

INIS at 25: Pioneer of the nuclear information highway

Marking its silver anniversary of service, the IAEA's International Nuclear Information System is carving out some new directions

From the beginning, the collection and dissemination of information has been an important part of the IAEA's mandate. Indeed, the Agency is required by its Statute ".... to encourage the exchange among its members of information relating to the nature and peaceful uses of atomic energy and ... serve as an intermediary among its members for this purpose".

The birth of such a globally oriented nuclear information system, however, was some years in the making.

The first documented proposal on an international nuclear information system was made in 1966 by Dr. L.L. Isaev of the Soviet Union and Dr. R.K. Wakerling of the United States. Two years later, in 1968, a detailed systems study was carried out by a team consisting of experts from these two countries, plus the United Kingdom, Federal Republic of Germany, European Atomic Energy Community (Euratom), and the IAEA. The team's report, which was the culmination of an intensive 2-year period of work of many consultants, formed the basis of a proposal submitted to the IAEA Board of Governors. At its meeting on 26 February 1969, the IAEA Board decided to ".... approve the setting up of INIS on an operational basis as early as possible in 1970, and authorize the Director General to request the participation of Member States therein". Upon the proposal of the Governor from India, Mr. Trivedi, the Board also decided that "In developing INIS, the Agency would as far as possible take note of the needs of developing countries".

Within that framework, the world's first truly international computerized system was born with its mission "to produce and disseminate

both a database containing records of the world's nuclear literature and full text of non-conventional literature on microfiche". INIS operations officially began in March 1970.

by
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An information cooperative

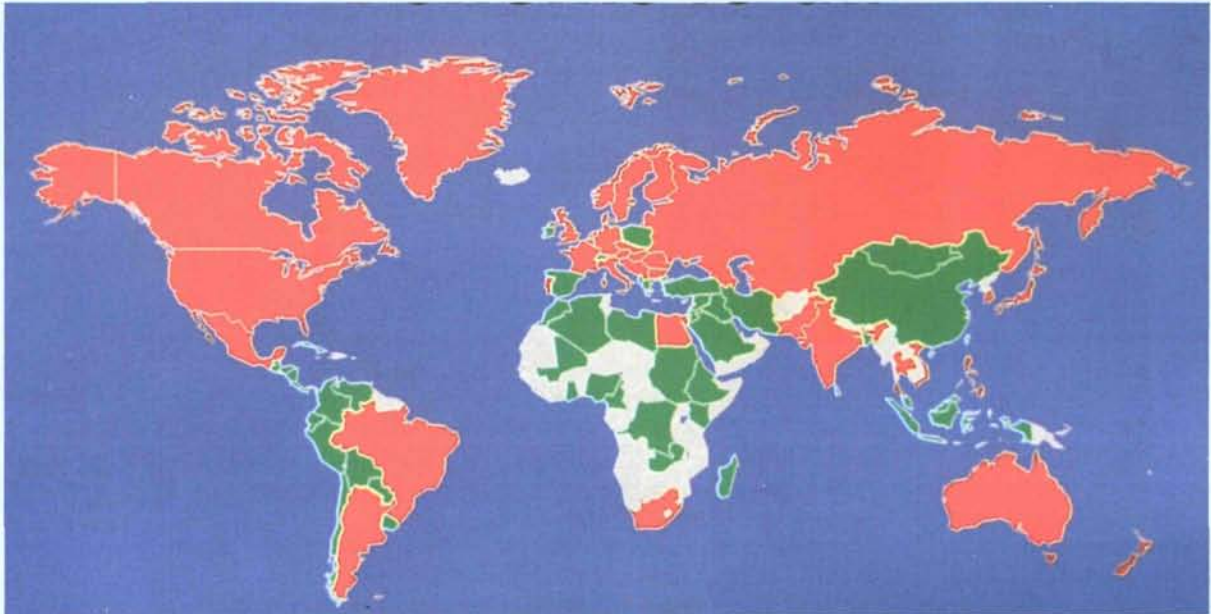
INIS is a co-operative system between the Agency and its Member States including some international organizations. A distinguishing feature is the decentralized operational philosophy. Each Member State participating in INIS scans the scientific literature published within its national boundaries, identifies items that fall within the subject scope of the system, prepares standardized descriptions of these, and sends the descriptions, in many cases together with a copy of the original piece of literature, to the Agency. At IAEA headquarters, the incoming information is checked and merged into a single file so as to create a comprehensive bibliographic database. A copy of the full text of non-conventional literature (e.g., research reports and conference papers) is microfiched and stored in a central collection. Copies of the database and microfiche are delivered to the Member States for their use in providing information services to end-users.

