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FEASIBILITY STUDY OF A
COMPUTERIZED CANADIAN FOREIGN POLICY
INFORMATION SYSTEM

LIBRARY DEPT. OF EXTERNAL AFFAIRS
MINISTÈRE DES AFFAIRES ÉTRANGÈRES

FEASIBILITY STUDY OF A
COMPUTERIZED CANADIAN FOREIGN POLICY INFORMATION SYSTEM

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INTRODUCTION

It has become commonplace today to speak of the "information explosion" and the concept itself has a multitude of implications for all levels of human activity. In company with virtually all governmental and private organizations, the Department of External Affairs has had to take account of this phenomenon in a positive fashion. Provision of vastly improved library services and facilities in the Department's new headquarters and attempts to modernize, systematize and improve internal records management, beginning with the appointment of a Coordinator of Information Systems in 1974, were major steps in this regard. In an effort to improve access to unclassified material, information from other departments and public documents on Canada's external relations, this study of the feasibility of a computerized Canadian foreign policy information system was commissioned in 1975.

SECTION 1

THE NEED FOR A COMPUTERIZED CANADIAN
FOREIGN POLICY INFORMATION SYSTEM

Until recent years the volume of material being produced dealing directly with Canadian foreign policy and external relations was relatively limited. Traditional informal and personal means of keeping abreast of the flow of information necessary for the execution of professional duties were adequate. Today this is no longer the case as the volume of available material has increased dramatically and the scope and nature of the subjects of interest have altered greatly. Moreover, as the conduct of foreign affairs has become more a matter of public interest and concern the volume and substance of information being generated in the public domain has increased greatly. While the Department's Division of Library Services provides sound information service, some means of organizing and accessing the increasing volume of current material of interest to members of the Department has become essential.

The objectives of the proposed computerized Canadian foreign policy information system may be stated as being to develop an information system for officers of the

Department at home and abroad in order to enable them to be more fully informed of current writing and research on Canadian foreign policy and external relations. To this end it will be necessary to:

(1) create, maintain and access a machine-readable data base of abstracts on Canadian foreign policy and external relations,

(2) provide ready access to the data base to meet the policy, planning, research and operational needs of the Department,

(3) provide, as a by-product, information for members of the academic community and others conducting research on Canadian foreign policy and external relations.

Advances in computer hardware and software systems in the 1970's make consideration of the development of a computerized system to satisfy these requirements particularly appropriate. Through the creation, manipulation and accessing of machine-readable files of information it should be possible to meet the wide range of disparate requirements for information from members of the Department in Canada and at posts abroad. Linked to the developing internal Departmental information system being developed, a much broader range of data and sources could be made available to meet the policy, planning and operational requirements of the Department.

In conceptual terms the data base created by this system would include bibliographic information and abstracts of a wide range of materials covering subjects of interest as identified by the Department. Material in the following forms might be included:

Books

Theses

Reports

Briefs (eg. to committees, commissions etc.)

Symposium reports

Journal articles

Newspaper articles

2. Audio-visual materials (films, audio & video tapes)

- Statements and speeches

3. Published government documents

- Unclassified (but unpublished) government documents

Parliamentary debates (including committees)¹

UN debates & votes (and other international organiz.)

Obviously the list for potential inclusion can be great and it becomes essential to establish clear and specific parameters for the data base in terms of type of material, chronological coverage, levels of material, sources and subjects. <see Section 2 below>

In general terms there are two potential groups of major users of the system: members of the Department of External Affairs at home and abroad plus individuals or organizations outside the Department. "Outside use" might include:

(1) Other government departments -- especially those with international interests or involvement.

(2) Academics -- faculty, research staff, graduate students and potentially even senior under-graduate students would find the data base of benefit when doing research in related fields. Availability of such a data base could also be of considerable assistance in fostering the development of Canadian studies programs in foreign universities.

(3) Media organizations -- press, broadcasting, publishing and other similar groups frequently require rapid and comprehensive access to the types of material proposed for inclusion in this data base.

(4) The Canadian Institute of International Affairs and other public interest groups. Research and public information activities conducted by such organizations would be facilitated by the existence of the proposed data base.

(5) Political parties and pressure groups.

(6) Business and industry --- a wide range of potential uses from planning purposes to briefing company executives before going abroad on assignment.

The primary clientele of the system would be officers of the Department of External Affairs at home and abroad. During interviews with members of the Department in Ottawa and at three posts abroad (London, Paris and Geneva) considerable interest was shown in the system and a wide range of potential uses were identified. The most general reaction was, "its a great idea -- the system has considerable merit IF it can ever be implemented". Nonetheless, comments on the building and use of the data base varied considerably depending largely on the perceptions of the individuals interviewed based on their experience and present role.

A number of specific uses for the proposed data base by members of the Department were identified and certainly there are other possible uses as well. Included among those identified were:

- (1) Specific information enquiries -- action requests related to specific needs.
- (2) Policy, planning and development requirements.
- (3) Formation and revision of country plans.
- (4) Briefing materials for new officers coming into the Department.
- (5) Briefing materials for officers about to be posted to new assignments in Ottawa or abroad.
- (6) Briefing materials for delegations attending international meeting, conferences, working groups etc.

(7) Preparation of training materials.

(8) Public information programs at home and abroad. Uses could include the answering of specific public enquiries (libraries in the larger posts regularly get questions that could be answered readily using the system) as well as the preparation of prepared dossiers of materials on specific topics for distribution to interested individuals and groups.

(9) Raw materials for the preparation of speeches.

(10) Regular SDI (Selective Dissemination of Information) listings on specific subjects to help officers keep abreast of published materials they might otherwise not see. This would be of particular use to those who may be trying to keep up on a wide range of issues or subjects.

(11) Academic relations - providing information on the research being done on a particular subject by Canadian academics or simply an indication of who is active in a particular subject area. Availability of the system would be useful in liaison work with the Canadian academic community. Abroad the system could be of particular use in providing access to resources for Canadian studies programs.

(12) Historical studies and research activities of the Department would benefit greatly from the availability of the data base as the chronological coverage was increased over a period of years.

At all times it must be borne in mind that this data base may well only be able to supply officers with portions of the the information they require. It is essential that it be possible to link requests for material from this 'published' file with the internal records management information system being developed for the Department and to the 'Country Data Sets' being created by the Policy Analysis Group. This "linkage" will probably have to be accomplished through the intervention of knowledgeable staff who are fully aware of the coverage and scope of the various systems. In theory at least, it should also be possible to link up the various systems during a search providing the files are designed in a compatible fashion.

The utility of the system for those on the 'political' side of bilateral posts abroad seems to be relatively limited as virtually all their work is presently done with classified sources and, while they would perhaps profit from the use of unclassified material, they generally feel that they do not have the time available to read it. If a bilateral post is making a major presentation on a specific topic the directives governing that presentation will have been prepared in Ottawa and it is the post's responsibility only to understand the issue and to make the best possible presentation. As one senior officer abroad commented, "people abroad are not expected to be 'experts' in a way

they were a generation ago - the experts will be sent from headquarters in Ottawa". Nonetheless, it would appear that the system would certainly have potential as a 'back-up' when required in specific situations and much more direct application for those involved in public information and specialized post activities (eg. scientific officers). Similarly, it would be useful in helping to bridge the gap between officer's special expertise and the more general demands often placed on them.

In multilateral posts there seems to be a somewhat greater involvement in the policy formation process as the officers (along with expert delegations from Ottawa) are often in the midst of the multidimensional round of discussions and negotiations on international committees, working groups and in countless other forums. While the need for access to the system in day-to-day operations may still be limited, its potential overall use in this type of mission may well be somewhat greater.

Several officers currently in positions in Ottawa commented that they felt the system would have been of more use to them while abroad, where their sources of information were often limited, than it would be in Ottawa. They saw this as being particularly the case if they were posted outside a major, highly developed, metropolitan centre. Availability of the system combined with the provision of supporting materials from the

Department's library (eg. copies of the most relevant items) was seen as being very useful indeed, especially if the subject involved was something "off the beaten track".

One officer abroad stated, in almost emotional terms, that in this day and age any organization such as the Department of External Affairs should have a readily available data base (regardless of the form) to provide access to publicly available information on its operations and activities. While this is perhaps a difficult view to defend in objective terms, it does have some merit and was implicit in the statements of many officers interviewed.

SECTION 2

SCOPE OF THE DATA BASE

A clear, precise statement of the extent, coverage and nature of the data base of the proposed system will ultimately be required before its feasibility can be finally determined. Establishment of the parameters of the data base will, in the final analysis, have to be done by members of the Department who are thoroughly familiar with the ongoing priorities, programs and operational needs of the Department at home and abroad. The experience of having been in the 'firing line', be it on a desk in Ottawa or at a post on the other side of the globe, combined with a knowledge of the clientele who will be using the system will have to be brought to bear on the problem of establishing the necessary parameters if the results are to have any long term relevance to or utility for the Department. The outsider's view of the requirements will be based at best on limited information and at worst on potentially severe misperceptions or prejudices.

