

THE EUROPEAN REMOTE SENSING AND PHOTOGRAMMETRY
(ERSAP) DATABASE

Irène Mader, European Space Agency, ESRIN, Italy
Charles-Henri Lata arche, Groupement pour le Développement de la Télédétection
Aérospatiale, France

ISPRS Commission VI

ABSTRACT

The background, present status and future prospects of the European Remote Sensing and Photogrammetry Database being developed under the auspices of the European Space Agency are presented. International cooperation aspects in the various phases of the evolution of this project are outlined.

Initiated following a recommendation of the 16th ISPRS congress in Kyoto (1988) and a cooperative agreement between ESRIN, (the European Space Agency establishment in Italy) and GDTA, France, this database will encompass all the documents generated in European countries in the fields of surveying, mapping, remote sensing and related applications.

This online file will complement all imagery catalogues and products, and all online services and tools developed by the European Space Agency as support to its Earth Observation and Environmental Programmes.

KEY WORDS: Data Base, Remote Sensing, Remote Sensing Applications, Photogrammetry, European Space Agency, Europe, International Cooperation

1. INTRODUCTION

The establishment of a bibliographic Remote Sensing and Photogrammetry Database was the subject of a resolution taken by the Commission VI at the Hamburg congress in 1980.

The following steps can be traced back first to the Mainz symposium in 1982 with a paper presented by J. H. Ten Haken entitled "An Investigation of Available On-line Databases in the Field of Photogrammetry and Remote Sensing", and then to the Rio congress in 1984 with the paper of Prof. J. Hotmer entitled "The ISPRS-IRS Information Retrieval System for Literature and Factual Data" (WG VI-4) of fundamental importance to the implementation of the project.

In parallel, Ch.-H. Lata arche presented an inventory of relevant existing databases at the Rio congress in 1984, concluding that the databases were spread across a large number of international hosts. In 1986 the Badagry symposium confirmed previous resolutions.

Joint action and coordination, with a view to defining a single set of creation procedures for

a unified and standardised database in the field of Remote Sensing and Photogrammetry, was needed due to:

- the increasing development of remote sensing, particularly in view of new image technologies
- the recent advances made in photogrammetry and the contribution to Geographic Information systems (GIS)
- the scattered locations of existing databases and the consequent increasing number of access procedures and languages
- the proliferation of different hardware, standards and formats due to the explosion of microcomputing and the large number of new subject-specific databases

A working group under the lead of GDTA, having given consideration to the timeliness of implementing the ISPRS-IRS database, has conducted a study of the existing resources in 1988 amongst the organisations potentially interested in the project. The results of the survey and of a questionnaire sent to 600 European organisations were used to study the users' information requirements. The broad outline of a proposed ISPRS-IRS database was beginning to take shape.

The feasibility study, presented at the Kyoto congress in 1988, entitled "Prospective Study for an ISPRS Database" by D. Burette, Ch.-H. Lata arche et al. put forward several possible configurations, each leading to a project implementation based on different possible networks of producers with various choices to be made and areas to be considered such as:

- choice of host
- types of informations to enter into the database
- choice of thesaurus
- indexing languages
- database language
- analytical or non-analytical database
- dissemination products
- etc

At that time the necessity for a close and complex coordination with various geographically distributed database producers and the lack of definitions in the various areas mentioned above was delaying the implementation of the ISPRS database.

2. EXISTING REMOTE SENSING AND PHOTOGRAMMETRY RESOURCES

The 1988 inventory of existing resources in the field of remote sensing and photogrammetry, performed by the GDTA (France), revealed two categories of information resources.

