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Institute
FOR
Prospective
Technological
Studies



JOINT
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COMMISSION OF THE EUROPEAN COMMUNITIES

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EXECUTIVE SUMMARY

- 1 - The Institute for Prospective Technological Studies, (usually called PROMPT), came into existence only at the start of 1989. This first year has therefore, unsurprisingly, been largely devoted to putting in place the tools and structures necessary for fulfilment of its designated tasks.

These tasks, as outlined in the Commission's blueprint for the restructured JRC , include

- monitoring of new developments in science and technology
- strategic analyses of new areas of science and technology

- 2 - To this end PROMPT is engaged in building up a Science and Technology Observatory which , it is hoped, will eventually provide European decision-makers with an unrivalled and readily accessible source of information on the state-of-the-art of key technologies, the major players involved in their development and Europe's state of preparedness relative to our major trading partners.

The Observatory, which will make use of the latest developments in hypermedia information processing, represents not only a technical but also a human challenge since it will depend, for its information inputs, on a complex structure of sources and much skilled evaluation. The intention is to rely heavily on networks of experts (including the JRC' s own scientists) to supplement such traditional sources as journals, newsletters, press reports and data bases. In addition special antennae would be established in the USA and Japan.

Much time, during the current year, has been devoted to specifying the structure of the Observatory and to deciding what information technology support is appropriate. Plans have already been drawn up for creating an initial Observatory module in the Advanced Materials sector. Meanwhile the essential core service of on-line bibliographic data bases has been developed to the point where over 500 DBs are currently available.

- 3- The other main task entrusted to PROMPT is the conduct of strategic analyses of new areas of science and technology. Based on the JRC' s existing expertise, but drawing also on the skills and knowledge of research fellows, visiting scientists and experts on secondment from other institutions, such studies are

performed on the request of various clients, mainly from within the Community institutions but also including national and regional authorities and private industry. Clients can include other JRC Institutes.

Among the studies initiated during 1989 were two for the Institute of Advanced Materials and one for the Environment Institute. Preliminary work also commenced on three studies for DG XII: one, on the underlying structure and dynamics of the technological system, at the request of the Director-General; the other two, on R&D strategies for transport-related environmental problems and on research aspects of norms and standards, as part of PROMPT's contribution to the SAST activity of the MONITOR programme.

Other work in support of Commission services is currently being discussed mainly in the context of providing assistance to the "Cellule de Prospective", newly established by the Commission and operating under the direct control of the President. Several studies have been proposed and some of them will start early in 1990.

No action was taken yet on various proposals for exploratory research submitted in 1989.

As regards work for third parties, PROMPT has been requested by the German Federal Ministry for Research and Technology (BMFT) to undertake a study.

PROMPT remains a small institute, with only 7 A-grade staff and a further 3 under recruitment. For this reason collaboration with other institutes and research bodies is essential. The current year has seen extensive informal contacts, with the eventual aim of establishing formal cooperation and the designation of certain bodies as "associated laboratories"

INTRODUCTION

The Institute for Prospective Technological Studies (also known as PROMPT) started its activity in 1989, following the new orientations and the new organization of JRC which were put into effect at the end of 1988. The official document which describes these changes for the JRC (A new outlook for the Joint Research Centre - COM (87)491) contains the following statements, relating to the new Institute for Prospective Technological Studies :

"prospecting, assessment, scientific watch and strategic analysis will assume a new significance in the context of scientific and technological developments. This work will become an integral and essential part of the process of programming Community research. In particular, the scientific and technological watch function, which is virtually unknown in the Community, will be called upon to play a key role in the future alongside the prospective studies and technology assessment functions" and "the special feature of the JRC's role in this area is its ability to supply strategic analyses based on "inside knowledge" of the scientific and technical trends in the world of research".

On these bases, and relying on the wide spectrum of scientific/technical knowledge available within the JRC, PROMPT shall support a permanent system for information on and analysis of the situation of science and technology in the European Community and of its relative position worldwide. The activity includes the analysis of the potential and drawbacks of new technologies, the prospects for application in various fields and the developments foreseen.

The subject of the Institute's activities is advanced, applied research with priority going to the subjects covered by the Community Framework Programme and to those newly emerging subjects which are potentially important for European society and industry.

