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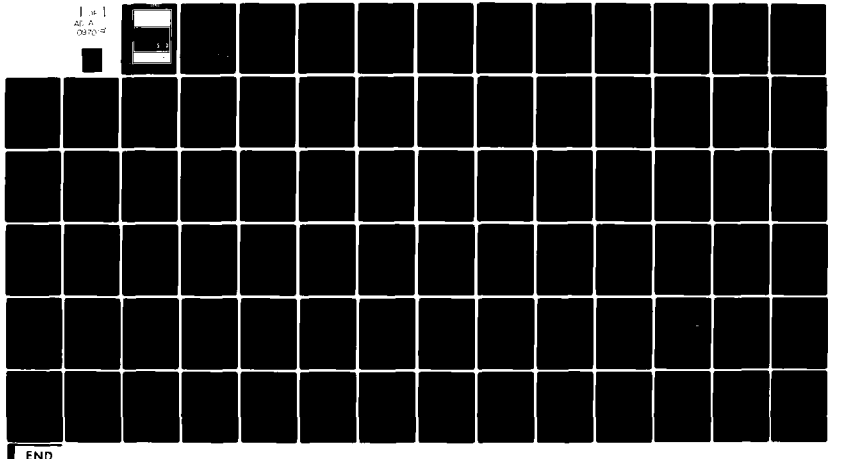

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ADVISORY GROUP FOR AEROSPACE RESEARCH & DEVELOPMENT

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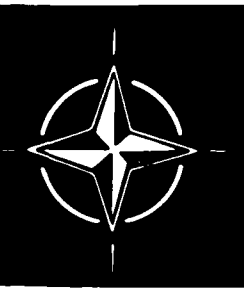
AGARD CONFERENCE PROCEEDINGS No. 294

Information Services: Their Organization, Control and Use

NORTH ATLANTIC TREATY ORGANIZATION



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NORTH ATLANTIC TREATY ORGANIZATION

ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT

(ORGANISATION DU TRAITE DE L'ATLANTIQUE NORD)

AGARD Conference Proceedings No.294

INFORMATION SERVICES: THEIR ORGANIZATION, CONTROL AND USE

Copies of Papers presented at the Technical Information Panel Specialists' Meeting held in Lisbon, Portugal, 5–6 November 1980.

THE MISSION OF AGARD

The mission of AGARD is to bring together the leading personalities of the NATO nations in the fields of science and technology relating to aerospace for the following purposes:

Exchanging of scientific and technical information;

Continuously stimulating advances in the aerospace sciences relevant to strengthening the common defence posture;

Improving the co-operation among member nations in aerospace research and development;

Providing scientific and technical advice and assistance to the North Atlantic Military Committee in the field of aerospace research and development;

Rendering scientific and technical assistance, as requested, to other NATO bodies and to member nations in connection with research and development problems in the aerospace field;

Providing assistance to member nations for the purpose of increasing their scientific and technical potential;

Recommending effective ways for the member nations to use their research and development capabilities for the common benefit of the NATO community.

The highest authority within AGARD is the National Delegates Board consisting of officially appointed senior representatives from each member nation. The mission of AGARD is carried out through the Panels which are composed of experts appointed by the National Delegates, the Consultant and Exchange Programme and the Aerospace Applications Studies Programme. The results of AGARD work are reported to the member nations and the NATO Authorities through the AGARD series of publications of which this is one.

Participation in AGARD activities is by invitation only and is normally limited to citizens of the NATO nations.

Published January 1981

ISBN 92-835-0285-X

Printed by Technical Editing and Reproduction Ltd
Harford House, 7–9 Charlotte St, London, W1P 1HD

MEETING THEME

At present there are significant developments underway in Europe in the information science field; the appearance of the Direct Information Access Network for Europe, DIANE, which links together all the information services available through the European data communication network (EURONET) which came into operation recently; and the imminent availability of low-cost microprocessor technology. Together with the availability of these new tools, new requirements for information dissemination have to be formulated. Governments have to define new information policies in the form of national action plans and the need for more cooperation and participation in networking has been recognized.

The object of this Specialists' Meeting was to provide a forum in which those who are organizing, controlling and using information services could exchange views on how information problems are to be defined, what actions have to be taken and what problems are likely to be encountered when introducing new systems or technologies. Problems encountered in Portugal in the up-grading of information activities were specifically addressed.

THEME DE LA REUNION

On assiste actuellement en Europe à d'importants développements touchant la science de l'information: la récente mise en service du Réseau d'Accès Direct à l'Information pour l'Europe, DIANE, qui relie tous les services d'information existant à travers le Réseau Européen de Communication de Données (EURONET), et la mise à disposition imminente de la technologie des microprocesseurs de faible coût. Parallèlement à l'apparition de ces instruments nouveaux, de nouvelles exigences doivent être formulées au plan de la dissémination de l'information. Les gouvernements doivent définir de nouvelles politiques de l'information sous forme de plans d'actions nationaux, et la nécessité d'une coopération et d'une participation plus poussée en matière d'établissement de réseaux a été reconnue.

Le but de cette Réunion de Spécialistes était de créer un forum permettant à ceux qui organisent, contrôlent et utilisent les services d'information de procéder à des échanges de vues sur les sujets suivants: comment définir les problèmes de l'information, quelles sont les actions à entreprendre, et quels sont les problèmes susceptibles de se poser lors de l'introduction de technologies ou de systèmes nouveaux. Une attention particulière fut accordée aux problèmes posés au Portugal par l'amélioration des activités touchant l'information.

TECHNICAL INFORMATION PANEL

PROGRAMME COMMITTEE

MEETING COORDINATOR

PANEL EXECUTIVE

ACKNOWLEDGEMENT

The Technical Information Panel wishes to express its thanks to the Portuguese National Delegate to AGARD for the invitation to hold its 33rd Panel Meeting in Lisbon, and for the personnel and facilities made available for this meeting.

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TECHNICAL EVALUATION REPORT

by

S.C.Schuler
(Former Chairman of the Technical Information Panel of AGARD)

BACKGROUND

This TIP Specialist Meeting took place on 5 - 6 November, 1980, at the splendid Gulbenkian Foundation Building, Lisbon, with its excellent conference facilities. Some 228 delegates attended the two-day meeting and eleven papers were presented during four separate sessions, each with a specific theme. An open forum discussion took place on the last afternoon. The subjects under discussion were primarily focussed on recent developments in the European information science field, notably the growth in direct information access networks. An important aspect was to discuss problems encountered when introducing new systems and, in particular, to review the technical information activities in Portugal and provide an opportunity for presenting ideas for up-grading the information services in that country.

MEETING PRESENTATIONS

(i) The first session was concerned with the Information Environment. In his presentation, "Information Transfer: Barriers and Trends", Dr Kunz gave a valuable analysis of current information processes and explored areas where new approaches are required. Although mainly theoretical in content, this paper contained several excellent concepts for improving information transfer, the aim being to afford users direct access to data or new items of knowledge rather than to provide bibliographic references. He made out a strong case for the avoidance of the conventional documentation systems as the link and suggested the use of artificial languages or algorithms which would capture the essence of the new data or knowledge. He suggested that authors should be willing to express their scientific message in terms of a given formal language.

The interest and involvement of the end-user technical staff in the design of information systems has always been a problem for the library/information manager. As a possible example of a response to Dr Kunz's plea for user involvement in new systems it is interesting to note that recently the British Library has awarded grants to Birmingham and Loughborough Universities to undertake research on various types of experimental 'electronic' journals. Contributors will be drawn from research authors who have an active interest in the subject, one of the aims being to assess how the users feel that an 'electronic' journal satisfies their needs as a form of communication. It is to be hoped that some of Dr Kunz's novel proposals will be considered during these studies.

(ii) The second paper was presented by Ing. G.Pulido (CDTC) who gave a most interesting general overview of the Portuguese scientific and technical information scene. He gave details of the current information services operated by various centres, mainly government, together with his own centre, CDTC. During the question period, he explained that CDTC have a staff of 19 and that, via the use of Timenet, Telenet and IRS, they were undertaking some fifty online searches per month. These were mainly on behalf of industry, but there was a growing interest from other government departments and individual medical practitioners. Documents could be supplied on request, those not available being drawn from other Portuguese libraries or agencies, such as the British Library (BLLD). There was clearly scope for expanding the services of CDTC if further resources could be made available. He stressed the need for a clear National Policy for scientific and technical information. This point was further elaborated during the forum discussion period (para (i) page ix).

(iii) It was back in 1971 that the Council of the European Economic Community agreed in principle to a first three-year plan of action with the objective to create a European network for scientific and technical information. Now, in 1980, Euronet-Diane is operational with over 180 data bases on-line. The fascinating history of this major project and its interlinking to other networks was the subject of Dr G.M.Vanautryve's paper. Having regard to the wide scope and complexity of the subject, this was a most stimulating and clear presentation of the many problems which had to be overcome and gave a good insight into the future development of the network. Unfortunately, there was only a limited time allocated for the discussion period. Some principal comments and points which were raised were - because of the time lag before Euronet became operational, the large American database operators had fostered a considerable number of users in Europe - to date there had not been any great rush to switch over from these services to the databases available via Euronet - it will, perhaps, take one or two years for Euronet users to get used to the practice of switching over from one host to another so as to interrogate a different subject database, the PTTs have a monopolistic position in

the EEC countries and this might create problems for the On Line Users Groups to exercise influence; furthermore, although Euronet was originally set up for the transmission of scientific and technical information, the PPTs were permitted to engage in third-party traffic for banking, economics, etc., and these latter services were likely to grow substantially in importance - there was also a possible danger of too many host computers offering the same databases; finally, the need for improved publicity regarding the technical information databases available via Euronet was emphasized.

(iv) External information services was the theme for the second session. Dr Rittberger gave a most useful review paper on National information policies and went on to describe various national information services which also had International partnerships. He stressed the advantages such as sharing of costs, avoiding duplication of work, and increased timeliness. During the question period he also drew attention to a new project called SIGLE (System for Information on Grey Literature in Europe) which will be launched on 1 January 1981. The term "grey literature" refers to literature not issued through conventional commercial channels, i.e,. reports, theses, conference proceedings, and translations. The project, with financial support from the European Community Commission, is a cooperative venture between UK (BLLD), France (CEA-CEN), Germany (FIZ), Belgium (LABORELEC), Denmark (RISOLIB) and Eire. Commenting on Dr Rittberger's thoughts on the USA having a comprehensive National information policy, Miss P.Berger (Nat. Bu. Standards, USA) said she had attended the White House conference referred to in the paper and considered that a formal national policy was still a long way off. In her view there was already sufficient momentum in the various sectorial technical information areas and an overall formal information policy was not likely to contribute significantly. She made the point that developments in the USA had clearly stemmed from perceived national needs which had been followed up vigorously with the aid of pressure from specialist groups. Mr Krog (NCI Norway) observed that as a user from a small country, about 90% of the technical information used in Norway stemmed from overseas sources. Mr Tan (NAL Netherlands) said that there was no formal National information policy in the Netherlands. His own laboratory and other centres had arranged information exchange agreements with various countries and he thought that this was a good mechanism to cultivate.

(v) The use of "External Information Services" was the title of the paper prepared by Mr T.Norton (RAE - UK) and presented by myself. The paper stressed that even a large technical library such as the one at Farnborough was very dependent on co-operation with other UK libraries and information centres for back-up services. The paper drew attention to the importance of developing a network of contacts. This was essentially a practical paper including several good ideas for developing informal contacts and emphasising the importance of good personal qualities, such as leadership, drive and enthusiasm in the management and library staff. This latter point was endorsed by Mr Sauter (DTIC - USA) who went on to commend the value of good dialogue with the users, to foster interest and participation in plans for additional information services. A Portuguese questioner enquired as to the cost benefits of technical information services to industry. During the discussion which followed, Mr Kirouac (TIS - Canada) reported on a survey of users in his country which indicated that the cost benefits to industry by the information services provided by TIS were of the order of 15:1. Nationally-sponsored information services were particularly valuable to small companies who were not able to afford an in-house technical library. Mr Chandler (NASA - USA) described the NASA technology utilisation programme for aiding industry which arose as a spin-off from the NASA R & D programmes.

(vi) The final paper of this session was a presentation by M. Jean Devoge on the unique "French Building Data Bank Service ARIANE" which is now available via Euronet. It was pointed out that clients do not normally require bibliographic references, but direct technical and factual data on building regulations, technical commercial data covering a wide range of building trades. Diagrams and full texts of regulations were supplied by micro-fiche copies. In reply to questions from Dr Cockx (Belgium) and Mr Tan, it appeared that it would be some years before the database would be available in languages other than French. They are looking into the feasibility of automatic translation into English. Since the recent connection to Euronet, some thirty passwords have been allocated.

(vii) The next meeting session was concerned with the practical aspects of information retrieval and the document delivery problem. The opening paper was by Mr B.Kingsmill (TRC - UK) who gave an admirably lucid introduction to on-line searching in information services. This paper gave a comprehensive overview of the techniques involved and laid stress on the education of users, via training courses, and the important personal qualities which are needed for developing effective searching techniques. Answering questions on the problem of line noise and network breakdowns, he said that while these can be irritating to the user, it was his experience that the reliability of networking had greatly improved in the past few years and total breakdowns were now rare. In most cases, it was possible to resume your search after a temporary computer or line-failure. Dr Cockx asked for an elaboration of the training programmes. The speaker said that, in addition to in-house introductory sessions, it was the practice to hold two or three times a year more detailed programmes when representatives of the database producers, e.g., INSPEC and AGRIS, would give presentations including details of how their databases are mounted on the IRS system. Similarly on networking, instruction would be given on how to connect to IRS via Euronet, but further elaboration on the Euronet facilities would be given by the Euronet launch team.

Mr R.Bernhardt (GID - Frankfurt) drew attention to the competitive on-line systems which offered the same databases but had different implementation procedures. This was a problem for the user who wanted to make parallel searches on different hosts before making a decision. In reply, Mr Kingsmill agreed this caused difficulties; inevitably, commercial considerations play a part when there are hosts in competition. Other factors were that the capacity of the computers used varied, some hosts cannot put up the whole range of a database and may have to split these into several

files. Comparisons have been made and there are some published papers available. On a question regarding publicity for on-line services in Portugal, Ing. Pulido said that courses were initiated some four years ago by his centre - other sessions had been promoted, notably by Lockheed, STC, and IRS and, more recently, by CASTEL - a Lisbon-based service. Elaborating on the effectivenesss of searchers, Mr Kingsmill observed that, in the UK, probably 90% of users were either librarians or information specialists. He personally felt it would be better if the end-user did the searching, since they were more knowledgeable on the subject - the difficulty was that many users only required searches occasionally and could not spare the time to be given the necessary terminal training. Desirably, the searcher should have some subject knowledge or even have a specialist alongside to aid the operations.

(viii) A survey of possible solutions to the document delivery problem and the growth control of library collections was the subject of the talk by Mr S.F.Vedi (Norway). The great contrast between the rapid electronic means of retrieving document references from databases (perhaps in a few minutes) and the slow delivery (often several weeks) of the actual documents was analysed. The speaker said this problem had been the subject of a study by IFLA sub-committees for some years and, more recently, the EEC had awarded a contract to a French company (Steria) to investigate the supply of text, subsequent to searches on Euronet and to present proposals for improving the document supply. Speakers from Belgium, Germany and the United Kingdom put forward several suggestions, including the setting up of a central collection centre dedicated to lending and that smaller countries could spread the load, so to speak, by arranging for a division of the lending service between two or three main libraries. Union catalogues were a vital tool and greater efforts were needed by co-operation between libraries to establish these. Dr Cockx drew attention to the involvement of the large database operators who were now very active in the document delivery business and would take over this function from the more traditional library sources in some countries.

(ix) The final presentation in this session was by Mr Wilson (AWRE) on the use of a mainframe computer for "Library records and consideration of in-house File Creation versus use of External Services". This was a well-structured paper giving an excellent insight into the experiences (over a span of twelve years) of computerised information activities at a specialist library, which fortunately had access to a large in-house computer together with programming resources. In the discussion period, the value of joining or using co-operative services (OCLC, BLAISE, INTERLIB, etc.) was highlighted to ease the cataloguing burden. For the specialist library, utilisation of local large mainframe computers do not appear to be economically viable. A better solution is the use of mini-computers which are more flexible and cost-effective - a problem here was that there were, apparently, not many software packages commercially available for library applications. Mr Tan (NAL) reported that his library (staff of seven) was considering the renting of a mini-computer; he quoted the cost as being about 25,000 Portuguese escudoes per month, which would include all the necessary software, programming etc. being provided by the supplier.

(x) On some occasions, it has, alas, been my experience, after a specialist meeting has been going on for two days, to contract a severe dose of mental indigestion! Not so at this meeting, for the programme committee had chosen a well-balanced series of papers and for the last session two excellent "broader-interest" presentations. During his introductory remarks, the session Chairman, Mr M.S.Day (NTIS - US) spoke of the importance of new technology in National development and that problems of increased innovation and productivity were of considerable concern to all countries. This was the theme of Mr Klintoe's paper. He gave an enthusiastic picture of the role of information services in aiding the innovative process, drawn from his wide industrial experience in Denmark. His paper gave some useful practical guidelines and made the point that the key to stimulating innovative thinking was the efficient organisation of the information flow. He emphasized the role of a small group of specialists within an enterprise (e.g., development, production, and marketing personnel) meeting regularly to seek out and evaluate articles in the technical literature which might be of value to the enterprise. During the discussion period, Mr Klintoe explained that TNO had originally started operations as part of a productivity campaign in Denmark. Basically, when initiating services with a company, a visit is made and discussions take place with staff at all levels. After analysing the Company's needs, the Centre would begin to send a flow of "pieces of information". When the Company returns for more information, a financial agreement would be initiated and further work undertaken.

Commenting on a point made by Mr Sauter on mechanisms for bringing technical information within the small company scene, Mr Tittlbach (W. Germany) said that they had considerable success in disseminating technical information to small and medium sized companies by developing links with the "innovation consultants" within the Chambers of Commerce.

At the beginning, new users would invariably seek information from the Patents data files - later, when they got used to the searching facilities, they would extend their requirements to the many other databases at the Centre. On a question of Policy issues for information services, Mr Klintoe observed that it was not the role of Government to be innovative - its role was to balance the innovative powers within the community. It required someone or some body of professionals to formulate the Information Services Policy needed and send it to Government for consideration.

(xi) The final paper, by Mr R.L.Chartrand (The Library of Congress, USA), was a brilliant and fascinating presentation which was greatly enjoyed by all attendees. His subject was information services for legislative policy making. This is an information task of some magnitude and complexity. The talk and discussion was punctuated with some startling facts - the congressional research service dealt with over 300,000 information requests last year on behalf of members, committees and constituents; some senators receive a million letters per month, with a change of administration, upwards of 75% will be new members of the Senate; Congress deals with over 30 000 Bills and Resolutions each year; there is an

in-house electronic voting system; there are some 25,000 staff members requiring regular information services such as "issue briefs". The wide range of sophisticated information technology services such as on-line terminals, audio/visual and microform aids now available to legislators "up on the hill" stemmed from a willingness by Congress to try out innovative information handling approaches in order to keep a grip on its own environment and the plethora of paper work. The strong message which came through, was the vital importance of being ready to accept change and to take advantage of the new technologies. His final thought – "the only way to conserve is by innovating – the only stability possible is stability in motion". This neatly summarised the main thrust of the last session.

GENERAL DISCUSSION FORUM

This was well attended and was admirably conducted by the Chairman Mr Joe Coyne (Dept of Energy, USA) assisted by Ing. C.Pulido (CDTC Lisbon).

(i) The first part of the session was concerned with discussions on ways to encourage development of strong information ties between industry, government departments and universities. Commenting on the points made in two papers presented that a national information policy was of significant importance, Mr Coyne reminded the audience that in the USA there is not a formal technical information policy as such, yet many people think the appearance of one is there simply from the way in which various organisations in the USA act. He emphasized that it is the strength of the actions taken individually and collectively which leads to getting the tasks accomplished.

Mr Krog suggested the conversion of more libraries into the role of information centres. Librarians should reappraise their responsibilities so as to project the image of information resource managers rather than book and document custodians. Dr Baracho (Servico Provedor de Justica) and other Portuguese speakers pointed out that although the country has some excellent academic libraries, staffed with skilled and experienced librarians and information officers, there was a serious gap in co-ordination and utilisation of resources on a co-operative basis. It was stressed that much more needed to be done to make higher management, both in industry and government, aware of the vital importance of improved science and technology information services within Portugal. Miss P.Berger and Mrs R.Smith (Inst. for Defense Analyses, USA) gave lively accounts of what can be achieved by organising a strong special group of information officers to act as a focus for drawing the various authorities' attention to weaknesses in organisations and making suggestions for improvements. Such groups had been most valuable in motivating agencies in the USA and elsewhere. They also pointed out that information systems were becoming more interdependent and stressed the advantages to be gained from resource-sharing to enable a speedier announcement and document delivery. Other speakers supported this approach suggesting that the groups representing both information specialists and scientists, engineers and technologists be formed so that the user involvement is effective. Mr Tittlbach emphasized the value of close contact and dialogue with the users who are, incidentally, the prime producers of information.

The general concensus was that the Portuguese information scene could be improved by setting up specialist groups with the aim of effecting greater co-ordination, identifying the national information needs, and fostering contacts nationally and internationally to obtain the necessary resources for upgrading the information services.

(ii) Turning the discussion to more general topics, Miss P.Berger enquired about TIP activities other than the promotion of specialist meetings and wondered if there was a case for setting up a central computerised technical information centre to serve the needs of the whole AGARD community. Mr Tan and Mr Sauter explained that there are quite a number of on-going TIP co-operative activities. Examples are the AGARD Multilingual Aeronautical Dictionary recently published, the compilation of specialist bibliographies to support lecture series sponsored by the nine AGARD technical panels, and the production of the four-volume Manual of Documentation Practices. Other activities include the provision of consultants to advise the smaller NATO countries on the setting up of National Information Services or to improve the effectiveness of existing centres, and the sponsoring of specific publications, glossaries, and indexes to fill gaps in information literature.

An important element in TIP's mission is to foster international co-operation, information exchange and to rationalize procedures for defence documentation within the AGARD community. Regarding the concept of a central AGARD technical information centre, this hardly seemed necessary, since in North America both the USA and Canada have well-developed organisations and in Europe each AGARD country has its own national distribution centre and, via Euronet, access could be gained to the innumerable databases for on-line information retrieval. Mr Chandler (NASA) explained that his organisation has a large number of exchange agreements within the AGARD countries. He has found the opportunities with TIP activities for a better understanding of the sources and uses of information and this has led to improvements and expansion of these agreements.

(iii) Ms Ferreira (University of Coimbra) sought comments on the approach to mechanising a large document and book collection. Mr Sauter recommended a stage-by-stage approach. He advocated computerising the most recently received material as a first step and, having tested and tried the system, proceeding to consider adding the old material. Retrospective cataloguing can be a very expensive operation and many centres have found it more cost-effective to have a dual system, that is, a computerised part and a manual catalogue for the older material. Mr Wilson (AWRE – UK) agreed and said that, with mini-computers, book cataloguing could be a relatively simple operation. He though that in the future video discs would assist retrospective cataloguing.

(iv) The exchange of information experts is a valuable service and Dr W.Rittberger said that his institute does have an exchange programme for overseas information officers to gain experience. Other such services were operated in France and by ASLIB in the UK.

GENERAL OBSERVATIONS AND RECOMMENDATIONS

Taken overall the subject coverage of the papers in the programme was closely identified with the specialist meeting's theme. The high standard of the presentations and the excellent audience participation throughout made for a very successful meeting. It is to be hoped that the Portuguese attendees found this TIP specialist meeting informative, stimulating and useful as they go forward to expand their own technical information services.

There can be little doubt that the next few years will see a remarkable growth in the use of data telecommunication services, particularly throughout western Europe. According to a recent Eurodata report, the network connections should increase (1980/87) more than fourfold from 393,000 to 1,620,000, the number of terminals more than sixfold from 625,000 to 3,960,000 and the overall volume of traffic more than sevenfold. These growth projections provide a great challenge to the library/information centre managers to exploit these major developments in the data telecommunications field, so as to provide upgraded technical information services to the AGARD community.

Arising from this meeting, some topics for possible inclusion in future TIP Meetings are:

Improvements in the delivery of documents – a review of the electronic mail delivery service and recent surveys.

- Review of progress in viueotex and digital fascimile transmission of documents.
- Progress in the development of the paperless communication systems or 'electronic journal'.

Developments in automatic or computer assisted translation of technical documents (for example, TITUS).

Data telecommunications, nationally and internationally.

INFORMATION TRANSFER: BARRIERS AND TRENDS

Prof. Dr. Werner Kunz
Gesellschaft für Information und Dokumentation (GID)
6900 Heidelberg
Werderstr. 35
Federal Republic of Germany

Based on a model of knowledge a concept of information as knowledge alteration is outlined. Problems of transfer of knowledge into new areas of application are described. Strategies for designing 'friendlier' information systems for innovation processes are discussed.

Information as Knowledge Alteration

Discussing the problem of knowledge transfer one finds that the exact definition of an information concept formulated by Shannon and Weaver is too strict. This is hardly surprising considering that the term was meant to describe certain technical questions regarding the transmission of signals. Everyday, non-scientific language has attributed far richer meanings to the concept of information, transcending this narrow technical term and providing a much closer approximation of the concept of information underlying the problem of knowledge transfer. Figures of speech like "to be well informed", "to be misinformed" "to possess information", etc. indicate dimensions not accounted for e. g. by any entropy factor. They demonstrate that information can be understood as a process performed under real conditions of communication partners, and whether the reception of signals initiates an information process depends upon the condition of these persons.

This definition of information gains practical significance only if we define an information process as an operation which alters the knowledge of an agent. Defining every operation leading to the alteration of someone's knowledge as an information process, this does not mean that the alteration must always involve the removal of uncertainty or corroboration of previous knowledge. An information process may also lead to uncertainty (one becomes less certain that a piece of previous knowledge applies or one is actually convinced that the logical contradiction of previous knowledge is really correct). For example "atoms with saturated electron shells are chemically inactive" is replaced by "noble gases also form bonds". Here a basic 'image' of the problem is 'overthrown' and replaced by another image.

Manyfold methodological problems arise if somebody's knowledge is declared a criterion for information processes. However, it seems that this appears to be a solution which allows for the possibility of simultaneously comprehending the subjectivity of information and the phenomenon of frequently successful communication. For an information process only occurs relative to the subjective knowledge of an agent in a problematic situation and, on the other hand, all communication is based on the sharing of knowledge between the partners. Knowledge is always somebody's knowledge. That means that it is senseless to study knowledge detached from persons. Here resides the foremost difficulty of the problem of information transfer which applies especially to the design of new information systems: The basic difficulty in designing information systems lies in determining the basis of knowledge and the intentions of its users. A source of these difficulties lies in the necessity for acquiring this knowledge in every specific case.

This leads to a dilemma for it refers to "A's knowledge of that which B knows". In order, for example, to assess what could possibly be relevant for someone (a task daily confronting every librarian), not only must one know precisely what the other knows, but one should also - strictly speaking - have already solved his problem, since a degree of relevance can only be established in light of the degree of success obtained in solving a problem.

Somebody's knowledge - the information needs of an agent - can be described and classified into the following questions:

- What is the case? (factual knowledge)
- What should the case be or become? (deontic knowledge)
- If X is the case and Y should become the case: What operation would produce Y? (instrumental knowledge)
- Why is X the case? (explanatory knowledge)

Various combinations of these basic types of condition yield further types. As yet, systems devised to answer questions of the second type (deontic) have not received much attention but they must be represented in information systems for planning, policy making, etc.
It has been shown that a model of knowledge which can be used as the basis for the problem of information transfer describes the knowledge of an agent as a sum of knowledge elements which may be represented as statements of factual, deontic, instrumental, or explanatory nature. On the basis of this model

describing the information transfer processes, the structural and functional characteristics of information systems can be developed.

Systems Analysis of Information Processes

Information systems are meant to support problem solving activities. They should inform by changing the state of knowledge of the problem solver. Only very recently, problem solving processes have been looked at in terms of problem solver's procedures and his state of information. His modus procedendi is a function not only of the problem at hand, the data flow, and the documented knowledge but also of his logic of argument based on his expectations and his style of work. On this basis it can be determined which kind of information environment should be provided in order to accomodate and to support the information transfer. Therefore, strategies and typical figures of reasoning of the various kinds of problem solvers have to be identified. The various questions have to be analysed as they occur in the course of their reasoning as well as the various ways of obtaining it. There seem to exist some characteristic 'figures of reasoning' which are typical for the various phases of the problem solving- and information process. Whenever relevant knowledge from large externally stored data banks is to be utilized, similar structures of argument appear and guide the mode of operation. A certain mode of reasoning correponds to a certain mode of organizing the information which is utilized to attack a problem of certain kind.

Systems analyses of the logic of information processes result in a kind of block diagram with loops and decision boxes, each block representing a step of reasoning, transforming the state of knowledge towards the solution of the problem at hand. Outgoing branches designate questions, and incoming branches represent information received.

