Chapter 7

The Beginning of the Systems Modernization Plan, 1982

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By fiscal year 1982, the Social Security Administration (SSA) had 260 million names in its account number files, and was maintaining 240 million earnings records. It was paying $170 billion annually to 50 million beneficiaries. It had 88,000 full-time, part-time, and temporary employees, 1,344 field offices, 10 regional offices, 32 teleservice centers, 6 program service centers, 3 data operations centers, the Baltimore headquarters complex, and a new computer center under construction. [1]

SSA *programs* included:

- Income Support Programs:
  - —Retirement and Survivors Insurance (RSI),
  - –Disability Insurance (DI),
  - –Supplemental Security Income (SS1), and
  - –Aid to Families with Dependent Children (AFDC).
- Other Social Service Programs:
  - –Black Lung Disease Claims (BL);
  - –Health Insurance (Medicare), shared now with the Health Care Financing Administration;
  - –Food Stamps (for SS1 participants);
  - —Low Income House Energy Assistance;
  - —Refugee Assistance[2]; and
  - –Child Support Enforcement."
- Administrative Services for Other Federal Agencies':
  - –Assistance to Selective Service for draft registration,
  - –Income Survey for the Department of Health and Human Services on Federal program participants,
  - —Recordkeeping of vested rights in private pension benefits,
  - —Information for the Internal Revenue Service on employer annual reports for income tax enforcement, and
  - –Other minor responsibilities.

The magnitude of SSA operations was impressive. SSA was in 1982':

- maintaining 240 million records on persons with an active social security account, or their survivors;
- paying monthly benefits to over 50 million people;
- issuing 10 million new Social Security cards annually;
- posting annually 380 million wage items reported by employers;
- receiving 7.5 million new claims applications each year;
- processing 19 million postadjudicative transactions annually, including 2.5 million benefit recomputations; and
- handling more than 120 million bills and queries from private health insurance intermediaries, carriers, and providers.

SSA was, however, by its own admission in 1982, only "marginally capable of performing critical program functions. In nearly all areas there were serious problems. Both SSA and Congress now realized that action must be taken, and soon.

[1] Social Security Administration, *Annual Report to the Congress for Fiscal Year 1981; also* Social Security Administration, Office of Systems, Systems *Modernization Plan: From Survival to State of the Art,* SSA Pubs. No. 41-002, Baltimore, MD, 1982, hereafter cited as SSA: 1982 SMP. Another source, the *Social Security Bulletin, 1984-85,* tables 14, 69, 174, 175, says that in calendar year 1981 SSA paid $124 billion annually to 36 million OASI beneficiaries plus $6.5 billion SSI payments to 4 million beneficiaries.

[2] This program reimburses State and local governments for refugee programs.

[3] A program t. collect payments due for child support.

[4] These programs constituted about 10 percent of total SSA workload.

[5] U S. Congress, *Social Security: How Well Is It Serving the Public?* Hearings Before the Senate Special Committee on Aging, 98th Cong., 1st sess., Nov. 29, 1983; hereafter cited as Senate Special Committee (title, date). Testimony by the General Accounting Office, pp. 38-39.

[6] SSA: 1982 SMP, p. I-4.

THE DIMENSIONS OF THE CRISIS

There were major problems in service delivery and in making operations cost-effective. In terms of service delivery[7]:

- issuance of new numbers and cards now took 4 to 6 weeks;
- SSA was 3 years behind in recomputing retiree's benefits to credit them with additional earnings, and backlogs had grown to half a million items;
- claims processing operations were behind schedule 50 percent of the time and payments and notices to beneficiaries were delayed;
- SSA was 3 years behind in posting the 380 million annual wage items reported by employers, and over $69 billion in unposted items had accumulated by 1982;
- checks totaling $60 million were mailed to 8,000 people who had been dead for at least 2 years;
- there was a 3 month backlog of data needed to notify employers about incorrectly reported employee earnings;
- annual cost-of-living increases processing forced suspension of all other processing for 1 week each year;
- large backlogs in processing Medicare claims caused payments for services to be badly delayed;
- systems security failed to meet minimum standards for Federal agencies;
- SSA was over 2 years behind in enforcement operations to detect overpayments;
- computer procedures to detect potential fraud were not able to be done regularly; and
- overwork and alienation of workers was high, tapes were deliberately destroyed and equipment sabotaged, with 46 acts of willfull vandalism reported between 1977 and 1981.

