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18051

Project of the Government of India

Kirst STALER

PROJECT DOCUMENT

Project title : Establishment of a Centre for Engineering Design & Analysis (CEDA) at National Industrial Development Corp Ltd (NIDC).  
 Project number: DP/IND/89/XXX/A/01/37 Duration : 3 years  
 Project site : New Delhi, India  
 ACC/UNDP sector and subsector : Industry (05)/Manufacturing Industries Support Services (0510)

Government sector and subsector:  
 Government implementing agency : Department of Public Enterprises through the National Industrial Development Corp Ltd.(NIDC)  
 Executing agency : United Nations Industrial Development Organization (UNIDO)  
 [Co-operating or associated agency (if applicable)]:  
 Estimated starting date (month, year): May 1989  
 Government inputs (local currency) : Rs.26,782,000  
 (in kind) (in cash)

UNDP and cost-sharing financing

UNDP  
 IPF : US\$ 3,092,000  
 Other (specify) :  
 Govt. or third party cost-sharing (specify):  
 UNDP & cost-sharing TOTAL : US\$ 3,092,000

**Brief description:** The project is an institutional building project and aims at the establishment of a centre for Engineering Design and Analysis at the National Industrial Development Corporation (NIDC). This centre will be capable of delivering services to the small and medium scale engineering industry in the northern region, as well as assisting and improving the performance of other departments of NIDC in executing national country-wide programmes. The project will assist industry in improvement of their product-quality, cost-effectiveness, product-features and reaction time to adopt new products, in order to strengthen their position in export- and import substitution markets. Further it will assist industry in improving their capacity utilization. The services incorporated are in the field of i)Product- and tool -design, -adoption, -modification and -analysis, ii)Consultancy on use of advanced techniques, iii) Manpower development, and iv) Infrastructure development. The centre will act as a focal point for application of advanced (computer) techniques in the small and medium scale engineering industries in the Country and will co-operate with related institutions and educational establishments. Project envisages the creation of the Centre through provision of high-level expert services; training of DPE staff; and installing and operating of a computer system, peripheral equipment and related software package(s).

On behalf of	Signatures	Date	Name/title
the Government	_____	_____	_____
Executing Agency	_____	_____	_____
the UNDP	_____	_____	_____

UN official exchange rate at date of last signature of project document: US\$ 1.00 = Rs.16,72 (as of December 1989)

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**A. Context****A.1 Description of sub-sector**

The subsector concerned is in the field of Engineering Industries specially in the small and medium sector. These industries produce diverse nature of engineering products for domestic and industrial purposes. The outputs of these industries can be classified as consumer goods and industrial components. Product-range is mainly prescribed in governmental plans on a scale-wise bases. For example domestic appliances (heaters/mixers/telephones etc.) are to be produced in small scale industries, Pumps, compressors power supply systems air conditioners and alike are to be produced in medium scale industries where-as steel, oil, fertilizers etc. constitute the large scale sector. Majority of the small and medium scale industries continue to operate in conventional methods with little regard to quality of product. This is typical of the sellers market, but situation is fast changing as more and more competition is coming in. The Government is liberalizing private industry to a substantial extent and is 'luring' foreign investment and technology by way of multi-nationals and Non Resident Indian investments. With the result, newer technologies are fast emerging on the scene making it difficult for conventional designs and techniques to compete. The induction of Maruti (Suzuki) in automobile industry and its feeder industries is one classical example: Since the introduction of modern Japanese production techniques in India in 5 years 25 percent of current cars in use are locally made Japanese types. The local traditional car manufacturers and especially their vendors suffered fierce competition and set-backs. In view of such competition and export targets set by the national plans, products must be produced of high quality standards and most cost effectively to be able to compete within and outside the country.

To give an impression of the role this sector plays in Indian economy, the following annexures are attached :

Annex IX A gives an idea of the growing volume of such industry in industrial production. Annex IX B gives the region wise concentration of engineering industry in India; about 20 percent in the northern region, while Annex IX C shows that about 10 percent of exports from India come from engineering industries.

The share of small scale industries in the country is increasing every year and is estimated to be over 50% of total as per Annex IX D .

Another sector the project is related to is in respect to the nation wide governmental programs which are targeted on the whole population of India. The targets are to supply sufficient levels in quality/quantity of water, health services and alike.

**A.2 Host-country strategy**

The objectives of development programmes and policies in the VIIIth Plan (1985-1990) document (Volume II) of the Republic of India for the industry sector are as :

- (i) To ensure adequate supply of wage goods and consumer articles of mass consumption at reasonable prices and of acceptable quality;
- (ii) To maximize the utilization of the existing facilities through restructuring, improving productivity and upgrading of technology;
- (iii) To concentrate on development of industries with large domestic market and export potential to emerge as world leaders in them;
- (iv) To ensure in 'sunrise' industries with high growth potential and relevance to our needs; and
- (v) To evolve an integrated policy towards self-reliance in strategic fields and opening-up of avenues for employment of skilled and trained manpower.

The Plan aims at overall annual average growth rate of 8% in the industries sector, selected segments of it having been projected to grow at much higher rates. Upgrading of technologies and modernization of industry has to be combined with better efficiency in the use of factors of production. The resultant improvement in product quality and reduction in costs would not only stimulate domestic demand but also enable our industrial products to compete abroad.

Strengthening of product design development departments in engineering industry and introduction of computer-aided design and manufacture will contribute substantially to the development of industry because of its versatility, easy adaptability and impact on the quality and performance. Selective application of automation, microprocessors, fibre-optics, flexible manufacturing systems and application of computer-aided design and manufacturing operations should help the process of productivity improvement.

The diversified industrial base in the country now needs systematic, scientific and technological inputs to consolidate and maximize the utilization of existing capacities, improved productivity and quality of products, attain long-term survival of viability and raise the level of innovation and new product development. Sizeable investments on modernization and upgrading of technology and research and development facilities are proposed in the Seventh Plan.

A major part of the outlay provided for industry in the Seventh Plan is towards augmenting the share capital of institutions like industrial development corporations, financial corporations, infrastructure development corporations, etc. for financing their activities in the field of industrial promotion. Apart from public sector programmes, considerable expansion in capacities and output industries such as cement, fertilizers, industrial machinery, automobiles, consumer durable and electronic goods. The investment in the private corporate sector is of the order of \$ 38,000 million.

The main thrust in the Seventh Plan in the engineering industries will be towards facilitating the adoption and absorption of modern technologies. The ability of the industry to introduce new products in the industrial and consumer market suited to the needs of the country will have to be strengthened. Seventh Plan aims at much closer linkages among the capital goods producers, user sectors and the consultancy organizations. Technological perspective plans for the 'products' and the 'processes' will be drawn up jointly. The acquisition of imported technology and equipment will be linked with the transfer of design engineering and manufacturing technology to the domestic units. The Eight Five year plan currently under definition, is expected to strengthen the current tendencies and strategies.

In addition to the National Five year Plans, the Government introduces special programmes on specific development problems. The Minimum Needs Programme (MNP) is one such programme started in the Fifth Five Year Plan. The objective of the programme is to establish a network of basic services of social consumption in all the areas up to nationally accepted norms, within a specified time-frame. Another of these programmes is the Technology Missions introduced in the Seventh Plan. These have mission-oriented approach to technological development fostering relevance and providing motivation, automatically establishing organic linkages between sectors which otherwise tend to be compartmentalized, introduce urgency to meet time-targets and give technological inputs to essential social programmes like water supply, immunization, literacy, etc.

### A.3 Prior or on-going assistance

Some related projects have been implemented by UNDP assistance in the same or related field.

DP/IND/82/019 CMTI Bangalore : Computer Aids for Metal Working Industry.

This project aims at metal working industry only, and is focussed on training on CNC machines. The current project has a far broader integrated spectrum of services targeted at design quality improvement, product features, reverse engineering techniques, company strategy and capacity utilization. Because of this integrated approach a certain overlap could come up, but only for a specific part. It is envisaged that during and after the implementation of the project, assistance and know how of CMTI can be used. (see also B.7 co-ordination arrangements).

DP/IND/82/033 Computer Aided Design Programme. This project is located at 4 technical Universities. The nature of this project is more research and development oriented, targeted at computer applications in large scale industrial complexes like steel and petro-chemical plants. The application is more plant and process control oriented. Therefore there is no duplication of activities.

### A.4 Institutional framework

The project will be implemented within the premises of NIDC. (see annex VIII and XII for additional information on NIDC). The expected establishment of CEDA as a result of the implementation of this project is described in section D.2 --Outputs.

To advise, guide and decide on various matters, which may come up during the implementation of the project, a high-level Project Advisory and Review Committee (PARC) will be constituted under the auspices of the Ministry of Public Enterprises including representatives from Ministry, NIDC, client enterprises, associations, universities, UNDP/Executing Agency and experts from related projects being implemented in India (see also section B.7 --Co-ordination arrangements)

NIDC is a financially self-sufficient institute, earning all its operational expenses through contract fees and service charges.

## B. Project justification

### B.1 Problem to be addressed by the project: the present situation

Issues such as lack of quality and reliability of engineering products, capacity utilization, and low competitiveness in export and import-substitution markets are discussed in section A.1 --Description of sub-sector. Here, that discussion will not be repeated. NIDC operating as a consultancy partner in the mentioned sectors is facing growing difficulties in solving clients problems at the required level. The reason for this being the growing level of competition and technology required to meet the market demands in terms of product quality, costs and reaction time. At the same time there is a lack of qualified, trained manpower in the required modern technologies.

With growing contribution of NIDC in the country development programs, which involves large scale complex projects with often much data to work with, the development of the right solution can result in substantial savings. Advanced techniques and equipment will undoubtable contribute to this.

**B.2 Expected end of project situation**

At the end of the project implementation, it is expected that the National Industrial Development Corporation (NIDC) will be strengthened through the transfer of design, development and prototyping technologies. so that NIDC will be able to serve to Indian manufacturers of consumer goods, light industry products, engineering goods, spare parts, etc. Furthermore, NIDC will lead the efforts to proliferation of modern product design technologies (including CAD/CAM techniques including CNC prototyping) in India. For a more detailed description of the end of project situation see D-2 Outputs.

With the help of CEDA facilities NIDC will be better equipped in designing timely and cost-effective solutions to be implemented under the national programs.

**B.3 Target beneficiaries****a) Direct beneficiaries:**

- i) Staff of the Institute who will be further trained through the fellowship programme of the project.
- ii) Engineers and technicians of co-operating enterprises / organizations who will either attend training programmes to be carried out by CEDA, or will receive direct technological advice/assistance from the Centre.

**b) End-users:**

Three types of end-users will benefit from the project:

- i) Direct users of product and tool designs in their processes (e.g., consumer goods manufacturers);
- ii) Consumers purchasing and using the end-products mentioned (i) and (ii) above --which constitutes a large public.
- iii) Population in India in general through the design and implementation of national programs

**B.4 Project strategy**

Project strategy is to strengthen NIDC through training/further training of its present and future staff, provision of high level expertise, and supply of computer hardware and software. Then the aim is to establish a Centre of Engineering Design and Analysis using this strong base of NIDC. It is expected that NIDC then would assist the Indian enterprises in tackling all their problems related to adoption of market trends and new products, design, analysis, and prototyping. It is foreseen that where NIDC cannot provide the needed services, they will be provided through NIDC by co-operating arrangements. The ultimate goal will be to improve the position of target industries in export and import-substitution on respective markets.

The project has been designed by keeping the above-mentioned target in mind, and observing the fact that such a facility will be effective only if it is fully integrated to manufacturing industries and other related institutions (see also section B.7 --Co-ordination arrangements)



### B.5 Reasons for assistance from UNDP/executing agency

UNDP/UNIDO assistance here is of catalytic nature. A considerable amount of investment (infrastructure and equipment) has already been made and/or planned by NIDC. All investment of the participating enterprises have also been completed outside UN system. Additional inputs from UNDP, however, will enable/accelerate the much needed transfer of technology.

Further reason for UNDP/UNIDO assistance is the fact that UNIDO can supply multi disciplinary expertise, and has experience in sort-alike projects in other developing countries.

### B.6 Special considerations

None.

### B.7 Co-ordination arrangements

To advise, guide and decide on various matters, which may come up during the implementation of the project, and to secure a high-level Project Advisory and Review Committee (PARC) will be constituted by the Ministry of Industry including representatives from:

- Ministry
- NIDC
- Enterprises
- Professional associations (such as CEI and NSCI.)
- University
- Other related UNDP projects (such as DP/IND/82/019 CMTI Bangalore.)
- UNDP/UNIDO

PARC will, on one hand, ensure full co-operation between all concerned parties and, on the other, will enable the project to follow market trends without loosing time.

Other co-ordination arrangements will be made to establish working relations with industries or other institutions to organize in co-operation services to clients/target-groups on equipment not available in NIDC or CEDA. An overview of co-ordination arrangements is given in Annex XII.

### B.8 Counterpart support capacity

NIDC has been provided with qualified personnel, buildings, facilities and equipment. Its services are frequently requested by a large number of enterprises so that the Institute has been able to become financially fully self-sufficient through its earnings from clients. Enlargements of floorspace is planned and due to be available within the next 4 months (see also annex VIII --Description of NIDC).

### C. Development Objective

The Eighth Five Year Plan (now under formulation) aims at consolidating the growth of the industry sector as outlined in the Seventh Plan. The Eighth Plan sets a target of 11% growth in industry sector; 6% increase in Gross Domestic Product (GDP); 9% in manufacturing. 24% as against 21% in Seventh Plan in share of value-added manufacturing; 12% per year by volume increase in exports and the expected outlay in the Eighth Plan for engineering industries is expected to increase by 1.8 times. The emphasis on productivity, self-reliance, capacity utilization and quality improvement will be maintained.

To achieve the growth and export targets being set in the Eighth Plan, introduction of newer technologies in design and manufacturing will be necessitated. Requirement of skilled manpower in these areas is expected to grow considerably to pursue production technologies and sustained growth.

### D. Immediate objective(s), outputs and activities

#### D.1 Immediate objective

The project aims at the establishment of a Centre for Engineering Design and Analysis (CEDA) within the National Industrial Development Corporation (NIDC) to provide additional services through NIDC to Small and Medium Scale Industries being the target groups of NIDC, as well as to provide these additional services to other departments of NIDC executing county-wide governmental programs

More specific the Centre should be able to assist client industries in:

- Improve of their design quality and the reliability of manufactured engineering products.
- Improve product features for competitiveness in export market
- Improvement of reaction time in adapting new products
- Improve the capacity utilization.

The additional services will be made possible through strengthening of NIDC in aspects of human resources and physical facilities so that NIDC would be the focal point of application of advanced design and production techniques for small and medium scale industries in northern region of India, and so that NIDC can improve their performance and outputs in executing governmental programs.

Therefore NIDC could:

- a) Make available practical services and facilities in the different stages of adoption, product-design, -development, and -prototyping as well as tool-design, -development, and prototyping for products in mechanical and electronic engineering fields.
  - Reverse engineering including Computer Numerical Controlled (CNC) machining, of die and mold components (and spare/replacement parts of machines);
- b) Provide consultancy services to its co-operating institutions/clients as well as to other departments of NIDC such as:
  - Procurement service and System analysis/system implementation.
  - Software consultancy

- c) Supply different training programs at different levels, in subjects mentioned in pt a) and b) to target groups
  - Demonstrate possibilities of computer techniques -> CAD awareness.
  - Training to be able to use CAD techniques in general cases.
  - Training to be able to use CAD techniques in specific cases.
- d) Carry-out design studies and advise clients and other NIDC departments in the field of Infrastructure Development.
  - Planning and lay-out of new factories and office buildings
  - Optimize use of existing facilities, whether at large scale (governmental programs) or smaller scale (factory / workshop)
  - Develop and optimize growth plans and modification plans for facilities and factory lay-out.

In the above listed capabilities, a) and b) are mainly targeted at improving design quality and reliability of manufactured engineering goods, as well as improvement of product-features for more competitiveness in the export market. At the same time they will contribute to the shortening of the reaction time of industries for adapting new products. Objective c) will support these two and will play an important role in the penetration of use of CEDA services in the target industries. The last point d) will be more directed towards the improvement of existing (production) facilities and the optimization of new facilities.

## D.2 Output

The main output of this project is a capability, complete with trained personnel; fully installed and operational equipment, machines and software, and transferred/adopted/generated design and manufacturing technology, to design, develop and prototype products and tools for metal and plastic products and electronic products, as well as to provide training and consultancy in related fields, and to assist in development and adjustment of factory lay-out and facilities management. More specifically, following four outputs are identified:

- OUTPUT 1.1: Engineering Design, Analysis and Prototyping Service in the field of :
  - a) Mechanical engineering
  - b) Printed Circuit Board Design
- OUTPUT 1.2: Consultancy services
- OUTPUT 1.3: Manpower development
- OUTPUT 1.4: Infrastructure Development.