- computerised multidisciplinary and specific thematic databases produced by major database suppliers available through online information retrieval systems
- documentary resources on remote sensing and/or photogrammetry existing at various organisations and laboratories

2.1 Computerised multidisciplinary databases

This category covers large multidisciplinary bibliographic reference databases, such as:

- NASA (USA) basically aerospace oriented, containing some references on remote sensing and photogrammetry
- NTIS (USA) containing earth sciences references
- COMPENDEX (UK) dealing with engineering, including remote sensing records
- INSPEC (UK) oriented towards electronics including remote sensing records
- PASCAL (France) including records in the field of remote sensing and photogrammetry
- GEOBASE (UK) covering in its part G, the remote sensing, photogrammetry and cartography records

2.2 Computerised Specific or Thematic Databases

This category covers specific databases oriented towards the earth and/or water resources, such as:

- CAB (UK) and AGRIS (FAO) dedicated to agriculture
- Selected Water Resources (USA) and ASFA (FAO) oriented towards water and marine issues
- GEOLINE (DE) covering geosciences, including surveying and mapping with remote sensing
- GEOREF (USA) dedicated to geology and earth sciences
- IBISCUS (France) research progress dedicated to developing countries
- RESORS (Canada) concentrating on remote sensing, surveying and mapping as related to remote sensing

2.3 Other documentary resources

This category covers mainly remote sensing and/or photogrammetry centres and organisations located in Europe, such as:

- IITC International Institute for Aerospace Survey and Earth Sciences (Netherlands) having significant dedicated resources in particular theses and technical reports
- GDTA Groupement pour le Développement de la Télédétection Aérospatiale (France) having resources such as papers of the various symposia it organises, unpublished documents such as DESS students' study reports and technical reports
- IGN Institut Géographique National (France) possessing its own computerised database containing records of theses and technical reports in the field of photogrammetry
- GSTS Groupement Scientifique de Télédétection de Strasbourg (France) having semi-computerised records of publications such as congress proceedings, theses and study reports
- ORSTCOM now Laboratoire d'Informatique Appliquée (France) producing an internal database of journals articles, conference proceedings, monographs and unpublished documents
- UCL Université Catholique de Louvain, Laboratoire de Télédétection (Belgium) having computerised records of journal articles, theses etc..

In his Kyoto 1988 paper "Information Retrieval for Literature and Factual Data in Photogrammetry and Remote Sensing", Prof. J. Hotner also mentioned the following non-computerised systems:

- Zeitschrift für Vermessungswesen (DE). Publishing literature references in the field of remote sensing and photogrammetry
- The Chinese Society of Geodesy Photogrammetry and Cartography. Publishing an abstract journal
- The VINITI (former USSR). Publishing the abstract journal Geodesia y Aerofotosjenka covering geodesy, photogrammetry and remote sensing
- The AIDOS database (DE). Covering surveying, mapping and remote sensing (this database is not available online)

3. ANALYSIS AND STATUS OF EXISTING RESOURCES

Various surveys analysing the major databases dealing with remote sensing performed by J. H. Ten Haken in 1982 and updated by the same author in his 1988 paper "Data Bases in the Field of Aerospace and Related Fields" indicated that scientists in the field of photogrammetry and remote sensing have a variety of databases at their disposal for online searching and that none of them offers a very comprehensive coverage. Further analysis of this paper evidenced then that the majority of these databases were available through the European Space Agency/Information Retrieval Service

(ESA-IRS) at ESRIN, the European Space Agency establishment in Italy, with the exception of GEOARCHIVE (UK), GEOREF (USA), GEOLINE (DE), GEOBASE (UK), RESORS (Canada) and Selected Water Resources (USA).

It should be noted that in 1991 and 1992, in support to the Earth Observation Programme of the Agency, RESORS, GEOBASE and Selected Water Resources were loaded on the ESRIN computer.

A 1990 analysis of the 93 major journals dealing with remote sensing and photogrammetry indicated that RESORS scans 20 remote sensing journals, PASCAL 36 journals and GEOBASE 54. Moreover, this survey evidenced that very few European journals were scanned. Other surveys provided new opportunity to quantify the lack of European remote sensing journals in existing databases as well as the very poor coverage of low-circulation and non-mainstream literature. This also applies to invaluable documentary resources produced at universities and research centres in Europe, including technical reports, handbooks and other unpublished literature, documents commonly known as "grey" literature.

