Joint European submicron silicon initiative

JESSI-0024

1992 - 1993

Joint meetings Board/Committee

Strategy discussion in the joint Board/Committee meeting on 24 April 1992; Minutes of Committee meetings held in London on 24 April 1992, in Munich on 20 October 1992, in Brussels on 27 April 1993 and in Paris on 29 October 1993 respectively

Jessi Board. Jessi Committee.

Enclosure 7

Munich, April 8, 1992
HM/sm

Strategy Discussion in the JESSI Board/JESSI Committee Meeting on April 24th, 1992

Working Paper prepared by: Mr. Joël Monnier

Subject: **Vision of the European microelectronic industry on the medium term future**

SHORT ANALYSIS OF PROBLEMS:

- Electronics is today the first worldwide industry and determines all the significant shifts in our industrial infrastructures and lifestyles (electronics will represent by year 2000 $ 2.000 billion of sales).

- Semiconductors are the key to progress in electronics since they enhance performance level of systems and bring down their costs: the wealth of Europe now depends on silicon (semiconductor market growth rate: 15% annual on average between 1970 and 2000).

- Europe, as one of the three main economic macrosystems, must have a sufficient level of autonomy in the information technology sector and consequently also in the semiconductor area.

- To anticipate developments in the field of electronics, it is thus mandatory to achieve a huge rate of innovation and competitiveness improvement. This is the challenge Europe has to face.

- The overall situation for European industry is somehow contrasted with:

  * High level of R&D, but weaknesses on the production side despite recent improvement.

  * Consumption of Electronics goods is high in Europe, but the European semiconductor market share is rather small (19% of worldwide market).

  * Production by European manufacturers is still unsufficient: 10% of WW production, 40% of domestic needs coverage.

  * Critical size (5% of WW market for a broadrange supplier) not yet reached by the major European companies.

OPEN QUESTIONS

- Will European electronic industry accept to be more and more dependent on external sources (incl. competitors on their market segments): probably not.

- Will the rate of R&D costs and productive capital investments reduce in the next years: certainly not.

- Are the public authorities ready to help European IC-makers to operate on an equal footing with their competitors (financing conditions, labour flexibility ...).

- Are the key actors (IC companies, System companies and public authorities) in Europe ready to set up actions to improve the situation and avoid increased dependency?

PROPOSAL FOR ACTIONS IN THE MEDIUM TERM

- Maintain a high rate of innovations as the main fuel for growth: exceed the average in R&D expenditures as percentage of sales. Subsidizing needed from public authorities at a level in accordance with the strategic importance of semiconductors.

  As a matter of comparison, each of the Japanese first three leaders will spend $ 3 billions for R&D till 1996.

  Today, the IC manufacturers cannot assume alone such a load, while remaining competitive on the market.

  For R&D support, prefer small, committed consortia on cooperative R&D projects with goals relevant to selected priorities.

- Promote strategic alliances with key European customers for innovative products definition (virtual vertical integration).

  Today European system industry buy only 40% to European producers, whilst Japanese ones purchase 85% in Japan. Find ways to improve together product portfolios and "buying European" willingness.

- Help IC industry developing, renewing and restructuring its manufacturing resources via concentrated and dedicated major investments.

- Provide favourable environment with compensations where needed, to attack disparities between the European business environment and that of its competitors (tariffs, legal and social aspects).

- Prepare ourselves to accept and meet the costs, both social and finacial, of industrial restructuring to reach critical size. Public authorities should be prepared to favour this process.

Distribution list to the summary of results of the JESSI Board / JESSI Committee meeting in London, April 24, 1992

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Munich, May 4, 1992/HM/sm

To the members of the JESSI Board:

Mr. Paletto
Prof. Radelaar
Prof. Aigrain
Mr. Hagmeister
Mr. Knorr
Prof. Lawes
Mr. Petit
Mr. Pistorio
Mr. del Prado
Dr. Scholl

File
Circulation

To the members of the Board Support Group:

Prof. Radelaar
Mr. Ernest
Dr. Friedrich
Dr. Haepp
Drs. Kamerbeek
Drs. Kramer
Mr. Lepetit
Mr. Monnier

Jessi Board-
Jessi Committee
April 24th 92 Copy.

G. Matheron
G. Zocchi

To the chairmen and Vicechairmen of the Subprogram Management Boards:

Drs. Kramer
Mr. Dumas
Drs. Kamerbeek
Mr. Doche
Dr. Sauer
Mr. Borel
Dr. Gilardini
Mr. Schwippert
Prof. Lawes
Prof. Gerber

To the members of the GAT Interface Group:

Prof. Radelaar
Dr. Burgmans
Mr. Ernest
Mr. Guyot
Mr. Haserer
Drs. Kamerbeek
Drs. Kramer
Dr. Sauer
Dr. Villa

To the members of the JESSI Office:

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May 4, 1992
HM/sm

Meeting between JESSI Board and JESSI Committee on April 24th, 1992

Summary of Results

1. Opening and approval of the agenda

Mr. Shotton welcomed the participants of the meeting (list of participants: see **enclosure 1**).

The agenda was approved.

2. Review

a) Introduction

Mr. Paletto gave a short summary on the April Review prepared by the JESSI Organization, explaining the content of the document and highlighting the results of JESSI during the reporting period.

b) Presentation on projects

In order to demonstrate the technical progress achieved by JESSI partners, presentations were given on three different projects:

Mr. Kreuwels: "IMPLEMENTATION OF PROTOTYPE BUILDING BLOCKS FOR A DAB STANDARD"
selection of presentation slides: see **enclosure 2**

Mr. Monnier: "ADVANCED TECHNOLOGY FOR VOLUME PRODUCTION"
selection of presentation slides: see **enclosure 3**

Prof. Radelaar: "I-LINE PRODUCTION LITHOGRAPHY FOR 0.5 MICRON"
selection of presentation slides: see **enclosure 4**

JESSI

The presentations were recognized by the JESSI Committee as very interesting contributions and good introductions to the discussion.

c) Approval of the JESSI Review

Mr. Shotton summarized the JESSI Committee's opinion: The April Report is a very readable and helpful document, clearly improved with regard to technical content and strategic messages. Suggestions for further improvement of the document will be summarized in a written form by Mr. Shotton and sent to Mr. Paletto.

Some proposals for improvement were mentioned:

- put more "weight" on the executive summary
- describe the relation between clusters
- show the links between "single projects" and Flagship Clusters
- describe the impact of JESSI on the market situation (in the document "Market Relevance")
- improve the description of cluster management
- check the "focus" of the program (the number of different technical areas covered by JESSI projects might be too high)

The JESSI Committee recommended to take these remarks into consideration in the preparation of the next Review and to regard the April Review as a "living document" which needs continuous improvement.

JESSI Committee and JESSI Board approved the April Report 1992.

d) Comparison between Budget 1992 and actual spending

The JESSI Committee submitted a set of papers which summarize the funding status of JESSI projects as of April 1992 (see **enclosure 5**). As the difference between the Budget Plan agreed upon in October `91 and the presented funding status might partially be caused by the fact that some project partners have not applied for funding, the JESSI Organization and the Governmental Action Team are asked to check the details.

The Committee informed the JESSI Board that the Governmental Action Team will provide JESSI with updated figures for the Budget Frame 1993, to be used in the coming discussions on the Budget 1993.

e) JESSI/SEMATECH

Dr. Friedrich gave an overview on the present status of discussion with SEMATECH and explained the cooperative projects under investigation (see **enclosure 6**). He emphasized that final decisions on the projects will only be possible after clarification of the budget situation and that JESSI might be forced to cut joint JESSI-SEMATECH-projects because of budget contraints.

The JESSI Committee informed the JESSI Board that the JESSI Organization resp. the industrial partners have the full responsibility to define their priorities for projects and to decide which projects should be labelled or proposed for funding under the given budget limitations.

3. Discussion of strategic issues

a) Vision of the European microelectronics industry on the medium-term future

Mr. Pistorio gave an introduction based on the arguments prepared in the back up document (see **enclosure 7**).

The discussion mainly concentrated on the need to improve the image of JESSI in order to receive sufficient public support for the political discussions and financial decisions.

The JESSI Committee proposed an offensive Puplic Relation work in order to create sufficient political support to solve the problems of microelectronics in Europe.

Mr. Cadiou stated that the support of microelectronics by the EC depends strongly on the positive attitude of the heads of the national Public Authorities and that JESSI should therefore try to take appropriate actions.

Dr. Rupf underlined that JESSI is necessary, but not sufficient to secure the medium term future of the microelectronics industry, and that JESSI should be supported by other parallel activities.

b) The future role of the Public Authorities in JESSI in general and of the CEC in particular

After the introduction given by Prof. Radelaar (see **enclosure 8**), JESSI Board and JESSI Committee underlined the necessity to improve the interaction and the communication between JESSI Organization and EC Organization. Mr. Cadiou agreed, that improvements could be helpful, but that the modus vivendi is already reasonable.

c) Basic & Longterm Research in JESSI

Prof. Lawes gave an overview on the status of the Subprogram BLR as a whole and the individual BLR projects in detail and recommended that Public Authorities and JESSI agree on a broad outline of the future BLR program and on a reserved budget within JESSI for the years 1993 to 1996 (see **enclosure 9**).

With the example of project BT1 he showed that the subsequent funding "decisions" and interference by the funding Public Authority led to a situation which made it nearly impossible to manage the project. The JESSI Board supported the arguments and asked the JESSI Committee to take into account that the

amount of funds dedicated to BLR work is presently insufficient to meet strategic targets in this sector of JESSI.

The JESSI Committee underlined that only the JESSI Organization has the responsibility to set priorities and that these priorities have already been given implicitly with the proposal for the Budget 1992. The JESSI Committee also recommended to include universities and institutes as subcontractors to industrial project partners in order to make sure that the projects are really industrially guided.

4. Agreement on the Press Release

JESSI Board and JESSI Committee agreed on a draft press release and asked JESSI Office and GAT to make final editorial changes.

5. Date of next meeting

The **next meeting between JESSI Board and JESSI Committee** will take place **on October 20, 1992, in the JESSI Office in Munich.**

H. Meyer

Enclosure 1

FORTE
VENUE GUARANTEE

JESSI COMMITTE / JESSI BOARD MEETING

Friday 24 April 1992

NOTES		ACTION
Dr Keith Shotton	DTI / UK	
Mr John McAuley	DTI / UK	
Dr Alun German	DTI / UK	
Mr. RENATO GISLON	MURST / I	
Prof. GIANCARLO SCHILEO	MURST / ITA	
Henri SERRES	MICE / F	
Ch Henry DOMINE	"	
W. Kreuwels	Philips / JSMB/A.	
JOEL MONNIER	SGS THOMSON	
RON LAWES	JESSI / SERC	
Hans Meyer	JESSI Office	
A.H. DEL PRADO	ASM-HOLLAND	
François PETIT	ALCATEL NV	
Gérard Gradeau	THOMSON	
Raimondo Scletto	SGS-Thomson	
Pasquale Vitorio	SGS-Thomson	
Didier AIGRAIN	Thomson	
Jürgen KUHN	SIEMENS	
Roel Kramer	Philips Semiconductors	
Hans Friedrich	Siemens	
DAVE BROSTER	CEC	
Jean Claire CADIOU	CEC	
Guido GRATA	CEC	
WIM VAN 'T HOF	MEZ / NL	
Gaele Winters	MEZ / NL	
KLAUS RUPF	BMFT	
DUDDE	BMFT	

EUREKA 147

EBU

DEFINITION

ACCEPTANCE

IMPLEMENTATION

DIGITAL
AUDIO
BROADCASTING

ON SILICON

FLAGSHIP

CAD

JOINT LOGIC

London/ovh/3

Enclosure 2

DAB
Digital Audio Broadcasting

EU 147 (360 MY)
1987 1992
MEIER ENGELEN (DLR)

DBP-FI PLATFORMS
BBC EBU (CCIR)

IRT
FhG
CCETT
TELEFUNKEN
AEG

TCE
GRUNDIG
BOSCH BLAUPUNKT
PHILIPS

JESSI AE-14 (240 MY)
1991 1996
KREUWELS (PHILIPS)

IRT
FhG
CCETT
TELEFUNKEN
AEG

TCE
GRUNDIG
BOSCH BLAUPUNKT
PHILIPS

SGS THOMSON

JESSI-APPLICATIONS DAB-AE14

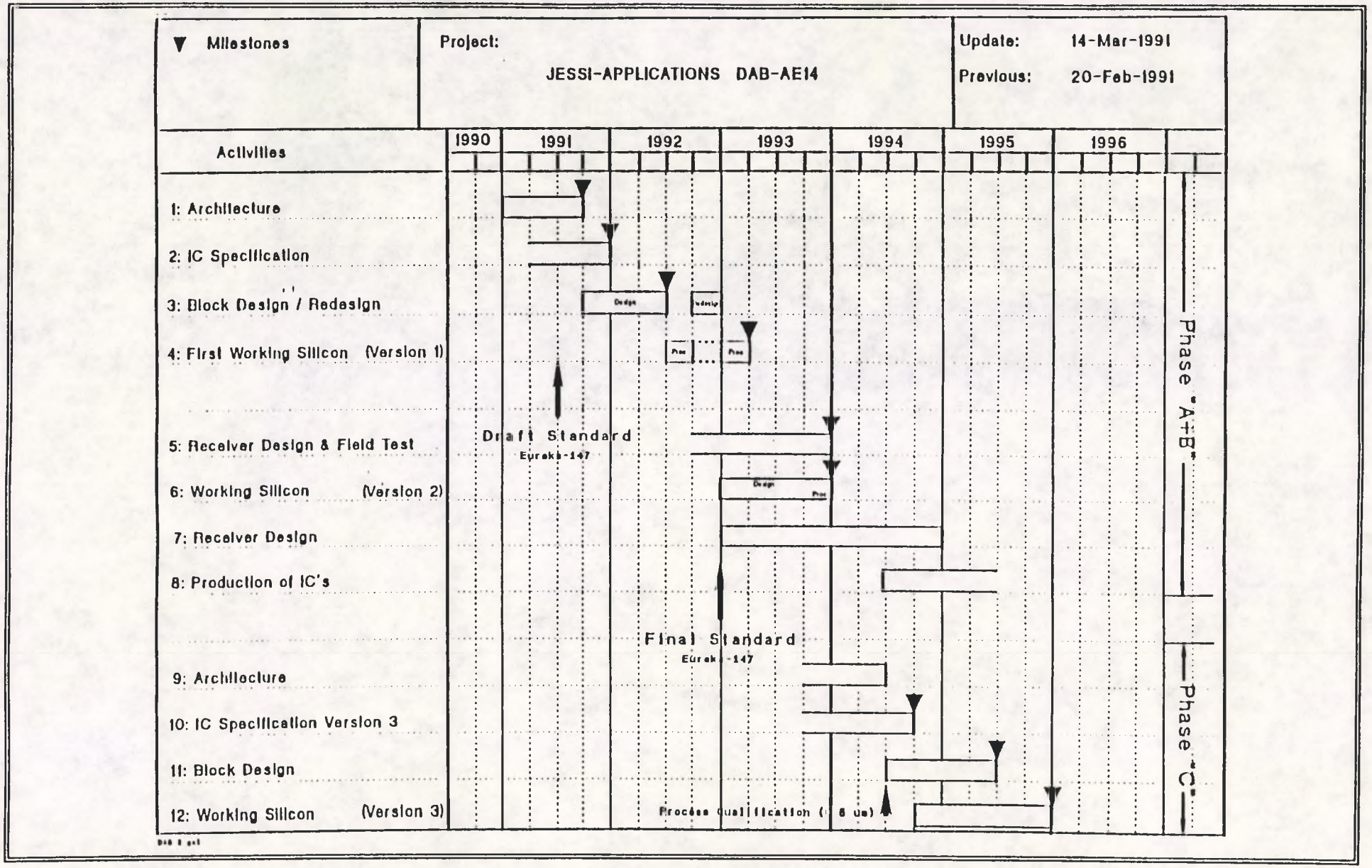
JESSI-APPLICATIONS	PROJECT COORDINATION COMMITTEE (P C C)									DAB-AE14
Phillips	AEG	Bosch	CCETT	DTB	FhG	Grundig	IRT	Phillips	SGS-Th	Telefunken
Chair : Kreiwels	Bergmann	Amor	Sicre	Schweer	Gerhäuser (Seltzer)	Gärtner (Saalfrank)	Sedlmeyer	Jongepier	Pogam	Lodahl

ADMINISTRATIVE OFFICE
Boks

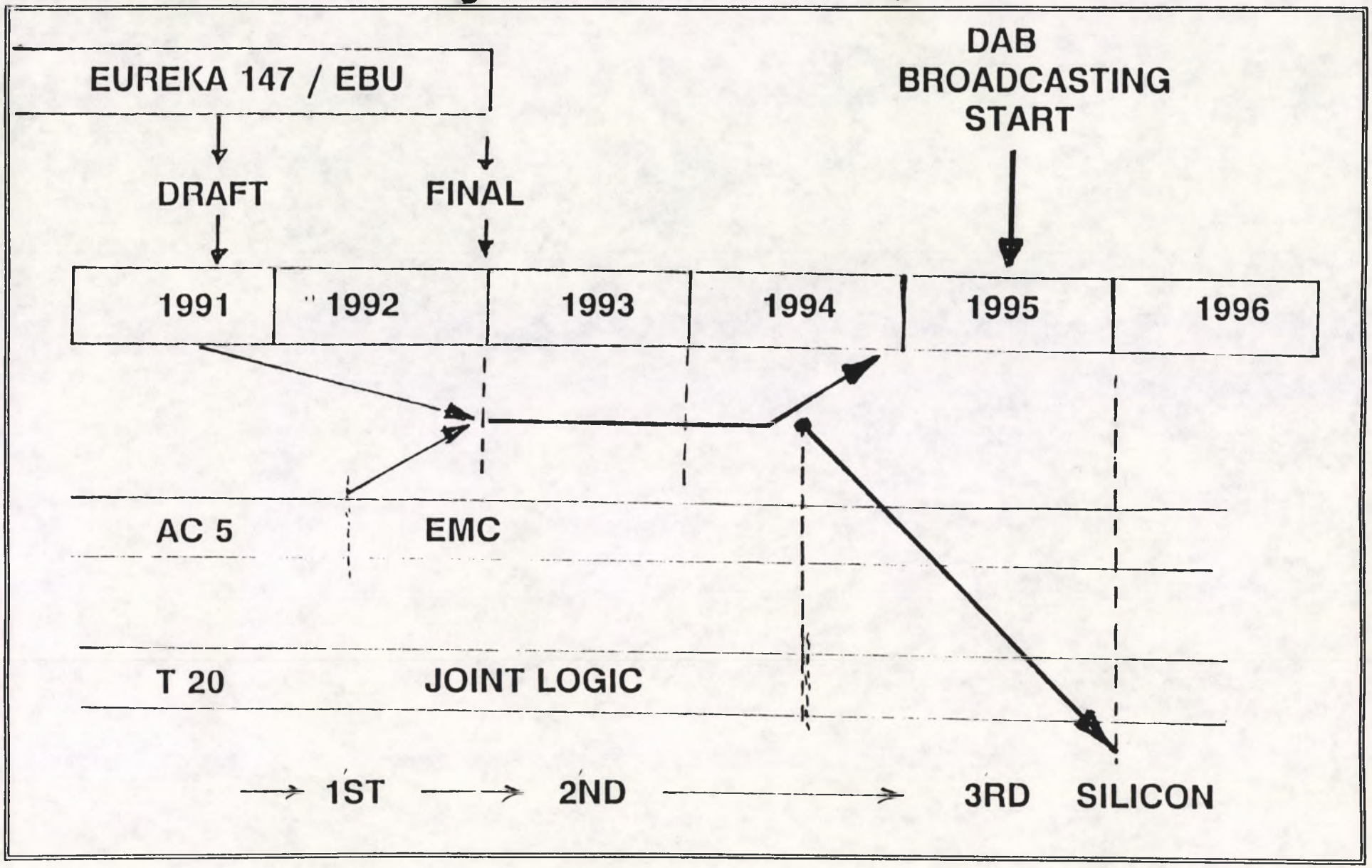
WORK PACKAGE	AEG	Bosch	CCETT	DTB	FhG	Grundig	IRT	Phillips	SGS-Th	Telefunken
1 RF front-end	Kling	Amor	Richard	Rieger	Heuberger	Siegert	–	Sempel	–	–
2 Demodulator & channel decoder	Beck	Amor	Castelain	Schemmann	–	Zunkeller	Weck	Delaruelle	Pogam	–
3 Source encoding & decoding	–	–	Chouquet	–	Eberlein	–	Sedlmeyer	vd Kerkhof	Pogam	–
4 Signal & ancillary data processing	–	Müller	Chouquet	Schemmann	Herre	Reis	Wiese	–	Pogam	–
5 Channel encoder & modulator & transmitter	Golberg	–	Rault	–	–	–	Schnee-berger	–	–	Jeremias
6 Receiver architecture & experimental realization & interf. to tools & processes	Golberg	Achilles	Rault	Klank	Spinnler	Gärtner	–	de Graaf	–	–
7 System testing	–	Amor	Richard	Klank	Spinnler	Lehmann	Sedlmeyer	Isarin	–	Jeremias