It must be noted that although the outputs are separated, the use of expertise and equipment will be shared in a lot of projects, due to the fact that the projects NIDC is involved in require often a integrated approach. In this respect the services to be performed can often include co-operation of staff/expertise listed under other outputs.

The fellowship training program foreseen is indicated with a Capital behind the staff concerned, and refers to the overview in Annex IV

The following is a full description of the outputs:

OUTPUT 1.1: ENGINEERING DESIGN ANALYSIS AND PROTOTYPING

Provision of services to support elements of the complete engineering process involved in the development of products from small and medium scale industries. Specifically these industries will be in the fields of mechanical and electronic engineering. The following tables outline the status of CEDA staff and equipment available to provide these services, as well as the expertise and equipment to make use of via co-operating arrangements.

**MECHANICAL ENGINEERING**

DESIGN/PRODUCTION STEP AND RELATED SERVICE OF CEDA	REQUIRED KNOW HOW OF CEDA STAFF	REQUIRED EQUIPMENT HARDWARE /SOFTWARE	REQUIRED CO-OPERATION
1. End product specifications (geometry, ergonomics, materials, etc)	Design Engineering	Design Data, Market data	Market experts Materials experts
2. Product Design	Design Engineering	Workstation with 2D/3D software Drafting / surfaces Solids.	
OR ALTERNATIVELY			
2a Dimensional measurement of an existing product.	Design Engineering	Coord.measuring eq. digitizing software manual measurement instruments.	Materials experts
2b Digitizing existing die or drawing.	Drafting	Coord.measuring eq. digitizing software manual measurement instruments.	Materials experts
3. Verification and Optimization	Design Engineering Analysis	Workstation with analyzing, simulation and calculation packages. (FEM, Clash detect. mechanisms etc.)	
4. Manufacturing data compilation	Design Engineering Production Engineer	Workstation with 2D/3D CAM, Post-processing software	
5. Prototyping	Production Engineering CNC Techniques	CNC machine tools Manual mach. tools	Complex and/or Large CNC machine tools Manual machine tools
6. Tool Design	Production Engineering Tool Designing	Workstation with 2D/3D s/w. Standard Tool design s/w	Tool designer complementary to CAD package.
7. Tool Production			CNC Tool production Facilities.

## ELECTRICAL/ELECTRONICAL ENGINEERING / PCB DESIGN

DESIGN/PRODUCTION STEP AND RELATED SERVICE OF CEDA	REQUIRED KNOW HOW OF CEDA STAFF	REQUIRED EQUIPMENT HARDWARE /SOFTWARE	REQUIRED CO-OPERATION
1. End-product specifications (functions, geometry, technology etc.)	Design Engineering	Design Data, Market data	Market experts Technology experts
2. Product Design	Design Engineering	Workstation with schematic entry tools	
3. Verification and Optimization	Design Engineering Analysis	Workstation with schematic entry tools Digital/Analog simulator, Packager	
4. Manufacturing data compilation	Design Engineering Production Engineering	Workstation with software for inter- ing, active and automa- tic placement and routing, converting lay-out to manufact- format. Paper/magn tape etc	
5. Prototyping	Production Engineering		PCB production facilities.
6. PCB production			PCB production facilities.

i Functional Services to be Performed: Strengthened/fully trained design and development teams capable of providing CAE services to supplement all or part of the design and production process in client enterprises, particularly in:

- a) Specification of Function  
Detailed specification of the function or problem to be solved by the design and manufacture of the product.
- b) Design  
Design of new products and adoption of existing products.
- c) Functional verification.  
Analysis, design verification, simulation and optimization of product function, including material/component specification.

- d) **Manufacturing Data Compilation**  
Production of data used in computer aided manufacture of a product from the computer-aided design e.g.. Mask data for PCB, cutter location data for CNC machine tools, Neutral format design data.
- e) **Prototyping**  
Production of prototypes to carry out real tests and simulations. from tooling or photo masks.
- f) **Tool Design**  
Design of plastic mold, press forging or casting tools.
- g) **Tool production**  
Computer Aided Manufacture of parts of production/prototype tooling e.g.. cavities and core sets for injection molds, photo masks, electrodes for cavity spark erosion.
- h) **Co-operating with the other groups of CEDA, particularly taking part in consultancy (Output 1.2) and the training programme (Output 1.3).**

**ii Staff Composition:** Apart from the specific for this output required staff, the centres overall organization of manpower will include several management and service functions. These have been arbitrarily included in O/P 1.1 .

#### General

- a) **Director of Centre (1)**  
*Tasks - Co-ordination with NIDC and co-operating institutions*
- b) **System manager. (1) (S)**  
*Tasks - To ensure proper function of all computer equipment.*
- c) **Junior Engineers (2) (S)**  
*Tasks - To assist system manager.*

#### Output 1.1 specific

- d) **Teamleaders (2)**  
*Tasks:- Co-ordinating, organizing and overseeing client/ subcontractors and other CEDA dept. interface. Work on systems.*
  - Mechanical Services and Prototyping (M)
  - Electronic Design (combined function with teamleader o/p 1.4) (E)
- e) **Senior Engineer (3)**  
*Tasks - Design specification, supervising design process. result interpretation. User of systems*
  - Design of mechanical products (M)
  - Production of products and production tools (M)
  - Design of Electronic products. (E)
- f) **Engineers (4)**  
*Tasks - Specialist user of the systems, gives training under o/p 1.3.*
  - Design of mechanical products (M)
  - Production of products and production tools (2) (M)
  - Design of Electronic products. (E)
- g) **Junior Engineers (4)**  
*Tasks - Operators of systems, day-to day maintenance and operation.*
  - Design of mechanical products
  - Production of products and production tools (2)
  - Design of Electronic products.

**iii Methodology/Work Routines (Operational Procedures):** These exist of detailed design guidelines and specific design documentation (should be standardized); Data base for previous design data; Data base for standard components; etc.

**iv Premises and Facilities:** Teams for engineering design analyses and prototyping facility will be located in office/laboratory type spaces with air conditioning. (see also Annex XIII)

**v Equipment and Supplies:** With regard to equipment needs of design and development activities, existing equipment of NIDC are limited to some PC's and UPS's. A full description of the additional equipment to be provided by the project is given in annex V.E. In short the equipment will consist of:

**a) Computer Hardware**

- 1 High performance engineering workstation with file server capacity.
- 3 Engineering workstation.
- 2 Pen Plotters ( A0 format)
- 4 Printers (2 Dot matrix with LQP option, Laser, Color hardcopy)
- 1 Back-up Tape system
- 1 Document scanner

**b) Computer Software**

- Operating systems
- 1 Integrated drafting and solid modeling package.
- 1 Finite Element Method (FEM) Analysis package.
- 1 Integrated Surface modeling and Machining package.
- 1 Integrated PCB design and lay-out system including simulation, packaging, and conversion modules.

**c) Prototyping Equipment, (Laboratory scale)**

- 1 CNC Milling machine (including tooling and digitizing probe)
- 1 CNC Lathe (including tooling)
- 1 CNC Wire EDM machine (including tooling)
- 1 Manual surface grinder.
- 1 Band/Hack saw
- 1 Direct Numerical Control (DNC) system
- Hand tools.

**vi Market/Marketing:** In line with the objectives of this project, the engineering design analyses and prototyping facility at CEDA will serve NIDC, as well as its clients.

**vii Management/Financing:** Close co-ordination of all design and development efforts in general, and creation a common design/standard parts library in particular will be necessary. The operation of engineering design analyses and prototyping facility, as in the case of the overall CEDA, will be self-sufficient financially.

**OUTPUT 1.2: CONSULTANCY SERVICES**

**i Functional Services to be Performed:** The main task of this consultancy services group will be to provide assistance for target group industries in their selection, procurement, implementation, use and optimization of CAE systems. Additionally they will provide custom software and interfaces to improve the design and utilization of proposed or installed CAE systems. Further services to other departments in NIDC are in the field of system-analysis,

special software applications, development of advanced graphical computer interfaces, etc., and will be characterized by offering special dedicated solutions and working methods.

It represents a capability of trained staff to utilize modern technologies (including expert system languages and graphical programming tools).

- a) Consultancy on computer applications to each step in the Design/Production process as outlined in the description of O/P 1.1
- b) Advice on suitable systems, configurations, software, training and maintenance.
- c) Advice on sourcing or procurement of resources for these processes.
- d) Maximization of the utilization of proposed or installed systems.
- e) Co-operating with the other groups of CEDA and NIDC, particularly in respect to execution of governmental programs, and taking part in the training programme (Output 1.3).

**ii Staff Composition:** Consultancy services will make also use of the existing staff of NIDC. However, the following additional staff will be required to provide those skills which are not presently available at the Institute:

- d) Teamleader (1) (C)  
*Tasks:- Co-ordinating, organizing and overseeing client, subcontractors and other CEDA dept. interface. Work on systems.*
- e) Senior Consultant (3)(C)  
*Tasks - Analysis of problems in client companies in design process. CAE system design and procurement advice.*
  - Mechanical Engineering Industries (2)
  - Electronic Engineering Industries
- f) Senior Software Engineer (1) (C)  
*Tasks - Analyzing problems and specifying needed software, software development management. Programming.*
  - Dedicated program and software development
- g) Software Engineers (2)(D)  
*Tasks - Production of software*
  - Dedicated program and software development

**iii Methodology/Work Routines (Operational Procedures):** These exist of standardized system analyzing methods, Prepared software modules, reporting procedures etc.

**iv Premises and Facilities:** The group of consultancy services will be located in offices of NIDC (see also annex XIII).

**v Equipment and Supplies:** The detailed list of equipment is given in annex V.E. In short the equipment will consist of:

Computer Hardware:  
- 3 PC work stations.

Computer Software:  
- Computer Aided Software Engineering Tools (CASE)



vi Market/Marketing: The consultancy services will be carried out mainly as a part over bigger contracts to client manufacturers or in governmental programs.

vii Management/Financing: The activity will be directly monitored and paid as part of overall contracts.

### OUTPUT 1.3: TRAINING PROGRAMME

i Functional Services to be Performed: CEDA will operate a training programme designed to train personnel of client companies, and as well new/additional staff of CEDA and NIDC itself. Elements of each course should include demonstration, 'hands-on' learning and lectures/seminars putting the subject of the course in a wider perspective and highlighting the various possibilities of each subject within the total design and production process.

The immediate goal of training programme will be to design and to implement the following courses:

COURSE NO.	DESCRIPTION	DURATION (weeks)	MAINLY TARGETED AT	KNOWLEDGE ACHIEVED
<b>OVERVIEW COURSES</b>				
1	CAE Implications	1	Planning Manager Govt. Investment NIDC Management	Implications for investment and future regional and national planning.
2	CAD implications	1	Management Eng. Ind.	State of the art overview of implications for industry. Future Developments. Consequences for investment, costs/benefits, change in organization structure.
3	CAM implications	1	Management Eng. Ind.	
4	ECAD implications	1	Management Electron. Industry.	
<b>GENERAL COURSES</b>				
5	Drafting/Design	1-3	Design Engineers	Functionality and possibilities of design drafting systems.
6	Finite Element Method Analysis	2	Design Engineers	Functionality and possibilities of design drafting systems.
7	Manufacturing	2-4	Tooling Engineers Design Engineers	Functionality and Possibilities of CAM and CNC systems.
8	Operating Systems	2	System Engineers	Functionality and Possibilities of Operating and Network syst.

COURSE NO.	DESCRIPTION	DURATION (weeks)	MAINLY TARGETED AT	KNOWLEDGE ACHIEVED
9	Software Engineering	2	System Engineers Software Engineers	Functionality and Possibilities of Comp. Aided softw.eng.tools
10	Electronics Design	1-3	Electronic Engineers	Functionality and Possibilities of elec design systems
11	Electronics Analysis	2	Electronic Engineers	Functionality and Possibilities of elec Analyzing systems
<b>PRODUCT RANGE DESIGN AND PRODUCTION COURSE</b>				
12	Specials - Mech Eng. Products - PCB design	2-4	Product design and production management senior engineers.	Understanding of the CAE processes available for the total design and production of a product (range).

Later, the number of courses can be increased based on the request of the client companies/organizations.

At the same time a interactive learning system will be developed (tentatively based on interactive video) of which different stations can be temporarily installed at client enterprises sites. These programs can be run without a teacher making a more flexible approach possible to raise the awareness level of client enterprises on the CAD/CAM issue.

**ii Staff Composition:** Initially, CEDA training programme will have two full-time staff members assigned to undertake all activities. These staff members will be trained through the fellowship programme of this project. The programme will call upon the services of the other CEDA personnel to successfully implement the programmes. Ultimately the staff will consist of:

a) Teamleader (1) (T)

*Tasks:- Co-ordinating, organizing and Analyzing needs for training programmes. Defining training curricula and organizing resources with co-operating institutions.*

b) Senior Trainers (4) (T)

*Tasks - Teaching. Program development composition/selection of material.*

- Computer applications to Mechanical Engineering Industries (2)
- Computer applications to Electronic Engineering Industries
- Standard computer applications.

c) Senior Training Materials Development Engineer (1) (T)

*Tasks - Specification of needed teaching software, Production of software*  
- Dedicated program and software development

**d) Training Materials Development Engineer (2) (T)**

*Tasks - Detailed production of teaching materials and teaching software. Analyzing problem and specifying needed software, software development management. Programming.*

- Dedicated program and software development (2)

**iii Methodology/Work Routines (Operational Procedures):** Detailed courseware, that is, books, hand-outs, software packages, video tapes, and other audio-visual aids. Course schedules, costing, procedures, etc.

**iv Premises and Facilities:** CEDA will allocate and furnish a training/seminar room for the activities of the training programme. Additionally, the Programme will make use of the other CEDA/NIDC facilities as and when the nature of the course under implementation requires.

**v Equipment and Supplies:** The training programme will utilize special allocated equipment of CEDA. However, equipment will be used listed under O/P 1. The number of courses that can be run simultaneously, their content and size will depend upon the number of computer equipment, machine tools, etc. and their loading. At the same time it is possible that special advanced training will be given on the more high-end workstations (No 12 of above programme). The detailed list of equipment is given in annex V.E. In short the equipment will consist of:

**Computer Hardware**

- 10 PC based workstations.

**Computer Software**

- PC based training software covering:
  - Mechanical CAD
  - Electronics CAD
  - FEM Analysis
  - Wordprocessing
  - Spreadsheets
  - Databases

**Additional Equipment**

- Audiovisual training aids
- Photocopier

**vi Market/Marketing:** It is expected that the participants of the training courses will mainly be the technical personnel of industrial enterprises, as well as NIDC/CEDA's own staff.

**vii Management/Financing:** It is expected that the training programme of CEDA (as NIDC itself) will be financially self-sufficient.

**OUTPUT 1.4: INFRASTRUCTURE DEVELOPMENT**

**i Functional Services to be Performed:** CEDA will operate with fully trained and equipped design and development teams capable of delivering the following services to client enterprises and other departments of NIDC:

- Analysis of infrastructure utilization
- Study of future infrastructural requirements.

- Design of new buildings, plants, and other infrastructure
- Adjustment of existing infrastructure in order to optimize utilization.
- Manage the practical implementation of the suggested designs and or infrastructural changes.

**ii Staff Composition:** At the end of the project the staff of the centre has the following composition:

- a) Teamleader (1) (F)  
*Tasks:- Co-ordinating, organizing and overseeing client, subcontractors and other CEDA dept. interface. Work on systems.*
  - Electronic Design (combined function with teamleader o/p 1.1)
- e) Senior Engineer (1) (F)  
*Tasks - Design specification, supervising design process. result interpretation. User of systems*
  - Design of plant facilities and optimization of capacity utilization
- f) Engineer (1) (F)  
*Tasks - Specialist user of the systems, gives training under o/p 1.3.*
  - Design of plant architecture, structure and lay-out.
- g) Junior Engineers (1)  
*Tasks - Operators of systems, day-to day maintenance and operation.*
  - General plant design.

**iii Methodology/Work Routines (Operational Procedures):** These exist of detailed design guidelines and specific design documentation (should be standardized); Data base for previous design data; Data base for standard components; etc.

**iv Premises and Facilities:** Team for Infrastructure development facility will be located in office spaces with air conditioning. (see also Annex XIII)

**v Equipment and Supplies:**

The detailed list of equipment is given in annex V.E. Infrastructure development services will share common equipment with O/P 2 and additionally make use of :

- Computer Hardware
- 1 Engineering Workstation

- Computer Software
- Facilities Lay-out software
  - Civil Engineering software
  - Plant design software

**vi Market/Marketing:** In line with the objectives of this project, the engineering design analyses and prototyping facility at CEDA will serve NIDC, as well as its clients.