Meanwhile, the European Space Agency developed a multidisciplinary database, the European Aerospace Database commonly known as EAD, aiming at covering all grey literature documents in aerospace and aerospace related fields, generated by European organisations located in its 13 Member States and Participating countries. The database was officially released for access in 1990. Aiming at producing the database in harmonised and unified standards by a network of European organisations, ad-hoc processing tools and software were developed. The database is produced by ESA-IRS and loaded on its computer located at ESRIN.

4. COOPERATIVE ESRIN-GDTA AGREEMENT AND CREATION OF THE PROTOTYPE OF THE EUROPEAN REMOTE SENSING AND PHOTOGRAMMETRY (ERSAP) DATABASE

In 1990 a cooperative agreement was concluded between ESRIN and the "Groupement pour le Développement de la Recherche Aérospatiale/GDTA" (France).

Aiming at creating ultimately a specific computerised database, the European Remote Sensing and Photogrammetry (ERSAP) Database, an online bibliographic file with its corresponding archives, the terms of the Agreement were:

1. The creation in 1991 of a prototype of the ERSAP database, under the respective budgets of both Agencies, and its loading on the computer of ESA-IRS, who was entrusted the task to produce the database.
2. The promotion of the ERSAP project, using the prototype, amongst various groups of the Earth Observation Programme of the European Space Agency, GDTA partner organisations as well as other European organisations and institutes involved in remote sensing, photogrammetry and related fields.

By the end of 1990 a meeting was held with the following European Centres, the GDTA partner

organisations, constituting the nucleus of the producers of the future database:

- ITC (Netherlands)
- GDTA (France)
- IGN (France)
- The Laboratoire d'Informatique Appliquée former ORTSOM (France)
- The Laboratoire de Télédétection de l'Université Catholique de Louvain,
- BRGM: the Bureau de Recherches Géologiques et Minières (France)

The meeting, amongst various aspects, evidenced the need for:

- a harmonisation policy between the future European partners and producers aiming at the elimination of possible redundancy of work
- a common format to be used when dealing with new records
- a reformatting of existing records already in electronic media

The same meeting confirmed:

- the poor coverage of European Remote Sensing and Photogrammetry records in existing relevant databases
- the existence of documentary resources in European organisations
- the usefulness to develop a European Remote Sensing and Photogrammetry (ERSAP) Database

and recommended a survey to be performed of all institutes and organisations in Europe including not only the countries of the European Space Agency Member States and European Communities Member States but also other central and oriental European countries.

In August 1991 the prototype of the ERSAP database was created, including 100 records of CETEL DESS dissertations (sponsored by GDTA) with French and English abstracts and controlled terms from the EAD/NASA thesaurus, loaded on the ESRIN computer and demonstrated at the International Astronautical Federation (IAF) congress in Montreal in October 1991.

In February 1992, the pilot database was demonstrated to the Earth Observation Programme of the European Space Agency who recommended to include into the prototype 500 additional items generated under the Earth Observation Directorate of the Agency in the following categories: technical reports, handbooks, conference papers, technical bulletins as well as Earth Observation newsletters.

These documents are being acquired for further processing and entry into the prototype.

5. THE EUROPEAN REMOTE SENSING AND PHOTOGRAMMETRY (ERSAP) DATABASE PROJECT

5.1 Major Features

The European Remote Sensing and Photogrammetry (ERSAP) Database is an online bibliographic file resident on the ESA-IRS host. The references contain the title in English and original

Quest Accession Number: 91U00106

ERSAP Thesis NN=ER91U00106

Trial mapping of different species of the forest of Bouconne (France) / Thesis - Paris VI Univ.
ESSAI DE CARTOGRAPHIE DES DIFFERENTES ESPECES DE LA FORET DE BOUCONNE
Houssin, Sabine

Groupeement pour le Développement de la Télédetection Aérospatiale, Toulouse
(France). (G6776145) CETEL. Prepared in cooperation with Ecole Nationale des Sciences
Géographiques, Saint-Mandé (France). (EC97988E)

