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EUROPEAN COOPERATIVE PROGRAMS AND THE U.S.

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DECEMBER 1990

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## INTRODUCTION

The political movement for European unification, which started right after World War II and led to such expressions as the European Economic Community, now the European Community (EC), has brought forth also an increasing collaboration on scientific and technical levels. The principal driver for such cooperation was, foremost, the military threat by the East block countries, followed very closely by the perceived economic threat from the United States and, lately, also from Japan. A third driver was the recognition that R&D investments to counter these threats would have to be so large that no single country alone could be successful. Since most European countries already had a tradition of Government funding for nearly all university basic R&D, it was only natural that mechanisms emerged under which joint programs could be created, in which one research objective was being pursued cooperatively at two or more research organizations across the Continent. In Europe, such Programs are called 'Transnational' programs.

## OVERVIEW OF EUROPEAN COOPERATIVE PROGRAMS

European cooperative programs are identified by their sometimes colorful Acronyms (see list on page 6). They consist of national and transnational programs.

European transnational cooperative programs fall roughly into two categories, i.e., those sponsored by the European Community, such as ESPRIT, RACE, BRITE, and COMETT, and by multinational agreements, such as the 16 Nation EUREKA initiative. This paper will describe the origin, scope and methodology of these initiatives.

## NATIONAL PROGRAMS

The best known of these is the British Alvey program, named after Lord Alvey, that consisted of a 5 year, \$500M program, completed in 1988. It was managed centrally by a directorate. Typically, industry participants did match government funding 1:1, while universities were not required to do so. A database search lists a total of 331 Alvey projects in such fields as microelectronics and computer architecture. A subset of the Alvey program was the \$150M VHPIC program for military circuits. As a follow-up to Alvey, the British government instituted LINK, a \$640M program directed at molecular electronics, optoelectronics and robotics. On the Continent, the best known programs were the Mega Project between Dutch Philips and West German Siemens from 1983-89, which laid the foundation for JESSI; and the SUPRENUM program funded by the German government.

## PROGRAMS BY THE EUROPEAN COMMUNITY

Programs by the 12 nation European Community (EC) (now France, Belgium, The Netherlands, Luxembourg, Italy, West Germany, Denmark, Ireland, Spain, Portugal, United Kingdom and Greece) are administered by the European Commission's Science secretariat, a large organization in Brussels that handles applications for funding and project supervision of approved projects.

One of the first programs sponsored by the EC was the Microelectronics Program (MEL), which started in 1982 and lasted for four years, when it was succeeded by ESPRIT 1 (1984-87 at 1.5B ECU) and now ESPRIT 2 (3.2B ECU). As of 15 April 1990, there were 451 projects listed in ESPRIT databanks.

Another EC program is RACE, a 5 year, \$1.5B project to develop an integrated broadband network in Europe. Currently 47 RACE projects are listed, including GaAs R&D.

### EUREKA

EUREKA was proposed in April 1985 by French President Mitterand as a European alternative to the U.S. SDI program. However, the program is now entirely civilian and primarily product-oriented, aimed at keeping European nonmilitary technology abreast of the U.S. and Japan. Its focus is to push technologies to marketable products. More than 410 projects are now listed in EUREKA databanks.

### EUCLID

After the success of the civilian-oriented EUREKA project, the Independent European Program Group (IEPG), consisting of the defense ministers of all European NATO members except Iceland, launched (at their June 1989 meeting, in Lisbon) a military cooperative program which they called "European Cooperation for Long-term in Defense" (EUCLID). The program is designed to consolidate European Defense R&D requirements and resources, and avoid duplication. The ministers expect that this program will enhance the position of Europe's defense industry, which is perceived to lag behind the United States and even Japan in many areas. Initial funding was set for \$120M in 1990. The following topics have been selected for EUCLID:

- Modern Radar Technologies
- Silicon Microelectronics
- Composite Materials and Structures
- Modular Avionics
- Electronic Guns
- Artificial Intelligence
- Signature Manipulation/Processing

Optoelectronic Devices  
Satellite Surveillance Technology (including Verification)  
Underwater Acoustics  
Human Factors/Training Simulators

#### HOW EUROPEAN PROGRAMS ARE MANAGED

##### ESPRIT

ESPRIT is by far the most visible of the EC programs and accounts for roughly 40% of its spending. Member states agree periodically on a total budget and framework, and EC employees then solicit proposals, have them peer-reviewed, and award contracts. Half of the funding is generally borne by the participants. Multinational participation is required; progress is reviewed at an annual ESPRIT conference. ESPRIT receives virtually thousands of proposals per year of which only a fraction obtain funding.