Nevertheless, it is possible to identify the major elements of the necessary parameters. These elements include,

(1) Subject coverage: In general terms there are two approaches that might be taken to the setting of subject bounds for the data base. One would be to select a narrow range of subjects of particular interest to the Department and to undertake to cover these in some considerable depth. Such a list might include Canadian policies on or interests in the following subjects:

- Raw materials and natural resources
- Energy
- Food
- Defence
- Arms trade
- Nuclear proliferation and disarmament
- Technology
- Foreign investment
- Multinational corporations
- Trade
- Finance
- Population and demography
- Economic and military aid
- Transportation and communications
- Environmental issues
- Regionalism and nationalism
- Multinational institutions
- Law of the sea
- Arctic sovereignty
- Terrorism

An alternative approach would be to encompass a much broader range of subjects but not to attempt to provide such exhaustive or in depth coverage. For example, the list of subject headings used by the Department's newspaper clipping service includes approximately 150 specific subjects plus entries under individual countries and geographic areas. While this list itself is not necessary relevant to the data base being considered, it does give some indication of the range of topics that have

been of interest to the Department in the past. Similarly, a look at the list of subjects covered (in terms of meetings and delegations) by a multilateral mission such as Geneva during even a few months is also instructive in this regard.

Building a data base of this nature is, of necessity, a long term project. This fact in itself makes it difficult to identify a very limited range of subjects that will necessarily be of priority interest in even a few years, let alone a decade in the future. A broader "net" has a better potential for including a span of coverage of issues or subjects of future interest. Several officers said that they felt that the system might be of particular use in providing information on new issues, the existence of which might be difficult to forecast in advance. These considerations make the development of specific subject parameters difficult.

In addition, as can be seen from the "narrow" list of subjects above, some definition of just what is included under the rubric "the foreign policy and external relations of Canada" is clearly required. Failure to develop this clear definition would result in the development of a system that is basically without limits.

(2) Chronological span: ideally, the greater the span of coverage for inclusion of material in the data base the greater the potential value of the file. In the retrieval process it is a simple task to select items only from the time period you wish to cover thus making it

desirable to have as great a coverage available for potential use as is possible. Over the years a file of considerable historical benefit could be built. The original parameters of this study were phrased in terms of coverage from 1970 onward. If the financial resources were available it would certainly be advantageous to begin at that point since it would link in with the existing bibliography prepared by Professor D. Page. <1>

Given the time it would probably take to implement the system it may be more realistic to plan on comprehensive coverage (within whatever parameters are established) from the year of implementation onward. As part of the first few years of operation an attempt could be made to add as much retrospective material as possible. Failure to include any retrospective coverage would severely limit the usefulness of the system in the early years of operation.

(3) Types of material: The list provided in section 1 above provides an indication of the types of material that might be included within the scope of this system. Although it is presently possible to gain access to many of these materials through a wide variety of existing sources, nowhere are they pulled together in a fashion that would directly meet the needs of the Department.

All the various types of materials listed above have potential value in meeting the information needs of members of the Department, but some limits must be drawn in order to avoid creating an impractical monster. Two

types that pose particular problems are the debates, proceedings and votes of international organizations and newspaper material. Both could be considered "bottomless pits". In the case of the former it would probably be necessary to restrict coverage to very specific topics being considered by particular organizations and agencies. This could provide a realistic level of input while, at the same time, meeting at least some of the Department's information needs in these areas. For newspaper material it would probably be possible to use the Department's existing clipping service to select material of particular interest (especially major articles with some analysis) with the final decision on inclusion being left with those responsible for selecting other material for inclusion in the file. Even this approach could generate a fairly large volume of material unless very specific limitations were made on the types of material to be included. The cost of including large amounts of newspaper material could make the system potentially very expensive and the probable payoffs to the Department would be limited. <2>

(4) Language: the parameters of this study limit coverage to English and French language publications, but some consideration must also be given to the inclusion of material originally published in other languages. If the posts are to be involved in providing input to the system, material in many languages will soon find its way into the data base. When it is appropriate to include a non English/French item, the title could be given in the

original language and then translated, along with an abstract, into either English or French depending on the linguistic facility of the person doing the translating. ?

(5) A number of questions regarding "levels" of material for inclusion in the data base must also be raised. Within Canada, for example, should any (and all) items written by Canadian "academics" or "commentators" on international relations or foreign policy be included even if they do not otherwise fall within the subject parameters of the data base? This very broad degree of coverage might be useful to some sections of the Department (e.g. Academic Relations, Information and Historical Divisions, the Policy Analysis Group) but could over time mean some extension of the coverage of the file. Similarly, in the case of material from the posts abroad, should posts be asked to attempt to gather all material related directly to the subject coverage of the data base wherever possible or should it be looked at in a much more restricted way?

All of the above parameters need to be clearly spelled out in order to develop a workable program for implementing and operating an information system. Failure to do so will result in considerable confusion for those involved in providing input to the data base as well as frustration and disappointment for those who attempt to access the system to meet their information needs.

SECTION 3

CHARACTERISTICS OF THE DATA BASE

At the centre of any bibliographic data base is the basic core of information to be contained in each record that will be included in the file:

Author (s)

Title

Place of publication, publisher

Name of journal

Date

Paging

Depending on the anticipated use of the data base, it is probable that it will be useful to include other information where appropriate such as:

Departmental or corporate affiliation

Contract numbers and related information

Series notation

Illustrations

Statistical information, graphs

Maps

Bibliographies

Source or availability information

Elaboration of this basic record can take place in a variety of ways depending upon the requirements of the system and its users. The record may be augmented by the addition of:

Enriched title terms

Added descriptors

Brief abstracts (using either a free vocabulary or
a fixed thesaurus)

Full narrative abstracts (250-500 words)

Full abstracts with some qualitative assessment

The control of the vocabulary used to create enriched titles, descriptors or abstracts can range from no control at all to a very rigid vocabulary. Use of a controlled vocabulary or thesaurus will provide some structure for the content of the data base and will give a higher ratio of retrieval of relevant information. At the same time, use of a fixed vocabulary will generally result in higher indexing costs plus the cost of developing and maintaining the thesaurus. There can be no such thing as a permanently "fixed" thesaurus since there must be constant development of the thesaurus to ensure its continued relevance to the material being indexed and the retrieval needs of the clientele being served.

The types of indexing available vary considerably from complex hierarchically classified indexes (eg. the Dewey Decimal Classification) to those with virtually no

framework. Keyword systems (either KWOC - Keyword-out-of-context or KWIC - Keyword-in-context) are good examples of systems with no framework or index structure. Exploitation of keyword systems is a product of the "computer age" and today this technique forms the basis of countless computerized bibliographic systems. Through the use of Boolean logic (AND,OR and NOT) it is possible to develop complex and sophisticated systems for searching data bases using keyword systems. <3>

A related problem concerns the depth of indexing that is to be attempted. This is primarily a question of how many access points are to be provided to the record. Use of keyword systems allows the relatively easy expansion of the number of access points according to the significance of the item being indexed.

The requirement that the system must be able to accomodate material in either French or English poses some additional questions. Should enquiries be possible in either language that would retrieve all relevant documents in the data base without regard to the language of the original source material? Would it be adequate instead to have to query the system in BOTH English and French in order to retrieve in both languages? Several officers commented in interviews that since the Department of External Affairs is a bilingual service (or at least is supposed to be) its members should be able to form a query

in either language. If they can not then it might be suggested that to retrieve material written in the other official language will not be of much assistance anyway.

The difficulties caused by adopting the latter course could be partially overcome by adding descriptors or enriching keywords in the other language at the time of input. This would simplify and speed up retrieval but would also increase input time and costs. Use of a fixed thesaurus and provision for machine translation of the thesaurus terms would probably be a more satisfactory answer. In this regard, the plans for the development of the Department's internal records management system should be examined since that system will probably include some provision for machine translation of thesaurus terms. A parallel system should be planned for use with this data base.

From the user's point of view, translation of the full abstract would also be very useful, but this practice would add considerably to the cost of creating the data base. It is highly questionable if the added costs and probable delays that would result from attempting translation of the abstract would be worth the added benefit.

As suggested in Section 2 above, material in languages other than English and French should probably be entered into the system with both the original title and a French and/or English translation. Keywords or descriptors and the abstract (if used by the system) would then be provided in either official language depending on the language proficiency of the person doing the translation.

