TELIDON INFORMATION MANAGEMENT SYSTEM

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TELIDON INFORMATION MANAGEMENT SYSTEM:

GRAPHIC NEEDS ANALYSIS REPORT

" FINAL "

MARCH 1985

PHIPPARD AND ASSOCIATES

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EXECUTIVE SUMMARY

The features of Telidon technology suggest a strong potential for its use to support graphic applications in the office. This phase of the Telidon Information Management System (TIMS) project begins to explore that potential by assessing how selected users might benefit from Telidon (NAPLPS) graphic capabilities.

Our approach involved:

- a review of available sector documentation;
- individual interviews with sector managers and other departmental representatives; and
- focus groups with selected target users.

The interview process focussed on:

- overall environment (major goals and activities, obstacles and current use of graphics in general);
- information requirements and sources;
- document creation and distribution;
- analytical and decision support tools; and
- overall perceptions of the need for graphic tools and the implications of their use.

We also reviewed documentation on user needs identified in the Manitoba Telidon Project by Trigon Systems Group, Inc., and the use of graphics in the DOC Office Communications Systems Field Trial.

The results show a need for a set of basic, flexible, yet powerful graphics tools more so than for specific office automation applications enhanced by graphics. These tools will solve immediate problems with the preparation of graphics for presentations, briefings, and written documents, and allow diagrams (as well as words) to be communicated electronically. As a second step, these graphic capabilities or tools may be integrated with other technologies to provide enhanced capabilities in many generic office automation areas such as forms management, correspondence tracking, filing and retrieval, time, telephone and project management, etc.

Specifically the graphic tools that are of immediate importance are:

1. an electronic graphic template to support the easy efficient manual creation of specific classes of business-oriented graphics;

2. an automatic business graphics package to convert spreadsheet and other numeric data directly to high-quality bar and pie charts and graphs;

3. a graphic media conversion and production centre to convert presentations, briefings, reports and other documents incorporating electronically prepared graphics, to paper, 35mm colour slide, overhead projection "vu-graph", and other media for presentation and dissemination; and

4. a communications package that facilitates easy exchange of graphic images (as well as text) throughout the sector and with a broad range of external contacts, including videotex and other databases and services.

A more sophisticated but less universal and less urgent need was discovered, for a tool that would deduce and graphically document precedence and other relationships, (such as database structures and organizational structures), automatically.

Finally, a need was identified for a state-of-the-art, multi-media conference room and presentation facility, incorporating high-quality large-screen video display, and electronic as well as traditional presentation equipment. (This is assumed to be beyond the scope of the TIMS project as such.)

There is a high degree of similarity between these needs and those identified both in the Manitoba Government Telidon/OA project, (as documented in the June 22, 1984 Trigon report), and in the DOC Office Communications Program trial (Policy Sector). It would appear that tools developed within the TIMS project for the ADMTI environment will also be applicable to Manitoba Government and DOC-Policy Sector needs. Moreover, because these are generic tools rather than specific applications, they should be of broad relevance to many office environments.

The graphics needs of ADMTI staff should be viewed in perspective, relative to the Sector's overall needs. ADMTI staff typically use graphics for a relatively small but important part of their work. They are almost universally dissatisfied with the quality, timeliness and/or effort associated with the graphic tools currently available to them. On the other hand, the level of perceived need for other office automation capabilities varies considerably. Overall, we estimate the level of need for this "graphics tool set" to be:

- among the top 15 or fewer office automation needs for most Sector staff (as a group);
- among the top 3 or 5 office automation needs for selected individuals throughout the Sector:
- among the top 5 or 10 office automation needs for staff of the target alpha and beta user groups (as a subset of all Sector staff); and
- among the top 3 or 5 office automation needs for some of those target (alpha and beta) users.

On this basis, continuation of the TIMS project seems justified.

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1. BACKGROUND TO THE STUDY

1.1 Objectives and Scope of the Study

It is unrealistic to expect that the office of the future will have only textual capabilities. Sophisticated office communications systems will offer a common visual workspace, allowing their users to process and communicate with hand-sketched pictures and diagrams as well as words. Office systems will be linked with external information and transaction services, many of which will employ graphics. Traditional financial, inventory, and other corporate information systems will integrate with the office communication system, and in many cases will report results graphically rather than merely through lists of numbers. In many corporations, the office systems will support sales and promotional activities with quality color graphic visual information.

The attributes of Telidon (standardization, efficiency, equipment independence, resolution, quality, ease of use) suggest a strong potential for its use to support these graphic applications. The Telidon Information Management System (TIMS) project explores that potential by assessing the degree to which specific management and communications functions in the automated office can benefit from the integration of Telidon (NAPLPS) graphic capabilities.

Phippard and Associates has been contracted to analyze and document user needs and to prepare functional specifications for the prototype system. These documents will provide the basis for subsequent project phases which will involve procurement and implementation of a prototype system, and evaluation of its usage.

The overall scope of this first phase includes:

- Familiarization with the target user group (ADMTI);
- Investigation and synthesis of the perceived graphics support needs of the target user group;
- Analysis of these perceived needs against known results of other studies in similar environments; and
- Functional specification of a prototype system to meet these needs.

Following the terms of reference, we assumed that no significant office communications/office automation technologies or systems exist in the target user environment. However, the scope of this study and the resources available did not allow for the broader study of requirements for office automation support in general. Consequently, we addressed these issues only indirectly, focussing specifically on the use of, and need for, graphics within the broader context of office functions and processes.

1.2 Project Work Plan

Our approach to the study proceeds through a number of stages and activities. Specifically, these include:

Task		Activities
1. Familiarization	A.	Finalization of project plans with the Scientific Authority.
	B.	Familiarization of the project team with the mandate, structure, objectives, operational environment and relevant history of ADMTI, especially the target users for the project.
2. Requirements Definition	C.	Detailed planning of the interview and data-gathering process.
	D.	Individual interviews and focus groups to determine the nature and extent of graphic support needs as perceived by the target users.
	E.	Analysis, research and brainstorming activities to rationalize these perceived needs with the results of similar studies.
	F.	Additional, more application-specific data-gathering, using feedforward and brainstorming techniques as appropriate.
	G.	Synthesis and presentation of user requirements for Telidon graphics, in interim written report and oral presentation modes.
	H.	Preparation of a final report on user requirements, incorporating feedback on the oral presentation and interim report review, as well as subsequent data-gathering.
3. Functional Specifications	I.	Development and documention of a set of measures to be monitored during operation of the alpha and beta prototypes, to support evaluation of actual versus anticipated usage.
	J.	Preparation of a "systems overview" - level functional specification, to be reviewed informally with the Scientific Authority.
	K.	Preparation of specifications for detailed system functionality, hardware and software component overviews, performance criteria, cost estimates and schedule for Phase 2, resulting in a systems specifications report.
	L.	Identification of any suggested revisions to the Phase 3 time table, scope, or project activities, if appropriate.

This report represents the results of activities A through G above. The following section outlines the methodology implemented to date; the remaining chapters present our findings and recommendations.

1.3 Analysis of Graphic Support Requirements

The approach taken to carrying out the analysis of graphic support requirements followed the work plan outlined above. The key data gathered included:

- descriptive information on ADMTI; and
- information to support analysis of potential user needs for graphics, and more specifically Telidon graphics. in an office automation environment.

These data were gathered through:

- review of available sector documentation;
- individual interviews with senior managers and other departmental representatives; and
- focus group discussions with selected target group users.

Selections of interview participants was based largely on the target groups identified by the Scientific Authority. Eight groups and eight individual interviews were conducted over the period from October 15 - October 31st, involving a total of 39 respondents. Appendix A contains a listing of the participants. Briefly, the sessions included:

- individual meetings with the Assistant Deputy Minister of Technology and Industry, the Director General of Government Telecommunications, the Director General of Technology and Policy Assessment and the Director General of Applications Development;
- individual meetings with officers representing Telidon Impact Assessment, the Department of Communications Office Communications Systems Field Trial, and the departmental Task Force developing strategies for office automation;
- three professional/managerial groups and one administrative group from the "alpha" target group -- the Telidon Program within the Applications Programs Branch;
- one professional/managerial and one administrative group from the "beta" target group --the Technology and Policy Assessment Branch;

- one group representing the Management Systems and Services Division of the Application Programs Branch; and
- one group representing the Director General of Industry and Economic Development.

An interview guide was developed for use in both individual and group contexts (see Appendix B). It included comments provided in a client/project team review meeting. The instrument asked respondents to provide information on their:

- overall working environment --i.e., their mission or objectives, activities, hassles or constraints;
- understanding and general use of graphics;
- information requirements --their nature, sources, mode of communication, use of graphics and related problems;
- document creation and distribution, with particular emphasis on use and preparation of graphics;
- use of analytical / decision support tools, with particular emphasis on the integration of output;
- need for graphic tools and related implications in terms of training and productivity benefits.

Sessions varied in length from approximately one hour for individual interviews to 2 to 2 1/2 hours for group interviews. All sessions (with the exception of four individual interviews) were tape recorded.

Group sessions involved three project team staff --a leader / facilitator, a Telidon graphics specialist and a recorder / raconteur. Individual meetings involved two members of the project team.

Results of the interview sessions were then reviewed and synthesized into an analysis framework which allowed the project team to discuss:

- the target users' current use and need for office automation tools in general and graphic tools in particular;
- the appropriateness of any identified graphics needs to Telidon technology; and
- the implications with respect to existing systems.

As well, we have related the outcomes of our analysis to the needs identified in the Manitoba Telidon Project, as well as the departmental Office Communications Systems Field Trial and the preliminary results of a departmental study to develop an informatics strategy.

Interpretation of our findings and recommendations must recognize some important characteristics of the research design and sample used. First, the respondents largely represent a new and fairly dynamic organization. The sector is relatively new and in many instances, work patterns and products have not yet been firmly established.

Secondly, we did not ask for quantitative information except in a very general way --e.g., rough estimates of the frequency of use of graphics of various kinds. Consequently, assessments of functional needs are not linked in a highly quantified way to individual target users.

Thirdly, the special nature of the target user groups (i.e., employees of the Technology and Industry Sector, many of whom are responsible for and work towards the development of Telidon technology) prevents the study from being truly objective in its exploration of graphics tools. However, graphics in the office represents a novel and unfamiliar information tool. A group of truly unbiased users may also be so unfamiliar with their capabilities as to limit experimentation as to their use (and hence the success of the trial). To some extent, the difference between the Alpha and Beta groups, in terms of familiarity with and commitment to Telidon, provides a balance between experience and impartiality.

Finally, the intent has been to determine whether Telidon can meet any identified graphics needs, not to select a graphics tool from all those available to support identified needs. This reflects the mandate provided by the terms of reference for this project.

2. THE TECHNOLOGY AND INDUSTRY SECTOR: ORGANIZATIONAL OVERVIEW

2.1 Mandate and Structure

The Technology and Industry Sector (ADMTI) was established in late 1983 to respond to the opportunities created by the convergence of communications and information technologies. Specifically, its stated mission is to:

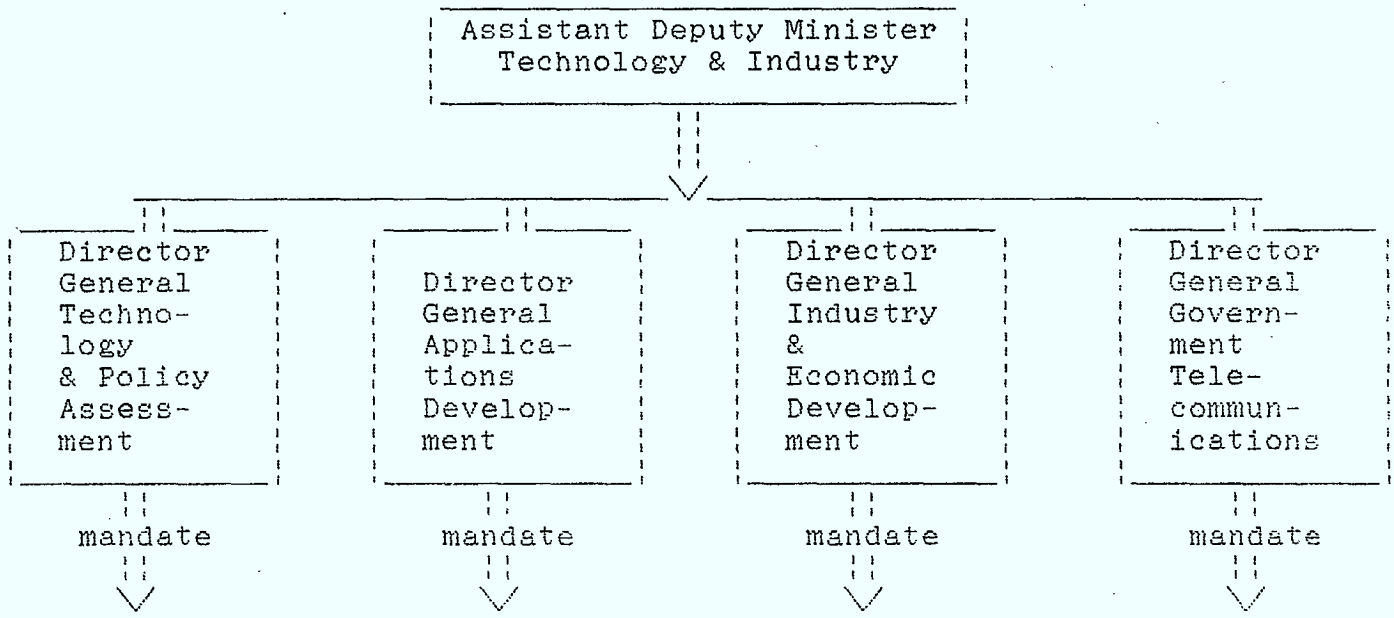
> "enhance Canadian technological and economic advantage in the domestic and foreign markets by fostering the development and application of advanced information and communications technologies and supporting the growth and development of industries creating, manufacturing and employing those technologies." (The Technology and Industry Sector Mission Statement, November 1983).

In order to achieve this broad goal, ADMTI is intended to:

- assess new information and communications technologies, along with policy and standards issues;
- explore market opportunities for communications goods and services, both domestic and export;
- develop policies, programs and facilities to assist domestic industry in the development and marketing of these technologies; and to
- develop and manage major applications programs.

Figure 1 shows the sector's organizational structure developed to carry out this wide range of functions, along with an overview of branch mandates. The following sections discuss each branch in more detail (particularly those identified as target users), including descriptions of the responsibilities of the divisions or programs and expected outcomes or results. The next chapter presents the results of our data-gathering, beginning with the goals and activities reported by representatives of the four branches. That is, we discuss here how the sector was intended to operate; Chapter 3 discusses how selected respondents report that they are currently functioning.

Figure 1. Sector Organization Structure and Mandates



To identify and assess the potential applications of new information & communications technologies against long-term economic & social trends & requirements.