Original contains color illustrations

pp. 94

PD:860000

Language: FRENCH

Avail.: ESA-IRS, unrestricted distribution

The methodology is to make a supervised classification using maps or aerial photographs as ground truth to simulate the case where real time ground truth cannot be carried out. The forest is presented in order to understand its complexity. The date of LANDSAT image acquisition (17 September 1985) is not an optimal period for studying forest country. A methodology is defined to resolve this problem and to alter it to advantage (study of the reflectance curves of the forest species belonging to the forest). The classification finally obtained offers quite a detailed inventory with ten different headings, and reveals deciduous forests, conifers, felling and water. The methodology is constructed for a particular season, Autumn, and for a particular subject, vegetal species of the forest of Bouconne, but it would be profitable to test it on other subjects for possible generalization. This would require adapting the study of reflectance curves if the species are different.

La méthodologie consiste à réaliser une classification supervisée en utilisant comme vérité-terrain des cartes ou des photographies aériennes pour simuler le cas où ne pouvaient s'effectuer des vérités-terrain en temps réel. La forêt est présentée afin d'en comprendre toute la complexité. La date d'acquisition de l'image LANDSAT (17 Septembre 1985) n'est pas une période optimale pour étudier un couvert forestier. Une méthodologie est définie permettant de résoudre ce problème et de le transformer en un avantage (étude des courbes de réflectance des espèces forestières propres à la forêt). La classification finale obtenue offre une nomenclature assez fine avec des postes différents, et met en évidence les feuillus, résineux, coupe et eau. La méthodologie est construite en fonction d'une saison particulière, l'automne, et d'un sujet particulier, les espèces végétales de la forêt de Bouconne, mais il serait intéressant de la tester sur l'autres sujets pour en voir la généralisation possible. Cela nécessiterait d'adapter l'étude des courbes de réflectance dans le cas d'espèces différentes.

Subject Category: 43 (EARTH RESOURCES)

Controlled terms: *CLASSIFICATIONS / *FORESTS / *GROUND TRUTH / *REFLECTANCE /
REMOTE SENSING / *SPECTRAL RESOLUTION / *VEGETATIVE INDEX / *AERIAL PHOTOGRAPHY /
CONIFERS / DECIDUOUS TREES / FRANCE / IMAGE PROCESSING / MAPS / SATELLITE
IMAGERY / THEMATIC MAPPERS (LANDSAT) /

Fig 1: Sample Record of the ERSAP Prototype

language, the author/s (personal or collective), the bibliographic details necessary to identify the document (place of work, corporate author/s, publisher, journal name, conference or symposium details) and the availability of the original document. In addition, the bibliographic records contain an abstract in English and French, augmented with controlled vocabulary terms selected presently from the common EAD/NASA thesaurus (later on from the ERSAP bilingual French/English thesaurus), and subject heading or classification codes from the EAD/NASA classification scheme (later on from the ERSAP classification scheme).

For a sample record see Fig. 1.

5.2 ERSAP Scope and Coverage

The ERSAP Scope and Coverage contains all categories related to the remote sensing and photogrammetry applications and techniques.

Remote Sensing Applications

Geographic Sciences

Cartography
Climatology

Communications

Geodesy
Land use
Photogrammetry
Resources mapping
Transportation
Urban geography and population

Geological Sciences

Bedrock geology
Erosion processes
Deposition processes
Superficial geology and geomorphology
Volcanic and tectonic processing

Water Resources

Chemical state
Ice and snow
Hydrology
Limnology
Oceanography
Pollution

Atmospheric Studies

Gaseous constituents

Meteorology
 Particulate constituents

Biological related studies

Agriculture
 Fisheries
 Forestry
 Vegetation
 Wildlife

Integrated Environmental Studies

Climatology
 Desertification
 Land degradation
 Land pollution
 Multiapplication studies
 Soil science

Remote Sensing Techniques

Sensing Platforms

Aircraft
 Balloons and aerostats
 Helicopters
 Manned orbital platforms
 Rockets
 Satellites
 Ships
 Surface data platforms

Sensors

Active microwave sensors
 Active optical devices
 Acoustic devices
 Arrays sensors
 Imaging systems and imagery
 Photographic systems
 Scanners
 Spectrometers
 Radiometers
 Television systems