This kind of investigations may be ambitious. They are, however, a prerequisite for the development of a more satisfactory understanding of the information behaviour and, therefore, of a better information transfer through the design of information systems which are more 'friendly' to a problem solver pursuing his tasks.
It is obvious that the results of systems analyses of information processes - the strictest form of user studies - will not always pertain to documented and published information but to other channels of knowledge generation and transfer. It becomes apparent that the purpose of information systems and their networks is to establish communication among people who share a concern about a similar problem. Documents are only one means to this end. New concepts for 'networking' the information transfer will have to emerge: relatively autonomous information systems and services are linked by 'focal points' to networks. These focal points are information systems of '2nd order', i. e. they do not themselves provide information satisfying given requests but refer the user to a source that might provide that information. They are 'switchboards' which establish connections for the sake of information transfer. For the problem information transfer this means that the ideal of universal compatibility among information systems should be abandoned as the overriding principle; not only because of the tremendous practical difficulties associated with the pursuit of this ideal, but above all due to the insight that this principle results in universal straight jackets fitting hardly any user. All attempts to fit all or many information systems into the same formats, categories, etc. would be counterproductive for the information transfer.

Transfer of Knowledge into New Areas of Application

There is an increasing number of cases for which customary documentation systems have not been made. It will be tried to argue for the hypothesis, that present information systems are designed mainly for the purposes of checking, searching, and comparing within very short 'conceptual distances' between the question raised and the information which is produced in response to it. Hence they cannot be considered 'friendly' to major innovation efforts because innovation can be defined as the process of conjoining components of great conceptual distance into new configurations. The present systems may well be most useful for 'modifying innovation', i. e. for research and development within a nested area of established and documented knowledge. They become, however, most 'uncooperative' with problems of information transfer into new areas of application. Existing information systems are more or less subcultural. That means they have been developed for a certain discipline or for a certain purpose. It can thus not be expected that they are very 'friendly' to the transfer of knowledge from one field or from one discipline to another, from one level of information to the other, or from one problem area to another.

One source of such information transfer queries is e. g. the program to search for spin-offs of scientific and technological knowledge which has been developed in the pursuit of a specific mission like nuclear technology or the space project. These programs aim at the utilization of the knowledge for peaceful or terrestrial purposes, for which they have not been developed. The old 'trickle-down' model of the production of 'progress' according to which autonomous basic science selects its problems solely guided by the internal logic of inquiry, offers its results to applied research which in turn through engineering etc. turns them into practical realities, this orderly picture is not realistic any more. Problems and findings are taking very erratic paths up and down the ladder of the innovation process. And as a consequence, information systems corresponding very precisely to the various layers of the traditional organizations and classification of the innovation system become more or less inappropriate. Furthermore, the analysis of this kind of information transfer for innovation processes shows that innovation problems cause less questions of the kind "Which knowledge exists with respect to the given

situation?", i. e. questions of factual or instrumental knowledge, but more "Which possibilities are there to doubt existing documented knowledge about a particular situation?", that means to challenge existing instrumental knowledge. In other words, it is unlikely to find existing documented knowledge which can be transferred custom tailored to an application in another problematic situation.

And finally, scientific and technical information is not autonomous. It cannot be regarded and organized independently of the other parts of the innovation system. It has become increasingly more evident that information transfer problems cannot be solved by improving the scientific-technical information system alone without consideration of its relation to other parts of society's more comprehensive innovation system. The greater the influence of the scientific-technical system upon social development is, the less justified the autonomy assumption becomes. Innovation is based on information. There is consequently little sense in designing information systems without any relation to the innovation system. These considerations are even more consequential, if it is a question of designing information systems for planning, decision making, etc.

All these situations for which present information systems have not been made have in common the difficulties of transferring knowledge into new areas of application, especially when the area of application might not even be established as a discipline. One might postulate that the more innovative an information is the more 'across' it is to the established classification system. This is not surprising. Innovation consists in linking what has not belonged together hitherto, that means what is assigned to different categories. And the more novel an innovation is, the greater the 'classificatory distance' of its components, the less meaningful the assignment of the innovation to any single class of a classification system.
An impressive illustration of this problem is provided by the history of the great patent classification systems. Regularly, every few decennia, a major and painful redesign of the system becomes inevitable. These changes are not normal 'refinements' of existing categories but - in many cases - thorough restructurings of the classes, necessitating reprocessing of previous files.
Therefore, information systems for this kind of knowledge transfer should support and present an incentive for 'counterclassificatorial associations', because it is supposed to enable the user to find stored factual data which have not literally been asked for, however, which are in close relevant neighbourhood to the question asked.

In these processes of deliberate transfer are language barriers: Different areas and disciplines have their specific discourse systems and the translation of one item of knowledge into a new context may not be trivial or self-evident at all. It has been emphasized that we live in an era of data explosion which cannot be mastered by traditional documentation techniques. This, however, is only one and possibly the minor threat. More consequential for an adequate information transfer seems to be the increasing autonomy of data banks and their parts together with their growing adaptation to single purposes. It may be more and more difficult to search for information across organizational, conceptual, and terminological boundaries. Apparently, this type of difficulty is the more likely to occur, the more 'conceptually distant' source and recipient area are. The resolution lies in the construction of 'conceptual bridges' between the problem and recorded knowledge which link special autonomous terminological systems and classification principles of different disciplines.

Direct Access to Recorded Data

Another way out of this dilemma would be the avoidance of documentation systems as intermediary systems between user and documents at all. That means: direct access to recorded data and texts. Instead of trying to characterize documents by indexing, classifying, and abstracting one could attempt to formulate the original document already in terms of a language which is as context-free as possible and capable of being processed by algorithms. Such a 'lingua franca' is not necessarily a compromise at the expense of expressiveness of a language. There are many areas where it might be possible that the richness and ambiguity and context dependence of natural language is not necessary. Those areas contain a large number of 'terms' in contrast to ordinary words of common language.
Much of science and technology takes place in linguistic structures which are centered around terminologies and such domains can be talked about without the intricacies of natural language: "Compound A and compound B react with each other" or "Process P yields product Q under contition C". These sentential patterns and similar examples represent a great number of sentences in the scientific and technical discourse. They have many analogies in natural language and it is unlikely that much information is lost by standardizing them into a normal form.

The development of 'classification-free standardized artificial languages' which are approximations to natural language, this formalized representation is not a binary alternative. One can construct a ladder of 'degree of formalization': starting from uniterms, keywords out of context (KWOC), to keywords in context (KWIC). The next step would be to impose a standardized syntactical structure assigning a positional value to each descriptor expression, then the introduction of quantifiers and qualifiers into the grammar and degrees of certainty and corroboration as qualifiers of descriptive sentences and, finally, the introduction of semantic relations between descriptors; i. e. besides synonymity relations like "descriptor A is a generalization of descriptor B", etc. are used to establish similarities between sentences which do not have any description literally in common. From this level on instead of just indicating its 'subject matter' more and more direct storage and retrievability of the content of a document becomes conceivable.

It should be investigated which of these levels, if any, is a sufficient approximation of the language necessary to convey the message of the document. There is no theoretical once-and-for-all answer. And at least on the higher levels of this ladder the logic of the corresponding languages and the algorithms for processing texts in such languages are not very well developed yet. A first step could be to test which level is sufficient to represent summaries and abstracts. In particular it would be necessary to study to what extent the authors themselves are willing and able to express their scientific message in terms of a given formalized language.

These concepts of information transfer will permit users' direct access to items of knowledge. In contrast to most conventional documentation systems, this 'direct storage' of factual knowledge, the items of which are linked with each other by several semantic relationships, shall not just lead the user to the identification of documents which might be pertinent to his problem, rather they shall offer direct discourse in the 'problem language'. The prerequisite for the design of this family of 'direct storage systems' is the precise understanding of the function and significance of the various kinds of scientific-technical information processes: We do have to know more about the knowledge of the users for whom we design information systems. The usefulness of the analysis of the existing information facilities as guides for the design of new information systems is very limited. Observing manifest behaviour does not tell much about the response to yet non-existent services and systems.
This leads to the conclusion that in order to improve information transfer, certain principles and techniques should be developed, which involve the user in the design of information systems as early, as closely, and as thoroughly as possible. Until now there is hardly much of methodology for this kind of participating user research and simultaneous system development. One approach seems to be the design of prototypical novel information systems together with groups of users willing to use and to operate the systems under real conditions.

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PORTUGUESE SCIENTIFIC AND TECHNICAL INFORMATION SCENE. PRESENT STATUS AND FUTURE PROSPECTS

CARLOS PULIDO

INSTITUTO NACIONAL DE INVESTIGAÇÃO CIENTÍFICA
Centro de Documentação Científica e Técnica
Av. Prof. Gama Pinto 2
1699 LISBOA Codex

The need of definition of an information policy is pointed out through the presentation of various sectorial experiences in Portugal.The proliferation of small libraries and documentation services without functional conditions is a handicap for establishment of an appropriate strategy. The existing on-line services must enlarge their availability.Promotional activities must be carried out among rural extension agents and information officers for industry, to demonstrate them the actual possibilities of these services. The demand for scientific and technical information is significantly increasing in Portugal, as entrance in EEC is approaching. Experts on almost every subject need easy and quick access to information. This paper presents essentially a static picture of the situation. In the author's view what is needed for changing it, is a dynamic approach treating the various inter-related factors. Failure to do this until now has produced weak results and prevented the establishment of modern and reliable services large enough to cover the whole potential market.

1 - INTRODUCTION

"Information in general and scientific and technological information in particular are today recognized as essential to social progress and to understanding of the problems affecting the lives of nations; the lack of them is a very serious obstacle to development. Society must learn to gain control of a collective store of knowledge and to make full use of it in order to progress. Wise use of that knowledge for development depends on a number of essential factors: accurate definition of needs; information policy and strategy-making in harmony with national development policies;guaranteed ease of access to information both national and foreign; greater availability of the latter to all categories of the community of users; judicious use of advanced information technology and, especially, determination to eliminate systematically all obstacles to the free and wider circulation of information" (1).

Through these words Mr. M'Bow in his opening speech for UNISIST II, last year in Paris, presented the analysis of the essential factors from which the use of the collective store of knowledge depends and pointed out that once the definition of needs is made the establishment of an information policy is the most important factor. Through the formulation and adoption of such a policy the long-term objectifs and programme for the evolution of a coordinated national information system are defined.

The situation in Portugal, where the needs are already known, is now sufficiently developed to enable,without difficulty,establishing the purposes of an information policy and defining the corresponding objectives.These objectives should stress the contribution of scientific and technical information to the national development policies. In different fields the value of information as an economic asset must be asserted in support of the creation of information systems, run by specialized staff which can enable this country to benefit from the scientific and technological knowledge available throughout the world.

But the lack of a clear and precise definition of aims, objectives and options is resulting in the existence in this country of several organizations without institutional connections.The available infrastructures and the resources for their development often present conflicting aims and expectations. In spite of many individual efforts to improve the situation, it still remains unchanged. All the attempts made until now by several organizations in different fields have ended without significant results.

As a consequence of this situation and since there is no unified information system in Portugal, some sectorial experiences are presented in the next section, followed by a few examples of inter-sectorial cooperation.

2 - SECTORIAL EXPERIENCES

2.1 - Science and Technology

2.1.1 - Ministry of Education

In 1936 the first scientific documentation service was created within the scope of the National Research Council (Instituto de Alta Cultura). The first coordinated action of the new service (Centro de Documentação Científica) was the publication of the Union Catalogue of Foreign Periodicals in Portuguese Libraries commencing by medical serials.

In spite of its dependence from the Ministry of Education this Centre was chosen in 1975 to be the national centre introducing modern methods of information services for research and development. This centre is therefore supposed to serve users all over the country, regardless of their origin and has become the Scientific and Technical Information Centre of the National Institute for Scientific Research (CDCT - Av. Prof. Gama Pinto, 2 - 1699 Lisboa Codex). It has been given means for starting the new information services, through the Swedish-Portuguese Agreement signed in 1975. The know-how and technical assistance to CDCT came from the Information and Documentation Centre of the Royal Institute of Technology Library, Stockholm.

CDCT provides SDI services and on-line retrospective search in connection with all the main international systems. It is a member of EUSIDIC and of its working group EUSIREF.

The Union Catalogue of Serials is now computer edited. About 13 000 different titles are already registered, mainly in science and technology. The edition which is now being prepared is a merge between CDCT catalogue and the University of Coimbra Library general catalogue.

CDCT is a member and national representative of International Translations Centre, from Delft.

CDCT users come mostly from industry but also from university and other entities.

Also dependent from the Ministry of Education is the National Laboratory for Tropical Scientific Research (Laboratório Nacional de Investigação Científica Tropical - Rua da Junqueira 86, 1300 Lisboa) which succeeds the former Board of Overseas Scientific Research. Its documentation centre holds about 20 000 monographies, 3 000 serials, 5 074 modern maps and 1 210 old maps.

The departments of this Laboratory possess extensive documentation on practically every scientific field related to the tropical zones, with a large number of works still unpublished.

In the Ministry of Education a working group of representatives of documentation centres was created with consultancy and organizational functions aimed at procedure standardization and resource development. This working group appoints temporary study teams aimed at the investigation and reporting on different matters.

2.1.2 - Secretary of State for Planning

In 1967 a board was created to coordinate at a national level all the scientific and technological research (Junta Nacional de Investigação Científica e Tecnológica - JNICT - Av. D.Carlos I, 126-2º - 1200 Lisboa). This board was placed in direct dependence of the Prime-Minister Head Office, being transferred some years later to the Secretary of State for Planning. Its scientific and technical information service pepares the input of documents related with scientific and technological policies, issuing a monthly bulletin.

This board is the focal point for UNISIST Programme and is preparing the Portuguese version of UNESCO SPINES Thesaurus.

2.1.3 - Ministry of Industry

The National Laboratory for Engineering and Industrial Technology (Laboratório Nacional de Engenharia e Tecnologia Industrial - LNETI - R. S.Pedro de Alcântara, 79 - 1200 Lisboa) was recently created congregating all the research and development laboratories dependent from this Ministry. Applied research, experimental development and technical assistance in the fields of technology, energy and industry are then coordinated by a central board. This National Laboratory incorporates among others the Nuclear Physics and Engineering Laboratory (Laboratório de Física e Engenharia Nucleares - LFEN - Sacavém) and the National Institute for Industrial Research (Instituto Nacional de Investigação Industrial - INII).

This new Laboratory has its own Technical Information Centre for the Industry (Centro de Informação Técnica para a Indústria). Public and private enterprises, research laboratories and universities are the users of the services provided.

This Centre is the Portuguese correspondent of INIS.

2.1.4 - Ministry of Public Works

The Civil Engineering National Laboratory (Laboratório Nacional de Engenharia Civil - - LNEC) is an applied research institution whose activities extend practically to every field of civil engineering. With a staff of about 1 000, including more than 200 university graduates, this Laboratory is an important research centre by international standards.

Its computing centre is also used on a time-sharing basis by external users. Its large library provides on-line information retrieval in some fields (roads, hydraulics) and it is now being extended to include new subjects to allow on-line consultation by outside users.

2.1.5 - Ministry of Agriculture and Fisheries

This Ministry has suffered in recent years several deep changes in its structure which prevented the establishment of adequate scientific and technical information services.

A project of an agrarian information network covering the whole country has been submitted to the Government. This network is intended to give support to the rural extension services.

The central documentation service of this Ministry will become the AGRIS input centre as soon as it will get enough competent staff to perform the job. Meanwhile it is holding seminars and training sessions in collaboration with the National Committee for FAO.

The fisheries sector has its own scientific and technical information service provided by the National Institute for Research on Fishing (Instituto Nacional de Investigação das Pescas - INIP - Algés Mar - 1495 Lisboa Codex) which is the input centre for ASFIS - - the FAO Aquatic Sciences and Fisheries Information System. This Institute is also collecting literature from the former Portuguese African Colonies, until these new countries have their own input centres.

2.2 - Administration

Under the Secretary of State for Public Administration the Centre for Administrative Information and Documentation (Centro de Informação e Documentação Administrativa - CIDA - - Palácio da Ajuda - 1300 Lisboa) tries to dynamize actions aiming the establishment of an information subsystem covering the fields of civil administration. With OECD cooperation an action programme is under way for establishing a data bank for administrative and forensic information.

2.3 - Economics and Social Welfare

2.3.1 - Secretary of State for Planning

A Working Group was created in 1971 under the Prime-Minister Technical Office (Grupo de Trabalho Permanente para a Documentação e Informação Económica e Social - GTPDIES - Av. Defensores 1, 126 - 1200 Lisboa) to coordinate several scientific and technical information services mainly in the field of Economics. This permanent working group enlarged its scope and includes now about one hundred services both in the public and the private sectors. Some of these services being from different areas, the activities of this working group will be expounded in paragraph 4 which concerns inter-sectorial experiences.

2.3.2 - Secretary of State for Social Welfare

A sub-system for social welfare is being implemented through regional centres covering the whole country. Four of this centres are already working in close collaboration with the central service in Lisbon. A manual SDI service is offered, with special emphasis to legal matters.

3 - INTER-SECTORIAL EXPERIENCES

What has been said about sectorial information services has perhaps already enhanced the difficulties of getting inter-related services, specially when official departments in different ministries are involved.

3.1 - Union Catalogue of Periodicals

As said before (2.1.1) a third edition of the Union Catalogue of Periodicals is being prepared, with about 13 000 titles already in magnetic support and resulting from the merge of the former catalogues edited by the CDCT (National Scientific Research Institute Information Centre) and the University of Coimbra Library.

This catalogue covers mainly physical, natural and applied sciences but also social sciences, law, etc. It includes contents from more than one hundred libraries, both from public and private sectors.

3.2 - Working Group for Economical and Social Documentation and Information

This permanent working group (GTPDIES - already cited in 2.3.1) comprises several working sub-groups concerning different activities, such as Agriculture, Social Policy, Transportation, Ship Industry, Forensic Matters, etc.

The sub-group on Agriculture (GTIA - Grupo de Trabalho para a Informação Agrária) is committed to prepare the input for AGRIS system as long as the Ministry of Agriculture Information Service is not able to do it. This input is channelled through EUR-AGRIS. GTIA is also committed to translate the CDIUPA (Centre de Documentation des Industries Utilisatrices de Produits Agricoles) French thesaurus, through an agreement with MIDIST and to translate the Veterinary ECC thesaurus.

4 - NATIONAL SCIENTIFIC AND TECHNICAL INFORMATION SYSTEM

Two different projects have been tentatively presented to the Government in the last few years for establishement of a national system for scientific and technical information. None of those attempts have succeeded due to the lack of decision on information policy.

This lack of decision has prevented the development of convenient structures giving way to the proliferation of small libraries and so-called documentation services of all kinds. The majority of them have no functional conditions which is a serious handicap for establishing a reasonable network. An appropriate strategy is needed for implementation of such a structure, as soon as possible.

In order to illustrate the main obstacle to the establishment of such a system, the following episode which happened in this country two centuries ago is perhaps a good example. A foreign ambassador tried to persuade the Portuguese prime-minister to take some attitude against his inclinations. The reply he received was that everyone in his own place is so powerful that even after death four people are needed to carry his corpse.

This static state of mind prevails today in most institutions throughout the world. In Portugal this spirit is particularly enhanced. In this country, many of the so-called documentation services, are actually small or large libraries (no more than libraries) or even a few book-shelves with specialized periodicals or books. And there are plenty of such small libraries staffed by unspecialized people, in fact people who do not intend that books are for use, in contradiction to what a librarian should be.

5 - DYNAMIC APPROACH

"Book production doubling in the last twenty years, government publications alone doubling in the last fifteen years and the sum total of human knowledge estimated to be doubling every five years" (2) means that in less than ten years from now, we'll have to cope with as many new written material as the total amount we have today.

But, people try to forget this and to forget that to cope with this flood of information mankind has to become organized in integrated systems.

The formulation and adoption of a scientific and technical information policy implies that the national scientific, technological and other information production is perfectly known. The establishment of such a policy must ensure the comprehensive use of professional and specialized knowledge in guiding social evolution.

An integrated information system must serve heterogeneous groups of users whose real and changing needs and requirements are often difficult or even impossible to assess. Therefore, the system encompasses many varied activities and services, not interconnected. And the volume of information involved creates problems of information selection and availability of adequate resources - know-how, trained manpower, equipment.

Scientific and technical information being an essential and inseparable part of national policy for economic and social development, the establishment of information policies and programmes should be harmonized and implemented to serve it. They should be formulated in close association with national development policy in order to improve the flow and utilization of information in development-catalysing activities and the capability in information system planning and development. Only under these conditions international assistance resources can be effectively utilized not only in scientific and technical information but also in relation with research and development activities in general.

In the particular case of this country, the process leading to the definition of an information policy is still more complex, especially in view of the internal political scene.

Among the obstacles facing an endogenous development, one should mention the users, who naturally have a word to say about the function of a system which concerns them directly. Since this system never existed so far it is difficult for its potential users to define their needs.

Sectorial departments do not have the possibility of filling the void however large their range of action or their resources may be.

But the already referred proliferation of documentation services and libraries with less than critical dimensions and staffed by unqualified people is a most important obstacle. This proliferation plays the double role of cause and effect. The existence of so many small libraries and documentation services difficults the establishment of an information policy. And it is because there is a lack of planning that new documentation services are created, contributing to an increase of the difficulties in reaching a national solution.

The leading role that international organizations play at this point is thus of essential importance. Their action upon governments in making them aware of the need for defining a national policy of scientific and technical information may lead into better results than any inner action.

The forthcoming ingress of this country in the EEC has on one hand put more pressure on the problem of the absence of structures but on the other may significantly contribute to its solution.

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EURONET AND ITS INTERLINKING TO OTHER NETWORKS

Guy M. Vanautryve, Dr. Sc.
Nationaal Centrum voor Wetenschappelijke en Technische Documentatie
Keizerslaan 4
B - 1000 BRUSSEL (België)

SUMMARY

Euronet/Diane is the result of a combined effort of the Commission of the European Economic Communities, the PTTs and the hosts. The PTTs are fully responsible for the design, installation and exploitation of the network. The technology selection for the implementation of Euronet is the electronic packet switching technology. The CEC, as a cofinancing body for the network, has been able to negotiate with the PTTs about some principles of tarification and has been very active in promoting the use of the network by the creation of an Euronet Launch Team, the promotion of the development of interfaces and by financing studies on the Common Command Language, videotex, the creation of data bases and data banks and the document ordering. The host computers wanting to hook up to Euronet have been asked to sign a memorandum of understanding. For the rest, they are completely free. Although it is still too early to estimate the impact of Euronet on the behavior of the users, who are finally responsible for the traffic on Euronet some comments are already made.

During the sixties, the secondary information services faced with the increased growth of the literature switched to the computer-assisted production of their abstracts and indexes. At the same time, the faster rate of industrial, economic and social evolution put more emphasis on the need for adequate and timely information. As a consequence, information centers tried to make use of the magnetic tapes which had become available as a subproduct of the publication process of the secondary services. The first computer-based services were the SDI services, followed by the batch retrospective searching. The latter however did not offer an ideal solution, due to the long turn-around time and the impossibility to redirect the strategy during search. A major improvement was achieved by the introduction of the online information retrieval services.

The evolution in the United States and Europe has been completely different. In the U.S. telecommunication networks were set up by, mainly, private firms to which the host computers only had to hook up to get a nation-wide access. The hosts tend to be huge, multidisciplinary databases by putting many databases on-line. In Europe, however, numerous information services were created to answer isolated and specific needs and they showed a tendency to create a multitude of small, isolated networks in order to disseminate the information. The monopolistic position of the PTTs in Europe prohibits private firms to set up telecommunication networks to be used by third parties. But the apathic attitude of the same PTTs has offered the chance to one of the American telecommunication networks to hook up for some years, a part of Europe to its American network, this networking being from Europe to the U.S. hosts. They, in fact, were easier to reach than most European hosts.

As an example of an European initiated network, we can mention the European Space Agency, ESA, which built up its own starred shape network, centered on its host computer in Frascati by renting lines from the PTTs. They were forced to handle this way, if they wanted to have some traffic, because of the lack of an existing telecommunication network, as already mentioned, and the insufficient reliable, very expensive, international public telephone links.

In June 1971, the Council of the European Economic Community agreed in principle on a resolution recommending the implementation of a first three-year plan of action with, as one of its major objectives, the creation of a European network for scientific and technical information and documentation "by the most modern methods" and "under the most favorable conditions as regards speed and expense".

A network is not a final goal in itself but is set up to provide an economic, easy and reliable access to e.g. host operators. By the development of the network, it was hoped that a favourable climate would be created for the elaboration of information services.

For the setting up of host operators it was relied on individual initiative. This makes that one can consider four partners in Euronet : the European Community, the national PTTs, the hosts and the users who finally are responsible for the traffic.

Studies carried out in 1973/1974 by consultants to the Commission of the European Economic Community showed that a network shared by all Information Service Vendors in the Community would cost the European taxpayer one-third to one-tenth of what it would cost if separate networks were set up for each host computer. The study also recommended that the network should be based on the "packet" mode of working.

The Commission of the European Communities (CEC), assisted by the Committee for Information and Documentation on Science and Technology (CIDST) was entrusted with the implementation of the resolution. For the technical execution of the plan the Commission started negotiations with the Conference of European Postal and Telecommunications Administrations (CEPT) to lay down the basis of a telecommunications network, now called "EURONET". The contract signed in 1975 between the Community PTTs and the CEC includes the following agreements, which are of considerable significance. These are :

a. the network should be implemented in accordance with internationally agreed standards insofar as they apply ;

b. the design of the network should be such that its reliability can be enhanced to that needed for a public network ;

c. access to the network should be via national public data networks wherever such networks exist or as soon as they exist ;

d. the design of the network should not preclude the carrying of non-EURONET traffic ;

e. in the longer term the services and facilities provided by EURONET should be gradually integrated into an emerging European public data network.

It was understood that the Post and Telecommunication Administrations would assume full responsibility in the management of the network, as it falls under the monopolistic regime which applies in most of the European countries. Obviously, the CEC, as a cofinancing body participates fully in the exploitation of the network. The actual network configuration has four packet switching exchanges (PSE), established in Frankfurt, London, Paris and Rome with remote access facilities in Amsterdam, Brussels, Copenhagen, Dublin and Luxemburg. These remote access facilities enable not only low speed data terminals, connected to the public switched telephone networks in each country, to gain access via suitable multiplexed links to the packet switching exchanges but also hosts to be connected. A central Network Management Centre (NMC) is located in London.

The design of the network is such as to ensure that the facilities available to users connected via remote multiplexors are identical to those for users who are connected directly to the PSEs. For example, the distance of user from a PSE or multiplexor site should not prejudice the facilities or performance offered. The advanced technology selected for the implementation of Euronet is the electronic packet switching technology ; it is practically identical to the technology used in the French network called TRANSPAC. This technology allows the efficient use of available circuits by a number of users whose capacity needs, quantitatively speaking, are often rather limited. It also provides an important facility for conversion between the different characteristics of the hardware and software used both by suppliers and users of information in order to make them compatible. It would have been unthinkable to compel the customers of the network to replace their present equipment by a single standard equipment.

Essentially, electronic packet switching means that each message is divided in very small pieces to which are automatically tagged indications of their origin, their destination and their sequence ; then, the message passes into the network where it follows a given circuit where it can be interleaved with other messages in order to use each millisecond during which a line may be available. When the packets reach their address, their tags are removed and their original sequence is restored. Thanks to electronic packet switching, the PTTs could guarantee a level of reliability and continuity of operation never reached before. In addition, a call should only take approximately 0,15 of a second to cross the network, even during peak hours.

At the time the PTTs started designing the network, only a few hosts were to be connected, but this was soon modified to show some 20 to 25 potential hosts. As furtheron, lots of papers have been written and lively discussions held on Euronet, even transatlantic, a much greater number of users as initially foreseen, showed their interest in Euronet. As a consequence of all this the PTTs and the Commission decided, even before the launching of the network to upgrade the capacity of the network by a factor of almost 3. The capacity of the PSE in terms of National Users Accounts (NUA's) after the first updating should be :

London	1000 NUA	500 UK 250 EI 250 NL
Frankfurt	750 NUA	500 D 250 DK
Paris	600 NUA	100 F 250 L 250 B
Rome	500 NUA	
Total :	2.850 NUA	8.550 National User Identifiers. (NUI)

The table shows also the division of NUA's by country. France has received a relatively low number of NUA's because of the interconnection between its national network Transpac and Euronet.

In the autumn 1980, a fifth PSE will be added to the network. This node, located in Switzerland, will be connected to Paris and Frankfurt.

When talking about service one of the first points of concern expressed by the user is the price. Due to its commitment the Commission was in a position to negotiate with the PTTs about some principles. Some basic principles of charging for the Euronet network are :

a. distance independance within Euronet, to meet the Commissions objective that all users should be treated on an equal footing throughout the Community and no one should be penalised tariffwise because of location ;

b. a time element for the duration of each virtual call, dependant on the user class, which is based on the transmission speed ;

c. a volume charge based on the segment rather than the packet, where a segment is a fixed number of bytes. The segment size has been set initially as 64 bytes in length, that is about half a packet ;

d. considerable reduction in virtual call duration charges and volume based charges for night and possibly weekend traffic ;

e. national access charges for direct connection and for dial-up connection appropriate to the originating country.

