment. New graduating students apparently do not want to work on obsolete equipment which does not represent current technology or require use of the skills they have acquired. In this regard, according to SSA officials, some students have declined employment because they do not want to reduce their future marketability by having worked primarily on obsolete equipment. SSA has had some success recruiting and hiring individuals for its Office of Data Communications, which oversees the operation of SSA's on-line telecommunications system. This system is one of SSA's most up-to-date and is currently undergoing further modernization.

ENCLOSURE V

BACKGROUND ON SSA'S SMP

In May 1981, the Commissioner of Social Security testified before the Oversight and Social Security Subcommittees of the House Committee on Ways and Means concerning SSA's ADP systems problems. During this testimony, the Commissioner stated his intent to develop a comprehensive plan for solving these problems.

PLAN DEVELOPMENT 1/

SSA's Office of Systems began detailed work in July 1981 to develop a number of systems improvement plans, each of which was aimed at improving a specific system weakness. In October 1981, the Commissioner assembled a small Systems Task Force which was charged with completing the plan development. The three primary members assigned to the task force came from outside SSA, and they were assisted by two GSA representatives and one Office of Systems employee.

The Systems Task Force's main job was to "package" the final plan. In this regard, its primary members reviewed a large number of past reports by Federal organizations and private contractors on SSA's systems deficiencies, the systems improvement plans developed by the Office of Systems, and various other studies and reports on ADP topics. They held discussions with selected SSA systems officials and visited several other large ADP installations. They then began consolidating the results of this work in the form of a plan draft. Throughout this process, the GSA personnel provided extensive advice and assistance in key areas, especially software improvement.

The Commissioner not only established the task force's original goals and objectives, but also played a major role throughout their work. He made all the key decisions and personally reviewed and revised the draft document several times.

Although the Commissioner personally briefed the Secretary and the Under Secretary of HHS on SMP's contents before its release, SMP was not submitted to any other internal or external reviews before being printed. It was published in February 1982 and took effect on March 2.

1/Because there was little documentation on this issue, we relied primarily on oral accounts of personnel from SSA and other agencies describing how the plan was developed.

ENCLOSURE V

KEY PLAN FEATURES

SMP's management approach establishes the organization and processes that are to be used to implement SMP over a 5-year period. These include:

--Establishing a single organizational body to plan, manage, and control the modernization program. SMP elevates the Office of Systems to the Deputy Commissioner level and establishes three Associate Commissioners under the Deputy, one each for System Operations, System Integration, and System Requirements.

--Separating the modernization program from ongoing operations and maintenance activities. The sole responsibility given to the Office of System Operations is to carry out SSA's day-to-day ADP operations and maintenance activities while the Office of System Integration has sole responsibility for implementing SMP.

--Providing for project continuity through using a System Integration Contractor throughout the duration of SMP. The contractor is to provide continuity to the project even if there is a change in leadership at SSA, by being the single point of responsibility for the planning and management of the modernization program. Also, the contractor is to be responsible for controlling the development process and providing technical resources.

--Obtaining and using proven state-of-the-art system engineering technology and resources from outside the Government. This is to modernize SSA's software development process and institutionalize it through standards, formal quality control, and the use of software tools. The new process is to be used in creating modern program documentation, restructuring and standardizing programs, and recoding to higher level language where necessary. Also, the process is to improve the ability to maintain and the portability of existing software and create from it a foundation upon which to build the new system.

--Achieving modernization through incremental and evolutionary improvements. SMP calls for defining manageable increments of improvement and evolving to the new SSA beneficiary payment system without jeopardizing service to the public. This is to be accomplished by documenting and improving the current system, making software improvements on an incremental basis, and redesigning only portions of the system at one time.

--Selecting both short-term and long-range approaches that minimize risks and attempting to salvage past investments by building on existing systems. Current problems are to be solved before redesigning the existing system, saving as much as possible but still working toward long-range developmental goals.

--Limiting design changes to only critical, user defined needs during software improvement and process redesign. This is to limit the competition for resources to do both improvement and redesign. Also, control over software changes is to be maintained by not allowing the improvement and redesign to be done at the same time. Further, SMP provides for controlling software development by requiring extensive testing of new software.

--Reconfiguring the system architecture to take full advantage of advanced technology. This is to enable SSA to shift from labor-intensive and error-prone tape files to direct access disk files. SMP calls for obtaining modern data storage equipment to implement the shift, and additional computer capacity to handle the current workload backlog.

--Following an acquisition strategy which permits upgrading technology within a code compatible architecture. This approach is intended to avoid a massive conversion effort that would inhibit software modernization. As a result of SMP's software modernization activities, however, SSA is to eventually increase its total of fully competitive procurements.

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