The main functions of the Institute are : to watch, evaluate, alert, helping to bridge the gap between European science and European technology, with the intention to provide information on strategic options and opportunities with a European dimension in a form suitable for users at the Commission, for science planners and for European industry.

The permanent staff of the Institute is very small in number and it will remain limited in the near future. However it will be complemented by the temporary collaboration of staff seconded from Member States, of visiting scientists and grant-holders. In addition, PROMPT will rely heavily on contributions from the outside, through formal contracts or collaboration agreements with national institutes and industrial firms and through

networks of individual correspondents in various fields and countries.

In particular, Institute's antennae will be established at the Washington and Tokyo delegations of the Commission of the European Communities.

The work of the Institute covers two main, closely interrelated activities :

- the operation of a scientific/technical Observatory
- the execution of Prospective Studies.

The S/T Observatory concerns the collection, organization and validation of the information needed for the regular assessment of the state-of-art of science and technology in Europe and for the early detection of new facts, breakthroughs and orientations in the scientific and technological field worldwide.

To this purpose structured access to existing bibliographical and documentation DBs is organized and new DBs will be set up, in particular covering the information collected directly by the Institute on strategic subjects .

Scientific/technical networks of correspondents will be created, composed of internal (i.e. JRC) and external experts in selected fields.

Periodic inquiries will be organized, calling on the opinion and expertise of managers and practitioners of science and technology. Use will be made of the Institute's correspondents in several countries, in particular the "antennae" in Washington and Tokyo .

The Prospective Studies concern the analysis and evaluation of information and its use for the study of prospects in specific fields of science and technology.

This activity is carried out upon request from various customers covering the following categories :

JRC General Directorate and JRC Institutes

DG XII and the R&D Framework Programme

Directorates General of the Commission in charge of the various sectoral policies

The Commission and other European Institutions

National and Regional bodies

Industrial associations and individual firms.

In order to carry out these studies , thematic workshops, panel meetings and structured inquiries are organized , extensive use is also made of outside experts.

1. MAIN ACHIEVEMENTS AND MILESTONES

1.1 Specific Programmes

S/T Observatory

In the framework of the actions supported by the budget of the General Directorate of the JRC and as a basic preparation and set up of the tools for the activity of the Institute, preparatory work for the establishment of the S/T Observatory has been made. In particular, the systematic on line access to bibliographic Data Bases has been organized as a primary tool for any literature search. All the most important international DBs are currently interrogated, including hosts such as DIALOG, ESA/IRS, BELINDIS, G.CAM. In addition, all the DBs on the Commission host ECHO are readily accessible, as well as some national DBs as those of the Italian CNR in Milan and of ENEA in Rome.

In order to store, treat and retrieve the information collected at the Institute, a new DB system is being set up. A hypermedia, user-friendly interface has been selected and steps have been made to establish a network system of personal computers. This will be connected to the mainframe and eventually open to outside correspondents.

The first sector chosen for the implementation of the S/T Observatory is Advanced Materials, where the information collected for the execution of a specific study (see below) will be used.

Study on the cross interaction of technologies

With a view to contributing to the evaluation of the future orientation of the Community R&D programmes and activities, a study of the underlying scientific/technical structure of the technological system has been started, at the request of the Director General of DG XII.

The study concerns the analysis of the innovation process at the nodes between horizontal technologies and vertical sectors/branches. A first part of the activity is being performed, under contract, by the "Centre de Sociologie de l'Innovation" of the Ecole des Mines de Paris and concerns the analysis of commonalities and synergies in the innovation process of seven mature industries, based on a recent OECD inquiry. The industries considered are: Printing and publishing, Glass, Textiles Clothing, Food processing, Watch makers and Paper.

On the basis of the results of the first contract, the specification for further actions will be set up, covering both conventional industries and innovative industries and, in particular, small and medium enterprises.

Studies on Advanced Materials

At the request of the JRC Institute for Advanced Materials, two studies were started in September 1989.

The first concerns a "Survey of R&D in Advanced Materials" and involves two parts : the setting up of an updated inventory of R&D on selected Advanced Materials and the assessment of the status of R&D in the same field. Up to now a literature search has been performed and a survey , concerning the level of effort of the various laboratories ,has been prepared.

The second study concerns the "Market Penetration of Advanced Materials". This is a pilot study aimed at collecting information on the time scale of the innovation process for typical materials , in order to gain insight on the possible behaviour, in the future industrial market, of advanced materials now at the research phase.

