June 1991

TAX SYSTEM MODERNIZATION

An Assessment of IRS' Design Master Plan

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GAO
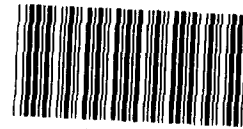
United States
General Accounting Office
Washington, D.C. 20548

Information Management and
Technology Division

B-244246

June 25, 1991

The Honorable John Glenn
Chairman, Committee on
  Governmental Affairs
United States Senate

Dear Mr. Chairman:

This report documents a May 15, 1991, briefing to your
office on our evaluation of the Internal Revenue Service's
(IRS) Design Master Plan for its Tax System Modernization
program (see app. I).

The Tax System Modernization program is a comprehensive, $8
billion dollar effort to acquire the technology needed to
upgrade IRS' information systems. It is composed of 11
major initiatives (see app. II). With this program, IRS
expects to

(1)   simplify and speed the input of tax information
       electronically with the goal of drastically reducing
       the number and types of errors caused by the
       existing manual processes,

(2)   provide on-line access to tax information for its
       employees, and

(3)   establish telecommunications networks connecting IRS
       offices nationwide to permit rapid electronic
       transfer of tax information.

IRS' Design Master Plan will be the road map for guiding the
agency through the development and implementation of the
modernization. The plan is to identify tax processing
needs and the projects and schedules necessary to meet those
needs. While it was to have been issued in final in
September 1990, a draft plan was issued instead. The final
plan, which will serve as the baseline, is due this
September.

RESULTS IN BRIEF

The draft Design Master Plan is a reasonable, useful, high-
level guide for the development and implementation of the
Tax System Modernization program. This plan, however, does

not address key issues vital to the success of the
modernization. These include

-- articulating a clear, comprehensive vision of how it
   expects to conduct business in the future and completing
   transition plans;

-- establishing and assessing progress against measurable
   goals;

-- fixing accountability for major modernization activities;

-- protecting taxpayer privacy;

-- evaluating and managing technology risks; and

-- developing a comprehensive human resources strategy that
   would include recruiting, training, and retaining staff
   with highly technical skills.

We briefed IRS on the need to address these issues in the
plan. IRS agreed and intends to recognize them in its
baseline plan or subsequent updates.

OBJECTIVES, SCOPE, AND METHODOLOGY

We analyzed the draft Design Master Plan to determine IRS'
approach to developing and implementing the Tax System
Modernization program. We assessed the plan against
criteria derived from:

-- our October 1989 symposium (see Meeting the Government's
   Technology Challenge GAO/IMTEC-90-23, February, 1990),

-- our report IRS' Challenge for the 21st Century
   (GAO/IMTEC-90-13, Feb. 8, 1990),

-- information resources management guidelines issued by the
   General Services Administration and the Office of
   Management and Budget, and

-- technical experts.

In all we identified 12 criteria that agencies need to
address to help ensure the success of systems modernization
efforts. We grouped these criteria into five issues:

-- Is a business vision described?

-- Are key planning components addressed?

-- Is accountability for major activities assigned?

-- Are risks and plans for managing them identified?

-- Are technical personnel needs defined and planned for?

We did not obtain written comments on this report. We did, as stated above, brief IRS officials, and we incorporated their comments and IRS' planned actions into the briefing given your office and into this report.

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We are providing copies of this report to the Commissioner of Internal Revenue, the Secretary of the Treasury, as well as interested members of Congress, executive branch agencies, and other interested parties.

Should you have any questions about this report or require additional information, please contact me at (202) 275-3455. Major contributors to this report are listed in appendix III.

Sincerely yours,

Howard G. Rhile
Director, General Government
   Information Systems

CONTENTS

Abbreviations

GAO   General Accounting Office

IMTEC   Information Management and Technology Division

IRS   Internal Revenue Service

TSM   Tax System Modernization

IRS' DESIGN MASTER PLAN: ASSESSMENT
AND ACTIONS PLANNED AND REMAINING

Figure I.1

GAO   Design Master Plan:
       Issues Assessed

• Business vision

• Key planning components

• Accountability

• Managing risks

• People--skills and quantity

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DESIGN MASTER PLAN: ISSUES ASSESSED

The criteria used to assess IRS' Design Master Plan for its Tax System Modernization program were grouped into five sets of issues:

-- Does the plan describe IRS' vision of how it wants to do business in the future? (See figure I.2.)

