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August 1994

# **Information Resources Management Strategic Plan 1994-1998**

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# Message From the Comptroller General

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GAO is facing a very challenging and exciting future. To better fulfill its mission, the agency is reshaping its internal processes to reduce staff time now spent on low-level tasks, improve teamwork, increase access to information and people, improve decision-making, and avoid rework. Our goal is to better meet the needs of our customers—the Congress and the American taxpayer—by increasing the quality of our products and reducing the time required to produce them. That is no small task.

Critical to this transformation is the creative use of information technology. By applying electronic communication tools, such as videoconferencing, voice messaging, and computer networks to its internal processes, line and staff units will gain better access to one another as well as a wide variety of information sources. They will discover new ways of working that will achieve the improvements in quality and timeliness that the agency and the Congress require. The Data Collection and Analysis application now being piloted for eventual roll-out to all of GAO is an example of that new capability.

Our customers will also benefit from our efforts to promote the electronic distribution of our products in a cost-effective way. In doing so, they will be able to request the output of our efforts in electronic as well as printed form and have access to a rich and flexible source of information.

This document spells out what we need to do over the next few years to fully realize this vision. Much has already been accomplished. These efforts will take time and significant resources, both human and financial. More importantly, they will require each staff member to accept the challenge that these new information tools offer and to apply them creatively on the job.

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# Message From the Assistant Comptroller General for Information Management and Communications

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Defining the combination of tools and services that will address GAO's diverse information resource requirements is a significant challenge. The information architecture that we are developing must be flexible enough to both grow with GAO's evolving requirements and also accommodate future technologies. At the same time, it must be stable enough to provide a long-term platform for which applications can be developed. To guide this development, the Office of Information Management and Communications (OIMC) has created this strategic plan.

The plan's strategy and various initiatives incorporate insights and issues that have been raised by divisions and offices across GAO. The information architecture addressed in this plan has been designed to meet known agency business needs, and we hope that we have built in the flexibility to address those still to be identified. It will require years of effort and substantial human and financial resources. Further, it will require a strong working partnership between OIMC, the Training Institute, the Office of Policy, and particularly GAO's operational units.

We will update this document as necessary to recognize changes in the agency's requirements and priorities. Please let us know how we can help you. We welcome your ideas and assistance at any time.

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# Information Resources Management (IRM) Strategic Plan

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To guide the development of its information resources (IRM)<sup>1</sup> and have them serve as a catalyst for creative change, GAO's Office of Information Management and Communications has produced this strategic plan. It shows how GAO's mission is supported by its IRM vision and then analyzes its existing combination of information tools and systems to determine their current and long-term adequacy. Based on this analysis, it determines the new mixture of information resources that will be required to support the agency's transformation. Finally, it identifies the specific initiatives required to give staff these new capabilities.

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## GAO's Mission and IRM Vision

GAO's mission is to "serve the public interest by providing members of Congress and others who make policy with accurate information, unbiased analysis, and objective recommendations on how best to utilize public resources in support of the security and well-being of the American people."<sup>2</sup> To accomplish this mission, GAO depends on its IRM resources and requires the support of a sophisticated mixture of information tools and systems to collect, analyze, and disseminate complex information on a wide range of subjects, doing so within time frames that meet the needs of the Congress and the public. Furthermore, since its staff are dispersed around the world, the agency requires information technologies to link them efficiently, allowing them to work as teams of highly skilled professionals despite their physical locations.

To develop these technological resources, GAO follows its IRM vision, which describes a future in which GAO's teams are empowered by their information tools. The vision highlights the relationships among three elements of GAO's operations: the IRM technologies, the work processes, and the staff. When these elements work in harmony, team members can make their maximum contribution to one another and the agency as a whole.