##### EUREKA

EUREKA was established in July 1985 by treaty among the 12 countries of the European Community, and, in addition, Iceland, Norway, Finland, Sweden, Austria, Switzerland, Turkey, and as separate participant, the European Commission. In contrast to ESPRIT, EUREKA is a bottom-up organization. Anyone having an idea and a partner can submit a proposal. If he has no partner, he may find one through the ECHO databank. Projects are to be submitted to National Coordinators who, in turn, send the projects to a panel of Senior Representatives for review, for which a maximum time limit of 45 days is specified. Recommendations are then sent to a ministers conference for final approval and announcement as a EUREKA project. All these activities are managed by a very small Secretariat in Brussels.

Funding of EUREKA projects is different than EC projects, in that EUREKA does not have a common funding source and each national organization has to secure its own funds from public or private sources. Nevertheless, listing as a EUREKA project provides a powerful endorsement that will facilitate obtaining such funding.

#### HOW TO ACCESS EUROPEAN COMMUNITY DATABASES

Information on virtually all European cooperative projects can be obtained on-line through the vast databank of the European Commission Host Organization (ECHO) in Luxembourg, which provides detailed program information on European Community projects, EUREKA, and national programs such as Alvey. ECHO also provides listings and information on many other public and private European and United Nations databases.

There are two ways to access ECHO from the United States:

1. Through a data network such as Telenet and Tymnet, connecting to the Luxpac datanet. The ECHO access number is: 270-448-112.
2. Through an overseas telephone call. The PC should be set as follows:

Full Duplex, 1200 bauds  
Even Parity, 7 Bits, 1 Stop  
Modem set to CCITT Standard

The number to be dialed is 011-352-420-347.

Although the packet network connection is faster at 2400 bauds, it is also more expensive for the occasional user, since large minimum charges are required. We found the telephone access quite reliable. When connection is made, the computer will answer:

THIS IS ECHO; PLEASE ENTER YOUR CODE

You now enter your password. To obtain access to the full range of the database, you need a password, which can be obtained by registering with ECHO at the following address:

European Commission Host Organization (ECHO)  
POB 2373  
L-1023 Luxembourg

Registration for most databases is free of charge, except for TED (EC Tenders Daily), which contains requests for bid and contract awards led by the European Community - similar to the American Commerce Business Daily (CBD). TED costs 36 ECU per connect hour.

Even without being registered, it is possible to access some of these databases by using one of the following public passwords:

EUREKA Full program information on Eureka projects.

TREND Access to the Trend Monitor database which can be searched for developments in various high tech fields.

DIANE Access to the Dianeguide database which contains information on access and content of numerous European databases.

TRAINE Gives information on commands and usage of ECHO.

MATEN Access to the DOMIS materials database.

JUSE Access to the JUSLETTER database.



## CAN FOREIGN FIRMS PARTICIPATE?

With the advent of the Europe 1992 agenda to abolish all trade barriers within the European Community, some concern of European protectionism exists in the U.S. Although European cooperative programs were originally designated to strengthen European vs. U.S. and Japanese technology, cracks have begun to appear and foreign companies have begun to participate as follows:

- o An agreement was signed in January 1990 between IBM (USA) and Siemens (Germany) on the common development of a 64-Mb DRAM, which parallels the JESSI goal, and undoubtedly will result in technology transfer between the two organizations.

- o European branches of multinational companies are welcome to submit EUREKA proposals.