Jessi-Applications DAB-AE14 16-Mar-92

London/ovh/11



London/ovh/13



London/ovh/14

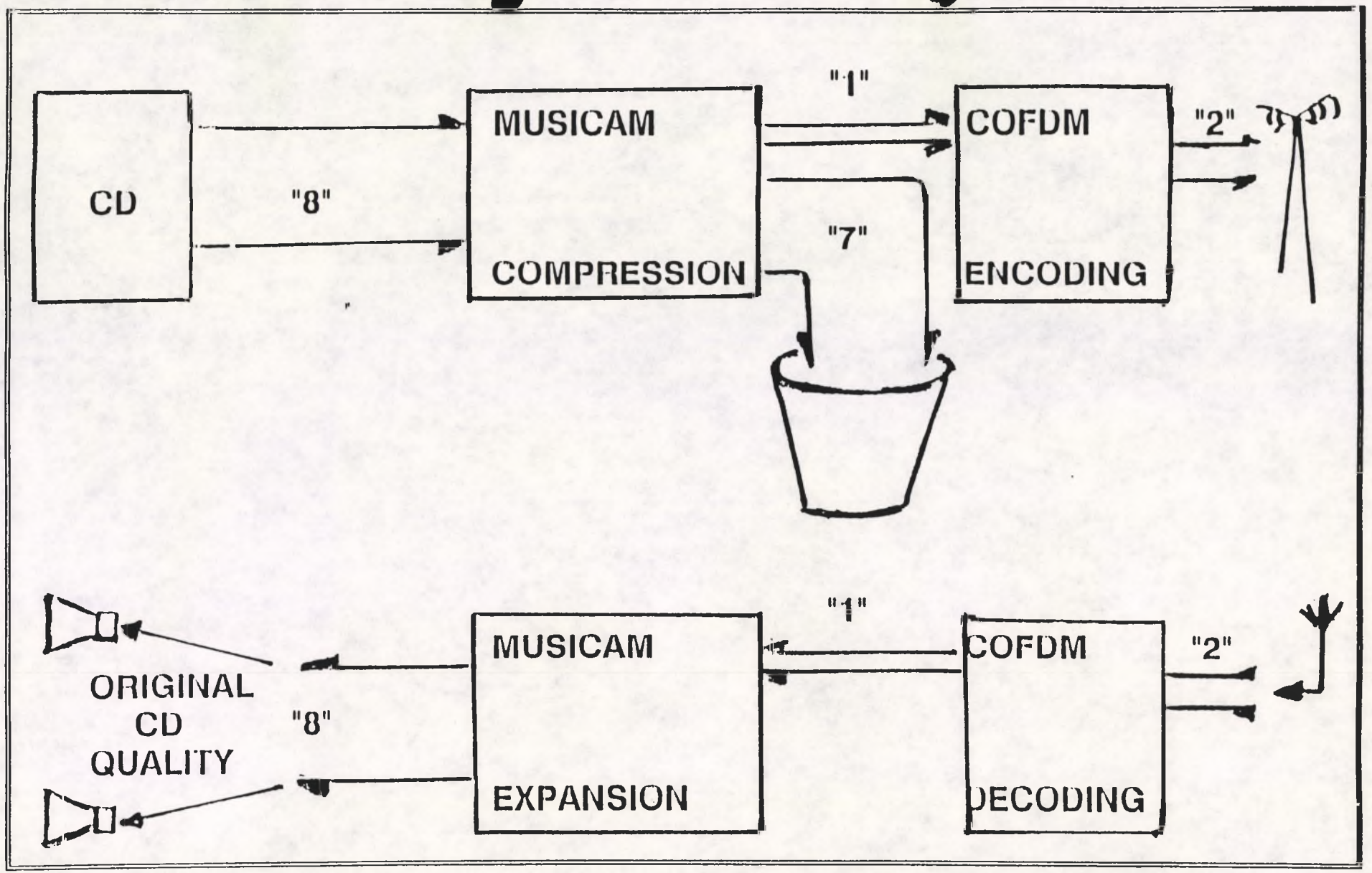
1ST SILICON : SUPPORTS FIELD TESTING

2ND SILICON : SUPPORTS BROADCASTING 1995
(12 IC's IN THE TRUNK)

3RD SILICON : SUPPORTS DAB 1998
(2 IC's UNDER DASHBOARD)

ENCOURAGING AUDIO
PAGING, DATA ETC.

DAB Digital Audio Broadcasting

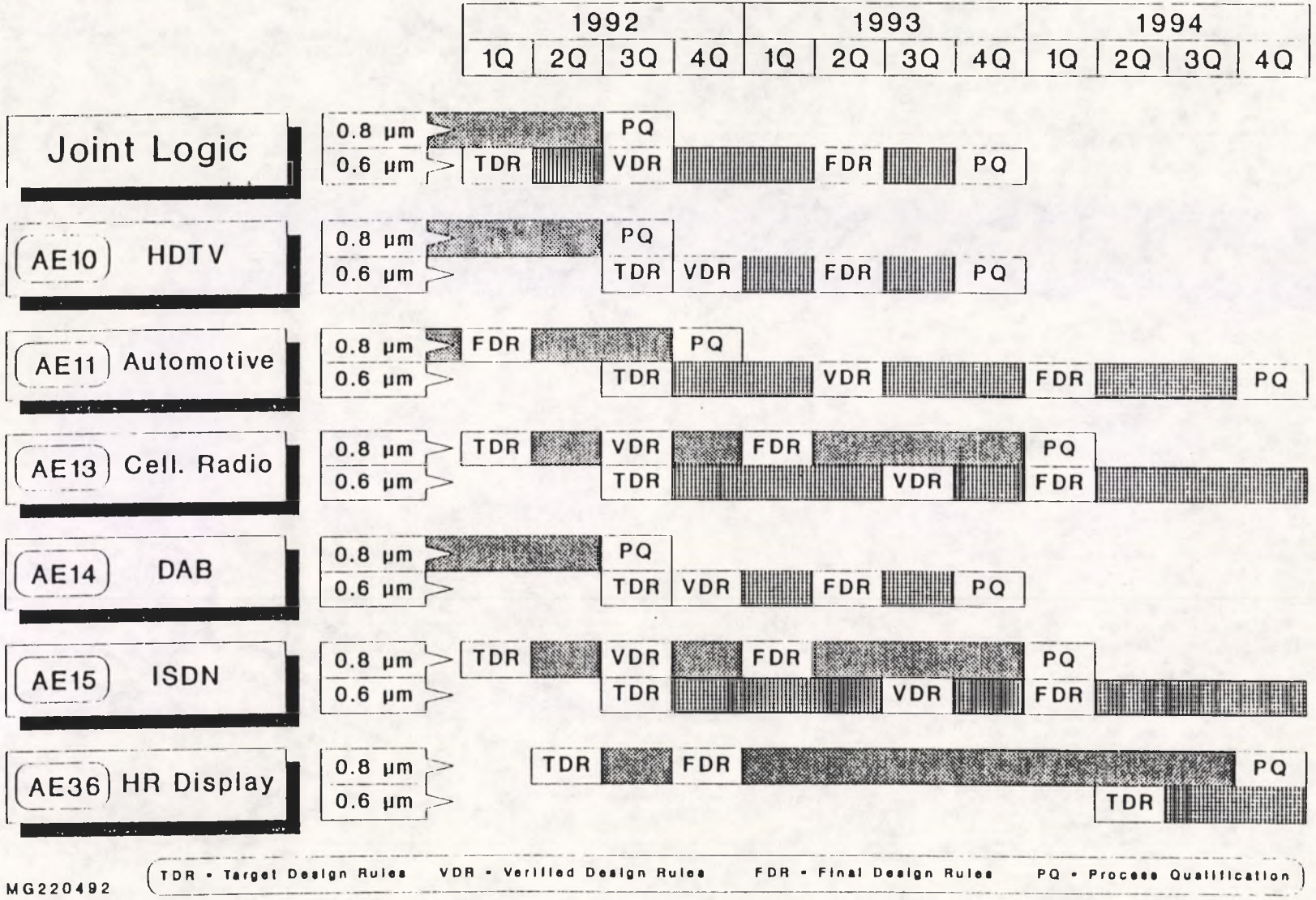


London/ovh/10

DAB
Digital Audio Broadcasting

JESSI Technology / Application Roadmap

CMOS Logic Requirements



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DAB Digital Audio Broadcasting

IC Density Trends

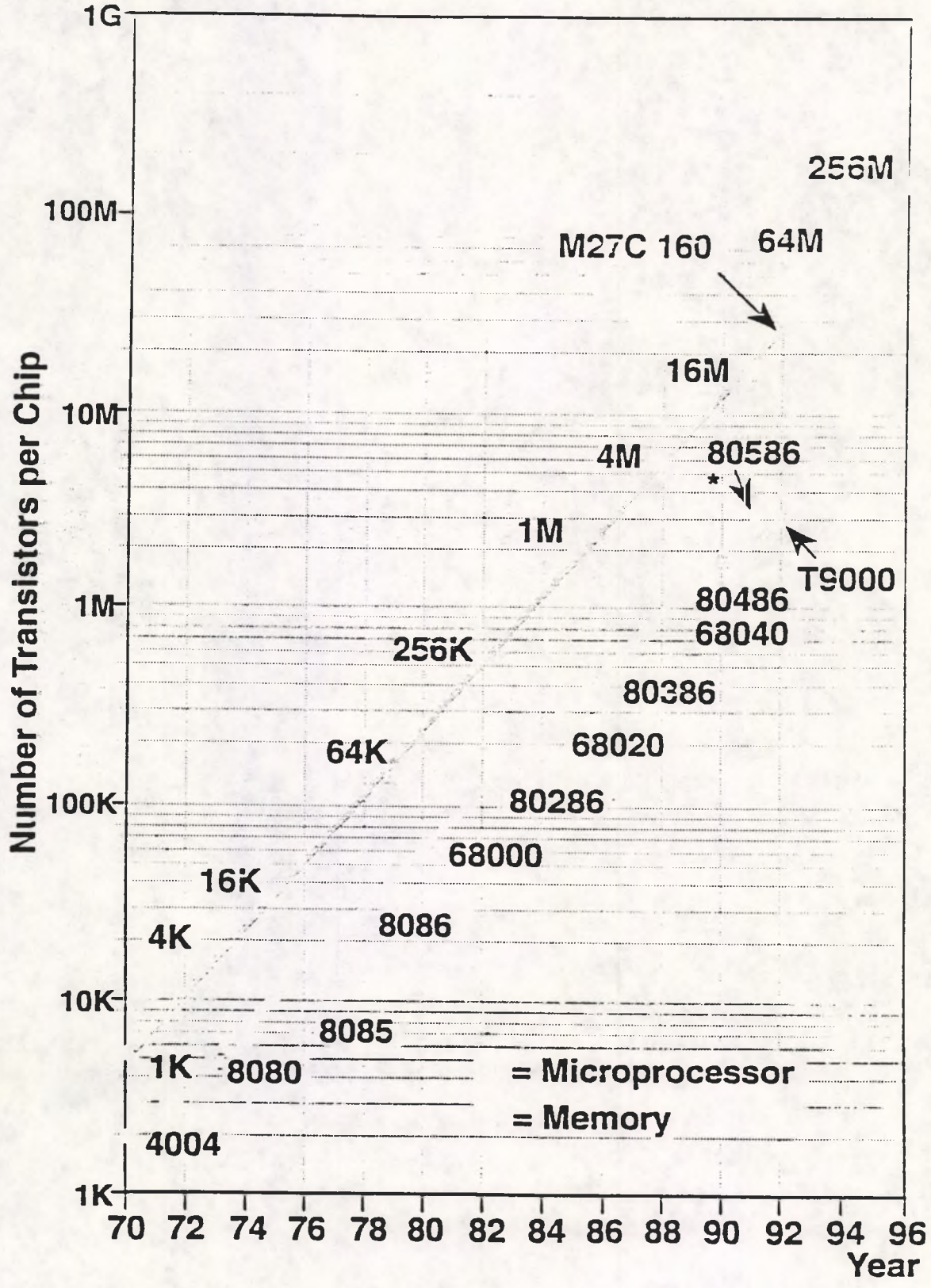
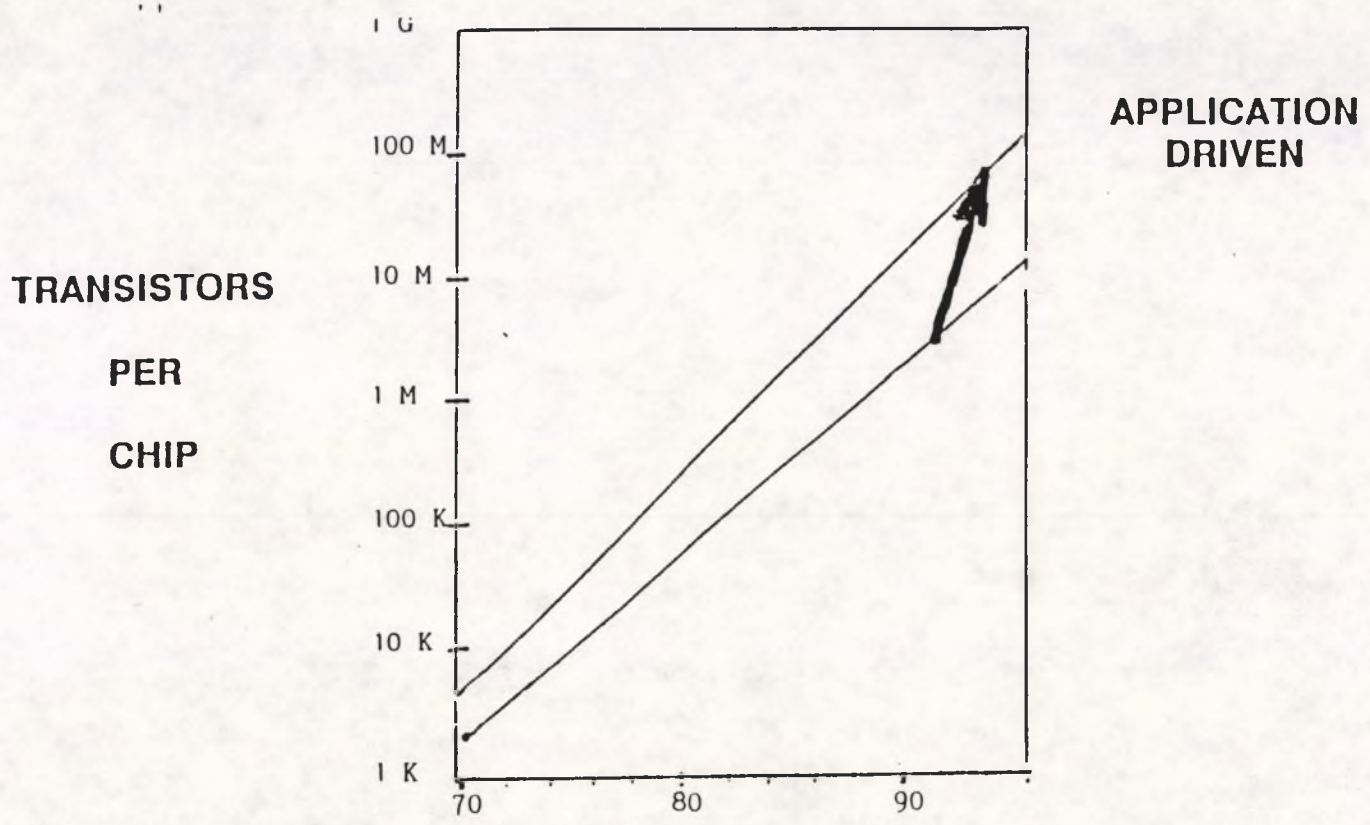


Fig 03 / 03 / 92

THE JESSI AMBITION

AN APPLICATION DRIVEN IC PROCESS BRINGS A JOINT LOGIC .5 MICRON IN 1994.
TRANSISTOR DENSITY INCREASES BY A FACTOR OF TEN IN TWO YEARS TIME (1992-1994)

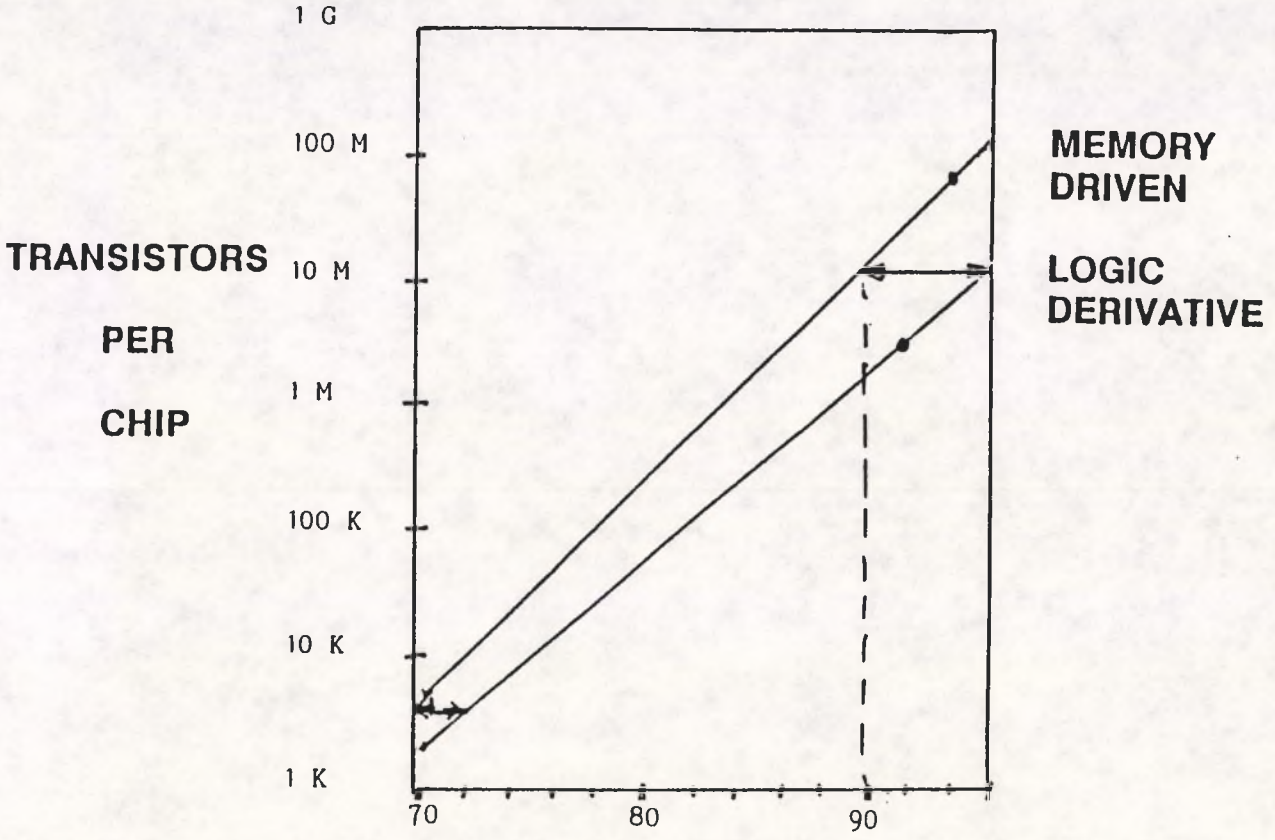


DAB Digital Audio Broadcasting

THE TIME LAG CHALLENGE

THE TIME LAG BETWEEN A MEMORY DRIVEN IC-PROCESS AND THE AVAILABILITY OF A DERIVATIVE FOR LOGIC DID INCREASE FROM

2.5	YEARS	IN	1970	TO
6	YEARS	IN	1990	



PROJECT T1: 1990 - 1991

Joint Memory Project

PROJECT T1b: 1992 - 1994

Advanced Technology for Volume Production

ULTIMATE GOAL

" To develop a 0.5µ and a 0.3µ technology for high complexity and high speed DRAM and EPROM memories "

Project Partners

Siemens Semic.	Germany
SGS-Thomson	Italy
SGS-Thomson	France

COOPERATION ISSUES

A STRONG COOPERATION ACTIVITY HAS BEEN ESTABLISHED BETWEEN SIEMENS AND STM ALL OVER 1991.