To identify the policy & standards issues related to their introduction and application.

To manage major applications programs & projects designed to develop & test new technologies.

To provide the management systems & services required by the sector.

To consider ways in which information and communications technologies can contribute to the government's industrial and economic objectives.

To provide shared & customized voice & data telecommunications services & facilities to federal departments & agencies.

To provide a market base for Canadian- developed technology where appropriate.

2.2 Technology and Policy Assessment Branch (DGTPA)

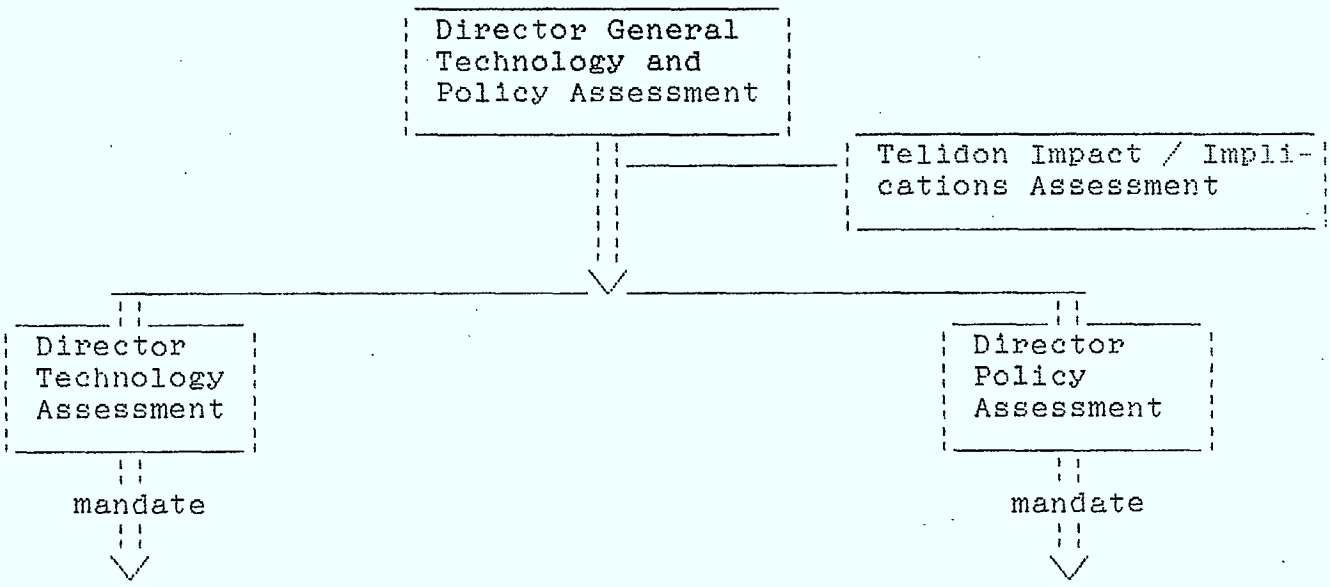
Figure 2 shows the operational structure and mandates at the directorate level for DGTPA. In identifying potential applications of new technologies and the implications of their introduction, this branch is intended to:

- provide crucial input to strategic planning for the department and definition of priorities for research and development;
- identify opportunities for applications programs;
- create strategies for standards development; and
- formulate policies for the introduction and use of new technologies.

Figure 3 presents a general model of activities, outputs and expected results for each division of DGTPA (based on the 1983 mission statement). Clearly, the major outputs of this group are intended to be largely informational/conceptual, taking the form of reports, policies, proposals, etc.

As well as the Director General and two Directors, DGTPA currently comprises approximately 8 officer level and 3 administrative support staff.

Figure 2. Technology and Policy Assessment Branch



To identify, analyze & evaluate long term trends in the evolution of technology.

To assess the direction, rate, implications and impacts of technical advances.

To assess the need for standards & resources for the orderly & progressive development of new technologies and systems.

To assess the public policy regulatory issues related to the introduction of new technologies and services at both the national & international levels.

To provide analysis for input to strategic plans for federal government policies for new technologies & services.

Figure 3(a). Technology Assessment Directorate: Operational Model

Functions / Activities:	Outputs:	Intended Results:
Requirements forcasts for expanded and new telecommunications services;	-> Reports ---------->	Comprehensive requirements database
Technology forcasts and social economic, human impact assessments;	---> Reports ---------->	Comprehensive planning database
Forcasts of market prospects for identified technologies;	----> Reports ---------->	Information for stategy development
Identify requirements and recommended priorities for R&D;	-----> Recommendations ----->	Improve linkage between the DOC Research Program and Social and Economic Objectives and Strategies
Identify opportunities and requirements for applications programs;	----> Program proposals --->	Innovative application of information and communications technologies appropriate to the Canadian context
Establish need and recommend priorities for industry programs	----> Recommendations ----->	Targetting of industry support programs in areas of maximum long term strategic advantage
Identify the need for standards for the introduction of new technologies;	-----> Reports and recommendations -->	An information base for standards and spectrum planning
Strategies for achieving acceptance of standards for the new technologies;	---> Strategies ---------->	Plans for standards development and spectrum utilized which encourage new technology applications
Planning for International Standards Meetings and fora	---> Canadian Input ------>	The protection and advancement of Canadian interest in international fora.

Figure 3(b). Policy Assessment Directorate: Operational Model

Functions / Activities	Outputs	Intended Results
Identify policy and regulatory issues arising from new technology applications.	---> Reports ---------->	An information base for public policy planning for the structure and regulations of telecommunications.
Identify the social and human implications of new technology applications.	---> Reports ---------->	An information base for social policy planning.
Proposal for Federal policies to foster new technologies applications.	--> Contributions to DOC Strategic Plan ->	Long Term Departmental Plans which facilitate structural change instead of reacting to it.
Formulate policies	----> Submissions to Cabinet ------->	A public policy environment conducive to the diffusion of new technology applications.

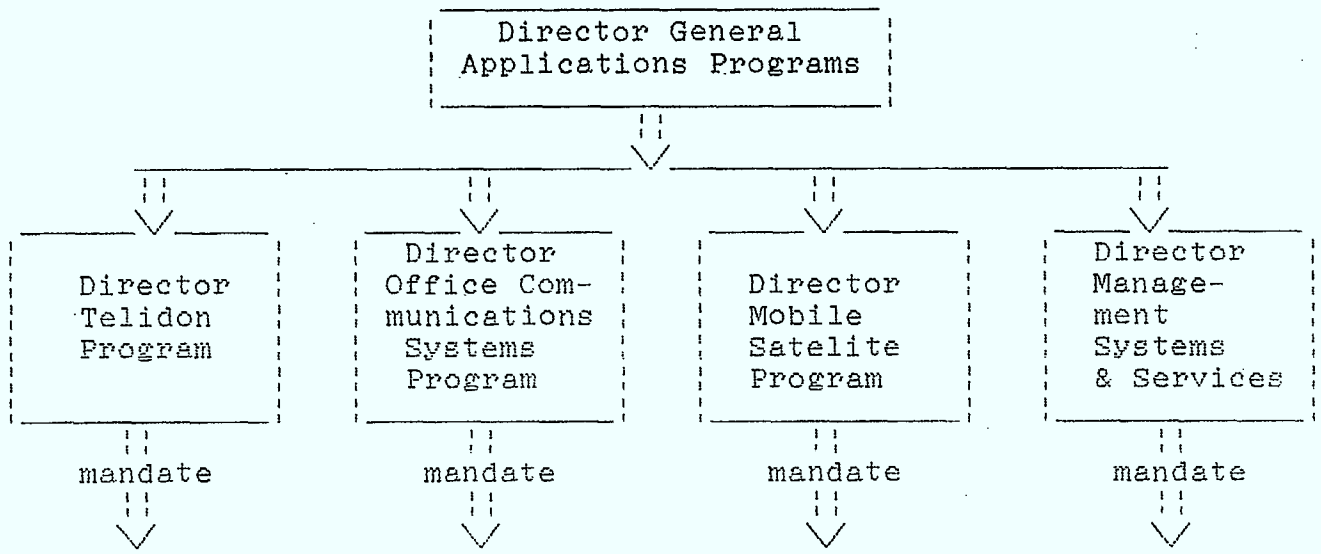
2.3 Applications Programs Branch (DGAP)

Figure 4 shows the program structure and related mandates for the Applications Programs Branch. DGAP manages the sector's development and applications programs to develop or test the concept and/or feasibility of new technologies identified as opportunities for Canadian exploitation. Since several of the activities undertaken represent "sunset" programs (i.e., they have a definite lifespan and termination date), management of the branch was intended to comprise individuals with qualifications and experience suitable to a wide range of applications.

Figure 5 presents a general model of the activities, outputs and expected results for DGAP. In general, the outputs include information, as well as considerable liaison with industry and demonstration of technologies.

As well as the Director General and four Directors, DGAP curently employs approximately 39 officer level and 9 administrative support staff. However, this is expected to decline to approximately 30 staff overall when the Telidon and Office Communications Systems Programs terminate in March, 1985.

Figure 4. Applications Programs Branch



To promote the diffusion & exploitation of Telidon technology in Canadian industries by supporting the development of new & better content & applications.

To develop a Canadian industry capability for supplying integrated electronic office systems by supporting field trials in federal government departments.

To foster the development of new mobile telecommunications services in Canada.

To maintain & operate the Sector's management control & information systems.

Figure 5. Applications Program Branch: Operational Model

Functions / Activities	Outputs	Intended Results
1. Programs and Projects (MSAT, OCS, Telidon):		
Manage approved programs / projects to meet their objectives and milestones within approved budgets	Field trials	The management of projects designed to use government as a test bed within which industry can develop new services
	Contracts with Industry	
	Impact Assessments of projects	The efficient and effective transfer to, or development of, technology in Canadian Industry
Develop program /project proposals for implementation	Proposals leading to approved programs	Implementation and management of programs/ projects for development of new services with maximun participation by Canadian Industry
	Definition of demonstration systems	
	Implementation of demonstration systems	
	Agreements with other agencies	

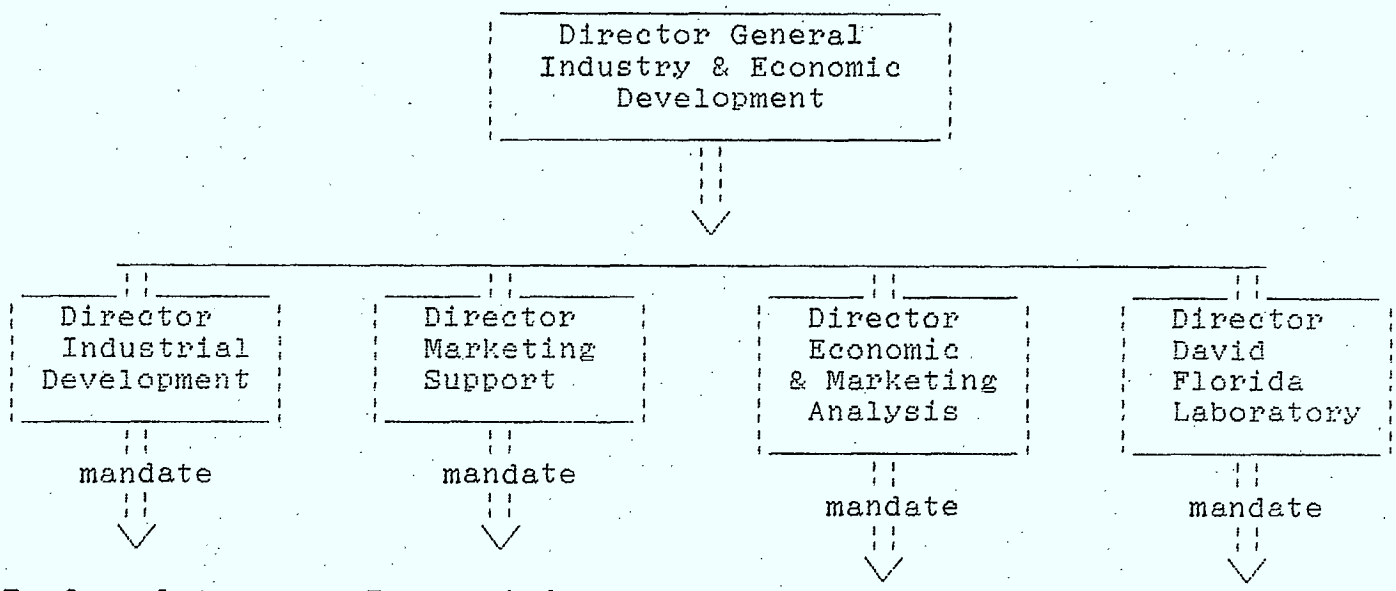
Figure 5. Applications Programs Branch: Operational Model - cont'd

Functions / Activities	Outputs	Intended Results
2. Management Systems and Services:		
Implement appropriate management systems for planning & control within the Branch and the Sector	---------> Management guidelines	---------> The establishment of management systems that meet the requirements of Sector managers
Provide management services required to control resources and to meet departmental and government requirements	--------> Management control and information systems, Operational Plans, MYOP	----> Efficient monitoring and reporting on resource utilization
Applications of advanced office technology and management practices to the conduct of Sector's activities	--------> Development of guidelines and implementation approaches for office automation	-----> Improved Sector productivity through application of office automation and advanced management practices
Support the department's participation in the Canadian Space Program and the European Space Agency Program and coordinate and prepare input to the ICS Space Plan	----------> DOC input to ICS Space Plans	-------> The management of DOC participation in international cooperative projects in support of industry development

2.4 Industry and Economic Development Branch (DGIE)

Figure 6 shows the organizational structure and mandates for the four divisions of DGIE. Essentially, this branch develops policies and programs to assist Canadian industy to develop, produce and market new technologies, and conducts related economic, marketing and industrial development analysis.