- o Official exchanges between JESSI and U.S. Sematech have resulted in an agreement on two cooperative, albeit nontechnical projects, to analyze U.S. and European industries vs. Japan, and to adopt common semiconductor standards. Negotiations are underway for JESSI to share materials information with Sematech in return for some device processing technology.

- o Japanese companies participate in Esprit Projects through their European acquisitions. One example is the British company ICL, which is involved in JESSI and ESPRIT and has been acquired by Fujitsu.

- o The European Commissioner for Science and Technology proposed to the U.S. the establishment of a joint permanent task force to monitor and coordinate research.

- o A strong discussion is currently underway among EUREKA participants on how to include Eastern Europe into their projects. A similar avenue may be feasible for the U.S.

- o It should be noted that project information in ECHO is detailed and provides program information and point of contacts, as well as telephone and FAX numbers for all participants, to facilitate making contacts.

## CONCLUSIONS

European cooperative programs gain ever more importance over national programs. Infrastructures and databanks exist to manage these programs efficiently. Most of this information is accessible on-line from the U.S. through telephone and data networks and active participation by U.S. companies appears imminent. Civilian programs such as EUREKA have been so successful that military programs such as EUCLID are being modeled after it.

## ACKNOWLEDGMENT

The authors wish to acknowledge the valuable assistance by Denise Duncan of the Logistics Management Institute in obtaining computer access to European databases.

## ACRONYMS

ARIA Automatisation rapide et integree d'assemblage  
(Assembly Automation)

BRITE Basic Research in Industrial Technologies for Europe

COMETT Cooperative Program in Education and Training in  
Technology

DOMIS Directory of Materials Data Information Sources

EC European Community, European Commission

ECU European Currency Unit (approximately one dollar)

ESPRIT European Strategic Programme for Research and Develop-  
ment in Information Technology

EUCLID European Cooperation for the Long Term in Defense

EURAM European Research on Advanced Materials

EUREKA European Research Coordinating Agency

EQUATOR Environment for Qualitative Temporal Reasoning (AI)

FAMOS Flexible Automated Montage System

ITHACA Integrated Toolkit for Highly Advanced Computer  
Applications

JESSI Joint European Submicron Silicon Initiative

MEL Microelectronics Program

MISEP Mutual Information System on Employment Policies

MITHRA Materiels Intertechnologiques de Haute Robotique  
(Robotics)

OSCAR Optical Switching systems, Components and Applications  
Research

PABLI Pages Bleues Informatisees

RACE Research on Advanced Communications in Europe

SUPRENUM Superrechner fuer Numerische Anwendungen (Supercomputer)

TED Tenders Electronic Daily

VHPIC Very High Performance Integrated Circuits

APPENDIX A: LOGIN AND SEARCH FOR JESSI IN ECHO DATABASE

```
% THIS IS ECHO; PLEASE ENTER YOUR CODE
%/EUREKA#####
% JMS0066 OLDSTYLE 90-11-14 15:44 4420
‡ CMD0553
BASE COMMAND ACCEPTED FOR ER88;EUREKA;ED=18.11.8F7 TO 05.10.90
?
FIND JESSI/TI
1.00 NUMBER OF HITS IS 1
?
{ _S F=ALL
1.00/000001 ECHO: -EUREKA /COPYRIGHT ECHO
CD      : 901004
SO      : EUREKA
RN      : 50127
TI      : (JESSI) JOINT EUROPEAN SUBMICRON SILICON INITIATIVE
PR      : EUREKA 127
AR      : SUBMICRON; SILICON; INFORMATICS
```

RL : The JESSI programmes must be seen in relation to the work done before in the field of semiconductors at the Community level (ESPRIT I and II) as well as through bi-national initiatives (Megaproject and EUREKA EPROM). Moreover, JESSI will support the achievements of Applications programmes (e.g. HDTV, CARMINAT, RACE, etc.).