- SEVERAL DAY-LONG EXPERT MEETINGS WERE HELD IN ITALY AND GERMANY.
- FROM EACH MEETING A DOCUMENT WITH 80-120 PAGES OF DETAILED PROCESS, DEVICE, EQUIPMENT AND RELIABILITY DATA WAS ASSEMBLED AND DISTRIBUTED.
- EXPERT VISITS WERE PAID FROM BOTH SIDES.
- PROCESSED WAFERS WERE EXCHANGED.
- EQUIPMENT EVALUATION RESULTS WERE SHARED.
- REGULAR CROSS FERTILIZATION BETWEEN COMPANIES HAS BEEN PERFORMED.

JOINT MEMORY PROJECT

MAIN ACHIEVEMENTS

	PLANNED	ACTUAL
ACTIVITY START UP		JAN. 90
16Mb DRAM FIRST SILICON OUT	MAY 90	MAY 90
EPROM PROCESS FLOW DEFINITION	APR. 91	APR. 91
16Mb DRAM FUNCTIONAL SAMPLES	MAR. 91	MAR. 91
16Mb EPROM FIRST SILICON OUT	MAY 91	JUN. 91
16Mb EPROM FUNCTIONAL SAMPLES	SEP. 91	DEC. 91
16Mb DRAM ENGINEERING SAMPLES	FEB. 92	SEP. 91

PROJECT T1b:

Advanced Technology for Volume Production

MAIN MILESTONES

16Mbit EPROM Engineering samples	2Q/92
Demonstration of a 0.65 µ DRAM process	2Q/92
4 or 16Mbit Flash EPROM in 0.5µ technology; engineering samples	2Q/93
Demonstration of a 0.5µ DRAM process	2Q/93
16Mbit FLASH EPROM second generation with 0.4µ design rules	4Q/94
Demonstration of a 0.4µ DRAM process	4Q/94

OBJECTIVES OF THE PROJECT

- Develop 0.5u photolithography tools:
  - I-line stepper (exposure tool)
  - I-line photoresist

- Asure Europes competitiveness with timeframes, relevant to the design-in window of 0.5 u semiconductor products

E60

PARTNERS OVERVIEW

COMPANY	FIELD	ROLE
ASM-L	Stepper	Projectleader
Zeiss	Lens	Partner
UCB	Photoresist	Partner
Hoechst	Photoresist	Partner
Philips	User	Partner
STM	User	Partner
Siemens	User	Partner
IMEC	User	Subcontractor

E60

PROJECT OUTLINE

1. Workout the user requirements:

   - Agree stepper specifications

   - Agree photoresist specifications

2. Develop and build new stepper:

   - New frame: * high throughput

     * 200 mm improved stage

     * improved metrology

   - New lenses: NA: 0.58 FS: 25.5 mm

     NA: 0.48 FS: 29.7 mm

E60

PROJECT OUTLINE

3. Develop new I-line photoresists

   - high sensitivity

   - high contrast

   - high process latitude

4. User evaluation and feedback for improvements

E60

CURRENT STATUS

Stepper

- First stepper completed and shipped 1 May 1991
- Excellent performance
  - . throughput : 80 wafer/hour 150 mm
  - . overlay : < 30 nm
  - . resolution: down to 0.4 um
  - . alignment: outstanding on multi level metal

Photoresist:

- UCB I X 500
  I X 700
- Hoechst: EXP 7500
  * Resist shows linearity down to 0.35 resolution
  * Good exposure latitude, focus latitude

E60

COMMERCIAL OUTLOOK

Stepper

- Evaluation starts June 1992 at STM
- Over 10 systems sold now (USA, Europe, Far East)
- Backlog

Resist

- Current 4 Mb DRAM production switching to I-line
- All 16 Mb DRAM (and other 0.5 um) production will be an I-line technology

Funding Status of JESSI-Projects in April 1992 [MECU]
Overview

Subprogramm	F[a)]	G	I[a)]	NL	UK[a)]	CEC[a)]	TOT
Application	7.9[1] + 6.9[2]	19.0[1] + 3.1[2]	x	6.6	1.9	7.0	42.4[1] + 10.0[2]
Technology	11.4[1] + 3.4[2]	2.6	10.4	4.9	0.3	39.0	68.6[1] + 3.4[2]
BLR						7.0[2]	7.0[2]
Equip. & Mat.	3.6[1] + 7.7[2]	19.0	0.1	7.6	1.8[1] + 2.5[2]	-	32.1[1] + 10.2[2]
SUB-TOT.	22.9[1] + 18.0[2]	40.6[1] + 3.1[2]	10.5	19.1	4.0[1] + 2.5[2]	46.0[1] + 7.0[2]	143.1[1] + 30.6[2]
TOTAL	40.9	43.7	10.5	19.1	6.5	53.0	173.7

Status: no index or 1: contract prepared or issued; 2: application received and/or funding planned
x - Participation planned
a) annualised figures

JESSI-GAT 920416/UW7DO-S4

Enclosure 5

Funding Status of JESSI-Projects in April 1992 [MECU]

Application

Project / Cluster	F[a]	G	I	NL	UK[a]	CEC[a]
Automotive Safety Electronics (AE 11, AC 8B)	2.3[1]+0.4[2]	4.5	-	0.33	0.1	-
Broadband Communication (AE 15B, AE 55B)	FT	1,55	-	-	-	-
DAB (AE 14, AC 5B)	1.2	4.5	x	1.51	0.3	-
HDTV (AE 10, AC 6, AE 56)	1.65[1]+4.04[2]	5.2[1]+0.4[2]	x	3.3	0.32	-
Mobile Radio (AE 13B, AC 12B, AE 31)	1.66[2]+FT	2.8	-	0.83	-	-
Standards (AC 41B)	0.2[1]+0.2[2]	0.5[1]+0.9[2]	-	-	-	-
CAD-Frame (AC 1)	-	-	-	-	-	7.0
Advanced Display (AE 36B)	0.6[2]	0.6[2]	x	-	-	-
SMI AE 23)	2.5	1.2[2]	x	0.65		-
(AC 61)	-	-	-	-	1.165	-
SUM: Application	**7.85+6.90[2]**	**19.0+3.05[2]**	**x**	**6.62**	**1.88**	**7.0**

Status: no index or 1: contract prepared or issued; 2: application received and/or funding planned
x : Participation planned
FT : under responsibility of France Telecom
a) annualised figures

JESSI-GAT 920416/UW/DO-A4

Funding Status of JESSI-Projects in April 1992 [MECU]

Equipment & Materials

Project / Cluster	F[a]	G	I[a]	NL	UK[a]	CEC[a]
Wafer Handling (T 14C, E 19, E 109C)	2.62[2]	2.3	-	-	0.7[2]	-
Packaging (BT 4, T9C, E9)	1.88[2]	1.4	-	0.5	0.82[1]+0.89[2]	-
Lithography (T8B, E39, E60, E64A, E162C, E104)	0.23[2]	7.0	x	4.00	0.74[1]+0.26[2]	-
Wet Chemicals (E2A, E13C, E20, E77C, E88)	1.57	2.8	-	-	-	-
Clean Gases (E2B, E181B, E186)	0.436[1]+0.35[2]	0.8	0.04	-	0.03	-
Cluster Deposition and Etching Processes (IVPS) (Exx, E5, E6B, E63C, E69, E74B, E164, E208)	1.163[2]	1.65	x	2.94	0.18[1]+0.64[2]	-
Silicon (E191, E66, E11, E15)	x	3.48	x	0.12	-	-
Testing (E179B, E183B)	1.55[1]+1.4[2]	0.3	-	-	-	-
SUM: Equipment & Materials	**3.56[1]+7.64[2]**	**19.06**	**0.04**	**7.56**	**1.77[1]+2.48[2]**	-

Status: no index or 1: contract prepared or issued; 2: application received and/or funding planned
x : Participation planned
a) annualised figures

Funding Status of JESSI-Projects in April 1992 [MECU]

Technology

Project / Cluster	F[a)]	G	I[a)]	NL	UK[a)]	CEC[a)]
Basic Technology (Competitive CMOS Manufacturing / Manufacturing Science & Technology) (T1, T4, T15, T30, T32)	11.38[1]+3.35[2]	-	10.40	2.25	0.29	16.0
Joint Logic T20, T22		2.60	x	2.61	-	~~23.0~~ 20 +Aspro3
SUM: Technology	**11.38[1]+3.35[2]**	**2.60**	**10.4**	**4.86**	**0.29**	**39.0**

Status: no index or 1: contract prepared or issued; 2: application received and/or funding planned
x : Participation planned
a) annualised figures

Funding Status of JESSI-Projects in April 1992 [MECU]

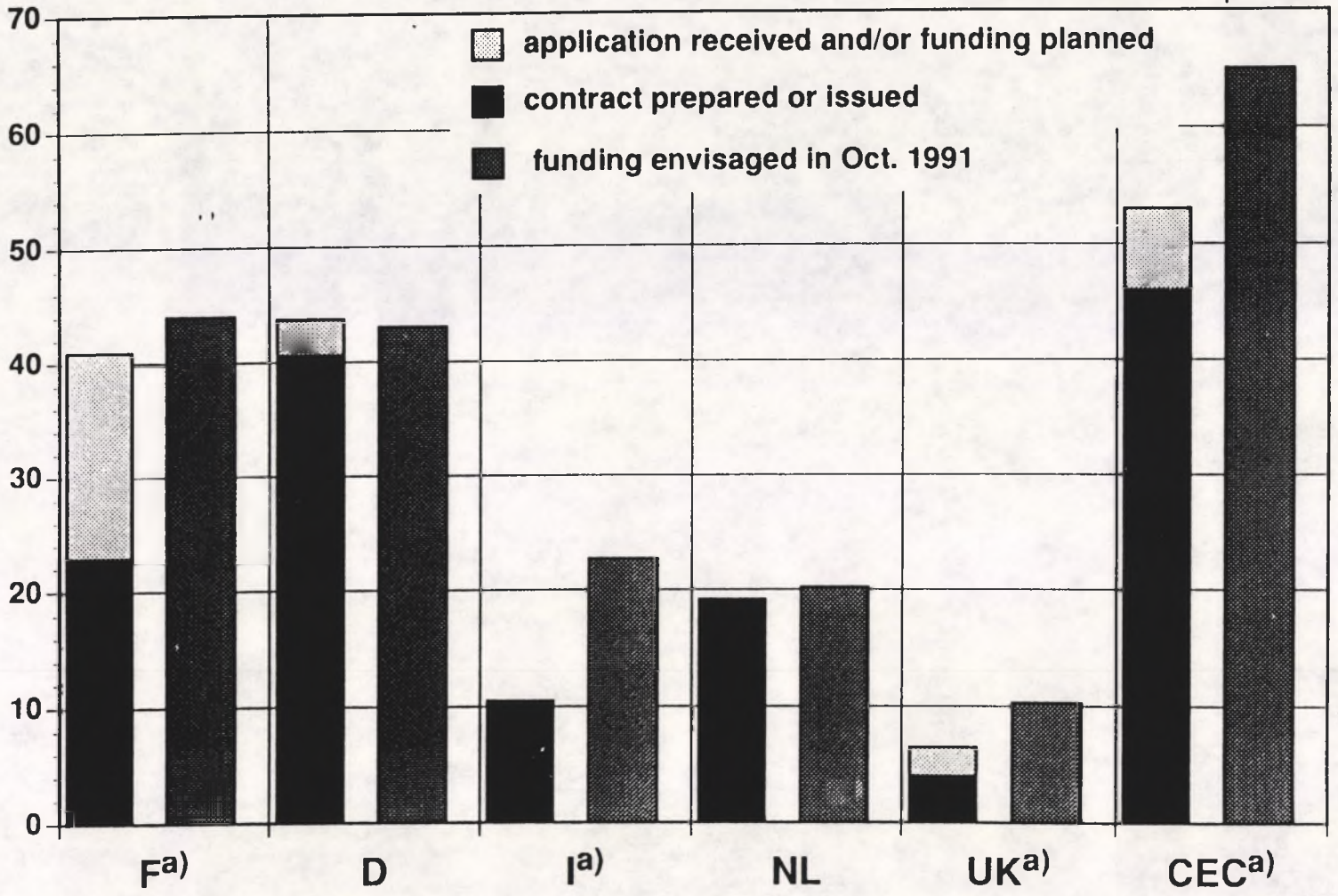
Basic and Longterm Research (BLR)

Project / Cluster	F[a)]	G	I[a)]	NL	UK[a)]	CEC[a)]
0.25 µ CMOS- ADEQUAT (BT 1)	-	-	-	-	-	7.0[2]
SUM: BLR	-	-	-	-	-	**7.0[2]**

Status: no index or 1: contract prepared or issued; 2: application received and/or funding planned
x : Participation planned
a) annualised figures

Funding Status of JESSI - Projects in April 1992
Overview (Funding in MECU)

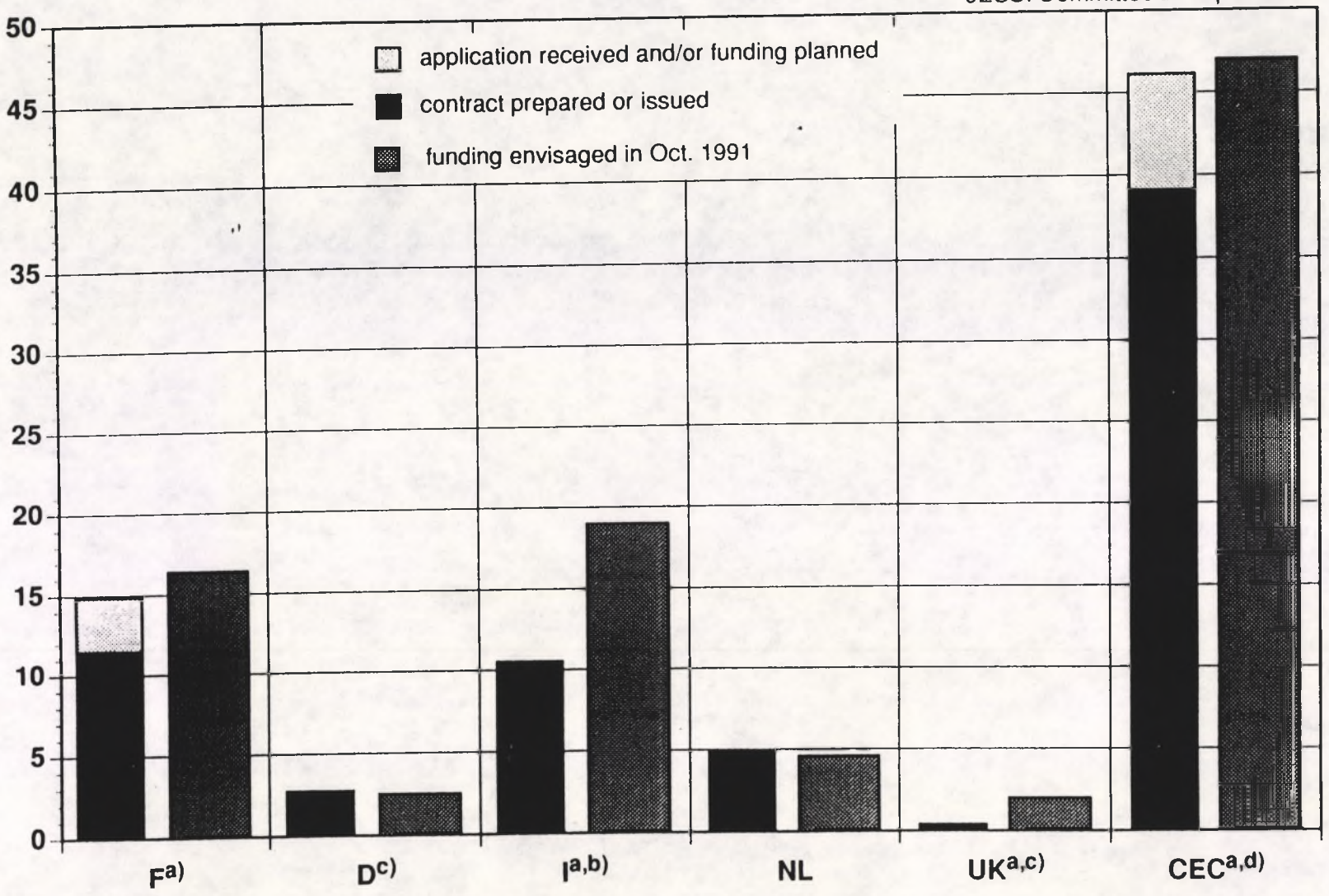
JESSI Committee 24. April 1992



a) annualised figures

Funding Status of JESSI - Projects in April 1992
Technology (Funding in MECU)