Figure 6. Industry and Economic Development Branch

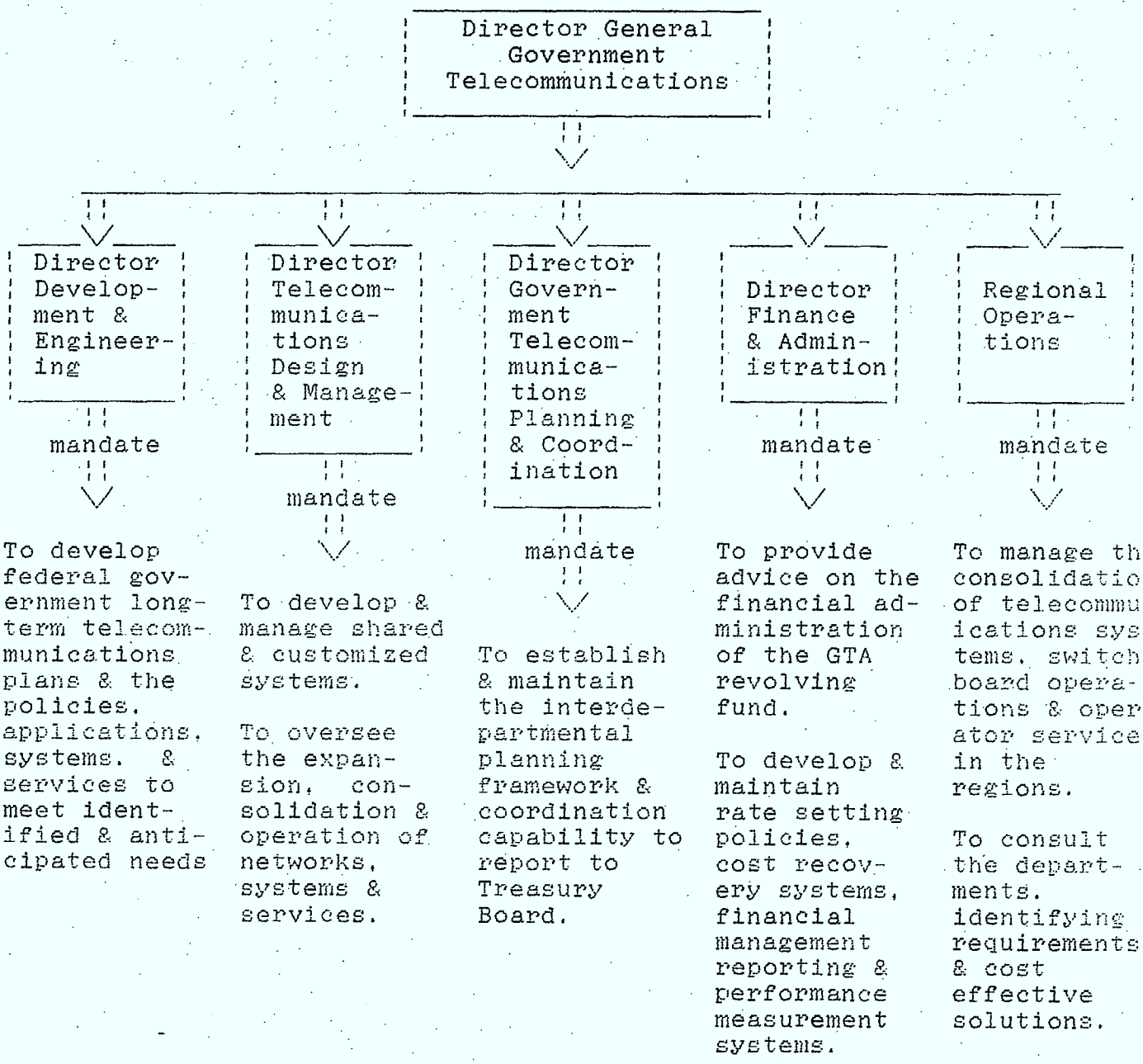


2.5 Government Telecommunications Agency (DGGT)

DGGT provides telecommunications services and facilities that satisfy the requirements of federal departments and agencies at the lowest possible cost. As well, it is responsible for developing strategic objectives and administrative policies, disseminating information, and conducting studies and pilot trials of new telecommunications technologies, including Canadian-developed technology.

Figure 7 shows the organizational structure and mandates for the four headquarters divisions of DGGT. The branch also has a decentralized field organization with six regional and eight district offices.

Figure 7. Government Telecommunications Branch (DGGT)



3. THE TECHNOLOGY AND INDUSTRY SECTOR: SUMMARY OF OFFICE ACTIVITIES AND REQUIREMENTS

3.1 Introduction

Chapter 2 discusses the mandates and objectives of ADMTI and its component branches as they are stated in the original mission statement for the sector. This chapter summarizes the activities and support requirements identified in our interviews with target users. Specifically, the following sections address, by organizational unit:

- overall environment --major goals and activities. "hassles", and general awareness and use of graphics;
- information sources and requirements;
- document creation and distribution;
- analytical and decision support tools: and
- overall perceptions of need for graphics tools and implications of their use.

The intent is to produce an overview of the nature of information processing currently operating in these groups --what they need. where it comes from. how it is processed, the extent to which it contains or might contain graphics. and any related problems or limitations. Our emphasis is on the identification of needs more so than the documentation of activities and processes.

The major focus of our interviews was two organizational units. the Telidon Program Directorate (DTL) and the Technology and Policy Assessment Branch (DGTPA), anticipated to be the alpha and beta prototype sites respectively. Our findings are reported first for these two groups. and then (less comprehensively) for other organizations for which representative interviews were conducted on a smaller scale.

The requirements are also summarized in tabular fashion. comparitively by organizational unit, in Appendix C.

For purposes of data gathering and requirements analysis for this project, the term "graphics" was defined to include a broad spectrum of visual communications - essentially any enhancement to a monochrome, single size, single font "text only" mode. "Graphics", therefore includes:

- text enhanced with multiple fonts and character sizes and/or colour:
- simple tabular charts incorporating straight lines for borders;

- pre-printed forms or form-images;
- simple monochrome line-drawings such as might be produced by spreadsheets or project management packages (schedules, etc.);
- organization charts and other box diagrams;
- graphs, pie charts, bar charts, and other "business graphic" techniques;
- complex graphics with or without color (the kind of graphics Telidon has most often been used for): and
- photographs.

3.2 Target Prototype Users: Alpha Group

3.2.1 Operational Environment

The Alpha Group of potential prototype users is comprised of employees of the Telidon Program. The overall mandate of this sunset program is to support the continued development of Telidon technology by:

- promoting the use of Telidon in organizations:
- fostering the development of new Telidon applications:
- assessing the impact of Telidon technology on its users.

These objectives are pursued through such activities as:

- participating in the development of international standards;
- liaison with industry and other organizations in the development of content, applications and market for Telidon;
- development of content for the Telidon database with related contract and project management activities;
- encouraging the use of Telidon technology in government: and
- managing Telidon equipment.

Overall, the group is expected to provide technical leadership and industry coordination for Telidon technology. However, its status as a "sunset program" within the department, due to terminate March 31, 1985, creates certain pressures and constraints on members of the group. The question of future jobs and of the

future role of Telidon in the department creates an atmosphere of uncertainty. As well, resource and staffing cuts to date have resulted in a shortage of support staff. Coupled with the generally reactive mode of working and frequently changing priorities, the resulting environment is one in which individuals report having virtually no time for planning and not enough for keepng up-to-date on technical information.

Alpha group members also indicate a number of administrative obstacles. Several feel constrained by the administrative burden, in particular the lack of clarity and in some cases. the perceived inapplicability of departmental procedures. Other general problems include the number of revision cycles for paperwork, problems associated with filing and retrieving information, poorly designed telephone management, and incompatability in word processing equipment.

3.2.2 Information Sources

Members of the Alpha Group rely on both verbal and written information sources in carrying out their jobs. A great deal of information comes from informal conversations and more formal meetings or presentations, both within and outside the department --e.g., colleagues, contractors, seminars/conferences.

Other information accessed includes journals, periodicals. reports, files. manuals, memos and data bases such as Infoglobe and Lockheed.

Information (both written and verbal) is obtained most frequently in English.

Presentations will often include graphics in the form of slide material. As well, reports sometimes include tables or diagrams. However. for the most part. other major information sources rarely contain graphics.

Overall, the types of problems that emerged with respect to obtaining required information included disorganized filing, obtaining information from client companies, too much written material with not enough time or support to catalogue, lack of procedural information and "telephone tag".

3.2.3 Document Creation and Distribution

The types of documents created by the Alpha Group cover a broad range including:

- general correspondence:
- standard reports and forms --e.g., Level 1 Reports, Contract Review Board documents, Program Approval

Documents, leave forms, etc.;

- project schedules;
- computer system documentation and procedures manuals;
- presentations; and
- papers.

These documents are distributed to other locations within the department and government, as well as to the private sector. Modes of communication include public mail, hand delivery, electronic mail, telex and videotex (using the departmental database). Communicating word processing capability has been used and may be made available again.

Document content includes both newly created text and standard "boilerplate" material and is most often in English. The process of creating documents also varies widely. Authors may provide hand-written text for secretaries to word process; may dictate; and/or may prepare text on personal computers. (The resultant document may or may not be re-typed on a stand-alone word processor.)

Most frequently, documentation tends to be relatively short (i.e., not long reports) and to include mainly text with some tables and diagrams. Reliance on graphics as a medium of communication seems to vary both according to individual preference and the availability of resources and tools. Typically, originators prepare their own graphics --often manually, occassionally electonically (e.g., Lotus 1-2-3, Mac Paint). Although a standing offer exists with several firms for the preparation of graphics, they are rarely used except for formal presentations due to administrative implications. Similarly, responsents do not often call on the internal page creator due to that person's heavy workload. Support staff may prepare graphics using a word processor or pen/pencil and ruler, but more sophisticated techniques are not used (e.g., plotters, templates). Generally, when originators do not prepare the final version of their graphics, they provide support staff with a draft sketch.

Most group participants report that their current approach to creating graphics basically meets their needs, but suggest that their perceived "needs" or demands might be different if more accessible tools were available. For example, some indicated that they would use a graphics tool if it was easy to use and offered "electronic templates", windowing, and a plotter. In this way, a large chart could be built by windowing one part at a time, producing the whole output on the plotter.

Several aggreed that improved graphics capability would help to overcome current problems in generating quality graphics -- specifically, the cost, unsatisfactory turnaround time, and

the overall effort required to obtain the final product. As well, colour is regarded as a key attribute. That is, most felt that they would use colour if it was readily available and easy to use.

3.2.4 Analytical and Decision Support Processes

For some group participants, analysis is most often qualitative assessment of written or verbal information. Others also use tools such as spreadsheet packages, electronic databases, and project and time management (e.g., Lotus 1-2-3 and Kontac). When such tools are used, the output is frequently presented in graphic form.

3.2.5 Graphics Tools: Current Use and Potential Requirements

Alpha Group participants are mixed in their existing use of graphics in their work. Some report that they prepare drawings and charts manually. Others occasionally use graphics for presentations and database structure diagrams. However, in some cases, graphics are used constantly for time management and diagrams. Generally, it appears that graphics would be used more if the effort required and responsiveness were improved -- primarily for tables, diagrams and charts. The consensus was that graphics can significantly improve the clarity and quality of information. However, support for enhanced graphics capability was typically expressed with the following qualifications:

- that the tools provided be capable of integrating text and graphics and be compatible with the existing office systems;
- that quality paper copies of the output be possible;
- that the related computer system be user friendly and centralized;
- that formal training be provided, as well as managerial support for the time required;
- that any graphic-related tool be accompanied by a library of stock symbols and templates with icons and instructions in both French and English; and
- that a prototype system offer good resolution with some colour.

Aside from these parameters for a generic graphics tool, the Alpha Group interviews also suggested a number of general applications:

- automatic generation of charts from numeric data, with

the ability to conduct a dialogue with the user to determine the most appropriate graphic representation:

- a common visual workspace to enhance the "consultative process" --that is, the ability to "point" to a common diagram so that others can see and perhaps change the same diagram;
- support for the creation and maintenance of organizational charts;
- the ability to link and combine geometric figures and to support freehand drawing;
- a tool to combine graphics with project planning, databases, spreadsheets and modelling tools, word processing and communications;
- electronic form-filling with logic/help functions;
- electronic procedures manual showing how to fill out forms; and
- electronic logging forms to track correspondence and requisitions.

3.3 Target Prototype Users: Beta Group

3.3.1 Operational Environment

The role of the Technology and Policy Assessment Branch is to identify and assess the potential applications of new technology and policy issues related to their introduction. In doing so, the Branch contributes to the Department's strategic planning, the definition of priorities for research and development, and the formulation of public policies to guide the introduction and use of new technologies.

The Technology Assessment Directorate primarily approaches its functions in a multi-disciplinary way, through such activities as econometric analysis, modelling, social impact analysis, definition of requirements including standards, and the development of policy and regulatory issues for others to analyze. The Policy Assessment function involves strategic planning and assessment of informatics policy issues in general and the departmental telecommunications policy in particular. As well, the Branch has allocated resources specifically to assessment of the potential impact of Telidon technology.

The general framework within which work tends to proceed in the Branch is to define a problem, design a project to solve it, and hire and manage a contractor to carry out the project. Research projects --most of which have only been implemented recently -- tend to be quite large (e.g., $100,000-$200,000 range).

Overall, middle management spends the majority of time in management activities such as meetings. Officers tend to spend about equal amounts of time in research (i.e., keeping abreast of technology), administration (e.g., contract management), meetings, conferences, productive project work, and in a reactive mode, responding to interuptions.

Senior management time is largely spent in communicating and planning. Since the Branch does not have responsibility for technology programs, involvement in operational management is light. Rather, the Director General is primarily occupied providing support and direction to Branch staff, planning and providing interpretation and liaison between the Branch and departmental senior managers.

Support staff carry out a broad range of standard administrative activities including logging mail, scheduling meetings, word processing, making travel arrangements, filing and some research support.

Reported obstacles to carrying out their work varied across the group. Senior and middle management indicated that time pressures and information overload are problems. The high volume and low quality of information, without an effective system for cataloguing and searching, creates great demands on time in order to remain informed. Contracting procedures are also perceived to be too time-consuming. Support staff also experience frustrations with existing office equipment, for example:

- The level of word processing equipment has been downgraded so that the features now available do not permit them to generate simple graphics. Consequently, half of such documents as the Level 1 Report are done by hand.

- Facilities to copy large reports are not immediately available and are time-consuming and inconvenient to obtain.

- Too many people are covered on the same telephone line and are dispersed over a large floor area which makes it difficult to deliver messages.

Support staff also report what they perceive to be unnecessary administrative burden in filling out forms and obtaining approvals. As well, retrieval of files from the central registry can be inconvenient.

3.3.2 Information Sources

Information sources used by the Beta Group members include other people in the department, Cabinet documents, contracted reports, online database services, the departmental library, management reports, memos, departmental planning documents,

journals and periodicals. The most important of all these sources are informal verbal communications between staff and internal and contracted written documents. Senior management tends to obtain verbal information largely through telephone conversations and boardroom sessions using the whiteboard as a common visual workspace.

Aside from commercial publications, the sources accessed provide graphic information mainly in the form of tables or diagrams in contracted studies and simple business graphics in standard management reports. The vast majority of input is in English.

Overall, the Beta Group experiences problems obtaining necessary information only in terms of occasionally slow turnaround time to retrieve files from central records, and difficulty locating some external reports.

3.3.3 Document Creation and Distribution

The types of documents created by the Beta Group include management reports and documentation (e.g., Project Approval Documents, Contract Review Board documents, Level I Reports), lengthy reports, presentations, correspondence, trip reports, memos, briefing notes and planning documents. Support staff also produce such documents as minutes of meetings and mail logs. Typically in English, most documents are handwritten by the originator, the word processed by a secretary. Some dictation is also done, and this mode of document creation may increase. Branch staff typically do not type their own documents, mainly because they do not have the equipment to do so.