SSA operations were no longer cost-effective:

- it was having to meet most legislative changes in programs through manual processing, often overtime, and at serious costs to other operations;
- to implement Cost of Living Adjustment (COLA) increases required 20,000 hours of computer processing, day and night over a period of 4 months[a];
- SSA itself argued, using GAO estimates, that using programmable terminals in only 4 of the 10 labor-intensive functions that it was hoping to automate would result in "savings of over 1,000 years, representing $133 million in savings, after taking into account the costs of adding these additional processing capabilities."9

Problem elements in the data-processing systems in 1981 involved hardware, data storage, software, data communications, personnel, and facilities; in short, all elements of the system were in trouble, as will be described in the following section. Procurement practices were, at best, inept. SSA'S practice had been to express its mission requirements in terms that, in effect, made IBM the only competitor. GAO advised Congress that SSA did not have the expertise to develop sound procurement strategies based on mission requirements. In 1978, at the request of the Brooks Committee, GSA put a hold on SSA'S computer acquisitions until they could be reviewed; subsequently 300 out of 500 were canceled.10

[7]House Committee on Government Operations, *Mismanagement of SSA's Computer Systems Threatens Social Security Programs,* 33rd report, 1982, p. 4.

[8]SSA: 1982 SMP.

[9]Ibid., p. 1-19.

[10]House Committee on Government Operations, 33rd report, 1982, p. 11. See also U.S. Congress, General Accounting Office, Solving Social Security's *Computer Problems: Comprehensive Corrective Action Planning and Better Management Is Needed.* A report by the U.S. Comptroller-General to the Chairman of the House Committee on Government Operations, HRD-82-19, Dec. 10, 1981. Hereafter cited as GAO (title, date).

DEVELOPING THE PLAN

1 n anticipation of asking Congress for nearly $150 million to rebuild SSA'S information systems, SSA'S new Commissioner, John V. Svahn, painted a dire, bleak public picture of its situation. Some who had been SSA managers for a long time now say that the situation was never as bad as it was portrayed, but that in order to build support for a large modernization program it was necessary to go along with the public posture that disaster was near. To some extent, the extraordinary defensiveness of SSA since 1982 to outside criticism can be attributed to these tensions.

Those who were struggling with the problems on a day-to-day basis understandably want to emphasize that SSA continued to cope. Those who were determined to make a new start may even have misrepresented some details; from the outside, it is not possible to pin all of these down, In some sense, these details are *now* unimportant; the situation was clearl} bad, and the critical questions for government, and particularly for Congress, were why did it become so bad? and how can this situation be prevented in the future for SSA and for other governmmt agencies'?

In the rest of this section, therefore the emphasis is on three questions: 1) why was SSA in a crisis'? 21 how did it get in that situation? and 3) who was m a position to know- was *Congress warned that the situation was developing"?*

The Data-Processing Environment

In 1982 SSA had a hodge-podge of software programs developed over a 20-year period for four different hardware systems. No information systems requirements study had ever been done. Software, as in most private organizations during the 1970s, was developed in response to specific problems in specific program areas: the enumeration system, which supports the issuing of social security numbers, in the late 1950s; the earnings processing system in 1978; the claims processing system in the early 1960s; and the Title 16 claims system in 1973. They had not been thoroughly redesigned or documented since those years.

Software

There had been four major equipment transitions since the 1950s. The software was not redesigned during those transitions but was rather recoded line for line, thus retaining archaic programming techniques; most SSA software is not written in accordance with modern, structured methods.

SSA in 1982 was operating a magnetic tape storage system. Magnetic tapes are susceptible to aging, cracking, and deterioration. Storage on tape requires batch sequential processing. In order to find a single individual's record, all preceding records must be read.

In 1982, SSA's basic computer operations used 76 software systems, which contained 1,376 programs, and in excess of 12 million lines of coded instructions. With these extremely large files, outdated software, outdated storage techniques, complex instructions, and patchwork of programs, any one of a thousand possible small foul-ups can cause the whole system to come down, or to back up. Backlogs continuously build up, manual processing increases, and district offices dealing directly with the public become unresponsive.

To make a small change in a program, such as a change in cost-of-living rates, required sorting through a huge mass of interwoven programs and tape files, requiring months of work. The 1980 amendments to the Social Security Act (Public Law 96-265, Section 501) mandating adjustment of retroactive Title II (retirement and disability) benefits to offset SSA payments, required changing virtually all payment and entitlement systems, approximately 880 programs.

It appears that neither Congress nor the Office of Management and Budget (OMB) fully understood SSA's limitations at this time, and SSA did not volunteer this information. The complexities of the program changes mandated by Congress and the President resulted

in SSA expending two-thirds of its computer resources (230 work-years annually) on software maintenance-not redesign but changes in old codes in order to fulfill new information requirements.

Only a handful of SSA people knew how a large number of the computer programs operated; as these people retired or left SSA a significant amount of the code was no longer maintainable by the remaining staff.

These problems also bedeviled many large private sector organizations in the mid-1970s, but SSA was about 5 years behind private industry in making important technological transitions.