Because of the more efficient use of the circuits, the PTTs were able to announce attractive tariffs. Taking TTY terminals with a transmission speed up to 1200 bauds connecting to the network through the public switching telephone network as an example, the time element is charged a rato of 1,4 BF (Belgian Francs) per minute while the volume charge is set at 0,70 BF for 10 segments. These prices relate only to the network and do not cover national access charge.

In his paper, at the 1979 annual meeting of the European Association of Information Services (EUSIDIC), Mr. Kelly of the British Post Office stated that : "since Euronet should be fully into line with current standards, it is compatible with the various other packet switching networks throughout Europe, North America and Japan. Interconnection of Euronet to national networks not only in Europe but also to those in North America and Japan should then be feasible". Its connection to national networks in France, United Kingdom, Spain, Norway and Sweden, probably during 1980, was further announced.

To date, only the French national network, Transpac, has been interconnected with Euronet. The expansion of Euronet to Greece and Spain, either by setting up a remote access or interconnecting the national network should not cause many problems as both countries will become members of the EEC in a near future. It seems that a consensus regarding the expansion or interconnection of Euronet has been reached to restrict it to the countries which are or will become members of the EEC. For the other countries in Europe, political implications may play an important role. Actually no hosts from non-member countries are admitted to connect to Euronet. As an example the Distributed Database Experiment (IDEX), jointly undertaken by the International Atomic Energy Agency and ESA can be mentioned. Although ESA is accessible through Euronet,users are not permitted this access possibility if they want to search the Inis or Agris databases in Vienna ; and therefore have to use the in parallel operating "ESA-network", which is more expensive. This "ESA-network" has been taken over last year by the PTT in some countries, so that they operate two access possibilities to ESA.

Most PTTs have set up their own connection with the North American networks. At a first stage, this connection assured only one-way traffic but PTTs are adapting their equipment to allow two-way traffic, so that European hosts could be reached by American users. As these connections have proved to be working at a high level of reliability it does not seem necessary to the PTTs to interlink Euronet with f.e. Tymnet. There are certainly other unterlying reasons to that decision : the future of Euronet, in which country the link should be established, the distribution of the income from that link between the different PTTs, the special position of the PTTs in Europe and their relation with the national governments...

Euronet has provided a stimulus to many European countries to plan their own national public packet-switched data services. These should be in operation in all countries, participating actually in Euronet by the end of 1982. It is quite logical that the national networks will be interconnected to each other and to the transatlantic networks. The Euronet network as it is known today could well disappear in four to five years time. Only the links to member countries where no national network exists could be maintained.

At the end of 1980, the Community will have spent, in the framework of these plans, about 16 MEUA, 6 of which having been earmarked for the setting up of the telecommunications network Euronet. Similarly, the PTT administrations have contributed nearly 3,6 MEUA during the same period, leaving aside, of course, studies and operating costs. The total amount invested for the setting up of the infrastructure indispensable to the information of the Community will therefore have cost approximately 20 MEUA.

Due to its heavy involvment in Euronet, it is quite evident that the CEC has been very active in promoting the use of the network. Besides the setting up of the Euronet Launch Team, the Commission has promoted the development of interfaces for host computers to enable them to connect to Euronet. The Euronet Launch Team is responsible for the day-to-day assistance, the marketing and training and the news and information service (enquiry service, help desk function...). The Enquiry Service was implemented on a dedicated host computer, located in the U.K.. Acces to this service is free of charge and can be in any of the Community based languages. The Service ressembles a yellow-pages type directory of Euronet/Diane. Diane stands for Direct Information Access Network for Europe and represents the ensemble of information services available through the Euronet telecommunications network. In addition, the CEC has promoted studies which should lead to the standardization of retrieval languages : the Common Command Language (CCL). It thus could become possible for the non-initiated users to access with one language most of the host computers connected to the network.

Amongst other projects of the CEC, all aiming at increasing the traffic on Euronet we could mention videotex, the creation of databases and databanks and the document ordering.

The mergence on the market of the new so-called "videotex" techniques which have been developed concurrently in several countries of the Community, seems promising, given that in this field Europe is ahead of America. The Commission is considering in what way these techniques, as long as they can be made compatible enough with each other, could use the infrastructure provided by Euronet. In this context it is also worthwhile to consider if the cheaper videotex terminals could not been made working on Euronet/Diane.

There is, at the moment, in Europe a serious lack of data banks and data bases in some fields as economics, social sciences. If one may think that in the scientific field there are not too many gaps, it is a fact that technological and factual information adapted to the needs of engineers, small operators, general practitioners, etc. is often missing. Faced with American competition, the difficult position in which Europe finds itself can be seriously improved only through the implementation of a deliberate action at European level, in order to fulfil existing needs whilst avoiding, through appropriate coordination, all sterile duplications.

As result on its call for proposals for the development of value-added information systems, the CEC received 266 proposals. The distribution of proposals by subject field is as follows :

subject	number
Agriculture, Food Industry	18
Biomedicine and Health Care	35
Environment (incl. earth and sea resources)	22
Demography, statistics, social sciences, education, geography, history	25
Bus./economics, public admin. finance	35
Engineering, Aerospace, transport	19
Informatics and Telecommunications	34
Energy	10

Chemistry and Physics	12
Industrial Processes (incl. mining and metallurgy)	26
Law	14
Patents	5
Multidisciplinary Projects	11

The CEC has now the difficult task to select the projects they will co-fund.

A major problem of the users deserves attention : if, on the average, 10 minutes to 1/4 of an hour are necessary to obtain through a dialogue between terminal and computer, the bibliographical references which hopefully answer a question, it takes normally anywhere between 2 to 8 weeks to obtain the full documents indicated during the search. Moreover, one can very seldom obtain everyone of them. Naturally, if one could, through an adequate referral system, find the location of all relevant documents, one could without too much difficulty and at reasonable cost obtain and transmit copies of the documents through facsimile or other methods. This rather naive scenario ignores the existence in the Community of nine different legislations on copyriht. As it is out of the question at the moment to propose a single legislation in the field which would be valid throughout the Community, it will be necessary to elaborate the ways and means to ensure the payment and the recovery of royalties corresponding to copyright for authors and publishers.

The language barrier in Europe is a heavy problem and may prohibit severely the use of a lot of those "specialised data bases". Thanks to the help of the European Parliament, the Commission has been in a position to launch a programme for computer-assisted translation which has proved extremely fruitful. For tactical reasons, and notably because of the high cost of the studies, the Commission had to select a few fields for concrete, in depth studies, covering all the languages of the Community. In spite of the very encouraging results which have been obtained up till now, the cost of computer-assisted translation using the so-called first generation methods is still very high. That is the reason why the Commission is about to propose a fully fledged research programme in matters of automatic translation, to which all these specialized research centres which are already active in the field in the Member States would participate closely in a cooperative effort. One may thus hope that in a certain future, a Sicilian doctor will be in a position to put a question in Italian, through Euronet, to a German data base specialized in the medical field, that his question will be automatically translated into German and that the answer provided by the German data base will be automatically translated into Italian before appearing on the screen placed in front of the doctor's eyes.

Actually, some 19 hosts are connected to Euronet, offering some 127 data bases, of which 109 are different. Some of the information services offer only their own data base and thus still aim at a specialised group of users.

Although the CEC coordinates the meetings of the European host operators group, it can only make suggestions and certainly cannot tell hosts to do anything. In order to protect the users of Euronet DIANE, the Commission has nevertheless obtained from the host computer operators a commitment to the principles of a memorandum of understanding, which is in fact a code of conduct excluding any discriminatory practice based on the nationality of their customers and any action which might go against the normal market competition rules. This memorandum is the only weapon the Commission has against the hosts, which are completely free in the choice of the services they offer and in fixing the tariffs.

It is still too early to estimate the impact of Euronet/Diane on the behavior of the users. The status per July 1, 1980 on the number of NUA's issued by the Management Center in London is 719. The distribution per country is :

	NUA		NUA
Belgium	97	Italy	37
Denmark	73	Luxemburg	9
France	2	Netherlands	203
Germany	110	United Kingdom	173
Ireland	15		

These figures are only an indication of the number of NUA's the national PTTs have requested from the NMC and do not necessarily reflect the number of actual users. To date no bills have been issued for the telecommunications and therefore no statistical information available ; the PTTs are not releasing this information. From informal talks it appears that, at least in some countries, the use of Euronet was not overwhelming in the previous months. If one takes only the cost factor into consideration, this seems quite surprising. However, the reliability of the network plays an important role. Euronet has been based on new technology, which inevitably, has caused problems at the beginning. As a consequence, the launching of Euronet in the different countries, about which the PTTs decided independently, did not occur at the same time and, in some countries, not all interested users could get a free NUI for testing. The interruptions, users have experienced, were not always due to the new technology, but also to the upgrading of the network and to the quality of the lines. In the Netherlands f.e. users were often disconnected during search,

even two to three times, due to a line fault between Amsterdam and London. It further has happened that users from Denmark and Ireland were not able to use Euronet for longer periods. The problems were rather always "localized". This created unhappy users. Undoubtebly, the PTTs will or, perhaps already have, overcome the initial problems so that the network will become as reliable as any other network, but if this will be sufficient to generate heavy traffic is an open question.

The network is looked at by the user as an integrated part of an information providing service the other part being the host computer. Actually, the biggest concerns lay with the host operators. It is sufficient to compare the American scene with the European to understand. Software-wise it is rather subjective to determine which one is the most versatile but, nevertheless it is a general feeling that the American softwares are, in most cases, more performing. American hosts, at one side, offer a whole variety of data bases in almost all disciplines (one host offer as many data bases as are actually available through Euronet) while at the other hand European hosts operate rather in a mission-oriented way. The actual users are accustomed to the American services and they will stick with these, rather than switch to European hosts and having to learn many different sets of rules for operating the systems.

By financing studies about the CCL, the CEC tried to alleviate the problem of the different softwares. The main advantages of enabling to search on any system with the same commands may be summarized :

- all systems may be searched with equal ease ;
- users are not "tied" to frequently used systems : they are more likely to search other data bases on other systems ;
- new systems attaching to Euronet are, if usable with CCL, at less of a disadvantage compared with established hosts ;
- users will be able to concentrate more on learning the problems specifically associated with a new data base and its treatment on a retrieval system.

However the CCL, so far, has only been implemented by two groups of hosts : the group using the DIMDI-software (Deutsches Institut fuer Medizinische Dokumentation und Information), being the German hosts and the host computer of the CEC, and ESA. These two versions already show differences in the interpretation of the rules. Furtheron, most hosts, working on the implementation of the Common Command Language, seem to confine their efforts in merely translating their actual commands into CCL, which is not always completely possible. Further meetings to streamline the CCL will be necessary.

The CCL has been designed from comparison of the commands in the different search systems and thus only covers the most common commands. The unique features available on the different systems are not covered.

As many of the hosts belong to the public sector the principle of the "free market place" may perhaps not work as it was hoped. Also, for some data bases, there might be supplemental difficulties by the rights national liaison officers have been octroyed. The only possibility the CEC had in the actual situation to further increase traffic was the cofunding of typical European data bases and data banks in field where real gaps have been identified.

As already mentioned, the tariffs announced by the PTTs are very attractive. However, each PTT independently, is allowed to decide on the national access charge for the network. Some countries, as f.e. Belgium have decided on a distance independent access charge, but in other countries the charge is a function of the distance. This makes that accessing a London host computer from The Hague, may prove to be cheaper than from Scotland, destroying partly the "distance independancy" image. As all messages are send in packages the volume charge may be higher than one would expect at first, but still will be significantly lower than actual charges.

The prospective studies carried out on behalf of the Commission have shown that one can expect a dramatic increase in the demand for on-line information services in Europe.. The number of searches of information services which was about 60.000 in 1976 should, 10 years later, in 1985, overshoot the 2 million mar. Furthermore, one expects an increase in the yearly frequency of use per person from 1,7 retrospective searches in 1976 to 3,7 retrospective searches in 1985. It is up to Euronet/Diane to obtain its part of the traffic.

Four years after the signature of the first contracts with the PTT administrations Euronet DIANE is operational about twenty-five computers serving approximatively 150 data bases and data banks are either connected or being connected to the network. The success is not just due to technology and its fall out will have a considerable impact on the implementation of the policies which are essential to the development of the internal market;

thanks to the acceptance of the same fundamental principles in matters of switching techniques, the adoption of common standards leading to the opening of a huge market to European industry has been achieved.

The success of Euronet lies in its disappearance. In fact, Euronet has been the necessary impuls some PTTs needed to start developing their own national networks. It also has been the start for the creation of the development of a true information market within the Community. One is becoming more and more conscious in Europe that information has become an essential component in the gross national product. Europe simply has to export the product of its brainware , i.e. information, not only to developing countries with which it has commitments (Lomé Convention) but also to developed and industrialized countries.

To end we kindly would like to thank the Commission of the European Economic Communities for the assistance it has given me in preparing the paper. Some usefull information has also been taken from the "Euronet Diane News" newsletters.

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National information services with international orientation

Dr. Werner Rittberger
Fachinformationszentrum Energie Physik Mathematik GmbH
D-7514 Eggenstein-Leopoldshafen 2
Federal Republic of Germany

Tasks and targets of national information centres and information systems are embedded in national information policies. The information policy of the Federal Republic of Germany is presented and a few examples from other countries illustrated. Besides cooperation in international information systems there is the form of participation in national information services with international orientation, i.e. with bi- or multilateral cooperation. This kind of cooperation is illustrated by the examples of Energy Information Data Base (EDB), INKAPhysics Data Base (INKA-PHYS), Système de Documentation et Information Métallurgique (SDIM), NASA Data Base, and Evaluated Nuclear Structure Data File (ENSDF).

Principles of information policies, economic and legal aspects as well as the experience gained so far are discussed. The problems of information distribution are also briefly dealt with.

From the experience gained so far, criteria for national information services with international orientation are outlined. They are a genuine alternative to international systems, if the criteria outlined can be realized. The subject area then is the decisive factor.

I. National information policies

National information centres and national information systems - as their name implies - usually have the task to satisfy the information needs of various user groups within a certain country by offering a suitable range of services. Tasks and targets are thus embedded in national information policies. These policies, in their turn, are dependent on the information needs of society, and - beyond that - have to take into account political tendencies and technological and economic developments. These, on the other hand, are not quite independent of surrounding influences, they are increasingly embedded in the international development.

To start with, the relationship of information system to national information policies is illustrated by the example of the Federal Republic of Germany. After that, a few comparisons from other countries are pointed out.

The fundamental principles of the information policy of the Federal Republic are laid down in the "Programme of the Federal Government for the Promotion of Information and Documentation (I&D Programme) 1974 - 1977" (1). I quote: "The I&D Programme aims to initiate and support the development of scientific and technical information services so as to keep pace with increasing knowledge and the growing needs for information of contempory society. It seeks to ensure better access to all types of information from the various subject fields and missions, so that existing knowledge and information can be mobilised to meet the scientific, economic, technical, political and social problems of our time and thus avoid wasteful duplication and poor investment. The development of information activities must lead to a service which, in its preparation and presentation, its coverage and selection, its accessibility and cost, provides information which is both oriented to the specific and the often changing needs of different social groups. The development plans of the I&D Programme should also contribute towards international information exchange and European integration".

In continuation of this programme, the following information-political aims are proclaimed especially at present:
- securing resources, i.e. securing national interest in major information data bases in science and technology which have been produced in partnership
- improving the transfer of knowledge by developing new information services in response to user needs, and by partially reorientating dissemination of information.

The integration of the numerous information and documentation facilities within the Federal Republic of Germany into "Fachinformationssysteme" (specialised information systems) and the foundation of "Fachinformationszentren (subject oriented national information centers) as the germ-cells of these systems is seen as the most important conceptual framework for coordinating the information activities in the various fields of science and for improving the services. By concentrating means and manpower and by applying modern methods and techniques, the efficiency of "input work", such as bibliographic and subject-related description of documents, and dissemination of information will be increased. In particular as far as the bibliographic and subject-related description of documents is concerned, all measures of cooperation and sensible, subject-oriented distribution of activities are taken in order to avoid unnessary duplication of work. In dissemination of information and in consultancy services these centers are the partners of brokers, libraries, publishers etc. Within the national framework, the partnership will find strong support in ODIN (2), a concept supporting the partners.

Another very important aim of the I&D Programme is to improve the scientific and technical infrastructure of information. For this purpose the "Gesellschaft für Information und Dokumentation (GID)" was founded

and a research programme "Information Sciences" started at universities and politechnics.

The national measures are to be seen directly in the context of, and firmly embedded in, international cooperation. They create suitable preconditions for efficient and competent partners for international tasks and projects. Furthermore, they guarantee improved supranational cooperation in the free exchange of scientific and technical knowledge.

Just lately, most industrial countries show an increased tendency to national information policies with an overall concept, in the context of which the formulation and implementation of concrete programmes, however, are more or less still missing.

To demonstrate this, I will pick out a few countries which tackle things in a different way.

About Portugal, our host, others will be reporting during this meeting. In France there are all signs for a national information policy; S. Nora and A. Minc (3) have laid a solid foundation. By creating the "Mission Interministêrielle de l'Information Scientifique et Technique (MIDIST)" (4), information policies are introduced which differ from those of the Federal Republic of Germany in their structure, but not in their aims. According to this programme, there is also to be expected a greater tendency to international cooperation. The United Kingdom is taking quite a different approach in its information policies. There is no support for integrated information policies with concrete and comprehensive programmes. There is also some hesitation about joining into international cooperation (5).
Now let me come to the United States of America. After having developed over the past ten years several single plans for various fields, an all-comprehensive plan is now under discussion, and in the White-House-Conference (6) the National Information Policy was dealt with. If one accepts that pragmatic single efforts in various fields in the end also lead to an overall policy then the United States are very much on their way, for instance, it is the United States who already have information systems in energy, aeronautics and space research, medicine, and also in the field of data information. These national information systems, produced in international cooperation, have found a lot of recognition.
Japan (7), in preparation of a national information policy, has been discussing for a long time the Plan for a National Information System in Science and Technology. The National Information System envisages a national coordinating centre, national information centres and data centres. The first step in achieving this goal is the production and the acquisition of data bases. There are few pointers to national information systems with international orientation.
The USSR (8), within the framework of a national information policy, has programmes for various subject-oriented, branch-oriented and inter-disciplinary systems at different levels, which take care of all information activities. National information systems with international orientation are little known.

II. National information services with international orientation

The documentation of the worldwide existing literature, data and facts on one's own means a lot of investment. In addition, not all channels for literature acquisition are available - especially not abroad. Cooperation thus means: More timeliness and completeness, sharing of work, which again means the sharing of costs between several partners, less duplication - or multiplication - of work, decrease of costs because of language barriers, and finally improvement in the exchange of information. National information systems with supranational documentation tasks have been and are therefore anxious to intensify bilateral or multilateral cooperation.

Wysocki (9), East (10) and Page (11) have made an attempt to typify the national and international information services. The type "National Service with International Orientation" be now introduced, and I like to apologize that I have only chosen some from "my line of business" and - for lack of time - only few of those.

"International orientation" is not meant in the sense of international coverage, because all major information services are international, but in the sense that bilateral and multilateral cooperation leads to the production of data bases through the contributions of various partners on the basis of clear-cut agreements about rights and duties. The user then benefits by gaining the avantages of timeliness, completeness etc.

Energy Information Data Base (EDB)

EDB is produced by the Technical Information Center of the US Department of Energy, Oak Ridge. It contains worldwide literature (journal articles, books, reports, patents, theses, conference papers, etc.) from all fields of energy, and it is the only machine-readable data base of this size in this field. The number of recorded conventional and nonconventional literature items for 1979 was some 135,000. English is the carrier language of the data base, and it is issued as a magnetic tape and as a printed product under the name of "Energy Research Abstracts".

On the basis of a cooperation agreement the Federal Republic participates in the production of this data base. It supplies, in an internationally recognized format, all relevant literature in the field of energy - as far as it is published in the Federal Republic. In return, it gets the data base for use in its own boundaries. The Technical Information Center has agreements with other countries, and more agreements are in preparation. Thus, the principle of national information policy, I was talking about earlier on, securing national interest in jointly produced data bases, is fulfilled. Another benefit which arises for the partners participating in the cooperation, is that scientific and technical results are distributed very fast. By having very clear agreements on rights and duties, cooperation has been running smoothly for years, and that goes for the input as well as for the dissemination of information.

INformation system KArlsruhe PHYSics Data Base (INKA-PHYS)

The data base INKA-PHYS is being established by the Fachinformationszentrum Energie, Physik, Mathematik (FIZ). It contains worldwide literature (journal articles, books, reports, patents, theses, conference papers, etc.) in the field of physics and related subjects. Apart from the complete coverage of journals it

puts its emphasis on the so-called nonconventional literature. During 1980 some 105,000 items will be added to the pool. The data base contains bibliographic data, abstracts, classification, descriptors. Its carrier language is English. It is available on magnetic tape and as a printed product called "Physics Briefs / Physikalische Berichte".

On the basis of a cooperation agreement, the American Institute of Physics (AIP) participates in the production of this data base. It supplies the information (bibliographic data, abstracts, classification, descriptors) of all journal and series articles published by AIP in an internationally recognized format (1980 some 25,000 items). FIZ has agreements of this kind with publishers in other countries, though the input is not supplied in machine-readable form yet. Agreements with other countries are in preparation. The agreement between AIP and FIZ, from the point of the national information policy, has introduced a new dimension in cooperation, in so far as the producers of primary literature and secondary literature work directly together. Furthermore, both sides have economic advantages, and the legal problems have been solved very satisfactory for both sides as well.

System for Documentation and Information in Metallurgy (SDIM)

SDIM old (1972-1977)
The data base SDIM was operated by the European Communities (EC). It contains worldwide literature in the field of metallurgy. Following a decision of the EC Council in 1971, the Member States were invited to participate in the establishment of the data base. The first countries to start this collaboration were Belgium, the Federal Republic of Germany, France and Luxemburg. The Netherlands, and later still Denmark, Great Britain and Ireland followed. Only Italy did not contribute at any time. Member States had to supply their countries' literature, particularly journal articles - and to a certain extent also journal articles in Eastern languages. By the end of 1979 the data base had a pool of some 145,000 items, which includes, however, voluntary contributions after 1977.
The data base has no carrier language. Bibliographic data, abstracts and descriptors were allowed in English, French and German. The data base is available on magnetic tape. The abstracts are stored on microfiches.
The system had to stop at the end of 1977. On the one hand, the information-political powers and contractual means were not strong enough to force, or to encourage, certain Member States to more comprehensive and timely deliveries, and on the other hand, for the same reasons, the system did not implement the new necessary technical developments.

SDIM new (1980 -)
France and the Federal Republic of Germany have decided to continue the data base in the field of metallurgy and metallic materials in joint bilateral cooperation. According to the agreement each partner can consider himself to be the producer. 30,000 items are to be added each year, mainly journal articles. The bibliographic data and the descriptors are available in Englisch, French and German, the abstracts only in French and German. English will be the carrier language eventually, but at a somewhat later stage.
Bilateral cooperation with partners who are on the same par (other countries could join at a later stage) is from the information-political point of view a new and interesting road to go, whereby the fact that English is not the carrier language should be put right soon. Division of labour brings economic advantages, and as the rights and obligations are settled quite unambiguously, success is to be expected.

NASA Data Base

The NASA Data Base is the only machine-readable literature data base in the world which comprehensively covers (annually 90,000 items) nonconventional and conventional literature in the fields of aeronautics and astronautics, space research and related subjects.

The nonconventional literature is compiled and processed in cooperation with the European Space Agency (ESA) (who supplies the West European literature) and announced in the "Scientific and Technical Aerospace Abstracts (STAR)". The input of the conventional literature (data base International Aerospace Abstracts (IAA) is carried out by the American Institute for Aeronautics and Astronautics (AIAA) on behalf of the NASA. An agreement is the basis for ESA supplying the nonconventional literature of the ESA Member States. Cooperation between NASA and ESA limits the activities of national documentation and information centers in the ESA Members States at present to the collection of reports in the countries concerned.

With a view to the development of national information policies during the past few years - which in the Federal Republic of Germany, for instance, have lead to "Fachinformationszentren", national subject-oriented information centers which have to carry out "national" tasks -, a certain liberation of the decisions taken in the Sixties is to be expected and I think that in the future cooperation with national centres as the focal point, instead of cooperation with several single institutions within one country, should become common practice.

Evaluated Nuclear Structure Data File (ENSDF)

In the past the data base was produced by the Nuclear Data Project in Oak Ridge. From 1981 onwards the activities will be taken care of by the National Nuclear Data Center in Brookhaven. The data base results from a complete and continuous nuclear structure data evaluation of all isobaric mass chains in a four year cycle. It consists of a file which only contains evaluated data (a pool of about 1,5 million data which an annual increase of about 300,000 items) and a file with bibliographic citations of about 85,000 records (annual increase of some 4,500).
The Federal Republic of Germany has a cooperation agreement and takes part in the production of this data base by evaluating the mass chains A=81 to A=100. In return it receives the complete data base for use within its boundaries. Apart from the Federal Republic, there are another 15 evaluation groups from 11 countries and 2 international organizations participating. The activities are coordinated by the Nuclear Data Section of the IAEA.
The data base is available on magnetic tape and as a printed version in the form of "Nuclear Data Sheets" published by Academic Press.

In the field of data compilation and data evaluation this kind of cooperation, from the information-political

point of view, can be considered as a proper prototype. The compilation of numerical and factual data bases, in most cases, because of high quality demands and because of high costs, can only be carried out by sharing the work in bilateral, multilateral and international cooperation, and in this context national information centers will have to play a growing role in taking over contributing, coordinating and financing functions.

More national information services with international orientation are to be found in other important fields of science, such as chemistry and medicine, and in specialised fields, such as road construction, geophysics, constructural engineering, cancer research, etc.

The examples I just presented demonstrate the multitude of possibilities and ways of national information services with international orientation. The emphasis, however, is quite clearly always on the "input side", or in other words on the production of a data base. Input, the subject- and contents-related description of documents, is a scientific task, and cooperative authorship across the borders is just as valid here as it is for primary literature. Dissemination of information, on the other hand, is much more influenced by the user, and therefore has quite different targets and preconditions, which are also strongly influenced again by the intermediaries, that means the brokers, publishers, and libraries.

For printed products transnational, supranational, international orientation goes without saying and comes quite naturally, and producers as well as publishers always have just this aim in mind.

In connection with the exploitation of magnetic tapes the "national" orientation comes to the fore. And here comes the cooperation I have just been talking about to its advantage for the national centers, because by having made a contribution to the production of the data base they have "earned" themselves some rights to the data base for the users within their own country.

The international networks for information distribution - or for electronic information distribution - , which come into being at an almost worrying speed at the moment, encourage the information exchange beyond frontiers, and have already a typical character of international orientation. There are, however, some problems for the cooperating partners described above, problems which are not to be found in the network itself, but partially in the conditions of the network operators and of the hosts. I very much hope that good solutions can be found in the future.

III. Conclusions

The problems in connection with the establishment of a national information system with international orientation have been very appropriately summarized by M.E. Williams (12):
"The major data base problems are not technical ones. They are legal, political and psychological and are associated with a lack of national leadership, cooperative resource sharing, network arrangements, competition, marketing, copyright, standards and continued economic viability".

To me, the information systems I have been talking about, all carry in them aspects - different ones - of solution, if cooperation as we discuss here respects the following criteria:

- aiming at completeness, in particular as far as nonconventional literature, data and facts are concerned
- avoiding duplication of work, which means saving costs
- increasing timeliness
- trying for a balanced exchange of information
- securing the national interest or the territorial rights in data bases.

There is also proof that quality and quantity of such systems very strongly depend on the prestige and initiative of the "producer". If these criteria are fulfilled, then these systems are a genuine alternative to international systems which will be dealt with in the next paper.

International systems have advantages, because they contain the information exchange between Eastern and Western countries, and because they involve the developing countries very much in the information scene. It is to their disadvantage that the influence they have on persuading member countries to meet the obligations resulting from partnership in such systems is only very moderate.
If the national information systems with international orientation were to incorporate the developing countries more into their activities, I would have difficulties to decide between the two alternatives. In my case, the thing that would tip the scales would then probably be the subject area, the field of science, the information system would have to be effective in.

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USE OF EXTERNAL INFORMATION SERVICES*

by

Tom Norton

Deputy Chief Librarian
Royal Aircraft Establishment,
Farnborough, Hampshire, England

SUMMARY

This paper examines some of the external information services which would be of use to a defence-aerospace organisation in the UK. Sources for reports literature, serial publications, translations, and conference proceedings, are discussed and differences between the various sources are examined. Attempts to improve the detection, identification and collection of non-conventional or 'grey' literature are described. Organisations and systems mentioned are the British Library Lending Division (BLLD), Technology Reports Centre (TRC), the Defence Research Information Centre (DRIC), the Ministry of Defence (MOD) Library Network, Aslib, *World Transindex* and the System for Information on Grey Literature in Europe (SIGLE).

Reasons for continuing to subscribe to printed indexes and abstracts covering fields of major importance to an organization, even when online equivalents are available, are discussed and finally, the importance of informal contacts (the 'old boy' network) in making effective use of external information services is emphasised.