GAO's IRM vision is to create an organization in which work groups can be more self-sufficient in meeting the information requirements of their jobs. Such an organization would be characterized by (1) information technology that is so readily available and easy to use that work groups can better create, access, process, and share the information required to complete their tasks; (2) staff who have been prepared to use technology

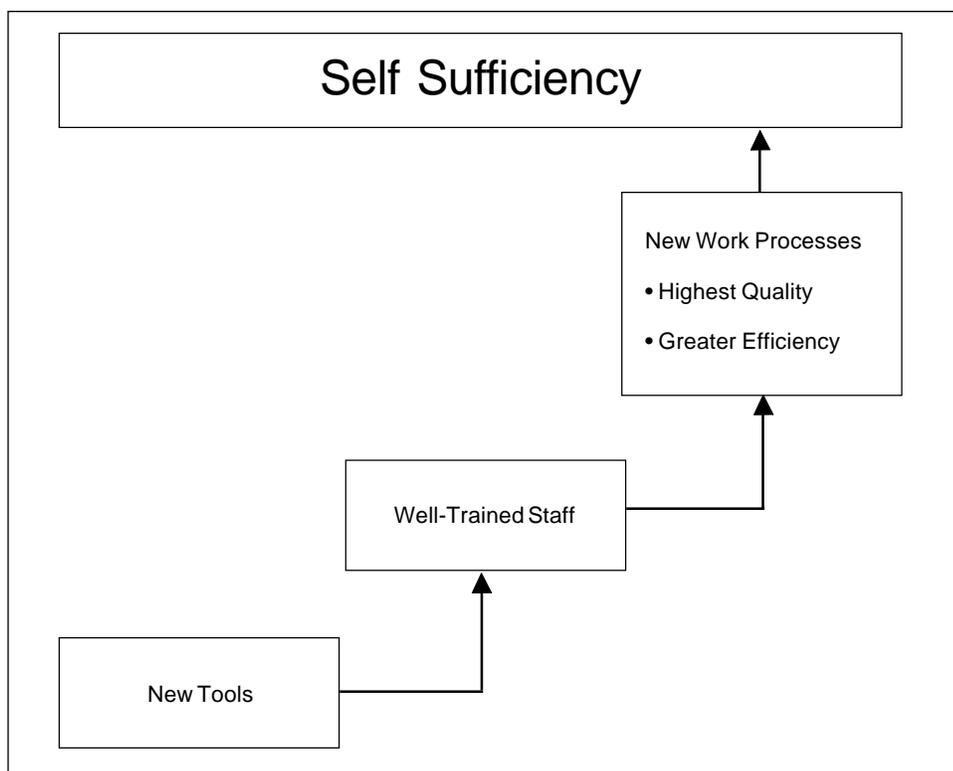
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<sup>1</sup>GAO's IRM resources cover a wide range of activities: office automation; end-user and administrative computing; library and data access services; local and long-distance voice services; publishing, distribution, and mail; video production and teleconferencing; and retention of records and databases.

<sup>2</sup>Quality Improvement Plan for GAO: Early Implementation (GAO/QMG-92-1, November 1991), p. 4.

effectively; and (3) improved work processes, which yield higher quality products and which are more efficient as a result of this technology.

### The IRM Vision



### IRM Strategy

To help attain this vision, GAO has adopted a strategic IRM planning model. This model begins with a recognition of GAO's mission and IRM vision and then develops a strategy that will help achieve them. It then proceeds to identify the specific IRM initiatives required to carry out that strategy.

The central step of this model, the development of the IRM strategy, analyzes the three variables upon which the strategy will depend:

- business needs: the requirements of its line and staff units, especially as they are shaped by the agency's Total Quality Management (TQM) initiative;
- strategic information environment: (1) GAO's IRM existing condition, including its base of hardware and software, its mission and administrative systems, and the IRM services provided to its staff, and (2) its future

condition, i.e., the technical environment that will be required to satisfy its business needs; and

- resources: the cultural, human, and financial resources that will influence and/or support the new technological environment.

The model then identifies the individual initiatives that GAO must complete to establish the future technical environment and achieve its IRM vision.

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## Business Needs

While defining GAO's business needs is the first step in determining its strategic IRM requirements, doing so now is especially difficult because GAO's needs are changing. Driven by its ongoing TQM improvement initiative, GAO is examining its current business practices to find ways to improve the quality of both its work processes and products.

In this change process, information technology can enable new ways of working, for example, speeding up report development and review by making an assignment's workpapers easily available on a network server. GAO has recognized this relationship between technology and organizational change by establishing both the creative use and the effective deployment of technology as key outcomes supporting the TQM priority to "Improve the Quality of Work and Processes."

However, because many of its business needs in the late 1990s are unknown now, GAO has had to implement a flexible information-planning process. This process emphasizes the establishment of a basic information infrastructure, founded on industry standards, that can evolve along with its changing requirements and can support the developments in its work processes.