Hardware

In 1982, SSA was operating outdated, unreliable, and inadequate hardware. Of the 26 large-scale computers, 23 were supporting program-related operations and 3 processed administrative workloads. SSA operated 11 IBM 360/65 systems in its Program Service Centers (PSCS) and central offices, and two UNIVAC 1108 systems in Baltimore. The UNIVACS had not been manufactured or marketed for 10 years; their operating costs were more than $3 million, compared to $1 million for more modern equipment. The IBM 360/65 systems were first produced in the 1960s. SSA also operated an IBM 370/165 and an IBM 370/168, which were 10 years out of date and no longer manufactured or marketed.[11]

Since this hardware was no longer supported by the manufacturers, SSA had to contract for costly third-party maintenance. This hardware contributed to about 25 percent of the production jobs having to be done over, wasting approximately 30 percent of the available computer processing power.

A great deal of labor was required to load, unload, and catalog the magnetic tapes. Each month, 30,000 production jobs required manual handling of 150,000 tapes. About one-third of these did not have internal standard labels to allow the computer to check on whether the proper tape was being run. This increased the level of errors.

Many of the major production jobs were designed to operate on only one specific computer or were too large to run on other computers. The lack of adequate hardware meant that very little computer time was available for testing and development of new programs.

SSA failed to meet its computing requirements 45 to 75 percent of the time, each month in 1982. According to Svahn, SSA estimated that its gross computing capacity requirements in 1982 approached 5,000 central processing unit (CPU) hours per month. The maximum capacity of the computers was 3,000 CPU hours per month, and staffing levels would support only 2,000 CPU hours. Program analysts, operators, and managers operated systems on an overtime basis to process critical workloads, while backlogs continued to mount.[12]

Telecommunications

Field offices need timely access to data stored and processed at the central computer facility to take claims for benefits and to process changes. The telecommunications system had evolved over the previous 15 years, since SSA entered into an interagency agreement with the General Services Administration (GSA) in 1966 to be a prime user of its Advanced Records System (ARS), a teletype network. The SSA telecommunications system of 1982 included:

- three types of data-entry terminals: ARS teletypewriter equipment, SSA Data Acquisition and Response System (SSADARS), and interactive video display units in local offices, plus other key-to-disk recording equipment in the program service centers;
- concentrators (telecommunications minicomputers which receive data and query messages and send them to a main host computer);

[11] Testimony of Commissioner Svahn, in 1981, in Brooks Committee, *Viability of the Social Security Administration Computer Systems, 1981.*

[12] SSA: 1982 SMP, p. 1-3.

- modems and local communication lines connecting SSADARS terminals to the concentrators;
- high-speed trunk lines connecting the communicators and front-end processors;
- front-end processors that interface between trunk lines and host computers and translate between them;
- the host computers, already described; and
- SSADARS software (communications and applications programs).

When built in 1974, SSADARS consisted of two IBM 370/165s, and was designed to handle 20,000 inquiry-response transactions and 80,000 data transactions per day. It was saturated a year later and required updating to 370/168 computers. Since then teleprocessing has grown by 500 percent.

By 1982, SSADARS had old, inadequate concentrators, insufficient communication circuits, and obsolete front-end processors. It suffered overload, frequent failure, absence of manufacturer support, unavailability of replacement parts, and extended outages. During the first half of 1981, the system was down 11 percent of working hours and 88 percent of the downtime was due to hardware failure. Field office staff had to come in on weekends to key in data that SSADARS was too overloaded to accept during the week. By 1982 there was little capacity remaining in off-peak periods to handle current workloads. In other words, workload could not be shifted to off-peak hours; high traffic peaks occurring in peak load time had to be backlogged, and entire streams of communication were frequently lost, requiring rekeying, which meant that transmission time was lost while messages were rekeyed. This resulted in printing backlogs ranging from 10,000 to 100,000 messages at a time.

Database

Methods used for the storage and organization of fundamental SSA data were about a decade behind the times, in 1982. Data was on 500,000 reels of magnetic tape stored in a vault on portable pushcarts; tight scheduling and a great deal of labor (200 people, or more than a third of the operations staff) were dedicated just to handling the tapes and getting the reels into use. Physical disintegration of the tapes, plus human error, caused a high number of failures and subsequent reruns. About 24 percent of CPU hours were lost in this way each month.

Data was stored on tapes at 1,600 bytes per inch (bpi), a very low density compared to commercially available 6,250 bpi drives. It was organized by programs, with many data elements repeated from one program to the next, and there were more than 1,500 separate programs. There was no formal data dictionary with standard definitions of all data elements comprising the SSA databases. The same data elements (e.g., earnings) were labeled and described differently indifferent programs, which made for confusion.

These transaction processing systems are the foundation for higher level systems, which in many large organizations include management information systems and decision support systems. The former are systems designed to support middle and senior-level management by providing routine reports on operations. In modern organizations, information needed for management is often routinely copied from transaction files into a management information system file that allows managers to access it through personal computers or some network arrangement. In SSA, the transaction data was not generally available to managers because it was on magnetic tape, and all requests for reports had to be funnelled through central processing. There might be de lays of up to several years in the production of reports needed to manage decisionmaking and control. There was no management information system and no plans to develop such a capability.