It is difficult to assess the relative advantages and disadvantages of the various methods potentially available for dealing with bilingualism in this context. Changes in computer hardware technology and software techniques may partially show the direction to choose in the years ahead. In the meantime, however, whatever course is adopted should be at least similar in philosophy and technique to that used by the Department's internal information system as it is developing.

SECTION 4

BUILDING THE DATA BASE

Apart from the actual data input and computer related aspects, there are two major questions to be considered regarding creating and updating the data base: WHO is going to provide the input and HOW will they identify and acquire the information. Dealing with the machine related aspects of the input process will be largely similar regardless of who is doing it.

WHO will provide the input data can be arranged in three ways (or possibly in combinations of these three):

(1) Staff provided in the Division of Library Services whose training and experience relates directly to the handling of bibliographic data and the provision of this type of information service.

(2) Bureau Information Control Officers who will be doing the indexing for the Department's internal information system and who will be providing the primary access to that system for officers

(3) Use of a contract with some outside institution, organization, corporation or individual. A number of possibilities present themselves including use of,

The Canadian Institute of International Affairs

The Canadian Peace Research Institute

Information brokers (INFORMART, SVP or others) ^{or}

Universities (libraries, academic departments)

Free lance indexers under Departmental supervision

Regardless of who is doing the indexing and abstracting, the identification and collection of material to be included in the data base will involve a significant effort. Input will have to be made on a regular basis and it will be essential that new material be added without delay. A number of basic sources will have to be used:

(1) Complete indexing of certain sources or types of material (eg. Department of External Affairs statements and speeches, publications of the Department, certain core journals).

(2) Selective inclusion of materials currently acquired by the Department's library (eg. Hansard, UN material, journals, Canadian theses, etc.)

(3) Acquisition of some additional materials -- either the original source documents or additional indexing and abstracting services that cover areas of interest to the system.

(4) Purchase of regular SDI (Selective Dissemination of Information) profile runs on data bases that cover material which should be included in the file.

(5) Input from Canadian missions abroad can provide

a valuable dimension and should be fostered as much as possible. The potential for supplying input will vary considerably depending on the nature and location of the post, but the type of material which might be generated from this source would frequently be unobtainable by any other conventional means. Posts already send material from their areas to Ottawa in the course of their normal reporting, but this process could be made more systematic in order to link up with the creation of this data base. <5>

A significant data base of material on Canadian foreign policy and external relations is not going to be built by the chance accumulation of data. Considerable planning and organization will be required in order to ensure the creation of a data base that is sufficiently complete (within the parameters established for the system), accurate and timely to be credible in the minds of potential users. If it is not credible as an information source it certainly will not be fully used by its potential clientele.

SECTION 5

ACCESS TO THE SYSTEM

Requirements for accessing the system will vary according to the operational needs of prospective users at a given point in time. Some will be looking for quick information in response to an immediate need. Others will want a more "in depth" survey of the literature on a topic but may not require it for several days. A regular, selective listing of references covering a particular subject or series of subjects may be required by still other users. All of these needs can be accommodated by the same data base with ease, but the handling of the requests will vary according to the circumstances.

In general terms it would seem most appropriate to channel these requests through designated staff in the Department's Library. Reference librarians and associated non-professional staff should have the training and experience to enable them to deal efficiently with enquires of this type. Working with the requestor, the librarian or search editor can determine what information is required, the most appropriate means of locating that information (which may well be another data base or a more "traditional" source), the time frame involved, prepare

the appropriate search and then submit it to the system.

<see Computer Aspects below>

At the same time it is essential that access to this system be coordinated with the use of the Department's internal records management information system. A close working relationship with the proposed Bureau Information Control Officers will be essential to ensure that all enquiries are treated appropriately and are directed to whichever system will best meet the requestors requirements.

In the near future it is unlikely that many officers will directly interrogate the system themselves. Experience with other similar bibliographic systems indicates that, except for individuals who have a particular interest in information retrieval systems, most end users of information find it quicker, more efficient and more effective to have a trained searcher actually interrogate the system. There is a certain "knack" required and many techniques that must be learned. While this will no doubt change over the years, especially as on-line interactive systems become easier to use, for the moment it is a fact of life.

Requests from officers in posts abroad could be handled in much the same fashion by channeling them through search editors in the Library (assuming they would

have first gone to the librarian in their post if there is one). Depending on the urgency involved, requests could be handled by telex, mail or diplomatic bag. The system would be most valuable to the posts abroad if it included back-up provisions whereby they could request copies of material retrieved. Posts outside major Western capitals would particularly benefit from this supplementary service. In effect, it would represent an addition to the existing service provided by the Library in response to post enquires.

It should be remembered that the data base can also be used to produce a variety of other products apart from listings of materials to meet individual requests. Selective bibliographies could be generated on specific topics and then printed for distribution (with the printing masters produced directly by the computer system). COM (Computer-Output-Microform) files created directly from the machine-readable data base could provide a very inexpensive method of distributing large amounts of data to a number of sites. For example, a complete listing of the file in various orders (subject, title, author, etc.) could be generated and distributed to all posts relatively inexpensively. Once the file has been created there are a vast range of possibilities for its use.

While this study is primarily concerned with use by members of the Department of External Affairs, it must be

borne in mind that a Canadian foreign policy information data base would be extremely valuable to many individuals and organizations outside the Department. There are two general approaches that could be taken to meeting their requirements while avoiding any adverse affect on the security of the Department's operations:

(1) by handling specific requests through the Departmental Library.

(2) by providing a tape copy of the data base to some other information centre, allowing that centre to mount the tape as part of its service and then allowing public access to the data base through that centre. There are a number of such potential centres developing in Canada, but two that would be in a position to accomodate such a file (and probably happy to have it owing to the dearth of Canadian bibliographic data bases) are the National Research Council's Canada Institute for Scientific and Technical Information (CAN/OLE System) and QL Systems.

Public access to the data base could be provided as a service by the Department, but the public use of the file should also generate at least sufficient revenue to cover any incremental costs incurred in making the data base available. Users of computerized bibliographic information services are largely prepared for the concept of "fee for service" as a result of their experience with existing systems. The main concern of "outsiders" will be that the

data base be available rather than the fact that they may have to pay a reasonable fee to gain access to it.

SECTION 6

COMPUTER ASPECTS

In some ways the "computer" aspects of this study are the most straightforward of all in that the technology exists, has been well developed and currently is being exploited in literally hundreds of bibliographic retrieval systems. There is a wide range of computer systems potentially applicable to this proposed system and one could be selected to meet virtually any established need or level of available funding. The actual computer system design chosen will depend largely on the needs defined in terms of the requirements identified in Sections 1 to 5 above.

With the availability of an "in-house" computer (or computers) in the Department of External Affairs later in this decade, the system could easily be implemented on that machine (or machines, depending on the configuration finally chosen). This would allow direct control over the development, implementation and operation of the system by specialists within the Department.

Building the data base could be accomplished either through on-line data entry systems or in a batch mode. The

most cost-effective at the moment would probably be some type of on-line "key edit" or "data entry" system with batch file maintenance runs and file updates as regularly as are required to meet the needs of the system. Retrieval from the system could be either on-line or batch, depending largely on the type and nature of the retrieval requirements and the frequency of demand.

Maintaining the data base on a tape file and doing updates and retrievals from it in batch mode would be the most economical prospect in terms of computer resources. Data entry might still be accomplished via terminals into some type of on-line data gathering system, but this would not necessitate maintaining the whole file "on-line" for lengthy periods. Searches could also be entered via terminals and executed in batch. SDI profiles and other types of output such as COM would normally be run in the batch mode with any system.

A slightly more expensive version would be to mount the system on-line for retrieval purposes "on demand" or during certain limited time periods each day or each week. There is no doubt that interactive on-line searching is more satisfactory in terms of the quality of the search results. This approach allows the search editor to refine the search dynamically as it is proceeding thus giving instant feedback on the results being achieved and providing a greater probability of achieving a high

proportion of relevant material for the requestor. On-line searching will serve the needs of the user more quickly and efficiently but it does so at a cost in terms of computer resources.

The most expensive approach (but also the most attractive to the users) would be to have the data base spinning on-line at all times thus providing instant access on demand by any authorized user. A fairly high level of utilization would be required to justify the costs of this approach although it would have many advantages both in terms of retrieval and file creation.