INTRODUCTION

1 I am very pleased to see that, thanks to Monsieur Devoge, poetry finds an honourable mention at an AGARD TIP Conference[1]. I cannot follow his example, but perhaps a quotation from a sermon would be an uplifting way to start this paper. Nearly 400 years ago John Donne wrote that "no man is an island entire of itself"[2] and these words are an appropriate text for my paper today. No library or information centre can be completely self-sufficient and must rely to a greater or lesser extent on gaining access to the information resources of other organisations. It is not my intention to attempt an exhaustive listing of possible external information services, but to focus on a few major ones which a defence-aerospace scientific and technical library might use. My approach is to examine the kinds of material and services which such a library needs, where they can be obtained and the thinking behind the selection of a particular source. By way of illustration, I shall be drawing my examples largely from the UK.

REPORTS LITERATURE

2 Introduction

Scientific and technical reports are of course of major significance in our field and Peter Auger has opined that the history of reports literature coincides almost entirely with the development of aeronautics and the aircraft industry[3]. The libraries of the Atomic Weapons Research Establishment (AWRE) and the Royal Aircraft Establishment (RAE) have substantial collections of approximately half a million documents, but these satisfy only a modest proportion of the overall demand in these establishments for report literature. External sources need to be drawn on to supplement in-house collections.

3 British Library Lending Division (BLLD)

I imagine that most of you will be aware of the principal services which the BLLD provides. The BLLD has substantial holdings in all categories of material which are of interest to defence-aerospace libraries. The reports collection (mostly in microform) is the most comprehensive in the world and consists of over 1.75 million items and increases at the rate of 120000 items a year[4]. The BLLD attempts to collect all unrestricted British reports from government organisations, industry, universities and learned institutions and these are listed in the monthly *British Reports, Translations and Theses* (BRTT, formerly *BLLD Announcement Bulletin*). In addition, all unrestricted reports issued by the principal US agencies, for example, NTIS, NASA, the US Department of Energy (the former USAEC and ERDA), and the RAND Corporation are received. John Chillag has produced a detailed checklist of the major reports series received at the BLLD[5]. The BLLD casts its acquisition net widely and draws in reports from all over the world including the publications of such organisations as the Institut Sejsmologii, Taskent, the Thai Atomic Energy Commission and the Centro Brasileiro de Pesquisas Fisicas. I shall return to the BLLD and its services later.

4 Technology Reports Centre (TRC)

TRC is the UK Department of Industry's research and technical information centre which processes and makes available to industry and research centres, exploitable and

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* *Revised version, December 1980*

unpublished research and development reports arising from UK government programmes and those of overseas governments. TRC holds most of the unrestricted reports produced in government research establishments and the holdings are especially strong in aeronautics, electronics, materials technology, and mechanical, electrical and industrial engineering. Reports are announced in the fortnightly *R & T Abstracts*. There is a considerable overlap with the BLLD in the holdings of certain reports series such as MTIS (AD, PB series and NASA (N Series). TRC has recently examined its priorities and, in concert with BLLD, has rationalised its reports holdings. TRC's principal role is the encouragement of innovation in industry and for this purpose recent reports tend to be the most useful. Therefore, as from 1 October 1979, TRC holds only five complete years of reports plus the current year. Older reports have been sent to the BLLD. TRC now has more time to concentrate on difficult items and to help libraries with bibliographical checking. This last point is particularly important. The BLLD receives up to 17000 requests a day and to make sure of a quick response it is essential that documents are correctly identified and can be found if the BLLD has them. There is very limited capacity at BLLD for bibliographical checking and experience has shown that if the requesting library submits insufficient or incorrect details, then there can be considerable delay in supplying requested items.

5 Defence Research Information Centre (DRIC)

Both BLLD and TRC deal only with unrestricted reports. For documents which have security classifications or other limitations on their distribution, then DRIC is the central organisation in the UK Ministry of Defence (MOD) for their processing and distribution. DRIC has a collection of over one million documents which consists principally of unpublished research and development, evaluation and trials reports, and foreign military specifications and standards. Apart from supplying reports on loan or retention in response to specific requests, DRIC acts positively by selectively distributing new reports in accordance with the known interests of the various defence-aerospace establishments.

SERIAL PUBLICATIONS

6 BLLD

As with reports, the BLLD is the major central repository for serial publications in the UK with 145000 titles. The 54000 serials currently acquired[6] are listed in the publication *Current Serials Received*. The *Keyword Index to Serial Titles (KIST)* derived like the *Current Serials Received* from computer records of BLLD holdings, and published in microfiche form, lists all serials, alive and dead, held by the BLLD. This has recently been put on sale and with its regular updating is a most useful key to this particular treasure house. The services of BLLD are available outside the UK and in 1979/80 there were over half a million overseas requests, representing 19% of total demand on the service. Nearly all these requests were for photocopies and the principal requesters were the USA (16%) and France (12%). By March 1980 the number of users of the international services had reached 3836, from 120 different countries[7].

7 A central loans collection

Before the BLLD and its predecessor the National Lending Library for Science and Technology (NLLST) was established, interlending was based on cooperation between existing libraries with access via union catalogues. Satisfaction rates were low and supply times lengthy. This approach can be successful with relatively limited demands on the service, but for mass interlending, something better was needed. The solution was the building up of a single source of supply and at the time this was a unique concept. The success rate - 84% of valid requests supplied from stock with a further 9% from back-up libraries - clearly vindicates this approach. The stock was originally heavily biased towards science and technology but the BLLD now has a comprehensive acquisition policy which excludes only foreign language books in advance of demand, fiction and non-book materials. A study of the origins of the BLLD/NLLST is interesting and instructive[8]. An alternative to a single source would be to concentrate demand on a few major libraries specially funded to acquire the necessary material and to provide a fast, efficient service. This and other possible interlending systems for developed and developing countries are examined in a recent issue of *Interlending Review*[9].

8 Ministry of Defence (MOD) library network

Although BLLD service is excellent by any standards, the rising cost of request forms and postal delays have obliged MOD libraries to exploit their existing resources to better effect. It has long been apparent that a high proportion of serial/photocopy requests could be successfully met from the existing stocks of the various libraries in MOD. Fig 1 shows the main outlines of the MOD library network, but it does not adequately reveal the depth and diversity of, for example, the 20 principal research and development establishment libraries in the Procurement Executive. The network is heavily used for serial loans and a union list of the holdings of each library is the essential basis for this. Systems based on union catalogues can become inefficient as they grow in size and mainly for this reason, participation is limited to MOD libraries. There was a danger that too many requests would be sent to the largest libraries in the system (AWRE and RAE) and they would become overloaded. By agreement, requests for serials are sent to the first-named library in the locations listed against each serial title.

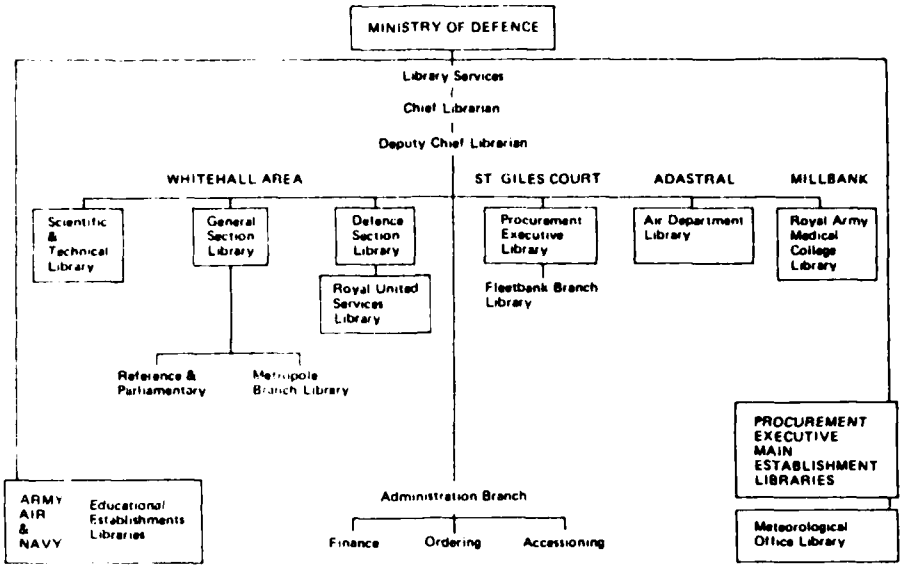

Fig 1 Ministry of Defence library network[10]

[illegible]

[illegible]

It has been estimated that something like 50% of the world's scientific and technical literature is published in languages other than English and this proportion is growing with increasing prosperity and national awareness amongst non-English-speaking communities. Clearly, therefore, it is important for defence-aerospace organisations to pay attention to material in foreign languages.

In-house translating

Many libraries have a consistent demand for translations and it is worth their while to employ one or more staff translators. The advantage of having a staff translator is that he is on the spot to translate an urgent telex message or to give advice on the content of an article so that a researcher can decide whether a full translation is needed. ERIC, AWRE and RAE have staff translators. RAE has had its own translation service since 1946 with a full-time professional translator who coordinates the work of a panel of free-lance translators having specialist subject knowledge. Over 5000 translations have been published and made widely available through DRIC, TRC and BLLD.

Aslib Index

In-house translation is expensive and it is essential to avoid costly duplication of translation effort. Before a translation is commissioned, therefore, it is necessary to check to see whether one has already been done. The 'Aslib Index of Unpublished Translations' is an important source for such checking. The Index is a card index of some half million entries and gives the name of an organisation which holds a particular translation. Most of the information is compiled from lists supplied by over 400 organisations in the UK and abroad. Included are most of the translations entered in the British Library Lending Division Translations Index and some American translations deposited at the National Translations Center (NTC) in Chicago. The Index also notes intention to translate and a record of inquiries is kept so that if more than one organisation is interested in a particular item, there is the possibility of cooperation to prevent duplication of translation effort.

British Library Lending Division Translations Index and Translating Activities

BLLD's stock of translations, gathered from numerous sources such as NTC, consists of well over half a million items with an annual intake of 15000 [illegible]. The advantage of using the BLLD service is that each request is thoroughly checked to see if a translation already exists, and if it does not an informative abstract in English is supplied, if available. The BLLD will also commission translations of items when requested, in summary or in full. It has published jointly with the International Translations Centre a list of Journals in Translation. The BLLD is also sponsoring the cover-to-cover translation of a number of mainly Soviet scientific journals. *All* the translations from British sources received at BLLD appear in BRTT.

13 World Transindex

World Transinder is a machine-readable file of translation announcements collected by the International Translation Centre, the Commission of the European Communities and the Centre National de la Recherche Scientifique. It announces translations in all fields of science and technology from East European and Asiatic languages into Western languages. Translations from Western languages into French are also announced. The file can be searched online through ESA/IRS and covers 1978 to the present.

14 Use of sources

I have discussed very briefly the major sources for checking on translations in the U.K. I have omitted a number of topics which are comprehensively dealt with in a special issue of *Aslib Proceedings* entirely devoted to translations matters[13]. Efficient use of the above mentioned sources is a matter of judgment and experience. Organisations with online access to ESA/IRS can quickly eliminate *World Transindex* from their inquiries. Aslib can be telephoned but BLLD must be contacted by telex or the post. BLLD does however rigorously check all requests. Apart from these major sources, the experienced translations' hunter will also have developed a network of contacts among fellow translators in other organisations and the inspired use of such sources can often resolve a problem far more quickly than the official channels.

CONFERENCE PROCEEDINGS

1 Introduction

Conference proceedings are a growing and important specialised source of information which can be difficult to identify and acquire. Many papers given at conferences are never published in full, either because no proceedings are published, or the organisers feel that discussion at the conference would be inhibited if the paper and discussion were to be published. Another possible reason is that the author of the paper does not submit it for publication to any journal. In this way valuable information is being continually lost. Fortunately, strenuous efforts are being made to identify, acquire and circulate as much as possible of this important form of communication.

2 BLLD

The BLLD has one of the most comprehensive collections in the world of published proceedings of conferences, symposia, seminars, workshops etc. Great efforts are made to identify, acquire and index all proceedings irrespective of subject, language and place of publication, whether they appear as a regular series, one-off publications, separate papers or parts or supplements of original journals or monographs. The collection at present amounts to 50 titles held with an annual intake of 14000[14]. Conferences are listed by keywords and phrases in the monthly *Index of Conferences and Meetings received* which cumulates into an annual volume. There is a 10 year cumulation for 1968-1977 and a 5 year cumulation for 1974-1978. The whole database can be accessed from a computer terminal through the British Library's BLAISE system. Users of BLAISE, who are also registered users of the Lending Division, will be able to make subject copyright - an Automatic Document Request Service (ADRS). It is essential, however, that advance arrangements are made with the Lending Division before requesting the ADRS. Further details of the extent of BLLD's activities in proceedings literature are given in John Philip's paper[14].

3 Non-BLLD literature

Grey literature

Reports, translations and conference proceedings which are not issued through the normal commercial publishing channels and which can therefore be difficult to access, are known as "non-conventional literature" or "grey literature". Other types of publication which fall into this category are theses, official documents issued in limited numbers (for example, UK government department publications not issued through Her Majesty's Stationery Office) and these categories of material are acquired by the BLLD and listed in its ERIC - and technical recommendations or standards (BSI, for example, produces several such series). There is a growing trend for producers of scientific and technical literature to publish these papers in the form of grey literature. The main reason is that this type of publication is easier, faster and cheaper; it allows the original author supervise the delivery (important where security considerations are involved) and to keep in direct contact with the interested users. These advantages are not without problems which potential users have in detecting, identifying and acquiring such literature.

Other sources

[illegible] many cases, non-conventional literature is difficult to acquire with [illegible] of information in this literature is known [illegible] from experience. Apart from the BLLD and [illegible] from the BLLD, the British Standards Institution - [illegible] (BSI), the German [illegible] (DIN), the Belgian [illegible] (IBN), the Swedish [illegible] (SIS), the Japanese [illegible] (JSA), the Canadian [illegible] (SCC), the Australian [illegible] (SAA), the Netherlands [illegible] (NNI), the Italian [illegible] (UNI), the Swiss [illegible] (SNV), the Danish [illegible] (DS), the Finnish [illegible] (SFS), the Norwegian [illegible] (NSF), the Irish [illegible] (IIRS), the Belgian [illegible] (IBN), the Spanish [illegible] (IRANOR), the Portuguese [illegible] (IPQ), the Israeli [illegible] (SII), the Greek [illegible] (ELOT), the Austrian [illegible] (ON), the Indian [illegible] (ISI), the Pakistan [illegible] (PSI), the Brazilian [illegible] (ABNT), the Mexican [illegible] (DGN), the Argentinian [illegible] (IRAM), the Cuban [illegible] (NC), the Hungarian [illegible] (MSZH), the Polish [illegible] (PKN), the Czechoslovakian [illegible] (CSN), the Romanian [illegible] (IRS), the Bulgarian [illegible] (BDS), the Russian [illegible] (GOST), the Chinese [illegible] (CSBTS), the Korean [illegible] (KBSI), the Taiwanese [illegible] (BSMI), the Turkish [illegible] (TSE), the Egyptian [illegible] (EOS), the Nigerian [illegible] (SON), the Ghanaian [illegible] (GSB), the Kenyan [illegible] (KBS), the Tanzanian [illegible] (TBS), the Zambian [illegible] (ZBS), the Zimbabwean [illegible] (SAZ), the Malawian [illegible] (MBS), the Ugandan [illegible] (UNBS), the Sudanese [illegible] (SSMO), the Ethiopian [illegible] (ESI), the Somalian [illegible] (SSI), the Libyan [illegible] (LNCSM), the Tunisian [illegible] (INNORPI), the Algerian [illegible] (INAPI), the Moroccan [illegible] (SNIMA), the Iranian [illegible] (ISIRI), the Iraqi [illegible] (COSQC), the Syrian [illegible] (SASMO), the Jordanian [illegible] (JSMO), the Lebanese [illegible] (LIBNOR), the Saudi Arabian [illegible] (SASO), the Kuwaiti [illegible] (KOWSMO), the Bahrain [illegible] (BSMO), the Qatar [illegible] (QSMO), the United Arab Emirates [illegible] (ESMO), the Omani [illegible] (OSMO), the Yemen [illegible] (YSMO), the Singapore [illegible] (SISIR), the Malaysian [illegible] (SIRIM), the Indonesian [illegible] (LIPI), the Philippines [illegible] (PCSTD), the Thai [illegible] (TISI), the Vietnamese [illegible] (TCVN), the Burmese [illegible] (BSI), the Sri Lankan [illegible] (SLSI), the Nepalese [illegible] (NBSI), the Bangladesh [illegible] (BSTI), the Afghanistan [illegible] (ASI), the Iceland [illegible] (IST), the Luxembourg [illegible] (SEE), the Liechtenstein [illegible] (SNV), the Monaco [illegible] (SEE), the Andorra [illegible] (SEE), the San Marino [illegible] (SEE), the Vatican [illegible] (SEE), the Malta [illegible] (MSA), the Cyprus [illegible] (CYS), the Fiji [illegible] (FSB), the Papua New Guinea [illegible] (PNGSB), the New Zealand [illegible] (SANZ), the Australian [illegible] (SAA), the Canadian [illegible] (SCC), the United States [illegible] (ANSI), the Mexican [illegible] (DGN), the Cuban [illegible] (NC), the Jamaican [illegible] (JBS), the Trinidad and Tobago [illegible] (TTBS), the Barbados [illegible] (BNSI), the Guyana [illegible] (GNBS), the Suriname [illegible] (SSB), the Netherlands Antilles [illegible] (NNI), the Aruba [illegible] (SEE), the Curaçao [illegible] (SEE), the Sint Maarten [illegible] (SEE), the Saba [illegible] (SEE), the Sint Eustatius [illegible] (SEE), the Bonaire [illegible] (SEE), the Venezuelan [illegible] (COVENIN), the Colombian [illegible] (ICONTEC), the Ecuadorian [illegible] (INEN), the Peruvian [illegible] (ITINTEC), the Bolivian [illegible] (IBNORCA), the Paraguayan [illegible] (INTN), the Uruguayan [illegible] (UNIT), the Chilean [illegible] (INN), the Argentinian [illegible] (IRAM), the Brazilian [illegible] (ABNT), the Guyanese [illegible] (GNBS), the Surinamese [illegible] (SSB), the Falkland Islands [illegible] (SEE), the South Georgia [illegible] (SEE), the South Sandwich Islands [illegible] (SEE), the British Antarctic Territory [illegible] (SEE), the British Indian Ocean Territory [illegible] (SEE), the Pitcairn Islands [illegible] (SEE), the Saint Helena [illegible] (SEE), the Ascension [illegible] (SEE), the Tristan da Cunha [illegible] (SEE), the Gough Island [illegible] (SEE), the Inaccessible Island [illegible] (SEE), the Nightingale Islands [illegible] (SEE), the Middle Island [illegible] (SEE), the Stoltenhoff Island [illegible] (SEE), the Falkland Islands Dependencies [illegible] (SEE), the Graham Land [illegible] (SEE), the South Shetland Islands [illegible] (SEE), the South Orkney Islands [illegible] (SEE), the Coats Land [illegible] (SEE), the Queen Maud Land [illegible] (SEE), the Enderby Land [illegible] (SEE), the Kemp Land [illegible] (SEE), the Mac.Robertson Land [illegible] (SEE), the Princess Elizabeth Land [illegible] (SEE), the Ingrid Christensen Land [illegible] (SEE), the Queen Mary Land [illegible] (SEE), the Wilkes Land [illegible] (SEE), the Adélie Land [illegible] (SEE), the George V Land [illegible] (SEE), the Oates Land [illegible] (SEE), the Victoria Land [illegible] (SEE), the Ross Dependency [illegible] (SEE), the Marie Byrd Land [illegible] (SEE), the Ellsworth Land [illegible] (SEE), the Antarctic Peninsula [illegible] (SEE), the Bouvet Island [illegible] (SEE), the Peter I Island [illegible] (SEE), the Queen Maud Land [illegible] (SEE), the Prince Edward Islands [illegible] (SEE), the Crozet Islands [illegible] (SEE), the Kerguelen Islands [illegible] (SEE), the Heard Island [illegible] (SEE), the McDonald Islands [illegible] (SEE), the Amsterdam Island [illegible] (SEE), the Saint Paul Island [illegible] (SEE), the Adélie Land [illegible] (SEE), the George V Land [illegible] (SEE), the Oates Land [illegible] (SEE), the Victoria Land [illegible] (SEE), the Ross Dependency [illegible] (SEE), the Marie Byrd Land [illegible] (SEE), the Ellsworth Land [illegible] (SEE), the Antarctic Peninsula [illegible] (SEE), the Bouvet Island [illegible] (SEE), the Peter I Island [illegible] (SEE), the Queen Maud Land [illegible] (SEE), the Prince Edward Islands [illegible] (SEE), the Crozet Islands [illegible] (SEE), the Kerguelen Islands [illegible] (SEE), the Heard Island [illegible] (SEE), the McDonald Islands [illegible] (SEE), the Amsterdam Island [illegible] (SEE), the Saint Paul Island [illegible] (SEE).

- to improve the detection, identification and collection of grey literature items in each EEC country;
- to perform a document delivery service for each item recorded by the system;
- to set up a European grey literature bibliographical data-base which could be available through Euronet/DIANE and to publish a grey literature index.

SIGLE will therefore be a valuable complement to existing Euronet/DIANE services because it fills a gap which has hitherto been a weak point in present data bases: the detection and accessibility of non-conventional literature.

ONLINE SERVICES

1. Introduction

Brian Kingsmill has given an admirably clear and succinct amount of the fundamentals of online searching in his paper[1]. I want to focus on one particular aspect of the subject which is in line with my brief to examine the thinking behind the choice of external information services.

2. Print vs online

It is sometimes asserted that access to online services means that printed indexes and abstracts need not be kept. This is certainly true where only occasional reference is needed to particular indexes. But it is inconceivable that a defence-aerospace organisation with access to the NASA database would consider dispensing with the printed *Scientific and Technical Aerospace Reports* (STAR) or *International Aerospace Abstracts* (IAA). Printed indexes and abstracts are more appropriate than online for certain purposes. Or, to put it another way, online must be put in its place as simply another weapon (albeit a powerful one) in the total information armoury. Librarians frequently make this point but it is all the more impressive to gain support from Eugene Garfield, Chairman and President of the Institute for Scientific Information and one of the major database producers. (I was tempted to write "high priest of information technology" but apart from being a deplorable cliche, the theological reference in this paper is quite sufficient.) In a guest editorial in a recent issue of *Database*[2], Dr Garfield makes a number of telling points about the relative merits of print and online sources. In spite of the low cost and appropriateness of online in particular instances, it is still an immature technology which can only be used properly by trained searchers. Online enthusiasts therefore, have no right to deprive library users of printed indexes which have the following benefits:

- useful for working out effective search strategies before going online;
- always available for library users to do quick searches and to browse on their own initiative;
- superior in display features over online technology;
- enables the user to say it openly how little he knows.

This last point is particularly important. Research has repeatedly shown that some users feel inhibited in a library and librarians do not always appreciate the vulnerability of the inquirer in which the inquirer finds himself and may be unwilling to admit his ignorance to the librarian, especially if he is uncertain about its extent. Using a printed index helps him to gain some of that uncertainty privately before he approaches the librarian with a more specific request for information. An additional reason for keeping printed indexes is that there is no point in [illegible] article that their cancellation could drive up the price of the remaining print-only subscribers.

3. [illegible]

3.1 [illegible]

[illegible] with what is perhaps the key to the success[illegible] services. Just as [illegible] have their invisible [illegible] and invisible networks of information between themselves, [illegible] have their [illegible] network. As an aside, I made [illegible] of this phrase in various European languages but [illegible] "grapevine" in French struck me as the most vivid, the literal translation being "la vigne rouge" and the German "Buschtrommel". [illegible] the importance of the [illegible] is particularly [illegible].

3.2 [illegible]

[illegible] will [illegible] develop their own personal network [illegible].

informal contact can be made at conferences and professional gatherings. In the UK government library service there are organisations such as the Circle of State Librarians, membership of which is open to anyone who works in a government library or information centre. Within the Ministry of Defence there are such groups as the Society of Ministry of Defence Librarians, the Procurement Executive Heads of Libraries Committee, the Technical Information Officers Coordinating Committee and specialist committees like the Computer Applications Working Group. Apart from exchanging information and discussing problems of mutual interest at meetings, librarians can develop friendships and lay the foundations for informal cooperation. The essence of this process is not easily captured, documented and reduced to a formula or a set of principles, since it is intangible and depends largely on individual initiative, drive and enthusiasm. I am convinced that these personal qualities are at the heart of successful use and development of information services, be they in-house or external.

Acknowledgment

I wish to acknowledge the generous help given by John Chillag of the BLLD in preparing this paper. Interpretations of BLLD policy and any inaccuracies are my own responsibility.

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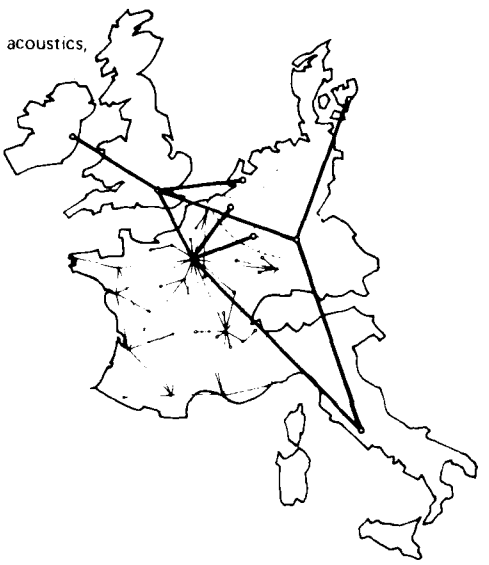
ARIANE

BUILDING DATA BANK

by
Jean DEVOGE
Chef du Service ARIANE - Attaché de Direction
Centre d'Assistance Technique et de Documentation
Institut Technique du Bâtiment et des Travaux Public
Fédération Nationale du Bâtiment
9, rue La Pérouse
75784 Paris Cedex 16
France

ARIANE data bank has been computerized since 1972 : it collects all information required by the building professionals (i.e. engineers, works foremen, architects, ..) and covers the following fields :

- **Building technology and tools :**
  construction techniques (concrete, wood, metal), thermal insulation, acoustics, water-proofness, equipments, materials, ...
- **Technical regulations concerning building :**
  all the texts in force ruling the art of building in France.
- **Building products :**
  10 500 manufacturers, 100 000 trade marks, 3 200 families of products.



600 MILLION CHARACTERS ON LINE,

WEEKLY UPDATING

Available thanks to the interactive mode through

- **TRANSPAC network**
- **EURONET network**

More than twenty years ago, the "Fédération Nationale du Bâtiment", in France, anxious to answer the technical needs of its members, created a service called "Service de Renseignement Technique par téléphone" (which means Technical Information Service by phone). This service first worked some hours, then eight hours per day ; the use of files was quite obviously manual.

The principle was and still remains the following : the building professionals ask their questions and the aim of the staff belonging to the "Service de Renseignement Technique" by phone is to answer these questions which concern the fields of building technique, technical regulation of building, as well as the technico-commercial field, immediately and in a pratical way.

The service which was first available eight hours a day was later opened around the clock, thanks to the setting of a phone answerer which records the questions asked outside the working hours.

At the end of the sixties, two problems occurred at the same time : the problem of the inquiry volume and especially the problem of the documentation management which was of basic necessity to answer the questions asked on technical, regulation or technico-commercial subjects.

ANSWERING PRACTICAL PROBLEMS

In fact, when the building professionals, whether they are site men or design office men, have to solve a problem, what they always want is practical answers that meet the problem they have to solve immediately.

To that purpose, it is necessary to have a well trained staff, working like phone operators who would have not only the mission to take in charge a phone call and to direct it on

a phone extension, but also that of taking in charge a technical, regulation or technico-commercial question. This team must be able to discover the very question or the very concern of the phone-caller, throug a very punctual question.

Influence of the cost of the phone communication linked to the distance of the answer centre

Moreover, at the end of the sixties again, the problem of the phone communications occurred (because we had chosen to answer by phone only) as well as the question of their cost. Our "Service de Renseignement", though national, was in fact available to one region only : the Paris area - the Provinces beeing penalized by the higher cost of the phone communications.

Therefore, the Provinces wished to obtain a service equivalent to that available in the Paris area.

About a prolific documentation

On the other hand, the proliferation of the documentation we had to manage for the technical paper files, the regulation paper files, the technico-commercial paper files concerning the manufacturers, the trademarks and the building products, oblige us to consider another technique.

DATA PROCESSING PERSPECTIVES

The end of the sixties saw the birth of the dataprocessing linked with the telecommunications and with what was later called "Telematics" (U.S word : compunication). For us, the intensive use of a manual file soon made the use of it awkward and then impossible, and that occurred in the first hours of a working day - when each member of the team had searched the elements necessary to the answers meeting the questions asked.

It was therefore necessary to find another system which, allowing access to whole or part of the information, would not involve a degradation of the tool : the File. We had to overcome the hindrances coming from the management heaviness : the manifold index copies, coding copies and other difficulties on every part of the fiches constituting the file.