Personnel

There was constant pressure from OMB under several Administrations to constrain or reduce the size of the work force (see table 4).

IJSSA, 1982 SMP, p. 2-16.

Table 4.—Size of Work Force of Social Security Administration, 1975.84

Fiscal year	Full-time permanent: Staff on duty end of year[a]	Temporary and part-time	Total
1975[b]	78,400	7,300	85,600
1976[b]	78,400	7,300	85,600
1977[b]	80,300	7,300	87,500
1978[b]	78,600	7,100	85,700
1979[b]	76,300	7,600	83,900
1980	74,500	7,200	81,700
1981	74,600	9,700	84,200
1982	74,800	11,300	86,100
1983[d]	76,000	9,900	85,900
1984[d]	75,800	8,000	83,800

aFIgur~~ ma; not acjcjacross due tO rounding
b R$_{appre}$S$_{ee}$t $_{approxima}$t$_{e}$ levels of employment Derived from subsequent Year's appropriations' justfftcatton
clncludes 6000 **employees** who had 2-year term appointments at that time
dThese are ~stlmates derived from 1984 appropriatlons' justification
NOTE This table provides actual and estimated levels of employment for the Soc Ial Security Admln Istration, and does adjust for various reorgan Izations and shifts In agency responslbllity, e g , the transfer of Medicare respon. stbilttles to the Health Care Ftnanclng Admintstratlon and adoption of AFDC and child support enforcement program functions
SOURCE Alan Westtn

Both Congress and OMB reasoned that investment in automation should be justified in terms of increased productivity, defined as a saving in labor costs. By about 1980, private industry (e.g., the insurance industry) had begun to realize these gains in lower labor costs per unit, but these gains showed up only some years-at least a decade—after the companies first began to build a modern data management infrastructure. That infrastructure was not yet in place at SSA.

Perhaps even more important was the failure of SSA to maintain and upgrade the skills of its computer specialists relative to the rapidly advancing state of the art of computer science, or to attract the best of the crop of new graduates in this field. There was no adequate program in SSA for replacing experienced pro w arnmers who were about to retire, or for training new staff. In 1981, the agency lost 112 of its 560 experienced programmers1[4]; they took with them much of the knowledge of the patchwork software. Only 21 of them were replaced. SSA'S 1982 System Modernization Plan (SMP) noted that:

> The full impact of ADP staffing losses is more serious because the knowledge of patchwork software is lost due to the Iack of documentation. New recruits cannot be prepared adequately for the maintenance of undocumented programs and systems using archaic programming techniques.

SSA says that in 1981 entry-level programmers got 6 weeks of training; some remember that it took about a year for them to learn enough to perform adequately.

Computers had also changed the work of the rest of SSA'S staff. Over one or two decades, the amount of material a claims representative had to master had enormously increased. As one employee said:

> Now I am (expected to be) not only an expert with respect to retirement and survivors' benefits, and disability benefits, but how to make all those work in a computer system. From a Claims Manual of three volumes, that I started from, now (I have) no less than 20 volumes, half of which are systems instructions. . . . Claims reps have long since given up trying to keep track of rules and regulations and law. Now you are only dealing with instructions.

Labor relations were, according to both management and labor, at an all time low. In 1979, the American Federation of Government Employees (AFGE) proposed a consolidated bargaining unit and SSA agreed. The parties bargained for 18 months over a contract which finally went to arbitration. After 23 days, an agreement was signed, in 1981. According to management, labor was using charges of unfair labor practices to stall improvement in operations —in 1 year, AFGE filed over 800 charges of unfair labor practices. According to labor, management failed to take into account the interests of the workers when designing and implementing new systems, especially quality of worklife issues and employment impacts. Both management and labor agreed that unless there were drastic changes in the climate of distrust that prevailed in 1982, the de-

[14] According to the SSA: 1982 SMP, p. 1-15. However, SSA now disputes this (in written communication to OTA) saying that: "In 1981 total losses in the 334 series (which includes computer programmers and systems analysts) was 71, not 112. This is one below the average yearly loss for the period 1981-1985. In 1981, new programmer trainees totalled 155, higher than in any subsequent year." It is possible that Mr. Svahn exaggerated, but SSA was certainly feeling the scarcity of competent programmers in 1981-82.

velopment of new information technology would intensify the strife.