Depending on their nature, documents generated by the Beta Group are distributed to other parts of the Department, to other government departments and agencies (e.g., Treasury Board, National Research Council), to provincial governments and to private firms/contractors. One major study produced to date was distributed around the world and others may be as widely circulated. Distribution generally takes place through external and internal mail and by hand. The volume of external requests for documents is reportedly significant enough to consider electronic public access capability. Current word processing equipment does not offer a communications feature.

The qualitative, text-oriented nature of policy work does not create a large demand for graphic output in documentation. However, graphics have been used for presentations, as well as simple business graphics for reports. Complex graphics and more formal presentations have been prepared by the departmental graphics staff or by the computer-aided design group at the Communications Research Centre. Telidon equipment is rarely used. More simple graphics are created manually by support staff, usually after being sketched by the originator.

At the senior management level in the Branch, the graphics now

used are satisfactory. The use of whiteboards and colour-enhanced overheads serves most of the Director General's needs. Although more applications of graphics tools were perceived at the operational level, some reluctance was expressed towards using graphics to convey complex ideas. The concern is that extensive use of graphics in a text-oriented environment might be perceived as a superficial, imprecise way of dealing with policy issues. Another factor impacting on current use of graphics is the cost and effort required for something that might not be re-usable.

Middle managers and officers, however, report that better graphics tools to enhance document creation would be welcomed. They are not currently satisfied with the quality, flexibility, time and effort required to generate graphics.

3.3.4 Analytical and Decision Support Processes

The use of formal tools for analysis and decision support is quite limited in the Beta Group. Most analysis entails the qualitative assessment of verbal or written information. Some interest in "idea generator" software was expressed. But overall, the need for personal/time management tools appears to be minimal.

3.3.5 Graphics Tools: Current Use and Potential Requirements

Currently, the level of graphics use among members of the Beta Group is quite low. Presentations have constituted group participants most significant applications to date. However, most report that they would use graphics if good tools were available. The kinds of operational parameters they would expect to see related to such tools include:

- the ability to generate both drawings and business graphics with automatic dating of all creations;
- the ability to store and manipulate diagrams and tables;
- availability of colour but compatible with monochrome plotters or screens;
- a common data base of graphic symbols and charts with the ability to update and iterate;
- easy to use, preferably with the ability to integrate graphics with text;
- formal training; and
- more working space for effectively accommodating any terminals.

The group plans to improve the current status of graphics tools with or without a prototype system. A much more extensive need for graphics is foreseen as the group's work begins to yield products (e.g., studies, policies). Much of the input from contractors is already graphical.

The nature of potential applications cited ranged from simple tables and diagrams to the capability to replace the whiteboard with an electronic graphic presentation that functions as an interactive thinking tool or thought facilitator, pictorially representing group discussions in first electronic, then paper form. Overall, the expected improvements in results are felt to justify the time required to learn how to use graphic tools.

3.4 Office of the Assistant Deputy Minister

Administrative activities in the office of the ADM includes a heavy portion of logging mail and other correspondence. This is currently done manually and could benefit from an automated tracking and bring forward system. Documents prepared for the Minister must be in French, which has meant an increase in translation requirements.

The ADM is a participant in the DOC Office Communications Systems field trial and the IRIS Telidon trial. Consequently, he has access to other senior managers and staff participating in the trial through an electronic mail system and has access to a Telidon terminal. He provides direct input to the mail system (i.e., types and sends his own mail and messages) which is not reflected in the general correspondence log.

Graphics support requirements at the ADM level consist largely of the percieved benefits of graphical representaion of internal sector data, specifically the project management and financial information found in Level I Reports. Similarly, business graphics to represent financial operating data for the sector at the departmental level would be useful. Conversion of such presentation materials to hard copy (both black and white and colour) and to other presentation media (e.g., 35mm slides and vu-graphs) would be important. Beyond these basic management requirements, access to a data base to provide graphics for senior level briefings would also be desirable. Otherwise, more sophisticated graphics are not percieved to be cost-justified.

3.5 Industry and Economic Development Branch

The Industry and Economic Development Branch (DGIE) formulates policies and programs to help Canadian industry develop and market new technologies and services, and conducts related economic and marketing analysis.

The Branch representatives interviewed reported that they produce a lot of short internal briefing papers and presentations. Indeed, they estimate that at least one-third of their time is spent preparing and giving presentations to industry and other government departments. Many of these presentations contain some similar content, but typically considerable up-dating is done.

Graphics included in briefings and presentations are either prepared manually or sent to graphic designers, a Telidon page creator or to be created on a Hewlitt-Packard graphics system outside the sector. These methods reportedly involve delays in turnaround time, as well as problems in making changes.

Our interview with this group suggested that graphics capability would be used regularly to achieve the perceived benefits of better quality output, enhanced understanding of presentations and potential time savings. Better graphics tools would be used for both presentations and reports. Ideally, these would be integrated with existing word processing capability, but would still be used otherwise.

More specifically, the graphic tools provided should offer:

- An electronic drawing template, supported by a central library of symbols. This type of tool would probably be located in a central area to be available for such applications as diagrams to both officers and support staff.

- A tool that would automatically generate graphs and charts, ideally integrated with other capabilities so that data would not have to be entered again.

The first type of tool would allow Branch staff to create original graphics as required, rather than using other sources as they have done to date due to the time required to create better representations. As well, both types of graphics tools would offer the flexibility to compare alternative presentation formats --currently a very time-consuming process.

As well, this group suggested a need for a dedicated presentation room with a Telidon control terminal, large screen and several monitors, all driveable independently. This would allow the use of additional pictures on monitors to support the main presentation. Such a capability would require both the physical facility, as well as the improved equipment and software. They also emphasized that hard copy of graphic outputs is important.

3.6 Government Telecommunications Agency

The Government Telecommunications Branch (DGGT) has the mandate to provide telecommunications services to federal departments and agencies at the lowest possible cost. Overall, this Branch is an acquisition and distribution organization, matching telecommunications products and services from industry to the needs of various government users. As well, it is responsible for developing strategic objectives and administrative policies. and conducts studies and trials of new technologies.

The Branch has a continuing need to obtain and maintain an up-to-date inventory of information and to keep up-dated organization charts. Branch staff make frequent use of graphics for these and other applications such as a Level 1 Report, engineering designs and configurations, management information system documentation, financial reports, cost trends, and presentations. These take the form of diagrams, tables, pie charts and graphs, some of which are in colour. Indeed, approximately 30%-50% of the documents produced in the Branch contain extensive graphics.

These documents are distributed both within and outside the department and government, with particularly heavy distribution to regional offices, other departments and suppliers/contractors. Distribution modes include public and internal mail, electronic mail and communicating word processors.

The graphics currently used are created:

- through terminals linked to a central microcomputer;
- by engineers using a computer-aided design (CAD) system;
- by secretaries using either pre-formatted pages and felt pens (e.g., to prepare organizational charts) or word processors;
- by using Telidon either directly or indirectly (through 35mm slides) for presentations.

Although these methods generally meet existing needs, genuine improvements might be achieved in graphic efficiency, cost and quality with better tools.

The Branch also undertakes a considerable amount of quantitive analysis, including statistical analysis, modelling, financial analysis, economic evaluations and project management. These activities are generally carried out with automated packages. Occasionally, the need arises for the graphic output of this analysis to be incorporated into other reports, systems or presentations.

Graphic tools that provide good, easy-to-use business graphics would be used extensively in lieu of tabular reports. Branch Management also anticipates that better electronic graphic templates which they anticipate would provide a net increase in efficiency. As well, our interview identified a need for:

- support for presentation preparation;
- automation of the graphics used in the inventory control system;
- integration with text, if possible:
- a system that provides quality paper output;
- a system that supports standard formats --i.e., a certain diagram must always be done with the same colours, size, scale, etc.

3.7 Office Communications Systems Program

The Office Communications Systems (OCS) Program is a sunset program operated within the Applications Programs Branch (DGAP). Begun in 1981, its mandate is to develop a Canadian industrial capability to supply integrated electronic office systems by supporting field trials in federal government offices.

Our data-gathering included an interview with the Director of the OCS Program in order to obtain an overview of potential graphics needs within that area of DGAP, and to identify any preliminary findings or trends from the field trials with respect to the need for graphics in an office automation environment.

Within the OCS Program itself, graphics are mainly used in preparing presentations for seminars and briefings. Usually, the originator will provide a rough layout to either a secretary/word processing operator, or will have more formal material prepared by a graphic artist. The latter process typically involves a two-three week turnaround time. Telidon has also been used, and can cut down on the turnaround time, but is sometimes not used due to perceived density/resolution limitations for display, in relation to the complexity required. However, over 90% of the presentation material could be handled well by converting from Telidon as a creation medium to 35mm slides or foils as a display medium.

The Program maintains a stock of textual and graphic presentation materials.

Other than presentation requirements the work of OCS staff is largely verbal (i.e., obtaining and disseminating information) and text-oriented and does not require graphic support. Indeed, even if more sophisticated graphics tools were available, they would not be used directly by Program management due to the

already demanding workload.

OCS Program experience to date suggests that graphics does not tend to be a high priority among office systems requirements. The primary problem to be solved is developing an office system with a high degree of functionality and interconnection. To do so requires overcoming problems with standards and gateways. In the view of the Director of the OCS Program, the idea of building Telidon graphics capability into an office system introduces even more problems related to interconnectivity. As well, the integration of voice and data was indicated to be more important than text and graphics.

Although the Program recognizes the attempt through such activities as the TIMS project to develop more Telidon applications in industry, a perceived absence of support for Telidon by office technology firms in their product development was also noted. The suggested rationale is that users are not likely to disregard their investment in personal computers with graphics software in favour of Telidon technology. Any development of Telidon graphics for use in the office environment should, however, be directed towards integration with regular office functions and be easy for staff to learn.

3.8 Management Systems and Services Division

The Management Systems and Services Division is responsible for maintaining and operating the management control and information systems for the Sector. Current activities include the development of a resource information system (financial and human), a reporting/accounting system (Level I) and a management manual for ADMTI (being prepared by the Bureau of Management Consulting).

Much of the Sector's work is project-oriented, driven by individual needs with little integration of projects and results. Consequently, management systems have often been in a state of flux with those responsible operating too much in a reactive mode to develop them further. As well, the original structure of the Sector is changing and this Division now reports to both the Director General of Applications Programs and to the ADM directly.

The work being conducted by BMC is being expanded by the Division to provide more specific procedures and there is some interest in storing such procedures on a Telidon data base. As well, Management Systems is looking into the problem of lack of compatability between existing systems (e.g., AES and Kontac). The group also hopes to develop standard formats for spreadsheets for financial clerks throughout the Sector's various branches, breaking out the budget by line object.

The Division communicates mainly with the departmental finance and other groups within ADMTI, and less frequently with other

departments and agencies.

The perspective of Management Systems and Services on the graphics needs of the Sector was that TIMS should provide tools that assist, enhance and standardize. That is, they should:

- be easy to use, need-oriented and result in time savings;
- enhance the final product through greater clarity, neatness and colour;
- pre-do as much as possible of administrative procedures (e.g., forms, letters, graphs, charts) to facilitate uniformity at the senior management level.

Such tools would be used for the communication of procedures, to support the preparation of presentations and to provide a sector-wide roll-up of the variance graphs in the Level I Report for the ADM. The Level I Report currently takes two days per month of Sector management time and involves inconsistent approaches. Consequently, they would like to provide managers with a standard spreadsheet package with business graphics that would produce such outputs as a bar chart showing the relation between dollars spent and goals met.

Other office support needs identified include:

- electronic mail to communicate both within and outside the Sector and department;
- automated bring-forward system; and
- communicating word processing capabilities.

4. GRAPHIC SUPPORT REQUIREMENTS

4.1 Introduction

The previous chapter of this report included a summary of needs identified during the data gathering activities, presented by organizational unit. These included graphic support needs as well as other application, technical and administrative needs.

This chapter focuses on the graphic support needs only. This reflects the scope and mandate of this project, which is to identify those needs that can be met through the application of Telidon technology, as a subset of the systems that would be required to support all office processes.

Please refer to our definition of "graphics" in Chapter 3, Section 3.1.

These needs are presented in a synthesized summary reflecting the overall ADMTI data gathering and analysis results. However, where important differences were found between individual divisions or directorates within the sector, these are identified as appropriate and may be explored further in Chapter 3, and in the tables in Appendix C.

The study team approached the data gathering and analysis without pre-conceived solution biases. Our methodology allowed for the study of needs at two levels:

- functions or tools, and
- applications.

Functions or tools are generic capabilities that may be used for a variety of purposes. Applications are usually complete solutions, tailored to specific needs or problems.

The results reflect a strong emphasis on the first category of needs, in all graphic areas. Although this may be surprising to those who expected there to be strong specific application-level needs, we believe that the results are reasonable.

Because of the organizational youth and changing mandates within ADMTI, many potential users are unsure what their specific application needs may be six months into the future, but are quite confident that their activities will be generally of a nature that will almost certainly require the support of certain generic tools.

Current professional thinking, both within ADMTI and in the industry in general, is that to be successful, graphic aspects of the automated office must be completely integrated with all other aspects. While relatively few office applications are exclusively graphic, many are impractical to implement without some at least primitive graphic capabilities, and many more would benefit from, but do not absolutely, require graphics.

In several areas within ADMTI, electronic office tools are beginning to be made available to management, project officers, and/or administrative staff. These consist mostly of:

- arithmetic and analytical tools (spreadsheets, for example);
- communication tools, (telephone management, etc.);
- text creation and text management tools; and
- time management tools (calendars, etc.).

The requirements described in this chapter are for a set of automated graphics creation and management tools which can be used independently for exclusively graphic applications, and integrated with other tools to create more complex, multi-functional applications. The provision of at least a subset of these graphics tools seems to be a meaningful and worthwhile immediate objective for the TIMS prototype system.

However, it is envisaged that over time, additional needs in the target user areas can be met through the development and implementation of more traditionally "office automation" applicat-ions. (These may include forms management, filing, cataloguing, correspondence tracking, teleconferencing, mail and messaging, electronic procedures manuals, etc.) In fact, we expect that, as they become familiar with the tools available to them, some users may begin to develop their own specific applications, to meet individual needs.

These office automation applications would utilize the graphic tools to varying degrees according to their need for graphic support. It is possible that NAPLPS, which is envisaged as the basis of the graphics tools, may also be employed as a standard user interface to all the user's office automation applications, taking advantage of its user-friendliness to improve the connectivity and consistency of the overall office automation environment.

Although this approach of providing basic tools at first, followed by application-level systems, is evolutionary rather than revolutionary, we believe that it will result in a more successful pilot, and better user acceptance of these new tools without unnecessary "cultural trauma" in the changing office environment.