**vii Management/Financing:** Close co-ordination of all design and development efforts in general, and creation a common design/standard parts library in particular will be necessary. The operation of the infrastructure development facility, as in the case of the overall CEDA, will be self-sufficient financially.

### D.3 Activities

In the scheduling of activities two main stages have been established: Stage 1 characterized by implementing the basic functionality with minimum equipment, required for offering first basic services, and stage 2 ; the growth to full capacity and advanced functionality and services including prototyping.

Furthermore, for the purpose of identifying common project activities, project is assumed to have only one major output, that is, a capability, complete with trained personnel; fully installed and operational machinery, hardware and software, and acquired/generated design and prototyping technology to provide die and mold design/precision machining services, and to carry out training of its own as well as others' personnel.

Activities, therefore, are arranged for this output in the following format:

- **Milestones:** The starting and/or finishing point of a group of activities. Monitoring the milestones will make it possible to broadly determine the project timing and performance. They are indicated in the table below;
- **Events:** The first breakdown of project activities. Their description is also given below, and
- **Tasks:** Detailed breakdown of project activities indicating clearly the aim, resource person(s), equipment and precise timing. The work plan which will be prepared every half year by the National Project Director in consultation with the international and national staff, will describe every single task.

**E. Inputs****Government Inputs**

(See section J.2 Government budget for a detailed breakdown of Government inputs) Besides the overview here under, see also Annex XIV : Details of pre-requisites and activities of project in initial and later stage.

- a) **Buildings and facilities:** Suitable space with required facilities and services (such as air-conditioning) will be allocated by the Government at the current building of NIDC to install the project equipment. Offices will also be allocated for the international staff of the project.
- b) **Equipment, supplies and services:**
- All equipment required in addition to those provided by UNDP will be supplied by the Government (see section D.2 Equipment and supplies and annex V.C). Furthermore, existing equipment at the above-mentioned premises relevant to the implementation of the project shall be at the disposal of project staff.
  - All services (air-conditioning, ac voltage regulation, etc.) and supplies required for the smooth operation of the project will be provided by the Government.
  - Office equipment (telephones, typewriters, telex) and furniture, office supplies and transport services for the international staff will be provided by the Government.
- c) **Staff:** Technical staff (counterparts, fellows, etc.) will be assigned/recruited by the Government in accordance with the timing schedule of the project. Administrative support personnel will be assigned to assist the national and international staff of the project.
- d) **Miscellaneous:** Customs clearance, transport, loading/unloading of the project equipment, etc. will be arranged by the Government.

**UNDP Inputs**

The UNDP inputs for a period of 3 years is US\$ 3,0092,000. These inputs involve the following main components (see sections D.2 Outputs and J.1 UNDP Budget for more detail):

**a) Personnel (see also annex VI.A and B)**

- i) **International Consultants** : 69.5 m/m, US\$ 695,000  
Services of the following experts and/or consultants are envisaged:

- a) A high level principal expert/CTA with extensive experience in application of CAE in manufacturing industry ( C1)  
CTA will undertake 3 split missions:
- 4 months at the beginning of the project on the equipment specification, and national staff assesment.
  - 4 months at the end of the first implementation stage to evaluate and prepare equipment specs and workplan for second stage.

- 4 months at the end of the project to evaluate and to assist in planning of future work of the centre.

12 m/m, US\$ 120,000

- b) A team of experts with specific experience in the application fields covered in the project. The team will undertake a mission of approximately two to three weeks at the beginning of the project and will support the CTA in specifying the ultimate equipment, preparation for requests for bids and overview of selection criteria.

1.5 m/m, US\$ 15,000

- c) A CAD/CAM specialist with specific working experience on the software packages to be selected for this project. Experience in the application field of CAD and in the operation of CAM equipment and CNC Machine tools is essential.

The expert will undertake two split missions:

- 4 months mission after installation of first stage hard and software. (around month 13)
- 4 months mission after installation of second stage hard and software (around month 29)

8 m/m, US\$ 80,000

- d) A CAD Specialist in the field of PCB design and lay out, with specific experience in the software packages to be selected for this project. Wide experience in industrial use of these packages is essential

The expert will undertake three split missions:

- 4 months mission after the installation of the first stage hard and software. (around month 13)
- 1 month mission at the beginning of the second stage procurement of equipment to support the CTA in specifying the additional components of CAD electronics software. (around month 25)
- 4 months mission after the installation of the second stage hard and software (around month 29)

9 m/m, US\$ 90,000

- e) A CAD Specialist in the field of Finite Element Method Analysis, experienced with the hard and software selected for this project. Wide experience in industrial use of these packages is essential. The expert will undertake one mission of six months starting after the second stage installation of hard and software.

6 m/m, US\$ 60,000

- f) A Computersystem specialist with specific experience on system administration on the hardware/operating systems to be selected for this project. Experience in practical administration and organization of a computercentre in the industry is required.

The expert will undertake two split missions:

- 4 months mission starting around one month before installation of the first stage hard and software. (around month 12)
- 3 months mission starting around the installation of the second stage hard and software

7 m/m, US\$ 70,000

- g) A Software development specialist with specific experience in operating systems and CASE software to be selected for this project. Working experience in the use of case tools within the development of software packages for CAD/graphical applications is required.

The expert will undertake two split missions:

- 4 months mission starting after installation of the first stage hard and software. (around month 15)
  - 3 months mission starting after the installation of the second stage hard and software (around month 30)
- 7 m/m, US\$ 70,000

- h) A Specialist in Technical Training of CAE packages, with broad working experience in the design and use of PC based training programs and the use of interactive training on computers.

The expert will undertake two split missions:

- 4 months mission starting around one month before installation of the first stage hard and software. (around month 12)
  - 4 months mission starting around the installation of the second stage hard and software
- 8 m/m, US\$ 80,000

- i) A Specialist in Computer Aided Facility planning with working experience in the application field concerned and in the software packages selected for this project.

The expert will undertake one mission of 4 months after the installation of the first stage hard/software. (around month 13)

4 m/m, US\$ 40,000

- j) A CAD Specialist in the field of plant lay out and architecture experienced in the industrial applications of the software packages to be selected for this project.

The expert will undertake two split missions:

- 3 months mission after the installation of the first stage hard and software. (around month 13)
  - 3 months mission after the installation of the second stage hard and software (around month 29)
- 6 m/m, US\$ 60,000

- k) Short Term Consultants

1 m/m, US\$ 10,000

ii) UNIDO Staff Missions : 2.0 m/m, US\$ 20,000

-----  
Personnel Total : 71.5 m/m, US\$ 715,000

- b) Training (see also annex IV.A and B)

i) Fellowships : 121 m/m, US\$ 786,500

ii) Study tours : 8 m/m, US\$ 80,000

-----  
Training Total : 129 m/m, US\$ 866,500



c) Equipment (see also section D.2 Outputs and annex V B)

i) Expendable equipment	:	US\$ 20,000
ii) Non-expendable equipment	:	US\$ 1,464,000
		-----
Equipment Total :		US\$ 1,484,000
d) <u>Miscellaneous</u>	:	US\$ 26,500
		-----
PROJECT TOTAL :		US\$ 3,092,000

F. Risks

At the outset, it is almost impossible to identify any major risk which would jeopardize the implementation of this project. As far as the delivery of inputs is concerned, that is, expertise, training, machinery, hardware and software, there is no insurmountable difficulty. However, it should be stressed once more that the effectiveness of the project will be measured in terms of the quantity and quality of the services provided by CEDA to third parties. Therefore, close co-operation between CEDA/NIDC and its clients has vital importance for the success of the project.

G. Prior obligations and pre-requisites

The Government will have the responsibility, among others, to:

- a) Arrange the necessary facilities for the international project staff and equipment;
- b) Assign/recruit in time the national counterpart staff and/or fellows, who should have a sufficient level of knowledge and experience in their respective application specialities, in order to make most practical use of the computer-applications to respective area's. Because the national staff is one of the major factors for succesful implementation, descriptions of crucial counterpart staff assignments are described in Annex XIV.
- c) Purchase and commission in time all other equipment outside the coverage of this project, but required for its efficient and effective implementation.

The project document will be signed by UNDP and UNDP assistance to the project will be provided, subject to UNDP receiving satisfaction that the prerequisites listed above have been fulfilled or are likely to be fulfilled. When anticipated fulfillment of one or more prerequisites fails to materialize, UNDP may, at its discretion, either suspend or terminate its assistance.

H. Project Monitoring, Reporting and Evaluation

The project will be subject to tripartite review (joint review by representatives of the Government, Executing Agency and UNDP) at least once every twelve months, the first such meeting to be held within the first twelve months of the start of full implementation. The national project co-ordinator and/or international senior project officer of the UN executing agency shall prepare and submit to each tripartite review meeting a Project Performance Evaluation Report (PPER). Additional PPERs may be requested, if necessary, during the project.

The project shall be subject to evaluation 18 months and 42 months after the start of full implementation. The organization, terms of reference and timing will be decided after consultation between parties to the project document plus any associated United Nations Agency. Schedule for project reviews, reporting and evaluation is given in Annex-II.

Towards the end of the project, the project management shall prepare the draft terminal report for review and technical clearance by the executing agency four months prior to the terminal tripartite review meeting.

The National Project Coordinator will prepare every 12 months a progress report on the project in the form prescribed by UNDP. The first such report will be prepared 12 months after the start of the project. These reports will be submitted to the Resident Representative who will forward them to the Government and UNDP/New York.

#### I. Legal Context

This Project Document shall be the instrument (therein referred to as a Plan of Operation) envisaged in Article I paragraph 2 of the Agreement between the Government of India and the United Nations Development Programme, signed by the parties on 20 October, 1959. A detailed description of the responsibilities of the parties to the said Agreement is given in Annex III of this Document.

The following types of revisions may be made to this project document with the signature of the UNDP Resident Representative only, provided he or she is assured that the other signatories of the project document have no objections to the proposed changes:

- a) revisions in, or additions of, any of the annexes of the project document;
- b) revisions which do not involve significant changes in the immediate objectives, outputs or activities of a project, but are caused by the rearrangement of inputs already agreed to or by cost increases due to inflation;
- c) mandatory annual revisions which rephase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account Agency expenditure flexibility.

## J.1 UNDP Budget

Country : India  
 Project No. : DP/IND/89/xxx  
 Project Title: Centre for Engineering Design and Analysis (CEDA) at NIDC.

Budget Line	Description	Distribution of Budget Over the Years							
		TOTAL		YEAR 1		YEAR 2		YEAR 3	
		n/a	US\$	n/a	US\$	n/a	US\$	n/a	US\$
10.	<b>PROJECT PERSONNEL</b>								
11.	<b>International Experts</b>								
11-01 C/1:	CAD Expert	12	120,000	4	40,000	3	30,000	5	50,000
11-02 C/2:	CAD/CAM Mechanics	8	80,000	0	0	4	40,000	4	40,000
11-03 C/3:	CAD Electronics	9	90,000	0	0	4	40,000	5	50,000
11-04 C/4:	CAD Analysis	6	60,000	0	0	0	0	6	60,000
11-05 C/5:	System expert	7	70,000	1	10,000	3	30,000	3	30,000
11-06 C/6:	CAD Special sv dev.	7	70,000	0	0	4	40,000	3	30,000
11-07 C/7:	CAD Teaching Expert	8	80,000	1	10,000	3	30,000	4	40,000
11-08 C/8:	CAD Facilities Man.	4	40,000	0	0	4	40,000	0	0
11-09 C/9:	CAD Plant design	6	60,000	0	0	3	30,000	3	30,000
11-50	Short-term Consultants	2.5	25,000	1.5	15,000	1	10,000	0	0
11-99	Sub-total: Inter. Experts	69.5	695,000	7.5	75,000	29	290,000	33	330,000
16-00	Other Personnel Costs	2.0	20,000	.5	5,000	.5	5,000	1	10,000
19-99	Component Total-Personnel	71.5	715,000	8	80,000	29.5	295,000	34	340,000
30.	<b>TRAINING</b>								
31-00	Individual Fellowships	121	786,500	54	351,000	36	234,000	31	201,500
32-00	Study Tours	8	80,000	8	80,000	0	0	0	0
39-99	Component Total-Training	129	866,500	62	431,000	36	234,000	31	201,500
40.	<b>EQUIPMENT</b>								
41-00	Expendable Equipment	0	20,000	0	7,000	0	6,000	0	7,000
42-00	Non-expendable Equipment	0	1,464,000	0	766,500	0	0	0	697,500
49-99	Component Total-Equipment	0	1,484,000	0	773,500	0	6,000	0	704,500
50.	<b>MISCELLANEOUS</b>								
51-00	Sundries	0	6,500	0	2,000	0	2,000	0	2,500
53-00	Reports	0	20,000	0	6,000	0	6,000	0	8,000
59-99	Component Total-Miscellan.	0	26,500	0	8,000	0	8,000	0	10,500
99-99	<b>PROJECT TOTAL</b>	201	3,092,000	70	1,292,500	66	543,000	65	1,256,500
999.	<b>UNDP TOTAL</b>	201	3,092,000	70	1,292,500	66	543,000	65	1,256,500

**J.2 Government Budget**

Country : India  
 Project No. : DP/IND/89/XXX/A/01/37  
 Project title: Centre for Engineering Design and Analysis (CEDA) at NIDC.

Budget Line	Description	Distribution of Budget Over the Years							
		TOTAL		YEAR 1		YEAR 2		YEAR 3	
		n/a	1000 Rs.	n/a	1000 Rs.	n/a	1000 Rs.	n/a	1000 Rs.
<b>1. PROJECT PERSONNEL</b>									
	Average Rs.5,500/month	1212	7,152	324	1,944	396	2,340	492	2,868
1)	Component Total	1212	7,152	324	1,944	396	2,340	492	2,868
<b>2. BUILDINGS AND FACILITIES</b>									
2.1	Building	0	15,000	0	5,000	0	6,000	0	4,000
2)	Component Total	0	15,000	0	5,000	0	6,000	0	4,000
<b>3. EQUIPMENT</b>									
3.1	Non-expendable Equipment	0	4,400	0	1,800	0	0	0	2,600
3)	Component Total	0	4,400	0	1,800	0	0	0	2,600
<b>4. MISCELLANEOUS</b>									
4.1	Sundries	0	150	0	50	0	50	0	50
4)	Component Total	0	150	0	50	0	50	0	50
<b>TOTAL GOVERNMENT INPUT</b>		1212	26,782	324	8,794	396	8,390	492	9,598

December 1989 rate: US\$ 1.00 = Rs.16.72 approximately.

## ANNEX 1.- COSTED WORK PLAN OF THE COMPLETE PROJECT

	TIMING									DISTRIBUTION OF BUDGET OVER YEARS				
	Year No. -->	1			2			3			1	2	3	TOTAL
	Quarter No. -->	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	US\$	US\$	US\$	US\$	
<b>TOTAL PROJECT</b>		(+++++)									1,355,000	524,000	1,166,500	3,045,500
<b>OUTPUT 1.1: Eng. Des. &amp; Analysis/Prototyping</b>		(+++++)									893,000	267,000	892,500	2,052,500
Consult. 1: CAR expert		..(xx).....			.....(xx).....			.....(xx)			40,000	30,000	50,000	120,000
Consult. 2: CAD/CAM Mechanics		.....(xxx).....			.....(xxx)			.....(xxx)			0	40,000	40,000	80,000
Consult. 3: CAD Electronics		.....(xxx).....			.....()			.....(xxx)			0	40,000	50,000	90,000
Consult. 4: CAD Analysis		.....(xxx).....			.....(xxx)			.....(xxx)			0	0	60,000	60,000
Consult. 5: System expert		.....(xxx).....			.....(xx)			.....(xx)			10,000	30,000	30,000	70,000
Consult. 5B: Short term		..(x).....			.....()			.....()			15,000	10,000	0	25,000
Training: 73 n/a		.....(+++).....			.....(+)			.....(++++)			195,000	117,000	162,500	474,500
Study-tour 7 n/a		.....(.).....			.....(.)			.....(.)			70,000	0	0	70,000
Equipment: Computer / hard- & software		.....(+x).....			.....(+x)			.....(+x)			563,000	0	500,000	1,063,000
<b>OUTPUT 1.2 : Consultancy Services</b>		(+++++)									120,000	66,000	55,000	241,000
Consult. 6: CAD Special Programming		.....(xxx).....			.....(xx)			.....(xx)			0	40,000	30,000	70,000
Training: 16 n/a		.....(++)			.....(++)			.....(++)			70,000	26,000	0	104,000
Equipment: Computer / hard- & software		.....(+x).....			.....(+x)			.....(+x)			50,000	0	25,000	75,000
<b>OUTPUT 1.3 : Manpower development</b>		(+++++)									213,500	101,500	90,000	405,000
Consult. 7: CAR Teaching specialist		.....(xxx).....			.....(xx)			.....(xx)			10,000	30,000	40,000	80,000
Training: 20 n/a		.....(+++).....			.....(+)			.....(++++)			50,500	71,500	0	130,000
Study-tour 1 n/a		.....(.).....			.....(.)			.....(.)			10,000	0	0	10,000
Equipment: Computer / hard- & software		.....(+x).....			.....(+x)			.....(+x)			135,000	0	50,000	185,000
<b>OUTPUT 1.4 : Infrastructure Development</b>		(+++++)									120,500	89,500	129,000	339,000
Consult. 8: CAD Facilities planning		.....(xxx).....			.....(xx)			.....(xx)			0	40,000	0	40,000
Consult. 9: CAD Plant design		.....(xx).....			.....(xx)			.....(xx)			0	30,000	30,000	60,000
Training: 12 n/a		.....(+++).....			.....(+)			.....(++++)			19,500	19,500	39,000	78,000
Equipment: Computer / hard- & software		.....(+x).....			.....(+x)			.....(+x)			101,000	0	60,000	161,000

( : Start; ) : Finish; xx: Activity in the field; ++: Activity off the field

## ANNEX II

Schedule of Project Reviews, Reporting and Evaluation.