It is the reason why, in 1968, the management of the "Centre d'Assistance Technique et de Documentation (CATED) studied the opportunity of using the data-processing to answer the aims and preoccupations of its "Service de Renseignement" by phone.

The decision was taken within the Board of the "Fédération Nationale du Bâtiment", in France, to study the possibilities of a computerized processing applied to the data owned by CATED.

What was then available ?

It would have been interesting to acquire a computerized system applied to information management if there had been one on the market. Now, on one hand, at that time, the systems so-called of automatised documentation were stammering ; on the other hand, they worked only under the batch processing mode. For a technical information service by phone which had reached the aim of answering 2 questions out of 3 without interrupting the phone call, and therefore of giving an almost immediate answer to the correspondent, it was out of question that the passing on to data processing should oblige us to answer our callers : "Sory, but our data processing system does not enable us to answer to-day". At this stage, it would not have beenan improvement but a degradation of the service. It was therefore necessary to consider a system in which the response-times would fit in within the duration of a normal phone call. Such was not the case of automatic documentation systems. Besides, our study showed us that the automatic documentation systems used the same tools for indexing and inquiring (the use of descriptors, thesauri and Boolean operators). The cost of the treatment of punctual questions (information retrieval) requiring considerable file handlings, was becoming too high because of the inverted files treatment, these files having considerable populations.

In fact, let us take the example of the loading and unloading for a lorry on a building site. If in some cases, it is actually necessary to load the lorry with the help of the workers' shovels, on the contrary, it may not be absolutely necessary to use the same method for the unloading, if you have a tip-lorry at your disposal.

How to differenciate indexing tools and inquiring tools

Our processin defining the system has led us to differenciate the data imput tools and the data retrieval tools. The main point, in a data bank system, is the answer you can get by questionning the system within the shortest time allowed and with the best reliability.

Starting from these ideas, we have created and defined the specifications of what we call the ARIANE data bank which deals with building data for France, at the present time.

THE SPIRIT OF ARIANE

The intellectual process that led us to define the system was strongly marked by two preoccupations :
- providing the user who takes in charge the question of our caller with an information for direct use and through associated ideas.
- giving the user who has taken up a question at a raw and rough stage the possibility to recenter the problem, as we say.

If we question a colleague, an SVP service, a documentation centre or an information centre, it is quite obviously because we have not been able to solve the problem under consideration ourselves ; and sometimes it is so much like a blind alley that we cannot engage the reverse gear that would enable us to recover the real initial problem.

What we had to create was a data management system allowing the out-put of the data necessary to all the CATED activities :
- the main tool of the "Service de Renseignement Technique" by phone,
- allowing its decentralization towards the various French Provinces as well, to as to provide the building professionals in the Provinces with the same service and information as the Paris ones.

How the data bank was achieved

The work master was quite obviously the "Fédération Nationale du Bâtiment". The latter entrusted two organizations with the achievement of the project :
- CATED (Centre d'Assistance Technique et de Documentation) with all that concerned the methodology of data-processing.
- CIAC (Centre d'Informatique Appliquée à la Construction) with all that concerned the writing of required softwares.

The co-operation of the two organizations permitted the running of service of ARIANE data bank in August 1972, followed by its official inauguration, 14th December 1972.

WHAT IS MEANT UNDER THE WORDING OF ARIANE

Under the wording ARIANE several meanings are to be understood :
- on one hand a data bank specialized for building information,
- on the other hand a general software for the management of information,

at present, ARIANE is only concerned with building data. It must be taken into account that technical data, regulation data and technico-commercial data for building cover field of over 70 trades ranging from the plumber to the concreter, from thermal insulation with acoustic correcting, through concrete setting, or the ways and means of putting in electricity in a building, etc....

Such information management software allows the treatment and dealing of information of all kinds. The first conclusive experiment is the one made in the field of building works and techniques.

We have conducted designs and experiments in various other fields :
- medical information (in particular for an anti-poison centre in France). The problem was to find how a doctor questionning the anti-poison center could get the required toxicological information and ways of intervention.
- agriculture : management and Research plans under study.
- export : management of the inforamtion concerning export firms, their needs and the performed work.
- tourism : general information, planning of a tour, detailed information about a specific tour.
- special informations about some firms.

The treatment of specific data has proved that our software was able to answer all the needs of information management under the data bank form.

APPLICATION TO BUILDING, ITS EVOLUTION, CHOICES MADE

We first put on line about 90 000 information titles as well as 90 000 information units, representing as a whole a storage capacity on magnetic discs of 25 million characters or so - in 1972. At present, in 1980, we have reached 120 000 information titles and around 120 000 information units as well, representing as a whole 350 million characters directly available on line. They are perfected by 250 million characters concerning the texts of primary documents without beeing at all obliged to record them on magnetic carriers, for the following reasons :
- these texts do not require up-dating within their own body (it is the case for most of the regulation texts)
- their digitalisation cost is too high

Such is the case particularly with rough sketches, diagrams, plans, drawings and photos.

We have therefore chosen, for the whole of those texts, not to put them on magnetic memory, but to take photos of them to turn them into microfiches, and to address them by system itself. It is quite obvious that, if you do not adress the texts, the whole of them becomes unexploitable. Moreover, the microfiche carrier bears the enormous advantage allowing the broadcasting of the primary documents under a very small volume towards any user of the data bank. We thus provide the "end user" on one hand with the intellectual process that gives access to the relevant information he needs, and on the other hand with access to the primary document - which is very seldom provided by the documentary systems.

ARIANE data bank prospects, in 1980

What are the prospects, in 1980 ?
For more than eight years, this data bank has gradually become the main tool of the regional outposts of the CATED technical information services in the main provincial cities. Lille, Strasbourg Toulouse, Lyon, Nantes and Marseille welcome the setting-up of CATED agencies with a computer terminal as main tool, connected through the data telecommunication networks and used first by an engineer alone then by an engineer and a technician. These agencies thus answer the needs of the building professionals in every Province.

Such planting, which took place between 1973 and 1976, has thus enabled us to be present close to the building professionals to answer their needs.

USE OF THE DATA TRANSMISSION NETWORKS AND THEIR INFLUENCE UPON THE USE OF THE DATA BANK

We joined our Province terminals first through leased lines, then through a specialized network, called in France the CADUCEE network. For on year now, after the creation in France of the TRANSPAC network, a specialized data transmission, and the opening on 13th February 1980 of EURONET network (a European network), we have decided to become a host over these diverse networks.

Now, what is meant by a host ? It means that our computer is connected to the TRANSPAC and EURONET networks and that our data bank is available for anyone who needs information stored in our bank.

The setting up of such network undoubtedly involves several consequences. The invoicing system of those networks is absolutely different from that of the general switched network since the invoicing is no longer reckoned in terms of "distance" but in terms of "time spent" and "transmitted information volume" which is of undeniable interest for example for those who are far from the host computer. A phone call between Paris and Marseille costs about 150 French Franc per hour. Using ARIANE data bank via the TRANSPAC network, teletransmission cost is only between 12 and 15 FF per hour, according to the transmitted information volume : the result is distance is no longer a handicap. EURONET network philosophy is almost identical though with slightly higher costs because it is an international network.

WHAT TEACHING MAY BE DRAWN FROM THIS ACHIEVEMENT ?

Our decade is that of "Telematics".

Like Mr Jourdain (in Moliere's comedy) who was making prose speeches unknowingly, we have been using telematics unknowingly.

The birth of telematics in industrialized countries will put everyone there in a position to reach the most varied information sources.

Public services, as well as private firms, with legitimate care for rentability, produce the tools that will make the access to the required sources easier for the information user.

To day, the VIDEOTEX system is only at its very first stage : by introducing a TV set, a telephone set and an interface coupling the two, VIDEOTEX makes possible the connection between the latter and the networks, and thereby the host computers.

In my opinion, only the data banks will answer up-dated, directly available and accessible, for our clients will less and less be contented with bibliographical references even followed by an abstract

Such is the request, urgently expressed by our professionals, that we chose to meet. By investing the requires funds, over ten years after we first decided to create it, our data bank conceived so that it could adapt to new services such as VIDEOTEX, is still ahead of the management and data retrieval techniques for any user of telematics, which is the present form of data transmission.

And since technique cannot live without poetry, I would like to conclude with a quotation from Annie Leclerc "ARIANE, certitude si évidente et parfois méconnue, ne s'égare pas. ARIANE tient son fil, elle tient toute vie à venir. (Le mythe d'Ariane).

ARIANE

BANQUE DE DONNEES DU BATIMENT

par
Jean DEVOGE
Chef du Service ARIANE - Attaché de Direction
Centre d'Assistance Technique et de Documentation
Institut Technique du Bâtiment et des Travaux Publics
Fédération Nationale du Bâtiment
9, rue La Pérouse
75784 Paris Cedex 16
France

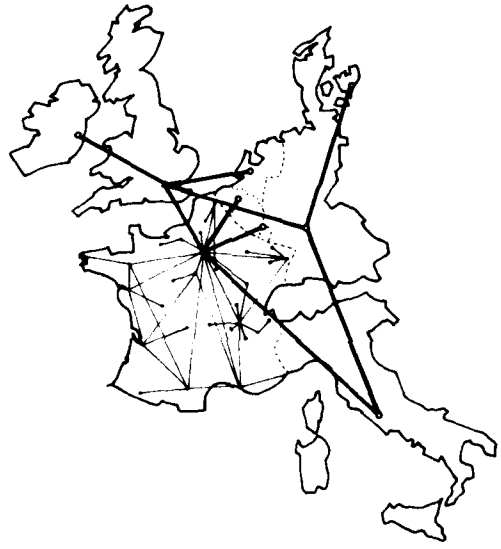
La banque de données ARIANE, informatisée depuis 1972, regroupe les informations nécessaires aux professionnels du bâtiment (ingénieurs, conducteurs de travaux, architectes, ...) dans les domaines suivants :

- **Les techniques du bâtiment :**
  technique de construction (béton, bois, métal), la thermique, l'acoustique, l'étanchéité, les matériaux, ...
- **La réglementation technique du bâtiment :**
  tous les textes applicables régissant l'art de construire en France.
- **Les produits du bâtiment :**
  10 500 fabricants, 100 000 marques, 3 200 familles de produits.

600 MILLIONS DE CARACTÈRES EN LIGNE,
MISE A JOUR HEBDOMADAIRE.

Accessible en conversationnel via :

- **réseau TRANSPAC**
- **réseau EURONET**



Il y a plus de vingt ans, la Fédération Nationale du Bâtiment, en France, soucieuse de répondre aux préocupations techniques de ses membres, a créé un Service de Renseignement Technique par téléphone. Ce service a fonctionné quelques heures par jour puis huit heures par jour ; l'utilisation des fichiers était bien évidemment manuelle.

Le principe en était et en est toujours le suivant : les professionnels du bâtiment posent leurs questions et le but de l'équipe du Service de Renseignement Technique par téléphone est de répondre, de façon pratique et immédiate à ces questions posées dans les domaines de la technique du bâtiment, de la réglementation du bâtiment ainsi que dans le domaine technico-commercial.

Au cours des années, le service, au début ouvert 8h par jour, a été ouvert 24 heures sur 24 du fait de la mise en place d'un répondeur téléphonique qui enrégistre les questions posées en dehors des heures ouvrables.

A la fin des années 60, se sont posés à la fois le problème du volume d'interrogation et surtout le problème de gestion de la documentation qui était indispensable pour la réponse aux questions posées sur des sujets techniques, réglementaires ou technico-commerciaux.

REPONSE A DES PROBLEMES PRATIQUES

Effectivement, lorsqu'un problème se pose aux professionnels du bâtiment, qu'ils soient hommes de terrain ou hommes de bureaux d'études, ils nous demandent toujours des réponses pratiques qui correspondent aux problèmes qu'ils ont à résoudre de façon immédiate.

Pour ce faire, il est nécessaire d'avoir une équipe bien entraînée fonctionnant à la manière de standardistes, mais de standardistes qui n'auraient pas uniquement la mission de prendre en compte une interpellation téléphonique et de la transmettre sur un numéro de poste, mais aussi

et surtout, celle de prendre en compte une question technique, réglementaire ou technico-commerciale. Cette équipe doit savoir découvrir, à travers une question très ponctuelle, la vraie question, la véritable préocupation de l'interlocuteur.

L'Influence du cout de la communication téléphonique liée à l'éloignement du centre répondeur

En plus, toujours à la fin de ces années 60, se posait le problème des communications téléphoniques (puisque nous avions choisi de ne répondre que par téléphone) et de leur coût. Notre Service de Renseignement, bien que national, n'était en fait ouvert qu'à une seule région : la région parisienne - la province étant pénalisée par le prix plus élevé des communications téléphoniques.

Donc, la province souhaitait obtenir un service équivalent à celui que recevait la région parisienne.

La prolifération de la documentation

D'autre part, la prolifération de la documentation que nous avions à gérer pour les dossiers techniques, les dossiers technico-commerciaux concernant les fabricants, les marques et les produits du bâtiment nous imposait d'envisager une autre technique.

LES PERSPECTIVES DE L'INFORMATIQUE

La fin des années 60 voyait l'apparition de l'informatique liée aux télécommunications et de ce qui s'est appelé plus tard la "Télématique". Pour nous, l'utilisation d'un fichier manuel de façon intensive faisait qu'il devenait très rapidement inutilisable, et ceci dans les premières heures de la journée de travail - chacun ayant cherché les éléments nécessaires aux réponses aux questions posées. Il nous fallait donc trouver un autre système qui, permettant l'accès à tout ou partie de l'information, n'entraînait pas une dégradation de l'outil : le Fichier. Il fallait nous affranchir des lourdeurs de gestion que sont : les multiples recopies d'index, de codification et autres sur chacune des parties du fichier.

C'est pourquoi, en 1968, la direction du Centre d'Assistance Technique et de Documentation (CATED) a étudié la possibilité d'utiliser l'informatique pour répondre aux objectifs et aux préocupations de son Service de Renseignement Technique par téléphone.

La décision fut prise au sein du bureau de la Fédération Nationale du Bâtiment, en France, d'étudier les possibilités de traitement informatisé des données que possédait le CATED.

Etude de l'Existant

Il était intéressant d'acquérir un système informatisé de traitement de l'information s'il se trouvait sur le marché. Or, à l'époque, les systèmes dits de "documentation automatique" balbutiaient ; d'autre part, ils fonctionnaient uniquement en temps différé (en batch processing). Pour un service de renseignement technique par téléphone qui avait atteint la performance de répondre à 2 questions sur 3 sans interrompre la communication téléphonique et donc de donner une réponse quasi immédiate au correspondant, il était hors de question que le passage sous informatique nous fasse répondre aux questionneurs : "Notre système informatique ne nous permet pas de vous répondre aujourd'hui". A ce stade, ce n'était plus un progrès mais une dégradation du service. Il fallait donc envisager un système qui ait des temps de réponse compatibles avec la durée d'une communication téléphonique. Ce n'était pas le cas des systèmes de documentation automatique. D'autre part, notre étude nous a montré que les systèmes de documentation automatique utilisent les mêmes outils pour l'indexation et l'interrogation (utilisation des descripteurs, des thésauri et des opérateurs booléens). Le coût de traitement de questions ponctuelles (recherches rétrospectives), demandant des manipulations de fichiers très importantes, devenait prohibitif du fait du traitement de fichiers inverses à populations très importantes.

En fait, prenons l'exemple du chargement et déchargement d'un camion sur un chantier de bâtiment. Si effectivement, dans certains cas, il est nécessaire de charger le camion à l'aide des pelles des ouvriers, par contre il n'est peut-être pas nécessaire d'utiliser la même méthode pour décharger si l'on dispose d'une benne basculante.

Différencier les outils d'indexation des outils d'interrogation

Notre processus de définition du système nous a amenés à différencier les outils d'introduction des données des outils de restitution des données. L'important, dans un système banque de données, c'est la réponse que l'on peut obtenir en interrogeant le système, dans le meilleur délai et avec la meilleure fiabilité.

C'est en partant de ces idées que nous avons créé et défini le cahier des charges de ce qui s'appelle la banque de données ARIANE, qui traite des données du bâtiment pour la France à l'heure actuelle.

L'ESPRIT D'ARIANE

Le processus intellectuel qui nous a amené à définir le système était fortement empreint de deux préocupations :
- fournir à l'utilisateur qui prend en compte la question de notre interlocuteur, une information directement utilisable en procédant de l'association d'idées.
- donner à cet utilisateur, ayant pris une question à l'état brut et fruste, la possibilité de "recentrer le problème" comme nous disons.

Si l'on pose une question à un collègue, un SVP, un centre de documentation, un centre d'information, c'est bien évidemment que l'on n'a pas pu ou su résoudre soi-même le problème envisagé ; souvent l'impasse est telle que l'on ne sait plus enclancher la marche arrière qui permettrait de retrouver le "vrai" problème initial.

Il fallait créer un système de gestion de données qui permette ma restitution des données nécessaires à toutes les activités du CATED :
- qui soit l'outil principal du Service de Renseignement Technique par téléphone,
- qui permette également sa décentralisation vers les différentes régions de France de façon à apporter le même service et la même information aux professionnels du bâtiment en Province qu'à Paris.

La réalisation de la Banque de Données

Le maître d'ouvrage fût bien évidemment la Fédération Nationale du Bâtiment. Elle a confié à deux organismes la réalisation du projet :
- au CATED (Centre d'Assistance Technique et de Documentation) tout ce qui concernait la méthodologie du traitement de l'information.
- au CIAC (Centre d'Informatique Appliquée à la Construction) tout ce qui concernait l'écriture des logiciels nécessaires.

La coopération de ces deux organismes a permis la mise en service de la banque de données ARIANE en août 1972, suivie de son inauguration officielle le 14 décembre 1972.

QU'ENTEND-ON SOUS LE VOCABLE ARIANE ?

Sous le vocable ARIANE, on peut retrouver plusieurs choses :
- d'une part, une banque de données traitant des données spécifiques au bâtiment,
- d'autre part, un logiciel général de gestion de l'information,

il traite à l'heure actuelle les données concernant le bâtiment. Il faut considérer que les données techniques, réglementaires ou technico-commerciales du bâtiment représentent plus de 70 professions ou domaines techniques allant du plombier au bétonnier, de l'isolation thermique avec correction acoustique en passant par la mise en oeuvre du béton, l'art et la manière de réaliser une installation électrique, etc....

Ce logiciel de traitement de l'information permet de traiter et de gérer des informations de toute nature.La première démonstration en est faite par les domaines concernant les travaux et les techniques du bâtiment.

Nous avons effectué des études et des réalisations expérimentales sur des domaines divers :
- informations médicales (en particulier pour un centre anti-poison en France). Il s'agissait de l'art et la manière de permettre à un médecin interrogeant le centre anti-poison d'obtenir les informations toxicologiques et les méthodes d'intervention.
- gestion des Projets de Recherche en Agriculture.
- gestion des informations concernant les entreprises exportatrices, leurs besoins, les chantiers réalisés.
- informations touristiques, organisation d'un programme touristique, recherche d'informations précises pour un voyage.
- informations particulières à certaines sociétés.

Le traitement de données spécifiques nous montre que ce logiciel répond à tous les besoins de traitement de l'information sous la forme de données.

L'APPLICATION BATIMENT, SON EVOLUTION, LES CHOIX

A l'origine, nous avons mis en ligne de l'ordre de 90 000 titres d'informations ainsi que 90 000 unités d'information, le tout représentant, en 1972, une capacité sur disques magnétiques de l'ordre de 25 millions de caractères. A l'heure actuelle, en 1980, nous en sommes à 120 000 titres d'informations et à peu près 120 000 unités d'information également, le tout représentant en ligne 350 millions de caractères d'information directement utilisable. Ceux-ci sont complétés par 250 millions de caractères concernant les textes des documents primaires qu'il faut pouvoir fournir sans pour autant qu'il soit nécessaire de les enrégistrer sur support magnétique pour les raisons suivantes :

- ces textes ne nécessitent pas de mise à jour dans leur corpus même (c'est le cas de la plupart des textes réglementaires),
- leur coût de digitalisation est trop élevé.
C'est le cas, en particulier, des croquis, des schémas, des plans, des dessins et des photos.

Nous avons donc choisi, pour l'ensemble de ces textes, de ne pas les mettre sur mémoire magnétique mais de les photographier sur microfiches et de les adresser par le système lui-même. Il est bien évident que si l'on ne fait pa l'adressage, l'ensemble des textes devient inutilisable. De plus, le support microfiche présente l'énorme avantage de pouvoir diffuser, sous un faible volume les documents primaires à quiconque utilise la banque de données. Nous fournissons donc à l'utilisateur final, d'une part le processus intellectuel d'accès à la bonne information dont il a besoin et d'autre part l'accès au document primaire - ce que font exceptionnellement les systèmes documentaires.

Les perspectives de la banque de données ARIANE en 80

Quelles sont les perspectives à l'heure actuelle ?
Depuis plus de 8 ans, cette banque de données est devenue l'outil principal des antennes des Services de Renseignement Technique du CATED dans les capitales régionales de France. Lille, Strasbourg, Toulouse, Lyon, Nantes et Marseille, en permettant l'implantation d'antennes du CATED avec, comme principal outil, un terminal d'ordinateur connecté par les réseaux de télétransmission de données et utilisé, en un premier temps par un ingénieur puis par un ingénieur et un technicien, répondent aux besoins des professionnels de chaque région.

Cette implantation qui s'est faite entre 1973 et 1976, nous a donc permis d'être présents auprès des professionnels du bâtiment pour répondre à leurs préocupations.

L'UTILISATION DES RESEAUX DE TELETRANSMISSION DE DONNEES ET LEUR INFLUENCE SUR L'UTILISATION DE LA BANQUE DE DONNEES

Nous avons commencé par raccorder nos terminaux de province par des lignes louées, puis par un réseau spécialisé qui s'appelle en France le réseau CADUCEE. Depuis un an, du fait de la création en France du réseau TRANSPAC, réseau spécialisé dans la télétransmission de données et de l'ouverture, le 13 février 1980, du réseau EURONET (European Network), nous avons décidé de devenir Serveur sur ces différents réseaux.

Serveur, qu'est-ce que cela veut dire ? Cela veut dire que notre ordinateur est raccordé au réseau TRANSPAC et au réseau EURONET et que notre banque de données est disponible pour quiconque a besoin des informations contenues dans notre banque.

Il est de fait que l'implantation de ces réseaux amène plusieurs choses. Le principe de facturation de ces réseaux est totalement différent de celui du réseau commuté général puisque la facturation ne se fait plus à "la distance" mais au "temps passé" et au "volume d'informations transmises" ce qui est d'un intérêt certain pour ceux qui sont éloignés de l'ordinateur serveur, par exemple. Une communication téléphonique entre Paris et Marseille coûte de l'ordre de 150 F français de l'heure. Dans l'utilisation de la banque de données ARIANE via le réseau TRANSPAC, le coût de télétransmission de données revient entre 12 et 15 F français de l'heure, selon le volume d'informations transmises si bien qu'il n'y a plus de pénalisation à la distance. La philosophie du réseau EURONET est à peu près identique, bien que les coûts soient légèrement plus élevés du fait que c'est un réseau international.

DE CETTE REALISATION, QUEL ENSEIGNEMENT FAUT-IL RETIRER ?

Cette décénie est celle de la télématique.

Comme Monsieur Jourdain qui faisait de la prose sans le savoir, nous avons utilisé la télématique sans le savoir.

La mise en service de la télématique dans les pays industrialisés va permettre à chacun d'atteindre des sources d'information de plus en plus variées.

Les services publics et les sociétés privées, par un souci bien légitime de rentabilité créent les outils qui vont simplifier l'accès de l'utilisateur d'information aux sources qui lui sont nécessaires.

Aujourd'hui, le VIDEOTEX est dans sa phase préliminaire : ce service permet, en intégrant un téléviseur, un poste téléphonique et une interface reliant les deux, de les mettre en relation avec les réseaux et par là même, avec les ordinateurs serveurs.

Seuls, à mon sens, les systèmes banques de données pourront répondre aux besoins des utilisateurs qui exigeront des informations fiables, actualisées, directement utilisables, des informations directement accessibles car nos utilisateurs se satisferont de moins en moins de références bibliographiques, même accompagnées d'un résumé.

C'est à cette demande, formulée de façon pressante par nos professionnels, que nous avons choisi de répondre. En investissant les moyens nécessaires, plus de dix ans après la décision de sa création, notre banque de données conçue pour s'adapter aux nouveaux services tels VIDEOTEXTE, est toujours à la pointe des techniques de gestion et de restitution des informations pour qui

utilise la télématique, forme actuelle de la télétransmission de données.

Comme la technique ne peut vivre sans poésie, j aimerais conclure en citant Annie Leclerc "ARIANE, certitude si évidente et parfois méconnue, ne s'égare pas. ARIANE tient son fil, elle tient toute vie à venir. (Le mythe d'Ariane).

INTRODUCTION OF ON-LINE SEARCHING IN INFORMATION SERVICES

B.A. Kingsmill
Technology Reports Centre
Orpington
Kent BR5 3RF
England

SUMMARY

The paper first examines the knowledge and techniques that need to be acquired for effective on-line searching, including operation of the terminal, command languages, system responses, how data bases are implemented, and general search strategy. It then describes the various aids available such as manuals, training courses at different levels and different degrees of specialisation, help desks and practice, and discusses how these can enable a person new to on-line to overcome some of the problems they will encounter initially. It will be seen that to maintain consistent performance a searcher will need to use on-line systems fairly regularly and this can influence the allocation of work amongst staff or perhaps make an organisation consider whether it would be better to use an external brokerage service if its anticipated use is low.

The paper then considers the question of how the searcher interacts with the end user of the information. Here another education process is required as end users will also need to be aware of the potential and limitations of on-line searching, particularly if they are expected to contribute to the cost of using it. In the light of the skills that are needed for searching, liaising and "selling" the service, the type of staff required is discussed. As there is now an increasing number of established on-line systems, many of which are offering the same data bases, consideration is also given to selection of these and the implications for user education.

1. TECHNIQUES AND KNOWLEDGE NEEDED

An increasing number of libraries and information departments serving scientists and engineers are using commercial or publicly available on-line information systems in their literature search activities. Systems such as the European Space Agency's Information Retrieval Service (IRS), Lockheed Dialog and System Development Corporation (SDC) enable users to make searches in a fraction of the time taken by traditional methods and cover a far greater range of literature than is normally held by a library. Staff using these systems need to acquire new techniques and knowledge, including:

Operation of terminal equipment
Connecting to the system
Search commands
Computer responses
Searchable features of data bases
Subject coverage of data bases
Search strategy

Operation of the terminal is usually explained by the terminal supplier. Only the most basic terminal features are needed for on-line information systems and it is not necessary for users to be fast typists. Problems may arise if terminals have special features, eg editing functions, and these should be ignored or suppressed.

Connecting to the system, "logging on", is normally a straightforward process, although if the user accesses the computer via a PTT (Post Office) network such as Euronet, it may be necessary to type accurately a string of about thirty characters to enter a password, eg:

02223077DQUESTN2349999ABCDE,

Users soon get used to this but it can be daunting at first.

Search commands. The basic set of commands on most systems enables the user to

Choose a data base
Select words and terms which represent the concepts being searched
Combine these together using Boolean logic (AND,OR,NOT) to describe the exact subject of the search
Have the references thus found typed out at the terminal
Order off-line printing of large sets of references.

The way in which these commands are expressed, and additional facilities, vary from system to system, although in some cases the command languages are practically identical.

Computer responses again vary between systems but are soon learned. Problems occur when there is a system malfunction, eg a command is altered on its way to the computer

by noise on the telephone line. Unexpected responses may result and what looked like a perfectly good command can be rejected with a message such as INVALID ARGUMENT. Usually the command will work correctly when it is typed again, but sometimes line problems can persist. Also computers occasionally go down in the middle of a search. This can all be disturbing to a new user attempting to learn how to operate the system.

Search features depend on what is included on the data base tapes supplied by the producers, and how they have been processed by the system. Since most of the bibliographic data bases correspond to a printed abstracts journal, they generally include index entries as used in the printed indexes. These may come from a controlled list or thesaurus. In many cases the tapes include additional terms which do not appear in the printed indexes. Other searchable features include classification codes, authors and author affiliation.

Subject coverage of data bases is a key factor when the user decides which to search, but the range of primary journals scanned and the number of years included are also important. Prior experience of the printed abstracts journals is valuable.

Search strategy, the effective use of commands and search features to retrieve a satisfactory set of references, is a technique that is acquired through practice and experience, rather than through detailed instruction.

2. LEARNING TO USE ON-LINE SYSTEMS

Methods and media available are:

INFORMAL INSTRUCTION

Teach yourself
By colleagues
By system suppliers

COURSES

System suppliers
Data base producers
Professional organisations
Library schools
User groups

LITERATURE

System manual
System newsletter
Work books
Data base guides
Thesauri, word lists, classification schedules
Journals
Books

OTHER

On-line tutorial displays
Audio visual
Computer-aided instruction

Many on-line users have taught themselves or learned from colleagues. System suppliers are only likely to give individual on-site instruction to potential large users, although some will run courses at users' organisations (and charge for this). Training courses are normally run by system suppliers at a central location and are set at "beginners" or "advanced" level, or they may be subject oriented.