In each of the following sections, a specific graphic capability requirement (or "tool") is described in terms of its:

- intended use (applications);
- basic features and capabilities required;
- enhanced features and capabilities desired; and
- potential for inclusion in the TIMS pilot/prototype system.

The final section of this chapter is intended to briefly place these graphics needs in perspective relative to overall office communications systems needs.

Several required features or characteristics were identified as mandatory for all graphic tools, and in fact for any automation or technology to be introduced to ADMTI. These are identified here to avoid repetition:

1. Training support:

   Formal, scheduled training sessions geared to non-technical personell, must accompany each new tool or system. This should include an adjustment of the worker's deadlines or workload if appropriate, to facilitate effective participation in the training session.

2. Documentation:

   Concise, yet thorough, documentation must accompany each tool. This documentation must be geared to non-technical, inexperienced staff at management, professional and clerical levels, and should be free of jargon.

3. On-line Help:

   User-friendly explanations of options, errors, and required user actions should be readily available to the user at his work-screen.

4. Ease of Use:

   The tools must require a minimum of effort, interaction, and input from the user. The tools should automatically make default choices where options exist, and provide the user with the ability to over-ride these defaults, at his desire. Lengthy sequences of commands should not be necessary, and all commands should be bilingual, in plain language, and as self-explanatory as possible.

5. The Diskette Jungle:

   There is a growing concern that as offices become automated, workstations that use diskettes for local storage of applications, tools and information may replace paper shuffling and burden, with diskette shuffling and burden. While this is acceptable at some level, the tools should be implemented and integrated in such a way as to minimize unnecessary proliferation and handling of diskettes.

6. Integration and Compatibility:

   Although the tools are described individually in the following sections, there is a high level of need for the integration and compatibility of all tools. Each tool or

function should be useful and meet appropriate application needs independently of the others, but each should interface effectively and efficiently with the others. For example, it should be possible to take a graph created by the automatic numeric-to-graphic tool (Section 4.3), enhance or overlay it with additional graphics using the graphic creation tool (Section 4.2), communicate it to others with the communications tools (Section 4.5), and convert it to another display medium using the media conversion and production facilities (Section 4.4). In fact, it is not necessary that these be physically separate tools, as long as each is conceptually and functionally separate, and accessible to the user independently of the other functions.

4.2 Graphic Creation

There is a need for a highly automated and simplified graphic creation capability which is specialized to the kinds of graphics required to support office documents, presentations and activities.

Applications and intended use:

- creation of pie charts, bar charts, graphs, organizational charts, tables, schedules, and other simple diagrams, as part of the process of creating reports, published papers, memos and other documents including the Level 1 Reports;
- preparation of exhibits and graphics of a similar nature, for formal presentations and briefings;
- possible use for more decentralized creation of simplified content for videotex databases within the sector, directly by project officers and administrative staff;
- possible utilization to create the standard forms to implement future electronic forms creation & management applications, correspondence/financial/periodicals tracking logs, and cataloguing applications;
- possible utilization to prepare diagrams to support electronic procedures manuals applications.

Required features and capabilities:

This tool should not be confused with currently available full-NAPLPS page creation systems. While page creation systems might be considered as a powerful electronic replacement for various coloured pens, pencils, compasses, etc., the tools required here would be the equivalent of a template of pre-defined symbols such as a programmer's template. The emphasis is on the standardization of symbols and on very high levels of user friendliness, specialization and automation. Current page creation systems are

too comprehensive and too powerful in a general way, and would require too much user training to be universally accepted and used by office workers at all levels. (This does not mean that current page creation systems could not be simplified, adapted, or "front-ended" to meet the needs identified.)

The requirement is for an "ELECTRONIC GRAPHICS TEMPLATE" with these features:

- It should have a library of frequently used symbols, such as circles, rectangles, arrows, brackets, pie segments, greek symbols, etc., plus a selection of standard backgrounds, borders, and formats for repetitive presentations.

- It should have the ability to add to or modify this library, possibly at the worker's station and also at a central "master" station within the organizational unit. The "master" station may have additional NAPLPS page creation capabilities not available on regular workstations. (There should be some control over the content of the common library, but individual users might have their own personal libraries, with additional symbols commonly used by that user.)

- The user should be able to retrieve symbols from the library by name, scale them up or down in size, rotate them, place them anywhere on the screen, add other symbols, connect symbols with lines, change the texture of symbols & lines (dotted, dashed, etc.), annotate or label the diagrams with text in one or more of several standard (pre-selected) character size/font combinations, and specify one of several (perhaps 8) standard pre-selected colours for any one or more lines, symbols, labels, etc.

- It should be possible to overlay one symbol or entire screen with another.

- Resultant composite graphic creations must be scalable, movable, and storable at the user's workstation for later retrieval by keyword/label.

- The tool should automatically record the date each graphic was created, and optionally (at the user's request) automatically display the date when the graphic is displayed.

- It must be possible to print or plot each graphic in a convenient manner, either locally at the user workstation and/or through the media conversion and production facility (Sec. 4.4). It must be possible to easily send graphics to this facility for conversion to other media, and to send them to other users and destinations through the communications tools (Sec. 4.5).

Desired features and capabilities:

These features were identified as being desired, but not absolutely necessary, by a significant proportion of the interviewees:

- It is desirable for users to have the ability to create timing and animation effects by creating graphic compositions which deliberately use pauses and/or overlays for these special effects.
- It would be useful to be able to create single graphic display "frames" which are larger (in size/resolution/content) than the user's workscreen can display. This would involve "windowing", allowing the user to see any contiguous segment of the image at one time, and facilitating transfer of the complete image to the media conversion and production facility (Section 4.4), for printing as one complete display on a high-resolution colour or black and white plotter.
- There is a need for the capability to create graphics using a resolution twice that of normal Telidon. (i.e. 512 x 400 pixels rather than 256 x 200). This would allow more detailed diagrams and graphs, finer annotation and labelling, and the display of 80 columns or characters per line of display. (Even higher resolution, such as approx. 1000 x 1000 or 2000 x 2000, is desirable if it does not negatively impact user friendliness, but is not necessary.)
- Integration with word processing systems and packages currently in use or anticipated to be in use within ADMTI, is important. This includes Wordstar, Multimate, Word Wand, and potentially other packages on the same work stations, as well as the stand-alone AES word processors currently in use, if possible. This involves the user being able to switch back and forth between text creation and graphics creation modes during preparation of documents, and to conceptually place the graphics within the text, for distribution of these documents through the graphic communications and conversion/production facilities.

Any other features or "excess capabilities" may be of longer term value but must be completely transparent to the novice user, to avoid learning curve, confusion, and "culture shock" problems.

Recommendation for the prototype stage:

We recommend that this tool, with those capabilities identified as "required" above, should be implemented in the alpha and beta prototypes.

The additional "desirable " features identified should be included, if possible, given the prototype budget and time constraints. These should be transparent to users who do not require them (except perhaps the word processing interface, which would likely be used by most users and therefore need not be transparent).

4.3 Automatic Number-to-Graphic Generation

There is a need for the automatic conversion of numeric results and data, whether provided by spreadsheets or other tools, or from manual form by the user, into quality graphical representations. These representations would include bar charts, pie charts and bi- or tri-axial graphs (two or three dimensions). This should be achievable without a burden of user instructions: the tool should be powerful and automatic. However, the users anticipate the need to experiment and interact with the tool for important graphic displays, varying scales, colours, orientations, and other attributes that would be assigned automatically by default by the tool.

Applications and intended use:

- creation of pie charts, bar charts, graphs, and other diagrams from numeric data as part of the process of creating reports, published papers, memos and other documents including the Level 1 Reports;
- preparation of exhibits and graphics of a similar nature, for formal presentations and briefings;
- possible use for graphic portrayal of project management, budgeting, accounting, and other application data;
- possible use for more decentralized creation of simplified content for videotex databases within the sector, directly by project officers and administrative staff;
- possible utilization to graphically portray statistical performance data collected by future automated correspondence and financial tracking applications.

Required features and capabilities:

The requirement is for an "BUSINESS GRAPHICS TOOL" with these features:

- The tool must perform simple conversion of numeric sequences to classes of graphics as identified above. It should be able to generate the graphic in an

intelligent manner without asking the user a series of questions; it should be able to use programmed defaults. However, the user should be able to over-ride these defaults, to change:

- the type of graphic display selected (i.e. bar instead of pie chart);
- the orientation of the graphic (axis, bars, etc);
- the scaling, and relative size of the graph on the screen;
- the colours and textures of lines, pie segments, bars, etc.;
- the labels, including position, size and colour of text (2-3 standard text sizes may be sufficient).

- Multiple colours are required on one graph, but a total of 16 possible colours is anticipated to be plenty, and 8 is probably enough.

- The tool should automatically record the date each graphic was created, and optionally (at the user's request) automatically display the date when the graphic is displayed.

Desired features and capabilities:

These features were identified as being desired but not absolutely necessary:

- The user should be able to record or save for later re-use, a special set of parameters or features selected for a specific type of graph. For example, if the Level 1 Report each month has a pie chart which is most effectively created by over-riding several parameter defaults, the tool should be able to remember what these defaults were and re-use them at the user's command.

- The tool should be able to accept and understand numeric values in a variety of formats, from different financial and analysis tools. Possibly the tool should be able to understand any numerics presented in the common "Data Interchange Format" (DIF).

- Specifically, the tool should be able to understand numeric values produced directly by Lotus 1-2-3.

- It should be possible to overlay multiple graphs in an intelligent and presentable manner. This may involve automatic re-scaling of graphs to be compatible with multiple display.

- It should be possible to combine or sum two graphs, to show the result as one line (or set of bars) representing the sum of the two combined graphs. This

may also involve automatic re-scaling.

- It should be possible to scale down and combine up to four full-size graphics, displaying them in a 2x2 grid on the resultant display, adjusting the resolution and revising text sizes as necessary.

- There is a need for the ability to create graphics using a resolution twice that of normal Telidon, (i.e. 512 x 400 pixels rather than 256 x 200), allowing more detailed graphs, finer annotation and labelling, and the display of 80 columns or characters per line of display. (Even higher resolution, such as approx. 1000 x 1000 or 2000 x 2000, is desirable if it does not negatively impact user friendliness, but is not necessary.)

- Integration with word processing systems and packages currently in use or anticipated to be in use within ADMTI, is important. This may include Wordstar, Multimate, Word Wand, and potentially other packages on the same work stations, as well as the stand-alone AES word processors currently in use, if possible. This involves the user being able to switch back and forth between text creation and business graphics modes during preparation of documents, and to conceptually place the graphics within the text, for distribution of these documents through the graphic communications and conversion/production facilities.

Any other features or "excess capabilities" may be of longer term value but must be completely transparent to the novice user, to avoid learning curve, confusion, and "culture shock" problems.

Recommendation for the prototype stage:

We recommend that this tool, with those capabilities identified as "required" above, should be implemented in the alpha and beta prototypes.

The additional "desirable " features identified should be included, if possible given the prototype budget and time constraints. These should be transparent to users who do not require them (except perhaps the word processing and Lotus 1-2-3 interfaces, which would likely be used by most users and therefore need not be transparent).

4.4 Graphic Media Conversion and Production

There is a need for a readily accessable, highly automated and simplified production facility where graphic displays created using Telidon (and potentially other electronic technologies) can be converted to other more traditional media for dissemination and presentation. This facility would also support the assembly of independent graphic creations into integrated, thematic presentations, still in the Telidon format.

This reflects the fact that Telidon is likely to be accepted and exploited in ADMTI and other office evnironments, first as a graphic creation medium. Initially, office workers will want to continue using the dissemination or presentation (display) media they are already comfortable with (35mm slides, overhead projector/vugraph, paper, etc.), but will readily accept the superior capabilities of Telidon in the creation of those displays. As electronic mail and other communication technologies proliferate in the office, increasing comfort with these technologies and the gradually changing office culture will lead to Telidon being used more and more as a communication and presentation medium, as well as a creation medium.

Therefore the level of need for this "GRAPHIC PRODUCTION CENTRE" is greatest immediately, and will reduce but not disappear in a few years.

Applications and intended use:

- production of hard-copy graphics, whether integrated with text or not, for:
  - management review of draft presentations and briefings,
  - preparation of audience hand-outs for formal presentations and briefings,
  - production of colour and black-&-white hardcopy for reports, papers, memos, and other documents for internal, and especially external, distribution;
- production of 35mm and/or vugraph versions of presentations and briefings, especially for use in remote locations where Telidon "slide projector" equivalents may not be available;
- creation of complete shows or presentations, including timing and sequence aspects, from component graphic screens;
- composition of complex displays from components that themselves were created at the limit of complexity allowed by the other tools described.

Required features and capabilities:

This "GRAPHIC PRODUCTION CENTRE" may be resident at each user workstation, but very little need of this was identified. Rather, we envisage this capability to be centrally located within each relatively small organizational unit, (not physically remote from the users), in much the same way as a photocopier. It may need to be electronically accessable from a user's workstation, or some of its capabilities may need to be duplicated on each workstation, in order to achieve the capabilities outlined below.

- The users require the ability to convert from:
  - Telidon to colour 35mm slides (and, if possible, prints),
  - Telidon to colour vugraphs for overhead projectors,
  - Telidon to quality colour plot (on paper), possibly including high resolution capabilities,
  - Telidon to quality black-&-white plot or printout, at high speeds (perhaps 30-60 seconds per page).

  If possible the user should be able to remotely request (from his workststion) at least the last two and preferably all of these actions, by sending the image with appropriate instructions, electronically to the production centre.

- It must be possible to select graphic items from multiple sources, arrange them in a sequence for a formal presentation, and create a portable copy of that presentation on a medium (probably floppy diskette) compatible with popularly available Telidon "electronic slide projection" equipment, including that which is now available in ADMTI or DOC boardrooms.

- It should be possible to send sequences of graphic items to a DOC Telidon database for insertion, storage, and later retrieval by Telidon videotex equipment.

Desired features and capabilities:

These features were identified as being desired but not absolutely necessary, by a significant proportion of the interviewees:

- In the creation of sequences for "electronic slide projectors", it is desirable to be able to assign time delays and produce an output which is compatible with available billboarding or automatic display cycling equipment, for unattended use. This should include the ability to assign the timing and sequences, and review the timed result, at the user workstation if possible.

- It is desirable to be able to overlay multiple graphics, potentially from different sources and created by different tools, to compose combined

displays as part of the production process.

- The ability to vary the resolution (low-256x200, medium-512x400, and perhaps high resolution options) of the outputs produced, especially paper outputs, would be helpful.

- There is a need to create intelligible black-&-white versions of colour displays for dissemination on paper, in printed and photocopied reports. This should include the conversion of coloured backgrounds to white, the conversion of labels and text to black, and the ability to substitute texture for colour on lines and symbols (for example, convert red lines to dotted lines, blue lines to solid lines, green lines to dashed lines, etc.) This conversion should utilize automatic default assignments, with the user being able to over-ride the defaults.