Study on environmental pollution management system

For the benefit of the JRC Institute for Environment, an analysis has been started of the perspectives of advanced tools of information technology as an aid to the management of environmental pollution problems. In particular the use of expert systems for the management of the environmental impact of waste from a sector of the chemical industry is investigated.

1.2 Exploratory Research

A number of proposals for exploratory research have been prepared concerning subjects such as the investigation of the possibility of introducing the S/T Component in the studies concerning the sectoral challenges of the internal market, the analysis of the secondary economic effects of public funded scientific research, the use of instrumentation as an indicator of s/t development, the potential of text automatic treatment in the field of s/t prospective studies.

However no exploratory research has been authorized as yet.

1.3 S/T Support to Community Policies

A continuous and sizable effort in support of the work programme of the "Cellule de Prospective" of the President of the Commission is foreseen, starting in 1990.

In preparation of this work, several subjects have been analysed with a view to proposing a study for the "Cellule". They cover :

- activities relevant to the Observatory function of the Institute in such fields as the Science and Technology developments in Japan and in New Industrialized Countries (NICs), particularly concerning those technological fields where these countries have not yet entered massively into the competitive market, but are likely to do so soon. The development of technology in the field of materials worldwide and its impact on small and medium industries in Europe is also considered.
- studies related to various aspects of future environmental problems.
- studies related to the analysis of the European scientific/technological system, etc...

A direct contribution to the MONITOR programme of the Commission is given through the participation in two SAST studies :

- Research and technology strategy to help overcome environmental problems in relation to transport
- Standards, technical regulations and quality control services: changes and implications for Community S/T policy.

Only preparatory work has been made for the first study; work has started on the second study by a preliminary investigation on prenormative research.

1.4 Work for Third Parties

A study contract was negotiated with the Federal Ministry for Research and Technology (BMFT) of the Federal Republic of Germany.

A literature and data base search has been performed in order to identify key survey papers, source documents and programme references. The identification of leading assessment of technology options, timescales, budgets, economics and environmental impact is under way.



1.5 Participation to EUREKA

No participation of the Institute in Eureka projects is envisaged at this stage.

1.6 Associated Laboratories

Several contacts were taken with national and international bodies, teams and individuals active in the field of science and technology policy, of technological forecasting and of technological innovation and exploitation. Contacts with potentially interested industries and associations were also made.

Most of the contacts were informal, in preparation for more formal cooperation agreements and, in particular, for establishing networks of correspondents for the various future subjects of study, when appropriate resources are made available.

In particular, contacts were taken with several "Research Areas" in the Southern part of Europe, with National Institutes and bodies active in the field of technology prospects and technology transfer, with local Industrial Associations and individual firms interested in the utilization of the competences and services available at the Institute.

2. HUMAN RESOURCES

The Institute staff gradually increased over the year from 2 A grade S/T and 2 C Administratives in January, to 7 A S/T, 1 B S/T and 2 C Adm. at the end of the year. In addition, 3 A S/T new posts were allocated to the Institute and the corresponding recruitment is under way.

PUBLICATIONS

Pitfalls of indicator-based evaluation

D.Bain, C.Rinaldini

Proceedings of a workshop on "Science indicators: their use in science policy and their role in science studies" held at the University of Leiden on 14-15 November 1988

Value of viability of PV generated electricity: stand-alone and grid-connected Systems