-- Does the plan address key planning components outlined in figures I.3 and I.4? These include whether the plan describes (1) the relationships between current information systems and those in the modernization program, (2) how IRS will make the transition from its current operations to future ones, (3) plans for support systems, such as facilities management, and (4) the extent to which priorities have been set for modernization projects.

-- Has accountability been established; that is, have measurable objectives and milestones for modernization activities been set, and responsibilities for those activities been assigned? (See figure I.5.)

-- Does the plan address the risks associated with security and privacy, technology availability, and technological breakthroughs? (See figure I.6.)

-- Have the needs for technical people, in terms of skills and quantity, been identified and planned for? (See figure I.7.)

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Figure I.2

GAO Issue:
Business Vision

Criteria for assessment
• Does the plan contain a
  business vision?

Assessment
• The plan includes no reference
  to an IRS business vision; IRS
  acknowledges that a vision is
  essential to defining its "new
  way of doing business"

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ISSUE: BUSINESS VISION

The plan makes no reference to IRS' vision of how it intends to
conduct its operations in the future. Such a vision should be
the driving force to focus an agency's modernization efforts and
gauge its success. The Commissioner's vision, as discerned from
statements he has made to us, the press, and others in the past,
and found in various IRS documents seems to call for "one-stop
service" with quality equivalent to that of the best financial
institutions; a reduced burden to the taxpayer in contacts with
IRS; and, enhanced taxpayer confidence in and compliance with the
tax system.

This vision is missing from IRS' plan for the modernization.
Although the Commissioner's vision has been articulated
piecemeal, IRS agrees that it ought to be comprehensively stated
and made part of the baseline plan. IRS added that
organizational impacts and work process changes will also be
addressed in the context of the vision.

Figure I.3

GAO Issue:
Key Planning Components

Criteria for assessment

- Current projects' relationships
  to TSM and how they
  interface described?
- Transition plan from current to
  future operations defined?
- Implementation plans for
  support systems identified?
- Priorities for the development/
  implementation of moderni-
  zation projects established?

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ISSUE: KEY PLANNING
COMPONENTS--CRITERIA USED

To help ensure the successful development of systems under the
modernization program and ensure that such systems function
together as intended, the Design Master Plan should
comprehensively address key planning components. These include
(1) identifying the interrelationships between current and
planned information systems, (2) outlining plans for the
transition of systems and business functions, (3) describing
implementation plans for support systems, and (4) establishing
priorities for the projects in the modernization plan.

With respect to interrelationships between current and planned
systems, we assessed whether the plan identified those current
systems that were also to be part of the modernization. For
those identified as part of the modernization, we determined
whether the plan called for using standards, to ensure that the
current systems would be effectively integrated with new systems
developed for the modernization. Standards, such as those for
the exchange of information, are needed to ensure that systems
work together to meet processing goals.

We also determined whether the plan identified how current
systems and business functions were to make the transition to the
modernized environment. Without such plans, for example, current
systems could be replaced prematurely before the modernization
capabilities become fully operational, reducing IRS' ability to
support vital business functions. Similarly, business functions-
-such as collections, examinations, and taxpayer services--that
are also to be modernized might not be ready to take advantage of
modernized technologies.

We also examined the plan to see if it identified the supporting
systems needed to implement the modernization program. For
example, we determined whether there were plans for ensuring that
facilities--such as building floor space--and telecommunications
would be in place as needed.

Lastly, we determined whether the plan established priorities for
developing and implementing the information systems that are
essential to the modernization program. Such priorities are
needed to ensure the proper sequencing of interdependent
modernization systems and the efficient use of potentially scarce
resources.

Figure I.4

GAO	Issue: Key Planning Components (cont'd.)

Assessment

- Projects' relationships described but strategy for integrating them, including setting standards, incomplete
- Transition plans incomplete: the business functions missing
- Implementation plans identified
- Modernization priorities are set but unstable

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ISSUE: KEY PLANNING
COMPONENTS--ASSESSMENT

The relationship of current systems that will also be part of
the modernization, to new modernization systems is generally
described in the plan. However, there was no detailed strategy
for how these systems are to be integrated, including standards
to assure they work together.