Security

Privacy protection, physical security, accountability, prevention of abuse and fraud, and backup and recovery capability had also suffered from lack of coherent management. SSA had poor physical control at its facilities and few audit trails to determine who in the agency initiated actions, either on paper or by computers. There was no systematic method for communication among various programs, so that an individual could obtain multiple benefits under multiple programs without overpayments being detected. The 1982 SMP document noted that due to computer processing backlogs and faulty programs, duplicate payments were often made, and "the computer backlog has reached the point where SSA cannot carry out its earnings enforcement operation (a primary overpayment detection mechanism) nor employ automated means to detect conditions indicating potential fraud. "*5

Another sign of poor management control was the inadequacy of systems backup and recovery plans, which were limited to storing copies of master files in an offsite storage area. An SSA document in 1982 warned:

> ... SSA'S systems operate without any backup in the event of critical damage, or worse—a catastrophe. . . . Although backup files are available to some extent, they are not duplicates. The destruction of a large number of key tapes would probably result in an inability to produce payment tapes. . . . Should a major disaster occur, untold billions of dollars could be lost as a result of SSA'S computer and communications systems being out of commission for up to a year. 16

The 1982 SMP also warned that because of deficiencies in controlling access to records and to the telecommunication network, SSA was vulnerable to fraud, abuse, and sabotage. It noted that there had already been "limited instances of fraud and abuse perpetrated by its employees . . ." and that "some instances of sabotage causing the destruction of equipment and tape files have occurred in the past, and could be repeated by disgruntled employees working under increasing workload pressures. . . ."

Planning and Management

SSA'S most critical weakness was its inability to gain management control over information resources and systems. SSA itself recognized that it:

> ... had not yet undertaken the management initiatives necessary to insure adequate controls over the development, operation, and maintenance of its systems. ...17

SSA had an explicit and well-institutionalized advanced systems planning group in the 1940s. But by the mid-19S0s, each program bureau was independently working on plans and development of its own systems, without regard to agencywide considerations. In the late 1950s, another central systems planning unit was formed, with a broad charter to develop concepts for advanced system and investigate the technology to move the agency toward that system. This appeared to be working fairly well until the mid- 1960s. 18 But during the late 1960s advance planning was usually sacrificed to the need to deal with recurring crises. A former SSA official recalls that:

> The heads of the two main program bureaus would withdraw people from systems planning and put them into current operations work. , . since those jobs just had to get done, I tried to keep the advance planning staff working ahead as much as possible, but there really was a kind of blackmail at work—Operations needed

[15]SSA:1982SMP, p. 1-7. SSA says that it did have an annual operation called MAFDUP which identified potential duplicate Title I I payment situations and alerted processing center personnel to review the affected folders.

[16]SSA: 1982 SMP, p. 1-18. SSA, however, now says that it maintained backup copies of all master files in a secure storage area; these backup files were not in fact duplicates; and restoring master files would have been difficult, expensive, and time-consuming.

[17]SSA: 1982 SMP, p. 1-14.

[18]Jack S. Futterman, *The Social Security Administration Recent Reorganizations and Related Administrative Problems*, report to the National Commission on Social Security, July 28, 1980, unpublished.

people to get the changes done and the checks out, and we couldn't deny them the resourcesolg

The planners, in any case, had no resources to begin to implement any of their concepts; those resources would have to come from operations budgets, and the operations people were never willing to make this contribution. There has always been an inherent dilemma in systems planning and implementation in very large and complex organizations such as SSA. Bottom-up planning and implementation gives a better fit to the needs of users, and is more likely to succeed than a top-down approach because the users have a vested interest in it. But bottom-up planning is also likely to result in a lack of integration and a failure to address the long-term needs of the organization as a whole, esecially if that implies a significant and fundamental change in the way the organization conducts its day-to-day business.

The Office of Advanced Systems was created in 1975 in an attempt to gain management control over the planning and development of information systems, and buffer it from the demands and assumptions of the operations side of SSA. But in the 1979 reorganization this office was decimated. GAO recommended[20] that the planning for information systems be assigned to a separate, independent component reporting directly to the Commissioner (as the Office of Advanced Systems had done).

Shortly after Commissioner Svahn was appointed in 1980 he began to try to reintroduce a strategic information systems planning group apart from the operational systems personnel; this became the origin of the SMP. Multiple reorganizations had failed to separate system operation from system planning and development.

SSA then undertook two major initiatives to address its systems problems: the Paradyne project and SMP. The Paradyne project was initiated to replace the old GTE equipment that was then beyond its estimated system's life and was failure prone and expensive to maintain. It is usually said to predate SMP, since planning for it began in 1979, but because the two initiatives are closely related, and because the outcome of the Paradyne project has had significant effects on the way SMP is being conducted, it will be described here.

[19] Jack S. Futterman, "Administrative Developments in the Social Security Program Since 1965, *Social Security Bulletin,* April *1972, pp.* 3-9.

[20] U.S. Congress, General Accounting Office, *The Social* *u *rity Administration Needs To Continue Comprehensive Long-Range Planning,* HRD-79-118, Sept. 10, 1979.

THE PARADYNE AFFAIR

The Paradyne project was one of the largest single government civilian information systems upgrades ever undertaken. The original contract was for $115 million, the largest ever let for information technology by SSA. It became a management disaster, even though in some technical respects the effort worked.