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## Strategic Information Environment: Existing Condition

GAO has come a long way in developing the flexible mixture of hardware, software, and services needed to meet its evolving business requirements. It has carefully balanced meeting short-term requirements with pursuing long-range strategic issues. Its resulting program has moved incrementally, first establishing a basic infrastructure and acquiring the tools to operate there and then integrating these into its work processes. While much remains to be done, the interim accomplishments of this program can now be seen throughout the agency.

## End-User Computing

GAO has begun to give its staff the workstations that they will use for the next 5 years and has begun linking them through a network. Before 1991,

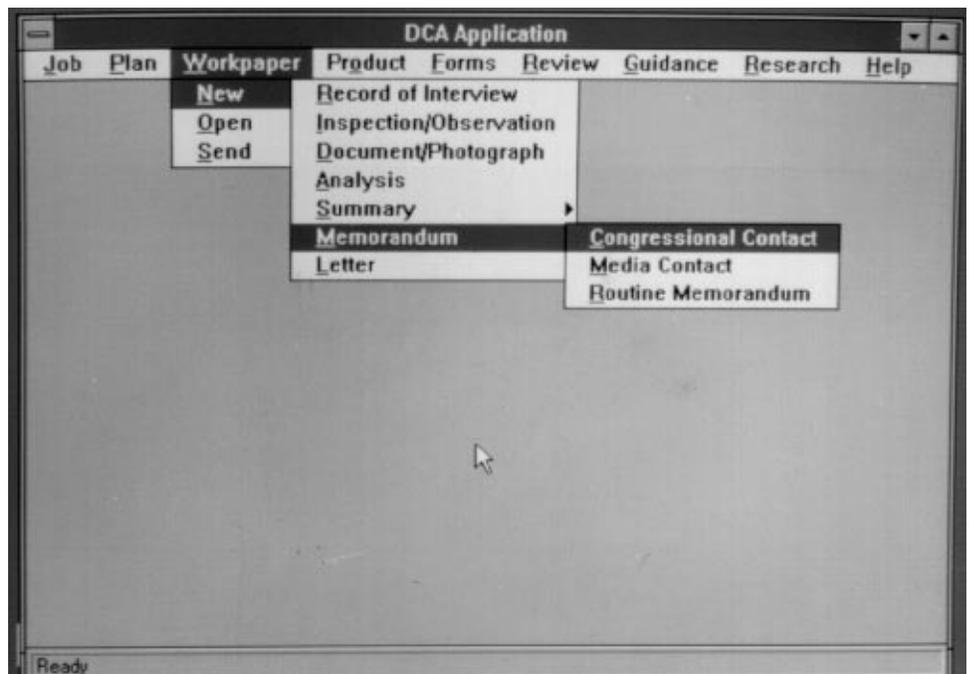
almost all the staff used standalone 16-bit microcomputers (i.e., “AT-class”) as their workstations. While these machines were adequate as personal productivity tools, they could neither operate efficiently on a network nor support the complex operating systems, software, and graphical user interfaces dominant in today’s marketplace. Therefore, the IRM program adopted a 32-bit workstation (i.e., “386” and above) as its standard in late 1991. Since that time, GAO has procured over 3,100 of these units, both desktops and notebooks. In addition, its goal for fiscal year 1996 is to have a full 32-bit inventory.

In addition to moving its hardware toward its standard, GAO has strengthened its software inventory. Because GAO has procured its standard software in different years, members of work groups frequently have found that they were using incompatible versions of a software application. As a result, the agency has begun to systematically upgrade its inventory to eliminate these disparate versions. It has now established and implemented a standard according to which each software package in use must be either the current release of that application or the release preceding the current one. This “current release minus 1” standard will remove an obstacle that has hampered work team effectiveness.

Network and Application  
Development

In addition, GAO has expanded its network pilot, both in headquarters and in the field. Before 1990, GAO had used standalone microcomputers exclusively, an inefficient response to its team-oriented work processes. In that year, the agency began its Mission Support Project in two divisions and one field location to establish a local area network (LAN) and the applications to run there. This network was subsequently broadened to include the Office of the General Counsel and 5 small-scale administrative LANS, and, by the end of fiscal year 1994, it will include about 2,000 users. In addition, the Mission Support Project began developing and testing a Data Collection and Analysis (DCA) application for use on the network, which will enable work groups to complete their assignments more efficiently and to improve their work processes.