The plan identifies how the current systems will make the
transition to the modernized environment, but it does not
describe how IRS will handle the transition of its business
functions from the currently slow, largely manual business
methods to the modernization's more rapid electronic methods.
Both systems and business functions should make the transition in
parallel. This would help ensure that IRS achieves its goal of
high-quality, one-stop service that meets taxpayers concerns and
reduce their burdens in contacts with the agency.

Implementation plans for supporting systems, such as the Systems
Engineering and Integration project to support the implementation
of the modernization architecture, the Facilities Management
project to manage all facilities upgrades for the implementation,
and the Telecommunications Systems project to address the
transition to a high-speed processing operation, were identified
in the plan.

Priorities were established in the Design Master Plan for the
development and implementation of the modernization. However,
some priorities have changed since the September 1990 draft plan.
For example, telecommunications is now considered high priority
although it was not a high priority in the draft plan.

Figure I.5

GAO   Issue:
       Accountability

Criteria for assessment
• Measurable objectives and
  milestones set?
• Responsibilities assigned?

Assessment
• Objectives for meeting goals
  and setting milestones
  incomplete
• Responsibilities for the major
  TSM activities missing

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ISSUE: ACCOUNTABILITY

IRS' Design Master Plan should contain measurable objectives for
each of the modernization systems. With these, managers can
determine whether the systems are achieving their goals. For
example, a system intended to improve the accuracy of responses
to taxpayers' questions should specify the level of accuracy
sought. Such measurable objectives do not exist in the draft
plan.

The plan should also contain critical systems development
milestones so that managers can monitor progress throughout the
duration of a project's development and implementation. Such
development milestones were complete for 10 of the 11 major
modernization initiatives. However, the Program Management
initiative, on which all systems depend, does not contain
complete and consistent milestones. This initiative contains 10
distinct projects that focus on the overall planning,
organization, direction, and control of the modernization. For
example, one of these projects--Acquisition Management--is to
develop, among other things, a strategy to keep track of all
acquisitions so that schedule and content deviations and their
impact on the modernization can be identified. No milestones
were identified in the plan for this project. Another project--
Data Management and Standards--calls for the development of a
data dictionary. A data dictionary is a central repository
containing the definitions of all data elements used by the
modernization systems including their syntax and formats. It
provides the uniformity crucial for effective sharing of
information among systems and business functions. The plan does
not show milestones for the development of the data dictionary.

The plan does not specify the IRS organizations responsible for
the 11 major initiatives in the modernization program. Such
responsibilities should be clearly spelled out in the plan to fix
accountability. We were able to identify the organizations
responsible for 10 of the 11 modernization initiatives and their
related projects, although these organizations were not specified
in the plan. However, neither we nor IRS were able to identify
the organizations responsible for two key projects in the Program
Management initiative. One project--Human Resources Management--
intends to establish training programs, assess the impact on IRS
of modernization decisions, and redesign jobs. The other
project--Quality Assurance--intends to ensure that all components
of the modernization are specified, designed, implemented, and
maintained according to IRS quality standards and sound software
development practices. IRS is now in the process of deciding
which organizations will be responsible for these key projects.

Figure I.6

GAO	Issue: Managing Risks

	Criteria for assessment
	•Security/privacy, technology
	  availability, and technological
	  breakthrough risks discussed?
	
	Assessment
	•Security risks partially
	  discussed; privacy not
	•Technology availability risks
	  not discussed
	•Technological breakthrough
	  risks also not discussed

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ISSUE: MANAGING RISKS

As with its current systems, IRS' modernized systems will contain
highly sensitive information. This information must be kept
secure and taxpayers' privacy must be assured. The Design Master
Plan contains a major initiative entitled Security. This
initiative provides for developing security features such as
access controls and data encryption to protect the information
contained in the modernization systems. While many of these
features should help to protect taxpayers' privacy, the plan does
not recognize privacy as a discrete issue and how this issue will
be addressed. Privacy issues will become even more important
under the modernization since IRS intends to allow public access,
under certain conditions, to some of its systems. For example,
it is possible that IRS may allow return preparers to
electronically inquire about the status of their clients'
accounts or the status of returns that were filed.