The Paradyne Contract

On March 27, 1981, SSA awarded a communications terminal replacement contract to the Paradyne Corp. of Largo, Florida. Paradyne was to supply the agency and its field offices with approximately 1,850 programmable microcomputer systems with an anticipated life of 8 years, plus related software.

Initially this was to be a one-for-one replacement of SSA'S deteriorating and obsolete SSADARS data communications terminal equipment, located in District Offices. Before SSA issued its terminal solicitation in June 1980, GAO and GSA had reviewed the plans. Both objected to the simple, original plan for purchasing dumb terminals that were not programmable and could not easily be adopted to future changes in requirements, and that restricted the network architecture to the current method of operation, precluding local office data processing. SSA had simply thought

about the existing SSADAR system and how to make it more efficient, rather than reconceptualizing the entire information processing sy~-tern. This was to be a fatal weakness throughout the Paradyne affair.

When GAO recommended (with strong congressional support) that the terminals be expanded to allow distributed processing, SSA agreed in concept that eventually the agency would require programmable terminals in local offices. But they argued that obtaining such equipment would have to be deferred. The memory capacity of the terminals would be enhanced after they were installed. In January 1980, GAO agreed to this approach." This project was now envisaged as a major part of SMP'S proposed Data Communications Utility Program.[22]

The equipment was simple in concept. Each installation was to include a programmable controller.'[5] Access to SSA'S main computers would now be distributed, by a series of add-ons to the existing telecommunication network. The Paradyne terminals would later be enhanced from dumb terminals to something very much like a microcomputer, having local storage and data-processing capability and the ability to produce reports, draw graphs, make lists, and store high peak load data for transmission later. This would be an early and major component in the multiyear SMP. SSA planned a phased installation of the equipment between June 1981 and July 1983.

SSA depends heavily on its data communication network to perform its mission. Field offices must have speedy access to data to issue social security numbers, maintain earnings records, accept claims, and process changes. Before the Paradyne purchase, the network was composed of a variet y of incompatible and outdated equipment going back to the 1960s and early 1970s. The primary components were three types of data-entry terminals (including the SSADARS, as described earlier), a collection of modems,[24] and local communication lines to connect the terminals to concentrators (minicomputers). The modems and local communication lines operated at low speeds of about 1,200 bits per second (bps). The concentrators combined, condensed, edited, and reformatted messages and sent them on to front-end processors, which are communication computers attached to the mainframe computer in Baltimore by high-speed trunk lines.

SSA also wanted the Paradyne network to eliminate the key-to-disk terminal equipment in the Program Service Center, which could not handle on-line inquiries or editing. Instead of operating three expensive, out-of-date, and inefficient telecommunication terminal subsystems, SSA would then have a single terminal system.

Failures in the Paradyne Implementation

As already noted, SSA initiated the Paradyne procurement before SMP was implemented, but later made it an integral part of SMP. SSA planned to have installed the Paradyne terminals by September 1983, *and* to have completed the hardware and software enhancements for local processing, and also to have begun designing user applications (such as benefit payment computation or preparation of claims applications) to be automated locally using the enhanced equipment. SSA hoped by September 1984 to begin using these applications so that operations could be completed at the local level and public service would be improved. By March 1986, accord-

[21] U.S. Congress, General Accounting Office, Social Security *Administration Data Communication Contracts With Paradyne Corporation Demonstrate the Need for Improved Management Controls*. IMTEC-84-15, vol. 33, July 9, 1984.

[22] A data communications utility is a communications network in which all remote terminals and a central host computer are connected by a common "back bone' capable of supporting a large variety of data communication requirements and equipment.

[23] A control device through which terminals and other peripheral equipment such as printers, card readers, and off-line storage devices are connected to a single communications line; hence, a single programmable controller could control several printers for outputting data, and also be connected to a card reader or terminal for inputting data, and could handle these loads '(on-line, " i.e., simultaneously.

[24] Devices that interface and translate between a digital computer and an analog telephone line.

ing to the plan, SSA would have installed its new data communications utility, providing a high-speed communication network that would integrate the Paradyne terminals and other local office equipment into the centralized national databases and computer systems.

But from the very beginning, the Paradyne equipment had severe operational problems and breakdowns. SSA began acceptance testing of the first 16 systems on April 30, 1981. All 16 failed to successfully complete 10 days of continuous testing.

SSA made a major contract modification and changed key operating standards so that the terminals would pass the test. Significant performance problems continued. Acceptance testing was suspended and the requirements were modified. During the first 16 months, Paradyne made repeated changes to the terminal controller in attempts to solve system performance problems." Paradyne did not begin to consistently meet contract performance requirements until April 1983.