Picture of DCA Screen



Time-Sharing

To perform the statistical analysis of large files required by some assignments, GAO has purchased computing time and associated technical support from government computing centers. Because this cost has increased steadily over the years, GAO now has a pilot project under way to investigate cost-effective alternatives to time-sharing while maintaining technical support for its users.

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Access to Information

To meet the needs of both line and staff offices, GAO draws on an extensive collection of information sources. Among others, these include

- GAO's historic data on the agency and program to be reviewed,
- congressional data on requests and on committee hearings and pending legislation,
- the audited agency's historic and operational data,
- analytic databases developed by government and private organizations,
- legal services,
- analyses of outside experts, and
- administrative information.

To access these sources, GAO uses various tools, including library collections, the subscription to multiple databases, and the availability of trained researchers. In addition, it has begun to provide staff with direct access to these data sources through, for example, a compact disk-read-only memory (CD-ROM) network and an on-line library catalogue system.

While these approaches provide staff with a broad range of both information sources and methods of access, they do not meet the needs of all users. Some staff are skilled technically and want the autonomy gained by direct access to data. In addition, if it can be done cost-effectively, GAO would like to shift some processes done by professional researchers to the staff, freeing up the researchers' time for more complex or specialized tasks. As a result, GAO has begun providing some evaluators and attorneys with on-line access to a restricted number of databases through the agency network and, eventually, will extend it to include the library's holdings and the CD-ROM systems. As it tests these access modes, the agency will determine what research is best done centrally and what is best distributed to line staff themselves.

Technical Library CD-ROM



However, enhancing access to data is valuable only if the data are accurately and consistently labeled. Currently, GAO has systems that hold similar data but refer to them under different names. To resolve this problem, GAO is developing naming standards and a data dictionary to ensure uniformity of data labeling and will implement them across GAO's systems.

Electronic Communications

In the area of enhanced electronic communications, GAO has recognized that effective teamwork requires members of work groups to have ready access to one another and the ability to share information. It has responded to this need by providing new tools and services, in particular,

- multipoint videoconferencing in headquarters and field locations, capable of linking all sites, and
- modern voice-processing (i.e., voice mail) service capable of sending and responding to messages and forwarding them to anyone in GAO.

These services are beginning to be integrated into GAO's work processes. Videoconferencing has allowed units to make staff more productive by decreasing travel time, improving teamwork and decision-making, and helping teams avoid rework. In addition, it has helped with human resource management tasks, especially by increasing training options. Voice processing has also improved the flow of information, provided new tools to staff who wish to reengineer their work processes, and has the potential to enable groups to work more productively.

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#### Videoconferencing Facility



#### Publishing and Distributing Products

Throughout the 1980s, GAO followed traditional publishing approaches: typesetting documents, printing a small portion of them in-house<sup>3</sup> and the majority through contractors, and distributing them by mail or messenger

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<sup>3</sup>In compliance with directives from the Joint Committee on Printing, the in-house print portion is designed only to satisfy unusually short turnaround requirements and to secure sensitive material.