Each Member State is represented in INIS by a Liaison Officer officially appointed by the appropriate national authority. Jointly with the IAEA Secretariat, the Liaison Officers are responsible for the day-to-day management and smooth running of the system. Each year they come together at a three- to four-day consultative meeting convened by the IAEA to review the progress achieved by INIS during the previous 12 months and make recommendations for its future development.

Far-reaching benefits. The decentralized approach to input preparation and output dissemination yields valuable benefits. It results in comprehensive coverage of nuclear literature, ef-

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INIS Participating Member States



- States joining 1969-70
- States joining after 1970

fective handling of information in different languages, and highly satisfactory services for users of the information in each participating country.

Spectacular growth has taken place in participation by Agency Member States. In 1970, at the commencement of the system, 38 countries indicated their willingness to participate. By the beginning of 1995, the number of countries had grown to 90. (See map.)

INIS on line in Germany.

(Credit:
Fachinformationszentrum
Karlsruhe)



In April 1970, the initial output product of the new International Nuclear Information System was distributed. In the first 2 or 3 years the amount of information collected and redistributed was relatively small. Gradually, however, the system's organization took shape on an international basis and by 1973 the number of items processed per year amounted to 56,700, about twice as many as the combined total of processed items from the previous 3 years. From 1974 on, INIS had achieved a steady operation, processing annually 60,000 to 70,000 documents. By 1976, INIS was considered the world's comprehensive abstracting and indexing service in the field of atomic energy. The total amount of information that has been collected in the 25 years that INIS has been operating now consists of over 1.8 million items, with an annual increase of 80-85,000 documents.

The usefulness of the system to end users — in particular decision makers, scientists and engineers — lies in access to information related to in all the areas of interest and activities of the IAEA covered by the subject scope of the INIS database. The subjects include nuclear power, nuclear safety, radiation protection, safeguards, nuclear applications, and related topics.

Choice of products

INIS provides useful products to Member States at different stages of development. The policy of "benefits for all" is met by producing a carefully balanced range of products and services. INIS information is available in different forms and the user may select the most appropriate forms for his facilities and users. INIS output products and services currently consist of:

- *INIS Atomindex*, a printed journal with full bibliographic references and abstracts for all literature reported to the system. There are 24 issues per year.
- Magnetic tape, the machine-readable equivalent of *Atomindex*. It is distributed upon request either 12 or 24 times a year.
- CD-ROM. The set consists of five archival disks covering 1976 through 1994 and one current disk which is updated four times per year.
- Document delivery services. Full text of non-conventional literature reported to the system, distributed on microfiche 24 times a year.
- On-line services. The INIS database is available on-line from the Agency's computer in Vienna as well as from hosts in Member States to users anywhere who have the appropriate technical capability.

High levels of demand. The most powerful criteria that can be used in the assessment of any information service is customer satisfaction. The usage of information products and services is one of these indicators.

Four hundred sets of printed *INIS Atomindex* are distributed annually to national libraries, research institutes, and universities in more than 100 countries. About 95,000 copies of microfiche containing full text of non-conventional literature are distributed annually to information centres, libraries, and individuals in 54 countries. Twenty-one countries receive *Atomindex* on magnetic tape which is used by information centres to disseminate INIS information internally. About 70,000 searches of the INIS database were performed in 1994 by those who have a network connection. Additionally, 173 sets of the INIS database on CD-ROM are currently distributed annually to collective and individual users in 85 countries. (A large number of searches are made on CD-ROM disks.) These statistics would seem to confirm the high usage of INIS output products.

Transferring expertise and systems

One major advantage of a decentralized system is that it tends to stimulate the improvement

of the national information infrastructure as well as promote the transfer of modern information technology.

In order to assist Member States in building up their information processing capabilities, INIS has established a regular training programme of seminars usually held every second year, a fellowship training scheme, and advisory services to national centres.