JESSI Committee 24. April 1992



a) annualised figures

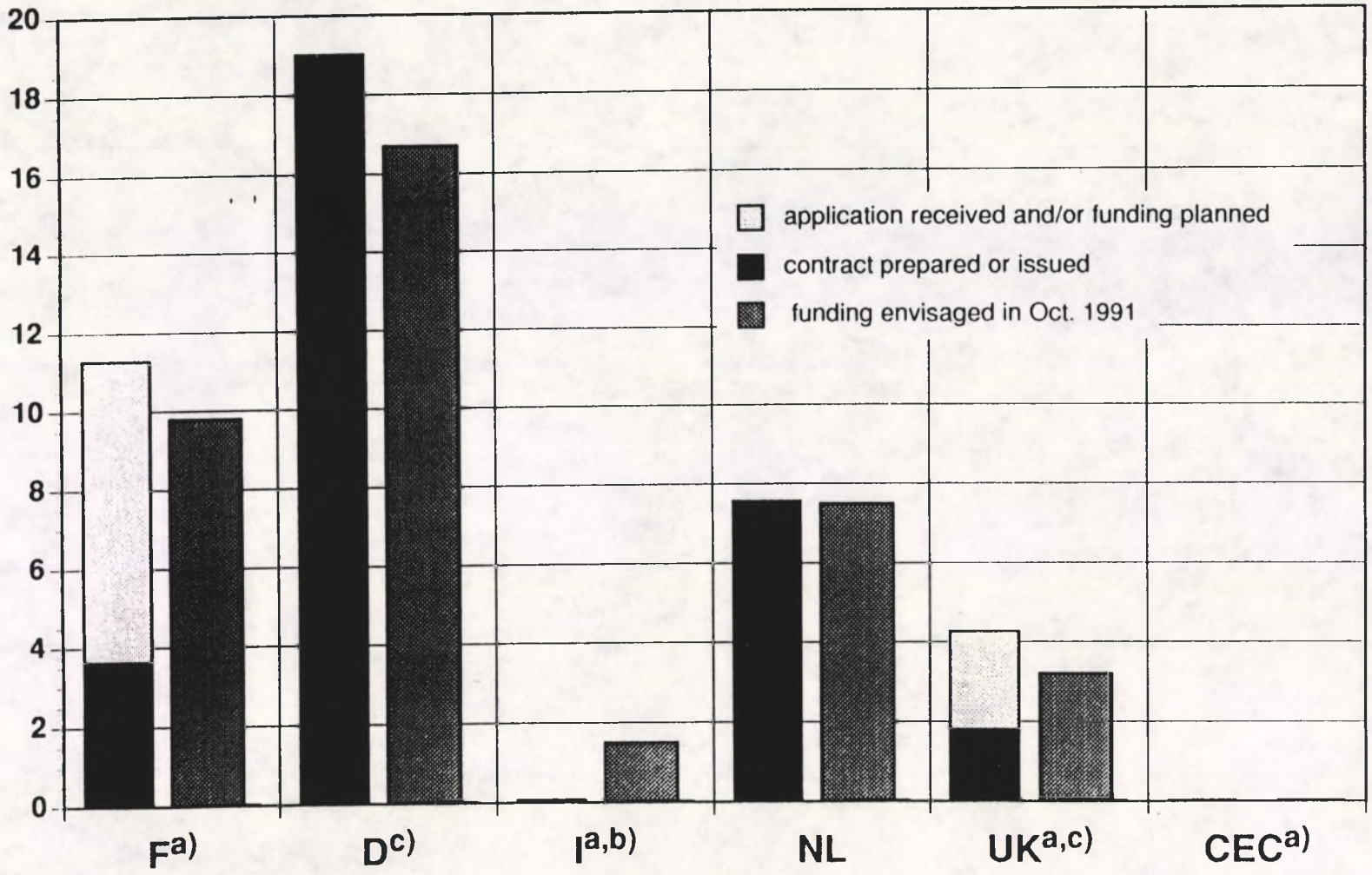
b) additional participation planned

c) Lithography and Wafer Handling figures moved to E&M with respect to Oct. 91

d) including ADEQUAT

Funding Status of JESSI - Projects in April 1992
Equipment & Materials (Funding in MECU)

JESSI Committee 24. April 1992



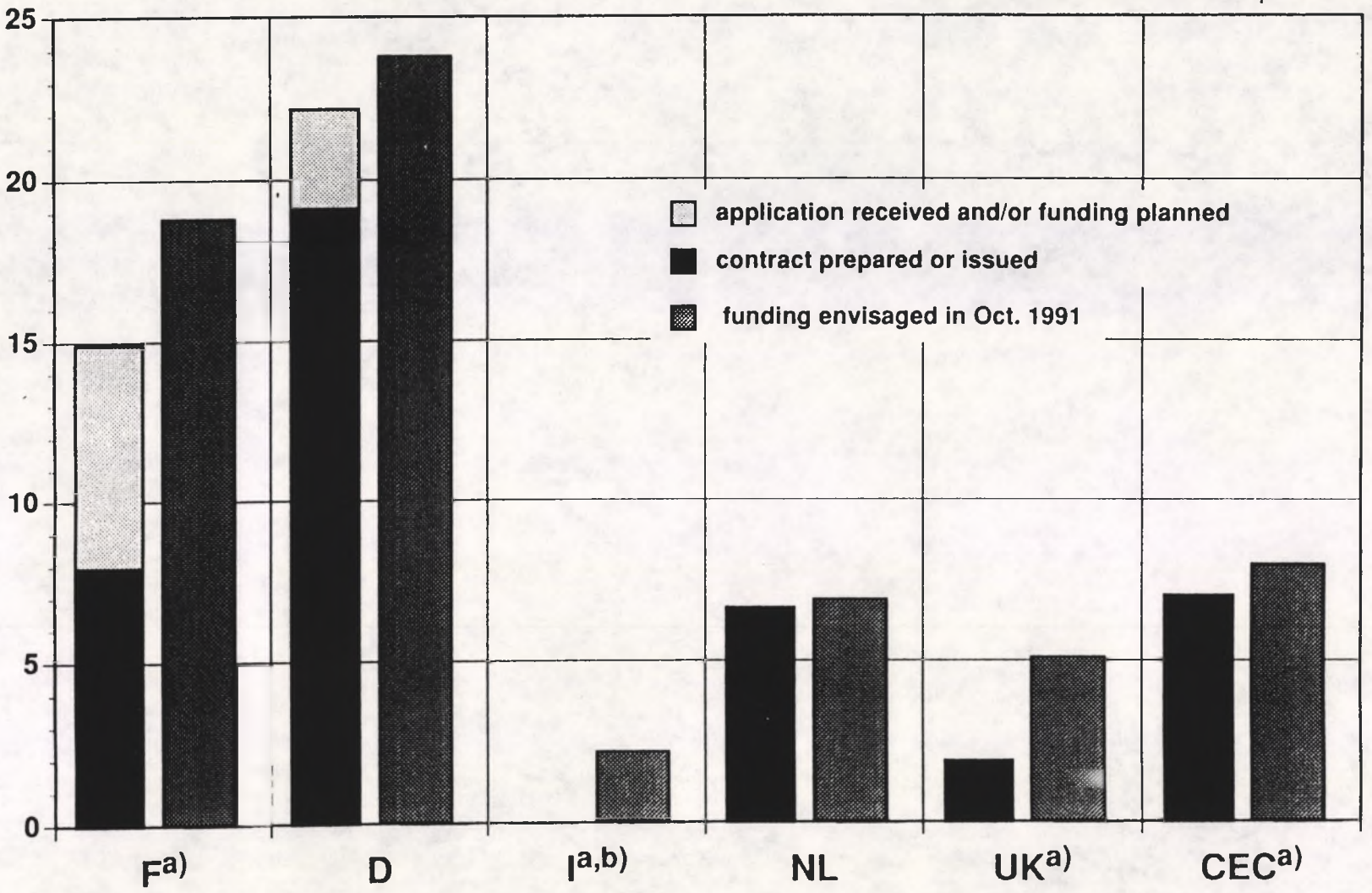
a) annualised figures

b) additional participation planned

c) Lithography and Wafer Handling included with respect to Oct. 91 figures

Funding Status of JESSI - Projects in April 1992
Application (Funding in MECU)

JESSI Committee 24. April 1992



a) annualised figures

b) additional participation planned

Mask Metrology

* With its optical mask metrology tool LMS 2000 Leica is well ahead of its competitor Nicon (15 LMS 2000 sold in the US and 4 in Europe)
* SEMATECH is committed to provide further roadmaps to Leica
* Leica will submit a project proposal to the JESSI Board
* Leica needs the JESSI-SEMATECH-Cooperation to keep and improve its leading market position

Mask Writers

* SEMATECH is prepared to reveal results to European customers
* ETEC is interested in the European market

SIEMENS AG

Phase Shift Mask (PSM) / Mask Blanks

* Europe´s PSM activities must be coordinated and streamlined (Project leader = industrial JESSI partner)
* SEMATECH will inform the JESSI project leader about its big PSM project
* PSM is considered as a strategic project where the JESSI-SEMATECH-Cooperation can increase efficiency
* European mask blanks consortium (BQL, DESAG, Balzers) needs commitment of users to compete with Hoya
* Du Pont will be asked to participate
* SEMATECH supports the European mask blanks consortium

JESSI-SEMATECH-Meeting in Munich, March 16th and 17th, 1992

Mini-Environment ("AUTOWEC")

* The SMIF-Box concept is 2-3 years ahead of competing clean room ideas
* It is well suited for automatic wafer handling and application in cluster tools
* SEMATECH will provide measurement equipment support
* Information exchange agreements needed
  - Intermediate agreements by May 19th, 1992
  - final agreement by end of June 1992

Integrated Vacuum Processing System (IVPS)

* IVPS is a key project within JESSI
* Important US equipment suppliers are interested in a cooperation
* JESSI-SEMATECH-Cooperation will give the European consortium access to the US market and will allow to standardize the equipment

SIEMENS AG

Modelling

* General
  - Contact points identified
  - Proposed program of cooperation for next meeting
* Process Modelling (microscopic and reactor scale)
  - Rapid Thermal Processing (RTP) proposed as first common project
* Production Systems
  - Exchange of proposals

JESSI-SEMATECH-Meeting in Munich, March 16th and 17th, 1992

HL JP, Dr. Ludsteck 3: folie-1.doc

SIEMENS AG

Materials

* Silicon
  - Confidential data exchange Wacker-SEMATECH
  - SEMATECH to evaluate Wacker Si
  - Development of 300 mm Si slices has low priority at Wacker Chemitronic
  - Encourage discussions between MEMC and SEMATECH

* Wet Chemicals
  - Contact of project leaders planned

Supporting Activity

* Quality
  - Optimization of the European and US qualification and certification procedures

* Legal
  - Provide model agreements for information exchange and project control

Fr & Gavernment.

Distribution list to the summary of results of the JESSI Board / JESSI Committee meeting in Munich, October 20, 1992

Munich, October 29, 1992/HM/sm

To the members of the JESSI Board:

Mr. Paletto
Prof. Radelaar
Prof. Aigrain
Mr. Hagmeister
Mr. Knorr
Prof. Lawes
Mr. Petit
Mr. Pistorio
Mr. del Prado
Dr. Scholl

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Telex 897060 = JESS

To the members of the Board Support Group:

Prof. Radelaar
Mr. Ernest
Dr. Haepp
Drs. Kamerbeek
Drs. Kramer
Mr. Lepetit
Mr. Monnier
Dr. Tischer

To the chairmen and Vicechairmen of the Subprogram Management Boards:

Drs. Kramer
Mr. Dumas
Drs. Kamerbeek
Mr. Doche
Dr. Sauer
Mr. Borel
Dr. Gilardini
Mr. Schwippert
Prof. Lawes
Prof. Gerber

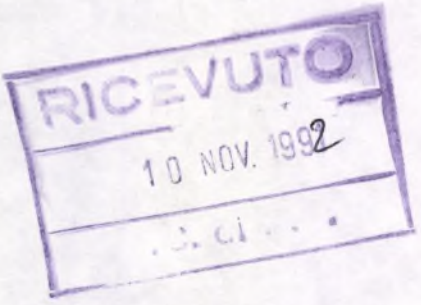
JB- JESSI Committee
20 Oct. 92.

To the members of the GAT Interface Group:

Prof. Radelaar
Mr. Ernest
Mr. Guyot
Mr. Haserer
Drs. Kamerbeek
Drs. Kramer
Dr. Sauer
Dr. Villa

To the members of the JESSI Office:

Dr. Dekkers
Dr. Grünewald
Mr. Le Goascoz
Mr. Sethi
Dr. Trilhe
Mr. van den Hurk



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October 29, 1992
HM/sm

8th Meeting between JESSI Board and JESSI Committee on October 20th, 1992

Summary of Results

0. Agenda and list of participants: see enclosures 1, 2

1. Welcome and introduction

Dr. Rupf welcomed the participants of the meeting.

In his short introduction, Dr. Rupf summarized the general opinion of the JESSI Committee, that JESSI has made a considerable progress in the last year and that the JESSI Review has provided solid and comprehensive information on the results achieved. He also underlined, however, that the acceptance of JESSI by the public and political audience needs considerable improvement and that the Public Relation efforts of JESSI therefore have to be improved.

2. Report on the project cluster "Automated Clean Environment - ACE"

Dr. Honold, deputy of the ACE-cluster spokesman, gave an overview on the status and progress of the project cluster, especially demonstrating the positive results of the cooperation between the different JESSI partners involved (see **enclosure 3**).

The presentation was regarded by the Committee and the Board as a very interesting and convincing example for successful JESSI activities.

3. Approval of the JESSI Review

Dr. Rupf summarized the opinion of the JESSI Committee that JESSI has again improved the quality of the report and that all necessary elements have been addressed. The JESSI Committee therefore accepts the Review as presented.

For future improvement of the document, the Committee proposed to put more emphasis on results and to give better descriptions of short-term goals. It was also requested to improve the information given in the section "market relevance".

Dr. Rupf mentioned also that the JESSI Expert Monitoring Team requests clarification on:

- Cooperation between equipment and technology manufacturers
- CAD exploitation
- Cooperation in the cluster "Broadband Communication"
- Management structure of JESSI in view of the flagship concept.

JESSI will receive a letter, in which the recommendations and questions will be explained in more detail.

Central point in the discussion between Board Committee was the question of the acceptance, the credibility and the visibility of the Program. The Committee strongly emphasized the need for a better explanation of the present JESSI strategy, taking into account the changes of boundary conditions since the beginning of the Program and explaining e.g. the importance of global alliances relative to European partnerships. A better explanation of the JESSI strategy should then be used as a basis for improved Public Relation activities.

JESSI Board and JESSI Committee stated that JESSI has already achieved considerable results, but the positive messages have not yet arrived in the public. It was agreed that JESSI will explain and formulate a convincing strategy in short-term.

4. JESSI Budget 1993

Dr. Dudde presented an overview on the funding situation 1992, an overview on the "planned supported costs 1993" and an overview on the long-term funding frame 1993 - 1996 (see **enclosure 4**, corrected after the meeting).

JESSI Board and JESSI Committee agreed that the funding provisions given in the overviews on "planned supported costs" are regarded by the JESSI Organization as the approved JESSI budget for 1993 with the usual general assumptions and reservations regarding funding rate and legal commitments.

With regard to the funding situation in Germany, Dr. Rupf informed the JESSI Board that part of the proposed budget has temporarily been blocked by a Parliament's decision and that a clearly defined JESSI strategy, fully supported by the major industrial partners is mandatory, in order to get the funding deblocked again.

5. JESSI strategy

Mr. Paletto gave a general introduction into the situation of JESSI with regard to the strategic goals. He underlined that due to changes in the environment of JESSI, the strategy of the Program has to be and will be modified. In his outline, Mr. Paletto especially mentioned the following three topics:

a) The role of Memories for JESSI, where the original goal of developing DRAM, SRAM and EPROM technologies will have to be replaced by two new goals: One dealing with the development of EPROMs resp. Flash-EPROMS and one dealing with the development of general purpose logic technology.

b) The connection between IC manufacturers and users resp. IC manufacturers and equipment/materials companies has to be reassessed and a solution for the financial support for prototypes in the evaluation phase of equipment has to be found.

c) In view of the financial support from the EC, the funding aspects for the overall Program have to be reconsidered and the JESSI plans have to be matched to the total funding.

Mr. Paletto informed the JESSI Committee that a JESSI document on strategy is in preparation and that comments from the side of the Public Authorities are welcome.

6. Presentation of the JESSI Basic & Longterm Research strategy

Prof. Radelaar gave an overview on the present situation and on suggestions for the future of BLR in JESSI (see **enclosure 5**). He emphasized that, despite of the presence of many excellent institutes in Europe, the industry has not used this asset sufficiently. Also industry has not yet given sufficient direction to the institutes' programs. In order to improve the situation, Prof. Radelaar suggested the following:

- Create a European Industrial Advisory Group
- Establish an organization of European microelectronic research institutes
- Create a separate fund for industrially guided research with medium-term goals.

With respect to the suggested organization of European research institutes and the creation of centres of excellence

Mr. Grata expressed doubts, whether the selection of such centres would be compatible with the general and legal rules for EC support (like the principle of subsidiarity). Instead, he proposed to take the "Networks of Excellence" into account, which have been established recently in the EC for various Microelectronics activities.

Dr. Rupf summarized the position of the Committee, saying that the proposal presented by the Board needs further investigation (e.g. better explanation of the technical content and goals of BLR) and should be discussed in a later meeting.

7. Presentation of the JESSI Public Relation activities

Prof. Radelaar presented an assessment of the present situation stating that JESSI has not yet been able to create the right understanding of opinion leaders and politicians for the true nature of the JESSI Program. He demonstrated that JESSI has done already a lot to improve its image with the current activities (like brochures, JESSI News, presentations at exhibitions and fairs), but that it is still necessary to explain far better the positive messages of the Program, using direct contacts with opinion leaders, organizing workshops and increasing presence at fairs and exhibitions.

JESSI requested help from the Public Authorities in the definition of target groups and of politically important issues/messages.

The Committee members repeated their urgent recommendation to increase the PR efforts for JESSI, but admitted also, that due to the unique complexity of the Program, it would be very difficult to benefit from experiences of other programs like HDTV or PROMETHEUS.

8. Next meeting: 27.04.1993 in Brussels

H. Meyer

Proposal for the agenda of the JESSI Board / JESSI Committee meeting

(October 20th, 1992, JESSI Office, Munich)

12:00 o`clock Lunch (buffet, close to meeting room)

1:00 p.m. **Review** (chaired by JESSI Committee Chairman)

- **Welcome Address** (JESSI Committee Chairman)
- **report on project cluster "Automated Clean Environment"** (Project Leader)
- **approval of the JESSI Review** (Committee)
- **approval of the JESSI Budget 1993** (Committee)
- **open points/action points** (Committee/Board)

2:15 p.m. **Strategic Issues** (chaired by JESSI Board Chairman)

- **introduction** (JESSI Board Chairman)
- **presentation** (JESSI Board Vice-chairman)
  - **Basic & Longterm Research in JESSI**
  - **JESSI Public Relation Activities**

3:15 p.m. **Summary** (chaired by JESSI Committee Chairman)

- **agreement on press release (if required)**

3:30 p.m. **End**

JESSI Office 11-9-92

JBJCOCT.XLS-HM/sm

Enclosure 1

Meeting between JESSI Board and JESSI Committee on October 20th, 1992

List of Participants

Public Authorities:

Mr. Grata
Dr. Rupf
Mr. Serres
Mr. Shotton
Drs. Winters

Mr. Broster
Dr. Dudde
Mr. Dominé
Mr. Gislon
Mr. van `t Hof
Mr. McAuley
Dr. Weigmann

JESSI:

Mr. Paletto
Prof. Radelaar
Prof. Aigrain
Mr. Hagmeister
Mr. Knorr
Prof. Lawes
Mr. Petit
Mr. Pistorio
Mr. del Prado
Dr. Scholl

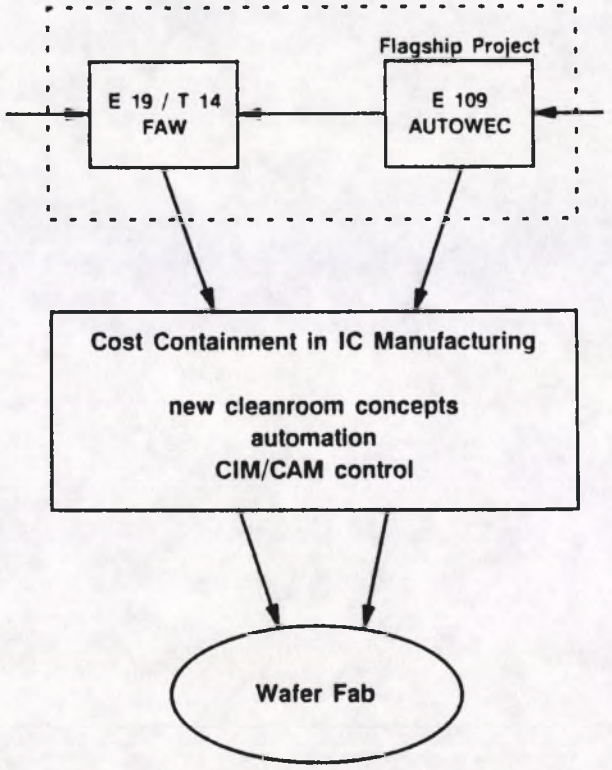
Dr. Meyer (Secretary)
Dr. Honold (guest for point 2 of the agenda):