## A. REPORTS

## 1. Project Performance Evaluation Reports

- |    |                       |                       |
|----|-----------------------|-----------------------|
| i  | for months 1-12       | Due by mid 13th month |
| ii | for months 13-24      | Due by mid 25th month |
| 2. | Draft Terminal Report | Due by 39th month     |

## B. REVIEWS

- |     |                            |            |
|-----|----------------------------|------------|
| i   | First Tripartite Review    | 13th month |
| ii  | Second Tripartite Review   | 25th month |
| iii | Terminal Tripartite Review | 42nd month |

## C. EVALUATION

- |    |                              |            |
|----|------------------------------|------------|
| i  | Mid-term in-depth evaluation | 18th month |
| ii | Terminal in-depth evaluation | 42nd month |

## ANNEX III

## STANDARD ANNEX TO PROJECT DOCUMENT FOR USE IN COUNTRIES WHICH ARE NOT PARTIES TO THE STANDARD BASIS ASSISTANCE AGREEMENT.

Supplement provision to the Project Document:  
The Legal ContextGeneral Responsibilities of the Government, UNDP and the Executing Agency

All phases and aspects of UNDP assistance to this project shall be governed by and carried out in accordance with the relevant and applicable resolutions and decisions of the competent UN organs and in accordance with UNDP's policies and procedures for such projects and subject to the requirements of the UNDP Monitoring Evaluations and Reporting System.

The Government shall remain responsible for this UNDP-assisted development project and the realization of its objectives as described in this Project Document.

Assistance under this Project Document being provided for the benefit of the Government and the people of (the particular country or territory) the Government shall bear all risks of operations in respect of this project.

The Government shall provide to the project the national project personnel, training facilities, land, buildings, equipment and other required services and facilities. It will designate the Government Co-operating Agency named in the cover page of this document, which will hereinafter be referred to as the "Co-operating Agency" and which will be directly responsible for the implementation of the Government contribution to the project.

The UNDP undertakes to complement and supplement the Government participation and will provide through the Executing Agency the required expert services, training, equipment and other services within the funds available to the project.

Upon commencement of the project the Executing Agency may be requested assume primary responsibility for project execution. However, that primary responsibility shall be exercised in consultation and in agreement with the Co-operating Agency. Arrangements in this effect shall be stipulated in the project Work Plan as well as for the transfer of this responsibility to the Government or to an entity designated by the Government during the execution of the project.

Part of the Government's participation may take the form of a cash contribution to UNDP. In such cases, the Executing Agency will provide the related services and facilities and will account annually to the UNDP and to the Government for the expenditure incurred.

Participation of the Government

The Government shall provide to the project the services, equipment and facilities in the quantities and at the times specified in the Work Plan. Budgetary provision --either in kind or in cash-- for the Government's participation so specified shall be set forth in the project budgets.

The Co-operating Agency shall in consultation with the Executing Agency assign a director on a full-time basis. He/she shall carry out such responsibilities in the project as are assigned to him by the Co-operating Agency.

The estimated cost of items included in the Government contribution, as detailed in the Project Budget, shall be based on the best information available at the time of drafting this project document. It is understood that price fluctuations during the period of execution of the project may necessitate the adjustment of said contribution in monetary terms; the latter shall at all times be determined by the value of the services, equipment and facilities required for the proper execution of the project.

Within the given number of man-months of professional services described in the Work Plan, minor adjustments of individual assignments of project personnel provided by the Government may be made by the Government in consultation with the Executing Agency, if this is found to be in the best interests of the project.

The Government shall continue to pay the local salaries and appropriate allowances of national project personnel during the period of their absence from the project while on UNDP fellowships.

The Government shall defray any customs duties and other charges related to the clearance of the project equipment, its transportation, handling, storage and related expenses within the country. It shall be responsible for the custody of the equipment, its installation and maintenance, insurance, and replacement if necessary, after delivery to the project site.

The Government shall make available to the project --subject to existing security provisions-- any published and unpublished reports, maps, records and other data which are considered necessary to the implementation of the project.

Patent rights, copyright and other similar rights to any discoveries of work resulting from UNDP assistance in respect of this project shall belong to the UNDP. Unless otherwise agreed by the parties in each case, however, the government shall have the right to use any such discoveries of work within the country free of royalty and any charge of similar nature.

The Government shall assist all project personnel in finding suitable housing accommodation at reasonable rents.

The services and facilities specified in the Work Plan which are to be provided to the project by the Government by means of a contribution in cash shall be set forth in the Project Budget. Payment of this amount shall be made in local currency to the UNDP in accordance with the Schedule of Payment by the Government.

Payment of the above-mentioned contribution to the UNDP on or before the dates specified in the Schedule of Payments by the Government is a prerequisite to commencement or contribution of project operations.

#### Participation of the UNDP and of the Executing Agency

The UNDP shall provide to the project through the Executing Agency the services, equipment and facilities described in the Work Plan. Budgetary provision for the UNDP contribution as specified shall be set forth in the Project Budget.



The Executing Agency shall consult with the Government on the candidature of the Project Manager (may also be designated Team Leader or Chief Technical Advisor, as appropriate) who, under the direction of the Executing Agency, will be responsible in the country for the Executing Agency's participation in the project. The Project Manager shall supervise the experts and other agency personnel assigned to the project, and the on-the-job training of national project personnel. He shall be responsible for the management of all equipment provided to the project from UNDP funds.

The Executing Agency, in consultation with the Government, shall assign international staff and other personnel to the project as specified in the Work Plan, select candidates for fellowships and determine standards for the training of national project personnel.

Fellowships shall be administered in accordance with the fellowships regulations of the Executing Agency.

The Executing Agency may, in agreement with the Government and UNDP, execute part or all of the project by subcontract. The selection of subcontractors shall be made, after consultation with the Government, in accordance with the Executing Agency's procedures.

All material, equipment, and supplies which are purchased from UNDP resources will be used exclusively for the execution of the project, and will remain the property of the UNDP in whose name it will be held by the Executing Agency. Equipment supplied by the UNDP shall be marked with the insignia of the UNDP and of the Executing Agency.

Arrangements may be made, if necessary, for a temporary transfer of custody of equipment to local authorities during the lifetime of the project, without prejudice to the final transfer.

Prior to completion of UNDP assistance to the project, the Government, the UNDP and the Executing Agency shall consult as to the disposition of all project equipment provided by the UNDP. Title to such equipment shall normally be transferred to the Government, or to an entity nominated by the Government, when it is required for continued operation of the project or for activities following directly therefrom. The UNDP may, however, at its discretion, retain title part or all of such equipment.

At an agreed time after the completion of UNDP assistance to the project, the Government and the UNDP, and if necessary the Executing Agency, shall review the activities continuing from or consequent upon the project with a view to evaluating its results.

UNDP may release information relating to an investment oriented project to potential investors, unless and until the Government has requested the UNDP in writing to restrict the release of information relating to such projects.

#### Facilities, privileges and immunities

##### UNDP and Executing Agency personnel

In accordance with the Agreement concluded by UNDP and the Government concerning the provisions of assistance, the personnel of UNDP and other United Nations organizations associated with the project, shall be accorded facilities, privileges and immunities specified in the said Agreement.

The Government shall grant UN volunteers, if such services are requested by the Government, the same rights, facilities, privileges and immunities as are granted to the personnel of UNDP

Subcontractors and their personnel

The Executing Agency's contractors and their personnel (except Government nationals employed locally) shall:

- a) be immune from legal process in respect of all acts performed by them in their official capacity in the execution of the project;
- b) be immune from national service obligations;
- c) be immune together with their spouses and relatives dependent on them from immigration restrictions;
- d) be accorded the privileges of bringing into the country reasonable amounts of foreign currency for the purposes of the project or for personal use of such personnel, and of withdrawing any such amounts brought into the country, or, in accordance with the relevant foreign exchange regulations, such amounts as may be earned therein by such personnel in the execution of the project;
- e) be accorded together with their spouses and relatives dependent on them the same repatriation facilities in the event of international crisis as diplomatic envoys.

All personnel of the Executing Agency's contractors shall enjoy inviolability for all papers and documents relating to the project.

The Government shall either exempt from, or bear the cost of any taxes, duties, fees or levies which it may impose on any foreign firm or organization which may be retained by the Executing Agency and on the foreign personnel of any such firm or organization in respect of:

- a) The salaries or wages earned by such personnel in the execution of the project;
- b) Any equipment, materials and supplies brought into the country for the purposes of the project or which, after having been brought into the country, may be subsequently withdrawn therefrom;
- c) Any substantial quantities of equipment, materials and supplies obtained locally for the execution of the project, such as, for example, petroleum and spare parts for the operation and maintenance of equipment mentioned under (b) above, with the provision that the types and approximate quantities to be exempted and relevant procedures to be followed shall be agreed upon with the Government and, as appropriate, recorded in the Work Plan, and
- d) As in the case of concessions currently granted to UNDP and Executing Agency's personnel, any property brought, including one privately owned automobile per employee, by the firm or organization or its personnel for their personnel use or consumption or which after being brought into the country, may subsequently be withdrawn therefrom upon departure of such personnel.

The government shall ensure: (a) prompt clearance of experts and other persons performing services in respect of this project, and (b) the prompt release from customs of: (i) equipment, materials and supplies required in connection with this project and (ii) property belonging to and intended for the personal use or consumption of the personnel of the UNDP, its Executing Agency's or other persons performing services on their behalf in respect of this project, except for locally required personnel.

The privileges and immunities to which such firm or organization and its personnel may be entitled, referred to in the paragraphs above, may be waived by the Executing Agency where, in its opinion or in the opinion of the UNDP, the immunity would impede the course of justice and can be waived without prejudice to the successful completion of the project or to the interest of the UNDP or the Executing Agency.

The Executing Agency shall provide the Government through the Resident Representative with the list of personnel to whom the privileges and immunities enumerated above shall apply.

Nothing in this Project Document or Annex shall be construed to limit the rights, facilities, privileges or immunities conferred in any other instrument upon any person, natural or juridical, referred to hereunder.

a) The UNDP may write notice to the Government and the Executing Agency concerned suspending its assistance to any project, if in the judgement of the UNDP, any circumstance arises which interferes with or threatens to interfere with the successful completion of the project or the accomplishment of its purposes.

The UNDP may, in the same or a subsequent written notice, indicate the conditions under which it is prepared to resume its assistance to the project. Any such suspension shall continue until such time as such conditions are accepted by the Government and as the UNDP shall give written notice to the Government and the Executing Agency that it is prepared to resume its assistance

b) If any situation referred to in sub paragraph (a) above shall continue for a period of fourteen days after notice thereof and of suspension shall have been given by the UNDP to the Government and the Executing Agency, then at any time thereafter during the continuance thereof, the UNDP may, by written notice to the Government and the Executing Agency, terminate the project.

c) The provisions of this paragraph shall be without prejudice to any other rights or remedies the UNDP may have in the circumstances, whether under general principles of law or otherwise.

ANNEX IV.A - ACTIVITY SCHEDULE OF THE TRAINING ABROAD COMPONENT

Year No. -->	1	2	3
Quarter No. -->	(-Q1-)(-Q2-)(-Q3-)(-Q4-)	(-Q1-)(-Q2-)(-Q3-)(-Q4-)	(-Q1-)(-Q2-)(-Q3-)(-Q4-)
Month No. -->	010203040506070809101112	131415161718192021222324	252627282930313233343536
H 1. CAD construction	(20);.....(333333);.....(222222)		
H 2. Analysing techniques	(6);.....		(2222)
H 3. Digitizing Techniques	(4);.....		(22)
H 4. CAM Techniques	(6);.....	(33);	
H 5. WC/CNC Programming/Mach.operating	(6);.....		(33)
H 6. CAD Schematic entry/PCB layout	(16);.....(333333);.....(111111)		
H 7. CAD-E Analysis / Simulation	(6);.....		(2222)
S 8. System Administration	(9);.....(2222);.....(1111)		
C 9. Technical consult. computer syst.	(10);.....(33);.....(22)		
D 10. Software development	(6);.....(2222)		
T 11. Training program development	(15);.....(2222);.....(3333);.....(2222)		
T 12. Training materials development	(5);.....(1111);.....(11)		
F 13. CAD Facility planning	(6);.....(1111);.....(1111)		
F 14. CAD Plant Design	(3);.....		(1111)
F 15. CAD Mapping	(3);.....		(1111)
Month No. -->	010203040506070809101112	131415161718192021222324	252627282930313233343536
Total number of HIRC personnel away from HIRC during any project month	0 0 0 0 11 17	0 9 8 0 0 4	4 10 4 0 0 0
	0 0 0 0 14 12	0 10 3 0 0 4	7 10 0 0 0 8

(: Start ): Finish nna: n=number of people trained abroad

## ANNEX IV B : LIST OF TRAINING COURSES

## General Requirements:

Courses will be based on the purchased hardware and software. They will cover all aspects of the software including:

- a) Application to design process and standard routines.
- b) Function of each applicable software module
- c) Interface between software modules and to other CAD systems, software and data.
- d) Customizing of software and macro languages.
- e) Data organization and storage.
- f) Installation of software
- g) Basic hardware and operating system training, including use of peripherals

Courses will consist of formal teaching, hands-on instruction and self study plus project periods. Course details, textbooks, and software will be made available for further training of CEDA staff in India. These courses will be provided where applicable by the major vendor of the software or by a by this vendor authorized institute.

In particular the courses should have the following elements and aims:

## M Mechanical

1 CAD construction.

- General CAD design using 2D and 3D drafting
- Design using solid modeling techniques
- Surface modeling techniques
- Geometric properties of models
- Color rendering techniques
- Use of standard elements
- application of cad design in manufacturing industry.

The course aims at providing the attendees with sufficient know-how in current state of the art cad techniques, to enable them to complete an entire design project.

2 Analyzing techniques

- Finite Element Analysis of CAD models, including linear stress analysis, optional flow, solidification and cooling analysis.

The course aims at imparting in the attendees sufficient know-how so that they can perform analysis on components and parts, interpret the results and modify accordingly.

### 3. Digitizing techniques

- Reverse engineering technique
- 2D digitizing on bitpads
- Interpretation and use of 2D digitized information
- 3D digitizing including manual profile and automatic techniques.
- Interpretation of 3D data including use of 3D profiles in surface construction, use of automatic or scanned data in surface creation and machining.
- Production of male/female surfaces from data
- Basic principles of CNC/CAM for machining of tooling

Aim of the course is to impart sufficient know-how in the attendees so that they can produce CNC data for reverse engineering from digitized data obtained from component or model.

### 4. CAM Techniques

- Production of CNC data from CAD models
- Generation of data for rough, semi-finish and finish machining of dies, molds and models.
- Tool database creation
- CNC data creation for lathes
- Tool management systems
- Direct and indirect transfer of data to machine tools (DNC/NC)
- Post processors
  - 2 and 4 axis wire spark tape file generation
  - 2, 2.5, 3 and 5 axis milling tape generation

Aim of the course is to impart sufficient know-how in the attendees so that they can produce post-processed tape files for CNC machine tools, wire eroders, milling machines and lathes from CAD data. They will also understand the various methods available for the transmission of tape files to machine tools (DNC, paper tape, magnetic tape etc.)

