The Director of Central Intelligence

Washington, D.C. 20505

Intelligence Research & Development Council

# ARTIFICIAL INTELLIGENCE STEERING GROUP

## MEETING MINUTES

DATE/PLACE

1300-1500, 27 June 1983
Defense Mapping Agency
Hydrographic/Topographic Center

ATTENDEES

[redacted]

25X1

BUSINESS

The fourth meeting of the Artificial Intelligence Steering Group gave us our first opportunity to tour the facilities of one of our member agencies, the Defense Mapping Agency. Unfortunately, because of computer failure we were unable to see any of their AI applications in operation. However, we were given a briefing by Hank Cook on DMA's plans for an all digital (and eventually all automatic) mapping, charting, and geodetic service over the next 10-15 years. In summary, DMA's objective is to build a 3-D digital model of the entire earth's surface and to maintain that model in real time.

There is a strong AI flavor to their plans. At one level they will be developing an Intelligent Operating System. Such a system would include:

- Knowledge-based Configuration Control
- Automatic Fault Detection and Repair
- Automatic Performance Monitoring and Reporting.

In addition to the Intelligent Operating System, DMA is building cognitive models of the various functions involved in making maps and communicating map-related information. Finally, they are developing numerous tools to support knowledge acquisition, representation, and processing.



B-239A

SUBJECT: AISG Meeting Minutes

Mr. Cook described several R&D projects in these areas which DMA currently has underway. The software and documentation for their current AI systems in Scene Understanding, Knowledge Acquisition, Natural Language Interfaces, and Knowledge Engineering are available to the Intelligence Community. Also, an SRI report on the deficiencies of ADA for AI programming is available (although several years old). A copy of his viewgraphs is attached.

[redacted] reported that the AI Symposium Panel is making progress. They plan to hold the symposium on 6-8 December 1983 in the CIA auditorium. The focus of this symposium will be on intelligence applications for Artificial Intelligence. It will be open to members of the Intelligence Community (including contractors) with TS/SI/TK clearances. Details regarding the program and invitations are under development. 25X1

The EXRAND AI Training Panel is continuing to develop a training program for the Community. The release of an RFP for contractual support in preparing the formal courses has been held up pending the identification of a source of the funds. Our hope is to get two introductory level courses started this fall through the CIA Information Science Center.

As of the date of this meeting we had received responses to our call for data on IC AI programs from Navy, DMA, NSA, and CIA. In addition, we received from NRL's AI Center (via EXRAND) 30 copies of the unclassified DoD survey of AI Programs, as completed by the Joint Directors of Laboratories in the Army, Navy, and Air Force. A copy of that report has been sent to AISG members under separate cover. As soon as we receive responses from the rest of AISG we will compile our own (classified) report of IC AI programs.

On 21 June 1983, [redacted] met with Richard DeLauer, Chairman IR&DC, to discuss the progress of the AISG. Dr. DeLauer's response was enthusiastic and he is highly supportive of the Group's efforts. He was particularly interested in the question of AI technology transfer from the U.S. to foreign countries. 25X1

The Steering Group briefly discussed the issue of technology transfer (within an agency, among agencies, or between countries). We concluded that technology transfer is a problem of general interest to the Group with valid arguments on both sides of the issue. Hank Cook offered some comments on DMA's experiences with technology transfer (see last viewgraph). [redacted] DIA, volunteered to set up an Awareness Briefing on Technology Transfer Issues for our next Steering Group meeting (see Next Meeting). 25X1

SUBJECT: AISG Meeting Minutes

The Group also expressed an interest in Supercomputer programs, especially as they relate to the use of or support of Artificial Intelligence. Apparently there are several related Supercomputer activities under development, including a proposed DARPA program, an NSF program, the IR&DC Super Computation Advisory Panel, a Defense Sciences Board Task Force, and a joint Los Alamos/NSA Supercomputer Conference scheduled for mid-August, as well as industrial efforts such as MCC. AISG will want to track these and other efforts to determine where we might have an impact and best represent the Intelligence Community's interest in Artificial Intelligence.