An example of how these three levels of systems could be implemented can be seen in the potential application of a system currently being used by the Department of External Affairs Library to handle its collection of government documents. Known as the CODOC system <6> it provides multipoint access to the government documents collection: by personal author, corporate author, title, series, serial and by KWOC (Key-Word-Out-of-Context) subject index (based on the title plus additional enriching terms when necessary). The system could be used at several levels:

MODEST SYSTEM: use the CODOC system basically as it presently is enriching the titles with added keywords when required. The system presently provides a single term KWOC but this could be adapted to link

terms or to handle phrase searches relatively easily. The Department's bilingual requirements could be accommodated by putting documents into the system in either English or French and then searching in both languages or by adding sufficient enriching terms to the title (eg in English for a French title) to allow searches to be done in only one language. Use of this system would allow the inclusion of the existing Department of External Affairs government documents collection in the data base with virtually no conversion thus providing some basic data for the file immediately. The two files would be maintained separately but would be compatible. Public access could be provided either through products generated by existing CODOC printed catalogue and COM features or through the on-line facilities of CAN/OLE as it appears likely the CODOC data base will soon be offered through this service. Cost of operating this system would be relatively low as it is based on quite straightforward batch input and output systems.

MEDIUM SYSTEM: could utilize the CODOC system as indicated above with the addition of a brief abstract. Some additional structure for the system could be provided by the use of a fixed thesaurus such as the one being developed for the Department's internal records management information system.

FULL SYSTEM: as above but with the addition to the record of a full narrative or descriptive abstract

(250-500 words). More complete bilingual coverage could be achieved by including abstracts and descriptors in both official languages.

The principle advantages of utilizing an existing system such as CODOC are,

(1) the system is operational, can be examined in a "real" functioning environment, is relatively economical, can be implemented on a wide range of machines (most of the programs written in COBOL), produces a variety of products and will be accessible on-line.

(2) it is compatible with existing files being built by the Department and allows the use of existing data with a minimum of conversion.

(3) would provide the potential of public access through CAN/OLE.

While the use of this system may not in the end prove appropriate, it does illustrate how an existing system could be used to get the project up and operating with minimum costs and delay.

*credit for
has not been
produced for
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SECTION 7

ESTIMATES OF COST

Until the parameters of the system are laid down very clearly and specifically, it is difficult to provide any firm estimates of the costs involved in the operation. Costs will vary dramatically according to the breadth of coverage (subject, types of material, chronological limits, etc.) which set the basic outline of the system, the type and limits of indexing and abstracting, the specific computer system chosen (on-line vs batch will make quite a difference) and the user demands placed upon the system.

Primary initial costs of establishing the system will include the staff required to design the actual system and to do the necessary programming as well as the computer facilities or services required for the testing necessary to bring the system to an operational level. Even if an existing system or "package" can be used there will still be some costs involved in acquiring the package and converting or adapting it to meet the specific requirements of this application.

Costs for operation of the system will include:

(1) Cost of the identification and acquisition of material to be included in the data base; this will include the staff time necessary to select and identify the material as well as possible additional expenditures for new journals, indexing and abstracting services and computer searches on other data bases.

(2) Staff cost for indexing and abstracting (and where necessary, translating) items to be added to the data base.

(3) Cost of creating the machine-readable input data.

(4) Staff cost for data control and file maintenance.

(5) Computer costs for creating the records, updating, maintaining and storing the data base.

(6) Terminal and line costs (if applicable).

(7) Computer costs for accessing the data base; this will include both on-line and batch charges as well as the cost of preparing other off-line forms of output (e.g. COM or printed output).

In the absence of specific parameters for the coverage of the data base it is difficult to estimate the volume of material that might be added to the file each year, but assuming the adoption of fairly broad subject guidelines one might anticipate the addition of

approximately 2,000 items from a current year plus some retrospective indexing.

The cost of identification, location, and collection of material will be virtually the same regardless of whether a "modest", "medium" or "full" system is chosen. The costs identified in 2,3,5,6 and 7 above will be more variable. It should, however, be possible to operate the "medium" system within the Department, with one full time person to identify, collect and index the material (using only descriptors and a brief abstract). The bilingual requirements of the system would necessitate that the person be able to deal with material in both French and English or else additional assistance would be required. Creation of the actual machine-readable data input records could be contracted out and would probably require about 250 to 300 hours of service per year. In addition, the services of a systems analyst/programmer would be required for part of the first year to design and implement the system. In succeeding years relatively little programming support should be required. Some professional supervision (e.g. 20% of a professional librarian's time) would be required on a continuing basis. Annual operating costs for

the "medium" system might then be viewed in terms of

Identification & indexing of material	\$12,000
Clerical assistance (part-time)	3,000
Systems Analyst	2,500
Professional supervision	3,000
Data input	2,500
Computer services	4,000
Misc. costs	3,000

	\$30,000

Limiting the system to the "modest" approach described above might reduce the cost by approximately 20%. Operation of the "full system" would cost at least 50% more with most of the additional cost being involved in writing the full, extensive abstracts.

Some elements of this costing are difficult to determine until the parameters of the system are more completely defined (e.g. the data input costs and the computer costs may be too high --- it depends on how computer services within the Department are "charged back"). For example, it is possible that economies could be realized in the identification and indexing phase by contracting out aspects of this work, but this might in turn necessitate greater "professional supervision". Regardless of how it is approached, however, gathering and assembling information is an expensive process.

SECTION 8

SUMMARY AND RECOMMENDATIONS

I. Implementation of the proposed system is highly desirable in view of the potential use by a wide ranging clientele both within the Department and outside. There is evidence of a need for this type of information to be available to meet a number of Departmental requirements.

II. The system is feasible from a "computer" point of view. There are a number of existing bibliographic retrieval systems that perform similar functions in other applications and many of them could be used as a basis for a system to meet the requirements laid down.

III. If the decision is made to proceed with the development of a computerized Canadian foreign policy information system, it is recommended that the "medium" system outlined above be adopted. The following points are implicit in that recommendation:

(1) That the abstract be limited to a brief descriptive abstract with a maximum of 50 words.

(2) That the subject coverage of the data base be broad rather than narrow in order to increase the range of possible users and to make the file

potentially of use to all members of the Department of External Affairs as soon as possible.

(3) That coverage begin in 1975 with inclusion of retrospective material being limited initially to that available from the bibliographies produced by Professor D. Page.

(4) That newspaper coverage be limited to material of substantial interest to the Department ---- largely analysis or editorial. Failure to limit this type of material might overload the system with newspaper input.

(5) That input be provided under the direction of the Division of Library Services in order to provide a direct integration with existing bibliographic services and sources. Actual identification, indexing and abstracting of the material might be done on a contract basis depending on manpower availability.

(6) That close links be developed with the internal records management information system being developed. The Bureau Information Control Officers who will operate that system should be fully aware of the nature of this bibliographic data base and be able to provide at least indirect access (by channeling requests) if not direct access to the file.

IV. Even though there is considerable potential for establishing a computerized Canadian foreign policy information system, it is recommended that the alternative of expanding and enhancing the use of existing information sources and data bases be explored. Depending on the resources available, this could be done in a variety of ways and through many channels. Some of the means of achieving this enhancement would include:

(1) Greater use of existing Library staff and equipment to access presently available (and developing) machine-readable data bases in Canada and abroad. The Library presently has access to some on-line retrieval systems (e.g. CAN/OLE, Lockheed, System Development Corp.) but further extension of the use of this type of service is required.

(2) Provision of additional research assistance in the Library to undertake specific literature searches or data gathering assignments for members of the Department (in Ottawa or abroad) to meet specific requests. This could include use of all the traditional information sources as well as the more recently developed computerized data bases. Present library staffing does not permit the provision of anything approaching this type of service.

(3) Provision of sufficient funding to enable the Departmental Library to place the bibliographic records of its full collection in the Ontario Universities Library Co-operative System monograph and

CODOC data bases. This would enable the Department to produce catalogues (COM or printed) for its own use as well as providing a major data base available for public use.

(4) Use of the files generated from the CODOC and CATSS systems to produce COM fiche that would serve as a low cost information retrieval tool for any post abroad that required access to such information. Revised catalogues could be provided for posts quite inexpensively. Backup copies of materials located through these catalogues could then be supplied from Ottawa as required. These microfiche catalogues could also be used as an integral part of the Department's developing role in the support of Canadian studies programs abroad. Bibliographic information of this type is a core aspect of the background resources required for such programs.

(5) It is essential that officers of the Department at home and abroad be made more aware of the sources that do exist and the potential that is present in many areas TODAY. Full integration of the Library into routine training and orientation programs for new officers, those returning to Ottawa from abroad or those about to be posted would provide an opportunity for developing this awareness.

V. It is very difficult to forecast exactly what the information needs of members of the Department will be in the years ahead -- either in terms of subjects or levels of coverage. To attempt to cover all the possible areas of need may well prove to be too expensive for the available resources although it certainly does have some long run advantages. If the prime intention of the proposed system is to provide a significantly increased level of information (in fact a whole range of new types of information) available to officers of the Department, it may well be more cost effective to adopt the alternative discussed above. This course would eliminate the creation of an automated file that might be made available to those outside the Department. However, the availability of such a file would be a great asset and although it would be expensive, the benefits may well be judged to exceed the cost.