PA : F. R. GERMANY: PHILIPS, VALVO UNTERNEHMENSBEREICH  
F. R. GERMANY: ROBERT BOSCH GMBH  
F. R. GERMANY: SIEMENS AG  
FRANCE: SGS THOMSON MICROELECTRONICS S.A.  
NETHERLANDS: PHILIPS, NEDERLANDSE PHILIPS BEDRIJVEN N.V.  
(main)  
UK: PLESSEY COMPANY PLC.  
Interest expressed by BELGIUM.

DU : For the semiconductor makers, the major milestones are:  
- fabrication of the 1st silicon for 0.5 micrometer CMOS circuits after two years (end 1990),  
- fabrication of the 1st silicon for 0.3 micrometer CMOS circuits after five years (end 1993).  
For the system houses and IC manufacturers, the earliest availability of design rules and powerful CAD tools will be a main objective of the programme, starting from 1 micrometer logic technology and going down to 0.7 micrometer in 1990, 0.5 micrometer technology in 1993 and 0.3 micrometer by 1996. Furthermore, for the system houses, the earliest access to the advanced IC-Technologies developed is decisive for their competitiveness.

RS : The overall JESSI programme cost is 3800 MECU for 8 years (1989-96).  
The 4 sub-programmes will respectively represent 41%, 13%, 32% and 14% of this cost (1550 MECU, 500 MECU, 1200 MECU and 550 MECU). Revised total estimate as at 01.02.90: 550 MECU.

CP : Main project contacts:  
Other national contacts:  
org : bosch4  
contact : GLAUERT  
title : DR.  
dept : DEPT. K8/DIC 2  
function :  
tel : +49 71 21 35 2791  
telex :  
fax :  
email :

org : bull3  
contact : GRUNDBERG  
title : MR.  
dept :  
function :  
tel : +33 1 45 02 94 78  
telex :  
fax : +33 1 45 02 97 31  
email :

org : elekt  
contact : H.R. MEYER  
title : DR.  
dept :  
function :  
tel : +49 89 92 80 820  
telex :  
fax : +49 89 92 80 82 12  
email :

org : jessihq  
contact : VELTMAN  
title : PROFESSOR  
dept : JESSI PLANNING COUNCIL  
function : CHAIRMAN  
tel : +49 4821 77 80  
telex :  
fax : +49 4821 713 90  
email :

org : phic  
contact : HAZEWINDUS

title : DR.  
dept :  
function : MAIN CONTACT  
tel : +31 40 78 37 36  
telex :  
fax :  
email :

org : phic18  
contact : H. WEINERTH  
title : DR.  
dept :  
function :  
tel : +49 40 32 96 501  
telex :  
fax :  
email :

org : plessw  
contact : LARKIN  
title : DR.  
dept : ENGINEERING & COMPONENTS DIVISION  
function :  
tel : +44 79 35 18 240  
telex :  
fax :  
email :

org : rtc  
contact : DE LA CHAPELLE  
title : MR.  
dept :  
function :  
tel :  
telex :  
fax :  
email :

org : siem4  
contact : MEYER  
title : DR.  
dept : GESCHAEFTSBEREICH HALBLEITER  
function :  
tel : +49 89 63 64 43 80  
telex :  
fax :  
email :

org : thom11  
contact : JEAN-CLAUDE VASUTH  
title : MR.  
dept : ETUDES ET PROGRAMMES

function : DIRECTEUR DU PLAN  
tel : +33 1 47 40 77 23  
telex :  
fax : +33 1 47 40 79 10  
email :

org : thom14  
contact : ZOCCHI  
title : ING.  
dept : CENTRAL RESEARCH & DEVELOPMENT  
function : DIRECTOR  
tel : +39 39 655 51  
telex :  
fax : +39 39 655 53 00  
email :

AB : Project description

JESSI is an 8 year research and development programme on silicon-based microelectronics and its integration into systems. The definition phase for the JESSI programme started on 1st January 1988 and ended on 31st December, 1988. This document deals with the JESSI execution phase programme which consists of 4 inter-related sub-programmes:

Technology, Equipment and Materials and Basic and Long Term Research.