Physical Principles and Phenomena

Sensing and Communications Paths

Ground Stations and Data Processing
 Laboratories and Facilities

Automatic classification
 Computer systems description
 Data processing
 Data correction
 Enhancement
 Manual interpretation
 Mathematical analysis
 Statistical analysis

Data Storage/Retrieval and Data
 Catalogues

Project and Mission Design

Programme Planning and Policy

Cost and benefits
 Technology transfer
 User related services

Sensing Techniques

Acoustic sensing
 Active microwave sensing

Active optical sensing
 Imaging sensing
 Array sensing
 Photographic sensing
 Television sensing
 Scanner sensing
 Spectrometry
 Radiometry

Pattern Recognition

Imagery

The ERSAP Scope and Coverage document will be continuously updated by an ad-hoc steering group of experts from the European Space Agency and experts from European remote sensing organisations, and will be the major tool used to select and include the original documents to be processed for entry into the database.

5.3 ERSAP Document Types

In the first implementation phase, unpublished documents will be included in the database such as:

- Technical Notes, Memoranda and Technical Papers
- Technical Handbooks
- Theses/Dissertations
- Contractor Reports
- Patent Applications
- Pre-Conference Papers
- Research in Progress
- Conference and Symposia Proceedings

as well as

- Dictionaries of Remote Sensing and Photogrammetry Terms
- Thesauri of Remote Sensing and Photogrammetry Terms
- Glossaries of Remote Sensing and Photogrammetry
- Encyclopaedia of Remote Sensing and Photogrammetry
- Directories of Remote Sensing and Photogrammetry Centres, Organisations, Professional Societies, Data Centres, Laboratories, etc.

Later on the conventional published literature will be included in the database, such as:

- Books
- Journals
- Journal Issues

5.4 ERSAP Document Sources

The sources of the documents of the ERSAP database will be:

- European Space Agency and its contractors
- Research Institutes and Centres and Universities
- Governmental Organisations
- Data Centres
- Other Organisations

working in the field of remote sensing and photogrammetry and their respective applications.

5.5 The ERSAP Input/Validation Processing System

The requirements to process the documents and input the data directly from various centres and organisations to the European Aerospace Database led ESA-IRS to develop the EAD Input and Validation System, based on the EAD bibliographic standards.

The modularity of the system, used for creating not only EAD records but also other databases produced internally by the European Space Agency, allows the adaptation to changes in the document processing standards.

The system consists of two separate packages, the "local" and the "central" functions. The local entry/validation software which can be very easily adapted to the ERSAP bibliographic standards performs three major functions:

- the data entry to ERSAP standards
- the local validation of records' contents against authority files (thesaurus, corporate authors, etc..) and tables
- services procedures, such as:
 - . the system parametrisation, enabling the continual updating and improvement of the ERSAP bibliographic standards
 - . the transfer of data to the ESA-IRS host (via floppy disk or electronically)

The central software operating at ESA-IRS will manage all the data received from various local input centres or database producers. The most important features of this software are:

- the reception of data transferred from remote input centres
- the preparation and formatting of data transferred to the ERSAP Retrieval System
- the identification and elimination of potential duplicates
- the generation of statistical reports of acquisitions

In order to perform the final quality assurance and control, the central system disposes of functionalities identical to those of the local level and can be considered at the administration level, which has full control over all entered data at any time of operations.

It is intended to make available the local ERSAP software to the organisations who will process their data directly to the ERSAP database as well as keep a local database. The system runs on a standard personal computer, it is advisable to run the system on PS/2 or AT machines, although it could theoretically also be run on XT models. At least 20 megabytes of free disk space and 512 kilobytes of memory must be available.

6. ACQUISITIONS AND CURRENT ERSAP INFORMATION FLOW

The ERSAP database documents acquisition and gathering procedures, adopted by the European

Space Agency, follow the traditional General Acquisition System aiming at the conclusion of bilateral agreements between the European Space Agency and the European organisations releasing the documents for entry into the database. Modelled on the European Aerospace Database agreements, these contracts will require the organisations to release their documents to the database.