VI. Credibility in the minds of the user community is vital regardless of the type of system implemented. The system must be able to satisfy realistic requests with accurate, complete, and timely information within a reasonable turnaround time. Failure to do so will result in potential users going elsewhere, use of private sources, further development of "squirrel files" and a waste of valuable resources and manpower. If this endeavour is to be undertaken at all it must be done well, regardless of the approach taken.

NOTES

1. Page, Donald M., A BIBLIOGRAPHY OF WORKS ON CANADIAN FOREIGN RELATIONS, Toronto, Canadian Institute of International Affairs, 1973, 442 pp.

2. At least one division indicated that they would like to have news stories included as well. Hopefully this need can be met in the future through systems like the New York Times Information Bank and the soon to be launched Toronto Globe and Mail computerized file. Other Canadian newspapers are also looking toward computerized indexes. One longstanding project is the computerized index to Le Devoir produced by Laval University for several years. This system now includes two other French language newspapers.

3. An example of this is given in W.K. Wardroper's Interim Report on Departmental information systems when he comments on a Swiss Foreign Ministry experiment with "full text" storage: "Their experiment, conducted by foreign service 'political' personnel, did demonstrate that the writing of abstracts or precis by the indexers involves far too much time and effort and that reasonably good retrievals can be obtained from key words alone". Wardroper, W.K., INFORMATION SYSTEMS DEVELOPMENT: INTERIM REPORT, Ottawa, Department of External Affairs, April 1975, p. 55.

4. Considerable work in this area has been done (and continues to be done) by the International Development Research Centre. They are developing a multilingual version of the International Labour Office's ISIS system.

5. Some officers pointed out that even publicly available material now being sent back from posts is often classified and thus could not now be included in this system. The reasons for "classifying" public material might have to be examined in light of the requirements of this system.

6. CO-operative DOCUMENT project of the Ontario Universities Library Co-operative System. Based on the Government Documents System originally developed by Margaret Beckman and implemented at the University of Guelph in the late 1960's, the system has been enhanced by the efforts of the co-operative group and is now in use in 8 university libraries in Ontario plus the Department of External Affairs.

7. Two excellent studies of the cost of computer based bibliographic information systems are: Vickers, P.H., "A cost survey of mechanized information systems", Journal of Documentation, 39 (September 1973), pp. 258-280; Dammers, H.F., "The economics of computer-based information systems: a review", Journal of Documentation, 31 (March 1975), pp. 38-45.

APPENDIX I

GLOSSARY

BATCH PROCESSING - data items to be input or searches to be made of files are gathered and submitted to the computer at a particular time. This may involve a time delay of minutes, hours or days between the creation of the original data and the computer run.

COM - Computer Output Microform. The output of the computer is produced in the form of transparent microfiche (usually 4 x 6 inches) or microfilm (usually 16mm). A typical COM format places 270 pages of computer output on a single 4 x 6 inch fiche at a reduction of 48x.

CPU - Central Processing Unit

DATA BASE - A collection of data organized to allow appropriate programs or users to retrieve information or update files. Normally designed to meet a multitude of requirements from a single collection of data.

KWIC - Key Word IN Context. A method of indexing using permuted titles of bibliographic records. The ratio of relevant "hits" can be increased by adding "enriching terms" to the field being permuted.

KWOC - Key Word OUT of Context. Similar to KWIC indexing except that the "keyword" is displayed physically apart from the context of the material being indexed.

LITERATURE SEARCH - A search of the available bibliographic information potentially encompassing a subject of interest in order to identify existing information on that subject. Such a search may be conducted using traditional printed library reference tools (e.g. indexes, abstracts, bibliographies, etc.) or by the use of a variety of automated systems.

ON-LINE - Terminals or other devices operating directly under the control of a computer's central processing unit. Through the use of such on-line facilities the user may interact directly with the computer.

SDI - Selective Dissemination of Information. A system for selecting and producing periodic listings of bibliographic (or other) information according to profiles established to meet specific requirements. These profiles may be based on a variety of criteria (e.g. subjects, authors, institutions, languages, country of origin of the material, etc.) linked together by logical connectors.

TERMINAL - A device connected to a computer via a communication link to provide entry of data or instructions and output of information from the computer. Typical terminals include CRT's (Cathode Ray Tube terminals -- similar to a television screen) and "hard copy" terminals that produce a paper output in a variety of ways. If a terminal is to be used as an input device it includes a typewriter like keyboard.

THESAURUS - A collection of words, terms or phrases used to index, classify or identify information for retrieval from a data base. It may be a simple list of words in alphabetical order or may have a complex structure or hierarchy.

TIME-SHARING SYSTEM - Through terminal devices several users can access and use a computer almost simultaneously with a time-sharing system making it appear to each user that the computer is dedicated to his individual use.

APPENDIX II

CONSIDERATION OF AN ALTERNATIVE

The original parameters of this study were phrased in terms of a "computerized system" thus implying the development of the single, integrated data base described above. Nonetheless, it became apparent during the course of the study that at least some consideration should be given to alternative means of achieving the objectives set out above.

One means of meeting the Department's objectives would be to expand and enhance the use of existing data bases and information sources to provide a significantly different dimension to the services currently being offered by the Department's Library.

In the past few years there has been a tremendous growth in the number, range of coverage and scale of bibliographic data bases being made available in machine readable form. <See Appendix III for a survey of available data bases.> Originally largely concentrated in scientific fields (e.g. chemistry, biology, physics, medicine), many data bases are now providing substantial social science coverage while others are being developed in the arts and humanities (e.g. philosophy). Although a very large proportion of these are being built in the United States their coverage is certainly international.

At the same time, however, it must be recognized that few of these data bases are being created in Canada and the coverage of Canadian subjects and sources, while considerable, is far from complete. No single available data base could meet all (or even most) of the Department's requirements for materials as set out above, but the skilled use of several appropriate files would be of substantial value in meeting the requirements of officers as they arise.

The most basic conceptual differences between this alternative and the proposal to build a computerized data base of public materials on Canadian foreign policy and external relations are,

- (1) it would be expected that searches would be made on a variety of available sources to meet a particular demand or series of demands from members of the Department rather than trying to anticipate in advance what all potential requests might be and assembling the data to meet them.

- (2) no systematic, organized and integrated data base would be created as a result of meeting these particular ad hoc requests. Information would be

assembled to meet specific present needs but not with a view to building up a data base for future requirements.

There are a number of advantages and disadvantages implicit in the suggestion of this alternative. As indicated above, using this approach would provide for the possibility of responding to requests covering a very wide range of subjects without the necessity of having identified them all in advance. Given the range of subjects of potential interest to the Department this factor could be crucial. In addition, use of this alternative would build on existing skills, tools and facilities in the Division of Library Services and thus could be implemented quickly and developed as required.

At the same time, however, it must be recognized that it would not result in the creation and building of a new data base of materials of Canadian interest. Such a data base, as outlined elsewhere in this study, has great long term potential for the Department of External Affairs, other government departments and for many individuals and organizations outside the Government of Canada.

In addition, many of the types of material listed in Section 1 are difficult to locate through existing systems (e.g. theses, newspaper material, statements and speeches, etc.). Thus, even with the availability of a large number of computerized data bases many of these materials would still have to be located through traditional sources as required.

Nonetheless, much could be done to extend the service presently provided by the Department's Library by ensuring that the Library is able to have the contracts necessary to provide access to any data base that might be needed combined with sufficient funding to do searches of those files as is appropriate. Moreover, the provision of even a single research assistant's position in the Library to undertake specific literature searches, compile annotated bibliographies, or do data gathering assignments beyond those possible with the existing Library manpower, would be a great asset.

As part of this alternative, it would also be essential to ensure that sufficient staff and resources are available to place the bibliographic records of the Library's total collection in the appropriate Ontario Universities Library Co-operative System monograph or documents data base. This would enable the Department to create catalogues of various types for its own use (printed, cards, COM, etc.) as well as providing public access to the unique information resources in this collection. In addition, it would also allow the production of low cost COM fiche catalogues that could be

used to provide access to the Library collection by officers in post anywhere in the world. If combined with an efficient back-up service by the Library to provide copies of needed materials, this could considerably enhance the information resources available to officers abroad, particularly those in smaller and more isolated postings.

Regardless of the system being used, be it the development of a new computerized data base or the augmenting of existing services, it should also be combined with a more highly developed and systematic library orientation and training program for all members of the Department at all levels. This is essential if they are to fully understand the myriad of information sources and services available to them today and if they are to make full and effective use of the possibilities before them.

It is often said that we are entering the "age of information" and it is obvious that there is no group for whom this has greater implications or importance than the members of the Department of External Affairs.