Cluster

Commercial Aspects

The ACE Cluster
and its cooperation
in JESSI

Automated Clean Environment (ACE)



new technology generations (0.35 μm and below)

extreme cleanliness requirements

cost containment

upgrade of existing production lines

extension of fab lifetime

medium investments

improved equipment utilization

better cost-of-ownership figures

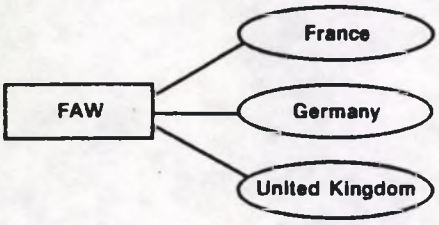
reduction of misrouting, misprocessing, and wafer breakage

Alfred Honold
MEISSNER+WURST GmbH+Co.
Stuttgart, Germany

deputy of
ACE cluster spokesman

Enclosure 3

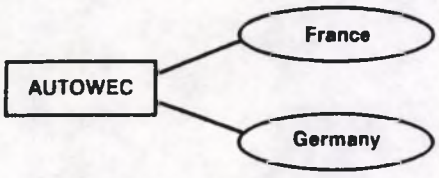
Cluster Partners



Matra MHS, LETI

Telefunken electronic,
ACR, Meissner+Wurst,
FhG-AIS, FhG-IPA

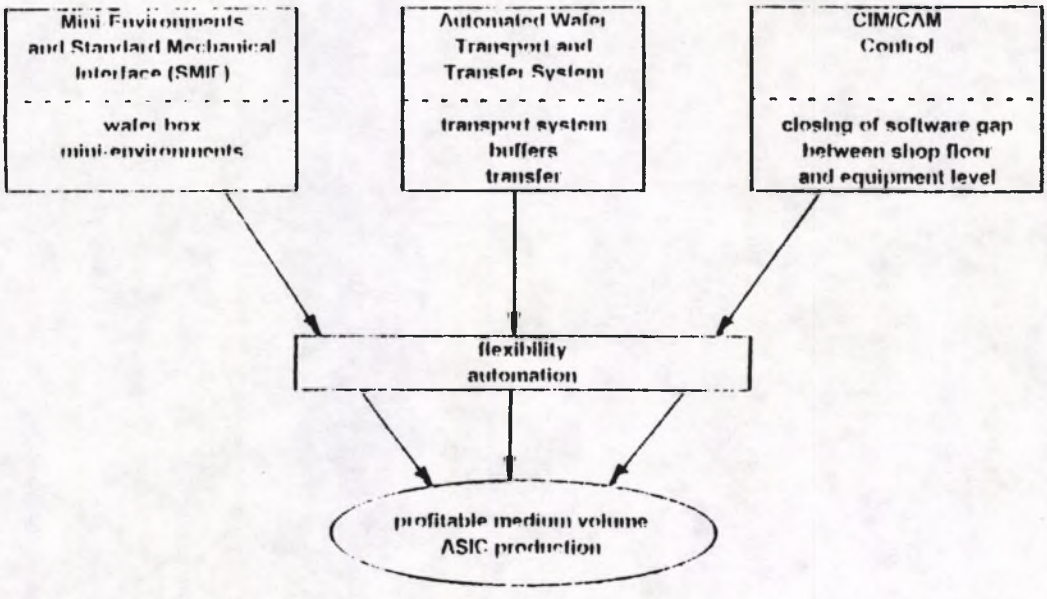
GEC Plessey Semiconductors



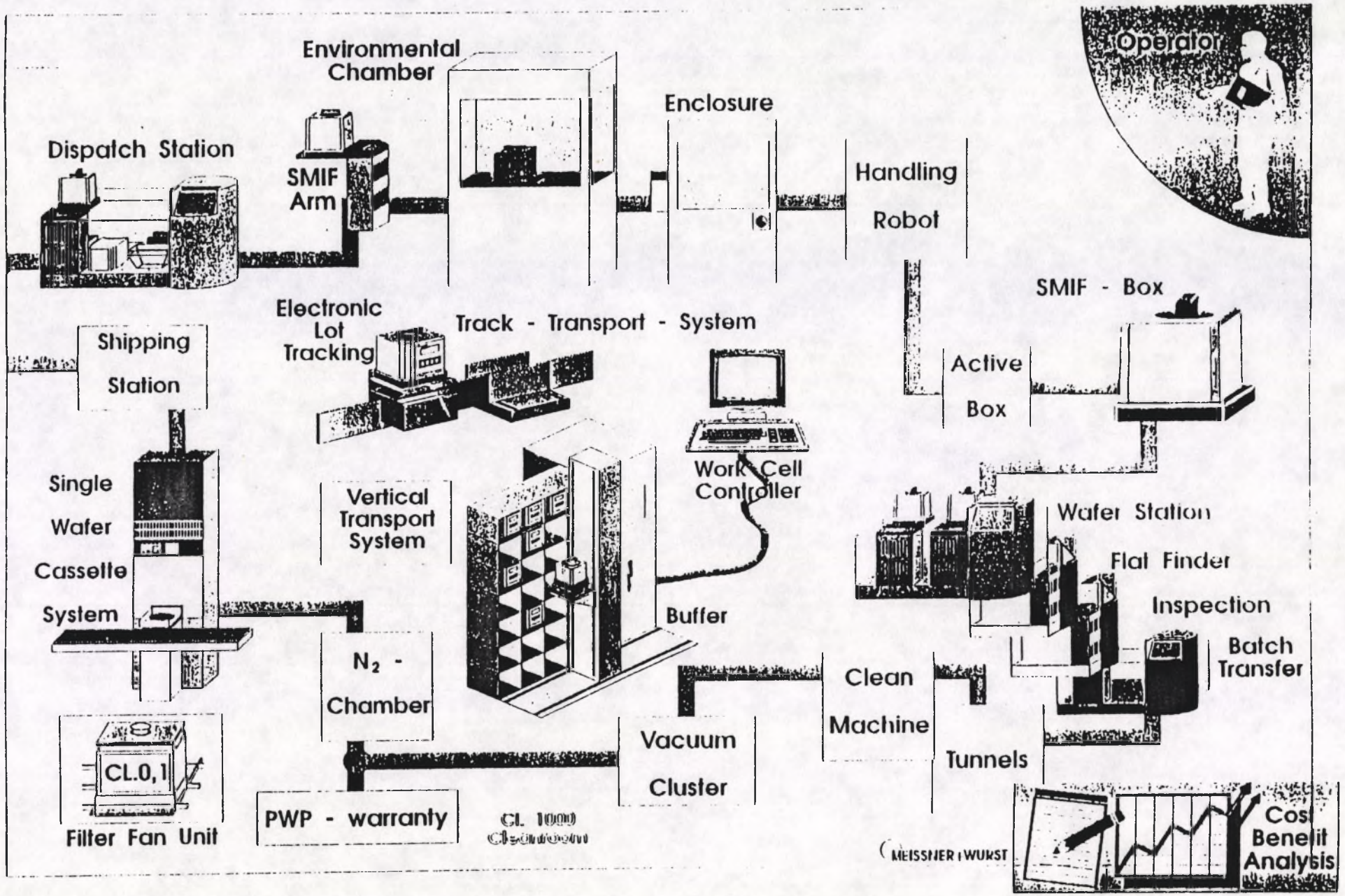
Sogelerg, Clima Neu, Cybernetix,
IBM-France, L'Air Liquide, LETI,
Matra MHS, SGS-Thomson, TMS

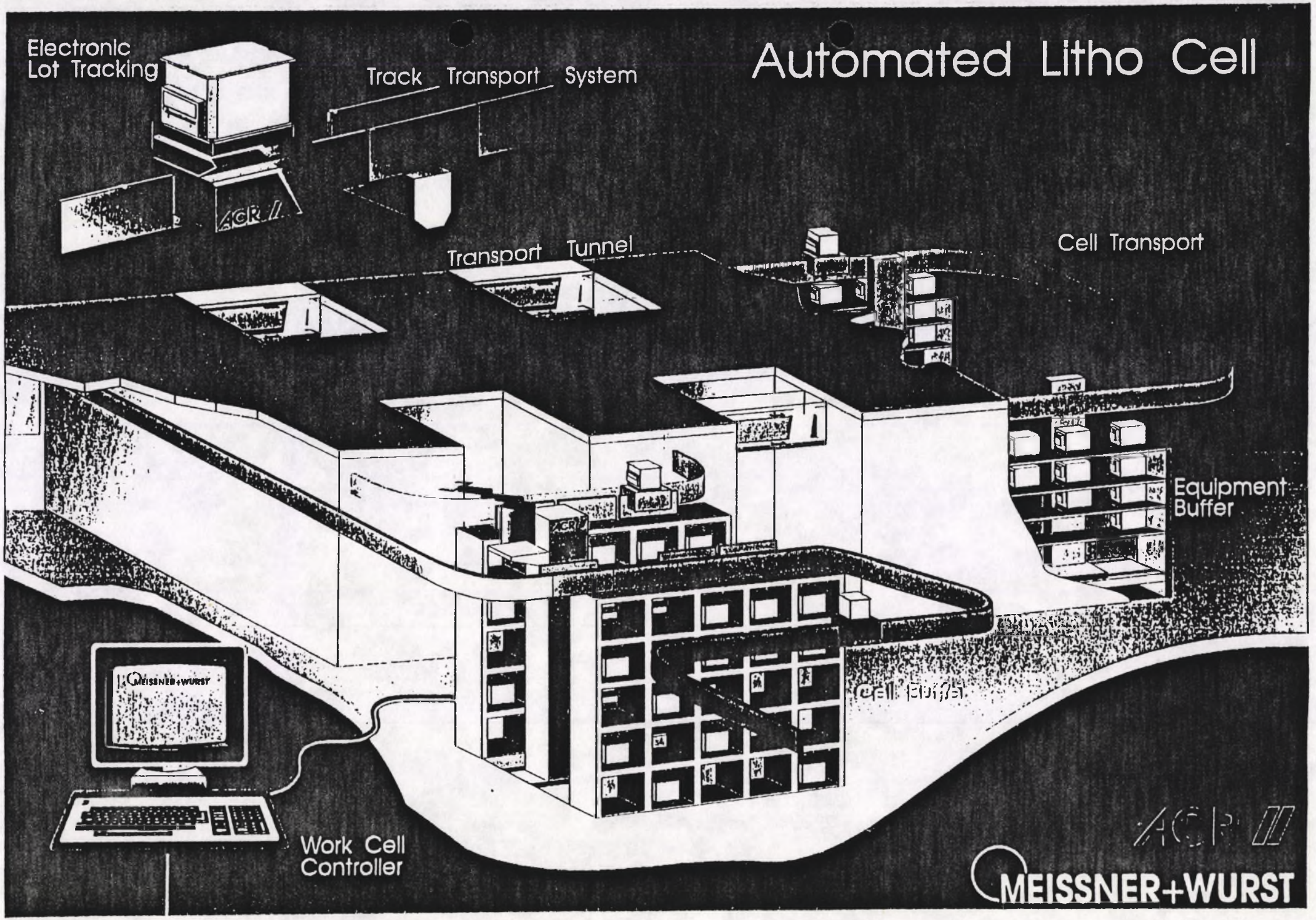
Meissner+Wurst, ACR, AndroMeDa,
IBM-Germany, Jenoptik, Siemens,
Telefunken electronic

Flexible Automated Wafer Production (FAW)

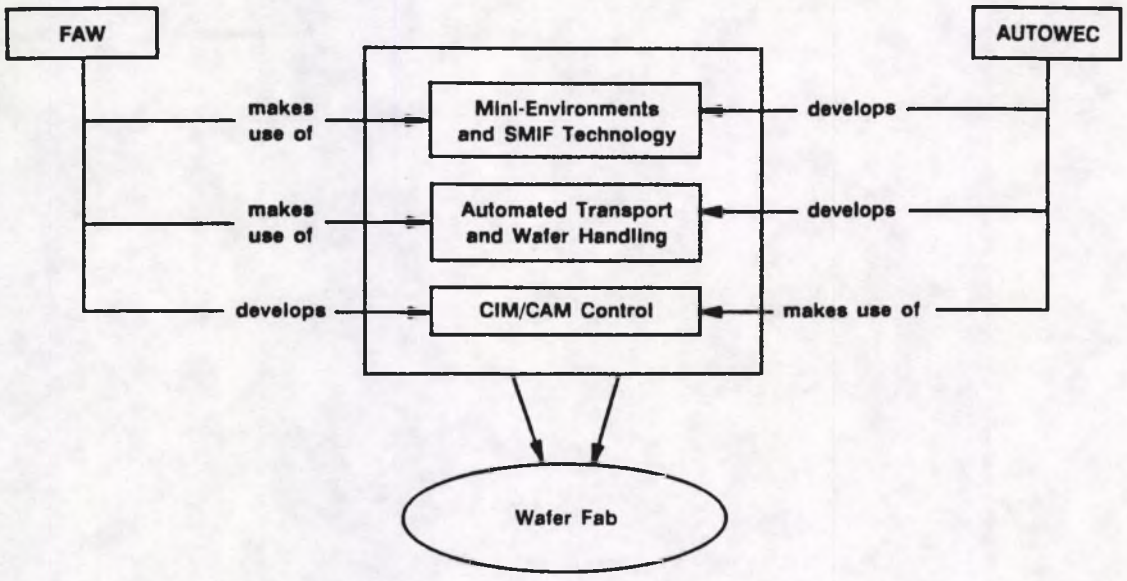


Automated Wafer Environment Control System (AUTOWEC)




Automated Litho Cell
Electronic Lot Tracking
Track Transport System
Transport Tunnel
Cell Transport
Equipment Buffer
Work Cell Controller
MEISSNER+WURST
ACR II

ACE Cluster
(Automated Clean Environment)



Cluster Milestones

		ACE	IBM-D 8", 0.35µm	TEG 6", 0.7µm
1	Clean room ready for installation of processing and automation equipment	12/92	5/92	6/92
2	Preproduction Systems tested	6/93	12/92 - 6/93	6/93
3	First Production Systems tested	6/94	12/93 - 6/94	6/94
4	Manufacturing Systems optimized in pilot line	12/94	7/94 - 12/94	12/94
5	Pilot line evaluated and optimized			12/95

Cooperation tools:

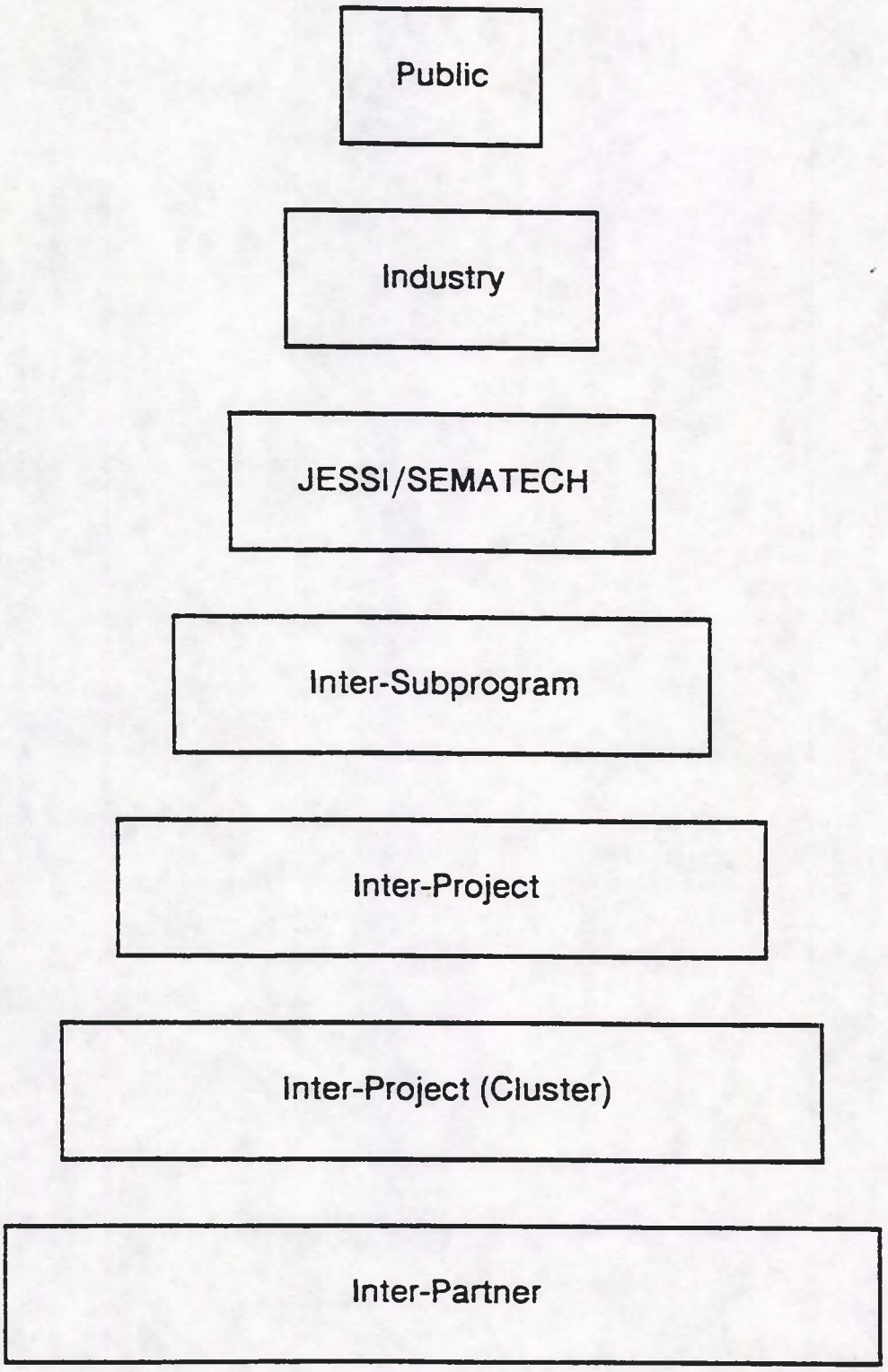
FAW Workshops

Task Forces: Box, Transport System, Buffers, Lot Tracking, Cell Manager

FAW Reference Book

ACE Cluster Meetings

ACE Cluster: Cooperation Levels



Inter-Project Cooperation

Joint definition of

- requirements
- interfaces
- test procedures

Ongoing discussion of

- design
- performance
- international market situation

Workshops with participation of partners from different projects

FAW Reference Book

Inter-Subprogram Cooperation

Interaction with Subprogram Technology in future IC manufacturing technologies

Cooperation with MST (Manufacturing Science and Technology) project in Subprogram Technology

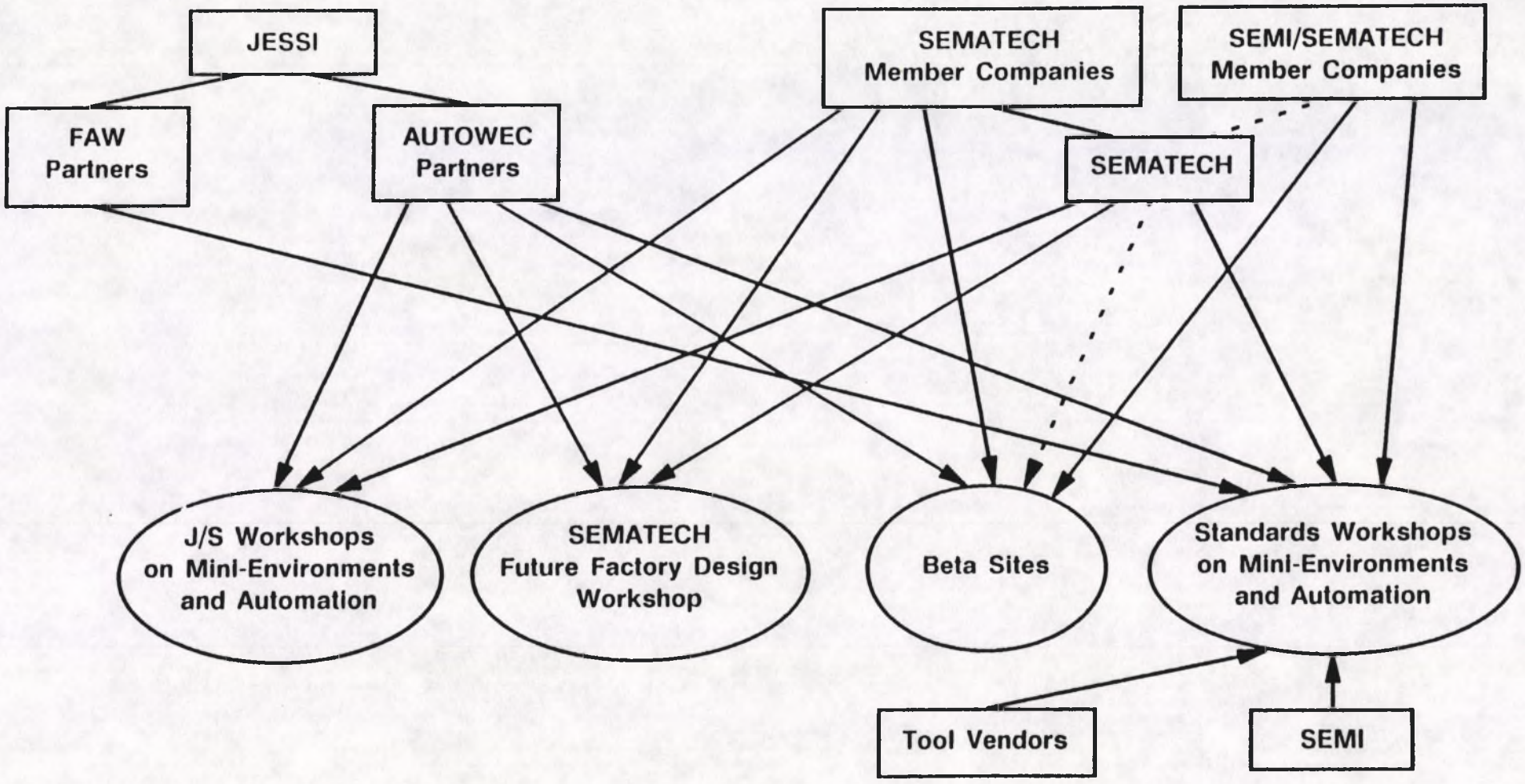
- Exchange of information
- Coordination of efforts
- Synergy effects

Information exchange will be established soon

Project for studies of basic material properties (outgassing, abrasion, surface quality, etc.) in Subprogram Basic and Long-Term Research?