The plan did not address the need to identify and evaluate the
technology availability risks, that is, the consequences to the
modernization program if technology crucial to the program will
not meet IRS' needs. For example, IRS hopes to eliminate paper
files by using new technology to optically read and
electronically capture typed and handwritten data from tax
returns and other documents when they are received. From that
point on, IRS intends to work entirely with the data in
electronic form. The technology for reading handwritten data is
currently evolving and it is uncertain whether it will reliably
meet IRS' needs. While the plan recognizes a significant risk in
using this technology, it does not provide for a fallback
position should the technology be unavailable.

IRS' plan does not recognize the need for a program to evaluate
technological breakthroughs and incorporate them into the
modernization, as they become practical and cost-effective.
Since IRS plans to use the modernized systems through the year
2008 and technology will probably continue to advance rapidly,
such a program would help IRS avoid building newer, yet obsolete,
systems.

Figure I.7

GAO   Issue:
       People--Skills & Quantity

Criteria for assessment
• Are technical-people
  requirements delineated?

Assessment
• Technical skill needs for TSM
  partially described
• Strategy for recruiting,
  training, and retaining identified
  types and numbers of technical
  staff not part of the plan

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ISSUE: PEOPLE--SKILLS
AND QUANTITY

The plan recognizes the need for software development and
maintenance staff, pointing out that such staff will need to grow
from a level of 1,800 in 1991 to 2,300 in 1994. It also states
that these staff will need strong technical skills. Further, the
plan recognizes the risk of not having these skills available
when needed, but it neither identifies the types of technical
disciplines the software development and maintenance staff need
nor provides a strategy for recruiting, training, and retaining
them. Although, as discussed earlier, IRS has established a
human resources project to manage the modernization's impact on
personnel affected by it, IRS has not established a program to
acquire, train, and retain the technical staff needed to
accomplish the modernization. Currently, each organizational
component having a role in the modernization is responsible for
meeting its own needs.

Figure I.8

GAO   Planned IRS Actions:
       Design Master Plan for 9/91

The plan will include

- IRS' business vision
- Measurable objectives to
  permit monitoring
- Evaluations of security, and
  some technology risks
- Expectation that technological
  breakthroughs be evaluated for
  applicability to achieving TSM

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PLANNED IRS ACTIONS

IRS generally agreed with the results of our assessment of the draft Design Master Plan. The agency plans to address some of our observations in time to incorporate them into the baseline plan to be issued in September 1991. Subsequent periodic updates to that plan will address the other open issues as needed (see figure I.9).

IRS told us that it intends to make the business vision part of the September 1991 plan. The vision will represent the agency's top-down view of how it will conduct business through the end of this century and beyond.

IRS also intends to add measurable objectives to the baseline plan that will serve as progress indicators of how well the agency is achieving its vision. The agency will then be able to assess the extent to which its goals--such as reducing taxpayers' burden in their dealings with IRS and increasing public confidence in and compliance with the tax system--are being reached.

According to IRS, the baseline plan will also contain provisions for further evaluating security risks and some technology availability risks. IRS did not specify which technology availability risks would be evaluated.

IRS also said that the baseline plan will include IRS' position that technological breakthroughs are to be evaluated for their relevance and applicability to the Tax System Modernization program.

We believe these actions will further enhance the Design Master Plan's usefulness as a high-level guide for the development and implementation of the Tax System Modernization.

Figure I.9

GAO   Additional Actions Remain:
Design Master Plan for 9/91

Subsequent plan updates need

- Transition plans completed
- Project integration strategy completed
- Business functions implementation plan included
- Stable priorities established
- Responsibilities for major activities assigned
- Privacy risks evaluated
- Technical resources specified

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ADDITIONAL ACTIONS REMAIN

IRS expects to make periodic updates to the Design Master Plan after the baseline plan is issued in September 1991. These updates will also address the remaining open issues as they develop.

In future plan updates, according to IRS, remaining transition plans, a strategy for integrating current systems with modernization systems, and the implementation plan for the transition of business functions will be discussed.

Priorities for the development and implementation of the modernization's systems will be stabilized whenever possible to minimize priority shifts that can cause delay and expense.

Responsibility for major activities in the plan will be assigned to IRS organizations so that accountability for achieving modernization objectives can be fixed.

The privacy issue, according to IRS, will receive greater attention as a discrete issue in future updates to the plan.

Each update of the plan will also identify the specific technical skills needed at different points in time so a strategy for acquiring those skills in sufficient numbers can be executed.