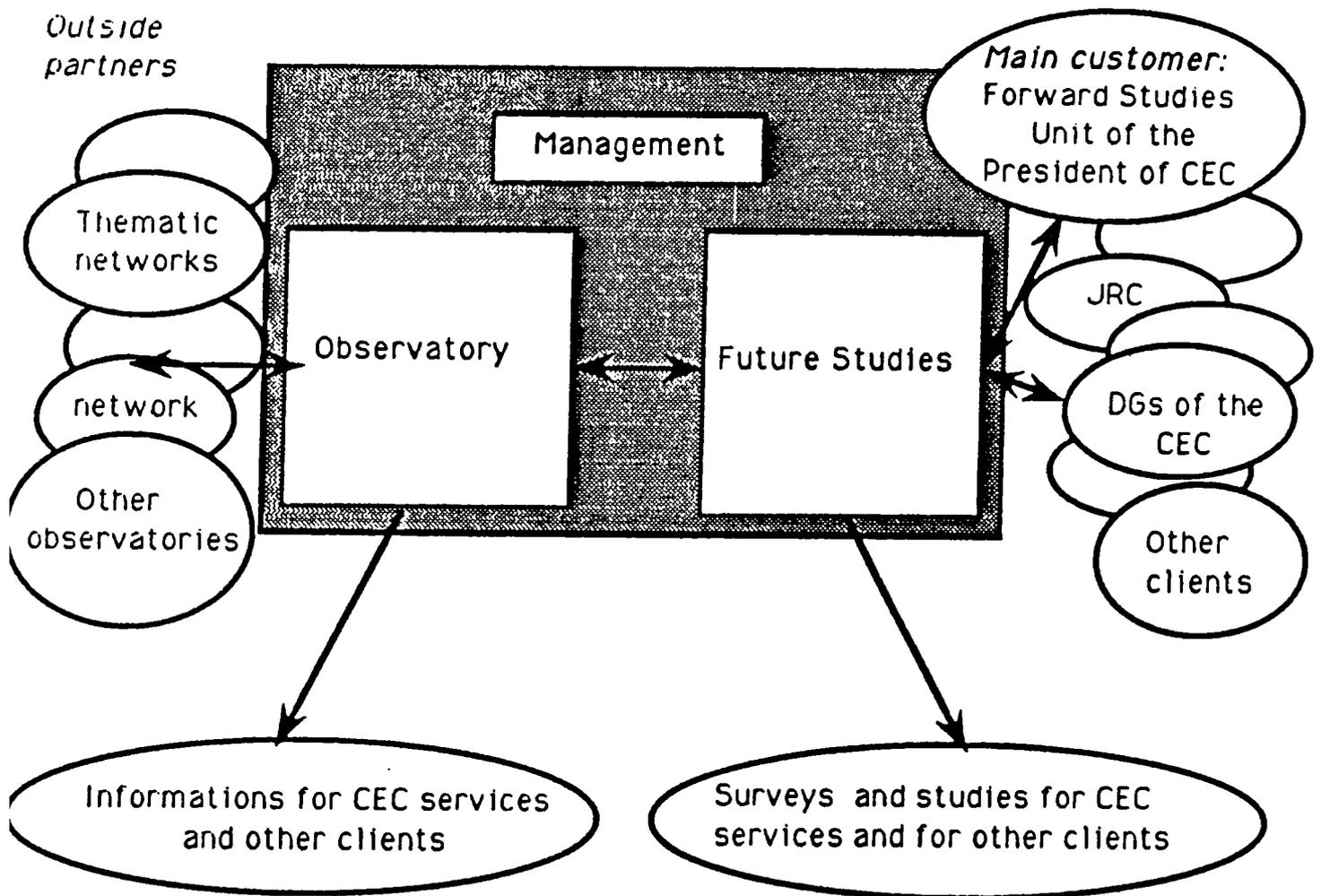
K.Krebs, M.Starr

Presented at "9th European photovoltaic solar energy conference and exhibition"

Freiburg, 25-29 September 1989

ORGANIZATION CHART

Institute for Prospective Technological Studies (PROMPT)



GLOSSARY

BELINDIS	BElgian INformation and DIssemination Service
BMFT	Bundesministerium für Forschung und Technologie (Federal Republic of Germany)
CNR	Consiglio Nazionale delle Ricerche (Italy)
DB	Data Base
DG XII	Directorate General for Science, Research and Development
DIALOG	Dialog Information Services
ECHO	European Community Host
ENEA	Comitato Nazionale per la ricerca e per lo sviluppo dell'Energia Nucleare e delle Energie Alternative (Italy)
ESA/IRS	European Space Agency/Information Retrieval Service
G. CAM	Groupement de la Caisse des Dépôts Automatisation pour le Management
JRC	Joint Research Centre
MONITOR	Community programme in the field of strategic analysis, forecasting and evaluation in matters of research and technology (1988-1992)
NIC	New Industrialized Countries
OECD	Organisation for Economic Co-operation and Development
PROMPT	Institute for Prospective Technological Studies
R&D	Research and Development
SAST	Strategic Assessments in Science and Technology (MONITOR programme)

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C. Rinaldini

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