### 5. NC/CNC Programming/Machine operation

Operation of purchased hardware including

- 3 axis CNC milling machine
- CNC lathe
- CNC 4 axis wire erosion machine
- Preparation of materials for tool/model/electrode manufacture
- Use of jigs and fixtures for CNC manufacture
- Programming (on line) of CNC controllers
- Interfacing CNC controllers to NC/DNC systems

Aim of the course is to impart sufficient know-how in the attendees so that they can safely operate the purchased machine tools under normal NC / CNC control. They will be able to write basic programs on the machine controllers.

## E CAD Electronics

### 6. Schematic capture and PCB lay out

- Specification of user needs and representing the logic with the means of a schematic entry graphic tool
- use and updating of symbol libraries
- Conversion of the netlist to formats for simulation, packaging and lay out
- Techniques of interactive placement and routing
- use of autorouter
- conversion of physical layout to manufacturing data
- basics of analyzing techniques and simulation.

Aim of the course is to impart sufficient know-how in the attendees so that they can complete an entire PCB design project from user to final manufacturing data.

### 7. Analysis and Simulation within PCB design

The course is based on no 6 and puts emphasis on improved analyzing techniques, interpreting results, logic and device simulation. The attendees will have the ability to analyze PCB designs and simulate design and layout with state of the art simulation tools, purchased through this project.

## S System administration

### 8. System administration

The course will teach the attendees how to administrate a computersystem, with the emphasis on the purchased configuration.

- System components
- Devices
- Maintenance
- Diagnostics
- Configuration
- Installation

At the end of the course the attendees will have the capability to maintain the complete computer configuration, secure its undisturbed functioning and to optimize its performance.

## C Consultancy

### 9. Technical consultancy

The course will provide attendees with knowledge on analysis of industrial design and production processes. in relation to automation, and the possible use of CAE systems. The course will cover at least the following areas:

- Problem specification/Identification
- Problem solving techniques
- Industrial organization
- Integration of new technologies in Industry
- Cost / Benefit analysis
- Writing of technical specifications.

## D Software Development

### 10. Software development

The course provides the attendees with the state of the art knowledge in the field of Computer Aided Software Engineering. It provides the ability to practical use the purchased software packages for special software development, with emphasis on graphical databases and standards for graphic user interfaces.

## T. Training programme Design

### 11. Training program development

Course will provide attendees with training on teaching methods and aids. It will cover at least the following areas, applied specifically to technical training

- Curriculum Design
- Course Design and structure
- Lesson planning
- Use of audio-visual aids
- Use of computer aided teaching programs

The aim of the course is to train existing technical staff, with a knowledge of training methods in state of the art training techniques, with emphasis on computer aided teaching programmes

### 12. Training materials Development

Course will train attendees on the development of computer based training materials. It will provide information and training on software development for such materials. This will include design of interactive learning software, advanced graphics and/or audio/visual interfaces from computers.



**F Infrastructure Development****13. Facility planning**

Aim of the course is to impart sufficient know how inn the attendees so that they can use the purchased software to analyze, modify, and optimize clients facilities and manufacturing processes.

**14. Plant Design/ Civil Engineering**

Aim of the course is to impart sufficient know how inn the attendees so that they can use the purchased software to design in detail the required structures for a building, manufacturing plant or other facility.

**15. Mapping**

- Use of scanned data
- Vectorizing of scanned data
- Use of standard neutral format maps.

Aim of the course is to impart sufficient know how inn the attendees so that they can use the purchased software to design and modify map data for infrastructural developments.

ANNEX V.A - ACTIVITY SCHEDULE OF THE EQUIPMENT COMPONENT

Year No. -->	1	2	3
Quarter No. -->	(-Q1-)(-Q2-)(-Q3-)(-Q4-)	(-Q1-)(-Q2-)(-Q3-)(-Q4-)	(-Q1-)(-Q2-)(-Q3-)(-Q4-)
Month No. -->	010203040506070809101112	131415161718192021222324	252627282930313233343536
<b>STAGE I</b>			
Formulation of detailed specs	.....(xx)		
Request for bids	.....()		
evaluation and selection	.....()		
purchase	.....()		
delivery and installation	.....(XXXXXXXX)		
Site preparation	..(XXXXXXXX)		
<b>STAGE II</b>			
Detailing equipment specifications	.....(xx)		
request for bids	.....()		
evaluation and selection	.....()		
purchase	.....()		
delivery and installation	.....(xxx)		
Site preparation workshop	.....(XXXXXXXX)		
Month No. -->	010203040506070809101112	131415161718192021222324	252627282930313233343536

A detailed description of each item is given in annex V-E : System Configuration

NUMBER	DESCRIPTION	EXAMPLE MAKE	Q	APPROX. PRICE	TOTALS	IMPL. STAGE
<b>OUTPUT 1.1 Engineering Design, Analysis and Prototyping</b>						
<b>Computer Hardware</b>						
hw 1.1	Server Workstation Type 1	SUN 4/390	1	140,000		1
hw 1.2	Engineering Workstation Type 2	SUN 4/60GX	3	90,000		1/2
hw 1.3	Pen Plotter A0	HP	2	14,000		1
hw 1.4	Laserprinter	LaserWriter	1	7,000		1
hw 1.5	Color Hardcopy Unit	D-Scan	1	8,000		1
hw 1.6	Dot matrix LQ printer A3	LQ 2050	2	4,000		1
hw 1.7	Document Scanner		1	5,000		1
hw 1.8	Cartridge Tape driver 1/4"		1	2,000		1
hw 1.9	Paper Tape Puncher	Facit	1	5,000		1
hw 1.10	Mass storage Back-up	Gigatape	1	20,000		1
					295,000	
hw 1.11	DNC System		1	25,000		2
hw 1.12	Consumables			20,000		1
hw 1.13	HW Maintenance			75,000		1/2
	<b>TOTAL Computer Hardware :</b>				<b>415,000</b>	
<b>Computer Software</b>						
sw 1.1	Mechanical CAD		1	100,000		1
sw 1.2	Mechanical CAM		1	50,000		2
sw 1.3	Electronical CAD		1	125,000		1/2
sw 1.4	Software Maintenance			70,000		1/2
	<b>TOTAL Computer Software</b>				<b>345,000</b>	
	<b>TOTAL COMPUTER EQUIPMENT</b>				<b>760,000</b>	
<b>Prototyping Equipment</b>						
pt 1.1	CNC Milling Machine + tooling spares and digitizing probe	Deckel	1	120,000		2
pt 1.2	CNC Lathe + tooling & spares	Deckel	1	88,000		2
pt 1.3	CNC Wire Erosion Machine plus tooling and spares	Deckel	1	95,000		2
	<b>TOTAL Prototyping Equipment</b>				<b>303,000</b>	
	<b>TOTAL EQUIPMENT OUTPUT 1.1 :</b>				<b>1,063,000</b>	
<b>OUTPUT 1.2 Consultancy Services</b>						
sw 2.1	Case Tools software			60,000		1/2
sw 2.2	SW Maintenance			15,000		1/2
	<b>TOTAL EQUIPMENT OUTPUT 1.2 :</b>				<b>75,000</b>	
<b>OUTPUT 1.3 Manpower Development</b>						
sw 3.1	PC-Based training software		1	130,000		1/2
sw 3.2	SW Maintenance			30,000		1/2
sw 3.3	Development system for training software			25,000		1
	<b>TOTAL EQUIPMENT OUTPUT 1.3 :</b>				<b>185,000</b>	
<b>OUTPUT 1.4 Infrastructure Development</b>						
hw 4.1	Engineering Workstation	SUN 4/60 GX	1	30,000		1
hw 4.2	HW Maintenance			6,000		1
sw 4.1	Facility lay-out and mapping			50,000		1
sw 4.2	Civil engineering architecture and plant lay-out			50,000		2
sw 4.3	SW Maintenance			25,000		1/2
	<b>TOTAL EQUIPMENT OUTPUT 1.4 :</b>				<b>161,000</b>	
	<b>TOTAL UNDP PROVIDED EQUIPMENT :</b>				<b>1,484,000</b>	

## ANNEX V C LIST OF GOVERNMENT PROVIDED EQUIPMENT

\*

A detailed description of each item is given in annex V-E : System Configuration

NUMBER	DESCRIPTION	EXAMPLE MAKE	QUA	APPROX. PRICE	TOTALS	IMPL. STAGE
<b>OUTPUT 1.1 Engineering Design, Analysis and Prototyping</b>						
	Uninterruptable Power Supply					
	UPS 15 kVA		1	250,800		1
	Conventional Surface Grinder		1	418,000		2
	Conventional All cut/Band Saw		1	250,800		2
	Hand tools & Measurement Eq.			250,800		2
	Maintenance			451,440		1/2
	Tape safe		1	83,600		1
<b>TOTAL EQUIPMENT OUTPUT 1.1 :</b>					<b>1,621,840</b>	
<b>OUTPUT 1.2 Consultancy Services</b>						
	Engineering Workstation type 3		3	501,600		1/2
	HW Maintenance			100,320		1/2
<b>TOTAL EQUIPMENT OUTPUT 1.2 :</b>					<b>601,920</b>	
<b>OUTPUT 1.3 Manpower Development</b>						
	Engineering Workstation type 3		10	1,672,000		1/2
	SW Maintenance			334,400		1/2
	Audiovisual training equipment			167,200		1
<b>TOTAL EQUIPMENT OUTPUT 1.3 :</b>					<b>2,173,600</b>	
<b>OUTPUT 1.4 Infrastructure Development</b>						
	None					
<b>TOTAL EQUIPMENT OUTPUT 1.4 :</b>					<b>0</b>	
<b><u>TOTAL GOVERNMENT PROVIDED EQUIPMENT :</u></b>					<b><u>4,397,360</u></b>	

## ANNEX V D - JUSTIFICATION FOR UNDP PROVIDED EQUIPMENT

- |  |  |
|--|--|
| 1. Is the equipment in conformity with UNDP policy as stated in PPM Section 4602, Sub-section 1.3?   | YES: The equipment will be utilized in design, adoption, development, training, testing and simulation, and is not usable in production.<br><u>None of these equipment is production oriented.</u>   |
| 2. Is the equipment necessary, cost-effective and relevant to the outputs to be produced and to the attainment of project objectives?  | YES: The equipment is relevant to the envisaged project outputs. They will make it possible for target group to gradually assimilate advanced computer techniques, thus shorten reaction time to market demands and improve product quality.   |
| 3. Is UNDP assistance the most appropriate source for these inputs and have other multilateral or bilateral sources been contacted with regard to their role in providing equipment? | YES: Careful survey of other possible sources indicated that UNDP is the sole source for the envisaged equipment. The project requires expert consultancy in several disciplines and sophisticated equipment to be purchased possibly all over the world. An international agency with experience like UNIDO/UNDP is most appropriate. |
| 4. In the case of a pilot plant, what is the relevance of the conclusions of the feasibility/preinvestment study?  | Not applicable.  |
| 5. Is the equipment of suitable quality and reliability for the conditions in which it will be used, and is its level of technology appropriate?                                     | YES: It is intended that the request for quotations for this equipment will be issued to reputable independent firms who now supply similar equipment to other users in developed countries.   |
| 6. What kind of infrastructure and services are necessary to accommodate the equipment and will these be available?  | Some computer equipment will possibly require air-conditioned environment. Some basic preparations are needed for the workshop. These are foreseen, planned and budgetted.   |
| 7. What kind of maintenance and servicing facilities are required for such equipment, are these available and whose responsibility is it to pay for them?                            | Maintenance and service will be provided by supplier or specialized authorized agent in the country. Maintenance contract will be agreed upon with purchase of equipment for full time of probable. Special provision is budgetted for this in UNDP and Govt. inputs.  |
| 8. Has the timing/planning for equipment delivery and related activities and inputs been adequately considered and are they judged acceptable?                                       | YES: Please refer to charts given in Annex V-A indicating the time schedules as well as the milestone list.  |

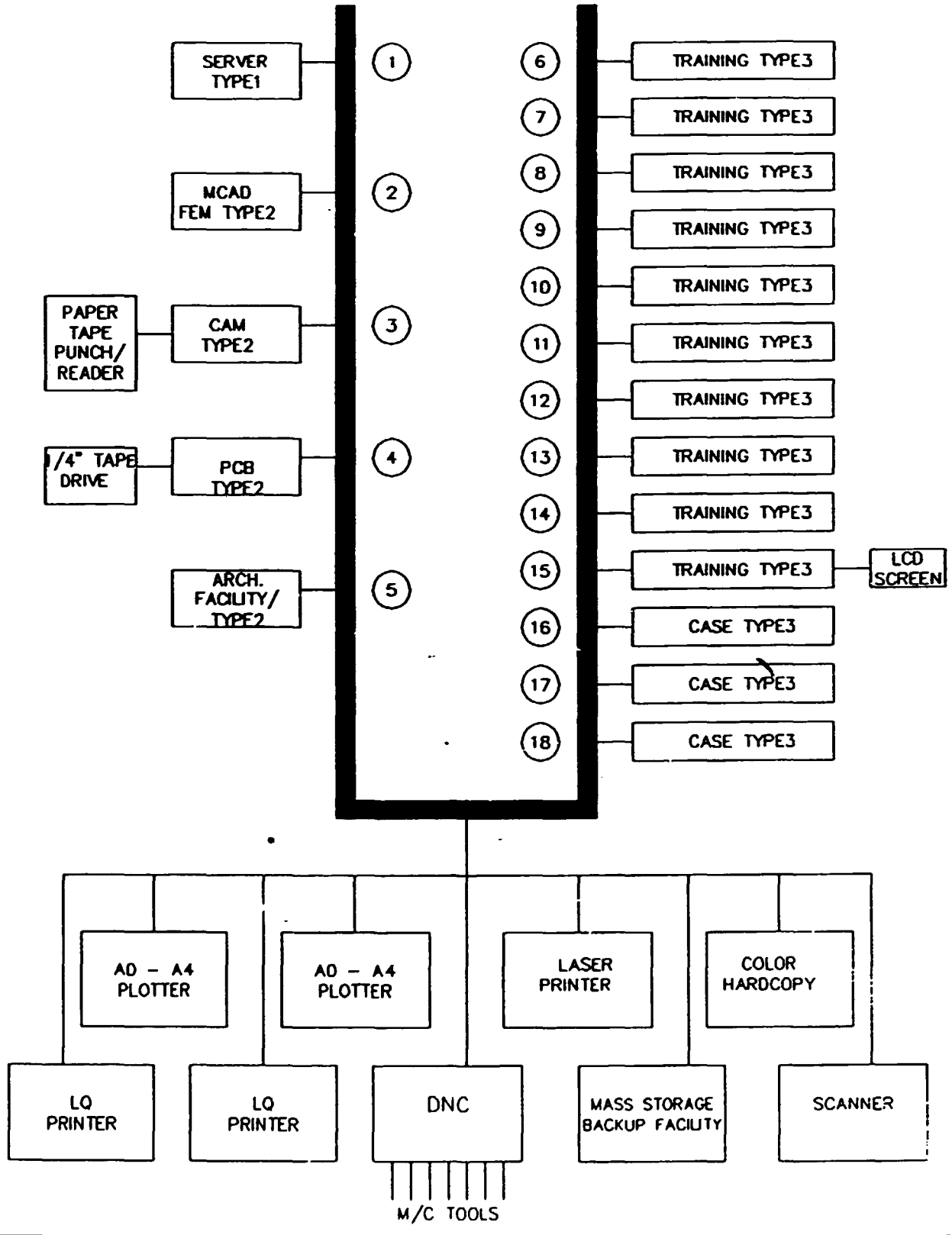
## ANNEX V D - JUSTIFICATION FOR UNDP PROVIDED EQUIPMENT (cont.)