NEXT MEETING

The next meeting of the AISG will be at 1330-1530 on 25 July 1983 in [redacted] 25X1
[redacted] In addition to our regular business meeting, [redacted] 25X11
[redacted] DIA, will give a one hour Awareness Briefing on Technology 25X1
Transfer Issues. 25X1

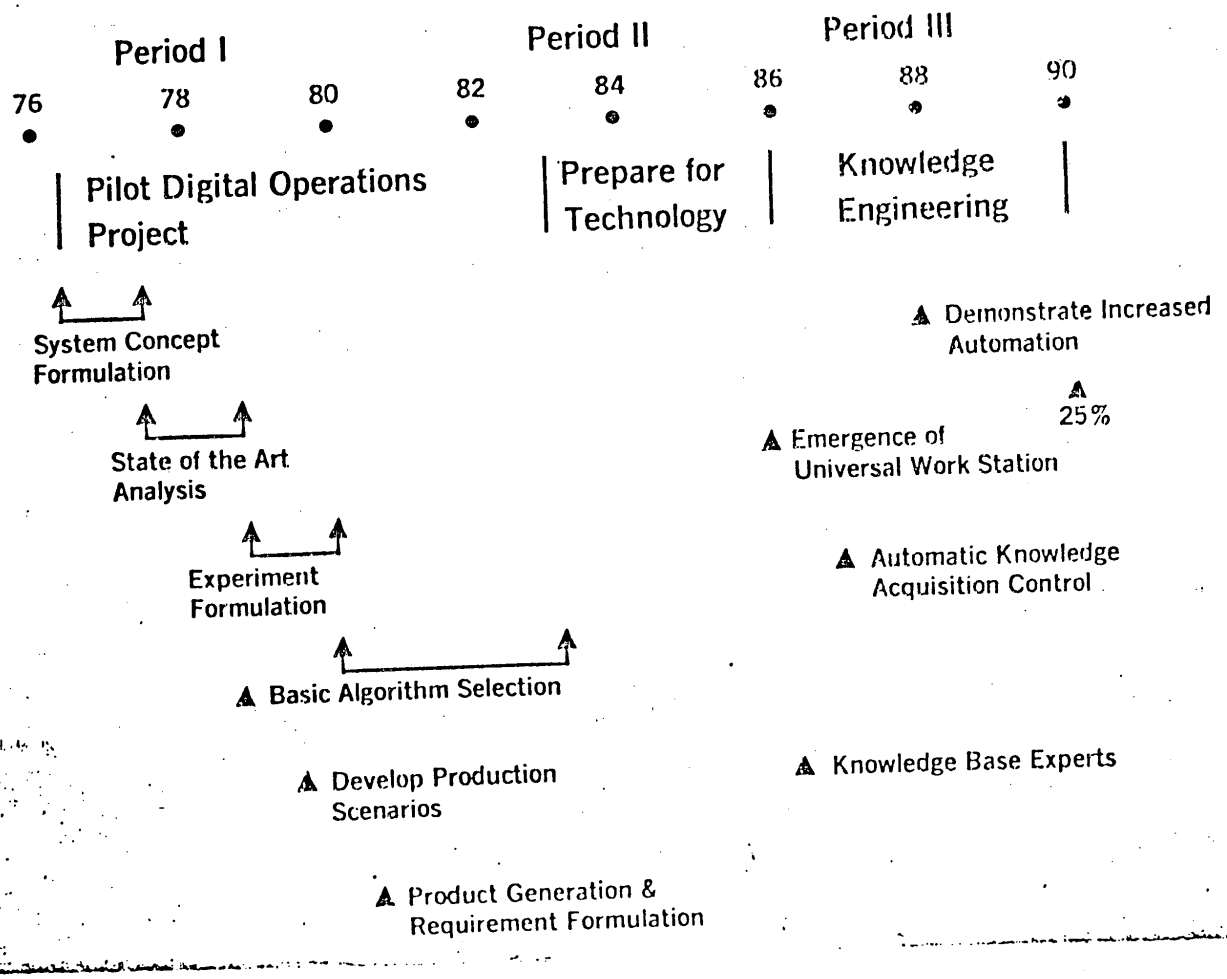
[redacted]
Executive Secretary

# DMA LONG RANGE PRODUCTION SYSTEM EVOLUTION (GOALS)

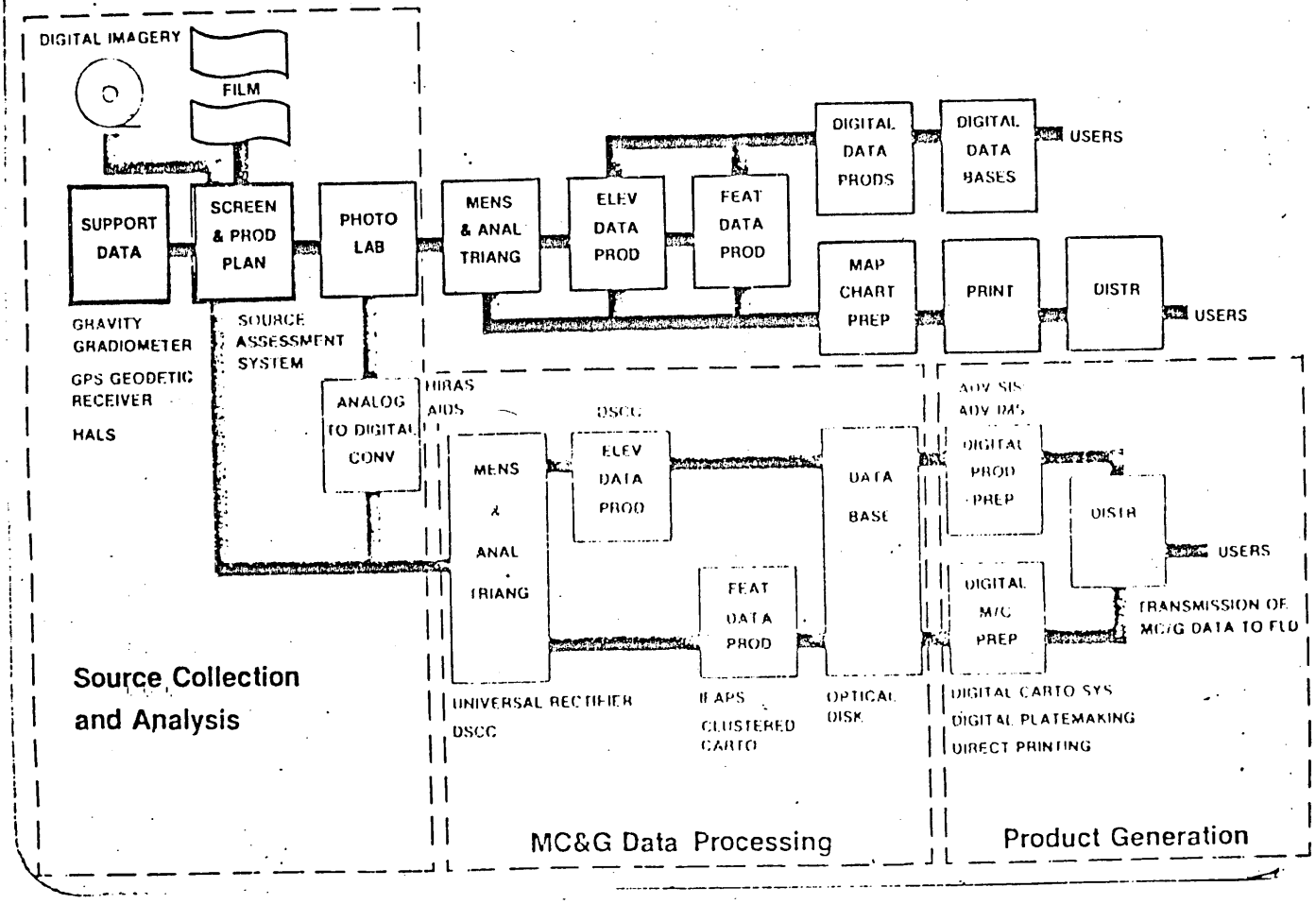
## System States:

