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Projects:

- Teleinformatics
- Eurocopi
- Esis

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1. INTRODUCTION

The programme «Informatics» includes those activities in which efforts have to be concentrated in order to make contributions to the Commission policy in this field and to promote the use of advanced and efficient systems for the automatic collection, analysis, automatic treatment and dissemination of information and the underlying techniques.

Three main items make up the programme, selected out of the public service activities, that can be expected to be performed by the JRC and on the basis of the specific experience available:

- contribution to the research work in the field of Teleinformatics which shall lead to extend and to improve the communication between geographically disseminated computers. The research is centered on the two subjects of «network» (language, operation, protocol) and «data» (databases, standards, processing).
- management of the EUROpean Computer Programme Institute (EUROCOPI), with the aim to integrate closely the

research and service activities in software evaluation and dissemination. The research is oriented on programming techniques and software information transfer problems. The dissemination service is pursued by setting-up an on-line available data base (via EURONET) on program information and by the organization of a program library which performs the program information service in detail and the program distribution.

- running the European Shielding Information Service (ESIS), which in a specific field, where very relevant experience has been accumulated at Ispra, fulfills the task of analysing, evaluating and synthetizing information on shielding data and calculation methods, as well as performing a shielding benchmark experiment. This information is exchanged with the interested organizations and firms in the European Community.

The work is in general pursued in collaboration with a range of bodies in the Community countries and is closely coordinated with the activities of the Commission services which are in charge of the various European actions in the field of Informatics.

2. RESULTS

Teleinformatics

The Teleinformatics research project has developed as a JRC contribution to three major Commission initiatives in the field of information technology:

- the COST 11 bis research project which offers the international framework for joint European research ventures in teleinformatics.
- the INSIS (Interinstitutional Integrated Services Information System) project, an inter-service activity, which aims at stimulating the European informatics industry by the development of a system to facilitate information flow amongst and within Community Institutions and member State Governments.
- the Working Group on Standards which assists the Commission in formulating the policy guidelines on information technology standards, and the Standards Implementation Committee which is the Commission's Watchdog on its internal use of standards.

As well as hosting the technical secretariat of COST 11 bis, the JRC actively participated in the R/D effort in the field of Local Area Networks (LAN), Satellite Data Transmissions and Internetworking, and the Transport Service. This work was initially undertaken as a set of joint research projects with different national laboratories.

The LAN project is carried out in the collaboration with DTA Copenhagen, CNUCE Pisa, ETS Barcellona and the J. Stefan Institute Ljubljana. The project is an attempt to coordinate the LAN developments between the participants with emphasis on the technologies and protocols used, and the services which are provided. The JRC contribution to this project are the ideas which have been generated in the HERMES development which itself is done in collaboration with Politecnico di Milano, NPL Teddington and the TITN company Paris.

The work on satellite data transmission and internetworking currently connects the JRC with CNUCE Pisa and CERN Geneva via Euronet and the Orbital Test Satellite (OTS). With the additional collaboration of RAL (UK) and CENTERNET (DK), an internetworking protocol is being implemented which will allow data transfer across different types of networks (LAN, Euronet, satellite etc.).

The third COST 11 bis project to which JRC participates is one dedicated to the Transport Service.

The «European Teleinformatics Conference» (EUTECO) took place in Varese, Italy, 3-6 October 1983.

This conference brought together more than 250 researchers from more than 50 institutions from member countries of the European Communities and from Finland, Yugoslavia, Norway, Spain and Sweden.

The JRC Teleinformatics team contributed to the success of this initiative at the level of the Organizing Committee, in presenting its original research activities and by setting up the necessary technical infrastructure that allowed the practical demonstration of the achievements of a number of joint COST 11 bis research ventures.

Some of the JRC R/D activities in the field of internetworking, computer messaging and standardization (the Reference and Test Centre) constitute now the subject of a number of experimental and service project proposals to be supported in the framework of the INSIS project.