- |  |  |
|--|--|
| <p>9. What resources will be necessary to provide (a) spare parts, (b) replacement of depreciated items, and (c) supply of consumables, and are these funds available from the Government's contribution or, during the life of the project, from UNDP's contribution? Are these and other recurrent costs clearly identified, are funds for their provision assured as necessary after the project's termination?</p> | <p>An initial supply of spare parts will be supplied as part of the equipment component. No difficulty is foreseen for the supply of operational funds which will be provided by the NIDC.</p> <p>Special consideration is given to provision of software maintenance, assuring state of the art software functionality through the whole project implementation.</p>  |
| <p>10. What kind of expertise is necessary to manage and operate the equipment in question, and is such expertise available to serve in the project? If such expertise is not yet available, how and when shall such personnel be available after the termination of UNDP assistance?</p>  | <p>NIDC being an engineering organization has to a large extent all the capabilities to manage and operate the equipment. However in the most advanced areas where expertise is lacking, both training and international expert assistance will be provided within the project. NIDC has already started recruitment of experienced people to work in the project.</p> |
| <p>11. Will the equipment operate at or near the capacity for which it was designed, or are arrangements envisaged for use of equipment on a time-sharing basis?</p>   | <p>It is expected that the equipment will be utilized at full capacity and on a top priority basis. Purchase is planned in 2 stages to assure that planned growth of expertise with the counterpart will match with the equipment capacity and functionality.</p>  |
| <p>12. If subcontracts are to be used, has the ratio of equipment been checked?</p>  | <p>Not applicable.</p>   |

# SYSTEM CONFIGURATION

## WORKSTATIONS

## WORKSTATIONS



**ANNEX V E SYSTEM CONFIGURATION****A: COMPUTER HARDWARE****Server Workstation Type 1**

32 bit CPU  
32 MB RAM  
1 GB Hard Disk  
Floating Point Co-processor  
19" color 8 bit-plane monitor  
5 1/4" floppy disk drive 1.2 MB  
3 1/2" floppy disk drive 1.44 MB  
1/4" cartridge tape drive  
Keyboard and mouse  
Ethernet Card

System Software  
Network software

(SUN 4/390 or similar)

**Workstation Type 2**

32 bit CPU  
12 MB RAM  
2\* 100 Mb Hard Disk  
Floating Point Co-processor  
Graphic co-processor  
19" color 8 bit-plane monitor  
3 1/2" floppy disk drive 1.44 MB  
Keyboard and mouse  
Ethernet Card  
Hardcopy printer (low-cost)  
A3/A4 digitizing pad

System Software  
Network software

(SUN 4/60 GX or similar)

**Workstation Type 3**

32 bit CPU  
2 MB RAM  
40 Mb Hard Disk  
Floating Point Co-processor  
14" color monitor  
Graphics Card (VGA)  
5 1/4" floppy disk drive 1.2 MB  
Keyboard and mouse  
Ethernet Card  
Hardcopy printer (low-cost)  
A3/A4 digitizing pad

System Software  
Network software

(PC 386 or 486)



Peripherals

A0 Pen Plotter	8 pen, roll feed plotter
Laser Printer	Postscript compatible, HPLJ emulation
Colour Hardcopy	Full colour thermal hardcopy for colour screen dumps (Seiko, D-Scan or similar)
Dot Matrix printer	A3, letter quality, option 400 cps
Scanner	Document scanner
Mass storage Back-up facility	Suitable mass back-up system for planned configuration (e.g. Gigatape or similar)
Paper tape puncher/reader	To produce tapes for interface with NC machinery
Direct Numerical Control system	suitable for data transfer to and from the machine tools in the prototype workshop
LCD-Screen	Transparent LCD screen for use with overhead projector.

**B COMPUTER SOFTWARE**Workstation 1

- Parts of application software from workstations 2 to 5 will be used on workstation 1 for tasks requiring high processing capability.
- Back-up software
- System Management software
- Network Management software

Workstation 2

The following software packages will run on this workstation and be interface with appropriate data transfer norms:

- 2 and 3 D Drafting
- Surface modelling
- Solid Modelling
- 3D mechanism design and analysis
- Finite element analysis

Workstation 3

The following software packages will run on this workstation and be interface with appropriate data transfer norms:

- Tool design package
- 2, 2.5 , 3 D Machining package.

Workstation 4

The following software packages will run on this workstation and be interface with appropriate data transfer norms:

- Schematic Capture
- Placement and Routing (interactive and Automatically)
- Simulation (logic and analog)
- Packaging
- Design Verification
- interfaces to transfer formats

#### Workstation 5

The following software packages will run on this workstation and be interface with appropriate data transfer norms:

- Facility lay-out and mapping
- civil engineering,
- architecture , building , plant design
- Electrical installation
- Case tools like compilers, graphic toolboxes, 4th generation languages, network software toolkit.

#### Workstation 6 to 15

These PC based workstations are mainly for training.

- Mechanical CAD
- Mechanical CAM
- Electrical CAD
- Technical Publishing
- Spread-sheets
- FEM analysis
- Databases
- PC based software for development of interactive training programmes

#### Workstation 16 to 18

These PC-based workstations are mainly for special software development.

- Common Case Tools for different management and technical applications.

### **C: PROTOTYPING EQUIPMENT**

#### CNC Milling machine

Laboratorium scale CNC Milling machine with full machining functionality in 3 axis directions, with a workspace of 400\*400\*400 mm. Includes numeric controller, tooling and some critical spares, a digitizing probe for digitizing three dimensional shapes for computer database creation. (For example Deckel FP3A with 3 axis controller with appropriate serial interface )

#### CNC Lathe

Laboratorium scale Lathe with full functionality. Workspace dia 300 mm with 900 mm between centres, includes numerical controller, tooling and some critical spares. (For example Deckel with 2,5 axis controller Fanuc or Haidenhain)

#### CNC 4 axis wire erosion machine

Laboratorium scale CNC wire Erosion Machine with full industry-standard functionality. includes 4 axis numeric controller, tooling and spares. Workspace 300 \* 300 mm. (for example Agie with 4 axis controller Fanuc)

#### Conventional Surface grinder

Manual surface grinder

#### Conventional All cut/Band saw

Hand tools, measuring instruments etc.

ANNEX VI-A - ACTIVITY SCHEDULE OF THE EXPERT COMPONENT

Year No. -->	1	2	3
Quarter No. -->	(-Q1-)(-Q2-)(-Q3-)(-Q4-)	(-Q1-)(-Q2-)(-Q3-)(-Q4-)	(-Q1-)(-Q2-)(-Q3-)(-Q4-)
Month No. -->	010203040506070809101112	131415161718192021222324	252627282930313233343536
11-01 C/1: CAR Expert.	(12);.....(XXXXX).....	(XXXXX).....	(XXXXX)
11-02 C/2: CAD/CAR Mechanics	(8);.....	(XXXXX).....	(XXXXX)
11-03 C/3: CAD Electronics	(9);.....	(XXXXX).....	(XXXXX)
11-04 C/4: CAD Analysis	(6);.....	(XXXXXX)	(XXXXXX)
11-05 C/5: System Expert	(7);.....	(XXXXXX)	(XXXX)
11-06 C/6: Special sw development	(7);.....	(XXXXX).....	(XXXX)
11-07 C/7: CAR Teaching	(8);.....	(XXXXXX)	(XXXX)
11-08 C/8: CAD Facility planning	(4);.....	(XXXXX)	
11-09 C/9: CAD Plant design	(6);.....	(XXXX).....	(XXXX)
11-50 Short-term Consultants	(2.5);.....	(C).....	(C)
Month No. -->	010203040506070809101112	131415161718192021222324	252627282930313233343536
Total number of consultants present	: 0 0 2 1 0 0	: 5 7 2 0 0 1	: 2 0 2 7 5 2
at WIDC during any project month	: 0 1 1 0 0 2	: 5 5 1 0 1 2	: 0 0 7 5 2 1

(: Start    ): Finish    xx: Service in the field

## ANNEX VI-B : ASSIGNMENT &amp; JOB DESCRIPTION OF INTERNATIONAL STAFF

1: Chief Technical Advisor**Duties:**

- 1: To assist the centre in improving their services to the target groups by applying advanced techniques and equipment.
- 2: To supervise the project on behalf of International Agency

**Therefore:**

- To analyse more in detail the services to be performed by CEDA
- To contribute in establishing detailed workplans of the project
- To produce in co-operation with short term consultants (if required) and national staff a final system specification.
- Asses required training and national staff requirements.
- Evaluate the project at required periods.

**Qualifications**

CAE Expert. Familiar with several application areas of CAE for manufacturing industries. Has 20 years experience in manufacturing industries and consultancy. The last 10 years intensive with Computer Aided Engineering. Has a proven insight in the CAE market, both hardware and software. Professional Engineer Qualification. University or equivalent education

**Location:** New Delhi

**Starting date :** Aug 1990

**Purposed duration :** 12 m/m in split missions

The contents of the job descriptions for other international staff will depend heavily on the equipment to be purchased since their work is closely linked with the software packages. These job descriptions will therefore be detailed later in the project in cooperation with project authorities.

## ANNEX VII

Framework for effective participation of national and international staff in the project.

The activities necessary to produce the indicated outputs and achieve the immediate objectives will be carried out jointly by the national and international staff assigned to the project. The specific roles of the national and the international staff will be determined by mutual discussions and agreements and will be designed on a framework for effective participation. The framework which will be attached to the project document as annex will be subject to review from time to time. The respective roles of the national and international staff should be in accordance with the established concept and specific purposes of technical cooperation.

The National Project Coordinator and the National Project Manager will be responsible for the overall management of the arrangement on behalf of the Government Executing Agency.

### THE NATIONAL INDUSTRIAL DEVELOPMENT CORPORATION (NIDC)

The National Industrial Development Corporation was established in 1954 to provide technical consultancy to serve as a nodal agency for securing balanced and integrated development of industries in India. Being one of the few consultancy organisations in the Bureau of Public Enterprises, NIDC's scope is open to a diverse range of industries unlike other consultancies which cater to limited sectors for example, Engineers India Limited caters to consultancy activities in the petrochemical sector. NIDC is therefore in close association with a large number of engineering industries and provides consulting engineering services for setting up new industries and modernisation of existing ones.

With a staff complement of 250 qualified and experienced personnel in civil, mechanical, electrical, electronics, metallurgical, mining, chemical engineering, instrumentation, computer science, architecture, town planning and developmental studies, NIDC offers the following services:

- \* Design Engineering
- \* Industrial Planning and developmental studies
- \* Project Management
- \* Management Information Systems
- \* Operation & Maintenance services

NIDC has experience in implementation of engineering projects in the fields of Industrial Projects, Civil and structural projects, environmental engineering, energy and industrial automation. NIDC involves the services of a large number of engineering industries in the concerned fields to cooperate in execution of turnkey projects resulting in a close working association with participating industries. Discipline wise breakup of projects/assignments completed by NIDC is as follows :

#### Civil, Structure & Architecture

Over the last 15 years, NIDC has set up one hundred and thirty projects including buildings, commercial complexes and colonies and have associated with 280 companies for

execution of the project.

### Electrical/Electronics

Over 155 projects/workshops in the area have been implemented by NIDC with the participation of over 450 feeder industries.

### Feasibility Studies

Over 300 plant feasibility studies have been carried out.

### Plant Layout, Design & Implementation

NIDC has designed and implemented a wide range of plants all over the country. The number of such plants is over 813 wherein about 770 plants have been set up in last three years.

In addition NIDC has an understanding with member industries in Confederation of Engineering Industries (CEI) and the National Small Industries Corporation (NSIC) for cooperation in achieving growth targets. NIDC plays a pivotal role in sharing technology and experience of value to such industries.

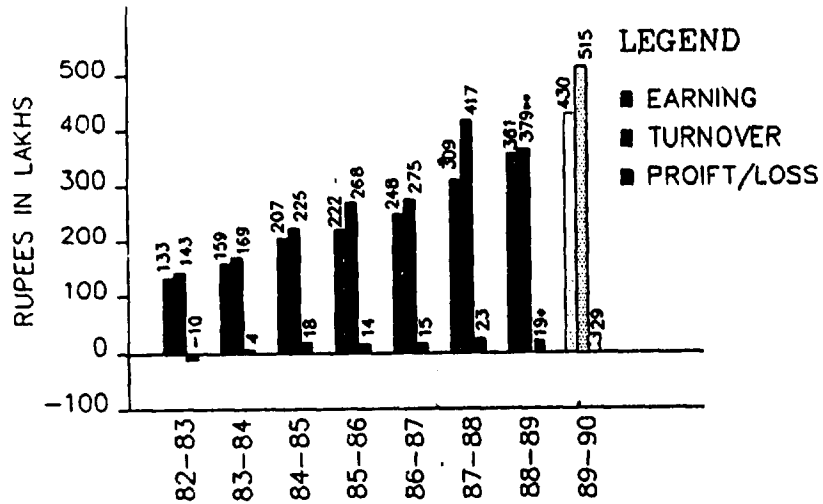
NIDC has grown by 50% in the last 5 years till 1988-89. The anticipated growth in 1989-90 is going to be at least 45%. Performance indicators for NIDC in terms of Earnings/Profits, Value of Orders secured and Manpower are shown in Annexure A.

NIDC's role in National Programmes is highlighted in the annexure B on National Technology Missions.

# PERFORMANCE OF NIDC

POSITION AS ON 10.4.89

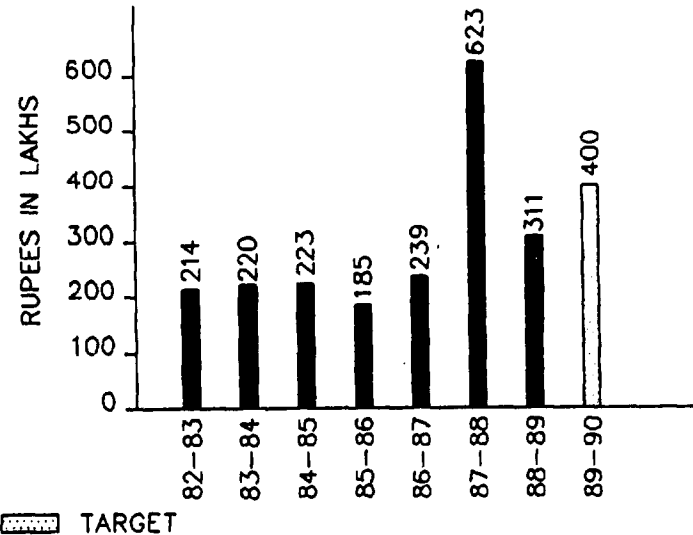
## EARNING/PROFITABILITY



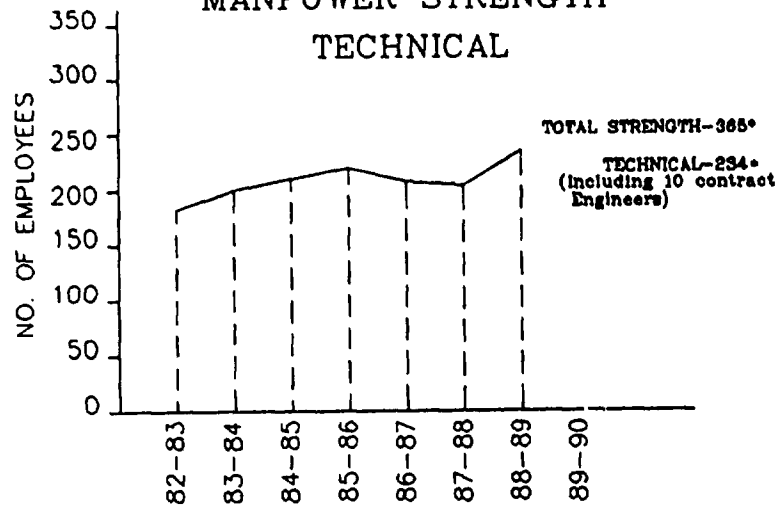
\*\*PLUS EARNING FROM TURNKEY PROJECTS  
(FIGURES ARE PROVISIONAL)

\* TILL MARCH, 1989

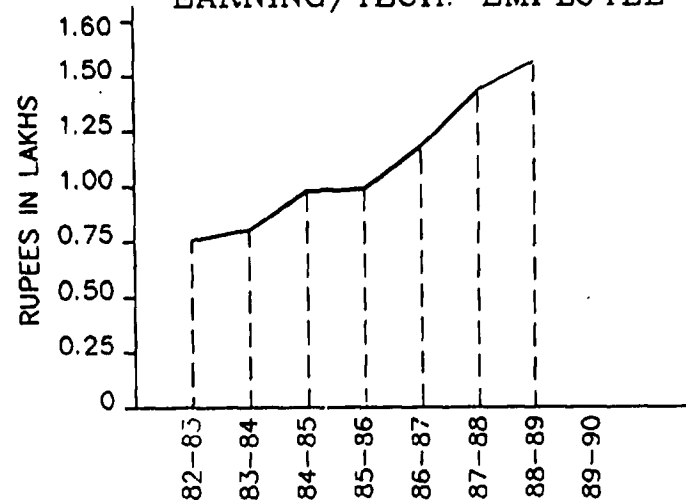
## ORDERS SECURED



## MANPOWER STRENGTH TECHNICAL



## EARNING/TECH. EMPLOYEE





### NATIONAL TECHNOLOGY MISSIONS

In addition to the National Five year Plans, the Government has introduced special programmes on specific development problems. The Minimum Needs Programme (MNP) is one such programme started in the Fifth Five Year Plan. The objective of the programme is to establish a network of basic services of social consumption in all the areas upto nationally accepted norms, within a specified time-frame. Another of these programmes is the Technology Missions introduced in the Seventh Plan. These have mission-oriented approach to technological development fostering relevance and providing motivation, automatically establishing organic linkages between sectors which otherwise tend to be compartmentalised, introduce urgency to meet time-targets and give technological inputs to essential social programmes like water supply, immunization, literacy, etc.