- It is desirable to be able to compose large/high resolution diagrams for production on a colour or black-&-white plotter, by composing several "windows" or components, each of which represents a full low-resolution screen.

Any other features or "excess capabilities" may be of longer term value but must be completely transparent to the novice user, to avoid learning curve, confusion, and "culture shock" problems.

Recommendation for the prototype stage:

We recommend that this tool, with those capabilities identified as "required" above, should be implemented in the alpha and beta prototypes.

The additional "desirable" features identified should be included if possible given the prototype budget and time constraints. These should be transparent to users who do not require them.

4.5 Graphic Communications

ADMTI user needs include the capability to electronically communicate graphics to and from other sources and destinations, both within the alpha and beta sites and externally to the trial, and to access both Telidon-NAPLPS and regular ASCII alpha-numeric database services.

Applications and intended use:

- communication with external Telidon-NAPLPS databases, to send and retrieve images for forms management, correspondence tracking & logging, periodicals tracking & cataloguing, electronic procedures manuals, presentation storage and retrieval, and traditional videotex applications,
- communication with other TIMS (prototype) users,
- communication with client companies, contractors, other non-TIMS DOC staff, and non-DOC contacts, in the dissemination and collection of financial, contractual, procurement, research, and other information. This includes external equipment which may or may not be compatible with all capabilities of the TIMS prototype tools and their creations.
- communication with normal ASCII alpha-numeric research and information databases and contacts.

Required features and capabilities:

The requirement is for a "COMMUNICATIONS PACKAGE" with these features:

- It should be possible to send any image created with the TIMS graphic (and other) tools, from one TIMS workstation to another, in a store-and-retrieve mode. (Both users should not have to be "signed on" for the communication to take place.)
- It should be possible to send any image to non-TIMS destinations, also in a store-and-retrieve mode. Destinations may include other DOC, government, and private sector contacts. Vehicles may include ENVOY-100 or other electronic mail services, DATAPAC or other networks, or simple point-to-point telephone links. At the (TIMS) users option, graphics should be stripped from the images for "text-only" transmission to destinations that do not have Telidon-NAPLPS graphic capabilities.

- It should be possible to receive ASCII alpha-numeric and Telidon graphic messages and documents from these external contacts.

- This tool should include the communications management and decoding capabilities necessary to access any DOC or external Telidon-NAPLPS or ASCII database or information service, both to send and to receive information, including the ability to locate and store information retrieved from these remote sources.

Desired features and capabilities:

Some potential users identified the desirability of a teleconferencing capability in conjunction with the intra-TIMS and especially the external communications features. This involves the capability for two or more users to share a common display on their respective workstations, usually in real time (all are "signed on" simultaneously). Any conference participant should be able to change or point to (with the "cursor") any aspect of his display within the limits of the tools available on his workstation), and these actions should be seen immediately by all other conference participants on their own screens.

These and any other features or "excess capabilities" may be of longer term value but must be completely transparent to the novice user, to avoid learning curve, confusion, and "culture shock" problems.

Recommendation for the prototype stage:

We recommend that this tool, with those capabilities identified as "required" above, should be implemented in the alpha and beta prototypes.

We recommend that teleconferencing options identified should not be implemented, at the alpha/beta prototype stage, for these reasons:

- Increased complexity and a heavier user training burden is likely to result.

- The anticipated impact of this feature on prototype cost and schedule does not seem warranted at this time, due to the relatively low level of perceived need.

- The external teleconferencing capability was seen as more important than the internal (intra-prototype) equivalent. However, this part cannot be implemented with sufficient capability due to a lack of compatable equipment available (and a lack of protocol standardization) in the broad spectrum of organizations likely to be participants in such teleconferences.

However, the specifications for this tool should identify the desirability of providing for future implementation of teleconferencing capabilities as an enhancement to the tools.

It is worth noting that several potential users recognize the importance of personal "face-to-face" communications, and the limitations of teleconferencing from a social and psychological perspective. The need for a "store-and-forward" messaging facility was seen as much more important than the need for a "real time" teleconferencing capability. This reflects the problems now being encountered with "telephone tag", and with scheduling problems, that would also limit the success of any other "real time" modes of communications such as teleconferencing.

4.6 Relationship Charting

Just as the "business graphics" tool described in Section 4.3 provides for the automatic conversion of numeric data and relationships for graphical representation, a similar need for a sophisticated tool to graphically portray precedence, ownership, or other logical relationships.

Applications and intended use:

This tool would be used to automatically create:

- graphic representation of the internal "free" structure of the DOC, Telidon and other databases;
- organization charts, especially for the relatively large DGGT Branch requiring only that the organizational structure be maintained in a simple electronic representation using a hierarchical database package;
- procedural or data flow diagrams for electronic procedures manuals;
- project schedules and related graphics, through interfaces with PERT/CPM and other project management tools now in use or expected to be in use in the future with ADMTI.

Required features and capabilities:

This tool must be extremely powerful and sophisticated in order to be of significant utility to ADMTI. Moreover, it must be very generic and flexible in its scope, in order to be of broad use in office environments, beyond the special needs of ADMTI. It must be able to:

- automatically traverse a data base or equivalent computerized data structure, traversing all branches or options in the structure;
- record its traversal;
- convert that record to a series of "box labels": and
- generate the Telidon intructions necessary to draw and label those boxes, scaling the overall result to the size of the structure and the resolution of the graphic display.

This tool would need to be able to access a variety of databases having highly varied access methods and commands. It would require a very high resolution display device for any diagram large and complex enough to warrant its use.

If successful, this tool (along with the automatic business graphics "tool") would greatly reduce the need for the "graphic template" desribed in Section 4.2.

Recommendation for the prototype stage:

We do not recommend this tool for inclusion at the alpha/beta prototype stage, for these reasons:

- The feasibility of successfully developing such a generalized, flexible yet powerful tool is not established.
- The level of perceived need in the target user groups is not uniformly high.
- This tool is less important than others, especially in an environment of limited budget and short project timeframe.
- Such a tool would likely place a significant familiarization and training burden for the users, especially in conjunction with the several other new tools that would be delivered at the same time as part of the prototype.

However, there is a strong likelihood that the need for this kind of tool will grow as office technologies (and cultures) evolve, and more immediate needs are met successfully.

4.7 Presentation Room

One user group (DGIE) not targeted as a prototype user, identified a strong need for a "SUPER-EQUIPED PRESENTATION ROOM". Other users complained of dissatisfaction with the capabilities of Telidon as a display medium, from their experience with the Telidon equipment currently available to them for electronic presentations. These complaints reflect a similar need.

Applications and intended use:

The facility would be used for a wide variety of briefings and presentations by DOC management and staff, to internal and external audiences.

Required features and capabilities:

- The facility must be reasonably convenient physically to ADMTI users.
- It must occupy a relatively large conference room, yet hopefully one that can be partitioned for presentaions to smaller audiences.
- It must contain a large screen rear-projection colour video display, with high resolution, good colour reproduction, and good peripheral/angular vision capabilities.
- It should be possible to easily install several smaller (20"-30") screen video displays in the room, connected either all to the same display controller for synchronized (identical) display, or each to a separate controller for independant presentations. These extra displays should be easily removed from the room when not in use.
- The display controller(s) that drive these video display(s) must be compatable with Telidon graphics produced by the other TIMS graphic tools. These controllers should be capable of operation under user control, or in an unattended mode featuring timed sequences and "billboarding". Under user control, the control mechanism should provide remote control capabilities utilizing a device that is no more complicated than necessary. (A remote similar to that for a 35mm slide projector would be ideal for simple sequential presentations).
- The display control and other equipment should be unobtrusive, possibly located in a separate "projection room". Equipment clutter should be avoided.

. The room should also support traditional VU-graph and 35mm presentation media, on large screens.

Desired features and capabilities:

Some of the features identified above might be considered as optional, based solely on user requests. However, we believe that this combination of capabilities has the best chance of success both as a presentation theatre and as a showcase of the display capabilities of Telidon.

An additional feature that is desirable but not necessary is the capability to have several video displays (including the large screen) driven by the same display controller, but with different images appearing simultaneously on different displays. This would support more complex multi-screen presentations.

Recommendations for the prototype stage:

It is not recommended that this facility be included as part of the TIMS prototype, for the following reasons:

. The perceived need is not uniformly high.

. There are cost constraints on the TIMS projects.

. It is our understanding that there is already a conference room available to ADMTI staff, and having at least some of the capabilities defined above.

. The other tools identified are highly useful even without this facility.

. This facility could be considered a future enhancement for TIMS.

We do recommend that consideration be given to this requirement as a separate project, starting with the study of cost and feasability impact of upgrading present facilities to provide the capabilities specified above.

Furthermore, we suggest that specifications for TIMS should stress compatability (wherever possible) of the graphic creation and communication tools, with the Telidon display equipment now in use throughout DOC.

4.8 Perspective Relative to Other Needs

The graphics needs of ADMTI staff should be viewed in perspective, relative to the Sector's overall office automation technology and applications needs. Appendix C to this report contains four tables which provide a qualitative comparison of needs for:

- graphics tools and applications (Table A);
- other office automation applications which may or may not (use these tools to) provide graphics features (Table B);
- other technology-oriented needs (Table C); and
- administrative-oriented needs.

ADMTI staff typically use graphics for a relatively small but important part of their work. They are almost universally dissatisfied with the quality, timeliness and/or effort associated with the graphic tools currently available to them. Many feel that graphics tools would help them to be more effective, and some also feel such tools would help them to be more efficient. For some, these graphics needs seem to be among their most important office automation needs, at least from their own perspective. On the other hand, the level of perceived need for other office automation capabilities, and hence the extent to which other needs are more important than graphic needs, varies considerably throughout the sector, and even within some branches.

Overall, based on our data gathering, we estimate the level of need for this "graphics tool set" to be:

- among the top 15 or fewer office automation needs for most Sector staff (as a group);
- among the top 3 or 5 office automation needs for selected individuals throughout the Sector;
- among the top 5 or 10 office automation needs for staff of the target alpha and beta user groups (as a subset of all Sector staff); and
- among the top 3 or 5 office automation needs for some of those target (alpha and beta) users.

However, the greatest improvements to be expected from the implementation of these graphics tools are in the areas of:

- quality and timeliness of documents and presentations,
- job satisfaction, and
- effectiveness in certain specific areas;

rather than in terms of large time or cost savings. This is due to the high volume of verbal and other activities within the sector that does not use graphics and yet consumes a large proportion of the typical ADMTI workday.

5. ADMTI Graphic Support Needs: A Comparison with Other Prototype Requirements

5.1 Manitoba Government Telidon Project

Trigon Systems Group Inc. has completed an analysis of user requirements for Telidon in the offices of the Federal/Provincial Relations Division in the Department of Finance of the Government of Manitoba. The objective of the overall project was to design and implement a Telidon-based Management Graphics Pilot System as a means of demonstrating the viability of Telidon technology in an office environment.

The Statement of Work for the ADMTI TIMS User Needs Analysis requested that the contractor review the results and "identify areas of commonality between the two projects with the ultimate aim during the implementation stage of producing system functions that can be shared between the two projects". Accordingly, as part of our analysis of graphic support requirements, we reviewed the June 22,1984 Trigon report which summarizes the Manitoba methodology and results.

The Trigon study adopted a similar approach to the methodology used in our project. Essentially, members of the target division and other key personnel were interviewed and secondary data reviewed in order to gain an understanding of current office procedures --objectives, activities, obstacles, etc. Then a preliminary set of potential requirements were presented to and discussed with users. However, the scope of that project was smaller, involving only 11 interviees (as compared with 39 for the ADMTI study).

5.1.1 Graphics Requirements

Users in the Manitoba study indicated requirements for standard business graphics, with some colour, and to a lesser extent for graphics support for drawing. Specifically, the results suggested the following types of features in any graphics package:

- the ability to integrate analytical support software (e.g., spreadsheets) with the graphics system to generate standard business graphics such as pie and bar charts in colour;
- the ability to manipulate the graphic product, change colours, add text and produce hard copy outputs;
- the ability to show multiple graphs on one page and to overlay muliple charts;
- the ability to create and store standard pages; and

. the ability to produce geometric shapes and drawings.

More precise operational features of the proposed graphics tool are also specified. The perceived benefits of such graphics capability were enhanced quality and legibility of output to support decision making with less effort, freeing up time for other tasks. As well, the use of outside resources such as graphic artists would be reduced or facilitated.

5.1.2 Other Office Support Requirements

As well as the capability to produce business graphics and to allow for page creation and presentation, analysis of the Manitoba target users' needs pointed to the following types of office support requirements:

. enhanced decision support through access to spreadsheet capability and other modelling and analytical tools and quantitative data bases available on other computers;

. electronic mail and messaging to enhance communication;

. shared workspace conferencing to allow for an interactive group facility for team projects;

. text processing capability for officers to create their own documentation;

. electronic file management to allow for the creation of personal file databases;

. a forms facility to allow for structured input and retrieval of form-driven information; and

. direct access to qualitative databases.

5.1.3 Relevance to the TIMS Project

The automated business graphics needs as identified by the Trigon report are so similar to those of the ADMTI interviewees that the same tool could likely satisfy both sets of users without modification.

The Trigon report did identify the need for an electronic template to draw graphics, but under the heading of "Page Creation and Presentation". The concept of a special page creation capability geared towards business applications was not clearly identified. This may be due to one or more of the following factors:

. There were fewer interviewees, and hence less opportunity for the need to be detected.

- The interviewees seem less familiar with Telidon, and specifically with the complexity and other disadvantages of current available generalized page creation packages; and therefore may assume this to be a "non-issue".

- The interviewees seem to have less experience with the preparation of graphics, and the graphics produced are apparently most often tabular rather than diagramatic in nature.

The Trigon report did not suggest the need for a graphic media conversion and production centre, as such. However, some of its features were discussed as characteristics of other graphics functions. We expect the need for this facility may be reduced in the Manitoba Government environment, to the extent that there are fewer briefings, presentations and widely distributed reports, and more "internal use" documents.

The Trigon report did identify graphics communications needs, including some kind of shared workspace teleconferencing. The needs documented seem to be quite similar to those identified for ADMTI, except that ADMTI users seem to have a relatively small need for internal teleconferencing, prefering face to face contacts instead.

Many of the non-graphic requirements identified by the Trigon study (spreadsheets, electronic mail, word processing, file management, forms management, etc.) were also identified briefly in the TIMS study.

In summary, there is a high degree of commonality between the findings of the Trigon study, and those of this project.

5.2 DOC/Office Communications Systems Field Trial

The DOC Field Trial involves approximately 70 workstations used by senior departmental executives and staff in the Policy Sector. The prototype system is supplied by Comterm and is being used to prepare policy documents and to handle routine administrative tasks in French and English. As well, the system is used to create and transmit Ministerial correspondence, memos from senior managers, and other documentation.