APPENDIX III

SURVEY OF AVAILABLE DATA BASES

A vast amount of bibliographic data is currently available in machine readable form and is accessible through a variety of systems. While many of these are unlikely to be of any interest to members of the Department of External Affairs, others provide potential coverage of areas of substantial Departmental interest.

To give some indication of the range of data currently available to users in North America, Mrs. Ellen Pearson, Head of the Circulation and Information Services Division, University of Guelph Library, compiled the following survey providing brief information on a wide range of data bases and an indication (in brackets after the name of the data base) of the systems through which they are available. No attempt has been made to provide a definitive list of data bases or a fully comprehensive account of the coverage of particular retrieval systems or data base suppliers. The systems referred to include:

- CAN/OLE - Canada Institute for Scientific and Technical Information (National Research Council of Canada)
- CAN/SDI - C.I.S.T.I. (above)
- DIALOG - Lockheed Information Systems
- ORBIT - System Development Corporation
- QL - QL Systems

ABI/INFORM; Abstracted Business Information (DIALOG, ORBIT, QL) Business management, economics, statistics, business law and marketing. Major articles from about 300 journals are indexed. About 10,000 citations are added each year. Coverage from 1971. Produced by Abstracted Business Information, Louisville, Kentucky.

AIM/ARM; Abstracts of Instructional and Research Materials (DIALOG). Indexes instructional materials and curricula in vocational and technical education and the research materials which support them. There is purported to be very little overlap between this file and ERIC, especially since 1974. Material is indexed using the ERIC Thesaurus

and the ERIC guidelines to indexing. All material funded by the Department of Occupational and Health Education will be found in this data base. All the material indexed can be found in the complete file of ERIC microfiche. Produced by the Center for Vocational Education, Ohio State University, Columbus, Ohio.

AMERICA: HISTORY AND LIFE (DIALOG). This data base, produced by ABC-Clio, Inc., covers the current periodical literature since 1955 on American and Canadian history and American and Canadian area studies, including current affairs. Citations in English are provided for relevant articles appearing in 1,900 foreign and domestic journals. As of 1974, books and doctoral dissertations have been added to the data base. To date, AHL includes over 50,000 citations and is updated at an annual rate of 11,500.

ASI, American Statistics Index (ORBIT). Covers statistical publications of the U.S. government; subject coverage is as broad as the U.S. government's national and international interests. Includes material from 1970 to the present, but does cover some material from the 1960's. About 800 records are added monthly. Prepared by the Congressional Information Service.

BA Previews; Biological Abstracts Previews (DIALOG, CAN/OLE, CAN/SDI). Corresponds to Biological Abstracts and BioResearch Index. Covers life sciences and related fields. 8000 journals are reviewed representing about 84% of the total input. Includes material from 1972 (DIALOG) or 1973 (CAN/OLE). Prepared by Biosciences Information Service of Biological Abstracts, Philadelphia, Pa.

BI/DATA. A selection of up to 140 economic time series variables on 70 countries is available. Data in the system covers from 1960 to the latest, year for which data is available or can be estimated accurately. Produced by Business International Corporation.

British Columbia Provincial Statutes (QL). This data file contains all the public, private, and local acts of the Parliament of British Columbia consolidated to the end of 1974, and includes amendments to the acts and sections repealed.

CAIN; Cataloguing and Indexing data base (DIALOG, ORBIT, CAN/SDI). CAIN is the monthly cataloguing and indexing data base produced by the U.S. National Agricultural Library. It includes the complete Bibliography of Agriculture file, the contents of the NAL catalogue, and all the entries from their special Food and Nutrition file. Approximately 120,000 items including monographs and journal articles are indexed each year from material acquired on a world-wide basis in the broad field of agriculture, including agricultural economics and rural sociology, agricultural products, animal industry, engineering, entomology, food and human nutrition, forestry, pesticides, plant science, soils and fertilizers, and other related subject fields.

CANCERLINE see MEDLINE

CANSIM; Canadian Socio-Economic Information Management System (SMA). CANSIM is the data bank of Statistics Canada which contains over 60,000 series, both historical and current (raw, monthly, quarterly and annual), of statistical data collected and projected by the Government of Canada for the needs of the various government departments. The broad scope of statistical information which can be accessed is as follows: population statistics; the system of national accounts; price and price indexes; labour, agriculture; manufacturing and primary industries; Bank of Canada statistics; construction industry; business finance; and Central Mortgage and Housing Corporation.

CDI (Comprehensive Dissertation Index) (DIALOG). CDI provides cumulative, interdisciplinary listings of doctoral dissertations in all fields starting in 1861 and extending through papers accepted as recently as last month. It covers virtually all dissertations accepted by accredited, degree-granting U.S. universities plus many of those accepted in Canada. Listings cite the appropriate reference in Dissertation Abstracts International and give the order number for those dissertations available from Xerox University Microfilms. At the present time the file contains over 500,000 items and over 40,000 items are added each year.

CHEMCON; CA Condensates; Chemical Abstracts (DIALOG, ORBIT, CAN/OLE, CAN/SDI). Corresponds to Chemical Abstracts. Abstracts over 12,000 journals as well as

patents issued by 26 countries, books, conference proceedings and government research reports. Covers biochemistry, organic chemistry, macromolecular chemistry, applied chemistry, chemical engineering and physical and analytical chemistry. DIALOG provides retrospective searches from 1972, ORBIT from 1970 (the file is split with CHEM 7071 covering 1970 and 1971 and CHEMCON covering 1972 to the present) and CAN/OLE from July 1973 to the present. About 12,000 abstracts are added to CHEMCON bi-weekly. Produced by Chemical Abstracts Service, Ohio State University, Columbus, Ohio.

Chemical and Electronic Market Abstracts see PATS

CIN (Chemical Industry Notes). The CIN data base is designed to meet the current business information needs of chemical industry professionals who are involved in management, investment, marketing, or production. It contains brief extracts of articles from 75 world-wide journals on production, pricing, sales, facilities, products and processes, corporate activities, government activities, and people, for the chemical process industries. At the present time there are approximately 85,000 records in the file, with an additional 750 added each week. There is no corresponding printed publication for this file.

CIS Index; Congressional Information Service (ORBIT) Indexes U.S. Congressional publications, including hearings, committee prints, House and Senate reports, documents and special publications, Senate Executive reports and documents. Subject coverage is multidisciplinary and topical. Covers material from 1970 to date. About 900 records added monthly. Prepared by the Congressional Information Service

CLAIMS; IFI/PLENUM (DIALOG). International coverage of patents. There are two parts to the file: CLAIMS/GEM which is updated quarterly contains over 350,000 U.S. chemical and chemically related patents issued since 1950 plus foreign equivalents from Belgium, France, Great Britain, Germany and the Netherlands. CLAIMS/GEM begins with January 1975 and covers all issued United States general, electrical, and mechanical patents. The file is updated monthly and an estimated 55,000 patents were added during 1975. CT; Chemical Titles; (CAN/SDI). Chemical Titles contains references to chemistry and chemical

engineering. All the references come from journals. Approximately 730 journals are monitored and 242 are indexed completely. Each issue contains about 5,400 references with 63 per cent of them coming from English language originals. All the articles reported in Chemical Titles eventually find their way into CA Condensates, but they normally appear in Chemical Titles up to three months before they appear in CA Condensates.

COMPENDEX; Computerized Engineering Index (DIALOG, ORBIT, CAN/OLE; CAN/SDI). Corresponds to Engineering Index. Abstracts from journals, publications of engineering organizations, papers from conferences and symposia, books and other documents. Covers all aspects of engineering and related applied science fields. Includes material from 1970 (CAN/OLE, ORBIT) or 1972 (DIALOG). About 6000 records added monthly. Prepared by Engineering Index, New York.

Domestic and International Statistics see PATS

ENV; Environment (QL). References and abstracts prepared by the Inland Waters Directorate of Environment Canada. This data file contains references to published and unpublished documents about water resources and related topics that reflect the Canadian water resources scene. The documents cover scientific, technical, and sociological research; economics; administrative and management reports; legislation and political news issues. This data file covers from 1969 to the present and gives the user a full bibliographic citation along with the abstract.

EIS Plants see PATS

ERIC; Educational Resources Information Center (DIALOG, ORBIT, CAN/SDI). Corresponds to Research in Education, Current Index to Journals in Education, Current Project Information, Pacesetters in Innovation, Field Reader Catalog, and Exceptional Child Educational Abstracts. ERIC is made up of six individual data bases. They are:

- (1) Research in Education (RIE) a monthly record of significant educational research reports and projects, collected, screened, indexed and abstracted by nineteen clearing-houses located at universities or with

professional organizations in the U.S., and coordinated by the National Institute of Education.