GAO later found that:

- SSA did not use benchmarking techniques in an effort to minimize costs to vendors in qualifying for contract consideration," but instead used "operational capability demonstrations" as the precontract award testing mechanism. These were supposed to demonstrate processing and printing speeds and general operational capabilities; and
- SSA did not, however, enforce the operational capability demonstrations provision—i.e., did not ask vendors to demonstrate actual equipment or document the testing, or provide programs or workload file mixes, but instead allowed each vendor to structure its own demonstration and to submit 'written analysis for actual tests" if certain hardware components were not available.[z~]

By December of 1982, SSA had installed 1,600 of the 1,800 Paradyne terminals. It had given Paradyne a contract for software to enhance the transmission capabilities by changes in the operating system. It had issued a competitive solicitation for applications software to begin automating field office operations.

SSA awarded a sole source software contract of more than $2.5 million to Paradyne on September 8, 1982, to enhance the data transmission capabilities of its terminals by modifying the terminal software. More than $1.8 million of this was for documentation of all terminal software and developing a workplan for constructing the software modification and documentation.

But given the performance problems, SSA began in April 1983 to rethink the role of Paradyne terminals. The SMP was more and more focused on a strategy of centralized processing, which would eliminate the need for local intelligence in the terminals. The sole source software contract was canceled (April 29). By then SSA had paid Paradyne $550,000 under that contract and Paradyne had delivered one product—a workplan for conducting the modification and documentation. (Paradyne submitted a final bill for an additional $252,000 in July 1984.[28])

By 1982 SSA had purchased the 841 leased Paradyne terminals already installed in SSA offices, and had a lease on the other 1,000 terminals. As of mid-June 1984. SSA was still considering whether to buy, or continue leasing, the remaining 1,000 terminals, although it was unclear how they could be used, since the Paradyne equipment was no longer part of the future district offices under the SMP.

The Paradyne terminals ultimately did work as planned although they had severe startup

'"1'hey included four hardware changes, four versions of the operating system soft ware, five vesions of the hardware, in 21 different combinations, As late as August 1982, 17 differentt versions of the cent roller were being used by SSA. GAO, op. cit., IMTEC-84- 15, p. 16

-"Contrary to GSA guidelines, which strongly recommend that agencies use bench mar-k tests, in which agency computer programs and workloads are run on vendor equipment to validate system performance.

[27]GAO, op. cit., IMTEC-84-15, p. 14.

[28]This was attacked as an "$800,000 workplan"; note, however, that it may have covered work between Sept 8, 1982 and Apr. 29, 1983, 9 months not represented by the workplan.

problems and excessive down time. They will be replaced, beginning this year, with desk-top terminals, as described in chapter 2.

SSA Failures in Managing the Paradyne Project

In this $115 million acquisition, several major congressional and GAO inquiries indicate that there were three major failures:

1. faulty system development practices,
2. faulty procurement practices, and
3. underlying structural weaknesses in the procurement oversight procedures.

SSA did not do a requirements analysis; it failed to conceptualize the business environment and from this deduce information requirements. Instead, it assumed the existing way of doing its business would continue, and simply designed a replacement for existing systems.

GAO has documented[29] that SSA did not express their requirements to vendors in terms of specific operational workloads, which would have let vendors configure their proposed equipment to best meet agency needs.[30] SSA requirements instead were expressed in terms of general performance specifications, e.g., printer speeds of 200 characters a second. The SSA solicitation was also deficient in terms of stating requirements for documentation of software.

GAO said that expressing requirements in terms of general equipment performance specifications for individual terminal components, as SSA did, may have biased the solicitation toward particular vendors. Moreover, this method does not allow vendors to address overall systems processing requirements but instead forces them to address specific subrequirements.

Having failed to analyze its requirements sufficiently, or to fully conceptualize how an upgraded Paradyne system would fit those requirements, or how its own environment would change, SSA entered the procurement on a weak footing. It compounded this weakness in the preaward testing of vendors' equipment by not insisting that vendors demonstrate actual equipment and by not providing test programs for the vendors to perform. There were many faults with the preaward competition, including the fact that some of the equipment that was offered by Paradyne had not been shown to work,[31] and some of the capabilities that SSA asked for were not demonstrated at all, but merely described or promised.

other Factors in the Paradvnc Contract Problems

There was a major structural reorganization of SSA, involving the Office of Systems, in July 1982, which weakened the agency's procurement procedures just at the critical moment that it was about to issue additional software enhancement contracts to Paradyne. Until then, the Office of Systems Planning and Control, which was a component of the Office of Systems but had no responsibility for systems development proposals, had done technical reviews of procurements proposed by other components of the Office of Systems. In other words, it acted as a check on those procurements, although it was within the same office and therefore not a strong checkpoint. This procedure was in line with an OMB circular[32] that directed executive departments to have technical proposal review function independent of the development function.

The 1982 restructuring gave primary responsibility for planning and managing ADP/data

[29]GAO, op. cit., IMTEC-84-15, p. 14.

[30]Requirements stated in operational workloads would include, for example transaction volumes and descriptions, record size, file description, and turnaround requirements for a given workload.