Data base producers also run training courses. These are often in co-operation with a system supplier and concentrate on the way their data base is implemented on that system. However system-independent courses are run also. A number of professional organisations like the Association of Special Libraries and Information Bureaux (ASLIB), and academic institutions such as London University run short courses (one to three days) on the use of on-line systems. Library schools and academic departments of information science cover on-line in their degree and diploma courses although the aim here is often to give students an appreciation or background to the subject rather than train them to search.

Recently a number of on-line user groups have been formed both at local and national level and they are beginning to organise training courses which are independent of suppliers, in order to give users objective comparisons of systems.

The system manual is probably the most importart item of support literature to the user. These are often large volumes, usually in loose leaf form because of the need for frequent updating. In many cases mini-manuals and cards summarising commands are produced for quick reference. Most systems also produce a newsletter. This usually gives general news such as dates of training sessions and price increases, and also news of system changes like new commands and data bases. Sometimes important news is given as an on-line message. It can be a problem for users to keep themselves informed of all developments and maintain up to date records.

A quick way of checking system features is to use on-line tutorial displays. These explain how a particular command should be used or what features can be searched on a certain data base. However, access fees must be paid while these tutorials are viewed and they can be an expensive alternative to consulting the manual.

Most data base producers publish supporting literature which is usually system-independent. Some are comprehensive search guides such as that produced for BIOSIS which lists classification schedules, index words used and gives examples of searches (1). Other data base producers publish a variety of material including publicity handouts, thesauri or word lists, classification codes, lists of journals covered and descriptions of the tape format.

Workbooks and notes are often supplied at training courses. They may describe the essential features of systems or data bases, with search examples and exercises. Further information can be found in journals such as *Online*, *Online Review* and *Database*, and general publications on library and information science.

Audio visual aids (2) and on-line simulation have been used to a certain extent and there is probably a lot of scope for development of the latter.

3. EXPERIENCE AT TRC

At the Technology Reports Centre (TRC) we have been marketing the ESA Information Retrieval Service (IRS) in the UK (under the name of DIALTECH) for over four years. IRS has about twenty data bases on-line, mostly covering science and technology. Our training and support can be summarised as:

Manual
Newsletter
Practice
Training sessions
  Beginners
  Basics
  Follow-up
  Data base oriented
Help desk
User meetings

I have always felt that the manual should, on its own, give sufficient information for users to be able to search effectively. However, to try to cover every possible event that a user might encounter would result in a massive, probably intimidating, volume. I have tried to strike a balance between readability and total comprehensiveness. It would also be impracticable to try to describe the finer detail of all the different data bases. Instead the manual gives information on how they have been put on-line and what features can be searched, and directs users to the guides published by the data base producers (3).

Keeping the manual up to date can be difficult. When a new feature or data base is introduced there may be a time lag before the manual updates appear. Announcements in newsletters are not a very satisfactory substitute since these will usually be kept separate from the manual. Producing a manual update involves a lot of effort in the writing, printing and distribution and cannot be done at too frequent intervals.

Users of IRS, as on many systems, are given free access time to practice in the month in which they first use their password. It is surprising that many do not take full advantage of this, because practice is naturally an essential part of adapting to on-line.

It has long been realised that however comprehensive a manual may be, people new to on-line searching often welcome the idea of being introduced to it through a beginners' training course. Training courses run by TRC last one day and consist of a mixture of talks, demonstrations and practice at the terminal. The aims are to

Enable users to get a feel for operating terminals
Give them confidence in the system
Show them how to cope with problems
Explain what the system can do and its limitations
Show them how to use the facilities to run a search
Indicate the different features of the data bases.

The training is intended to give 'live' examples of the contents of the manual and not to be a substitute for reading it. Although there is a standard programme for courses, because of the wide variation in background of those attending, the contents are kept flexible. We try to encourage discussion and participation and to break down fears and embarrassment people may have when first trying to use a terminal.

The 'Basics' course lasts half a day and is aimed at people who have experience of other similar systems and only want to know the basic details of connecting, commands and search features.

Follow-up courses also last for half a day and are designed mainly for people who have been users for a few months and want to discuss or have explained any feature of the

system. The sessions are open ended. We answer the questions asked by the users and encourage general discussion. This normally leads on to other system topics and we can usually discover gaps in the users' knowledge or inderstanding and cover features as appropriate. I chose the name 'follow-up' rather than 'advanced' as there seems to be no general agreement over what should be covered by an advanced course. Some systems appear to cover the more complex search features, while other advanced courses are more subject oriented.

We also arrange courses on particular data bases. Here the course is usually run by a representative of the data base producer.

It has been our policy since the service started to run a help desk whenever the system is in operation. A qualified information scientist is always on hand to answer enquiries or sort out any problems. New users in particular are encouraged to ring the help desk when they have difficulties. We have answered enquiries on practically every aspect of the system, e.g. incorrectly set terminals, incorrectly input commands, and on occasions have examined half completed searches and offered advice when users have been unsuccessful.

Hopefully the aids described complement the users' own practice and experience and enable them to progress from beginners to efficient searchers. We try to be responsive to user needs, which we discuss at user meetings, training sessions and through informal contact. Other activities that we are considering in the future are workshops on search strategy and subject, rather than data base, oriented training sessions.

In addition users can get broader information about on-line by sharing experience both within and outside their organisations, going to lectures and conferences, membership of on-line user groups and from units such as the On-line Information Centre at Aslib, London.

4. USE OF BROKERAGE SERVICES

An alternative to the do-it-yourself approach is to use an on-line information broker, ie an external service that runs searches on behalf of clients. We have been running such a service at TRC since 1970, called TECHSEARCH. Although many of its users later get their own terminals and subscribe to DIALTECH, there is still a demand for this type of service. While using on-line is not a complex process, it should be apparent that it is necessary for the user to have a reasonably comprehensive knowledge of the systems they are using, to keep abreast of system developments and to keep in practice. Organisations intending to go on-line should therefore make sure that there will be sufficient demand for it (and allocate sufficient funds) to keep at least one member of staff in practice. Otherwise it will be more efficient to use an external broker.

5. CARRYING OUT SEARCHES - INTERACTION WITH END USERS

Once a user has, through reading the manual, training and practice, become confident in using the system, it can be offered to the potential end users of the information. Most on-line searching is done by *intermediaries*, ie librarians or information scientists rather than the R & D scientists and engineers who are the end users of the information. Although a number of research scientists have come to DIALTECH training sessions it is unlikely that their interests alone will generate sufficient searches for them to keep in practice.

The usual steps in a search are:

PRE-TERMINAL DISCUSSION

Identification of the subject
Type of search required
Expressing the subject in searchable words and terms
Choice of data bases.

AT TERMINAL

Setting up the search
Assessing references retrieved
Developing the search - interacting with the system.

AFTERWARDS

Assessment of results.

Whatever method is used to answer an enquiry, traditional or on-line, it is naturally first necessary to get a clear idea of what the end user is looking for. Apart from defining the specific subject, he must indicate the *type* of search required. Does he want the search to be

i Exhaustive (high recall) where very few relevant papers must be missed

ii Very specific (high precision) where the final list must contain the minimum of irrelevant material.

Both are likely to be expensive in access time or print-out and most searches are a

compromise between these extremes. During the pre-terminal discussion the end user can suggest words and phrases likely to appear in titles or index entries of relevant papers, and authors and institutions known to be working in the field. He may also be able to help in the choice of data bases.

At the terminal the intermediary can then set up the search, examine the resulting references and develop the search as necessary by selecting new terms and trying different combinations until an acceptable set of items is formed. This can then be typed at the terminal, or printed off line in which case the end user will have to wait for a day or two for the results to come from the system computer centre.

For a successful liaison it is helpful for the end user to have some idea of how the system works. Points that can be stressed are:

It is possible to select index terms and classification codes that he may sometimes look up in printed indexes.

Alternative words, terms and codes should also be considered.

Boolean logic is used.

Authors can be selected, or excluded (if he is very familiar with their work).

Some primary journals on some data bases.

Here also it is necessary to explain the limitations of on-line as well as the advantages and to point out that the 'perfect' set of references, even if it existed, would probably be prohibitively expensive to obtain from an on-line search.

The question of whether the end user should sit with the intermediary during the search is often debated. Many searchers are not in favour of this, as discussions while the terminal is connected to the system may increase search times. I feel that, providing the intermediary is experienced and has explained the rudiments of the system, because he is unlikely to know as much about the subject as the end user, the two should work together. This can be productive at the stage when references are examined and the search is developed. There is nothing to prevent the user from disconnecting from the system [illegible] and leaving the terminal. Most systems will keep the search for a certain time or provide a search save facility which allows the user to resume later. Once the search strategy is developed to his satisfaction, a 'trial' printout can be ordered and the search terminated after examination of this a few days later.

It is [illegible] the task that besides operating the terminal, and explaining the [illegible] the intermediary has to convince the end users of the value of on-line. This can be done with [illegible] demonstrations and meetings.

6 SEARCH STRATEGY

Experienced [illegible] often seek advice on how to use the [illegible] to achieve the best results. It is difficult however to give [illegible] Manuals and manuals give examples of [illegible] are usually all about, with a few terms selected and combined [illegible] relevant references. Buntrock lists three search [illegible]

1. [illegible]

   [illegible] with OR,
   [illegible]
   [illegible]
   [illegible]

   [illegible]

   [illegible]
   [illegible] using AND to narrow the subject down.
   [illegible] using AND to narrow down further.
   [illegible] is identified.

   [illegible]

   [illegible]
   [illegible]
   [illegible] the index terms used in the [illegible]

We [illegible] and there are undoubtedly [illegible] quick and dirty' technique [illegible] as possible and the results [illegible] any search [illegible] end-user. This [illegible] is not making any use [illegible]

[illegible] using both indexing terms and [illegible] We [illegible] used primarily to deter [illegible]

searching. Other data bases have detailed classifications designed for retrieval which can be used for broad concepts. Users should take note of any changes that have occurred in the schedules during the period covered. It may be necessary to restrict a code to certain years when it is selected.

The problem of trying to optimise strategy is not helped by the fact that it is difficult to make quantitative assessments of results. Apart from the question of precision versus recall, cost factors are usually included in assessments of on-line searches. De Jong-Hoffman (5) for example compared the use of uncontrolled index terms, controlled terms and classification codes when searching the Inspec data base and measured the results in terms of efficiency (recall) and cost per retrieved reference. She concluded that best results were obtained with a combination of controlled terms and classification codes. It was a detailed investigation covering one search subject and it would take a very extensive exercise, covering a number of different subjects, to produce any firm "rules" in this area.

7. WHAT QUALITIES ARE NEEDED BY SEARCHERS?

From the previous sections it can be gathered that a range of attributes is needed by an on-line user. In a paper titled [illegible] Van Camp lists (6):

Self confidence	Goes beyond formal training
Logical mind	Retentive memory
People oriented	Perserverence and patience
Exploits successes	Efficient work habits
Knows subject areas	Shares knowledge

It would be hard to argue with any of these although they could apply to a wide range of occupations. I would emphasise that the ability to communicate well and realistically 'sell' the service are essential, as is penetration and logic when analysing search subjects. Perserverance may be necessary, particularly when occasional line noise and system problems can cause setbacks. Imagination and flexibility are also usually found in successful searchers.

8. ADMINISTRATIVE ASPECTS

The introduction of on-line into an information service inevitably brings additional administrative work. For a start there are extra bills to be paid, eg for:

Data base access and print-out
Telecommunications (Network)
Telephone
Terminal equipment
Training courses
Supporting literature
Attendance at meetings

It would be wise to allow a certain amount of access and telecommunications time for in-house training, practice and demonstrations. It should be remembered however, when paying the bills, that on-line can produce an increase in work output without staff increases. Some information sections have also found it possible to stop taking printed versions of abstract journals now available on-line, but there is no general agreement on whether this is advisable. There is also likely to be an increase in requests for copies of original papers.

The extra administrative activities that need to be considered include:

Logging use
Checking and paying invoices
Recording payments
Recording searches
Checking and dispatching print-out
Maintaining support literature
Arranging demonstrations
Keeping customer records
Budgeting
Charging end users

The last item, charging end users, only of course applies if the costs of running on-line searches are to be passed on. If this is the case, decisions have to be made on how much is passed on. Should it be just the "extra" costs that arise from on-line such as access, print-out and telecommunications, or should staff time also be included? There are no definite answers, particularly if a comparison is made with how much it would cost in staff time to do an equivalent search by traditional methods.

9. CHOICE OF SYSTEMS

There are now many on-line systems available. Many of these offer the same data base and users have the problem of deciding which ones would be of most use to them. In choosing between systems the following factors should be considered:

Data bases
Command language
Ease of access
Local representation
Support literature
Training facilities
Cost

Obviously when a system offers a unique data base that is important to an organisation, this can outweigh other factors. When the same data base is being offered by different systems it should be remembered that there are usually differences in the way it can be searched. Chemical Abstracts, as CA-Search, is split into sub-files covering different time periods on some systems but is kept as a complete data base on others. Frequently there are also differences in which features have been made searchable.

Accessing new systems often means that new command languages have to be learned. This naturally means that systems having a command language similar to one with which the user is familiar will be more attractive. Attempts are being made to introduce a common command set as an alternative to the existing search languages on some of the systems which can be accessed via Euronet, but it will take time before users will be able to search with commands which are truly independent of the system being used (7,8).

Ease of access can be another crucial factor. If connection is possible via a network with a node in the users' country, access is likely to be cheaper, and through better quality lines, than when an international phone call is necessary.

Local representatives of systems can usually provide help, advice, training and support literature. The quality of these and language problems can also affect choice.

When comparing the cost of using different systems it must again be emphasised that it is unlikely that the implementations of the same data base will be identical. As Barker says (9) when considering Chemical Abstracts on-line "It is in practice very difficult to make a meaningful comparison between the various systems. Since differing system facilities will dictate differing strategies, the time of search for the same topic...will vary. A higher cost per connect hour on system A versus system B does not, therefore, necessarily mean a higher cost of search for any given topic on system A". It could be added that a true comparison would also have to allow for variations in system performance, eg longer response times during peak periods.

When an information service decides to use several systems, decisions may have to be made on how work should be allocated among staff. Should they specialise by system or by subject? Staff with subject knowledge would then be able to decide whether there was any advantage in using a particular system for certain types of enquiries but the staff concerned could have to learn a number of command languages and more training would be necessary.

Finally it should be mentioned that once an information service has shown its ability to use on-line systems, it may get requests for very highly specialised data bases or data banks on subjects like electronic components, chemistry, or law, where a substantial amount of subject knowledge is needed to get worthwhile results. It may here be advisable to encourage specialists in these areas to do their own searching.

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SURVEY OF SOLUTIONS TO THE DELIVERY PROBLEMS. GROWTH CONTROL OF LIBRARY COLLECTIONS

by

Sten E. Vedi
Chief Librarian
Universitetsbiblioteket avd B. Trondheim
Erling Skakkesgt. 47c
7000 Trondheim
Norway

I must say that I had to prepare this paper at very short notice, and under not too favourable circumstances, as the topic is not within my field of research. However, it [illegible] be argued, that every librarian in an administrative position ought to know a [illegible] of it, to say the least.

Then, there was a second problem which is related to the heading of this paper: "Survey of solutions to the delivery problems. Growth control of library collections." Are these two topics to be treated separately, or is it just [illegible] quite possible f.ex. to consider the problem of growth control of library collections in isolation, that is, in relation to space problems, shortage of money in a particular library, or types of libraries, and in relation to the needs and demands of a local academic and scientific community. As I had reason to believe that this could hardly have been the intention of the organizers, I have treated the question of growth control as secondary, and as an aspect of 'delivery problems' in a wider context; both national and international.

Given the theme of Session III - Information retrieval and document delivery problems - which this paper is part of, I further assume that the organizers want to draw attention to the fact that document delivery problems have become more acute with the introduction of on-line bibliographic searching, and that it is more urgent than before to find [illegible] solutions. There is a technological gap, and an imbalance, between the fast, [illegible] electronic retrieval systems, and the traditional and slow systems of document delivery. The latter includes the problems of locating the required documents and transmitting them. It has been argued, that it is of little use - and indeed positively frustrating - to provide a full and fast supply of references if the documents to which they refer cannot be obtained at all, or obtained only after considerable delay. The question of access to published documents has two aspects seen from the users point of view:

1. the rate of satisfaction of the request for published documents.

2. the time-lag between request and actual transmission and delivery of the required documents.

Surveys seem to indicate that the rate of satisfaction, even in developed countries, [illegible], and a speed of delivery of documents in more than a month, or more. [illegible] is partly high as the procedures are unwieldy and time-consuming in [illegible] countries. [illegible] of adequate and reliable statistical information, the situation may be worse in many countries. (Great Britain has a better record.) It is [illegible] difficult to assess the consequences of this for research and academic teaching, as the number of the "missing" documents is not known.

[illegible] efficient back-up document delivery systems has been recognized both [illegible] nationally and internationally. On the international level IFLA (INTERNATIONAL FEDERATION OF LIBRARY ASSOCIATIONS) and UNESCO have formulated and supported a programme known as UNIVERSAL AVAILABILITY OF PUBLICATIONS since 19[illegible]. As an ideal and a concept the programme has many facets, and the means of reaching the objective are many:

- [illegible] lending.

- Establishment or development of document supply centres; either a single centre [illegible] - possibly between a selected number of libraries in a country.

- [illegible] system for locating requested documents.

- Development of on-line-ordering [illegible] which can ultimately be linked to on-line bibliographic searches in order to locate the required documents [illegible].

- Transmitting the documents [illegible] original or copy [illegible] electronically.

[illegible] of the objective, the programme simply states, that every published document, wherever and whenever published, should be available to anyone who wants it, wherever he wants it.

To this day, the UAI-programme has tended to focus on interlending. The reason for this is partly that the question of interlending has been, and still is, a key factor in solving delivery problems, partly that IFLA's activities has been concerned with how to standardize procedures for interlending in order to make the present system more efficient. Efficient interlending is greatly dependent on the provision/acquisition of items in the individual countries, and their willingness and ability to make them available.

Four main problems and barriers to interlending and UAI have been identified:

a) Inability and/or inadequate means to locate items that are actually held by libraries.

b) Unwillingness on part of libraries to supply requested items because they are in use, rare, fragile, recently acquired or for reference only. In general this reflects that libraries owe their primary responsibility to local clients.

c) Most delays and slow supplies occur in requesting and supplying libraries, and less in slow transmission by mail. However, this can also be a serious problem in some countries and between countries.

d) Unavailability of requested items due to inadequate and/or uncoordinated acquisition programmes.

Some problems can be solved by establishing union catalogues or improving existing ones, by mutual agreements, regulations and standardization of procedures, more extensive use of photocopies, and by improving library operations. It is a generally shared opinion, that in most countries great improvements could be made within the existing interlending system. Nevertheless, major improvements may only occur from redesign of the entire system. One of the basic problems seems to be related to the fact that most libraries owe their primary responsibility to their local clients. Requests from other clients and libraries must wait. This problem may be solved by establishing a central collection dedicated solely to interlending. This has been done in Great Britain with great success; British Library Lending Division, BLLD. Alternative systems which have been tried, or are in existence, are:

a) Concentration of interlending to a few libraries in each country. This may be suitable for small countries where there already are substantial collections concentrated to 2 or 3 libraries. This is much cheaper than establishing central loan collections from scratch.

b) Planned decentralization. Provision of material allocated among libraries on a systematic basis, including a co-operative acquisition scheme. Allocation can be either by
i) subject
ii) language of publication
iii) country of publication
or iv) otherwise.

If properly specified, and followed, collection control may be secured by means of co-operative acquisition schemes which are part of the above mentioned systems.

Available, but maybe not very reliable evidence, seem to indicate that interlending based on co-operative acquisition schemes do not have very good records of achievement. But national decentralization may be worse.

However, neither of the systems seem to occur in pure form. In Great Britain for example, the BLLD is supplemented by interlending between local established libraries. For other countries, which do not have a central loan collection, BLLD functions as a supranational centre for interlending, supporting national co-operative acquisition schemes or different systems of mail and international interlending.

In a not too distant future, alternative and better solutions to the delivery problems than those provided by traditional methods of storing and transmitting documents published on paper proposable. Also unlimited storing capacity in computers, combined with high-speed transmission by satellite or otherwise, to anywhere in the world, is probably going to revolutionize the supply of information to science and technology, and communication between scientists. This may lead to bypassing of published documents and libraries. Part of the requested document or the whole of it, may be retrieved and transmitted in relation to the bibliographic search.

The effect will certainly be reduced importance of libraries and librarians as gatekeepers. Publishing is also going to be affected, indeed it is already being affected. The electronic journal is already a concept, but the full impact has yet to be seen.

LIBRARY RECORDS: IN-HOUSE FILE CREATION versus EXTERNAL SERVICES

David V Wilson
Atomic Weapons Research Establishment
Aldermaston
England RG7 4PR

SUMMARY

Since 1968, the Atomic Weapons Research Establishment Library, Aldermaston (AWRE) has had its own in-house mechanised cataloguing and ordering system (AMCOS), using the Establishment's IBM 370 computer. AMCOS, a batch-mode system with on-line input, manipulates bibliographic records in MARC II format. Products include book orders, the book catalogue, lists of new additions, and a number of lists relating to periodicals holdings.

The original objectives of AMCOS were: to reduce the staff effort involved in ordering and cataloguing procedures by having machine-readable records available at the outset; and to exploit the flexibility of form and content which is possible in reproducing the records.

Originally, it was considered that centrally-produced MARC records in the form of magnetic tapes would assist in speeding the processing procedures. The system was, therefore, designed to scan BNB and LC MARC tapes for the selection of books of potential interest to the Establishment. From the Potential Interest File, records could be extracted by their Standard Book Number (SBN) when required for ordering or cataloguing. Reasons are given for the discontinuance of those methods.

A recent investigation on BLAISE has shown that, in general, delay in the appearance of records has been a problem associated with that system. Again, a large percentage of the material acquired in special libraries in the defence field is not recorded in central files.

Although AMCOS is at present a wholly-internal system, facilities for importing records from central sources are kept available. External sources are considered from the point of view of their present and potential uses.

The Library of the Atomic Weapons Research Establishment (AWRE) has now had over twelve years' experience in the use of computers for the creation of files of bibliographical information. During this time, it has made as much use as practicable of external facilities, both on-line services and bought-in computer tapes. Some experiences have been more successful than others: some have resulted in moves from external data collection to in-house file creation, and vice versa. This morning, I intend to discuss this experience, and to consider some present-day options available to the special library.

AWRE Library's book stock amounts to approximately 50000 volumes; about 1200 periodical titles are subscribed to, many in multiple copies; and there are about ½ million unpublished reports from many sources, mostly in microfiche form. The total library staff, covering professional, technical and clerical duties, is thirty. In terms of the special library AWRE is a fairly large example, but, when compared with most university and public library systems, it is relatively small.

When one is considering the improvement of library systems, computerisation is frequently thought of as the answer. However, we know that many elaborate and all-embracing plans for mechanised systems have failed to materialise, or have failed to live up to expectations. At any level, benefits must be weighed against the efforts required to introduce and maintain the systems; improved library services are not synonymous with mechanisation. Practical experience seems to indicate that it is better to proceed pragmatically step by step rather than attempt to introduce an overall integrated system. This has been the approach at AWRE: evolution rather than revolution.

In every situation there is a point below which mechanisation would not be viable, but it is my opinion that, when introducing new systems, no fundamental differences exist between larger and smaller libraries: many are doing the same job on a different level. There may be differences in the quality of the services provided. This is especially so between different types of library - industrial libraries, for example, are generally expected to provide good current awareness services, and to be able to retrieve relevant information fast when needed. In such an environment there is an obvious case for having access to external on-line data bases. Before the days of such retrieval services, the industrial librarian had to give rather more consideration to the problem of what published information he ought to index locally, and how deeply to index it. In this paper, however, I am not so much concerned with that problem as with the problem of how best to create the local records that are likely to be required in this type of library, especially defence libraries.

In the UK during the late 1960's, some special libraries, and some public libraries, were in the forefront of library mechanisation. This was chiefly because they had access to

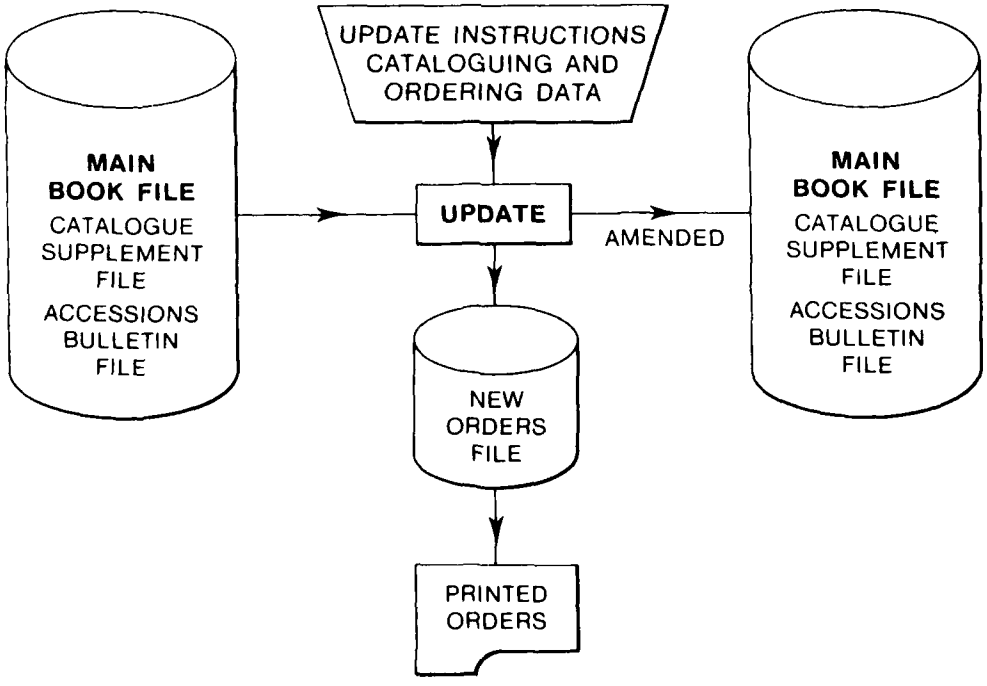
their parent organisations' mainframe computers, which were usually used for batch-mode processing. Some of these batch-mode systems, including my own organisation's cataloguing and ordering system, have survived the passage of time, and are still in use today. Nowadays, however, it is the big boys who lead the field - organisations such as OCLC in the USA, and BLAISE in the UK, also various cooperative schemes, particularly between university libraries. I should, therefore, like to consider how the special library stands in relation to the overall picture.

AWRE Library uses computers over the whole range of its house-keeping operations. It also subscribes to a number of commercially-available magnetic tapes, which it processes to provide a selective dissemination of information (SDI) service. For retrospective searching, it has access to a number of bibliographical data base services. However, when one thinks about mechanising local records, the obvious candidates are the library catalogues. In this respect, AWRE Library has the Aldermaston Mechanised Cataloguing and Ordering System (AMCOS) which was developed by the staffs of the Library and the Computer Services Division.

AMCOS has been used for ordering and cataloguing books since 1968, and, in its present form, using the Establishment's mainframe computer (IBM 370/168), since the beginning of 1972. It is a batch-mode system with on-line data preparation, ie, the main files are off-line, but data for each update are held in temporary on-line files. More recently, besides holding book records, AMCOS has been developed to include periodicals data, as well as records relating to AWRE reports. Thus, there are three main AMCOS files - for books, periodicals, and AWRE reports.

In the beginning, the main reasons for mechanising were that AWRE Library wanted to streamline its book ordering and cataloguing routines, and to save housekeeping effort by avoiding repetitive typing of the same bibliographic information - ordering, cataloguing, accessions listing, etc. Also, although the number of book records is small in comparison with, say, a university library, it was felt that AWRE Library, having the facilities and expertise at hand within the Establishment, was in a strong position to gain experience, and to take advantage of the benefits of mechanisation.

AMCOS is based on the premise that when a book is being ordered, even though the available data may be incomplete, the information is usually substantially correct. Bibliographic data are therefore input into the system at this early stage. At the next update of the main Book File, the data, besides being transferred into the File, are used to print orders for despatch to the bookseller. Later, when the books are received, the system is informed of this and responds by supplying prints of the records. From these, cataloguing additions and amendments are made, and local information, eg, call number, is added. The books are also indexed by the Universal Decimal Classification (UDC). A further update again amends the Book File, taking account of such alterations to existing records, and a printout is generated for a final visual check.



AMCOS UPDATE

In summary, Book File update results include the transfer of data from the on-line data preparation file to the main off-line Book File, which is amended accordingly.

A number of prints are also produced as follows:-

(i) Prints of orders, for despatching to booksellers;

(ii) Prints of records relating to newly-received books, for cataloguing and indexing;

and (iii) Prints of fully-catalogued books, for final vetting.

Updates are normally executed once a week. At present, the Book File consists of some 17000 records, and increases by about 1500 records per annum.