Copyright issues will also be dealt with, in order to create at ESRIN a new centralised archive of all documents referred to in the database. Indeed ESRIN has currently the responsibility to acquire, process, archive and distribute a great deal of information related particularly to earth observation. This includes bibliographic, full text, diagrammatic and acquired earth observation data.

From the time of the initial selection of documents, the contributing organisation will, in particular, be requested to determine the copyright status of its documents. If some permission will be proved difficult to obtain for a legal reproduction of the document by the Agency, the document will not be integrated into the ERSAP central archives for further distribution to third parties. It will only be processed as citation in the database.

Upon reception of a document from various remote sensing sources, the initial processing will include:

- the determination of the copyright status and right of legal reproducibility
- the special handling when appropriate
- allocation of a native ERSAP number

The next processing step will include:

- the descriptive cataloguing according to the ERSAP unified standards. These standards will be very similar to the international EAD/NASA standards
- the production of the French and English summaries
- the indexing or allocation of controlled vocabulary keywords from the common EAD/NASA thesaurus (or successors)
- the loading of the records in the ERSAP Information Retrieval System or database

The documents that the Agency is authorised to archive and distribute will also be microfiched using ANSI standards (98 frames with a reduction factor of 24:1) and the resulting master microfiche will be routed to its corresponding archives.

The text of the original documents will be ordered online from the reference retrieved as a search result by the ERSAP end-user.

Communications between the user and the ESA-IRS host will be handled via online ordering status, where an order will be either "waiting", "accepted", or "rejected"; the latter case applying to a document for which the permission to reproduce and disseminate was not granted by the supplying organisation.

The document reproduced either in microfiche or blowback paper copy according to the end-user

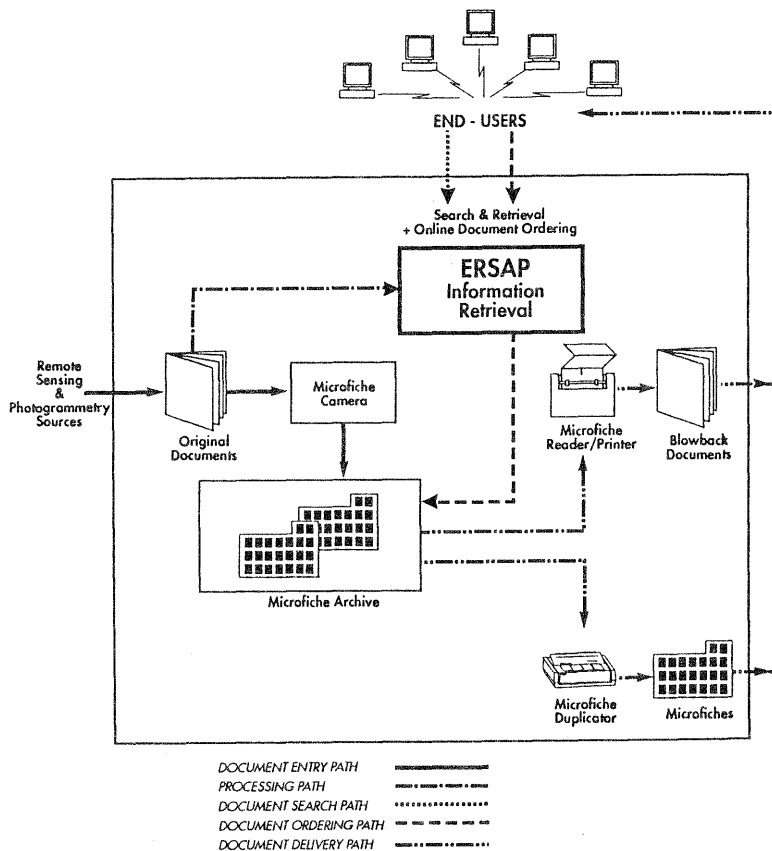


Fig 2: Current ERSAP Information Flow

requirements will be delivered to the user either via ordinary mail or fac-simile services. This process is illustrated in Fig. 2: "Current ERSAP Information Flow".