The major office applications to be tested in the trial include:

- text processing;

- the creation, storage and display of graphic information using Telidon;

- electronic spreadsheets to analyze quantitive information;

- document and task management; and
- electronic messaging.

The trial has only been fully operational for a couple of months (i.e., since September 1984). Consequently, it is too early to have any reliable feedback from the impact assessment activities.

5.2.1 Graphics

The intent is to provide graphics support through two versions of Limicon graphics software that will provide:

- each workstation with the ability to create and display graphics on monochrome terminals; and
- a full-functionality generalized NAPLPS page creation capability, available on shared workstations.

Once these capabilities are being used, project managers hope to build a library of images and fonts.

This graphics solution represents a departure from original plans. Firms bidding to become suppliers to the field trial resisted complying with the departments preference to include Telidon. The objective was to be able to offer the capability to manipulate data and graphics and to use Telidon for presentations in the briefing centre. However, the graphics package provided was not usable, resulting in a subsequent selection of Limicon's package.

Lotus 1-2-3 and Multi-Mate are currently available on the trial system. Although the Limicon software has been tested by Comterm, it does not appear that the Limicon graphics capability can be integrated with Lotus, according to representatives of that project.

Previously, the user group was allocating considerable resources to the preparations of briefings for the Minister. Now they produce most presentations using Telidon via contracted suppliers. This application, along with the desire to manipulate industry data and present it in graphic form, constitute the major needs behind the graphic support elements of the trial. It is anticipated that a small group will be trained on the more sophisticated Telidon facility, providing a shared resource for others.

One section of the user group --Broadcast Statistics --uses a Hewlett-Packard colour plotter. Users would like the same functionality with Telidon.

5.2.2 Relevance to the TIMS Project

According to our discussions with representatives of this project, the evolving needs of the Policy Sector users for graphics support very closely match those documented for target ADMTI TIMS users. This is especially true in the areas of presentation/briefing preparation, graphics in documents, and automatic business graphics generation, which correspond to aspects of the TIMS Media Conversion and Production Facility, the Graphics Template, and the Business Graphics Tool as documented in Chapter 4.

There may be a lesser need for graphic communications and database access within the Policy Sector, due to differences in the nature of the work performed.

In the area of non-graphic applications, virtually all of the applications being implemented in the OCS pilot correspond to identified ADMTI needs.

In summary, there is a high degree of commonality between these two projects also.

TELIDON INFORMATION MANAGEMENT SYSTEM:

GRAPHIC NEEDS ANALYSIS REPORT

APPENDICES

" FINAL "

MARCH 1985

PHIPPARD AND ASSOCIATES

(DSS File # 06ST.36100-4-4185)

APPENDIX A

INTERVIEW PARTICIPANTS

APPENDIX A

INTERVIEW PARTICIPANTS

This list of interviewees reflects the grouping used for scheduling and focussing purposes.

The consultant team wish ot thank the interview participants for their almost perfect attendance, their high level of interest and enthusiasm, and their generosity in taking the time that was necessary to support our data gathering.

C. Franklin	(DGAP - "Alpha Senior Management")
R. Marsh	
R. Baser	("Alpha Group 1")
K. Chang	(Alpha Managers)
M.-F. Laughton	
D. MacMillan	
C. Taylor	("Alpha Group 2")
H. Ober	
E. Gordon	
R. Vaive	("Alpha Group 3")
J. Werner (unable to attend)	
J.-Y. Fortin	
J. Horvath	
M. Ober	
G. Fortin	("Alpha Admin Group")
G. Godin	
L. Piccolino	
D. McLean	(DGTPA - "Beta Senior Management")
O. Roscoe	
D. Waung	
J. Carson	("Beta Group 1")
J. Hothi	
I. Bischof	
C. Le	
T. Wilson	("Beta Group 2")
J. Richer	
L. Moore	("Beta Admin Group")
J. D'Aoust	(includes ADM admin)
F. Bertrand	
K. Hepburn	(ADMTI - overview)

F. Symons P. Neogi S. Gallant	(DGIEM - overview)
G. Henter	(DGGT - overview)
A. Dubois	(DCS interests)
E. Jones E. Labelle	(DMG interview)
R. Elliott	(re: OCS planning)
M. Meloshe	(re: DOC - OCS trial)

APPENDIX B

INTERVIEW GUIDE AND PRE-CODES

DOC

PROTOTYPE TELIDON INFORMATION MANAGEMENT SYSTEM

REQUIREMENTS ANALYSIS: INTERVIEW GUIDE

FIRST OF ALL, INTRODUCE THE INTERVIEWERS, THE OBJECTIVE (BRIEF) OF THE STUDY, THE OBJECTIVES OF THIS SESSION, AND AN OVERVIEW OF THE STRUCTURE/FORMAT/CONTENT OF MATERIAL TO BE COVERED. EXPLAIN THAT WE'LL ADDRESS GRAPHICS WITHIN EACH SECTION AND NOTE THE USE OF THE TAPE.

A. OVERALL ENVIRONMENT, MISSION, HASSLES, AND GRAPHICS ORIENTATION

1. Does this (org. chart) show the actual working relationships in your organization?

   YES..... NO.....

   If NO, please describe relevant recent changes:

   [QUESTIONS 2 AND 3 CAN BE COMBINED DURING THE INTERVIEW.]

2. Briefly describe the MAJOR goals of your job, and key related activities. That is, what are you trying to accomplish, and how? Do you anticipate any changes in the near future?

3. Estimate the rough proportion of your time spent on each of these major activities in relation to the others and the relative importance of those activities:

   ... [PRECODES 4]

   - most, a lot
   - more than average, somewhat
   - average, equal proportion
   - less than average, a few
   - almost none, least

   ... [PRECODES 2]

   - most important, urgent, critical
   - higher than average importance
   - medium or average importance
   - lower than average importance
   - not really important at all

4. Do you experience any hassles or obstacles in trying to do your job?
[STIMULUS - SEE PRECODES 13]

GRAPHICS:

[PRESENT OUR OWN DEFINITION/TERMS OF REFERENCE AS TO WHAT WE MEAN BY "GRAPHICS" FOR THIS INTERVIEW. SHOW SAMPLES.]

5. What kinds of graphics do you use, and how often?
(almost never/occasionally/often/almost always)

Why/why not/please elaborate... [STIMULUS -SEE PRECODES 13/14]

B. INFORMATION REQUIREMENTS

("INPUTS" to support the accomplishment of mission.)

[QUESTIONS 1 AND 2 CAN BE COMBINED IN THE INTERVIEW.]

1. What kinds of information do you use in order to do your job? These can be in any form -- for example, written, verbal, electronic, etc.

[STIMULUS - SEE PRECODES 12]

2. Which are the most important of these?

3. [ONLY WHERE NOT OBVIOUS]:
What mode of communication (what media) is involved?

- by telephone
- in person, formal or informal meetings
- in person, thru the giving of formal audio/visual or
- multi-media presentaions
- electronic voice storage
- electronic messaging/document transmission
- formal or informal written (paper) reports, memos, notes, sketches, etc.

4. What are the main sources of these types of information and how frequently do you use each?

Sources:
- internally, locally within your division or branch
- outside your branch, but within DOC HQ
- DOC regional office(s)
- elsewhere within the government
- suppliers/contractors, or client companies
- other (other governments, general public, etc.)

Frequency:
(almost never/occasionally/often/almost always)

[QUESTIONS 5 AND 6 CAN BE COMBINED DURING THE INTERVIEW. ALSO SHOULD BUILD UPON EARLIER GENERAL GRAPHICS EXPOSURE RESULTS.]

5. How frequently does the information you use contain graphics?

(almost never/occasionally/often/almost always)

6. What kinds of graphics are typically involved?

[STIMULUS - SEE PRECODES 6]

7. Is the information you use typically in French or English?

8. Do you experience any significant problems getting the info you need?

yes..... no.....

if yes, please elaborate:

C. DOCUMENT CREATION/DISTRIBUTION

("Outputs" and the "PROCESSES" that create them)

[EXPLAIN "DOCUMENT" - WE MEAN THE TERM TO BE GENERIC, CAN BE ANYTHING FROM ELECTRONIC MAIL, TO SLIDES FOR A PRESENTATION, TO TELIDON, TO PICTURES, ETC.]

[QUESTIONS 1, 2, AND 3 CAN BE COMBINED IN THE INTERVIEW.]

1. What documents do you create (whether or not you actually produce the final product)? And what is the typical content of these documents?

[STIMULUS (TYPES OF DOCUMENTS) - SEE PRECODES 5]

Content

- most newly created text - normal size
- special text (large or unusual fonts, colors, etc)
- lots of boilerplate, standard paragraphs, with some new text or graphics (cut and paste)
- tables, columnar charts
- diagrams, flowcharts, orgcharts, schedules, etc.
- sketches
- pictures (photographic or nearly photographic - eg. Reagan's face slide)
- pie or bar charts or other business graphics
- complex graphics, polygons, representations or diagrams of things (Telidon - oriented, eg. grasshopper slide, Logos.)
- colors (in conjunction with any of the above)
- other

2. Which are the most important?

[STIMULUS - SEE PRECODES 2]

3. Approximately, how frequently is each type created? (almost never/occasionally/often/almost always)

[QUESTIONS 4 AND 5 CAN BE COMBINED IN THE INTERVIEW.]

4. How are the major documents created?

- created directly "on-line" on a personal computer
- created directly "on-line" on a word processing terminal (single function machine)
- Telidon page creation software or terminal
- created directly on a typewiter
- graphics creation software/terminal - non-Telidon
- written/sketched by hand
- dictated, either directly to a secretary or via a dictation machine
- interactive, collective, iterative or shared creation by a group or team (usually of peers)
- other

5. Who is generally responsible for processing (converting to final typed or equivalent format) these documents?

- yourself (author)
- your secretary
- a typist (common pool resource?)
- (local) word processing operator
- (remote) word processing centre or service bureau
- (internal/local) graphic/page/frame creation operator
- (external) graphic/frame creation company, service bureau, or common government centre, (including graphic art department)
- other

6. Are any of these documents produced in both official languages? (Please specify)

[QUESTIONS 7 AND 8 CAN BE COMBINED IN THE INTERVIEW]

7. For those documents that include graphics, how are the graphics normally prepared?

- created directly "on-line" on a personal computer
- created directly "on-line" on a word processing terminal (single function machine
- Telidon page creation software or terminal
- created directly on a typewiter
- graphics creation software/terminal - non-Telidon
- written/sketched by hand
- dictated, either directly to a secretary or via a dictation machine
- interactive, collective, iterative or shared creation by a group or team (usually of peers)
- other

8. ...and by whom?

- yourself (author)
- your secretary
- a typist (common pool resource?)
- (local) word processing operator
- (remote) word processing centre or service bureau
- (internal/local) graphic/page/frame creation operator
- (extenal) graphic/frame creation company, service bureau, or common gavernment centre. (including graphic art department)
- other

9. Do the graphics produced generaly meet your needs?

yes..... no.....
elaborate

[STIMULUS - SEE PRECODES 13 AND 14]

10. Why do you use/decline to use graphics in preparation of your documents? That is, in your opinion, what are the major advantages (or disadvantages) in using graphics?

[STIMULUS - SEE PRECODES 13 AND 14]

[QUESTIONS 11, 12 AND 13 CAN BE COMBINED IN THE INTERVIEW]

11. How broadly are the documents you create distributed? That is:

- internally, locally within your division or branch
- outside your branch, but within DOC HQ
- DOC regional office(s)
- elsewhere within the government
- suppliers/contractors, or client companies
- other (other governments, general public, etc.)

12. How are they normally distributed?

- via "vidoetex" network (one to many-indefinite/optional retrieval)
- electronic mail/"mandatory" retrieval by specific individuals (one-to-one or one-to-many)
- telex
- public mail/courier
- internal mail
- by hand
- communicating word processors
- other

13. Are there there any significant/recurrent problems experienced in the distribution of documents?

yes..... no.....

[STIMULUS - SEE PRECODES 13]

D. ANALYTICAL/DECISION SUPPORT

[IF TIME PERMITS OR IF THE QUESTIONS HAVE NOT ALREADY BEEN ADDRESSED. NOTE - DON'T FORGET MANDATORY SECTION E.]

(Additional "processing" activities)

[QUESTIONS 1 AND 2 CAN BE COMBINED IN THE INTERVIEW.]

1. How often do you use analysis of any kind? (almost never/occasionally/often/almost always)

i.e. qualitative analysis of written information
qualitative analysis of verbal information
quantitative analysis - specify:
statistical analysis
modelling
simple arithmetic
other(.....)

2. What tools do you use [PROBE] and how frequently? (almost never/occasionally/often/almost always)

calculator
computer- database package
computer- statistical pkge
computer- spread sheet pkge
computer- idea organizer pkge
computer-(.....)
time mgmt (which?.....)
project mgmt (?.....)

[QUESTIONS 3 AND 4 CAN BE COMBINED IN THE INTERVIEW.]

3. How frequently do you integrate or incorporate such analyses into written (paper or electronic) reports or other documentation? (almost never/occasionally/often/almost always

4. How often are these results presented in graphic form? (almost never/occasionally/often/almost always)

[QUESTIONS 5 AND 6 CAN BE COMBINED IN THE INTERVIEW.]

5. What problems (if any) do you experience with obtaining the analytical support you need? [STIMULUS - SEE PRECODES 13]

6. What problems (if any) do you experience with the preparation of graphic displays or exhibits to support this analytical effort? [STIMULUS - SEE PRECODES 13]

E. GRAPHICS SUMMING-UP

1. Are there any graphics tools we haven't discussed that you think might be of help to you in your day-to-day activities (to support analysis, decisions, communications, document preparation, personal management, etc)? [INTRODUCE IDEAS/EXAMPLES]

2. For these (and others we have discussed) how user friendly, how powerful would they have to be, and what features or capabilities would be necessary in order for the tools to be worthwhile to you?

3. Would you use them enough to make the learning process worthwhile, and to eliminate the need to re-learn every time you use them?

4. Do you think they would produce a net gain, or loss, in terms of productivity/workload?

THANKS FOR YOUR TIME AND PATIENCE - IF ANY PERTINENT THOUGHTS OCCUR TO YOU AND YOU WANT TO GET IN TOUCH WITH US, ELIZABETH GORDON WILL KNOW WHERE TO FIND US.

ONE OF US MAY BE IN TOUCH WITH ONE OR MORE OF YOU ON AN INDIVIDUAL BASIS DURING THE REQUIREMENTS ANALYSIS, IF WE NEED TO CLARIFY ANY OF THIS]

PRECODES LEGEND:

1. FREQUENCY: (dual meanings= context dependent)

NEV	=	almost never	/	never
OCC	=	occasionally, sometimes	/	monthly
OFT	=	often	/	weekly
ALW	=	almost always	/	daily

2. IMPORTANCE: (priority)

URG	=	most important, urgent, critical
HI	=	higher than average importance
MED	=	medium or average importance
LO	=	lower than average importance
NOT	=	not really important at all

3. SOURCES/DESTINATIONS: (communications)

INT	=	internally, locally within your division or branch
HQ	=	outside your branch, but within DOC HQ
REG	=	DOC regional office(s)
GOV	=	elsewhere within the government
SUP	=	suppliers/contractors, or client companies
OTH	=	other (other governments, general public, etc.)