A mission is a programme with a clear, measurable, time bound objectives and an integrated management system for integration. This calls for a high degree of leadership commitment, motivation, zeal and a sense of urgency. A mission involves a coordinating, nodal system integrative & consortium organisation that mobilises and brings together a no. of agencies (State Government, Central Government, Voluntary Organisation Industry, Scientific & Education Institutes etc.) to pool their resources for achieving commonly shared objectives. The Technology missions, which have been adopted by Government of India as a major management innovation in the following key areas are:

- DRINKING WATER SUPPLY.
- ADULT LITERACY
- IMMUNIZATION
- OIL SEEDS
- TELECOMMUNICATIONS

These missions are intended to bring about significant socio-economic transformation and during the seventh plan (1985-90), the outlay is close to Rs.7,000 crores. Table-1 gives the overview of these Missions.

A conceptual framework which has been designed by NIDC is attached as Figure-I.

TABLE - I

TECHNOLOGY MISSION : AN OVERVIEW

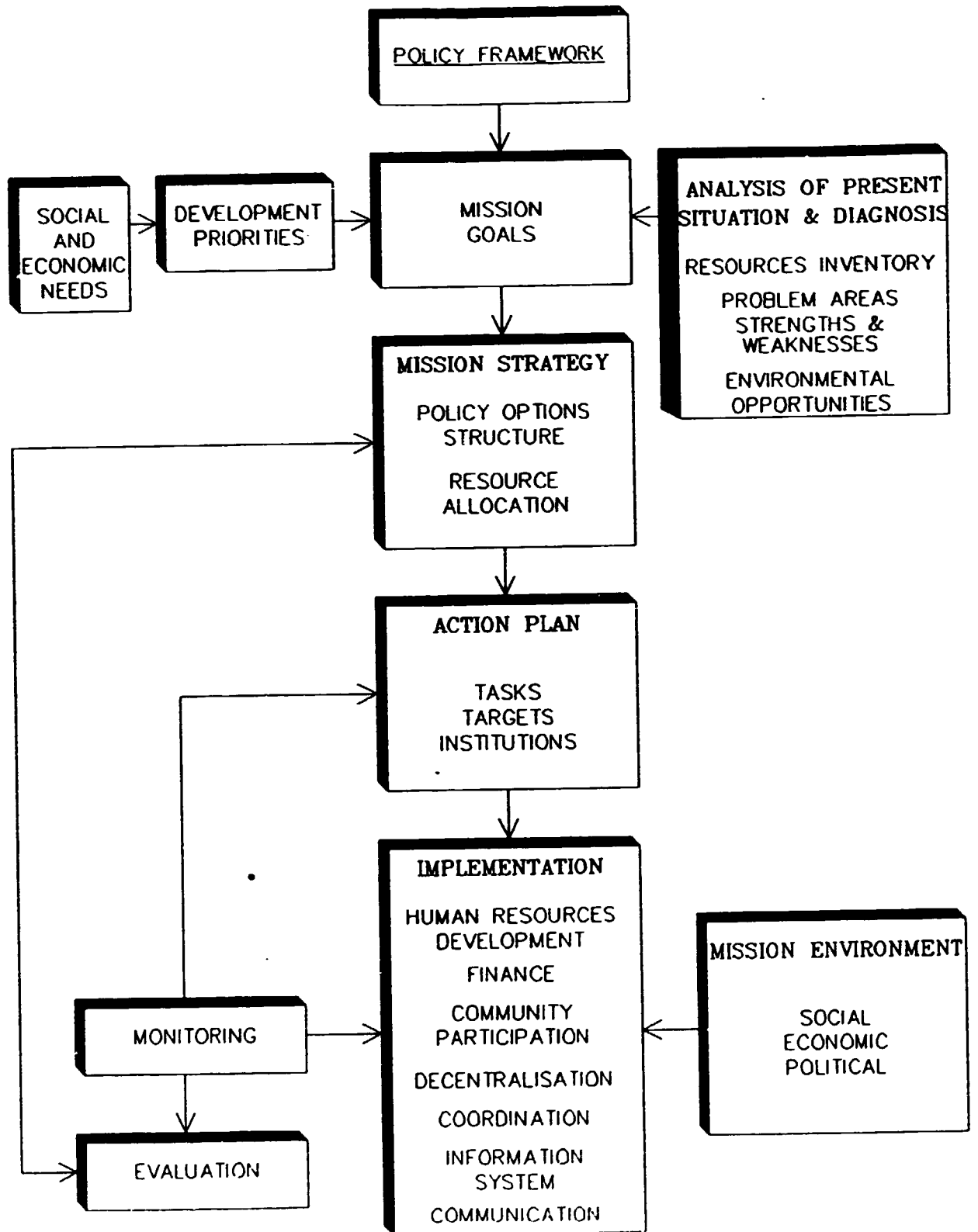
<u>MISSION</u>	<u>OBJECTIVES</u>	<u>KEY MISSIONS</u>	<u>STRATEGIES</u>	<u>MAJOR IMPLEMENTING AGENCIES</u>	<u>OUTLAY FOR 1988-90</u> (Rs. in Crores)
1. Drinking Water	- To Supply drinking water in identified problem villages in sustainable, cost-effective ways.	- Conservation of water and recharging of aquifers. - Eradication of guine worm - Control of flurosis - Desalination of water - Removal of Excess Iron.	- Scientific Source finding - Improvement of traditional methods. - Improvement of material, designs and maintenance - Community awareness and participation.	- Dept. of Rural Development - State Governments - Council of Scientific and Industrial Research - National Industrial Development Corporation (NIDC) - Voluntary Agencies - Voluntary Panchayats	3500
2. Adult Literacy	- Imparting functional literacy to 30 million illiterates		- Increase motivation - Technology Demonstration - Establishment of Mission Management Systems	- Department of Education - State Governments - National Industrial Development Corporation (NIDC) - Voluntary Agencies - Educational and Research Institutes	550
3. Immunisation	- To reduce mortality and morbidity due to communicable diseases among children	- Development of vaccines - Production of vaccines	- Research & Development - Production facilities	- Dept. of Health and Family Welfare - Indian Council for Medical Research	240

	- To reduce mortality to tetanus among pregnant women	- Storage and distribution of vaccines	- Monitoring Systems	- Department of Biotechnology	
	- To achieve self sufficiency in vaccine production.	- Administration of vaccines	- Community Participation	- National Industrial Development Corporation (NIDC)	
			- Cold Chain Technology	- Logistics agencies	
4. Telecommunication	- To achieve a continuously improving telecommunication service	- Improve quality of service - Increase urban PCOs - Improve delivery of telegrams - Provide telex on demand - Improve rural communications - Build up a national digital network	- Research & Development - Technology Demonstration - Increase Motivation - Monitoring Systems - Community awareness	- Department of Telecommunications - Centre for Development of Telematics - Indian Telephone Industries - Industry - National Industrial Development Corporation (NIDC)	2,285
5. Oilseeds	- Accelerating self-reliance in edible oils	- Crop Technology - Post-Harvest and Processing Technology - Farmer Support System - Post-Harvest Support	- Improved Crop Technology to motivate farmers - Modern Post-Harvest Techn. for better processing & storage - Strong Support system to farmers through state governments - Remunerative prices & procurement support - Support to Cooperatives, trade & industry for improved post-harvest operations	- Department of Agriculture Research & Education - Department of Agriculture & Cooperation - Department of Biotechnology - Department of Scientific & Industrial Research - Department of Civil Supplies - National Industrial Development Corporation (NIDC)	300

In addition to providing engineering services to small and medium industries, NIDC also plays the role of augmenting the government infrastructure to implement the national programmes. NIDC is currently providing extensive support in National Drinking Water Mission, National Immunisation Mission and the National Literacy Mission. These missions have a large degree of technological input in the form of infrastructure, plants and machinery for which complete design and detailed engineering is done at NIDC. The engineering design and analysis facility will help NIDC to render cost effective and better quality service in these national programmes.

As an example, The National Drinking Water Mission was set up in 1986 as one of the Technology Missions to provide safe drinking water to all the villages in India. The term safe has been defined as water which is free from any contamination - chemical, bacteriological or otherwise. The technological inputs for setting up a large number of iron removal, defluoridation and desalination plants, harvesting structures, solar photovoltaic purping systems and water quality testing laboratories are being provided by NIDC. Some of these are being imported. The facilities offered by CEDA would be made use of in facility utilisation, infrastructure improvement, design optimisation, cost savings, import substitution and standardisation for quicker and economical implementation of activities in the Mission.

# CONCEPTUAL FRAMEWORK



Estimates of Production & Employment

(Small Scale Industry)

Sl. No.	Year	No. of units registered (Lakh nos.)	Production (Rs.crores)	Employment (Lakh nos.)
1.	1982-83	6.07	35000	79.00
2.	1983-84	9.87	41620	84.15
3.	1984-85	7.57	50250	90.00
4.	1985-86	13.53	57100	96.00
5.	1986-87	14.57	64500	101.40

Source : Report 1987-88 Ministry of Industry.

**Region-wise Concentration of  
Engineering Industry 1984-85**

Sl. No.	Region	No. of regd. factories	Productive capital (Rs. lakhs)	Total employees (Nos.)	Total output (Rs. lakhs)	Value added (Rs. lakhs)
1.	Eastern Region	3421 (13.2)	719064 (35.2)	565112 (26.1)	779136 (24.1)	172248 (23.9)
2.	Northern Region	8284 (31.8)	283291 (13.9)	435559 (20.2)	663421 (20.5)	119480 (16.6)
3.	Southern Region	5706 (21.9)	332797 (16.3)	477888 (22.1)	611388 (18.9)	165605 (23.0)
4.	Western Region	8609 (33.1)	709333 (34.6)	682461 (31.6)	1182066 (36.5)	264343 (36.6)
	<b>Total of above</b>	<b>26020 (100.0)</b>	<b>2044485 (100.0)</b>	<b>2161020 (100.0)</b>	<b>3236011 (100.0)</b>	<b>721676 (100.0)</b>
	<b>Total Engineering</b>	<b>29373</b>	<b>2081535</b>	<b>2368039</b>	<b>3335875</b>	<b>759899</b>

Source: Annual Survey of Industries, CSO.

Note : Total Engineering includes Code No.380,381,382,386,972,973 & 974.  
This does not include small scale industries.

ENGINEERING EXPORTS

(Rs. cr or 10 mn; share %)

Year	Total Exports		Engg. Exports		Share (E/T) %	5-Year Growth (Y %)
	Rs. Cr	Index	Rs. Cr	Index		
1970 -71	1,535	100	116	100	7.8	
1975 -76	4,043	263	408	351	10.1	21.4
1979 -80	6,421	418	737	635	11.5	
1980 -81	6,710	437	870	750	13.0	10.7
1981 -82	7,802	508	1,060	913	13.6	
1982 -83	8,824	574	1,250	1077	14.2	
1983 -84	9,396	612	1,170	1008	12.5	
1984 -85	11,657	759	1,150	991	9.9	
1985 -86	10,200	664	1,000	862	9.8	8.7
1986 -87	12,550	817	1,150	991	9.2	
1988 -89	15,719	1,024	1,450	1250	9.2	12.2

E/T Share of Engineering Product in total exports

P Provisional

T Target



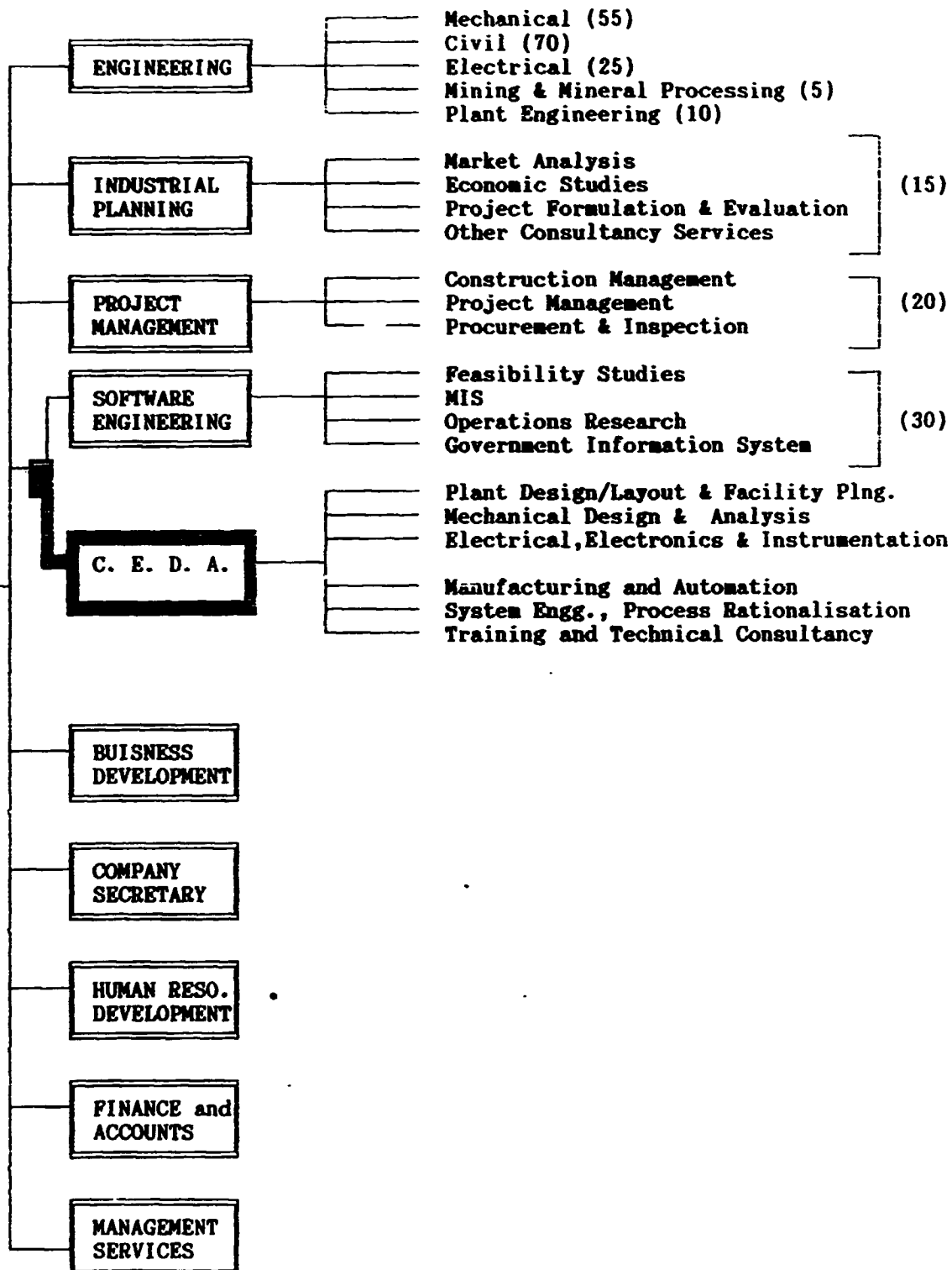
Share of Small Scale Industries in Industrial  
Production

(Value in Rs. crores)

S.No.	Year	Total Industrial Production	Small Scale Industries Production (SIDO Sector)	Share of Small Scale Industries in Total (%)
1.	1980 -81	61084	28060	46
2.	1981 -82	73672	32600	44
3.	1982 -83	96238	35000	41
4.	1983 -84	93537	41620	44
5.	1984 -85	105566	50520	47.9
6.	1985 -86	-	61100	-
7.	1986 -87	-	-	-