THE MODERNIZATION INITIATIVES

IRS' Tax System Modernization (TSM) program is composed of 11 initiatives described as follows.

1. Program Management

This initiative is composed of 10 projects described below.

-- Program Control-General Management: This project is responsible for the overall planning, organization, direction, and control of TSM.

-- Systems Engineering and Integration: This project is responsible for supporting the TSM architecture implementation through activities such as architectural-level planning and design, systems modeling, risk assessments, and capacity planning.

-- Acquisition Management: This project is responsible for developing a strategy to (1) acquire hardware, software, application development services, and systems integration services required for TSM, including replacement of components after their life cycles; (2) review current acquisitions to determine if all components will be available according to the acquisition schedules; and (3) develop a master acquisition schedule to keep track of all TSM acquisitions so that schedule and content deviations and their impact on the modernization can be identified.

-- Transition Management: This project is responsible for implementing the strategy to make the transition from the current environment to the TSM environment. It includes transition planning, integration support, and transition tracking.

-- Configuration Management: This project is responsible for capturing and controlling initial TSM information and for keeping track of changes in the TSM architecture, project requirements and design, and project implementation.

-- Data Management and Standards: This project is responsible for establishing data management for TSM, including the planning, identification, definition, implementation, and use of IRS corporate data and data bases. Also, this project is responsible for developing a data dictionary and policies and procedures for data and data base administration.

-- Quality Assurance: This project is responsible for ensuring
   that all elements of TSM are specified, designed, implemented,
   and maintained according to IRS quality metrics and following
   sound software engineering practices.

-- System Development Methodology: This project is responsible
   for establishing the system development methodology and
   associated standards for all TSM applications and data bases.
   Examples are strategic planning, prototyping, logical software
   design, conceptual data base design, and software maintenance.

-- Program-wide Standards Administration: This project is
   responsible for providing programwide direction and oversight
   on the selection, use, and replacement of standards. The
   project has three general activities: (1) define an initial
   set of standards for TSM; (2) assess the value of the initial
   set of standards and make necessary changes; and (3) monitor
   use of the standards and update them.

-- Human Resources Management: This project is responsible for
   labor relations and for working with the National Treasury
   Employees Union. With the assistance of the union, this
   project will establish training programs, assess TSM program
   decisions to determine their organizational impact, and
   redesign job functions of IRS' current work force.

2. Input Processing

This initiative focuses on the processing and archiving of paper
input documents through the Document Processing System (DPS) and
on the processing of remittances through the Cash Management
System (CMS), Check Handling Enhancements and Expert System
(CHEXS), and District Office Remittance Processing System (DRPS).

3. Electronic Data Interchange (EDI)/Electronic Management
    System (EMS)

This initiative focuses on the electronic exchange of information
between IRS and external parties.

4. Corporate Accounts Processing System (CAPS)

This initiative is responsible for all tax account data. It is
composed of seven projects: (1) account access; (2) account
update and analysis; (3) issue detection; (4) revenue accounting;
(5) reference support; (6) index and cross reference services;
and (7) Corporate Files On-Line (CFOL). Except for CFOL, all
CAPS projects are tentative; i.e., they have been identified as
activities under CAPS, but need to be defined and designed. CFOL

is a current project that is the end-user prototype for the accounts access project mentioned above. CFOL will be retired once CAPS is implemented.

5. Workload Management System (WMS)-Case Management

This initiative focuses on the management of all cases worked on by IRS regardless of the functional area or type of site to which the cases are assigned.

6. Case Processing

This initiative focuses on the processing of all types of cases and will share applications to perform common functions when required.

7. System Support

This initiative focuses on the technical support to application systems. It encompasses eight areas of technical support: (1) environment management; (2) program development and test environment; (3) standard end-user interface; (4) end-user support; (5) system management; (6) output processing; (7) proof of concept laboratory; and (8) file-server support.

8. Security

This initiative focuses on implementing the security architecture and ensuring that all TSM projects have incorporated appropriate security measures into their plans. Such measures could include access controls and data encryption to protect the information contained in the modernization systems.

9. Telecommunications

This initiative focuses on the modernization of IRS' telecommunications capabilities.

10. Facilities Management

This initiative focuses on ensuring that adequate facilities such as building floor space exist to support TSM projects.

11. Acquisitions

This initiative focuses on the major acquisitions that support TSM.

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