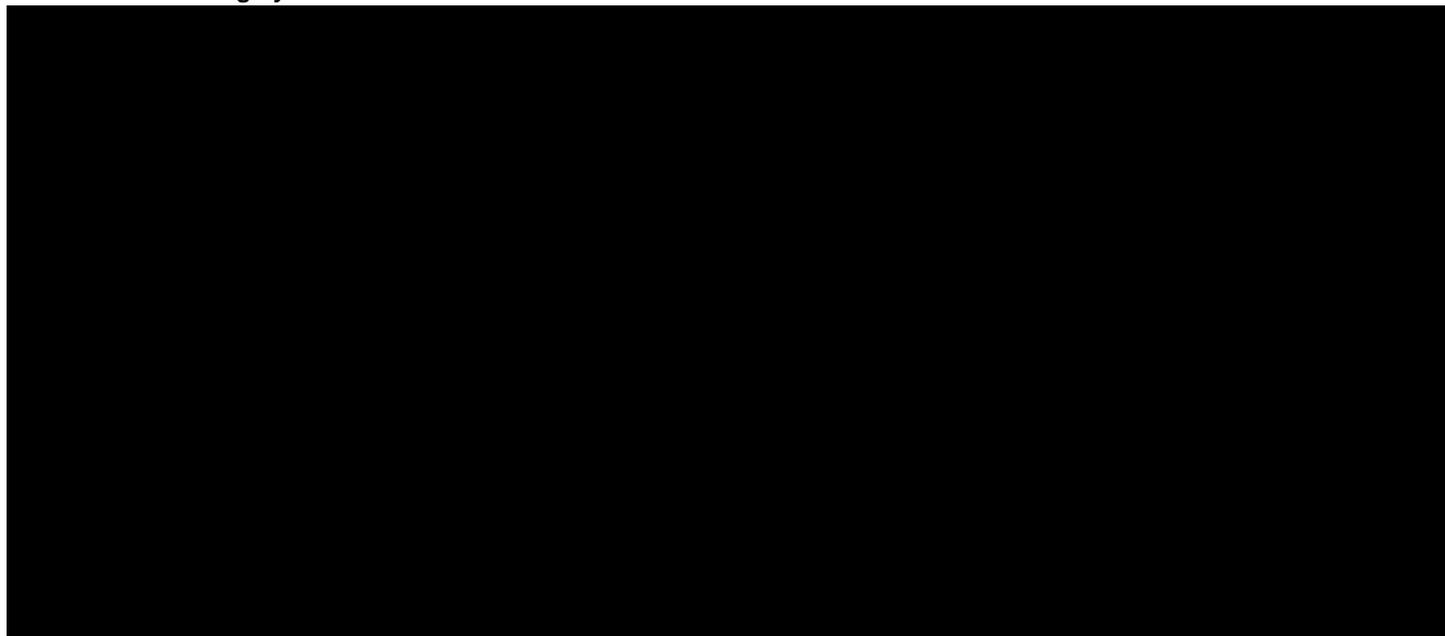
to individual recipients. While this approach met GAO's operational needs, it

- was relatively expensive;
- did not produce data easily used as a research database;
- did not permit publishing or distributing documents in anything other than a paper format; and
- did not meet the information requirements of the full range of GAO's customers, especially those who wanted an electronic file.

To determine how to overcome these limitations, GAO began an electronic publishing program by taking four coordinated actions. First, it established the capacity to typeset electronic files in-house. Second, it replaced some of its aging in-house lithographic presses with state-of-the-art equipment capable of printing directly from these files. Third, it began to investigate electronic distribution by providing customers some products on floppy disks; electronic bulletin boards; government CD-ROMs; and major information networks, like Internet. Fourth, it used its electronic files to develop two research databases as part of the mission support tools provided users of the pilot network: report abstracts from fiscal year 1988 to the present and full text from November 1992.

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Electronic Publishing System



As GAO has created, managed, and begun publishing electronic documents, it has also realized that a wide range of issues are raised by the long-term production, distribution, and retention of electronic files, for example

- ensuring that appropriate software and related documentation are retained, so that a file can be accessed and read properly;
- determining the appropriate period for retaining a file;
- determining appropriate storage media; and
- protecting the integrity of files.

GAO has begun a systematic process to identify these issues and develop strategies for dealing with them.

Corporate Systems

GAO's administrative systems, which execute the agency's administrative transactions (e.g., payroll activities) and track assignments, are in transition. While these systems maintain the integrity of corporate data, many units have tried to use them as management systems, even though they were not designed to give managers the ability to manipulate their units' data. Some managers have responded to this situation by developing their own customized systems, which, while timely, often are not

consistent with GAO's official data. In addition, their systems have been limited by the standalone technology upon which they are based.

To deal with managers' needs, GAO will link its network with its corporate systems. The network will use its graphical user interface to give the current corporate systems<sup>4</sup> the same look and method of operation as other network applications and over time will give managers greater flexibility in adding their local data to the agency's standard database. In addition, GAO will use the network to support any new systems and to integrate selected local systems into its corporate systems, starting with the Human Resources Information System (HRIS).

The network has raised some security issues. In particular, GAO is sensitive to the need to protect against unauthorized users accessing network servers and it recognizes the increased points for system failure inherent in any network. To deal with the former, GAO draws on the security designed into the network operating system and the applications themselves<sup>5</sup> and user training. To deal with the latter, it has implemented physical security for its servers, security standards and procedures, and a process for backing up network data. GAO has also begun a security program that will lead to certifying its sensitive systems.