Discussion with JESSI Office

JESSI/SEMATECH Cooperation: Example AUTOWEC



JESSI/SEMATECH Cooperation

September 3rd, 1991	JESSI/SEMATECH Cooperation Agreement
	AUTOWEC: candidate for cooperation
March 16th/17th, 1992	JESSI/SEMATECH meeting
	interest in cooperation on AUTOWEC
	identification of legal problems
June 22nd/23rd	JESSI/SEMATECH meeting
	legal problems resolved
	AUTOWEC: launch project for cooperation
May 19th/20th	Participation of AUTOWEC partners in SEMATECH's"Future Factory Design" (FFD) workshop
May 20th	AUTOWEC presentation for SEMATECH members in FFD workshop
May 21st	JESSI/SEMATECH standards workshop on mini-environments

further meetings planned

standards workshops to be continued

formal cooperation in preparation

Effect to Industry

IC Manufacturers

- Effect on design of future IC manufacturing facilities
- Benefits for IC manufacturers and project partners
- More cooperation with IC manufacturers needed

Equipment Suppliers

- Effect of integrated SMIF and CIM/CAM control on tool design
- Competitive advantage for European equipment vendors
- Benefits for equipment suppliers active in related JESSI projects
- More equipment suppliers must be approached

Cluster partners will approach IC manufacturers and equipment suppliers

Interaction with Public

Information of the public

Conference Contributions

22 - 24 September 1992 ICCCS, London

Presentation of CWIC system concept
with reference to JESSI

15/16 October 1992 TEC 92, Grenoble
2nd Forum of European Equipment & Materials
Manufacturers

3 AUTOWEC presentations in the session
"The Future of the Cleanroom"

Exhibitions

Articles

Article about contamination control and AUTOWEC
in "European Semiconductor" planned for 1/93

More attention has to be paid to this point!!!

Cooperation with SEMATECH (workshops, beta sites, standards)
offers a good opportunity

What Is Working?

Progress of projects

Cooperation in project and cluster (active partners)

Information exchange with projects directly affected by ACE

Cooperation with SEMATECH on standards

JESSI has helped in .....

..... forming a competent project consortium

..... receiving requirements from IC manufacturers

..... getting a better insight in international competition

..... establishing international contacts (US IC manufacturers)

..... attracting international interest

What Could Be Better?

Information exchange with other projects

better information flow via JESSI (JESSI workshops, regular news, ...)

direct communication between projects despite of cluster/subprogram barriers

Cluster partners will take actions!!!

File: Government.

Munich, May 4, 1993-HM/sm

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Distribution list to the summary of results of the JESSI Board / JESSI Committee meeting in Brussels, April 27, 1993

RICEVUTO 4 MAG. 1993 U.C. di R.S.

Drs. R. P. KRAMER RECEIVED 05 MEI 1993 COPY TO TSTS-T

To the members of the JESSI Board:

Mr. Hagmeister
Dr. Dumas
Mr. Gelsing
Mr. Grunberg
Dr. Gutberlet
Mr. Knorr
Prof. Lawes
Mr. Petit
Mr. Pistorio
Mr. del Prado

Dr. Scholl

To the members of the Board Support Group:

Dr. Dumas
Mr. Ernest
Dr. Glauert
Drs. Kamerbeek
Drs. Kramer
Mr. Lepetit
Mr. Monnier
Dr. Tischer

Enclosure 6 will be covered

To the chairmen and Vicechairmen of the Subprogram Management Boards:

Drs. Kramer
Mr. Brothers
Drs. Kamerbeek
Mr. Doche
Dr. Sauer
Mr. Borel
Dr. Gilardini
Mr. Schwippert
Prof. Lawes
Prof. Gerber

Exploitation of 0.5 µ-technology. ESAT presentation

To the members of the JESSI Office:

Mr. Gotz
Dr. Grünewald
Mr. Le Goascoz
Mr. Sethi
Dr. Trilhe
Mr. van den Hurk

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May 3, 1993
HM/sm

9th Meeting between JESSI Board and JESSI Committee on April 27th, 1993

Summary of Results

0. Agenda and list of participants: see enclosures 1, 2

1. Welcome and introduction

Mr. Grata welcomed the participants and took the chair for the first part of the meeting.

2. Presentation of the project cluster "CMOS LOGIC"

Drs. Kramer gave an overview on market and technology perspectives, cluster organization and objectives and technology roadmaps (see **enclosure 3**). He ended his presentation by stressing as a major concern, that the situation after 1994 is uncertain with regard to the public support for the 0.35 /um Technology.

The JESSI Committee was pleased with the positive results of the cluster.

3. JESSI April Review 1993

Mr. Grata conveyed the satisfaction of the JESSI Committee for the good quality of the report. He expressed his hope for further improvement of the reports by including more & more descriptions of good results in the future.

With regard to the chapter 1.6 of the Review, which describes the funding and budget situation, the Committee members strongly recommended not to include unneccessary negative statements in the official JESSI Report:

The general problem with regard to the insufficient EC-support is clear and well known. The repetition of complaints from the side of the Board would, however, only create a wrong impression on the situation of JESSI and would enhance a negative image of the Program without any positive effect on the funding situation itself.

The JESSI Board agreed to these statements.

JESSI Board and Committee then considered the Review approved, the final version will be distributed by the JESSI Office within the next days.

With regard to the JESSI Organization, the Committee was satisfied with the improved management coherence especially regarding the work of the Program Officers and the Subprogram Management Boards. The JESSI Board informed the Committee that the new task distribution of the JESSI Board Chairman, Vice-Chairman and Office Director has been approved and that relevant information will be distributed in the next days.

4. JESSI strategy update

The JESSI Committee raised the question whether the JESSI strategy paper will finally be accepted by the JESSI partner companies as part of their own strategy. The Committee expects that the JESSI strategy paper helps to create a corperate identity for the Program.

The JESSI Board acknowledged, that JESSI considers the update of it's stragegy an ongoing process which requires continuous supervision and refinement.

5. JEMT comments and open points

The Committee informed the Board that the GAT will contact the JESSI Office in order to discuss the different questions raised by the JEMT.

Several items were discussed in some more detail:

a) Meaning and importance of the BLR/Technology paper: The JESSI Board explained, that this paper describes the needs of the industry and is not only restricted to JESSI topics or JESSI partners. The Committee recommended to consider also capacities from those European countries and partners which are presently not participating in JESSI.

b) Image of JESSI: The JESSI Committee recommended to continue to explain to the public that JESSI is a user-driven program, providing application oriented results, not only a semiconductor-technology program.

c) Improvement of the industrial infrastructure: In answering a question of Mr. del Prado, the JESSI Committee emphasized, that the Public Authorities provide many opportunities to support projects which have left the phase of precompetitive development. Mr. Grata offered help to identify possibilities like structural funds etc.

d) Public Relation activities: Mr. Hagmeister asked the Public Authorities resp. the GAT to help in the distribution of the JESSI Public Relation material by identifying the right addresses and contact persons.

6. Strategy discussions

Mr. Hagmeister chaired the second part of the meeting.

6.1 Presentation of the "Relationship between Equipment Materials/ Technology"

Drs. Kamerbeek presented the "Conclusions and decisions on the JESSI Equipment/Materials-Technology relation" (see **enclosure 4**). The JESSI Committee welcomed the achieved results. Mr. van't Hof summarized comments and questions from the GAT (see **enclosure 5**).

Some questions were discussed in more detail:

a) Does the European IC industry really need independence in the field of equipment/materials?

Answer by Mr. Hagmeister: The JESSI IC partners have clearly expressed in the formulation of the JESSI strategy as well as in the selection of JESSI projects that the IC industry needs European equipment and materials suppliers.

b) Request of the GAT: Create a "buy European equipment" attitude.

Answer by Mr. Hagmeister: The European situation is not comparable to the American or Japanese with regard to the general availability of competitive "home made" equipment. The problem is also not unique to equipment/materials, as it holds also for e.g. IC suppliers or system suppliers which would have the same right to ask for a "European" purchase behaviour. However, JESSI is certainly interested to improve the chances of European equipment producers.

c) Is there a possibility to learn from the SEMATECH strategy or to use the contacts with SEMATECH in order to improve the European situation?

Answer by Mr. del Prado: One could maybe learn from their different ways to support the equipment/materials industry, the chances to participate directly in SEMATECH results are, however, very small.

JESSI

6.2 Presentation of the "Exploitation of JESSI Technology results"

The presentation of Drs. Kramer (see **enclosure 6**) was recognized by the JESSI Committee as a very important information which should be made public. The Board informed the Committee, that a press release including this information is in preparation.

6.3 Presentation of the "Exploitation of JESSI CAD results"

The Committee acknowledged the very promising progress reported by Dr. Sauer (see **enclosure 7**). Answering a question of the Committee, Dr. Sauer confirmed that JESSI partners are more and more using the name of JESSI in connection with the demonstration or advertisement of products whose development have been supported by JESSI.

7. Summary

The JESSI Committee was very satisfied with the reported progress of the Program.

8. Next meeting

JESSI Board and Committee agreed on October 29th, 1993 in Paris.

H. Meyer

AGENDA

JESSI COMMITTEE / JESSI BOARD MEETING

Tuesday , 27 April 1993 (12:00 - 16:00)

Location: CEC - Rue Montoyer 75, Room R5

12:00-13:30	**Lunch**	
13:30-14:30	**Review** (chair - JESSI Committee)	
	- Welcome address	(5m)
	- Project Cluster Presentation (CMOS Logic)	(15m)
	- Discussion of Reports & Papers	(30m)
	▪ JESSI Review April '93	
	▪ JESSI Strategy Paper	
	▪ JEMT comments	
	- Open points from Oct-92	(10m)
14:30-15:40	**Strategy Discussions** (chair - JESSI Board)	
	- Relationship between E & M - Technology	(5+5m)
	- Discussion	(20m)
	- Exploitation of JESSI Technology results	(10m)
	- Discussion	(10m)
	- Exploitation of JESSI CAD results	(10m)
	- Discussion	(10m)
15:40-16:00	**Summary** (chair - JESSI Committee)	
	- Future action points	
	- Date of Next Meeting (suggestion 29 October 1993 Paris)	
16:00	**Meeting ends**	

(version 19-Apr-93)

Enclosure 2

List of participants

JESSI:

Mr. Hagmeister
Dr. Dumas
Mr. Gelsing
Mr. Grunberg
Mr. Knorr
Prof. Lawes
Mr. del Prado
Dr. Scholl

Drs. Kamerbeek
Drs. Kramer
Dr. Meyer
Dr. Sauer

Public Authorities:

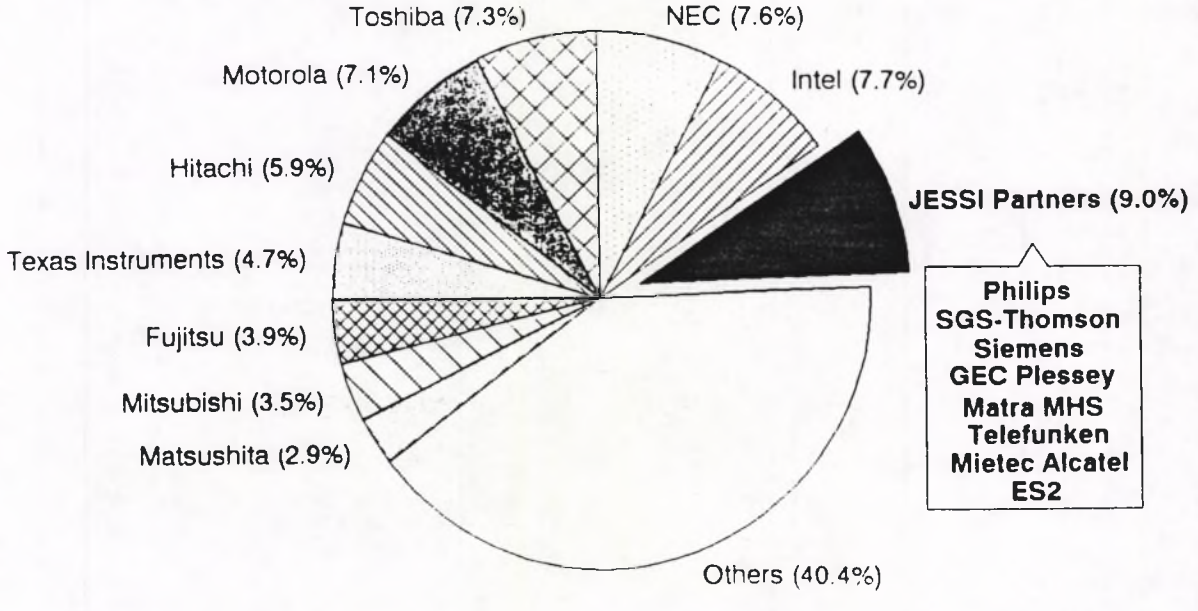
Mr. Grata
Dr. Rupf
Prof. Schileo
Mr. Serres
Drs. Winters

Mr. Broster
Mr. Cochet
Dr. Dudde
Dr. Gislon
Mr. van' t Hof
Mr. McAuley

JESSI CMOS Logic Cluster
Survey

- Market and Technology Perspective
- Cluster Organization and Objectives
- Technology Roadmaps
- Exploitation

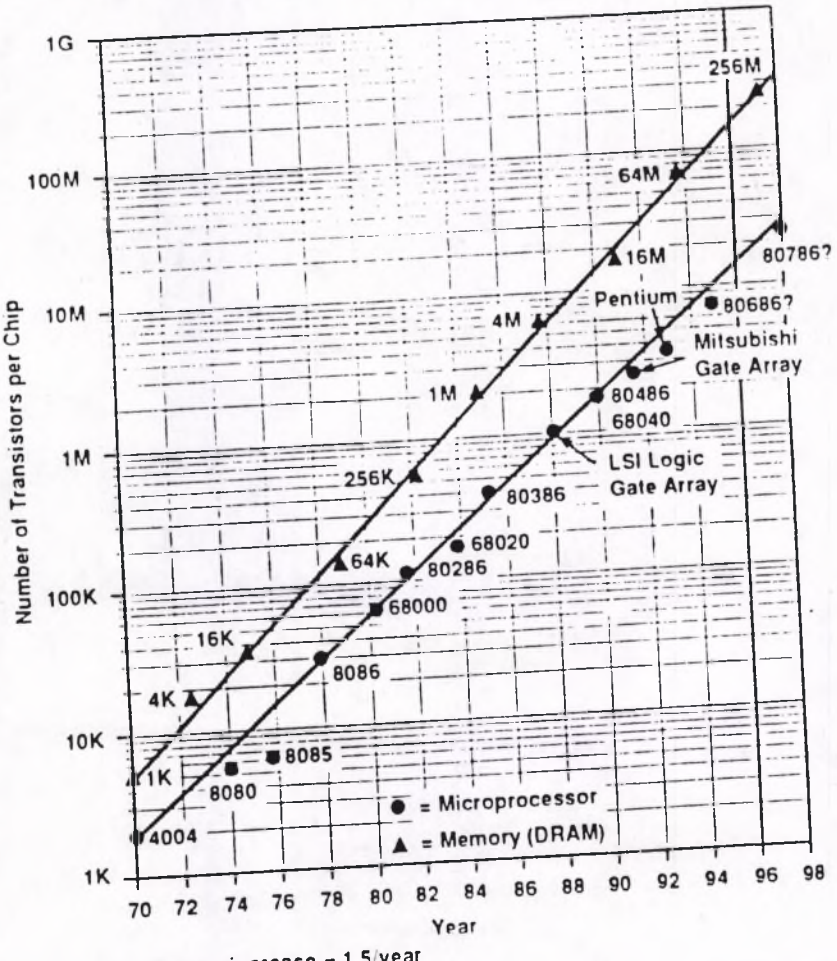
Worldwide Semiconductor Market in 1992
Share of JESSI Partners



(Source: Dataquest)