The JRC contributes with its participation on the Supervising board and on the Management group, as well as the «functional representative» for human and organizational aspects. The JRC now has three test facilities available across Euronet for testing implementations of standards. These are the TTY and Teletex test programs for testing those particular kinds of terminals, and the File Transfer test program. We are currently using prototype Teletex terminals which have an X25 interface for checking out the test program.

Recent involvement with the ESPRIT program has included participation in an evaluation group for the IES (Information Exchange System). Several commercial electronic mail systems have been put to practical use in order to choose one which can, at least initially, meet the needs of the ESPRIT groups. As regards internal developments, in view of the disappearance of the teleinformatics research project from the 1984-87 JRC research programme and the inclusion of some of its functions into the services provided by the «Informatics Centre» of the JRC, no new research activity was activated. In view to achieve some practical results to be included into the list of advanced services offered to the JRC users, it was tried to consolidate the already undertaken projects. In this sense the Internal Network (INET) has been reinforced with additional X25 networks as offered in the market place.

During the INET phase of consolidation, certain modifications have also been necessary due to the change of operating system on the AMDAHL, and also to tune the network taking account of the node in Brussels which is now operational. At the present time it seems highly probable that the company who participated in the software development for INET will be asking the Commission for a license in order to implement INET using micro-computers and to market it as one of their products. A contract was also placed for the realization of the advanced Local Area Network based on fibre optics (the DUAL machine).

As far as the data base function of the computerized mail service (SCRIBA), is concerned, the company who produced the software for the Commission has asked for a license so that they can market it. Progress is continuing with the POSTMAN function which is responsible for the automatic delivery of the mail to its destination location, as well as the collection of the mail from word processors, facsimile machines etc.

As previously planned, the POSTMAN functionality has now been added successfully to the original SCRIBA system (the computer mail service) and a test with a number of volunteer users is currently taking place. The provisional service has demonstrated to be particularly useful in supporting the communication between Ispra and Bruxelles. Unfortunately, due to some delays in the delivery of the automatic telex station, the integration of the telex messages into SCRIBA has been postponed. However in the meantime we succeeded in making a number of heterogeneous Teletex wordprocessors communicate over our X25 network infrastructure.

This has to be considered as one of the very first experiences in the field, as reported by the success of the demonstration offered during the EUTECO conference.

Human and organizational aspects of new office technology

Work in this area was centred on three major topics:

- education and training
- ergonomics
- organisational implications.

A book prepared following the Varese Workshop on the Human and Organisational Aspects of New Office Technology has been published commercially (Francis Pinter Publishers, London) and has now gone into a second printing. An Executive Summary of the Workshop has been printed in all Community languages for distribution to the interested parties in Community Institutions and Member states. A twenty minute video film has been produced to serve as a management briefing film on INSIS, describing the objectives and status of the programme. In the ergonomics area, an ergonomic advice brochure for users has been completed and is being translated into all Community languages. The contract to develop ergonomic specifications for Visual Display Units and printers has been successfully concluded as has work on the contract to review the status of European research on Software ergonomics.

Another contract is nearing completion which is aiming to demonstrate the use of computer aided instruction (CAI) for training word processor users. A broad review of educational technology methods and their suitability for use by INSIS has been completed as has a preliminary report on psycho-social and ergonomic criteria for the design of a video conferencing facility.

Data Base query language

The purpose of this project is to implement a retrieval system able to interrogate scientific Data Bases (developed with the ADABAS DBMS) in a EURONET environment using the syntax of the Common Command Language (CCL), as recommended by DG XIII.

In the first stage of activity a macro-processor capable of improving the macro-facilities existing in ADASCRIP has been implemented in order to execute complex enquiries formed with several search commands. By using this macro-processor it was possible to interface the syntax of the CCL and to deal with a networked file structure for a pre-defined and limited set of information.

This approach has permitted to operate positively with many Data Bases, such as EUROCOPI, HTM, AORS, etc.

The main constraint was essentially the need of setting up a specific set of macros for each Data Base.