Over the years, INIS expertise has provided and facilitated information technology transfer; the development of information skills, and the adoption and use of standards for maximizing information exchange. Information technology transfer is achieved, for example, by both INIS training and IAEA technical co-operation projects. These activities assure the establishment or upgrading of INIS National Information Centres, and provide necessary information technologies. They also facilitate formal and on-the-job information skills development. To date, INIS has conducted 48 training events with 1500 trainees.

Through an early regional technical cooperation project, the INIS network was strengthened. The project resulted in information centres being established or improved in 14 countries in Latin America, in the training of more than 50 staff, and the introduction of new information technologies. As a result, these countries can now function collectively and the exchange of information has strengthened ties within the region. Currently, there are three active regional technical co-operation projects in Asia and the Pacific, Europe, and West Asia. In addition to regional projects, INIS has been involved with 16 national technical cooperation projects, four of which are currently still active (Belarus, Lebanon, Mongolia, and Sri Lanka).

The benefits of such projects are the improved transfer of scientific and technical nuclear information to the recipient countries, strengthened capabilities of national information centres, and expansion of the INIS network as an "information co-operative". Each participating Member State, in providing information to INIS, gets a "return on its investment" and has access to a larger nuclear information database to which all Members contribute.

The basic organizational principles of INIS are still valid after 25 years. INIS has been used as a model for other United Nations information systems, notably for agricultural sciences and technology (AGRIS) established by FAO. From its inception, AGRIS adopted the basic principles, standards, and procedures from INIS, even to the extent of utilizing the same computer software.

INIS technical standards and rules for processing literature have also been adopted by two other international information systems. They

International Nuclear Information System: New directions and partnerships

INIS set itself the goal 25 years ago to employ the most up-to-date information technologies in providing nuclear information services to Member States. The range of output products enabled members to provide information services to their users according to their capabilities.

Over the years, INIS has adapted both its methodologies for information processing and the services that its products can provide. The current "information revolution", however, calls for a re-evaluation of methodologies for effectively providing nuclear information to users. This applies both to "what" information is provided and "how" it is provided. For example, what is currently referred to as the "information highway" provides worldwide telecommunication networks linking computers everywhere and enables searches of databases to be made from any location no matter where the databases themselves are stored. Once relevant references have been identified, the full text of the document can then be transmitted to the user.

Strategic planning. In the light of these developments, the IAEA and its INIS participating States have launched a plan for strategic development of the system to be enacted during the period 1995-2000 and beyond. Strategic developments that take advantage of the information revolution may change some of the basic tenets upon which the system was based.

The exchange of information has in the past been based on the development of a large bibliographic database containing references to the world's literature on the peaceful applications of nuclear science and technology provided by the national INIS centres. In addition, the full text of non-conventional literature (NCL) has been available on microform from the IAEA in Vienna. The new approach would continue the development of a bibliographic database of references supplied by the national INIS centres, but it would include additional bibliographic references through arrangements with other database producers. Further sources of information would be accessed directly through networks to hosts located anywhere in the world. Developments in optical storage technologies open new possibilities for distribution of NCL. The full text of NCL can be scanned onto optical disk and distributed widely at low cost.

To proceed with the implementation of strategic developments as outlined above, the participating INIS Member States and the IAEA have adopted an Action Plan. It foresees the establishment of partnerships with publishers of primary and secondary information. The publishers of primary information can provide bibliographic records of their publications in electronic form for direct incorporation into the INIS database and possibly provide access to the full text of their publications in electronic form. The publishers of secondary information — essentially the producers of bibliographic databases — could provide bibliographic records from their databases to the INIS database eliminating duplication in the processing of the literature by the IAEA or one of its Member States. These partnerships would necessarily need to be "two-way streets". While the publishers of primary information may see their benefit in the

announcement of their publications in the INIS database, the publishers of secondary information would see a quid pro quo in being able to draw references from INIS to be included in their databases. Further action would be the establishment of partnerships with database hosts. Three-party agreements between INIS, individual database producers, and database hosts would enable users to gain access to information available in other databases offered by the hosts and to do so through INIS.