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## Strategic Information Environment: Future Condition

Defining the combination of information tools and services that will satisfy agency requirements — i.e., its information architecture — is a challenge for GAO. Such an architecture must be flexible enough both to grow along with GAO's evolving requirements and to accommodate future technologies. At the same time, it must be stable enough to provide a long-term platform for which applications can be developed.

These seemingly contradictory requirements can be resolved only if GAO bases its new IRM architecture on well-defined technical and marketplace standards. This will guarantee that the hardware and software (1) are in the mainstream of technical developments and (2) provide the longevity needed for stability. Recognizing these requirements, GAO has selected the combination of hardware and software used in its pilot data network as its long-term architecture because it is founded on widely accepted technical and marketplace standards and has been proven to meet GAO's operational needs.

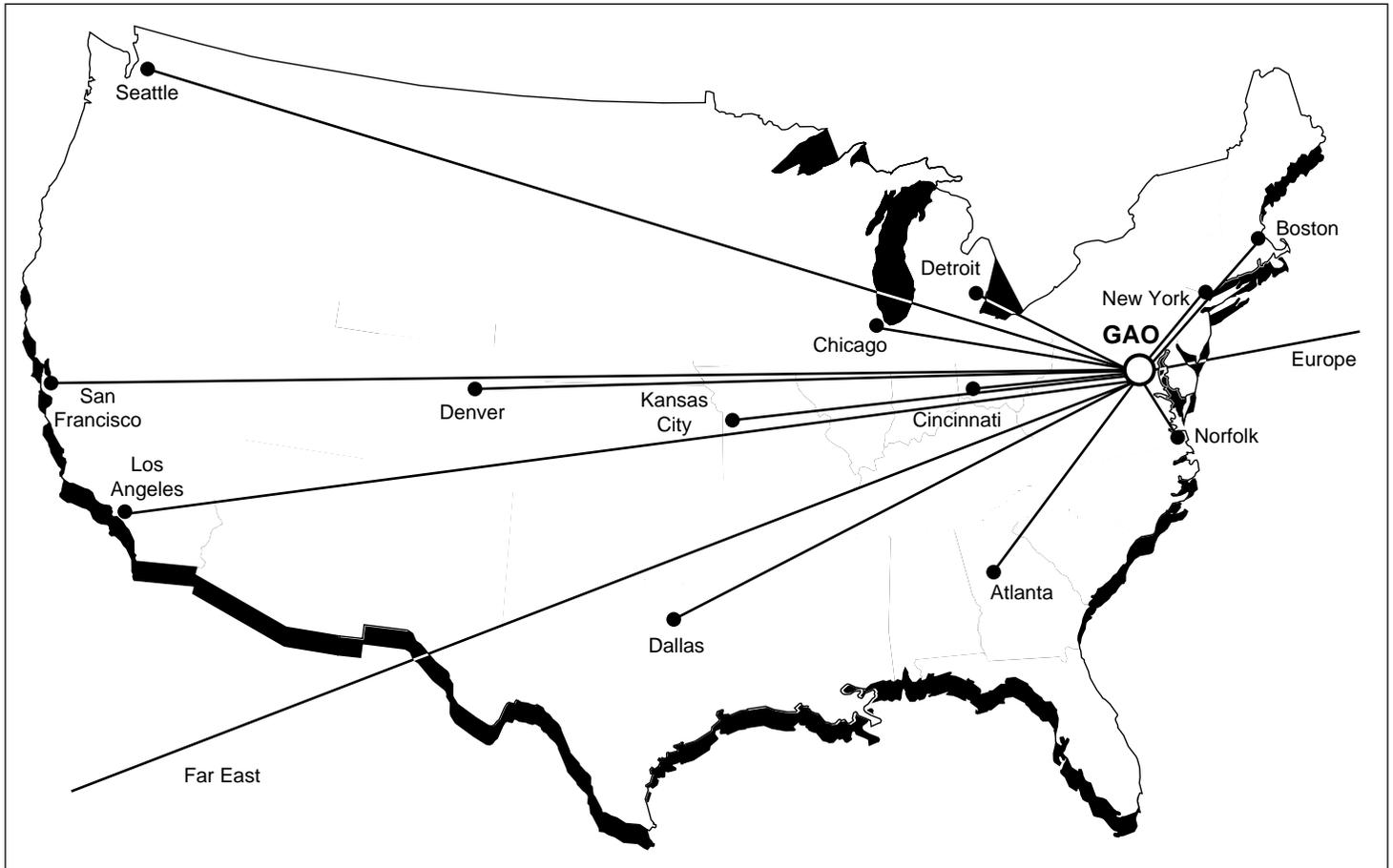
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<sup>4</sup>For example, Payroll/Personnel, Financial Management, and Mission Assignment Tracking System.