One of the great advantages of computer records, from any source, is their flexibility. AMCOS makes provision for the generation of a variety of printouts for AWRE Library users:-

(i) Twice a year the main Book Catalogue is reproduced on microfiches. At present it has three sequences, viz, Authors, Subjects (UDC), and Keywords. The information in each sequence is identical.

(ii) Between issues of the fiche catalogue, there are monthly printed supplements. These are cumulative, and contain all additions to the Book File between the last fiche production and the latest update, including data on books ordered but not yet received.

(iii) In briefer form, lists are produced of books recently added to stock. The masters are reproduced by offset and copies of the lists are distributed throughout the Establishment.

The second main file, the Periodicals Holdings File, was created in 1975. Whilst the Book File has some 17000 records and continues to grow steadily, the Periodicals File consists of some 1600 records and is unlikely to show an appreciable increase. Nevertheless, it is an invaluable source of easily-produced outputs, each of which varies in content according to its purpose. The present products are: Title Catalogue; Subject Catalogue (UDC); Stock Control List; and Shelf List. All of these are printed as they are required.

A fifth product, the "List of Periodicals", is reproduced by offset for distribution to AWRE Library users.

The Periodicals File was originally intended merely for catalogue purposes. In the existing economic climate, however, it became obvious that tighter and more up-to-date budgetary information was needed. It was, therefore, decided to form a series of on-line files holding information on all current subscriptions. The list of relevant titles extracted from the main Periodicals File was of great use in creating these files. This illustrates how, once information is available in machine-readable form, additional tasks not originally planned for can often be done faster and easier than would otherwise be possible.

The object of the third main file, which contains cataloguing data on AWRE Reports, is the same as for the two other main AMCOS files, viz, to facilitate extraction and printing of any required set of data from a single complete record stored on a disc file in MARC format.

In 1968, when the Book File was first started, MARC also was in its early stages. AWRE Library decided to adopt the MARC format, primarily, it must be said, because it was considered that exchange tapes might further cut down the cataloguing effort: records extracted from the tapes could be transferred straight into the AMCOS system.

For a number of years, AWRE subscribed to weekly MARC tapes of British and American literature, and each tape was run on the AWRE computer, against a stored profile of Dewey Decimal Classification (DDC) numbers. A printout of the selected records was used as a book selection tool, whilst AMCOS stored these records in a cumulating Potential Interest File (PIF), from which they could be extracted by their Standard Book Numbers (SBN) as required for ordering or cataloguing. However, a large proportion of cataloguing time continued to be spent on compiling local data, particularly UDC subject allocations, which are not provided on the tapes. It was also found that many of the relevant publications had already been bought before their records appeared on the tapes, and that relatively few of the other selected records were in fact needed at a later date. Again, books account for a comparatively small proportion of the library funds; periodicals take a much bigger slice. By the mid-seventies, UK library budgets were very tight. AWRE was no exception, so far fewer books were being bought, and this made the cost of purchasing MARC tapes, processing them, and maintaining a PIF quite unacceptable. For all these reasons, AWRE became convinced that, although the MARC tapes are very useful to cooperative organisations and to university and other large general libraries operating their own systems, they are not sufficiently relevant to special library needs. AWRE therefore decided to dispense with MARC tapes, and to amend AMCOS accordingly.

Although AMCOS is now a totally in-house system, having adopted the MARC format from its inception its options are still open: it is still possible that some use could be made of on-line data for cataloguing purposes. In this respect, in 1979 AWRE briefly investigated

the possibility of extracting on-line data from the British Library's BLAISE system. Again, only a small proportion of the required records were found to be available when first needed. Admittedly, the records sought almost invariably related to recently-published books. The on-going UK Cataloguing-in-Publication (CIP) programme is likely to help to reduce delays, and it will be an advantage to have access to the extra-MARC material (EMMA) when it becomes available on BLAISE. Nevertheless, it seems to me that, in the foreseeable future, for one reason or another, research libraries in the defence field will have to continue to do the bulk of their own book cataloguing themselves.

AMCOS has proved to be a good system, but never at any time was it ideal. Because it uses MARC, it has been sufficiently flexible to cope with all the additions and changes which have been designed for it in the light of progress, experience, and changing needs. On the other hand, the MARC structure is too complex and too cumbersome for a local system serving only one library. Also, AMCOS is an off-line system, and consequently it is complicated, and it is slow. Although it continues to serve its purpose quite well, it is obsolescent, as, in my opinion, are most local off-line systems.

When we consider other forms of literature, notably journal articles and unpublished reports, I mentioned earlier that, with the availability of mechanised SDI and of commercial on-line bibliographical services, there is no longer the same requirement for local indexes. Of course, there will always be a need in some libraries, particularly those covering narrow and highly-specialised fields, for local records of relevant journal articles and of open report literature, and it will always be essential to record classified literature. As with the books, there would seem to be no practicable alternative in these special cases but to arrange one's own data preparation.

At one time, AWRE Library used to compile a number of regular current awareness bulletins - Engineering Bulletin, Electronics Bulletin, Metallurgy Bulletin, and Physics Bulletin. Their production involved a considerable investment of staff effort which could not be justified when the major abstracting journals became available in machine-readable form. It was decided that the computer tapes should be purchased to provide a personalised SDI service. Each individual who has applied for the service receives a regular list of new publications to match his interests as registered in his subject "profile". For some time the bulletins were running concurrently with the SDI service, but when they were discontinued it was found that there was no longer any real demand for their existence. For those who require a current awareness service in a fairly broad subject area, eg, Chemical Hazards, it is convenient to augment the in-house SDI service with a few subscriptions to external sources, such as the UK Chemical Information Service "CA Selects" lists. Incidentally, when it comes to retrospective retrieval, despite the availability of the information on-line, AWRE still maintains all its subscriptions to published abstracts journals. There are a number of reasons for this - the abstracts provided by our SDI service are often not printed in full; hard copy is useful for very quick searches, especially as at present we do not possess a high-speed printer; the abstracts of Chemical Abstracts are not available on-line; users can browse through current issues, etc.

Although it seems that we must arrange much of our own data preparation, there are advantages to be gained from external cataloguing services, whether on- or off-line. They have been devised specifically for library cataloguing; software can be developed that would be far too expensive for a single library; all customers get equal priority; and not all of us have access to a local computer. In the UK, competition in the provision of automated catalogue services is likely to sharpen with the expansion, through BLCMP (The Birmingham Libraries Co-operative Mechanisation Project) of OCLC. At present, BLAISE has a reputation for being adaptable to customers' requirements, and BLCMP for serving the larger system well. Selected UK government libraries, in a co-operative called Interlib, are now being provided with automated catalogue services through the BLAISE Local Cataloguing Service (LOCAS). They join about 50 other institutions using LOCAS, and in this case, they have arranged for a full batch catalogue production service, from data preparation to COM output. However, very few other UK special libraries, and none in the defence field, yet use such automated cataloguing services. It could be that, unless one can join some cooperative system such as Interlib, for the special library external automated cataloguing services are not economically viable. One must also bear in mind that libraries with classified documents are restricted in the means and services that they can use to create some of their records.

Having considered batch systems, I must finally mention real-time library systems. There are no interactive catalogues available on any of the co-operative automated cataloguing services, nor would they be economically justifiable. Similarly, real-time systems on local large mainframes are not economically viable, chiefly because they tie up a lot of computing capacity which is not being fully used, and make the system unavailable to other users. However, with sophisticated minicomputer systems now available at relatively low cost, a dedicated minicomputer becomes a realistic library option for use either as a front end in conjunction with a mainframe, or preferably as a stand-alone system. An interactive catalogue is infinitely flexible, always up-to-date, facilitates the integration of other library functions and can be available to library users. Lastly, provided that one's records are compatible with MARC, external services can be exploited whenever circumstances seem to be favourable.

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Technical Information Services
in Innovation

KJELL KLINTØE, M.Sc. in Chem.Eng.
Director of ITP (Dansk Teknisk Oplysningstjeneste)
Copenhagen, Denmark

AWRE, Technical Information Panel Meeting 1980
"Information Services, their organization, control and use".
Subject: IN-HOUSE INFORMATION SERVICE

What are we discussing?

Within the frame-work for the MEETING THEME we are obviously discussing activities within an organizational entity
- that be a private or public enterprise or any other kind of organized entity providing product- and/or service.

We are discussing innovation !

To innovate is to further change - it is to stimulate and fulfill a need, hardly yet been formulated into a demand - it goes even that far that innovations within scientific are made to meet a hope (fig. 1 A.).

Innovations are aimed at bettering progress by their applications - progress for the innovator and progress for the client / by the innovation.

Innovations are not limited to technical areas - but are needed within any activity and/or occupation human being - even public administration, public service and politics !!!

The process-flow of innovation calls for certain capabilities of individuals involved - alertness to signals, imagination, commitment, faculty of combination, extrovert attitudes, unconventional temperament - but it is based upon skill in light and knowledge of a number of disciplines and areas of real life - to ensure the result to be reliable and valuable to the market.

We cannot gather all these personal capabilities - but we may be able to organize the information flow to stimulate innovative thinking and performance - how.

Purposes, aims and objectives of an enterprise.

Enterprises are there, all around us, and we have to understand their life conditions before we speculate on how the information flow can be of value for their vitality - i.e. improvement and innovation of their activities.

First of all - an enterprise is a living organism - to me it is a vital, strong and flexible organism - the one-cell mechanism consisting of a nucleus (the idea or purpose), the protoplasma (the living matter - the talents and competences of the management, staff and workers) and the cell wall (strong and flexible - the corporate policies and structure applied) (fig. 2).

Too few entities take effort to develop that understanding, but develop their organization only to meet bureaucratic measures - presumably because the patterns of science-based education is too dominated by deductive principles and not creative attitudes.

We may therefore characterize enterprises we use in very broad term by

A. Entities having a staff sufficiently qualified intellectually to be fully aware of the task, the responsibility and the opportunities of their organizational entity.

   Further they must have a capacity large enough to take action to learn in detail the structure and expectations of their customers and how their demand vary and develop.

   They frequently take action to convert the courses of knowledge for information, which can improve and renew their contribution, performance and function.

Due to consolidation and bureaucracy they may be slow in the innovation process.

B. Entities having intellectually qualified members in their staff, but in such a small number that they do not have enough capacity to take actions - neither in investigating the market structure and its trends - nor to search for and procure technological information to an extent which would continuously stimulate the innovative thinking in the enterprise.

Nevertheless they are often firm when taking actions and flexible in changing strategy according to opportunities.

C. Entities only having specific intellectual qualifications and little capacity for strategic planning and action - but very often they have a high potential of entrepreneurial spirit and a very adaptable skill. They have courage to try new ways.

In all three types of entities, which I think you have met, observed for their performance and recognized everywhere, management is responsible for the survival and growth of the entity.

That is an economic as well as a social responsibility - and most often taken with a personal commitment. At his disposal he has two sets of resources - the physical assets (always limited) and the intellectual assets - which is his staff (the protoplasma) - maybe limited in number - but not in capability, if he chooses the right strategy (fig. 4).

The staff must be carefully recruited - to match with the purposes, aims, objectives of the entity - applying the corporate strategy and policies - as they have been developed, set and announced.

The staff members must be meaningfully employed - to stimulate and use their competence and talent - and they must be challenged to develop - in competence and capability - to improve and innovate the enterprise.

The management has to further the maintenance and development of an organized information service.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

The information service functions.

It is stated that my picture of an internal information service of an enterprise - I would hate to say innovation oriented enterprise because all entities, private or public, should be innovation oriented - is that it is an intellectual, professional effort, striving at mobilizing all kinds of sources of knowledge - the intellectual raw materials or commodities - for the benefit of the enterprise - to make progress in form of improvement and innovation.

It must, of course, arrange itself with such tedious means as indexes, files, libraries, terminals, telex etc. - but never grow static in the sence that means become more important and sophisticated than the primary objective - to search, procure, get evaluated and put across and into operation - the technological information relevant and appropriate to further objectives and ideas of the enterprise.

Areas of activities.

Internal resources.

1. The corporate ideas, aims, strategies, policies, objectives, must be kept in file and when requested updated - very often on basis of market/technology information gathered (before or after the evaluation of staff members).

2. Gained experience, competence of the various departments, groups and individuals must be profiled and kept in file and rosters.

3. Target groups of clients must be registered and profiled in quantities, qualities, for past requests, present demands and operating situation together with indication of expected trend in needs.

4. Rosters, indexes and files of external persons, centers of specialized knowledge, information sources, R & D units - profiled according to field and level of knowledge, geographical position (local, domestic, foreign, international) forming a network of correspondents.

5. Indexes, files, key material etc. on bibliographical and factual data banks must be established.

6. Subscription to carefully evaluated primary and secondary journals and other serial publication must be arranged.

7. Collection of reference material, handbooks, encyclopedias must be built up.

The organization of the information flow.

To stimulate the staff members in thinking innovatively and becoming alert to new market/technology opportunities the information service should try to involve the staff members in being the eyes and ears of the enterprise. (fig. 5 and 6).

In groups or individuals picked up for individual competence from various sections of the company they should be requested to take responsibility for draining each their few information means (journals, professional meetings, conference proceedings etc.).

The individual is asked to examine his material according to these criteria:

What is the potential value of this information for the progress of the enterprise?

How can it be applied and utilized?

How will application influence present operations?

Working groups having members from marketing, production, product/process-innovation, maintenance, quality control, service etc. must regularly and verbally present what they have found in their material and identified as being relevant and of value for the progress wanted according to corporate objectives, strategy, policies and plans.

The presentation will call for discussion and result in a consolidated evaluation, which the information service will use for a news-letter to be circulated to all staff members of the enterprise and to the management.

Evaluated material is kept in file in the information service and continous gathering of more information from out side sources that be evaluated is available when requests are made.

There are various aspects of this process:

1. The staff members are stimulated by being voluntarily kept responsible for [illegible] the enterprise.

2. They are not overburdened with reading.

3. They are by the newsletter kept abreast with all the findings of all evaluation groups.

4. They are regularly in communication with competent colleagues from all over the company, exchanging experiences, present problems and future possibilities.

5. The information service is part of their life and becomes their communication [illegible] intermediary service to the outside world - relieving the pressure upon them for keeping abreast and extending their horizon and in light in the wealth of knowledge - which they themselves and their colleagues shall make a future of.

6. The information officer will be organizing the flow and be skilled, be competent to find the right and new and valuable sources of information, get them evaluated to ensure that the innovation process is going on continuously.

[illegible]
[illegible] make changes -
[illegible] make the future -
[illegible] demand strategy
and decisions.
Your decisions are only as good
as your information. -
Your information is only as
good as the quality and integrity of its sources.

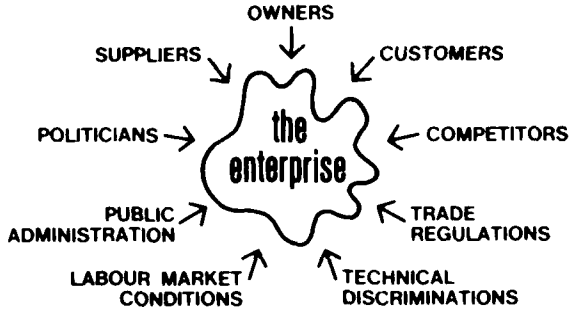
[illegible] National Industrial [illegible] is an

Last year one million quarter-inch drills were sold -
Not because people wanted quarter-inch drills -
But because they wanted quarter-inch holes!

Leo Mc Gluena

No one should be interested in the design of bridges -
they should be concerned with -
HOW TO GET TO THE OTHER SIDE!

Cedric Price



RESOURCE-ELEMENTS

PHYSICAL	INTELLECTUAL
fixed assets equipment capital	human beings knowledge talent

must be: acquired
useful employed
maintained
developed

JOURNALS

procurement

CRITERIAS

- PROFESSIONAL FIELD
- LEVEL OF COMPETENCE
- LIMITATION IN NO'S
- INFORMATION or RETRIEVAL

JOURNALS

Appropriate utilisation

METHOD

- 5 - 10 JOURNALS PER INDIVIDUAL
- ACCOUNTABLE READING
  what is relevant to our company?
- INFORMATION MEETING
  what are we able to convert?
- FILING
  selected material for immediate and future conversion
- REGISTRATION
- ANNOUNCEMENT (brief news)

INFORMATION SERVICES FOR LEGISLATIVE POLICY MAKING

Robert Lee Chartrand
Senior Specialist in Information Policy and Technology
Congressional Research Service
Library of Congress
Washington, D.C. 20540

SUMMARY*

Global pressures and domestic problems of unprecedented complexity are causing government policy makers to examine existing and potential information resources and services which can be utilized in the formulation of responsive policies and procedures. Both legislative and executive decision makers in the United States have become committed to the use of information technology--computers, telecommunications, microforms, word processing, audio and video devices--which affects virtually every facet of governmental and societal activity. The United States Congress has undertaken to improve the efficacy of its functioning through the creation of new legislative entities and mechanisms which would provide a broad spectrum of responsive information resources and services. This paper focuses upon the steps by which Congress determined its information needs, defined priorities in terms of files required and specific products or services created, and utilized public and private sector resources to provide the narrative, graphic, or statistical information required for policy making.

I. THE CRITICALITY OF INFORMATION IN OUR TIME

Perhaps at no point in the history of the Republic has the need of senior governmental decision decision makers for useful information been more acute. The 1970 decade was characterized by an unprecedented array of critical domestic problems--air and water pollution, energy shortages and alternative sources, transportation snarl, crime prevention and administration of justice, housing for the nonaffluent, and substandard education and welfare services-which required measured judgment by officials at all levels of Government. The continued criticality of these social and community problems during the 1980's will require the ongoing attention of those who govern our Nation.

It has been said that we live in "a brimming century of information and knowledge," 1/ with all of the immense potential benefits and dilemmas which this implies. Information, in a sense, has become like the air we breathe and our faith in the future: it is omnipresent, accepted, relied upon, but seldom analyzed in depth. There is a growing feeling--in Congress, the Executive Office of the President, and the private sector--that this "resource" should be understood more precisely. Corollary to this is the belief that the time has come when information policies should be set down, infrastructures strengthened, and the roles fulfilled by public and private sector groups delineated and discussed.

This perception of how information affects our lives has been tangibly manifested in recent Congresses through the passage of public laws which feature provisions establishing new clearinghouses, mandating new automated information systems, introducing new telecommunications systems, or protecting individual and corporate privacy. In the 95th Congress alone, 74 measures were enacted from among the 1,500 bills introduced in this area. Of especial significance is the fact that while the common frame of reference is information and communications, the topics being focused upon by the Members range from services for the elder citizen and ethics in government to student financial assistance, energy alternatives clean water, and the interlocking food-and-population problem.

Within Congress, functioning under a charter established long ago, the search for greater efficiency and effectiveness has been intensified in recent years. The Legislative Reorganization Act of 1970 (Public Law 91-510) provided guidance and procedures in certain key areas, including an emphasis on types of information support essential to the legislative and administrative operations of the Congress. For instance, budgetary and fiscal data, so critical to the congressional oversight role, would be collected and maintained in an executive branch computer-supported system. This information resource has proven to be useful in enhancing the ability of responsible congressional elements to make "more meaningful comparisons between the costs of Federal programs and their benefits" while permitting "the extraction of many other types of specialized information about the fiscal aspects of Federal activities. 2/ More recently, as a result of the passage of the Congressional Budget and Impoundment Control Act of 1974 (P.L. 93-344), the newly created Congressional Budget Office and the two Budget Committees have begun using advanced information technology in handling fiscal and budgetary data obtained from the Office of Management and Budget (OMB) and those derived from their own analyses.

1/ Carey, William D. Politics and Reason. Science, v. 193, Aug. 13, 1976, p.535.

2/ U.S. Congress. House. Committee on Rules. Legislative Reorganization Act of 1970. Report of the Committee on Rules on H.R. 17654. (91st Congress, 2nd session, House Report No. 91-1215, 1970). Washington, D.C., U.S. Government Printing Office, 1970. p. 11.

*The views expressed in this article are those of the author and are not necessarily those of the Congressional Research Service nor the Library of Congress.

Another thrust of the Legislative Reorganization Act of 1970 went to the heart of Member, committee, and staff needs for the type of research and analytical support provided by the Congressional Research Service (CRS). Several new duties were defined which encompass both a refinement of analytical and advisory services and a clear implication that more carefully structured and maintained files, better tools allowing selective retrieval of needed data from those files, and the rigorous use of available advanced technologies would be required to: 3/

1. Assist committees in analyzing, appraising, and evaluating the advisability of enacting legislative proposals and alternatives thereto and estimating their probable results; maintain continuous liaison with committees;

2. Inform committees of programs and activities scheduled to expire in the current Congress;

3. Provide committees with lists of subjects and policy areas suitable for analysis in depth; and

4. Upon request, prepare concise legislative histories of measures upon which committee hearings are to be held.

One salient facet of these intended improvements has been the enhancement of legislative information resources and services, especially through the utilization of automatic data processing (ADP) and micrographics devices, increased reliance on telecommunications networks, and a willingness to experiment with audio and video technologies. Oftentimes the reasons for the move to technology are astonishingly simple: a computerized mailing system is adopted because the floor of the room where addressograph plates were stored was buckling; a terminal switching of information requests from point of receipt to research units is instituted because the human messenger corps no longer could distribute "RUSH" inquries within a satisfactory time frame. For the most part, corrective action results from reflecting both inner and outer realities: the pressures of those who must perform responsively, and those emanating from the leadership who have an ill-defined but irrevocable feeling that changes are in order.

There is little doubt that the willingness of the Congress to try out innovative information handling approaches stems from a very real desire to maintain mastery over its environment. There is serious concern today about the degree to which effective management of the Information Revolution can be exercised: 4/

> In mature individuals and advanced communities, the problem in documentation is usually one of organizing a vast flood of information so the surfeited user can select more specific items or data and eliminate the vaster flood of undesirable material.

Such "user considerations" reflect the serious thinking which has been undertaken by those seeking to ease the burdens so long carried by Members and their staffs. Above all, time is of the essence where the Member's allocation of his personal and staff resources is concerned. Fulfilling, as he does, a multiple role -- legislative conceptualist and debater, key determinant in the deliberations and recommendations of his committees and subcommittees, and ombudsman serving his constituents -- he should be able to identify, modify as required, and periodically evaluate the information that his office must have to function effectively.

3/ Kravitz, Walter. The Legislative Reorganization Act of 1970: Summary and Analysis of Provisions Affecting Committees and Committee Staff of the House of Representatives. Washington, D.C., Legislative Reference Service, Library of Congress, December 28, 1970. p. 64-65.

4/ Rigby, Malcolm. Browsability in modern information retrieval systems: The Quest for Information. In Proceedings of the Symposium on Education for Information Science, Warrenton, Virginia, September 7-10, 1965. Washington, Spartan Books, 1965. p. 50.

II. THE MANY FACETS OF MEMBER INFORMATION NEEDS

As the busy Congressman and his staff endeavor to provide the range of services implied by this multi-faceted role, they continue to search for ways to "work smart." Always there is the need for information -- facts, quotations, statistics, citations, guidelines, pro's and con's, precedents, research summaries -- that is accurate, as comprehensive as possible, timely where necessary, and above all, relevant. In many quarters of Government today, there are references to "the white plague," the plethora of paperwork that threatens to engulf the bureaucrat, the top echelon decisionmaker, and the populace at large.

Above all, in the quest for improved information files and products, the emphasis has been placed on the recurring questions "What can it do for me?" "How much will it cost?" "Is it going to destroy my office routine?" "What will my constituents think?" Several carefully drawn surveys of Member and staff information needs have helped identify and prioritize those legislative and constituent service areas which should receive prime consideration as funding and staff resources are allocated. And for those charged with designing new or improved "systems," the old credo of "something here, something now" -- that is, providing useful deliverables en route to a total new capability -- still is very much in vogue.

For the most part, Members stress that the problem is not one of lacking specific information, although that obviously may arise from time to time. More often, the dilemma is which information to use, how to screen out the spurious or less useful data from the nuggets of truth. Each decision to be made is arrived at by a process which involves logic, hard facts, expert interpretation, a comparison of alternatives, political acumen, a "gut reaction," and a consideration of the real world situation as the Member sees it. How much reliance must be placed upon his own staff or external resources in obtaining the information that he has to have? Indicative of the Member's incredibly diverse information needs is this typical calendar:

7:30 a.m.	Breakfast with constituent group
8:45 a.m.	Review speech draft with Administrative Assistant
9:00 a.m.	Discussion with two colleagues of terminology in a bill up for debate
9:30 a.m.	Telephone conversation with staff member in district office about pressing local problem
9:50 a.m.	Meeting with visiting constituent who has a distressing problem involving an executive branch agency
10:15 a.m.	Go over background material on upcoming subcommittee session with Legislative Assistant
10:30 a.m.	Subcommittee meeting, including appearance of witnesses requiring Member questioning
12:00 noon	Luncheon with lobbyist group representatives seeking support on approaching vote

Even the most cursory examination of this truncated schedule reveals the variety of research, staff interaction, and decisionmaking which must take place. And all of these actions must occur against a backdrop of "drop-in" visitors' inquiries, official and constituent correspondence, and the omnipresent telephone.

Listen to the comments of the Members themselves as they reflect upon their information needs. Their candor is an indication of the importance attached to obtaining better information. 3/

Subject	Comment
Information that is current and reliable on the content and status of propsed legislation	"I want to find out when hearings are to be held; who are the witnesses; can other witnesses be scheduled or programmed?"
Floor action on a bill	"We don't know what's going to happen on the floor. Trying to follow the whip notices, and what is happening on the floor; there is a slight difference as to what takes place."
Information about federal grants, loans, projects, and contracts--programs in existence, and status of individual application by constituents	"We stumble across a program that is being used badly in a district. . . The money is available but it is just sheer luck if we find it."
Information for evaluation of federal programs, especially funding ramifications	"Congress ought to move on our [sic] own initiative to develop some sort of capacity to make our own budget analysis."

3/ U.S. Congress. House. Committee on House Administration. Second Progress Report of the Special Subcommittee on Electrical and Mechanical Office Equipment. Prepared by the Working Group on Automatic Data Processing for the House of Representatives. (91st Congress, 2nd Session, committee print, Oct. 1970). Washington, D.C., U.S. Government Printing Office, 1970. p. 6-9.

Information on the scope and nature of Federal programs throughout the country	"It is not uncommon to have to place seven or eight calls to get through to the right bureaucrat."

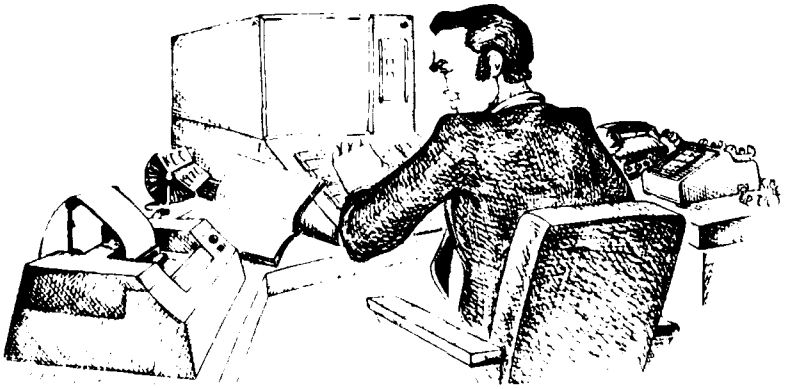
Great stress continues to be placed within Congress on attaining a heightened capability for budget analysis and program evaluation. Legislative proposals introduced during recent Congresses have provided for the creation of legislative branch offices to perform these essential tasks in a way that will allow the legislators to conduct their oversight more effectively.

Just as the Member has his hour-to-hour quandary about which sets of facts to ask for, much less use, so the administrative and legislative assistants, the special caseworkers, the committee staffers also must know how to exploit their information contacts. At the Member's hurried request, these de facto information specialists must be able to ferret out the latest White House utterance, editorial comment, or recommendation by an esteemed "think tank." Furthermore, such information must then be readied for the Member to use in a variety of ways: press release, comment over coffee with a colleague or in chamber debate, reflection during a "meet the press" interview, or as a possible amendment to a bill being considered in committee session. Ideally, Members would like to be given an "executive brief" in corporate parlance or a "daily estimate" as prepared for many senior military commanders. A number of Members asked the Congressional Research Service to look into the feasibility of establishing an "issue briefing system" which would furnish the essential elements of information a wide range of topics before Congress. In response to these requests a computerized file, known as the Major Issues System, now features "briefs" on more than 300 active issues and makes them available as cathode ray tube (CRT) displays, in printed form, or in microfiche. In addition, numerous audio and video taped issue briefs also are available. CRS presents video briefs at scheduled times on the House TV system.

Patterns of handling the myriad information needs of Congress and its constituents are shifting, as the volume and variety of requests proliferate. Committee staffs today find themselves occasionally being asked to fulfill Member's constituent problems. The expertise required to cope with many of the current domestic and foreign issues often must be sought outside the Member's personal or committee staff resources. Such factors as these necessarily affect the types of persons selected for the congressional staffs, and the degree of reliance on external support groups.