[31]Paradyne had signed a licensing agreement with Microsoft for adaptation of their Zenix operating system to Paradyne equipment (dated Mar. 5, 1981), 3 weeks before Paradyne received the SSA contract. Six weeks after award of the contract to Paradyne, it had not succeeded in adapting the Microsoft operating system to Paradyne equipment. U.S. Congress, *Social Security Administration's Management of Data Communications Contracts With Paradyne Corp.*, Hearings Before a Subcommittee of the House Committee on Government Operations, 98th Cong., 2nd sess., Aug. 2, 1984.

[32]See OMB Circular A-123, Oct. 28, 1981 (later revised, Aug. 16, 1983).

communications procurements to the Office of the Associate Commissioner for Systems Integration, merging the functions of specifications development into one office—the Office of Systems Engineering. This also lowered the level within SSA at which judgments are made about the adequacy of proposed developments. It was under these conditions that implementation of the Paradyne contract proceeded and the sole source software contract for $2.5 million was given to Paradyne.

The Department of Health and Human Services (DHHS) is responsible for monitoring SSA computer acquisitions through its Assistant Secretary for Management and Budget. DHHS did review the SSA procurement request and conducted a postaward review of the terminal replacement contract with Paradyne but did not become involved in key phases of the procurement such as definition of requirements, development of the solicitation, preaward testing, acceptance testing, or measuring of performance. In effect, according to GA0,[33] DHHS "in accordance with its normal practices, re-delegated management and oversight authority for these activities to SSA. . . . As a result, SSA received little, if any guidance from HHS. . . ."

An Unfinished Story

In early 1983, SSA began developing a new technical approach described in detail in chapter 2, for providing field office claim representatives with terminals for direct interaction with the public, but not for distributed data processing.

SSA'S dealings with Paradyne became the subject of litigation in both civil and criminal courts. The Securities Exchange Commission (SEC) filed a civil suit against Paradyne in March 1983, charging the firm with violations of the Securities Acts.[34] SEC alleged that Paradyne, in the preaward operational capability demonstration tests, used dummy equipment made by a competitor and altered to appear as Paradyne's; that it altered other equipment so that it falsely appeared to meet the processing rates required; that it falsely represented that its microcomputer would meet SSA needs; and, in short, that the tests were rigged and that Paradyne sold SSA a pro totype rather than the off-the-shelf terminal SSA thought it was buying.

In February 1984, the former Director of SSA'S Office of Data Communications (which played a key role in the contract award) was charged in criminal court with attempting to extort more than $400,000 from a California software company in return for assurances that the firm would be selected as a subcontractor on a $4 million data communications software contract to be awarded to Paradyne.

In March 1984, Sigma Data filed a civil complaint asking $70 million in compensatory and punitive damages from Paradyne, claiming that it (Sigma Data) would have received the SSA contract had Paradyne's misrepresentations been identified earlier.

In September 1985, SEC and Paradyne agreed to an out-of-court settlement on charges of commercial fraud. Criminal investigations of SSA and Paradyne personnel, and several civil suits, are continuing. The settlement required no admission of wrongdoing by Paradyne but simply the promise to comply with Federal securities laws in the future.[35] But on December 12, 1985, Paradyne, eight current and former executives, and one former SSA official were criminally indicted for bribery, conspiracy, and lying to government investigators concerning the 1981 contract with Paradyne. The former SSA director of telecommunications allegedly accepted a $500,000 contract for software developed from Paradyne.

Aftereffects and Implications for SMP

The Paradyne case was a severe blow to SSA'S reputation just at a time when outside support was needed to assure funding of the

[33] GAO, op. cit., IMTEC-84-15, p. 7.

[34] Securities Act of 1933 as amended, 15 U.S.C. Par. 770(A), 1976; Securities Exchange Act of 1934, as amended, 15 U.S.C. pars, 78J(B) and 78 M(A).

[35] "SEC Settles With Paradyne," *Computerworld*, Sept. 16, 1985.

Systems Modernization Plan. Hindsight suggests that there were three basic flaws in SSA procedures:

1. SSA had not thought through how it wanted to do business, and had not systematically defined its information requirements;
2. SSA probably did not have the onsite personnel capable of making a thorough study of its requirements and translating that into a full modernization plan;
3. the merging of the specifications development and review functions was a mistake, compounded by failure to bring in external consultants capable of criticizing the procurement; this widened the possibility that SSA personnel could be fooled and defrauded by vendors.

The perception of these deficiencies account for much of the skepticism with which SSA'S critics view SMP. They question whether SSA now has any more rigorously examined objectives than it did in 1979 to 1981; whether its systems personnel are more capable now than they were then; and whether the reviews and checks on the system are now more likely to catch mistakes or detect fraud. Moreover, the criminal indictments of SSA personnel have not been reassuring. SSA, in addition, has probably been made even more conservative and cautious, more likely to stick to short-term solutions and nonrisky options—for instance, its insistence on "proven technology' for SMP, which may make its decisions worse rather than better.