During the Definition Phase, people from 29 institutions and companies from 6 European countries (BELGIUM, FRANCE, F. R. GERMANY, ITALY, the NETHERLANDS and the UNITED KINGDOM) worked together to define the "Green Book" of JESSI. The Executive Outline of this green Book is available. It is forecasted that most of these institutions and companies will participate in the Execution Phase.

Developments

1. Technology:

- development of submicron memory technologies (down to 0.3 micron =DRAM, SRAM, EPROM)
- development of logic technologies starting from today's 1 micron, using first the results obtained on memory technologies, and adding some options (e.g. BICMOS, E2PROM)
- access to state-of-the-art processes for special circuit designs where performance and delivery schedules are more important than volumes.
- manufacturing engineering methods to assure timely and cost efficient production of present and future integrated circuit on 150 and 200 mm wafers.

2. Equipment and materials:

This JESSI programme sub-programme aims at:

- developing equipment and materials fulfilling the technological requirements for the production of memory and logic circuits defined in 1.

- building a solid base of European equipment manufacturers in selected areas.

3. Application:

The CAD tools and Euro-project objectives are:

- build up new design methodology and tools for the development of complex ICs (e.g. systems on a chip) and link to systems houses' system tools, by adding new tools which fill the gap between high end and existing low end IC design tools, independently of P.C., hybrid or IC implementation.

- develop prototypes of microelectronic systems (Euro-projects), serving as test vehicles for the JESSI CAD environment and the JESSI technologies, together aiming at validation of new system architectures.

4. Basic and Long Term Research:

This sub-programme goals are:

- to support the IC manufacturers in reaching their goal of 0.3 micron structure width,  $10^7$  -  $10^8$  transistor complexity in pilot production for 1996 and beyond.

- assure long-term continuity by developing new methods and technologies to be exploited after 1996.

OS : name : BELGIUM  
org : b  
add1 :  
add2 :  
city :  
zip : B -  
cntry : BELGIUM  
tel :  
telex :  
fax :

name : PHILIPS NEDERLANDSE PHILIPS BEDRIJVEN NV  
org : phic13  
add1 : (POB 80000)  
add2 :  
city : EINDHOVEN  
zip : NL - 5600 JA  
cntry : NETHERLANDS  
tel :  
telex :  
fax :

name : PHILIPS, VALVO UNTERNEHMENSBEREICH



org : phic18  
add1 : BAUELEMENTE  
add2 : BURCHARDSTRASSE, 19  
city : HAMBURG 1  
zip : D - 2000  
cntry : GERMANY  
tel :  
telex :  
fax :

name : PLESSEY COMPANY PLC  
org : plesex  
add1 : VICARAGE LANE  
add2 :  
city : ILFORD (ESSEX)  
zip : G - IG1 4AQ  
cntry : UNITED KINGDOM  
tel :  
telex :  
fax :

name : ROBERT BOSCH GMBH  
org : bosch5  
add1 : (POB 106050)  
add2 :  
city : STUTTGART 10  
zip : D - 7000  
cntry : GERMANY  
tel :  
telex :  
fax :

name : SGS THOMSON MICROELECTRONICS S.A.  
org : thom11  
add1 : 7, AVENUE GALIENI  
add2 :  
city : GENTILLY CEDEX  
zip : F - 942 50  
cntry : FRANCE  
tel : +33 1 47 40 75 75

telex : 63 25 70 STMHQ F  
fax : +33 1 47 41 38 44

name : SGS-THOMSON MICROELECTRONICS S.A.  
org : thom14  
add1 : (POB 3651 - MILANO)  
add2 : VIA C. OLIVETTI, 2  
city : AGRATE BRIANZA (MILANO)  
zip : I - 200 41  
cntry : ITALY  
tel : +39 39 655 51

telex : 330 13 SGS AGR I  
fax : +39 39 655 53 00

name : SIEMENS AG  
org : siem4  
add1 : (POB 830953)  
add2 : OTTO-HAHN-RING, 6  
city : MUENCHEN 83  
zip : D - 8000  
cntry : GERMANY  
tel :  
telex :  
fax :

GI : Financial contributions

Technology:

The leading European IC manufacturers will develop 0.5 and 0.3 micrometers CMOS technologies, starting from their respective know-how. Technological capability has to be demonstrated by manufacturing of competitive DRAM (V-RAM), SRAM, EPROM and LOGIC products. Cooperation will concentrate on the field of the development of process steps, of a common equipment strategy, on manufacturing science as well as on definition of design standards and interfaces. A wider cooperation with other partners on specific technological aspects will be possible.