CMOS Product Types

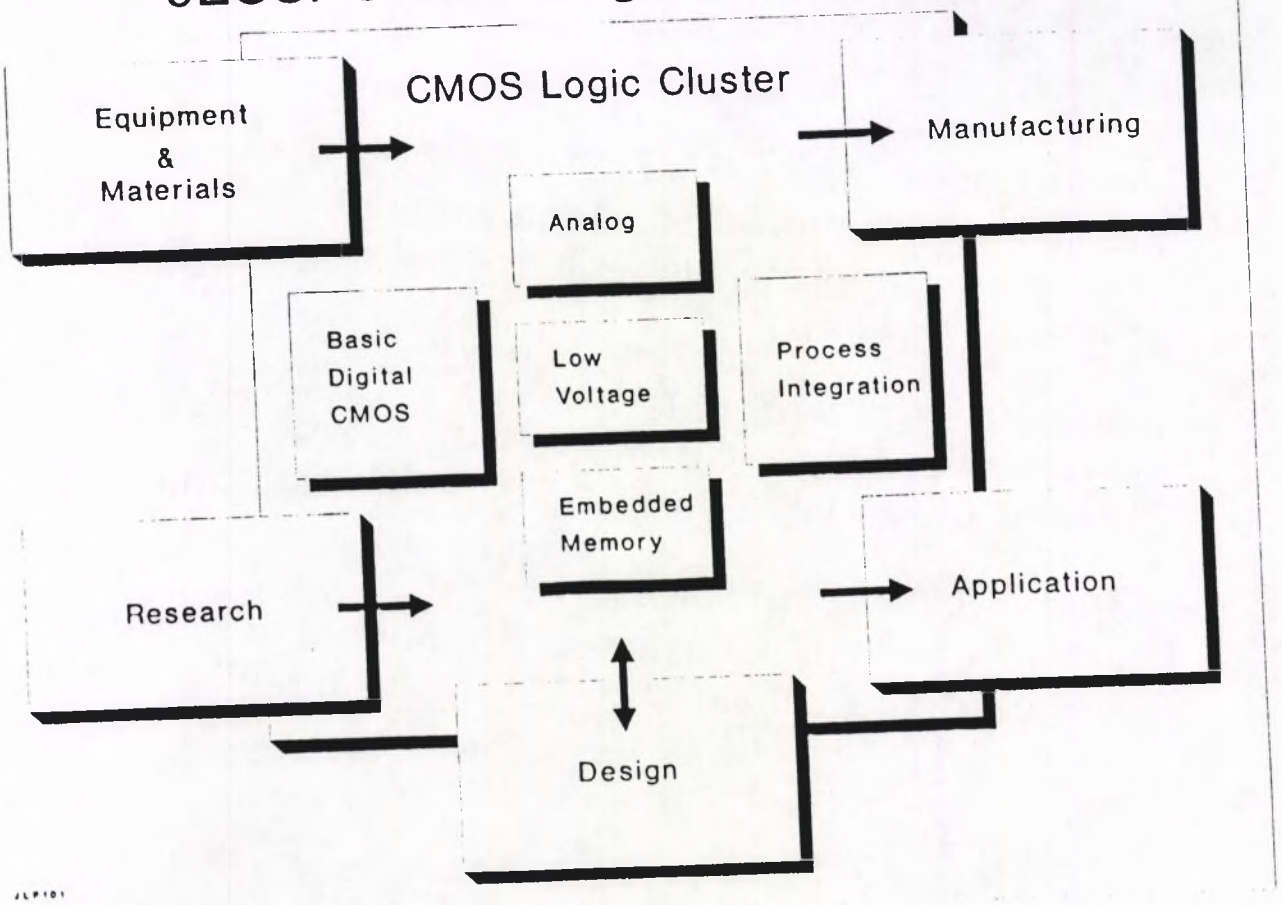
- *Memories (SRAM, DRAM, EPROM):*
  Maximum utilization of surface area,
  in order to integrate highest possible density
  of memory cells
- *ASICs (Cell-based, gate arrays):*
  Maximum design freedom
  Surface utilization less important than versatility
- *Logic (Microprocessors):*
  System-on-chip, incorporating functional blocks
  such as digital, analog, DRAM, ROM modules



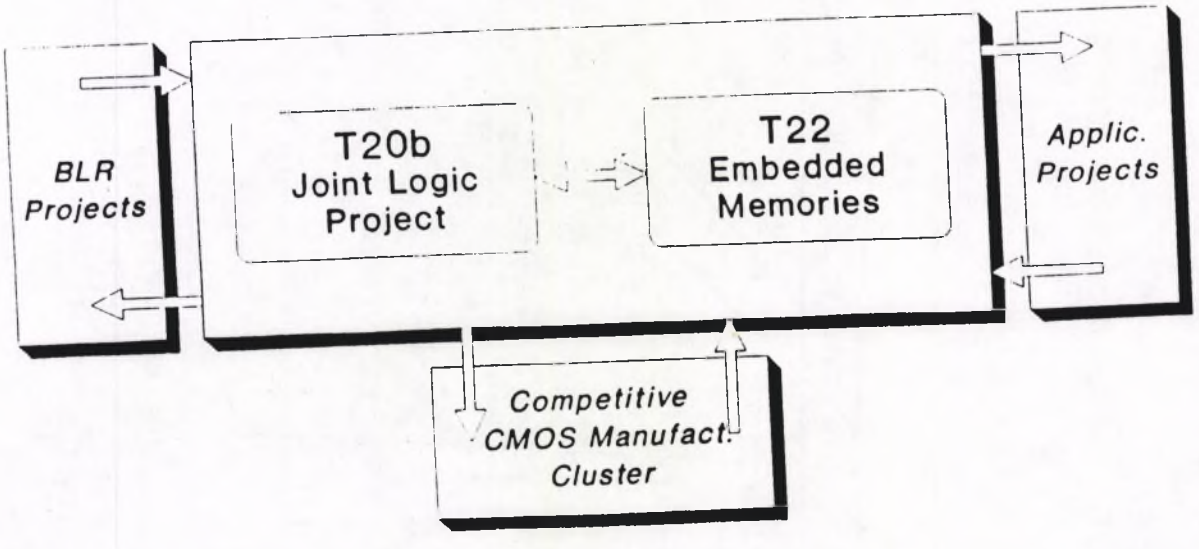
Memory increase = 1.5/year
MPU increase = 1.35/year

Source: Intel ICE

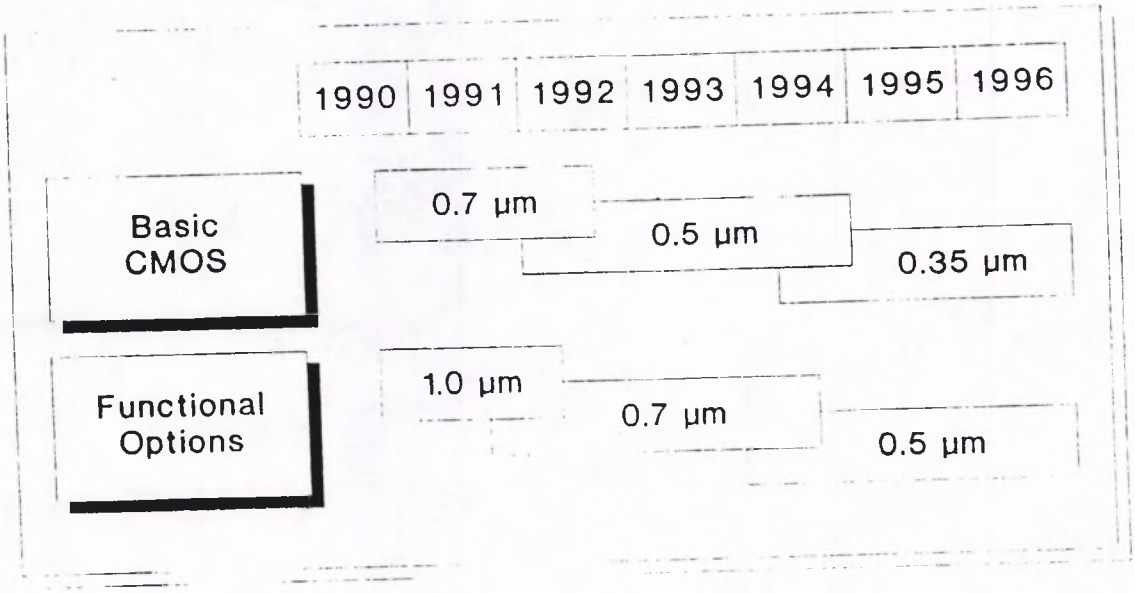
JESSI CMOS Logic Technology



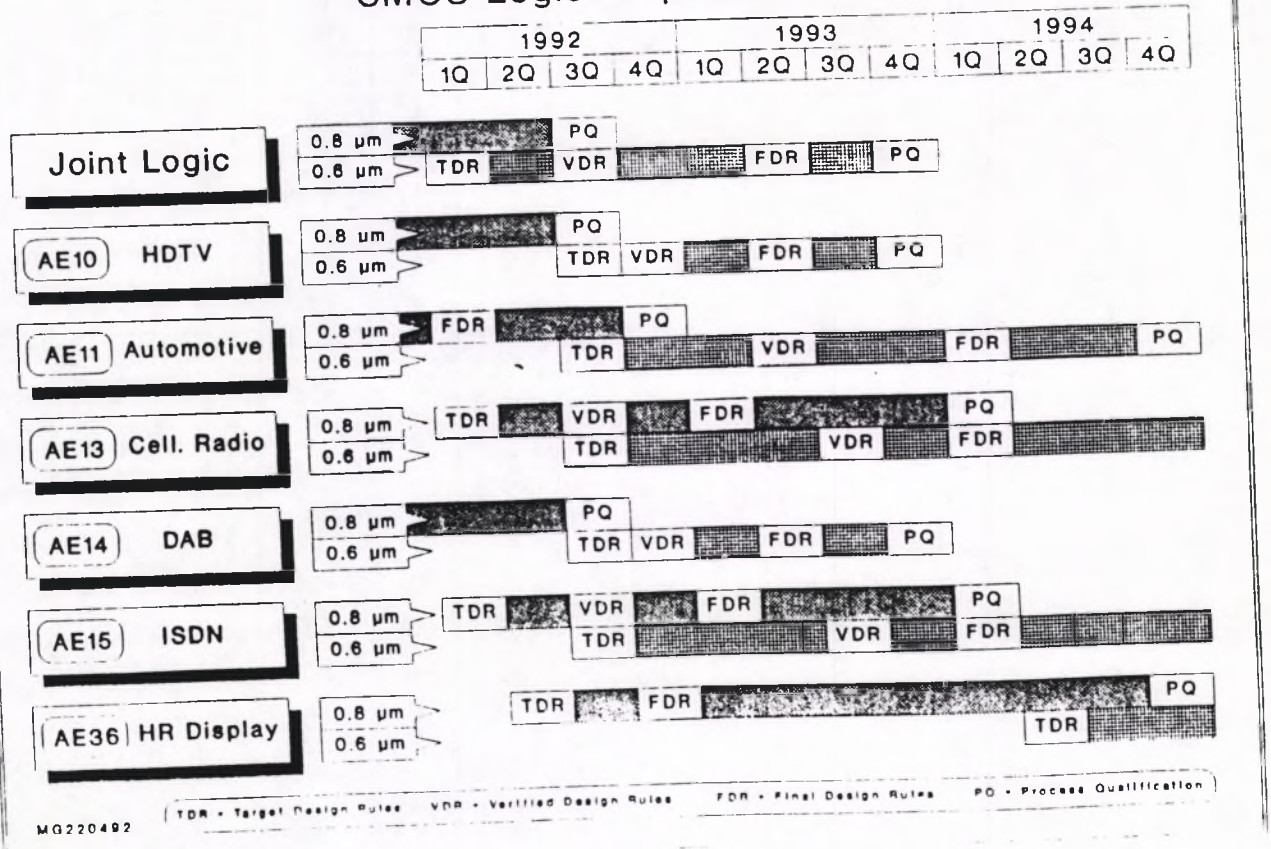
CMOS Logic Technology
JESSI Technology Cluster



JESSI CMOS Logic Program
Outline



JESSI Technology / Application Roadmap
CMOS Logic Requirements



JESSI CMOS Logic Program

Major concern:

What happens after 1994?

ROAD MAP AIMS TO LEAD U.S. TO CHIP DOMINANCE

R&D program designed to marshal forces of industry, government and academia

		1995	1998	2001	2004	2007
Feature size (µm)		0.35	0.25	0.18	0.12	0.10
Gates/chip		800k	2M	5M	10M	20M
Bits/chip	• DRAM	64M	256M	1G	4G	16G
	• SRAM	16M	64M	256M	1G	4G
Chip size (mm^2)	• Logic/microprocessor	400	600	800	1,000	1,250
	• DRAM	200	320	500	700	1,000
Wafer diameter (mm)		200	200-400	200-400	200-400	200-400
Number of interconnect levels (logic)		4-5	5	5-6	6	6-7
Max. power (W/die)	• High-performance	15	30	40	40-120	40-200
Power supply (V)	• Portable	2.2	2.2	1.5	1.5	1.5
Number of I/Os		750	1,500	2,000	3,500	5,000
Performance (MHz)	• Off-chip	100	175	250	350	500
	• On-chip	200	350	500	700	1,000

SOURCE SEMICONDUCTOR INDUSTRY ASSOCIATION

CONCLUSIONS AND DECISIONS ON THE JESSI E&M - TECHNOLOGY RELATION (6)

MSIG group will be revived and will be involved in defining the subprojects in MST, T1 and T15 where useful participation of E&M representatives is possible and beneficial.

- MSIG group consists of three members from JSMB T and three members of JSMB E&M.

E. Kamebeek 21-4-93/6

CONCLUSIONS AND DECISIONS ON THE JESSI E&M - TECHNOLOGY RELATION (7)

Information on trends for future 200 mm equipment and materials, created in T15 will be exchanged with E&M representatives.

E. Kamebeek 21-4-93/7

CONCLUSIONS AND DECISIONS ON THE JESSI E&M - TECHNOLOGY RELATION (8)

For some user companies it will be possible to inform the E&M representatives on what existing equipment will be replaced in the coming few years.

E. Kamebeek 21-4-93/8

CONCLUSIONS AND DECISIONS ON THE JESSI E&M - TECHNOLOGY RELATION (9.1)

With respect to evaluation of prototypes, α sites and ß sites the following was discussed and this needs further analysis.

- If there is no real interest from the user industry (European or non-European) it will be diffcult to justify JESSI support.

- α or ß site evaluation should sometimes not take place at the user. For this it seems to be possible to engage the institutes and/or Universities. However clear understanding of the anticipated results and their relevance for the industry should be guaranteed. Possible representation by the user industry during such evaluation at the evaluation location is foreseen.

E. Kamebeek 21-4-93/9

CONCLUSIONS AND DECISIONS ON THE JESSI E&M - TECHNOLOGY RELATION (9.2)

- FAW plays such role for the period until the pilot production is started. After this the start up of the FAW extensions in France and the UK will take over this evaluation task.

- Commitments of suppliers and users and involvement of the governments (with respect to financial support) will be detailed.
A first draft taken from the IVPS project was discussed and it was decided that further definition could be based upon this (see enclosure). It was realized that still a lot of unclear issues have to be discussed in this context.

CONCLUSIONS AND DECISIONS ON THE JESSI E&M - TECHNOLOGY RELATION (10)

If projects are to be split more clearly in a definition and specification part and a development and evaluation part, the MSIG group should play a major role in the process of advising for the go ahead of the second phase. This advice will among other reflect a judgement whether the equipment or material to be developed fulfills the requirements of the users.

CONCLUSIONS AND DECISIONS ON THE JESSI E&M - TECHNOLOGY RELATION (12)

Due to limited capacity of true European E&M users, JESSI is to advise favourably on projects where a non-European user is involved for the evaluation task.

The activities, however, should preferably take place in Europe.

E. Kamebeek 21-4-93 13

POSITION EUROPEAN E&M INDUSTRY

- PRESENT POSITION WEAK

  BASIC REASON: COMPANIES HAVE NOT

  BEEN STRONG IN THEIR HOME MARKET

- OTHER REASONS:

  * PRESENT CONDITION EUROPEAN IC

    COMPANIES (NO INVESTMENTS)

  * MIDDLE MANAGEMENT EUROPEAN IC

    COMPANIES DO NOT SEE THE NEED

  * MOST EUROPEAN E&M COMPANIES

    ARE SMIs

R&D COOPERATION, AS IN JESSI,

NOT SUFFICIENT TO OVERCOME PROBLEMS

OPTION TO OVERCOME PROBLEMS

- ALTHOUGH AIMED AT R&D

  COOPERATION THE JESSI PROPOSALS

  SHOULD BE IMPLEMENTED AS SOON AS

  POSSIBLE OR BE DISCUSSED WITH PAs

  WHEN THEIR INVOLVEMENT IS REQUIRED

- CREATE A MORE "BUY EUROPEAN E&M" ATTITUDE

- STIMULATE THE PURCHASE OF EUROPEAN E&M AT:

  * GOVERNMENT FUNDED INSTITUTES

  * COMPANIES THAT RECEIVE

    GOVERNMENT FUNDING

- ESTABLISH WORKSHOP

Enclosure 5

EUROPE NEEDS AN E&M INDUSTRY?

- STRONG IN WHOLE FOODCHAIN

- EARLY ACCESS TO LATEST IC

  TECHNOLOGY REQUIRES EARLY ACCESS

  TO STATE OF THE ART E&M

- DO NOT BECOME DEPENDENT ON OTHERS

  (COMPARE JAPAN AND U.S.)

BUT: IC COMPANIES SHOULD MAKE

FINAL JUDGEMENT

Exploitation of JESSI Technology

JESSI offers 0.5 µm Process Capability
to European Users

Exploitation of JESSI Technology
Objective

Objective of JESSI:

Provide European IC users with early access to advanced technologies, in order to secure timely and cost-competitive innovative products.

European system companies depend to a large degree upon access to new semiconductor technologies

Exploitation of JESSI Technology
Technical Aspects

* Joint Logic Project provides CMOS Logic Technology
  - 0.5 µm minimum rules
  - Three level metallization
  - 3.3 V supply voltage
* Process parameters to be released (6/93)

Exploitation of JESSI Technology
Joint Logic Project

* Advanced Logic technology is being developed in Joint Logic Project (JESSI/ESPRIT)
* All major European semiconductor companies participate in JLP:
  - Philips Semiconductors
  - Siemens
  - SGS-Thomson / CNET
  - GEC Plessey Semiconductors
  - TEMIC / Matra MHS
  - Mietec Alcatel / Imec
  - ES2

Exploitation of JESSI Technology
0.5 µm Process Capability

* State-of-the-art 0.5 µm Logic technology has been developed in the Joint Logic Project

* This process will be offered to all European users of advanced microelectronics:
  - System companies
  - Small and medium enterprises (SME)
  - Design houses
  - Universities

Exploitation of JESSI Technology
Logistic Aspects

In the JSEB-T meeting in Rouen it was decided not to mention ES2.