To generalize the use of the CCL with any Data Base, a fully renewed version of the above mentioned query system, is under development, which uses a directory of information to retrieve data stored in a multi-files structure, as if they were stored in a single flat file.

The work carried out up to now has primarily been dealing with the design of the programme procedures and their im-

plementation in the present version of Query Language (ADACCL).

Another aspect of this activity, which is aiming at developing query facilities for use with the JRC Data Bases, consisted of a specific problem-oriented query language to be employed for the interrogation of the Component Event Data Bank, which forms part of the European Reliability Data System.

The CEDB is normally interrogated with the aim of computing statistical parameters of reliability; because of the rather complex structure of this bank and of the particular requirements of its users, the characteristics of the conversational language which have been developed are as follows:

- the language is problem-oriented; it makes the physical structure of the bank completely transparent to the end-user and aids the users in performing «intelligent» searches and in obtaining «intelligent» answers;
- the language passes directly the extracted data to statistics calculations and immediately displays the computed parameters;
- the language provides a flexible protection against unauthorized accesses, according to a complex regulation.

Eurocopi

The main objective of the EUROCOPI project is to provide EC users of scientific/technical computer programs with a program information and program distribution service. These services and additional development activities, including related research activities, are as follows:

- computer program information service;
- computer program library;
- practical programming and documentation techniques and aids for the development of computer programs which are structured, flexible (modular), and portable.

During the past year emphasis has been laid on extending the functions of the data base towards the commercial operation phase. Concerning the information level of the input data two important and large data collections from internationally well known computer program libraries have been converted and loaded into the central test file.

The adaptation of the data base to the new operation system MVS has been successfully completed. During this process certain operational procedures were changed, and the data base can be considered to be fully operational in this new improved version. The first stage towards future data base improvements has been completed. These improvements concern data input management, such as the development of a general input data converter and a general update program, and also the general operation of the data base and its usage (retrieval functions) in general. As far as data input in relation to information quality, format, and structure compatibility are concerned the data collection of internationally well known computer program libraries has been converted.

As to applied research and technical development there has been a steady emphasis on the implementation, use and maintenance of engineering packages. The adaptation of these packages to new functions and applications has already been

considered and some new implementations under the new operation system MVS have been completed.

As user support in Engineering Computing is a real multi-disciplinary matter we reconsidered the function of this support activity which resulted in identifying the following modules treated by Engineering Support in informatics: software, hardware, problems to be solved, user + computing, results. A real support activity has to intervene in all status and elements of these modules. Furthermore the analysis on replacing NASTRAN by another powerful engineering package resulted in the decision that the package MBB/MAN-ICES will overtake the functions of NASTRAN from 1984.

In relation to the TOOLPACK activities some mention should be made of the necessary basic contacts and agreements set up to ensure quality control which can be activated as soon as the software is released for selected test sites.

In order to support the need for conversion of FORTRAN programs developed on CDC computer systems, a conversion experiment has been started. The software selected for the experiment is NJOY, a nuclear code for Cross Section Calculations developed at Los Alamos and distributed by the NEA Data Bank.

Analysis of the experiment and some modifications have been progressed so far that the practical test case can start in early 1984.

The reorganization of the JRC Computer Program Library have been completely finished now and the present operation can be considered as the first practical test phase. Furthermore the package SAMS-MEDEE was available under the new operating system MVS. This conversion activity has to be considered as direct support to the Commission's activities.

Esis

Esis is a service activity in the field of radiation shielding dealing mainly, but not exclusively, with fission reactors. Its principal aim is to develop and maintain high level competence in shielding problems allowing for qualified support to reactor projects in the European Community.

In particular ESIS is working on cross section assessment for shielding and material damage applications, on the testing and developing of shielding computer programs and on the execution of a shielding benchmark experiment. To remain in close contact with current design problems ESIS participates in the calculations of a few reactor shield configurations. To facilitate information exchange it also maintains and updates a shielding data bank and issues regularly a newsletter.