Two recent developments have enhanced Members' direct access to computerized information. The Senate, working through its Committee on Rules and Administration, has facilitated placement of video screen terminals in all Member offices (See figure 1) 6/ which allows direct and immediate access to the CRS computerized data base (SCORPIO) and the Legislative Information System (LEGIS); recently, each Senator was authorized to install two terminals in each of two State office sites. In the House of Representatives, each Member is authorized to spend up to $15,000 per regular session of Congress out of clerk-hire funds for "computer services." More than 300 House offices now have on-line capabilities -- many having two or more terminal devices, including some located in district offices -- supporting various administrative and legislative tasks.

Figure 1



6/ Chartrand, Kevin C. *Illustration orginally appeared in:* U.S. Congress. Senate. Committee on Rules and Administration. Information Support for the U.S. Senate: A Survey of Computerized CRS Resources and Services. Prepared for the Subcommittee on Computer Services by the Science Policy Research Division, Congressional Research Service. (95th Congress, 1st session, committee print, January 12, 1977). Washington, D.C., U.S. Government Printing Office, 1977. p. 30, Figure 12.

III. UTILIZATION OF EXTERNAL INFORMATION SERVICES

As Congress has come to realize that it no longer can depend solely upon its in-house staffs and some of the traditional information resources elsewhere in Government and the private sector, a twin-pronged effort has been initiated to ensure acquisition of even better information. Information systems groups skilled in the use of computer and microform technology have been created within the House and Senate, and are offering such services or products as electronic voting (in the House), addressing and mailing (in the Senate), legislative calendar preparation, storage of campaign expenditure data, bill status information, and voting record information. But in addition, a major look is being taken at what exists in the Federal executive branch and beyond.

The Members and committees of the Federal legislature always have funneled many types of requests to the Federal executive establishment. In the volume, Both Your Houses, the author points out that: 7/

> . . . ready access to legitimate facts on the costs and performance of the Defense Department can be of incalculable value to an increasingly questioning Congress, which will have to be on the alert for any attempt to cloak routine information with a security blanket.

An inquiry from a Congressman to the executive branch usually is routed through designated liaison officers who will seek to expedite responses. Regardless of the effectiveness of this channel, however, the Congressman who would demand for himself or his committee salient budgetary or planning information must be prepared to do certain things:

1. he must define very precisely his information requirements;

2. he must see that compatible formats and procedures for accepting, transmitting, and utilizing the data are prepared;

3. he must have available to him those devices and staff capabilities which will allow him to use the data from the executive branch; and

4. he must be able to guarantee, through a system of protective legal and data processing procedures, the confidentiality of the incoming information, where that is a factor in its being made available. 8/

With the advent of computerized data bases, many agencies and departments have established a special type of "upon request" service. As may be imagined, the kinds of actions enumerated above become particularly critical when attempting to procure and use computergenerated products. It is not enough simply to obtain, for example, the magnetic tape containing a given file. One must also make sure that the automatic data processing (ADP) configuration to be used is compatible with that for which the data were originally designed to be processed, and that the "software" (computer program) is available to direct the machine in its step-by-step manipulation of the data.

Computerized repositories of subject data are on the increase, and many of these are proving to be of worth to Congress. Concerned congressional elements seeking assistance in deriving legal type information can turn to the United States Air Force Project FLITE (Federal Legal Information Through Electronics), in Denver, which allows a search of such material as the full text of the U.S. Code and the published Comptroller General's decisions. A similar service, known as JURIS (Justice Retrieval and Inquiry System), accessible "on-line" via videoscreen terminals, is operated by the U.S. Department of Justice.

Many types of bibliographic files have been computerized. The National Library of Medicine makes available its MEDLINE Service, an on-line system containing citations to an extensive array of bio-medical literature, while the U.S. Department of Commerce has developed the National Technical Information Service (NTIS), a central source for Government-sponsored research and development reports that are described in abstracts which may be searched for inclusion in custom bibliographies. The Federal Assistance Program Retrieval System (FAPRS), answering a long articulated need for essential information about the hundreds of domestic assistance programs, is available as an on-line service and now is operated out of the Office of Management and Budget.

Through the use of such "systems" as these, traditional information support by executive branch subject specialists and libraries is being augmented by special services in the private sector featuring quick, selective access to priority information. Examples of on-line retrieval systems being employed by Congress include the New York Times Information Bank, the multiple bibliographic data bases of Lockheed Information Service and Systems Development Corporation, Dunn and Bradstreet, and various econometric models.

7/ Weaver, Warren, Jr. Both Your Houses: The Truth About Congress. New York, Praeger Publishers, 1972. p. 172.

8/ Chartrand, Robert L. Congress, Computers, and the Cognitive Process. In Planning and Politics: Uneasy Partnership (Thad L. Beyle and George T. Lathrop, eds.) New York, The Odyssey Press, 1970. p. 183.

IV. LEGISLATIVE BRANCH INFORMATION RESOURCES

During the 1970's, there was a serious and sustained commitment of resources by Congress to the development of technology-supported information resources and services. In coping with its enormous, and ever-expanding information problem, Congress has evinced a willingness to explore a variety of ameliorative approaches, determined that its governing role would combine a perceptive "look ahead" capacity, as well as being able to respond with alacrity to pressures from constituents for unanticipated calamities. In the past 10 years, the volume of information on Capitol Hill has grown to a staggering extent, resulting, in part, from the tripling of congressional staff -- which now numbers 25,000. In spite of an annual expenditure of well over $50 million for costs involving the use of information technology -- up from $4.8 million in 1970 -- and significant legislative support staff growth, there will be continuing pressures on those responsible for providing requisite narrative and statistical data. (See figure 2.)

Figure 2

LEGISLATIVE BRANCH COMPUTER EXPENDITURES a/

	1970		1979	
	Budget	Percent of Legislative ADP Expenditures	Budget	Percent of Legislative ADP Expenditures
House of Representatives	$434,000	9%	$10,189,000	19%
Senate	298,000	6%	14,515,000	28$
Library of Congress	1,253,000	26%	13,290,000	25%
General Accounting Office	907,000	19%	5,331,000 b/	10%
Government Printing Office	2,004,000	41%	6,915,000	13%
Congressional Budget Office	(1,208,000) c/	--	2,400,000	5%
Office of Technology Assessment d/	----	--	----	--
TOTAL	$4,896,000	101%	$52,640,000	100%

Although the general pattern of developing such innovative "systems" has been chamber oriented, or left to the various legislative support agencies -- the Congressional Research Service, General Accounting Office, Congressional Budget Office, Government Printing Office -to implement, the realization has evolved that there should be a mechanism to monitor and guide these efforts. Early in 1977, CRS Director Gilbert Gude proposed formally to the Senate Committee on Rules and Administration and the Committee on House Administration that a "Policy Coordination Group (PCG)" be created "to coordinate the development of technology-supported information systems during the present and succeeding Congresses." 9/ The PCG would operate through a series of task forces, such as those responsible for developing the joint LEGIS (Legislative Information and Status System) capability, one focusing on the potential of microform technology, and another to coordinate orientation and training in the use of information technology on Capitol Hill. Full approval of the PCG staff mechanism was given by the respective Committee chairmen.

a/ Budget figures provided by cognizant legislative personnel (1/9/80) include equipment and personnel costs, and contracting services. The option for each House Member to spend $15,000 annually from clerk-hire funds is not included.

b/ Preliminary actual amount.

c/ Figure is for year of CBO's first formal budget (1976) and is not part of 1970 total.

d/ The Office of Technology Assessment spent $100,000 in FY'79 for the use of time-sharing services and peripheral equipment to access the system. This figure is .002 percent of the total legislative ADP expenditure percentage.

9/ Separate letters from Gilbert Gude, Director, Congressional Research Service, to: The Honorable Howard W. Cannon, Chairman, Committee on Rules and Administration, United States Senate; and Honorable Frank Thompson, Jr., Chairman, Committee on House Administration, United States House of Representatives (both dated April 27, 1977). 1 p.

The House of Representatives, which began its advanced information systems development in 1969, has separated its policy formulation and operational responsibilities. Within the Committee on House Administration, a Policy Group on Information and Computers, chaired by Rep. Charlie Rose, performs the former task while the 182-person House Information Systems Group handles all of the information developmental and service operations.

Among the priority applications of ADP technology is the handling of bill content and status information through the on-line LEGIS capability. Begun in 1973, this "bill status system" now makes such information available to Members and congressional staffs. Originally, such data were obtained by calling a central inquiry office which obtained the needed information from computerized files. With the growth in terminal devices located in Member offices-over 300 offices now have such units--direct access to these files is becoming more common.

The potential for using computers in the bill drafting function was first recognized in the House Office of Legislative Counsel in the late 1960's, but positive action through a series of experiments did not ensue until the 94th Congress. The ATEX terminal-oriented composition and editing system -- installed for the purpose of publishing proposed legislation using text processing and photocomposition methods -- features a single minicomputer that performs all three of the essential systems functions: editing, file management, and composition. As the system expands its configuration with additional minicomputers and multiple terminals, 96 users will be able to utilize the system concurrently. The Legislative Counsel now uses the system for supporting the bill drafting process.

A broad array of budget analysis and monitoring projects in support of the House Committees on the Budget and Appropriations and the Congressional Budget Office (CBO) has been developed since the passage of the Congressional Budget and Impoundment Control Act of 1974. For the most part, these systems were developed and are maintained by the Congressional Budget Office with assistance from House Information Systems and commercial vendors. The operating programs include:

Budget Control System	Member Budget System
Budget Tracking System	Fiscal Data Base
Legislative Classification System	CBO Congressional Scorekeeping System
Project Control System	Rescissions and Deferrals
Program and Fiscal Data Base	Comparative Statement of Budget Authority (CSBA)

An increasing number of computer-assisted models are used to help formulate policy alternatives, supported by such packaged programs as income modeling, statistical analysis, econometric forecasting, and income tax analysis.

A "Member Information Network (MIN)" allows Member offices access to various remote computerized files such as JURIS, FAPRS (Federal Assistance Program Retrieval System), LEGIS, and a dozen information files which comprise the Library of Congress SCORPIO (Subject-Content-Oriented Retriever for Processing Information On-line) system.

Other House uses of computer technology include the highly sophisticated electronic voting system in the chamber, the use of terminals by 18 committees in preparing their legislative calendars, and several routine administrative functions (e.g., payroll, inventories). Video technology now is being employed to record all gavel-to-gavel chamber action; this was undertaken following a multi-month trial filming of House chamber activities, conducted by the House Select Committee on Congressional Operations.

Within the United States Senate, the development of technology-oriented information resources and systems is controlled by the Committee on Rules and Administration. Official "guidelines," similar to those in effect in the House of Representatives, dictate that the committee has: 10/

> . . . authority concerning policy, organization, initiation, implementation, operation and evaluation of all matters concerned with information processing and communication as they relate to mechanization, automation, computerization, or related functions.

It should be noted that certain responsibilities are vested in the Sergeant at Arms, who controls the Senate computer center, and the Secretary of the Senate.

In fulfilling one of the recognized top priorities affecting information support -- "provide information and analysis to Senators and their staff to assist them in their legislative tasks" 11/ -- videoscreen terminals have been installed in 100 Member offices and approximately 50 other Senate locations (e.g., committees). Also, a growing number of Senators' offices in the States have access to the Senate Information Network. These units provide quick access to LEGIS and the SCORPIO-served files of the Library of Congress, such as the much used Major Issues System, the Bill Digest files for the 94th, 95th and 96th Congresses, and the Congressional Record Abstracts.

10/ U.S. Congress. Senate. Committee on Rules and Administration. Initial report of the Subcommittee on Computer Services to the Committee. (92nd Congress, 1st session, committee print, July 21, 1971). Washington, D.C., U.S. Government Printing Office, 1971. p. 2-3 [Proposal 1]. Also see U.S. Congress. House. Committee on House Administration. Providing Funds for the Expenses of the House Information Systems of the Committee on House Administration. 95th Congress, 1st session, Report No. 95-137, March 29, 1977. Washington, D.C., U.S. Government Printing Office, 1977. 22 p.

11/ U.S. Congress. Senate. Committee on Rules and Administration. Report to the Subcommittee on Computer Services. (95th Congress, 1st session, committee print, January 3, 1977). Washingtol, D.C., U.S. Government Printing Office, 1977. p. v.

Several applications of information technology have been undertaken successfully during the past five years. As noted earlier, LEGIS has been developed on a joint basis by the House of Representatives, the Senate, and the Library of Congress. New capabilities include the utilization of "full text retrieval" programming through use of the SCORPIO software, data files featuring official information on Senators, Senate committees, and committee membership for use by the Secretaries of the Majority and Minority, a Senate meeting and hearing display system, and on-line files of unprinted amendments pending on the Senate Floor.

A series of fiscal-budgetary support capabilities exist, including the provision of tabular data on budget targets, allocations, and ceilings, and a library of analytical reports from the OMB budget preparation tapes for the Senate Committee on the Budget. In addition, external modeling services (Chase Econometric, Wharton Econometric, DRI) also are available to Senate committee users. The Committee on Appropriations utilizes ADP in its preparation of appropriations bill reports and has expedited the production of tables used in bill preparation through use of a high-speed printer.

Another milestone endeavor, designed to facilitate Member office operations, has been the "Correspondence Management System (CMS)" designed to better manage the voluminous correspondence which is a severe problem in most Senate offices. A controlled test in 11 Member offices established the need for such improvements and provided data to project the costs and benefits of a system which is now fully operational in approximately 80 offices. Related to this effort has been the establishment of an "Automated Index System" which permits committee offices staff to store basic identification data about a document only once: subsequently the computer provides cross files on the basis of name, date, city, etc.

Several Senate committees have had special computer-based services created for them. One of the most comprehensive efforts, for the Committee on Foreign Relations, features a retrieval system that contains a collection of indexing and abstracting records on such committee documents as charters, treaties or international agreements, press releases, and reports required by law.

Computers, microfilm, and other technologies are employed by the Senate as it copes with massive addressing and mailing responsibilities, receives and stores Senate campaign expenditure data, records vote tallies, and performs such routine administrative tasks as those related to payroll and personnel. Audio taping of Senate chamber proceedings and consideration of installing an electronic voting system also have occurred.

Thus, the past decade was a time for experimentation and evaluation, of asking Members and staff personnel about their information requirements and soliciting their opinions on attempted innovations. Figure 3 features a chronicle of key actions which contributed to improving congressional information support.

Concommitant with the development of sophisticated information files and services by the two chambers has been action within the three major legislative support elements -- General Accounting Office (GAO), Government Printing Office (GPO), and Library of Congress -- both to develop improved information systems and utilize, where possible, existing external resources that could enhance congressional operations.

The General Accounting Office's "watchdog" role is well-known, and in recent years the thoroughness of its detailed and sometimes massive analyses of governmental operations often has been sharpened by the use of computers in processing key statistical data. With the strengthening of the Program Analysis Division of the GAO, less reliance has had to be placed upon utilizing industrial or other governmental analytical capabilities. Strenuous efforts have been made to implement the requirements relating to budgetary and fiscal information contained in the Congressional Budget and Impoundment Control Act of 1974 and the earlier Legislative Reorganization Act of 1970, which called for the creation of a "standardized information and data processing system," "standard classifications of programs, activities, receipts, and expenditures of Federal agencies," and making available to committee or joint committees "information as to the location and nature of data available on such Federal agencies" and related summary tables of such data. 12/

The Government Printing Office, faced with ever-mounting production demands, has continued to modernize its facilities. Increasingly, such devices as the new Videocomp equipment and the slightly older LINOTRON system, a "high-speed phototypesetting device which operates off-line to a computer from magnetic tape inputs," 13/ are combined with special software -- e.g., the Master Typography Program -- to expedite the production of certain types of materials. Two general guidelines dictate which classes of work are most applicable to the use of this system: 14/

1. Data which are already, of necessity, being processed on ADP equipment and must be printed in high volume.

2. Data to be printed in volume and which could be handled advantageously through the use of computer processing.

12/ An act to improve the operation of the legislative branch of the Federal Government and for other purposes. Public Law 91-510, 91st Congress, H.R. 17654, October 26, 1970. p. 28-29.

13/ U.S. Government Printing Office. Electronic Composing System: A Guide for its Utilization. Washington, D.C., U.S. Government Printing Office, 1966. p. 6.

14/ U.S. Congress. House. Select Committee on Committees. The Congress and Information Technology. Prepared for the Select Committee by the Science Policy Research Division, Congressional Research Service. (93rd Congress, 2nd session, committee print, May 5, 1974). Washington, D.C., U.S. Government Printing Office, 1974. p. 179.

Figure 3

Chronicle of Key Steps Toward Improved Congressional Information Support

1965-1966	Second Legislative Reorganization Act hearings
1966	First bill to create a congressional computer facility (H.R. 18428, 89th Congress)
1967	CRS automates "Bill Digest" information
1968	CRS computerizes first House calendar operation
1969	House acts on Brademas resolution by empowering Special Subcommittee on Electrical and Mechanical Office Equipment to study ADP uses
1970	Passage of Legislative Reorganization Act of 1970 (Public Law 91-510)
	Senate establishes Subcommittee on Computer Services; authorizes study of ADP uses
1971	House Information Systems office created
	Potter administrative survey of offices of the Secretary of the Senate issued
1972	House and Senate campaign expenditure data systems implemented
	New House chamber voting procedures approved
	GAO "Budgetary and Fiscal Information Needs of the Congress" published
	Technology Assessment Act of 1972 creates OTA (Public Law 92-484)
	Library of Congress ISO begins SCORPIO development
1973	Senate commences "pilot" test of CRS on-line files
	House electronic voting system becomes operative
	CRS and Senate tie in to New York Times Information Bank
	CRS establishes links with MEDLINE and JURIS systems
1974	Congressional Budget and Impoundment Control Act of 1974 (Public Law 93-344) creates CBO and chamber Budget Committees
	House Select Committee on Committees makes recommendations (H. Res. 988)
1975	House Commission on Information and Facilities establishes "pilot member information network"
	Senate provides terminals for all Member offices
	House Committee Order No. 23 authorizes $1,000 monthly expenditure (from clerk-hire funds) by each Member for computer services
	Temporary Commission on the Operation of the Senate established
1976	Temporary Select Committee to Study the Senate Committee System created
	House Commission on Administrative Review formed
	Expansion of Senate, House, and Library of Congress computer capabilities
1977	House Policy Group on Information and Computers established
	Trial videotaping of House chamber proceedings by Select Committee on Congressional Operations
	Policy Coordination Group authorized by Committee on House Administration and Senate Committee on Rules and Administration
1978	First Annual Report of the Policy Coordination Group for Technology Development
	Audiotaping of Senate debate on Panama Canal treaty
	GAO "Congressional Sourcebook" files incorporated within SCORPIO system
1979	Congressional Clearinghouse on the Future features month-long series of seminars, workshops, and demonstrations on "Information and Communications"
	Videotaping of all House chamber proceedings attains operational status

Advanced capabilities continue to be integrated into GPO operations, including new ADP peripheral units, optical character recognition (OCR) devices, and automatic indexing approaches. Today, more than 80 percent of the GPO output is in non-hot type form, with especial emphasis on electronic photocomposition production. In particular, the ATEX system is employed for producing House and Senate hearings and bills.

The Congressional Research Service of the Library of Congress, a fixture on Capitol Hill since 1914, has broadened its non-partisan research and reference services to include more indepth support of committees and the placement of timely data -- showing, for example, where bills and resolutions are in the legislative process -- in computerized files. The 13 SCORPIO-served files now may be accessed by more than 1,000 terminals located within the legislative branch. As early as 1968, content and status information on all newly introduced legislation for both the House and Senate were stored in the Library's computer. While initial emphasis was placed on using special typewriter terminals to input, recall, and edit these data for later GPO publication in the Digest of Public General Bills and Resolutions or the CRS monthly periodical entitled Major Legislation of the Congress, this information now is also provided directly to legislative branch elements via a videoscreen network.

Other CRS major services to the Congress, utilizing computer support, include the Major Issues System (described above) and the Bibliographic Citation File which provides a current awareness of recent literature acquisitions. Each week, descriptive cards are sent to users on the basis of "profiles" consisting of interest terms selected by congressional user clientele. Then, if a congressional office staffer wishes to see the full text of certain documents, a request to that effect will be honored by CRS. Such bibliographic data are available also as a videoscreen presentation at user sites. In providing "out-of-house" services to Congress, CRS also is bringing the resources of the private sector to Capitol Hill. Several multipurpose videoscreen terminals now link CRS and its House and Senate Reference Centers to the New York Times Information Bank. Quickly accessible to researchers are special writeups on news and feature items appearing in the Times from 1969 to the present, plus selected coverage since 1971-1972 from nearly 70 other newspapers and magazines.

Several private firms have established data bases which are utilized by CRS, and are of proven value to Congress. Recognized as a valuable aid to committees and Members alike is the Congressional Information Service "CIS/Index," which abstracts and indexes hearings, reports, committee prints, and other congressional papers. In addition to the 10,000 abstracts issued on a monthly basis, all public laws enacted during a Congress are described (with legislative histories). Microfiche copies of all original documentation treated in the "Index" are maintained in a special collection. The types of information access offered by the New York Times Information Bank and other non-governmental systems such as the SDC Search Service and the Lockheed DIALOG information retrieval service -- both featuring multiple file, on-line products -- have helped raise the level of awareness and acceptance of modern information technology as it is applied to congressional operations. In his book, Congress and the New Politics, Dr. John S. Saloma correctly predicted that:

> . . . Congress is a relatively open system, and it is unlikely to escape such fundamental changes as the computer will introduce in American society, social organization, and education itself. 15/

As Members' perceptions improve, regarding information which might be available to them, and in what forms, certain decisions can commence to be made concerning source selection. Timeliness of the data in any system, whether computerized or not, and the depth of coverage provided may sharply limit the options open to congressional committees and Members needing selected narrative and statistical information. In some instances, where definitive material could be recovered and synthesized if time were not a factor, the Congressman may have to accept less perfect information with which to make his decision. And while many of the traditional periodicals such as the Congressional Quarterly and the National Journal are still used heavily, congressional aides look longingly at any service which allows them optimum flexibility in "browsing" through and selectively retrieving from a given collection of information.

15/ Saloma, John S. III. Congress and the New Politics. Boston, Little, Brown and Company, 1969. p. 245.

V. CONGRESS IN THE INFORMATION AGE: CONTINUING CHANGE

Early in the annals of mankind the observation was made that "where there is no vision, the people perish." 16/ Many contemporary observers believe that this judgment is of particular criticality today, as our complex global and domestic problems vie for the attention of decision makers and the allocation of precious resources. The role of information increasingly is being seen by those who govern not only as the underpinning for societal stability, but as the key to the future.

Throughout its existence, the Congress has had to respond to creative proposals and crises alike. The emphasis, in many notable instances, was necessarily on developing a synoptic capability, measuring the action alternatives, and striving to view the totality of a situation and not simply the fragmented components. To achieve this capability, often cutting through a welter of political pyrotechnics, demanded valid information.

In coping with its enormous, and very complex information problem, the Congress has evinced a willingness, as has been shown, to explore a variety of ameliorative approaches-a number of which involve the use of advanced information technology. Determined that its governing role would combine a perceptive "look ahead" capacity, as well as being able to respond with alacrity to pressures from constituents or unanticipated calamities which have inundated legislators with information, Congress has undertaken numerous initiatives. It is interesting in looking to the future to recall that in the 1965 "Management Study of the U.S. Congress" which was commissioned by NBC News for its special television report called television report called "Congress Needs Help," the projected role of high-speed computers was spelled out: "The very nature of some analytical problems of Congress calls for flexible manipulation of massive data into many different arrangements to serve many different purposes." 17/ It is toward that end that an array of technology-supported information systems, described above, were developed sometimes in the face of a not unexpected opposition to change. Misconceptions of what was possible when using computers, or how these technologies might affect legislative workings -- still a concern in certain quarters -- included:

- o Large numbers of staff would be replaced by computers
- o Committee chairmen would lose control of confidential legislative information
- o Computers would take over a number of decision-making functions
- o Machineable data bases would be the only source for needed data, with human specialists no longer available
- o Robotype letters would depersonalize Congressman-constituent relationships to an unconscionable degree

For the most part, these expectations have proven to be unfounded. New devices and man-machine techniques have been incorporated into traditional chamber, committee, and Member office procedures, and while a few new skills have had to be mastered, the extent of disruption has been minimal in most cases.

Although America has entered the Information Age, as was clarioned during the recent U.S. bicentennial celebration, perhaps there is a need for a measured look at information and its technology. And if the frontier methodology which cascades forth from the laboratories and proving grounds often threatens to overwhelm the senses and dissolve the tried-and-true means of transferring narrative, graphic, and statistical information--by employing satellites or other mechanisms capable of handling audio, video, and computerized data--there can be no relief in the search for the best ways to master and manage these technologies. Librarian of Congress Daniel Boorstin reminds us that "no device can be forgotten or erased from the arsenal of technocracy," 18/ so the burden of responsibility resides squarely with the creators and consumers of these innovations.

Intellectual acceptance of the importance accorded information and communications is one thing, but conscious conceptualization of their place in government and society through the design and adoption of "national programs" and strategies which effect key linkages between governmental and commercial information activities and those they serve, is quite another.

All of this implies change...change to recognized principles, practices, and procedures. Many tend to be discouraged by the continued onslaughts against tradition and known patterns of performance. But for the optimist, there is the reminder found in The Ascent of Man:

> "Among the multitude of animals...man is the only one who is not locked into his environment. His imagination, his reason, his emotional subtlety and toughness, make it possible for him not to accept the environment but to change it." 19/

16/ Bible, O.T., Proverbs, XXIX, 18.

17/ Arthur D. Little Company, Inc. Management Study of the U.S. Congress. Report to NBC News, November 24, 1965. p. 27.

18/ Boorstin, Daniel J. Tomorrow: The Republic of Technology. Time Magazine, v. 109: 36-38.

19/ Bronowski, Jacob. The Ascent of Man. Boston, Little, Brown, 1974. p. 19.

Perhaps this perception can best be viewed as a corollary to the approach taken by Peter Drucker in Landmarks of Tomorrow as he viewed a world buffeted by change and noted that "the only way to conserve is by innovating. The only stability possible is stability in motion."20/ Thus, the legacy of the past--as concerned with information and the means by which individuals communicated--is being extended imaginatively into the future in the belief that all institutions must now turn their full attention to the intertwined tasks of harnessing technology and humanizing society.

20/ Drucker, Peter. Landmarks of Tomorrow. New York, Harper & Brothers, 1959. p. 24.

REPORT DOCUMENTATION PAGE

1. Recipient's Reference	2. Originator's Reference	3. Further Reference	4. Security Classification of Document
	AGARD-CP-294	ISBN 92-835-0285-X	UNCLASSIFIED

5. Originator Advisory Group for Aerospace Research and Development
North Atlantic Treaty Organization
7 rue Ancelle, 92200 Neuilly sur Seine, France

6. Title INFORMATION SERVICES: THEIR ORGANIZATION, CONTROL AND USE

7. Presented at the Technical Information Panel Specialists' Meeting held in Lisbon, Portugal, 5–6 November 1980

8. Author(s)/Editor(s)	9. Date
Various	January 1981
10. Author's/Editor's Address	**11. Pages**
Various	86

12. Distribution Statement This document is distributed in accordance with AGARD policies and regulations, which are outlined on the Outside Back Covers of all AGARD publications.

13. Keywords/Descriptors

Information systems	Document circulation
Information centres	Management
Information retrieval	Organization theory

14. Abstract

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AGARD Conference Proceedings No.294
Advisory Group for Aerospace Research and Development, NATO
INFORMATION SERVICES: THEIR ORGANIZATION, CONTROL AND USE
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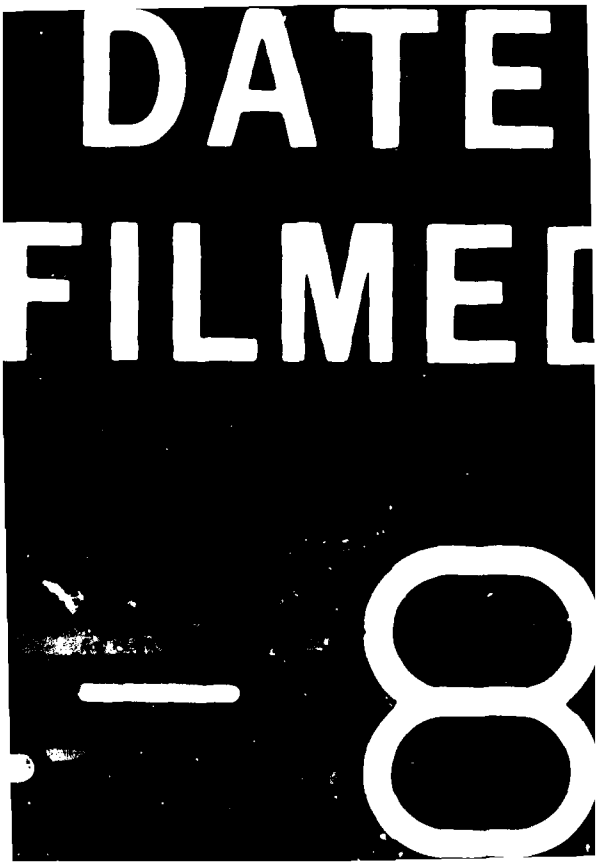
ISBN 92-835-0375-X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