(2) Current Index to Journals in Education (CIJE) a monthly record which indexes the core periodical literature of over 350 journals in the field of education.

(3) Current Project Information (CPI) a quarterly index which presents information about research projects funded by the U.S. Office of Education's Bureau of Research. It is intended to serve the management personnel who plan, control, and monitor research grants and contracts in the Bureau. New projects are added as they are initiated; deletions are made only when projects have been closed.

(4) Paccetters in Innovation (PACE) a cumulative file which presents information on U.S. "Projects to Advance Creativity in Education".

(5) Field Reader Catalog - a compilation of non-government specialists under contract to the U.S. Office of Education's Bureau of Research.

(6) CEC (Exceptional Child Education Abstracts). CEC data file contains about 40 per cent journal articles in addition to texts, conference proceedings, curriculum guides, monographs, research reports, administrative guides, and bibliographies focusing on the education of the handicapped and gifted. At the present time there are more than 12,000 abstracts in the file.

Coverage of most files is from 1966 to the present. Produced by the Educational Resources Information Center, Washington, D.C.

Exceptional Children Abstracts (DIALOG). One part of the ERIC data base (see above) which can be accessed separately through DIALOG.

Excerpta Medica (Informatics). Corresponds to the printed index of the same name. Indexes journals in the field of medicine and biomedical research. The data base covers European publications much better than MEDLINE and is used

mainly for searches where international coverage is important. The file includes citations from 1974 to the present. Prepared by Excerpta Medica Foundation.

F & S Indexes see PATS

FCR (Head Notes of the Federal Court of Canada Reports) (QL). The Head Notes are summaries, including descriptors, of cases heard by the court and judgements handed down of litigations against the Government of Canada and its administrative departments. This data file is available in both English and French.

Foundation Directory (DIALOG). Corresponds to the printed directory by the same name. The Foundation Directory file allows access to information about the largest 2,500 foundations existing in the United States. This information includes location, structure, personnel, financial data, purpose, and activities.

Foundation Grants Directory (DIALOG). Corresponds to the printed directory by the same name. The Foundation Grants Index file contains approximately 27,000 grant records of more than 400 American foundations. Information such as name and location of foundation and recipient; size, date, and number of grants; description and limitations of grants.

GEOREF (ORBIT, CAN/SDI). Corresponds to Bibliography and Index of Geology and Bibliography and Index of Micropaleontology. GEOREF offers monthly references to the world's current geo-science journal literature, and the citations to all masters and doctoral theses in the geo-sciences produced at U.S. and Canadian universities. In addition, it provides references from reports, conferences, symposia, maps, monographs and certain "informal publications". Over 3,000 serials are reviewed for input; of these, 40 per cent are English language publications and 60 per cent are non English. Three hundred of the journals are indexed completely. Coverage extends from 1967 to date.

GLOBE & MAIL. The FULL TEXT of all material other than advertising appearing in the Toronto Globe and Mail since January 1976 has been input to a machine-readable data base. An information retrieval service will be offered to the public on this data base early in 1977.

Government Reports Announcements see NTIS

GRA see NTIS

HISTORICAL ABSTRACTS (DIALOG). This data base, produced by ABC-Clio, Inc., includes articles from 2,200 serials and was initiated in 1960. It covers the world's cultural, diplomatic, economic, intellectual, political, and social history for the period 1775-1945. Since 1971, its chronological scope has been expanded to cover the period 1450 to the present. From 1960 to 1972, only the index entries (nearly 400,000) were included in HISTORICAL ABSTRACTS. Since 1973, the data base has included abstracts, now being added at an annual rate of 7,500.

HOQ (Hansard Oral Questions) (QL). The HOQ data file contains the whole "oral question period" of the House of Commons debates. It includes both the questions and responses to those questions between members of parliament and ministers of the parliamentary party in power. At the present time there are more than 13,000 questions and responses in the data file.

HWQ (Hansard Written Questions) (QL). This is a data base containing more than 6,000 written questions and responses from January 1973 to April 1976.

IFI/PLENUM see CLAIMS

INFORM see ABI/INFORM

INSPEC (DIALOG, CAN/OLE, CAN/SDI). The INSPEC data base provides a comprehensive source of information in the fields of physics, electrical and electronics engineering, computers and control. The data base consists of abstracts of journal articles, technical reports, patents, conference proceedings, books and theses, which comprise a total of 140,000 items a year. Journals comprise 80 per cent of the data input, and 28 per cent of the items are non-English language. Coverage from 1966 (DIALOG) and 1970 (CAN/OLE). Produced by the Institute of Electrical Engineers, London.

ISI see SCISEARCH and Social SCISEARCH

ISMEC (DIALOG). Coverage encompasses the key literature in mechanical engineering and engineering management. Specific subject matter areas include management and production, measurement and control, mechanics, tools and equipment, energy and power, transport and handling, mechanical engineering and natural resources, mechanical engineering in science and industry, and other applications of mechanical engineering. At the present time there are 30,000 citations in the file. Coverage from 1973 to the present.

LIBCON (ORBIT). Includes most of the monographic literature in the comprehensive catalogs of the Library of Congress from 1965 to date, including titles from the National Program for Acquisitions and Cataloguing. The LIBCON file comprises four related files containing citations to materials such as monographs, serials, filmstrips, and occasional 16 mm films. At the present time non monographic materials are incompletely covered. The four files that make up the LIBCON data base are the English language master file (LIBCON/E), the foreign language master file (LIBCON/F), the supplement file (LIBCON/S), and the card index file (LIBCON/C). At the present time there are over 1,500,000 records in the LIBCON/E and the LIBCON/F files and approximately 4,000 new records are added weekly.

MARC II; Machine Readable Cataloguing II (CAN/SDI). MARC II offers weekly references to the English language monographic literature, dealing with all areas of knowledge from religion, history and economics, to engineering and nuclear science. Approximately 1,800 items weekly including books, technical and government

reports, proceedings, and pamphlets are covered, many in advance of publication.

MEDLARS; Medical Literature Analysis and Retrieval System (CAN/SDI). Corresponds to Index Medicus. Indexes about 2400 serials in medicine and related fields. Updated monthly. CAN/SDI can provide either a current awareness service or a retrospective search back to 1969.

MEDLINE (NLM). Corresponds in part to Index Medicus. The main part of the data base indexes about 2400 serials in medicine and related fields. The current file covers 1974 to the present. The other files are:

(1) BACKMED. Covers the period 1966 to 1972. As files become 3 years old, they are moved from the current file to BACKMED.

(2) CANCERLINE is the National Cancer Institute's on-line data file dealing with cancer therapy, and chemical, physical, and viral carcinogenesis. At the present time there are over 37,000 citations in the file.

(3) CANCERPROJ is the National Cancer Institute's data file containing information about on-going cancer research in various countries. The research summaries are voluntarily submitted by cancer scientists.

(4) TOXLINE is the National Library of Medicine's data file of references related to toxic chemicals and the adverse effects of drugs. The citations are annotated with abstracts, keywords and some Chemical Abstracts Service registry numbers. At the present time the file is split into TOXBACK (1966-1973) and TOXLINE, 1974- for searching purposes and there are approximately 500,000 citations that can be searched.

(5) CHEMLINE (Chemical Dictionary On-Line). The CHEMLINE data file is a chemical dictionary created by the National Library of Medicine's Toxicology Information Program in collaboration with Chemical Abstracts Service. 270,000 chemical substance names representing 76,355 unique substances representing chemicals mentioned in TOXLINE only can be searched and retrieved on-line. The file contains the C.A.S. registry numbers which are useful for TOXLINE searching, molecular formulae, the preferred chemical nomenclature,

generic and trivial names, and a limited number with Wiswesser line notations.

(6) CATLINE is a data file maintained by the National Library of Medicine which contains approximately 150,000 references to monographs and serials catalogued since 1965 in the field of medicine and related sciences.

Produced by the National Library of Medicine, Bethesda, Md.

METADEX (QL). Corresponds to Metals Abstracts. METADEX provides comprehensive coverage of international metallurgical literature. About 1,100 technical journals in metallurgy and covered, as well as conference papers, technical reports, and books. Approximately 300,000 citations are included with 2,500 to 3,000 new citations added each month.

Meteorological Abstracts (DIALOG). Corresponds to Meteorological and Geostrophysical Abstracts. This data base provides comprehensive coverage of current meteorological and geostrophysical literature from both foreign and domestic sources. Subject coverage includes the fields of environmental sciences, meteorology, astrophysics, hydrology, glaciology, and physical oceanography. Approximately 200 primary sources are scanned for relevant literature, including technical journals, numbered monographs, and annuals. At the present time there are approximately 25,000 citations in the file.

New Brunswick Provincial Statutes (QL). This data file contains all the public and private acts of the legislature of the province of New Brunswick consolidated to the end of 1973, and includes amendments to the acts and sections repealed.