As already reported earlier, ESIS has prepared a neutron deep penetration benchmark in sodium. Its primary aim is the validation of cross section libraries, multigroup schemes and code performances and its ultimate goal the use of integral measurement for the adjustment of nuclear data in such a way that they reproduce the experimental results in a wide range of typical shield design configurations.

After passing the necessary licensing procedures seven steel canned sodium boxes were installed at the Pavia Euracos facility and measurements could be initiated in January 1983.

In an intensive measuring campaign sulphur, aluminium, in-

dium and gold foils have been irradiated up to penetration depths of 400 cm, followed by measurements with proportional counters (proton recoil) in the range of 50-300 KeV, which ended by the end of May 1983. The next stage of this part of the activity was then dedicated to a careful elaboration of the measured data. It started with the analysis of activation detectors based on count rates determined at different time intervals. In this analysis much emphasis was placed on the $S^{32}(n, p)P^{32}$ reaction which monitors the fast neutron flux.

In fact, by the use of big samples and an advanced burning technique fast flux profiles could be obtained up to 360 cm penetration depth in sodium.

The activated sulphur samples were split and processed independently at the UKAEA-Winfrith and the JRC-Ispra. Except for a systematic bias of the counting rates caused by different detection efficiencies, the decay rates agreed within the quoted error limits. Also a neutron spectrum analysis based on proton recoil measurements was initiated.

As far as the theoretical studies are concerned, they have been concentrated on a check of the multigroup library EURLIB, which was processed directly from evaluated point data and used as a basis for several collapsed group structures in shield design. For this purpose deep penetration measurements in iron performed at EURACOS and ASPIS were carefully analyzed and discrepancies between measured and calculated results were resolved by data adjustment.

For this task the program ADJUST-EUR which operates within the modular system RSYST has been used in conjunction with the latest error covariance information.

At the 6th ICRS conference at Tokio in May 1983 paper have been presented on «the adjustment of neutron multigroup cross sections to integral experiments», on «Monte Carlo Shielding Analysis Using Deep Penetration Biasing Schemes Combined with Point Estimators and Algorithms for the Scoring of Sensitivity Profiles and Finite Perturbation Effects» and on «A Parametric Representation of Gamma Ray Attenuation in Two-Layer Shields».

3. CONCLUSIONS

During the year 1983, the activities concerning the Informatics programme evolved within the framework of the following three projects: Teleinformatics, EUROCOPI, ESIS.

As far as the Teleinformatics project is concerned, a major effort was given to the R/D in the fields of Local Area Networks (LAN), of the Satellite Data Transmission and Internetworking and of the Transport Service.

The LAN project was carried out in collaboration with DTA Copenhagen, CNUCE Pisa, ETS Barcellona and the J. Stefan Institute Ljubljana. The JRC contributions to this project are the ideas which have been forwarded in the HERMES development. A contract was also placed for the realization of the advanced LAN, based on fibre optics.

The work on satellite data transmission and internetworking consisted among others of the implementation of an internetworking protocol which allows data transfer across different

types of networks, like LAN and EURONET. Some of the JRC R/D actions in the field of internetworks, messaging and standardization constitute now the subject of a number of experimental and service project proposals to be supported in the framework of the INSIS (Interinstitutional Integrate Services Information System) project.

Progress was also made with the POSTMAN function, which is responsible for the automatic delivery of the mail to its destination location, as well as for the collection of the mail from word processors, facsimile machines, etc.

The EUROCOPI project was mainly concentrated on the services activities, aiming at providing EC users of scientific/technical computer program information. Emphasis was laid on the extension of the data base function towards a commercial operation phase.

A conversion experiment was also started in order to support the need for conversion of FORTRAN programs developed on CDC Computer Systems.

Analysis of this experiment as well as some modifications progressed so far that the practical test case can start early 1984.

As far as the ESIS project is concerned, its main interest was focussed on neutron deep penetration measurements in the sodium benchmark experiment. Its ultimate goal is the elaboration of an adjusted nuclear data library which allows for the theoretical prediction of experimental results in a wide range of typical shield design configurations.

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