4. QUANTITIES/PROPORTIONS (relative)

LOT	=	most, a lot
SOM	=	more than average, somewhat
AVG	=	average, equal proportion
FEW	=	less than average, a few
NON	=	almost none, least

5. "DOCUMENT" TYPES

PRES	=	briefing/presentaion (may be multi-media)
PICT	=	"exclusively" pictorial (or equivalent graphic) document, not intended for presentation
MEMO	=	memo, letter, immediate-term relevance
REPT	=	report, specific to a subject, short-term relevance, focused
PROC	=	policy/procedure/reference manuals, long-term/widespread
FORM	=	pre-formatted document, ie. using a pre-printed or pre-memorized skeleton/form
DBAS	=	database/collection of information
NUMR	=	numeric of financial reports, spreadsheets, accounting, (mostly numbers and calculations)

6. DOCUMENT CONTENT (more than one category may apply)

TXT = most newly created text - normal size
STX = special text (large or unusual fonts, colors, etc)
BLR = lots of boilerplate, standard paragraphs, with some new text or graphics (cut and paste)
TBL = tables, columnar charts
DIA = diagrams, flowcharts, orgcharts, schedules, etc.
SKT = sketches
PIC = pictures (photographic or nearly photographic)
PIE = pie or bar charts or other business graphics
GRA = complex graphics, polygons, representations or diagrams of things (Telidon - oriented, eg. grasshopper slide, Logos....
CLR = colors (in conjunction with any of the above)

7. MEDIA (mode of communication/interaction)

TEL = by telephone
MTG = in person, formal or informal meetings
A/V = in person, thru the giving of formal audio/visual or multi-media presentaions
EVC = electronic voice storage
EML = electronic messaging/document transmission
PAP = formal or informal written (paper) reports, memos, notes, sketches, etc.

8. LANGUAGE

E = English
F = French
O = other

9. MODE OF (ORIGINAL) CREATION

P/C = created directly "on-line" on a personal computer
W/P = created directly "on-line" on a word processing terminal (single function machine)
TEL = Telidon page creation software or terminal
TYP = created directly on a typewiter
GRS = graphics creation software/terminal - non-Telidon
HND = written/sketched by hand
DIC = dictated, either directly to a secretary or via a dictation machine
GRP = interactive, collective, iterative or shared creation by a group or team (usually of peers)

10. PROCESSOR/PREPARER (the individual that converts a document to its final media or format)

SLF = yourself (author)
SEC = your secretary
TYP = a typist (common pool resource?)
WPO = (local) word processing operator
WPC = (remote) word processing centre or service bureau
GRI = (internal/local) graphic/page/frame creation operator
GRX = (external) graphic/frame creation company, service bureau, or common government centre, (including graphic art department

11. DISTRIBUTION

VTX = via "videotex" network (one to many-indefinite/optional retrieval)
EML = electronic mail/"mandatory" retrieval by specific individuals (one-to-one or one-to-many)
TLX = telex
PML = public mail/courier
IML = internal mail
HND = by hand
CWP = communicating word processors

12. INFORMATION SOURCES

VERB = inquiries, conversations, discussions (informal)
PRES = briefing/presentaion (may be multi-media)
PICT = "exclusively" pictorial (or equivalent graphic) document, not intended for presentation
MEMO = memo, letter, immediate-term relevance
REPT = report, specific to a subject, short-term relevance, focused
PROC = policy/procedure/reference manuals, long-term and widespread
FORM = pre-formatted data ie. using a pre-printed or pre-memorized skeleton/form
DBAS = database/collection of information (research)
HIST = project/subject history files
NUMR = numeric or financial reports, spreadsheets, accounting, (mostly numbers and calculations)

13. DIFFICULTIES/HASSLES (reasons why something is not used or done)

CAP = insufficient capability of the medium, system, or service
QUA = poor quality of the result
RES = unsatisfactory responsiveness or turnaround
EFF = too much effort required (time consuming)
COM = complexity, high skill level required by user
$$$ = too costly (financially)
TIM = time management/scheduling problems
UND = lack of understanding/clear perception (ie. of an input by the user/worker of an output, by his target recipient)
NEC = not necessary, therfore not done
MGT = management pressure (discouragement)

[NOTE - #13 AND #14 USE THE SAME PRECODES, WITH OPPOSITE VALUES TO BE IMPLIED BY THE CONTEXT OR INDICATED BY "-" AND "+" FOR 13 AND 14 RESPECTIVELY]

14. ADVANTAGES (reasons why something is used, done or selected over other alternatives)

CAP = good capabilities/features
QUA = high quality of the result
RES = very responsive
EFF = little effort required
COM = not complex - easy to learn (low skill levels required)
$$$ = cost-effective, inexpensive
TIM = easy to schedule, or manage from a timing perspective
UND = results are more easily understood by recipients/destinations
NEC = absolute necessity, no other option
MGT = management pressure (encouragement)

APPENDIX C

SUMMARY OF IDENTIFIED REQUIREMENTS

APPENDIX C

SUMMARY OF IDENTIFIED REQUIREMENTS - ADMTI

A. GRAPHICS TOOLS:

LEGEND:

1. LEVEL OF NEED: N=no need, M=may use, W=would use, S=strong need
2. OUR RECOMMENDATION REGARDING INCLUSION IN PILOT: (column marked "REC")
   ... Y=yes, N=no, ?=maybe, F=may not be feasible within the constraints of the prototypes, I=may not be important in the prototype scenario

ITEM AND FEATURES:	LEVEL OF NEED PERCEIVED:							REC:
	TARGET USER GROUP			OTHER GROUPS				
	ALPHA	BETA	ADM	DGIE	DGGT	DCS	DMG	
1. Graphics Template tool								
basic (symbols, text)	S	S	M	S	S	M-W	W-S	Y
overlay ability	S	M-W	M-W	M-W	W-S	M	M	Y
automatic date stamp	M	S	M	M	M	M	M	Y
hard copy quality b/w	S	S	W-S	S	S	M	W	Y
hard copy color	S	S	W-S	S	S	M-W	M-W	Y
animation & timing	M	M	N-M	M	N-M	M	N-M	?(I)
windowing-page>screen	W	M-W	N-M	M	W	N-M	M	?(F)
high resolution option	W-S	M-W	N-M	M	W-S	S	M	?(F)
integrated w/WP in use	W-S	W-S	W	W-S	W-S	M-W	M	?(F)
2. Auto. Business Graphic								
basic (w/defaults,opt)	W-S	W	S	S	S	N-M	S	Y
annotation of result	S	W-S	W-S	W-S	W-S	M	M-W	Y
date stamp	M	S	M	M	M	M	M	Y
flexible input formats	S	S	W	S	W	M	S	?(F)
LOTUS 1-2-3 interface	S	W	W	W	W	N-M	S	?(F)
overlays and combines	W-S	W	W-S	W-S	W-S	M	S	?(F)
multiple graphs/page	M-W	M-W	M	M-W	M	N-M	M	?(I,F)
high resolution option	W-S	W	W-S	W-S	W	S	W	?(F)
integrated w/WP in use	W	W-S	W	W-S	W-S	M-W	M	?(F)

... CONTINUED

A. GRAPHICS TOOLS - continued:

LEGEND:

1. LEVEL OF NEED: N=no need. M=may use. W=would use, S=strong need
2. OUR RECOMMENDATION REGARDING INCLUSION IN PILOT: (column marked "REC")
   ... Y=yes, N=no, ?=maybe, F=may not be feasible within the constraints of the prototypes, I=may not be important in the prototype scenario

ITEM AND FEATURES:	LEVEL OF NEED PERCEIVED:							REC:
	TARGET USER GROUP			OTHER GROUPS				
	ALPHA	BETA	ADM	DGIE	DGGT	DCS	DMG	
3. Multi-media Conversion								
Telidon to 35 mm slide	S	S	S	S	S	W	W-S	Y
Telidon to vugraph	S	S	S	S	S	S	M	Y
Telidon to color plot	S	S	S	S	W-S	M-W	M	Y
Telidon to good b/w pl	S	S	S	S	S	M-W	M-W	Y
concatenate & compose	S	W-S	S	S	W	W-S	W	Y
timed show composition	W	M	M	W	M	M	M	?(I)
overlay	W	W	M	W	M-W	M	M	?(I)
hi/low res switchable	W-S	M	M	W	W-S	S	M	?(F)
smart color-> b/w conv	M-W	W-S	M	M-W	W-S	N-M	M	?(F)
window composition	W	M	M	M	W-S	M	M	?(I,F)
4. Graphic Communications								
internal within pilot	S	W	W	M	M	M	S	Y
internal teleconferenc	M-W	N-M	M	N-M	M	M	W	N
external network conn	W	W	M	M	M	M	M-S	Y
external teleconferenc	W	M	N-M	M	M	M	M-W	N
vtx-db access - NAPLPS	S	M	M	M	N-M	N	M	Y
vtx-db access - ASCII	S	S	M	S	M	M	W	Y
5. Auto Relationship Charting (trees, etc)	N-S	N-M	N	N-M	M-S	N	M	N
6. Super-equipped Presentation Room	M-S	M-W	M-W	S	M	M-S	M-W	N

SUMMARY OF IDENTIFIED REQUIREMENTS - ADMTI

B. OFFICE APPLICATIONS:

LEGEND:

1. LEVEL OF NEED: N=no need, M=may use, W=would use, S=strong need
2. POSSIBLE GRAPHICS UTILIZATION: (POSS. GRAPH UTIL) reflects the potential for the integration or compatibility with graphic tools defined in Part A. 0=none, 1=should be able to pass graphics, 2=may be implemented as or with the help of a Telidon database, 3=may use graphic template tools for content creation/application set-up, 4=may interface with business graphics tools for display of results.

ITEM AND FEATURES:	LEVEL OF NEED PERCEIVED:							POSS. GRAPH UTIL:
	TARGET USER GROUP			OTHER GROUPS				
	ALPHA	BETA	ADM	DGIE	DGGT	DCS	DMG	
1. Generalized Correspondance. financial. & Periodicals Tracking System (with BF. sort, statistics & keyword retrieval)	S	S	S	M-S	M-S	M	M	2.3.4
2. Electronic Procedures Manuals	W-S	S	M	M-S	M-W	M	S	2.3
3. Bibliographic Periodicals Cataloguing. Filing & Tracking	W-S	W-S	N	M-S	M-W	M-W	N	2,3
4. Electronic Form Filling plus Forms Mgmt.	W-S	M-W	M	M-W	M-W	M-W	M-S	2,3

... CONTINUED

B. OFFICE APPLICATIONS - continued:

LEGEND:

1. LEVEL OF NEED: N=no need, M=may use, W=would use, S=strong need
2. POSSIBLE GRAPHICS UTILIZATION: (POSS. GRAPH UTIL) reflects the potential for the integration or compatibility with graphic tools defined in Part A. 0=none, 1=should be able to pass graphics, 2=may be implemented as or with the help of a Telidon database, 3=may use graphic template tools for content creation/application set-up, 4=may interface with business graphics tools for display of results.

ITEM AND FEATURES:	LEVEL OF NEED PERCEIVED:							POSS. GRAPH UTIL:
	TARGET USER GROUP			OTHER GROUPS				
	ALPHA	BETA	ADM	DGIE	DGGT	DCS	DMG	
5. Telephone & Time Mgmt (as a replacement for features on Kontact units. if they are to be removed)	N-S	N-M	N-M	N-M	N-M	N-M	M	3
6. Common Visual Wkspce/ Teleconference (universal ASCII only) (see also Sec. A # 4)	M-W	M	M	M	M	M	M	1?
7. Project Management Package (to replace current use of LOTUS 1-2-3 for this)	W	W	N-M	W	M	M	M	0-1
8. Automatic Spelling Checker for WP	M-S	M	M	M	M	M	M	0

SUMMARY OF IDENTIFIED REQUIREMENTS - ADMTI

C. NON-GRAPHIC TECHNICAL OR SYSTEM SUPPORT:

LEGEND:

1. LEVEL OF NEED: N=no need, M=may use, W=would use, S=strong need
2. TELIDON COMPATIBILITY RECOMMENDED: (TEL. COMP): Y=yes, N=no or n/a.

ITEM AND FEATURES:	LEVEL OF NEED PERCEIVED:							TEL. COMP:
	TARGET USER GROUP			OTHER GROUPS				
	ALPHA	BETA	ADM	DGIE	DGGT	DCS	DMG	
1. LQ Printer for Kontact - or - AES-Kontact interface	S	N	N	N	N	M	W	N Y
2. Communicating WP Netwk linking current WP equipment, but with store & forward	S	W-S	W	M-W	S	M	W-S	Y
3. Better telephone systm (more & central lines) (voice lines)	W-S	W-S	N	N?	N	N?	N?	N
4. Integration of WP + Elect. Filing + Email	W	M-W	M	M-W	M?	M?	M	Y
5. Email links to DOC Regional Offices	W-S	M-W	M	M	S	M	M	Y
6. Voice storage/messaging network w/indicatr	W-S	M-S	M	M	M	M	M	N

SUMMARY OF IDENTIFIED REQUIREMENTS - ADMTI

D. NON-TECHNICAL, ADMINISTRATIVELY ORIENTED NEEDS:

LEGEND:

1. LEVEL OF NEED: N=no need, M=may use, W=would use, S=strong need
2. SCOPE: I=internal within ADMTI, E=external orientation.

ITEM AND FEATURES:	LEVEL OF NEED PERCEIVED:							SCOPE:
	TARGET USER GROUP			OTHER GROUPS				
	ALPHA	BETA	ADM	DGIE	DGGT	DCS	DMG	
1. Staff training on existing equip/systems	W	N	M	N-M	N-M	M	M	I
2. LOTUS 1-2-3 special training &/or manuals with focus / relevance in ADMTI Finance areas & standards	M-W	M	M	M	N-M	N-M	M	I
3. Central ADMTI Technical Library	W	W	N-M	M	N-M	N-M	N	I
4. Organized Divisional Central Files	W	M	N	M	N-M	N-M	M	I
5. More Admin Support for project officers	N-S	N	N	N?	N?	N?	N	I
6. More complete, more up-to-date admin proc.	W	W	N	M?	M?	N?	W	I/E
7. Streamlined procurement	S	W-S	N-M	N-M	N-M	N?	N	E
8. Better support from Central files/registry	W-S	W-S	M	M?	M?	M?	N	E

TELIDON INFORMATION MANAGEMENT SYSTEM