- 1980 Mostly Manual, Limited Automation
- 1982 Special Program Office for Exploitation Modernization
- 1986-88 Emergence of "Advanced Digital Exploitation System" Key Characteristic: All Digital
- 1987 Emergence of Knowledge - Based Systems
- 1988-90 Emergence of Automatic Knowledge Acquisition
- 1988-90 Emergence of the Flexible Computer Architecture and Associated Intelligent Operating System for Control
- 1995- All Digital, "Fully" Automated Production System
- 2000- Real Time Response to Users

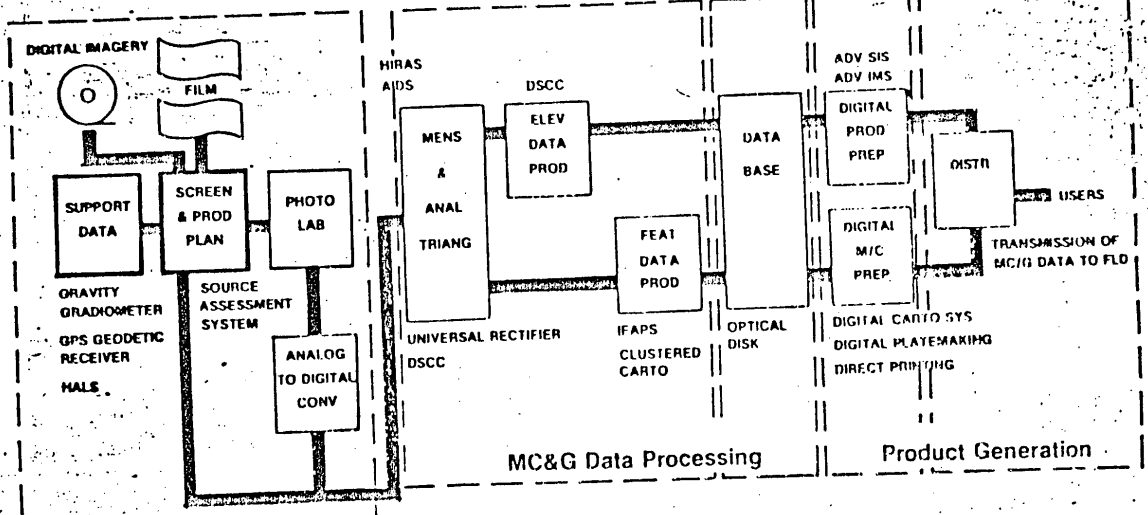
# DMA Time/Technology Overview



# Current Production System and Relationship to Emerging Advanced Digital Exploitation System



# Emerging Advanced Digital Exploitation and Relationship to Evolving Long Range Production Model

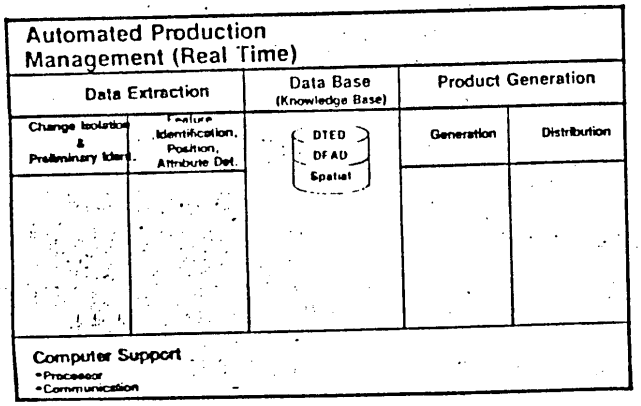



| Automated Production Management (Real Time) | | | | |
|---|---|---|---|---|
| *Data Extraction* | | *Data Base* (Knowledge Base) | *Product Generation* | |
| CHANGE ISOLATION & PRELIMINARY IDENT. | FEATURE IDENTIFICATION, POSITION, ATTRIBUTE DET. | DTED DFAD Spatial | GENERATION | DISTRIBUTION |
| | | | | |
| Computer Support<br>•PROCESSOR<br>•COMMUNICATION | | | | |