* ES2 acts as silicon broker center

* Broker sets up and maintains database

* Broker plans wafer fab runs with silicon supplier

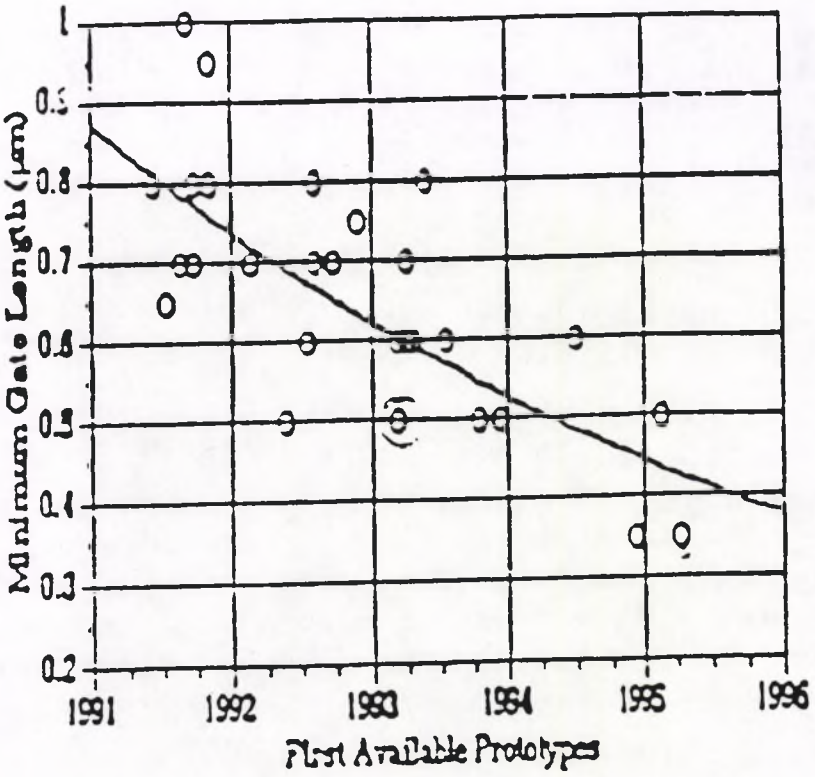
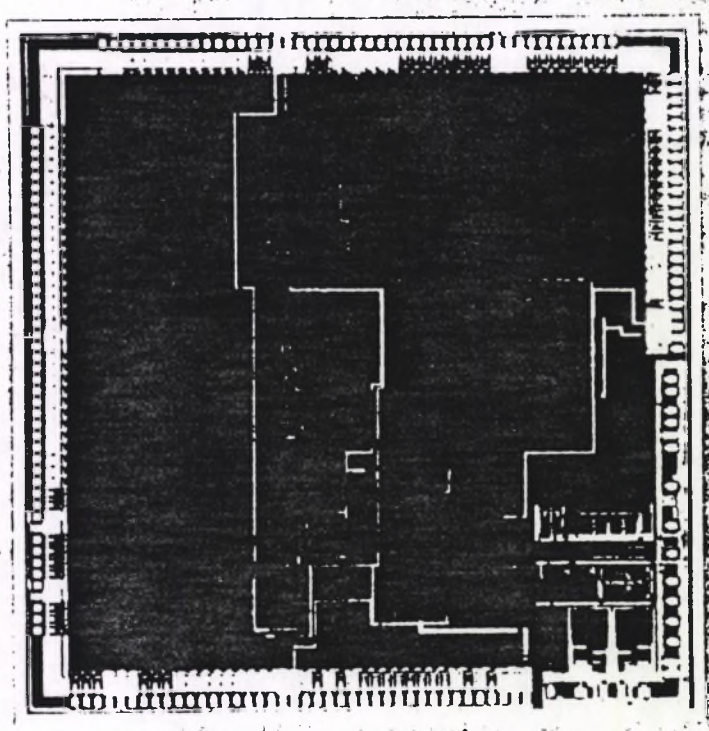


Figure 1: Minimum NMOS transistor gate length versus date of first available prototypes

SIEMENS

IEC-Q



- 1.0 µm analog technology
- LDD n-and p-channel devices
- High resistive polysilicon for high precision capacitors
  low temperature drift
- Double level metallization
- Chip area 32 mm^2
- PLCC 44 package

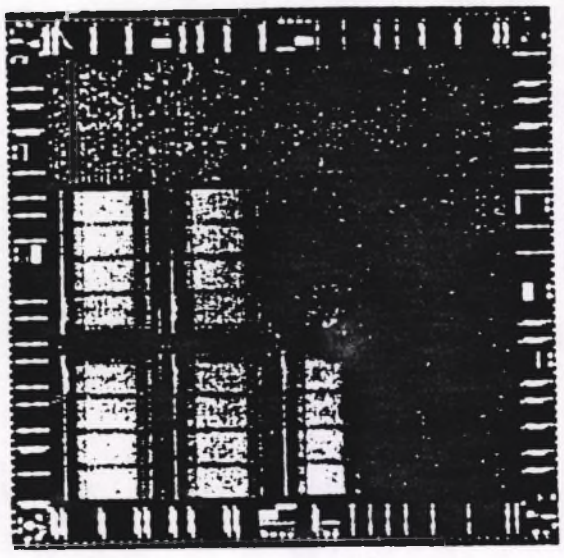
1.0 µm Analog Demonstrator

SIEMENS

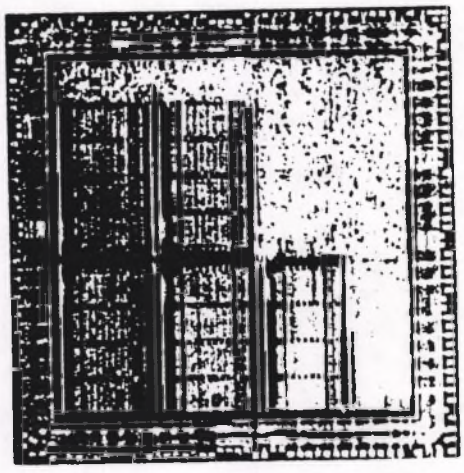
DUC (Distant Unit Controller)

Advantages of the Triple Level Version

- ☐ Chip Area Reduction 35%
- ☐ Performance Increase 15%
- ☐ Lower Power Consumption 5%
- ☐ Cost per Chip Reduction 20%
- ☐ Package Size Reduction



Double Level 7.92 x 7.68 mm^2

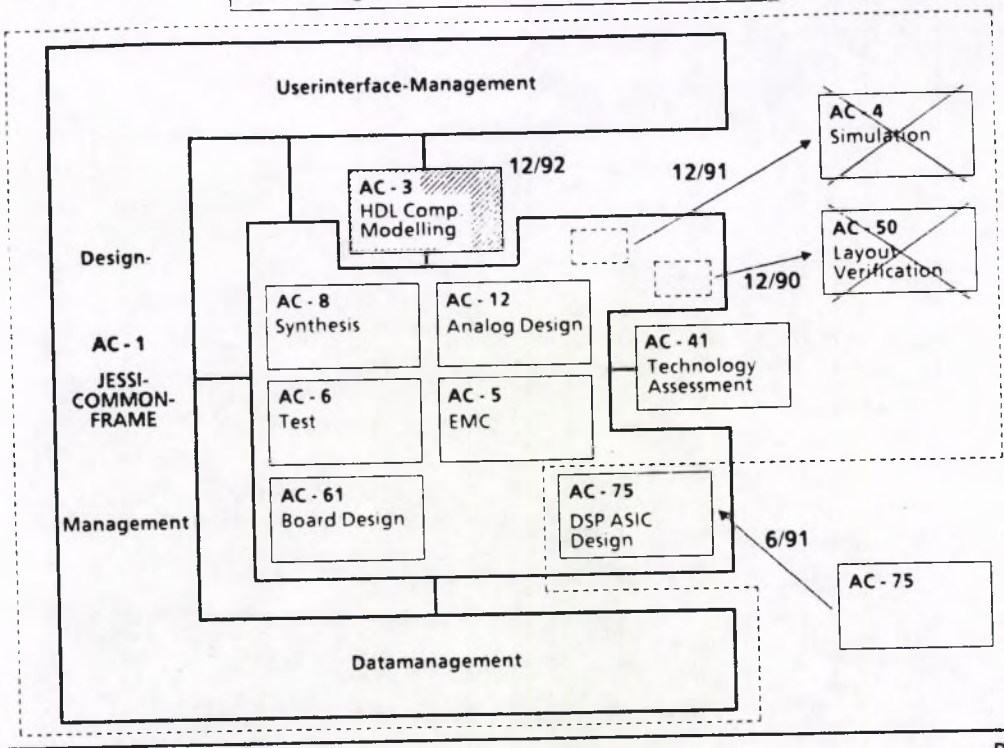


Triple Level 6.41 x 6.47 mm^2

0.7 µm-Demonstration of Triple Level vs. Double Level Metallization

JESSI Application

History of JESSI CAD Projects



Exploitation of JESSI CAD

JESSI Application

Project AC5: EMC-Workbench for Microelectronic Application

Project goals:

- Set of EDA tools to solve EMC problems already during the design process
- Set of EMC model libraries
- EDA tools and libraries embedded in an EMC-Workbench
- Support of design strategies considering EMC problems

Results achieved:

- Development of first version of tools supporting system design ready
  - analysis of radiation of systems (COMORAN)
  - calculation of transmission line parameters (TALC)
  - simulation of reflection and crosstalk of transmission lines (FREACS)
  - independent layout format to connect different commercial layout systems
- Integration of tool set into EMC-Workbench in progress (release planned end of '93)

Exploitation:

- Direct sales (SNI under discussion)
- Joined marketing with a vendor of layout tools
- Alternate distribution channels
  - German special distributor (pre-contract)
  - distributor with European distribution network
  - distributor for South-East Asia
- Tools integrated into EDA systems of CAD vendors
  (under discussion: Cadence, Mentor, Racal-Redac, small European CAD vendor)

EDA = Electronic Design Automation

EMC = Electromagnetic Compatibility

Exploitation of JESSI CAD

JESSI Application

Project AC41: Technology Assessment

Project goals:

- Standardized interface between technology suppliers and users (system houses)
- Common, European wide standardized technology assessment system
  - transistor models
  - parametric and reliability test structures (testchips)
  - test and measurement methods
  - parameter extraction methods
  - data interchange formats

Results achieved:

- Preferred 0.7 um CMOS transistor models for digital and analogue applications
- JESSI test chips for 0.7um CMOS and 0.8 um BiCMOS
- European Mini Test Chips (0.7/0.5 um CMOS, 0.8 um BiCMOS) for fast evaluation of basic technology parameters

Exploitation:

- Implementation in commercial tools of CAD/test equipment vendors (under discussion: Anacad, Analogy, Cadence, HP, Keithly, Silvaco)
- European wide standardization via ECSI and CENELEC (TC117)

JESSI Application

Project AC1: JESSI COMMON FRAME

Project goals:

- Basis for open, vendor independent, integrated design environment
- Platform for tool integration
- Uniform user interface and guidance
- Standardized interfaces and toolkit for building environments
- All work in close cooperation with CFI (CAD Framework Initiative)

Results achieved:

- JESSI COMMON FRAMEWORK (JCF) V2.0 released to evaluators
  - beta-site test by 11 project partners in progress
- SIFRAME (SNI product name) as market version of JCF ready for marketing

Exploitation:

- SNI: Marketing started for SIFRAME as
  - open framework for CAD applications
  - general framework for engineering applications
- Racal-Redac GmbH Germany: Marketing started as value-added reseller for SIFRAME to integrate their commercial CAD tools
- Pre-contract of SNI with a large US computer company to integrate SIFRAME into their engineering environment for the open market

Overview on Exploitation Activities

Project	External Commercialization	Internal Exploitation by Project Partners
AC1: JESSI COMMON FRAME	SNI (product SIFRAME), Racal-Redac, US partner	ICL
AC3: HDL Component Modelling Libraries	ANACAD, Bull (by CLSI), Fela-Speed, IM (by SYNTHESIA), INPG (by Innovative Synthesis Technologies)	all project partners
AC5: EMC-Workbench	SNI (direct sales, OEM partners, joint venture); contacts with Cadence, Mentor, Racal-Redac	all project partners
AC6: Testing	Philips ED&T, Philips/Fluke	Philips, Siemens, SGS-Thomson
AC8: Synthesis	AHL, IM (by SYNTHESIA), INPG (by Innovatice Synthesis Techn.), Philips ED&T, distributor network	Bull, Philips, Siemens, SGS-Thomson
AC12: Analog Design	ANACAD, CSEM, S3; contacts with Cadence, Mentor	Siemens, SGS-Thomson
AC41: Technology Assessment	CAD tool/test equipment vendors; standardization via CENELEC (TC117)	all project partners
AC61: Board Design	Racal-Redac (first releases in '92)	Bull, ICL, SNI
AC75: DSP ASIC Design	EDC (by Mentor); contacts with small CAD vendors	Philips

Summary of CAD Exploitation Activities

Different channels for exploitation of CAD project results:

1. Directly by PROJECT PARTNERS:
2. Project partner ⟶ START-UP COMPANY
3. Project partner ⟶ SOFTWARE HOUSE / DISTRIBUTOR

1. Exploitation directly by PROJECT PARTNERS:
   AC1, AC3, AC5, AC6, AC8, AC12, AC61

2. Exploitation by START-UP COMPANIES:
   AC3, AC6, AC8

3. Exploitation by SOFTWARE HOUSES / DISTRIBUTORS:
   AC1, AC3, AC5, AC8, AC12, AC41, AC75

Munich, 4 November 1993-HM/sm

JESSI Office
Office of the JESSI Organization

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Distribution list to the summary of results of the JESSI Board / JESSI Committee meeting in Paris, October 29, 1993

To the members of the JESSI Board:

Mr. Hagmeister
Dr. Dumas
Mr. Dunn
Mr. Grunberg
Dr. Gutberlet
Mr. Knorr
Prof. Lawes
Prof. Petit
Mr. Pistorio
Mr. del Prado

To the members of the Board Support Group:

Dr. Dumas
Mr. Ernest
Mr. Felix
Dr. Glauert
Drs. Kamerbeek
Drs. Kramer
Mr. Monnier
Prof. Radelaar
Dr. Tischer

To the chairmen and Vicechairmen of the Subprogram Management Boards:

Drs. Kramer
Mr. Brothers
Drs. Kamerbeek
Mr. Doche
Dr. Sauer
Mr. Borel
Mr. Kreuwels
Mr. Schwippert
Prof. Lawes
Prof. Gerber

To the members of the JESSI Office:

Dr. Fernholz
Mr. Gotz
Mr. Le Goascoz
Mr. Sethi
Dr. Trilhe
Mr. van den Hurk

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8 November 1993
HM/sm

10th Meeting between JESSI Board and JESSI Committee on October 29th, 1993

Summary of Results

0. List of participants: see **enclosure 1**

1. Welcome and introduction

Mr. Metakides was welcomed as new EC representative in the JESSI Committee.

2. Discussion of the reports

In a general comment to the October Review, the JESSI Committee appreciated the comprehensive description of results and considered the JESSI Program as well organized. For further improvement of the Review, it was agreed to add in the next issue a comparison of the achieved results with the competition elsewhere in the world and to give a better description of the benefit of JESSI for the industry in total resp. for the users of the JESSI results.

Mr. Hagmeister underlined the need to explain the progress and achievements of JESSI to the public and distributed the JESSI leaflets to JESSI Committee and GAT members. He emphasized that most of the important milestones of the Program had been met without delay.

JESSI Board and JESSI Committee discussed the possibilities to demonstrate the overall success of the Program in relation to worldwide competition in order to maintain political and financial support for microelectronics in Europe.

Several Board members reported on progress achieved in important markets (EPROM, Digital Mobile Communication) due to JESSI .

In view of the complicated political environment, the JESSI Committee considered the different examples remarkable, but not sufficient to defend the financial support for JESSI in the public discussions. The Committee suggested a common effort of JESSI and Public Authorities to prepare "political statements". A "EUREKA" approach was suggested in order to evaluate the situation of the Program.

Further questions related to the JESSI Review and to the JEMT Report will be discussed in the next meeting between GAT and Board Support Group.

3. JESSI funding 1993/1994

Dr. Dudde presented the overviews on the funding status 1993 and the funding frame envisaged for the years 1994 - 1996 (see **enclosure 2**, still containing typing errors!).

With regard to the budget figures for Germany, as included in the October Review, Mr. Hagmeister explained that the detailed distribution - within the given budget frame for Germany - has to be corrected in order to take the project T1 (ADVANCED TECHNOLOGY FOR VOLUME PRODUCTION) into account, which is considered by the JESSI Board to be of high priority. A corresponding footnote will be added to the budget plan in the October Review. The correction will be tried without affecting budgets of other countries, mainly by reallocating the support for German partners in Equipment/Materials and Application.

With regard to a possible reallocation of budgets, Dr. Dudde pointed out that for most labelled projects in Germany, money has been contracted for a longer period of time and that strong arguments for the discontinuation of any projects would be required.

The JESSI Office is asked to clarify the differences between the budget figures prepared by the GAT and the figures prepared by the JESSI Office.

4. JESSI/SEMATECH relations

Mr. McAuley reported on the results of a meeting of a GAT working group with members of SEMATECH and ARPA. In this meeting, the GAT representatives got the impression that SEMATECH had no clear vision about the objectives of their possible cooperations with JESSI.

Mr. Hagmeister informed the JESSI Committee about his meeting with SEMATECH representatives in which he got the impression that the cooperation projects are running well with a balanced exchange of information. Mr. Hagmeister underlined, however, that SEMATECH has no "transatlantic preference" for cooperations, but is only looking for the advantage of the U.S. semiconductor industry. In that sense JESSI is just

JESSI

considered as a "non-U.S." organization. An example for this attitude of SEMATECH could be seen from the situation in Lithography, where CANNON was finally given preference over ASM-L. Nevertheless, technical cooperation with SEMATECH is possible, mainly between E/M and Technology companies from JESSI, while the Application and the BLR areas are not in the scope of SEMATECH.

5. Strategy discussion

Mr. Hagmeister gave an introduction to the paper distributed as back up material for the strategy discussion and as contribution from JESSI to the FOURTH FRAMEWORK documents. Mr. Metakides emphasized that the more general documents for the FRAME Program should not include detailed workplans (proposed by JESSI), as in the present negotiations within the EC unanimity is required.

A common EC position on the FRAMEWORK Program is expected in December or at least before March 1994, otherwise a delay until 1995 might occur. A decision on the specific program could then be reached by mid of 1994 with a workplan to which JESSI should be able to contribute in the preparation. The present level of description in the FRAMEWORK IV document of the EC is - according to Mr. Metakides - sufficient to achieve unanimity and to take JESSI into account lateron in the workplan discussions.

Mr. Metakides strongly suggested not to use the term "focused cluster" for JESSI in order to avoid confusion with the concept proposed by the EC Commission. The term "focused cluster" should be reserved for activities which aim at a broad, European-wide approach including partners from all countries.

Mr. Hagmeister informed the JESSI Committee that a small group of industrial experts is being formed in order to evaluate the possibilities for a European microelectronic program after 1996 and that so far all Board members have agreed to continue their cooperation beyond 1996.

6. Any other business

JESSI Board and JESSI Committee confirmed the date for their next April meeting (29.04.1994 in the Netherlands) and decided on the meeting in October: 28.10.1994 in Italy.

Hans Meyer

H. Meyer

Enclosure 1

List of participants

JESSI:

Mr. Hagmeister
Dr. Dumas
Mr. Grunberg
Dr. Gutberlet
Mr. Knorr
Prof. Lawes
Prof. Petit
Mr. Pistorio
Mr. del Prado

Drs. Kamerbeek
Drs. Kramer
Dr. Meyer
Dr. Sauer

Public Authorities:

Mr. Metakides
Dr. Rupf
Prof. Schileo
Mr. Serres
Mr. Shotton
Drs. Winters

Mr. Broster
Mr. Cochet
Mr. Dominé
Dr. Dudde
Mr. van' t Hof
Mr. McAuley

Funding Status of JESSI-Projects 1993 [MECU]
Overview

Subprogramme	F	G	I[a)]	NL	UK[a)]	CEC[a)]	TOT
Application	10,4 + 2,6[2] + 2,6[FT]	21,7 + 1,9[2]	4,9[2]	6,3	1,8	7,0	47,2 + 9,4[2] + 2,6[FT]
Equip. & Mat.	6,2 + 0,9[2]	20,9 0,2[2]	0,8[2]	6,6	1,7	0,3	35,7 + 1,9[2]
Technology	24,1	3,2	15,0 +3,0[2]	4,3	0,5 0,8[2]	40,2	87,3 + 3,8[2]
BLR		1,9		0,5	0,4	9,3	12,1
SUB-TOT	40,7 + 3,5[2] + 2,6[FT]	47,7 + 2,1[2]	15,0 8,7[2]	17,7	4,4 + 0,8[2]	56,8	182,3 + 15,1[2] + 2,6[FT]
TOTAL	**46,8**	**49,8**	**23,7**	**17,7**	**5,2**	**56,8**	**200,0**
Funding Frame Envisaged 93 (October 92)	48,3	49,8	22,2	19,5	6,5	64,6	210,9

Status: no index or 1: contract prepared or issued;
2 : application received and/or funding planned
FT: under responsibility of France Telecom

a) annualised figures

JESSI-GAT 93 OCT 15 /DO/UW-V2

Enclosure 2

Funding Forecast of JESSI-Projects 1994

Overview

(Cost Estimations for ´94 in MECU)

Subprogramme	F	G	I[a)]	NL	UK[a)]	CEC[a,b)]	TOT
Application	39,6	51,4	14,2	17,1	2,5	14,0	138,8
Equip. & Mat.	21,9	43,7	2,9	22,8	4,7	3,0	99,0
Technology	45,2	4,4	33,0	7,4	4,9	85,7	180,6
BLR		4,8		1,0	1,7	23,2	30,7
TOTAL	106,7	104,3	50,1	48,3	13,8	125,9	449,1

a) annuallsed figures

b) based on payment credits

Funding frame envisaged [MECU]

(Oct 1993)

	1994	1995/1996	Total
F	53	88	141
G	52	86	138
I	25	34	59
NL	24	38	62
UK	7	10	17
CEC	63	29 + ?	92+ ?
Total	**224**	**285 + ?**	**509**

ANNEX 4