<sup>5</sup>For example, password protection and the assignment of application and data access rights to individual users.

To extend the network throughout the agency, GAO must take five coordinated actions. First, it must continue to upgrade its workstations and transform its standalone operations into an agencywide network with a common, easy-to-use interface. The network will allow staff to use their workstations to draw on sophisticated applications, access a wide range of data sources, and be in immediate contact with any individual or group in the agency. In addition, it will give managers more-responsive administrative systems by being the platform for downloading a unit's administrative data and then manipulating them in customized local management systems. Finally, it will give GAO the data required to better track the progress of its TQM program.

GAO Wide Area Network



Second, as it has done during the Mission Support Project, GAO must continue to use information technology to improve its work processes. Using business process reengineering and other methods, it must develop new ways of executing current processes and also create new processes, dependent on the information technology for their very existence.

Third, in addition to developing its network capacity, GAO must complete development of its fully digital communications capability and enable members of geographically dispersed work groups to better support one another.

Fourth, even as it enhances its ability to print and distribute products in a paper format, the agency must continue to develop its electronic printing and distributing capability. It must continue to extend its in-house capacity and, by moving to on-demand printing, reduce its warehousing expenses. In addition, it must expand its research database of GAO products by adding past documents. Finally, it must promote the electronic distribution of documents to reduce costs and to provide GAO's customers with as rich and flexible a source of information as possible.

Finally, GAO must ensure the long-term viability of this architecture. To do so, the agency must continue to use well-established technological and marketplace standards and establish sound policies to guide the architecture's development and implementation. These actions will enable GAO to integrate other technologies, such as multimedia, into the architecture when the products are sufficiently mature and the agency has demonstrated a need for them.

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## Resources: Cultural

Moving to this new architecture will be a difficult challenge for GAO. The agency has always provided great freedom to its staff in determining if and how to use information technology in pursuing their job objectives. In the past, for example, GAO did not direct the pace of technological development centrally. Rather, it established a standalone environment, provided training in the software operating there, and allowed individual units to determine the degree to which they would use the information technology.

The network will cause a cultural shift in GAO. Rather than leaving individuals free to choose how to use technology, the network will be at the heart of GAO's operations. No longer will the agency's workstations be operated as standalone tools. Although they will still be intelligent

microcomputers capable of processing information locally, the workstations will also be part of the agencywide network and will be subject to its requirements. In addition, the corporate culture will now require individuals to learn network applications, and those applications will influence the standards for performing assignments and developing systems.

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### Resources: Human

As GAO undergoes this cultural shift, it will naturally experience some resistance. People do not easily make major changes in their work processes, and GAO must expand the support provided to its staff, notably in the areas of training and technical services, to minimize the disruption to ongoing work and make the change successfully. Staff will need to master the new operating systems, application packages, and graphical user interfaces and learn to apply the new software to their assignments. This will require GAO to expand its user training curriculum and methods of training delivery. It also will, in turn, call for a new partnership among OIMC, the Training Institute, the Office of Policy, and particularly GAO's operational units.

Although training will improve the staff's technical proficiency, it alone will not be sufficient. Distributing information resources to the units will increase the complexity of their support requirements. Units will require access to both skilled network management staff, help desk personnel, and on-site troubleshooting. These support elements will help overcome the resistance and allow staff to benefit from the technologies.

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### Resources: Financial

Over the last few years the agency has faced constrained budgets. To operate with these reduced funds, GAO began scaling back capital expenditures and services, as well as reducing staff. In its IRM area, part of the funding necessary for development came from new efficiencies in ongoing operations and by redirecting funds for some services into capital investment.

Additionally, increased funding has been provided in FY95 to complete the computer network and much of the DCA application roll-out. The remainder of the DCA application will be completed in FY96. Furthermore, technological expansion will require the continued support of the Congress as equipment, operating systems, and software applications age and require maintenance and upgrading.