# Automation in the Evolving Long Range Production Model

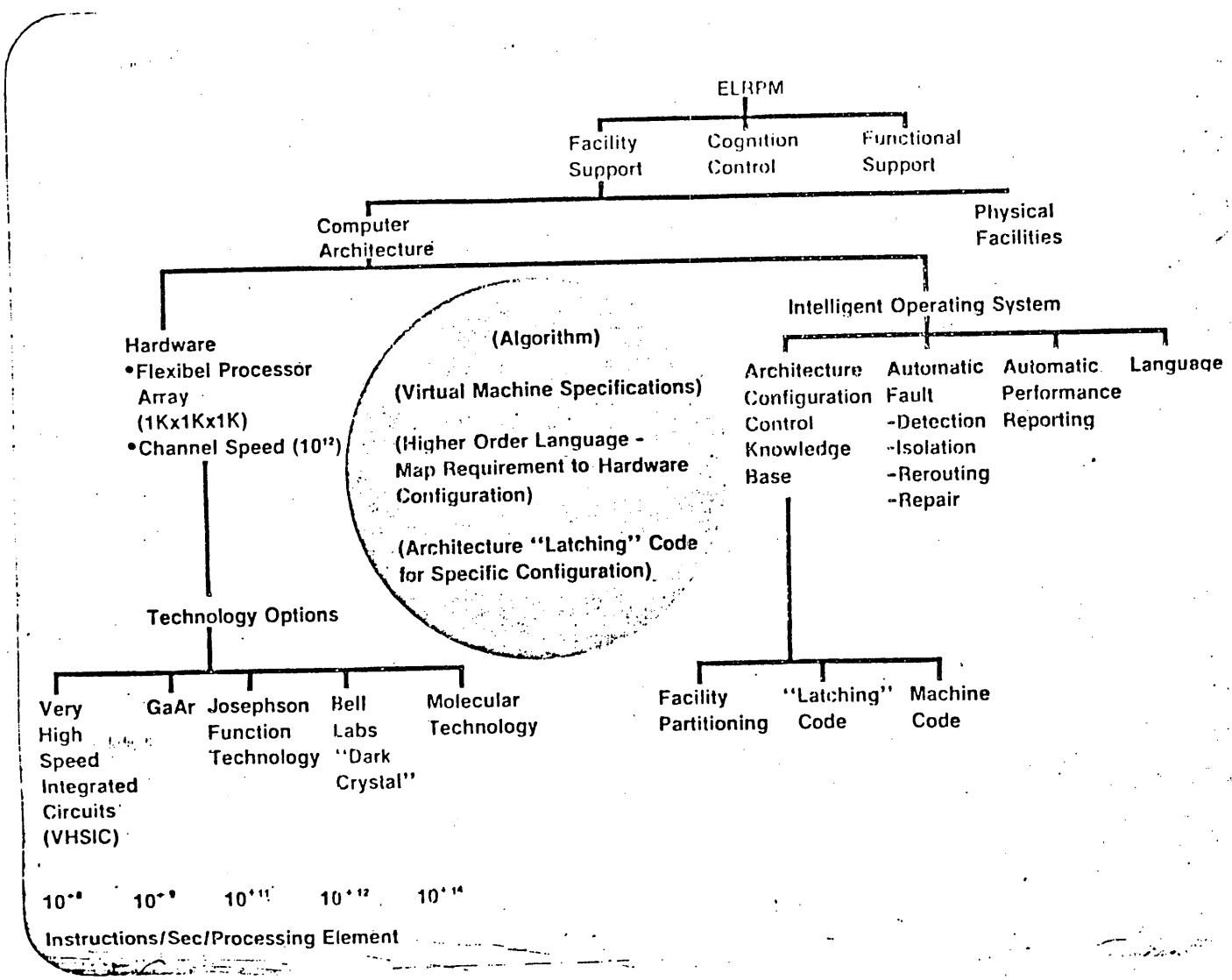
## Evolving Long Range