New York Times Data Bank (NYT). Constantly updated file of information abstracted from the New York Times and approximately 60 other newspapers and journals. Most suitable for information on current events, business, science, medicine, biography and other topics likely to appear in the newspaper.

NEWS (Water Resources Document Reference Centre News) (QL). This is a separate but supplemental data file to ENV WATDOC environment which covers all relevant water resources news clippings selected from more than 1,000 daily and weekly newspapers. At the present time there are more than 40,000 references in the file.

NTIS; GRA; Government Reports Announcements (DIALOG, ORBIT, CAN/SDI). The NTIS file which provides scientific and technical report literature and some business and economic data, is updated semi-monthly and covers new U.S. government generated research and development as well as U.S. government sponsored translations and some reports written in foreign languages. Many of the documents are received from the Department of Defense, the National Aeronautics and Space Administration, and the Atomic Energy Commission. Approximately 2,500 items are added with each update with abstracts provided about 70 per cent of the time.

OAB; Oceanic abstracts (DIALOG, QL). Corresponds to Oceanic Abstracts. Oceanic Abstracts indexes world-wide technical literature on the seas of the world and is designed to help researchers find published material on marine-related subjects such as biology, fisheries, geology, oceanography, pollution, engineering, ships, as well as government and legal aspects of the environment. Approximately 2,000 primary United States and foreign sources are scanned including books, technical journals, conference proceedings, trade publications, government reports, and documents. At the present time, the file contains approximately 83,000 citations. Coverage from 1964 (DIALOG) or 1970 (QL). Produced by Oceanic Research Institute, La Jolla, Calif.

PATS; Predicasts (DIALOG). This data base, produced by Predicasts, Cleveland, Ohio, is made up of several components:

- (1) Chemical and Electronic Market Abstracts; CMA/EMA. Contains digests of articles from hundreds of world-wide journals on new products, acquisitions, capacities, end-uses, market data, technology, production, environment, foreign trade, countries and regulations for the extractive, manufacturing, transportation, utilities and other industries. General economics and financial industries are not covered. Covers material from 1972 to date. 30,000 records added annually.

(2) Domestic and International Statistics. Made up of the following components:

(i) Predicasts statistical abstracts. Abstracts of the published forecasts with historical data for the U.S. Coverage includes general economics, all industries, detailed products and end-use data. Covers from July 1971 to the present. 20,000 records added annually.

(ii) Predicasts composites. Annual historical data (since 1960) and consensus of published forecasts through 1985 for 500 key economic, demographic, industrial and product series. Updated quarterly.

(iii) Predicasts basebook. Contains 18,000 time series (1958-1974) on U.S. production, wages, value of shipments, prices, end-use distribution for all different types of industries, products and services; updated annually.

(iv) Metrocasts. Contains historical and projected (to 1990) data on population, income, employment, earnings and distribution of industrial activity for states, standard business economic areas, and standard metropolitan areas. Updated quarterly.

(v) Worldcasts statistical abstracts. Abstracts of published forecasts with historical data for all countries of the world, excluding the U.S. Coverage includes general economics, all industries, detailed products and end-use data. Covers from 1972 to the present. 24,000 records added annually.

(vi) Worldcasts composites. Annual historical data (since 1960) and consensus of published forecasts through 1985 for 50 key economic, demographic, industrial and product series for 50 key countries. 2500 records in all. Updated quarterly.

(vii) Worldcasts basebook. Contains annual data from 1960 through 1974 for 20,000 key series for all countries of the world. Included are production, consumption, price, foreign trade and usage statistics for agriculture, mining, manufacturing and services as well as demography and national income. Updated annually.

(3) EIS Plants. Gives data and classifies 100,000 industrial establishments in the contiguous states of the U.S. with 20 or more employees. The establishments included account for 87.5% of the value of U.S. shipments. The file contains for each plant the name, address, telephone number, industry, value of shipments, employment size class, share of the market, the name and address of the parent company and various other classifications. The development of this file involved the separate estimation of each establishment and the checking of these estimates against geographic control totals (Country Business Patterns), industry control totals (Census of Manufactures) and corporate control totals (Annual Reports). The file is updated quarterly.

(4) F & S Indexes. Corresponds to F & S Index of Corporations and Industries and F & S International. Briefs articles relevant to business research from over 1000 newspapers, trade journals, government plans, bank letters and reports. All products, services, industries, companies, events and countries are covered. Covers 1972 to the present; 150,000 records added annually. This file also includes the Source Directory (which used to be a separate file) which gives complete bibliographic information for journals, including journal abbreviation, title, publisher, address, annotations, frequency, language, price, industries covered, countries covered, and events covered.

Produced by Predicasts, Cleveland, Ohio.

P/E News; Petroleum Energy News (ORBIT). Covers five major publications in the petroleum and energy fields. Platts Oilgram News Service, Middle East Economic Survey, Petroleum Intelligence Weekly. Petroleum Economist, and Oil Daily. 500 records added weekly. Coverage from 1975 to the present. Prepared by the Central Abstracting Service of the American Petroleum Institute.

Petroleum Abstracts see TULSA

PAB; Pollution Abstracts (ORBIT, QL). Corresponds to Pollution Abstracts. Covers the entire field of pollution and pollution research. Citations from journals, technical reports, newspapers, contracts, symposia and government documents and patents are included. About 1000 records added monthly. Covers 1970 to date. Produced by Pollution Abstracts Inc., La Jolla, Calif.

Predicasts see PATS.

Psychological Abstracts (DIALOG, CAN/SDI, SSIS). Corresponds to the printed index by the same name. Abstracts about 800 journals and 1200 monographs and technical reports annually in the field of psychology and the behavioural sciences. Coverage from 1967 to date (DIALOG) or 1970 to date (SSIS). Produced by the American Psychological Association, Washington, D.C.

RSC (Revised Statutes of Canada). The Canadian Federal Statutes data file contains all the public acts of the Parliament of Canada consolidated to the end of June 1975, and includes amendments to the acts and sections repealed. The data file is available in both English and French (QL).

SCISEARCH; ISI Source (DIALOG, CAN/SDI). Corresponds to Science Citation Index. Approximately 2500 journals in the fields of basic and applied science, engineering and technology, medicine, social and the behavioural sciences are reviewed. All articles, including editorials and reviews, are entered. The file lists the reference (cited) author and his work in the source index and groups together all source (citing) authors and papers who have referred to that same work since its publication in the citation index. A permuted title index gives a subject approach. Coverage from 1974 to date. Produced by the Institute for Scientific Information.

SCR (Head Notes of the Supreme Court of Canada Reports) (QL). The Head Notes data file contains summaries including descriptors, of appeals by plaintiffs and judgements handed down by the Supreme Court of Canada. This data file is available in both English and French.

Social Science Journal File (SSIS). Indexes approximately 80 journals (including 35 Canadian journals) in the social sciences. Most of the journals have been indexed since 1968 and some since 1972. An attempt is made to include every article printed in each issue; an updates are made to the file as soon as new issues become available. Prepared by the Institute for Behavioural Research, York University.

Social SCISEARCH (DIALOG, CAN/SDI). Corresponds to the Social Science Citation Index. Covers every editorial item in over 1300 social science journals and selectively indexes 1200 more journals. It lists the reference (cited) author and his work in the source index and groups together all source (citing) authors and papers who have referred to that same work since its publication in the citation index. A permuted title index gives a subject approach. Coverage from 1971 to the present. About 80,000 items indexed each year.

SSIE (ORBIT). Covers on-going and recently completed research in the life, physical and social sciences, both basic and applied research projects. Research in progress is included from over 1300 funding organizations such as U.S. federal, state and local governments, non-profit associations, colleges and universities, non-affiliated investigators and some non-U.S. organizations, and some industry. Includes material from Fiscal Year 1974 to date. Over 122,000 research projects and continuations added monthly. Prepared by the Smithsonian Information Exchange.

TOXLINE see MEDLINE

TULSA; Petroleum abstracts (ORBIT). Corresponds to Petroleum abstracts. Covers oil and gas exploration, development and production. Includes material from 1964 to date. About 4500 records added quarterly. Prepared by the Information Services Department of the University of Tulsa.

Union List of Scientific Serials in Canadian Libraries; ULSSCL (CAN/OLE). This date base lists alphabetically by Anglo-American cataloging rules main entry more than 37,000 serials titles, along with holdings, held in 236

libraries in Canada. The subject coverage, although primarily scientific, includes several related areas.

WAA; World Aluminum Abstracts (QL). Corresponds to the printed index by the same name. WAA date file contains over 42,000 citations covering world aluminum literature and patents. The file is updated monthly and most citations since 1972 include abstracts.

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