7. FUTURE PROSPECTS

7.1 The ERSAP Thesaurus

According to the dictionary, a thesaurus is a store of words, or synonyms or antonyms, which can be used as categorised index terms for use in information retrieval. Thesauri are tools used in terminology to translate the user's language into an artificial, but agreed upon, more restrictive controlled language. It is a hierarchical succession in a scientific representation (domain representative) with normative character. This secures an unequivocal access even if the information is unknown. Some databases to-day incorporate thesauri structure which allow to branch from selection lists. They typically follow the hierarchical ISO-NORM approach. In addition, modern thesauri, similar to hypertext (hypertext programmes allow to branch directly within applications from one term to other terms, images, graphics, or annotations), allow direct hierarchy-independent links. The links between terms are presented in a network structure. Electronic thesauri search may consist of means like, matching of synonyms, acronyms, and homonyms, lemmatisation, and other methods which ease and simplify utilisation.

Multilingual thesauri are essential, so that researching documents in various languages do

not depend on specific knowledge and use of a prevailing language. Whenever possible, indexers and users should have the opportunity of working in their mother tongue or, at least, in a familiar language. In the same way, multilingual thesauri might also be considered as playing an important part in improving control of literature and subjects being investigated.

It is intended to develop an ERSAP bilingual French and English thesaurus which will be later on translated into the official languages of the European Communities.

The aim is:

- to create a master list of "descriptors" to be used for indexing and searching remote sensing, photogrammetry, and related subjects in English
- to provide the translation of each "descriptor" initially in French, ultimately in all European Communities languages.

To this effect, an ad-hoc working group will be created composed of experts in the field of remote sensing and related applications, in the thesauri design and national language expertise. The group will examine and select in a single list all descriptors used in national or international information systems relevant to remote sensing, photogrammetry, and related applications research. Systems like INFOTerra, the International Environmental Information System of the United Nations Environment