The printed version of the INIS database has been available as an abstracting journal, *INIS Atomindex*, as a parallel product to the electronic database. It has been enjoying a decreasing popularity. A forthcoming action will be to discontinue the printed product and to make the database more widely available on CD-ROM at a substantially reduced price. A system is being developed to enable digitalization and optical storage of full text documents onto CD-ROM from hard copies sent to Vienna by the INIS centres. The system will also accept digitized documents from remote locations so that Member States having the technical capability can scan documents at their own sites and transfer these electronically to Vienna. There will be no need for those centres to ship hard copies to Vienna. Actions on implementation of this optical storage system will, however, include the continued availability of NCL in microform for a certain period of time for services to those Member States not yet capable of fully utilizing documents in electronic form.

Users in the nuclear community also require information of a factual or numerical nature, information that is found in catalogues and directories, press releases, calendars of meetings or information on persons having specific expertise, etc. Such information exists at the IAEA and in Member States. As part of the Action Plan, INIS will provide access to this type of non-bibliographic information available either in Vienna or at locations in the Member States.

Impact on INIS centres. Implementation of the Action Plan will affect operations at the national INIS centres. As a result of partnerships established with publishers and database producers for the provision of records to INIS, national centres may not need to process certain portions of their national nuclear literature, thus reducing their costs for input preparation. To ensure that all the relevant literature is covered for the database, further co-ordination will need to be established. On the other hand, INIS centres and their users will benefit from access to nuclear-related information available from other sources. With regard to document delivery, the availability of NCL in electronic form will speed its distribution, utility, and timeliness.

The strategic developments for INIS inherent in the Action Plan for the years 1995-2000 and beyond accentuate timely changes to current operations and will serve the users of nuclear information well into the 21st century.— *Mr. Claudio Todeschini, INIS Section, Division of Scientific and Technical Information.*

are the Energy Technology Data Exchange system established in 1987 by countries of the Organization for Economic Cooperation and Development; and a document delivery system set up 15 years ago by the European Association for Grey Literature Exploitation which covers grey literature produced in European countries.

Indeed, through its adoption and development of international information processing standards, INIS has contributed significantly towards improved compatibility and interconnection between information systems.

Systems such as INIS, which capitalize on information technology transfer, information skills development, and the use of standards for information management and exchange have literally "paved the way" for the global information highway envisioned today.

Future developments

The agenda for the further development of INIS reflects the changes that have occurred in the information industry and in the nuclear community. The information technology environment has changed, technology for electronic data exchange has been developing at a very rapid pace, the economics of information services at the national centres have changed, and the needs for nuclear information are also different from those that existed 25 years ago when INIS was established.

The main technological developments lie in telecommunication networks, digitization of information, and miniaturization of electronic equipment.

Networking, epitomized by the emergence of the Internet, has established the information highways along which flow data, information, and computing power so that access to these commodities spans time and space.

The digitization of all types of information (text, images, sound and video) provides new opportunities for information delivery. A growing portion of the total information productivity will consist of information in electronic form, especially full-text databases and images.

Miniaturization of equipment allows the information user to be more mobile and places large amounts of information at the user's fingertips.

There is considerable confidence in the technological feasibility of new products and services but whether they are economically feasible should be studied. The production and costs have to be acceptable and should be compared with the costs of existing media and the added value of the new technologies.

A careful evaluation of the environment, background needs and training of intended infor-

mation users is crucial. Information which is distributed by electronic means is not yet equally accessible to all countries. The outcome of these considerations should make it possible to provide information which meets the needs of users more adequately.

New missions. Besides the issues related to changing user needs and rapidly developing technology, there are some issues related to international co-operation and economics of information activity. The major one is "database building versus access to existing sources". For a considerable number of countries, the INIS database is the single and only source of readily accessible electronic information. In others, mainly the industrialized countries, nuclear and nuclear related information can be obtained from other databases. This issue was addressed by the Advisory Committee for INIS at its meeting in December 1994. The discussion resulted in a proposed new Mission Statement for INIS and recommendations on the development for the next 5-year period.

The new mission for INIS stresses not only the continued building of the database, but the need for INIS to provide access to mission-related information not encompassed by its own database but available elsewhere. The technology to provide such access already exists. The institutional arrangements need to be established.

As its founders envisaged a quarter century ago, the development of the International Nuclear Information System must go hand-in-hand with evolving technology and the changing information needs of the IAEA's Member States. □

The INIS databank contains about 1.8 million items of information.
(Credit: CERN)