Equipment and Materials:

Companies and institutes being involved with this sub-programme have the task to develop manufacturing equipment and materials in strategic areas. Cooperation between equipment manufacturers and the semiconductor industry will be supported by the tight mesh of equipment and process development.

Application:

Application industries, IC manufacturers and CAD design houses will cooperate in the realization of advanced microelectronics systems (Euro-projects) and CAD design systems having standardized interfaces.

Basic and Long Term Research:

Long term research in institutes, universities and companies participating in JESSI will develop new methods and processes in the field of technology and design/CAD. Supporting and alternative research will be under orientation.

Qualifications

The participating institutes and companies have considerable experience in their field.

### Agreements

A cooperation agreement has been signed between the institutes and companies participating in the Definition Phase. Cooperation agreements for the execution phase of the JESSI programme and sub-programmes are in process. Specific contracts will have to be signed between partners for each JESSI project respective sub-project.

### Markets

The world market for microelectronics will increase at an average of 14% per year until the year 2000, reaching approximately 160 billion US dollars with a 28 billion US dollar share for Europe. The three European IC makers cooperating in JESSI will aim at enhancing their positions on the European and world-wide market as well. On the other hand, on-chip system solutions will represent 50% of the IC market. The strength of the European electronic industry depends on its ability to develop such complex microelectronic circuits and to include them into systems.

### Location

The partners in each sub-programme of JESSI will carry out studies in their laboratories and plants within the European countries. Exploited Matter still to be discussed. As a general rule:

- within a specific project, the contractors will grant each other non-exclusive, non-transferable licences under the exchanged results, under favourable conditions
- other partners within the JESSI programme have the right to be granted licences and user rights against commercial conditions after a reasonable lead time.

\*\*\*END OF SHOW\*\*\*

## APPENDIX B: OVERVIEW OF ECHO DATABASES

The following is a list of some of the European databases that can be accessed directly from the U.S. Although not all are technical, they nevertheless provide insight into the social and economic process of European cooperation. The databases are listed in three categories: Research and Development, Language, and Industry and Economy:

### RESEARCH AND DEVELOPMENT

- ARCOME Covers the information and communication sector of Europe.
- BIOREP Biotechnological projects carried out in EC countries.
- DOMIS Directory of materials information sources.
- EABS Research sponsored by the EC in the fields of nuclear research, new sources of energy and environmental research.
- EUREKA Projects financed under the EUREKA program.
- EURISTOTE On-line access to over 10,000 theses and studies in the areas of community policy, competition law, and European institutions.
- IES-DC (Information Exchange System - Data Collection) Information on publicly funded information technology (e.g. ESPRIT, RACE, Alvey, etc.)
- TECNET Describes demonstration projects of the EUROTECNET network.
- ENREP Directory of Environmental Research Projects in EC states.

### LANGUAGE

- EURODICAUTUM Terminology databank containing scientific and technical terms, contextual phrases and abbreviations in all European languages except Greek.
- THESAURI Analytical inventory of all current structured vocabulary which appeared in at least one of the official languages of the EC, USA and Canada.

INDUSTRY AND ECONOMY

TED Invitations for bid for public contracts.

JUSLETTER Quick and concise information on European legislation.

ELISE European information network in support of the exchange of local employment initiatives.

MISEP Information exchange system on unemployment measures.

PABLI Bi-monthly blue pages by EC on progress in development projects.

ELECTRONICS TECHNOLOGY AND DEVICES LABORATORY  
MANDATORY DISTRIBUTION LIST  
CONTRACT OR IN-HOUSE TECHNICAL REPORTS

1 Nov 90  
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Defense Technical Information Center\*

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