Production Model

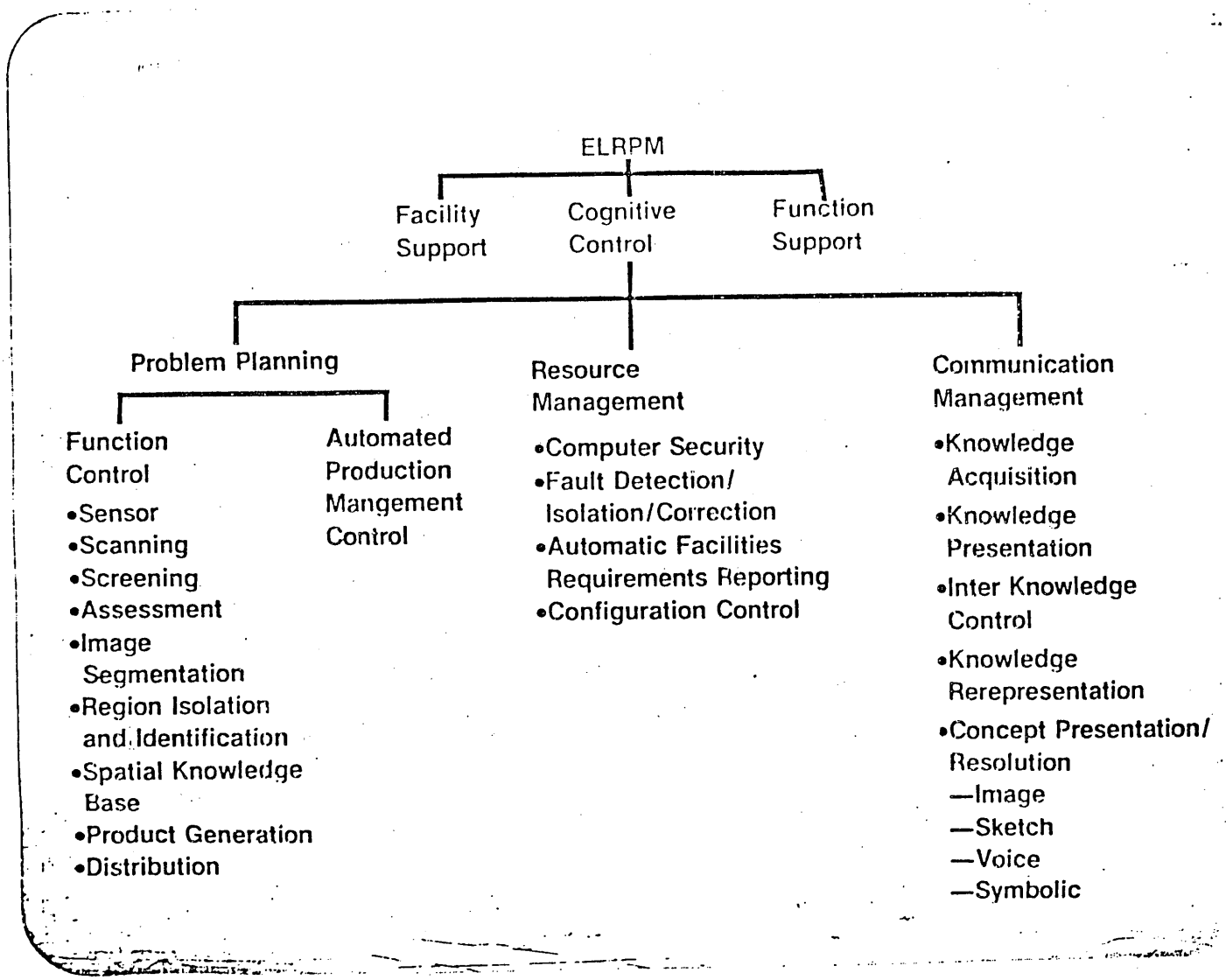
*Enhancement of SPOEM initial Digital Production System*