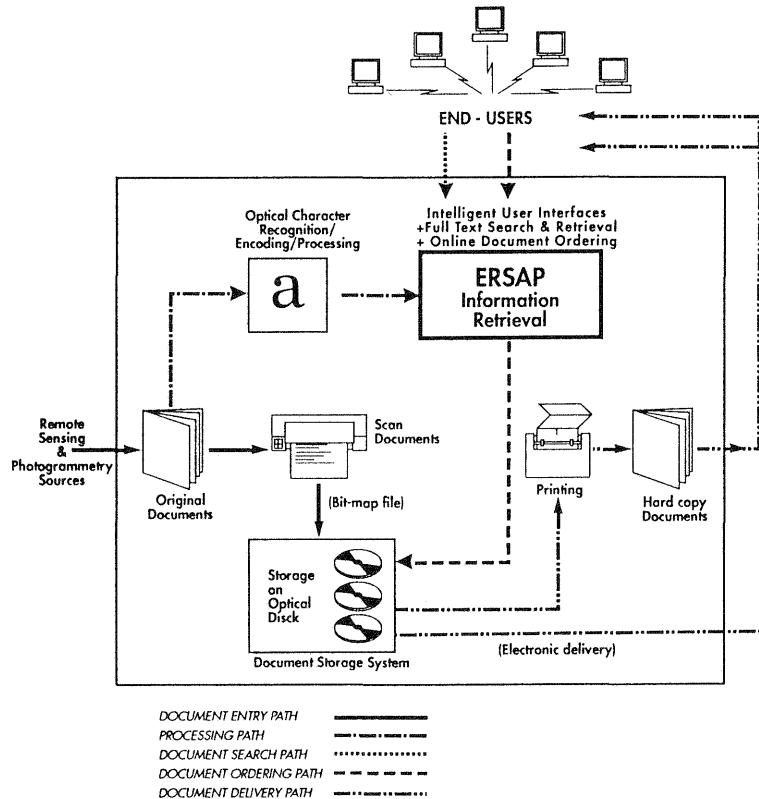


Fig 3: Future ERSAP Information Flow

Programme - UNEP or thesaurus of environmental terms (English, French, Spanish and Russian), the ISPRS dictionary, the PASCAL-GEODE thesaurus, the IBISCUS-CEGET thesaurus for generic terms, a multilingual dictionary of remote sensing and photogrammetry and other thesauri to be identified will be examined and screened. A single list of selected terms will be provided to form the basis for discussions with the experts. One of the main targets will be the standardisation and harmonisation of nomenclature. To fulfill this task, the information to be harmonised will be analysed and distributed to all relevant groups who will evaluate, contribute and make relevant amendments.

This thesaurus will be part of a Unified Remote Sensing, Photogrammetry, and Related Applications System, a long term effort to build an increasingly intelligent automated system that understands the relevant terms and their interrelationship and uses this understanding to help users to retrieve and organise information from a variety of machine-readable sources.

Meanwhile, Hyperline, the prototype hypertext system developed by the Agency will enable ERSAP users to interrogate the ERSAP database in their natural languages, navigate through the multilingual thesaurus structure and browse the documents associated with thesaurus terms.

7.2 The Future ERSAP Information Flow

In the future ERSAP Information Flow, the original documents will be scanned on a high performance scanner. Scanned documents will be transferred to an optical disk based archiving

system.

In parallel, an OCR (Optical Character Recognition)/Processing system will enable full text search and retrieval combined to traditional search capabilities on title, summaries, keywords from the ERSAP thesaurus etc.. Access to the search capabilities of the ESA-IRS will be performed through conventional workstations connected to the ESA-IRS Data Dissemination Network (DDN) or all the interconnected networks.

However, an interesting option could be achieved via workstations with two windows. The first window, connected to the computer would be used to access the ERSAP database via the ESA-QUEST search software. The required documents, identified by searching the database would be retrieved and displayed in the other window. The documents could then be ordered online and either printed and mailed/faxed, delivered on optical media (i.e. CD-ROM etc..) or transmitted via traditional communication networks, via the emerging ISDN networks or via broadband satellite links.

An example of this process is given in fig. 3.: "Future ERSAP Information Flow"

7.3 The ERSAP Dissemination Products

From the ERSAP database, ESA-IRS will produce a variety of current awareness products and services.

7.3.1 The ERSAP SDIs The Selective Dissemination of Information is of particular

importance to the remote sensing and photogrammetry community. QUESTALERT will allow the user to be kept informed on the latest news on a given topic. Using this facility, an ERSAP user will store a specific subject in a file of interest and receive automatically new information on the chosen subject upon each update of the ERSAP database.

7.3.2 The ERSAP Standard Titles

Selected Current Awareness publications will bring attention to recently entered report literature pertaining to remote sensing and photogrammetry. Each of the ERSAP standard titles will be carefully tailored to fit the given needs of a special research activity. New topics will be added as the need arises, others will be discontinued or redefined as research demands dictate.

8. CONCLUSIONS

As can be seen from the above outline of the features of the proposed European Remote Sensing and Photogrammetry Database, the European Space Agency responds to the needs of European and international communities with a new service.

Many space agencies are contributing to an international effort to understand the global Earth system and to monitor the intricate links between atmosphere, ocean and land.

ERS-1 (European Remote Sensing satellite), launched in July 1991, represents the European Space Agency's first contribution to environmental monitoring via radar systems.

Additional European contributing programmes include EARSEC (the European Airborne Remote Sensing Capability Project) jointly supported by ESA and the CEC (Commission of the European Communities), ERS-2 and follow on European Polar Platforms which will be launched starting from 1989 onwards.

Environmental space data, handled by these missions, will be used by the scientific communities to generate report literature, publications etc. which will be progressively included into the proposed ERSAP database.

The proposed ERSAP database will complement and be integrated into other services provided by the ESRIN establishment in the field of Earth observation.

This database can be viewed as the initial step towards an international endeavour and effort to provide a complete coverage and availability of documentary resources in the field of remote sensing, photogrammetry and related applications.

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