## IRM Initiatives

While developing this architecture fully will require years of effort, as well as significant human and financial resources, doing so requires the execution of only five interrelated initiatives:

- complete network development,
- increase access to information,
- enhance electronic communications,
- publish and distribute information and products electronically, and
- support administrative and mission applications.

## Complete Network Development

Accomplishing this initiative will establish the new architecture by fully deploying GAO's network and its accompanying support mechanisms. Table 1 identifies what the initiative will include.

Description	Estimated Date
Deploying the network fully and ensuring that it is technically sound and reliable	4th quarter, FY 1995
Using the network to apply new or enhanced applications to assignments	Ongoing
Ensuring that workstations and software conform to standards	4th quarter, FY 1995, and ongoing thereafter
Ensuring that the network is appropriately secure	Ongoing
Training staff to use the network and applications	Ongoing
Providing skilled support to individual units	Ongoing
Identifying and testing advanced technology	Ongoing

## Increase Access to Information

Accomplishing this initiative will increase the staff's access to information and create greater self-sufficiency in meeting their work requirements. The agency will develop various access options for staff, including specialists. Wherever possible, it will provide them with greater autonomy by giving them direct access to GAO, government, and commercial databases through their networked workstations. In addition, it will use highly skilled research specialists to perform complex searches beyond the capacity of general staff. This resource mix will allow staff to be more creative and will allow their contributions to be more readily recognized. Details of this initiative are shown in table 2.

<b>Description</b>	<b>Estimated Date</b>
Developing an agency data dictionary to promote consistency and clarity in data elements	4th quarter, FY 1996, and ongoing thereafter
Linking the CD-ROM network to GAO's data network	4th quarter, FY 1995
Providing staff with easy access to the library's holdings over the network	4th quarter, FY 1995
Linking GAO to commercial and government image-based systems	Ongoing
Increasing direct access to the databases of audited agencies	Ongoing
Expanding use of Internet as a research and information distribution tool	1st quarter, FY 1995
Developing a comprehensive plan for the long-term retention of electronic records	2nd quarter, FY 1995

**Enhance Electronic Communications**

Accomplishing this initiative will link regional and headquarters units, provide staff direct access to one another regardless of location, and enhance teamwork by more easily sharing information within teams. Table 3 explains this more completely.

<b>Description</b>	<b>Estimated Date</b>
Completing the implementation of voice processing in all audit sites and sublocations	3rd quarter, FY 1996
Linking the local voice-processing systems in a GAO-wide system	2nd quarter, FY 1995
Enhancing field telephone systems by providing a PBX or an electronic key system in all locations	4th quarter, FY 1997
Developing applications for the network linking GAO and the rest of the legislative branch	Ongoing
Applying videoconferencing and voice processing creatively to GAO's work and using them as tools to reengineer its work processes	Ongoing
Expanding videoconferencing and investigating the use of desktop video	Ongoing

**Publish and Distribute Information and Products Electronically**

Accomplishing this initiative will expand GAO's capacity to provide its products and information about its products in electronic as well as paper formats. This capacity will give staff and external customers a greater ability to search and review GAO's past work on an issue. In addition, it will allow GAO to reach new customers through mass electronic distribution on

widely used database services. Table 4 explains what this initiative will include.

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<b>Description</b>	<b>Estimated Date</b>
Improving customer services and reducing inventories by reprinting products on demand	1st quarter, FY 1997
Enhancing the full-text database of GAO products and information about GAO products	4th quarter, FY 1997
Distributing GAO's products in the electronic formats that best meet its customers' needs	4th quarter, FY 1996

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## **Support Administrative and Mission Applications**

Accomplishing this initiative will help staff substantially improve their work processes by using the network to reengineer their operations. In addition, when savings can be achieved, GAO will test the feasibility of moving some smaller administrative applications, as well as essential standalone systems maintained by individual units, to processors residing on the network. Finally, the agency is investigating alternative, cost-effective solutions to time-sharing while maintaining technical support for its users. This initiative will include the items shown in table 5.

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<b>Description</b>	<b>Estimated Date</b>
Moving corporate systems' functions from time-shared mainframes to in-house servers whenever appropriate	4th quarter, FY 1997
Moving local standalone administrative systems to more-flexible systems with access to official corporate data	4th quarter, FY 1995
Completing development of alternative sources of statistical-processing capacity	4th quarter, FY 1995

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