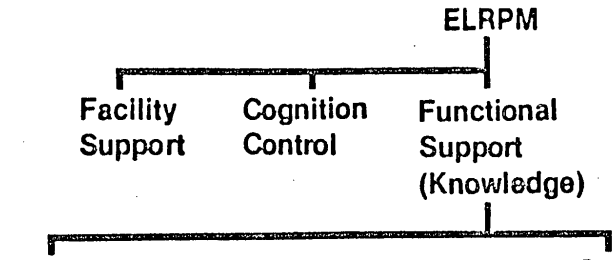



## Evolving Long Range Production Model (ELRPM) Decomposition

- Facility Support
- Cognition Control
- Functional Support








**Function**

- •Spatial Knowledge Base
- •Cognition
- •Image & Assessment
- •Application (Basic Tools)
  - —Signal Processing
  - —Image Restoration
  - —Image Enhancement
  - —Compression/Decompression
  - —Pattern Recognition
  - —Analytical Photogrammetry
  - —Specialized Experts
    - •Corner
    - •Line Linker
    - •Convexity
    - •Rectilinearity
  - —Geodetic
  - —Spectral
  - —Environmental
  - —Product Generator

**System**

- •Automatic Programming
- •Computer Security Assistant
- •User-Profile
- •Automatic Rerepresentation and Control
- •Automatic Performance Reporting
- •Communications Models
  - —Distributed Processing
  - —Network Model
  - —Production System Model
- •Knowledge Models
  - —Acquisition Tools
  - —Presentation Tools
  - —User Profiles
- •Meta System Model

# DMA Machine Intelligence Related Research

| | FY83 | FY84 | FY85 |
|---|---|---|---|
| A· MC&G Representation and Control | $400k | $600k | $700k |

1.1 - SMASC-Urban (83-Demo)
1.2 - SMASC-Rural (84-Demo)
1.3 - SMASC-Vegetation (84-Demo)
1.4 - SMASC-Shallow Water (85-Demo)
2.1 - Geographic Information System Input for Composition Analysis (84-Complete)
2.2 - Multiproduct Data Base (85-Complete)
2.3 - Data Structure Analysis (88-Complete)
3.1 - Product Specification (89-Complete)
3.2 - Knowledge Engr. (Continuing)
3.3 - Cognition Frame Formulation (84-Start)
4.0 - Automatic Rerepresentation and Control (84)
5.0 - Expert System Analysis (U.Mass) (84-Complete)

# DMA Machine Intelligence Related Research (Cont.)

| | FY83 | FY84 | FY85 |
|---|---|---|---|
| **B. DARPA MOU** | $1225k | $950k | $1000k |
| 1.0 - Expert System for Scene Understanding | | | |
| 2.1 - Transportable English Access Media (TEAM) for Local and Distributed Data Bases (83 Transfer) | | | |
| 2.2 - Knowledge Learning and Use System (KLAUS) (83-Demo) | | | |
| **C. Knowledge Engineering/Knowledge Base Development** | $83k | $547k | $500k |
| 1.0 - Expand Rule Base of SMASC | | | |
| 2.0 - Expand Inference Nets of ASCD | | | |
| **D. Rule Based Product Generation** | | $60k | $190k |
| Total | $1708 | $2157 | $2390 |
| People | 5 | 8 | 13 |

# Suggestions for Technology Transfer

- Clear Purpose, Definition Goals (both Near Term and Long Range)
- An Environment in which to Transfer the Technology (Not Production)
- Staff to Support Environment for Experimentation, Evaluation, Training
- Transfer as Early as Possible, Expending as few Resources as possible to Accomplish
  - —Determination of User Acceptance
  - —Validation of Technology Requirement to Support Goals
  - —Establishment of Risk
  - —Allow for Adequate Planning for Integration into Production (Hardware, Software, Skill Levels, Facility Requirements)