# NIDC ORGANISATION DIAGRAM (Schematic)

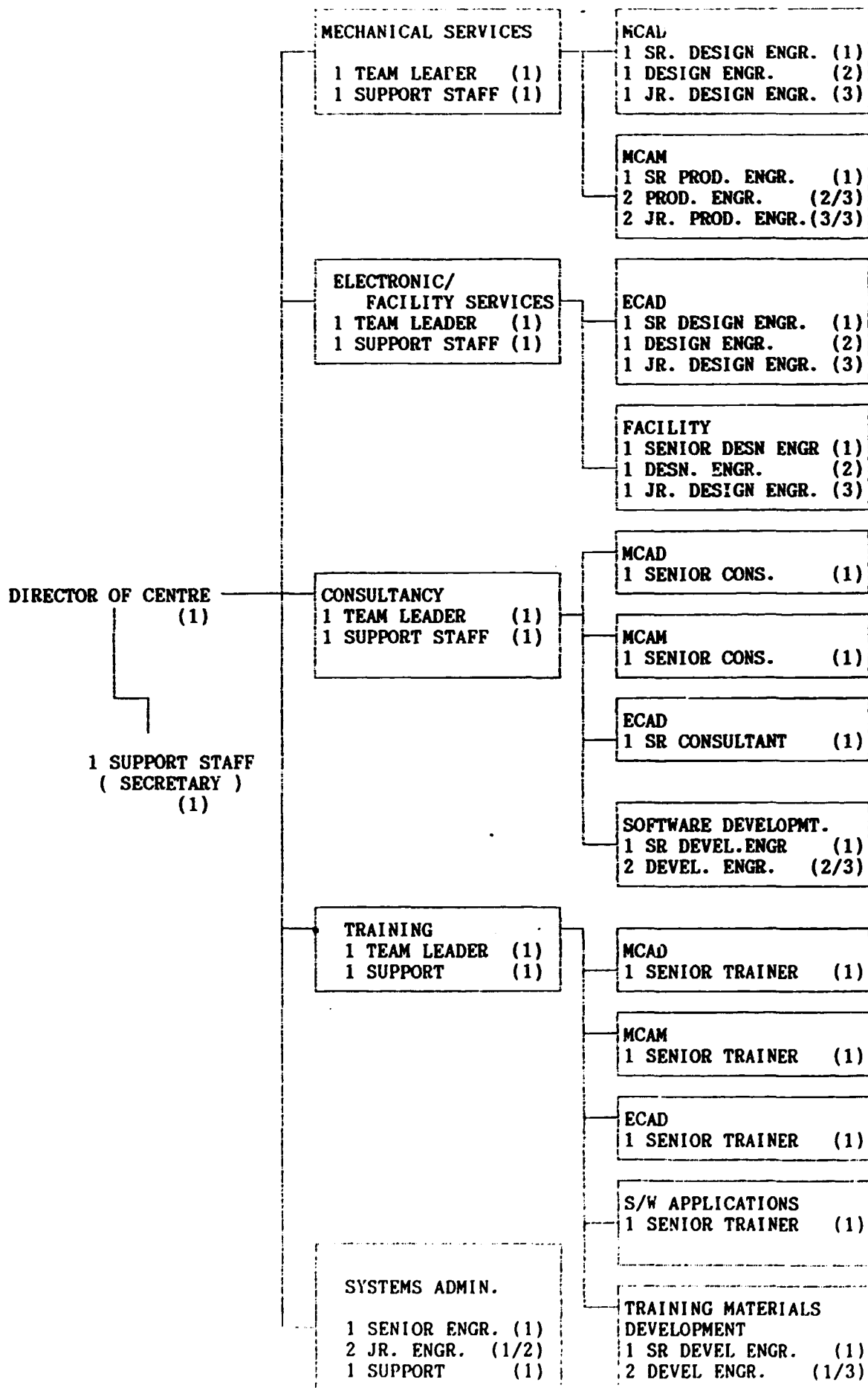
P.M. : Pre-project status in organisation without C.E.D.A.



(Total strength of Technical Staff = 230)

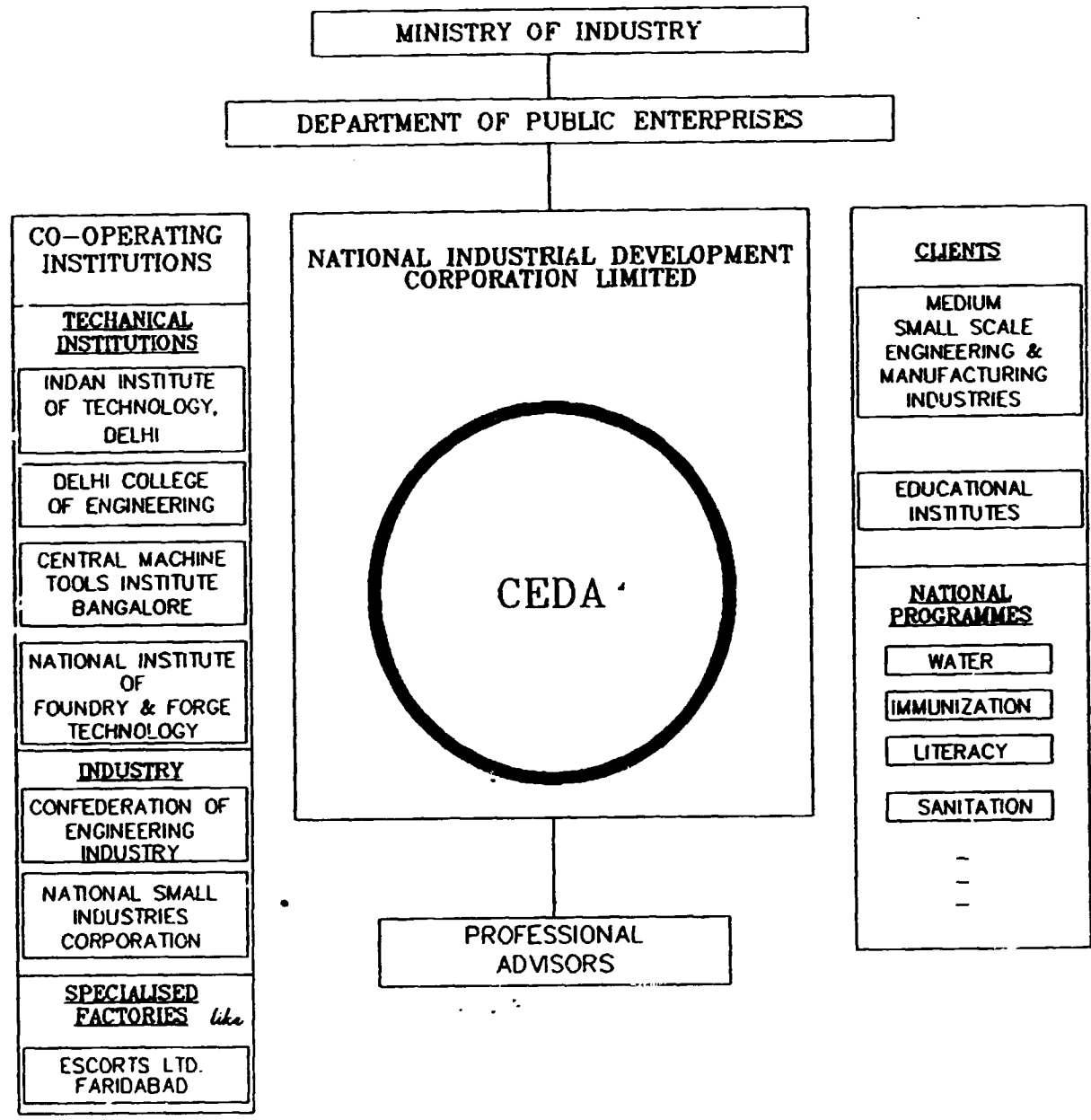
Figures in parantheses indicate no. of technical staff

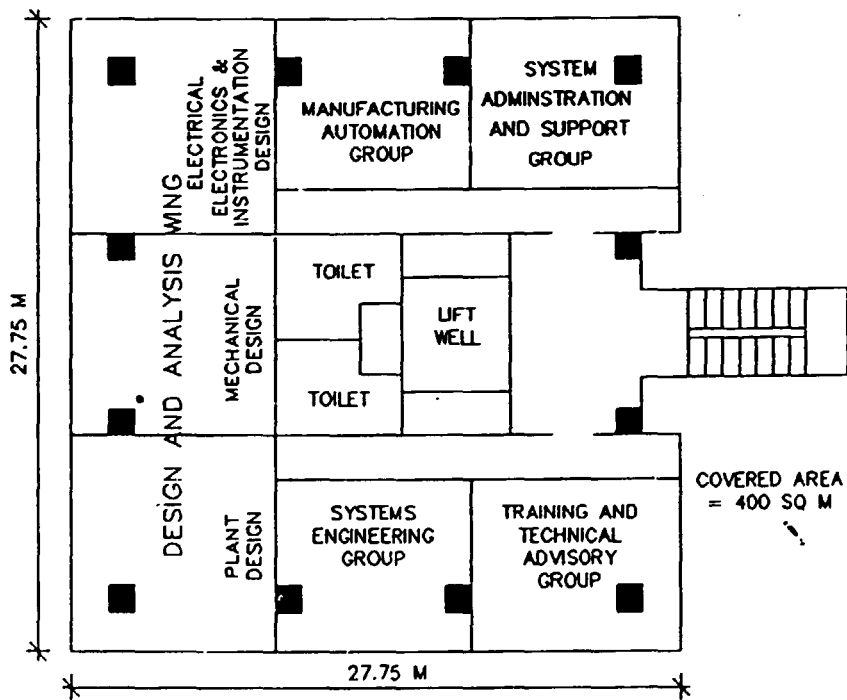
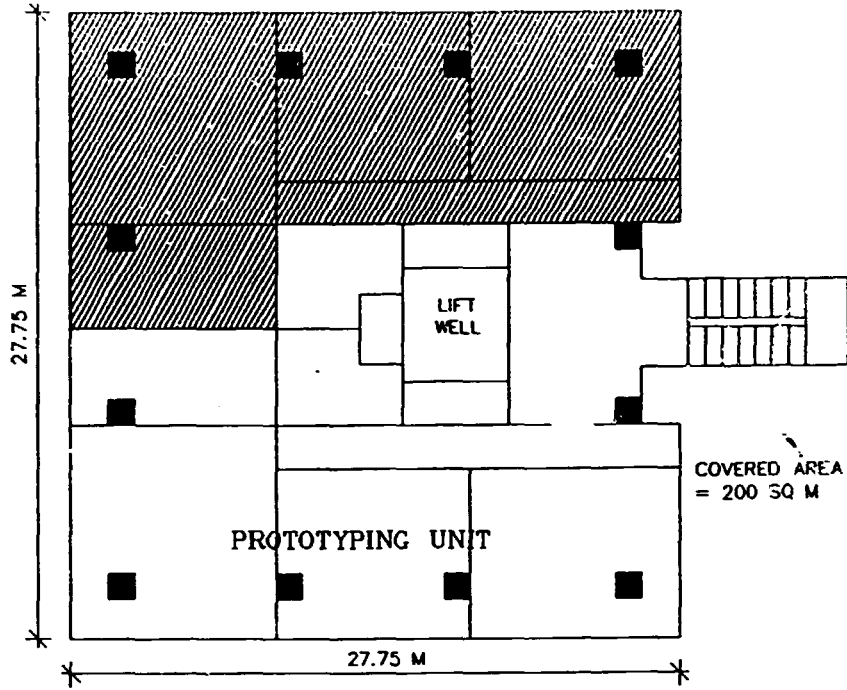
PROPOSED ORGANISATION OF CEDA



(n) : Year of assignment

# SCHEMATIC OVERVIEW OF CO-OPERATING PARTNERS OF NIDC / CEDA





Centre for Engineering Design & Analysis  
(Proposed Plan)

## ANNEX XIV

## DETAILS OF PREREQUISITES AND ACTIVITIES OF PROJECT IN INITIAL AND LATER STAGE.

- a) Preparation of detailed hardware and software specifications and details of the training programme will be carried out during and immediately after the study tour. A high level international Computer Aided Engineering expert will assist NIDC and UNIDO in this activity, where needed assisted by an expert team (Consultant 11-01, first mission plus 11-50 short term consultants).

Specifications must briefly describe the capability of proposed equipment and software, as well as the services expected from the vendor. Therefore the specifications should include, among others:

Computer equipment hardware functions

- File Server/ high performance workstation
- Central processing units
- Workstations
- Training workstations
- Networking
- Peripherals, disk, tape
- Monitors
- Digitizing/pointing devices
- Printing devices
- Power supply units
- Communication possibility with other computers

Software functions

- Operating system
- Integrated Mechanical Design Package
- Integrated Analysis package
- Integrated Manufacturing package
- Integrated Electronic Design package
- Integrated Electronic Analysis package
- Integrated Facility layout/Plant design package
- Integrated Civil engineering/ architectural package
- Standard Neutral Data forms for integration with other software packages
- Suitable software for training in CAD mechanics, electronics and CAM provisions of link with NC/CNC equipment.
- Office automation
- Desk top publishing.
- Data base
- Programming tools / CASE tools

Training

The vendor should provide training normally required for the above equipment and in the above (software) topics. Number of people required as a basic minimum and total number of weeks needed for training in the proposed software and hardware should also be estimated with time schedules.

## b) Preparation of bid packages, call for bids and evaluation of bids:

The vendor contract should, among others, clearly indicate the following:

- 1) Object of contract
- 2) Consignee
- 3) Terms of delivery
- 4) Price
- 5) Payment
- 6) License and Permits (successor product rights)
- 7) Warranty/Guarantee
- 8) Inspection
- 9) Packing and marking (Cables and connectors one-to-one marked)
- 10) Despatch instructions
- 11) Training programme of the CEDA Unit personnel
- 12) Project management and implementation
- 13) Computer models and software
- 14) Maintenance and spare parts (basic spare part list)
- 15) Contract for maintenance and rental
- 16) Documentation
- 17) Supplier delays
- 18) Dispute arbitration
- 19) Default and terminations

## c) Assignment of project staff and preparation of facilities:

## National Project Staff:

It must be noted that acquiring national staff of sufficient level and expertise is one of the most important prerequisites for making the project successful. The following qualifications are therefore desirable:

## Teamleaders (4)

Generally the teamleaders must be highly experienced managers from manufacturing industry. Each should have at least 15 years experience in their respective industry, with at least ten years in responsible management role. Experience of at least five years with CAE is also desirable. (university or equivalent)

Outline of Duties : Co-ordination at a high level within NIDC and with co-operating partners and clients. Specifying and detailing the exact role and function of their departments. Supervision and management of the development of their departments. Responsible for producing detailed workplan for each client project. Final responsible for services delivered. Reporting to Director of Centre.

## Senior Engineers (6)

They will be the technical staff at CEDA. They must be highly experienced, both technically in their respective fields and in project execution. Each will have at least 10 years experience in their application field. The sw development engineer must have at least 5 year experience in managing a software development team. The CAD seniors must have at least 5 years exposure to CAE in industry.

Outline of Duties : Responsible for the technical outcome of a project. Will take part in the specification of service projects, phase and rephase project timetables and budgets. Schedule resources. Supervise and take part in the actual design/production process. Responsible for letting the project outcome meet the client specification.

#### Seniors (Consultants and Training) (7)

Highly experienced technical engineers with consultancy/training background. Experience of at least 10 years in manufacturing industries is required and 5 years experience in CAE applications is desirable. They should have been in responsible management roles involving project/department management.

Outline of Duties : Responsible for the successful transfer of all the available and to be achieved knowledge within CEDA to surrounding industries. Analyze needs of enterprises, propose solutions for spotted problem areas, Organize and co-ordinate resources to achieve solutions. Supervise implementation.

#### Senior (System Administration)

Has to be highly experienced in the administration of workstation /pc based computer networks . Will have at least 6 years experience in computersystems and at least 2 years in the provided type of hardware.

Outline of Duties : Responsible for the hardware infrastructure of the institute (computer, network, peripherals). Co-ordinates the installation, maintenance and configuration of the hardware and the involved operating systems. Specifies concepts for the effective use of the resources, strategy for data back-up and data transfer to co-operating partners.

For the operation of the prototyping machines it is required that at least 2 employees of CEDA have 8 years experience in a workshop using conventional milling machines and lathes. They should be familiar with techniques of manual tool production. At least 3 years should have been spent working with NC machine tools.

With regard to preparation of facilities, the following should be taken into account:

- Distribution of data/signal within the Centre; cabling of computer equipment, shielding, grounding, protection, etc.
- Distribution of electricity; power distribution, stand-by power source, UPS (Uninterruptable Power Supply), voltage regulation, filtering of transients, protection, etc.
- Distribution of compressed air in the workshop
- Workshop should be supplied and laid out with regard for relevant health, safety and fire regulations.
- Access for installation and maintenance of machine-tools and large/heavy work pieces.



- Foundation / Anchorage of machine tools in workshop.
- Control of environmental/climatic parameters; air conditioning, dust filtering, humidity control, etc.
- Communication with outside world; telephone, telex, facsimile, etc., communication of computer with outside world (if required).
- Facility size, class rooms (number, size, furniture, etc.), staff rooms (or seating within the class rooms), etc.

d) Commissioning of hardware and installation of software:

In connection with hardware installation the vendor should:

- Provide detailed installation procedures (device connections, plugs, tests, etc.)
- Make installation technician(s) available at least 2 more weeks after system starts up
- Provide a checklist and detailed instructions of elementary maintenance tasks, including tasks such as changing printer ribbons, paper feeding, crash cancellation of printers, formatting storage devices, mounting magnetic tapes, stopping terminals in hang, action in case of disk warnings, basic plotter maintenance, etc.

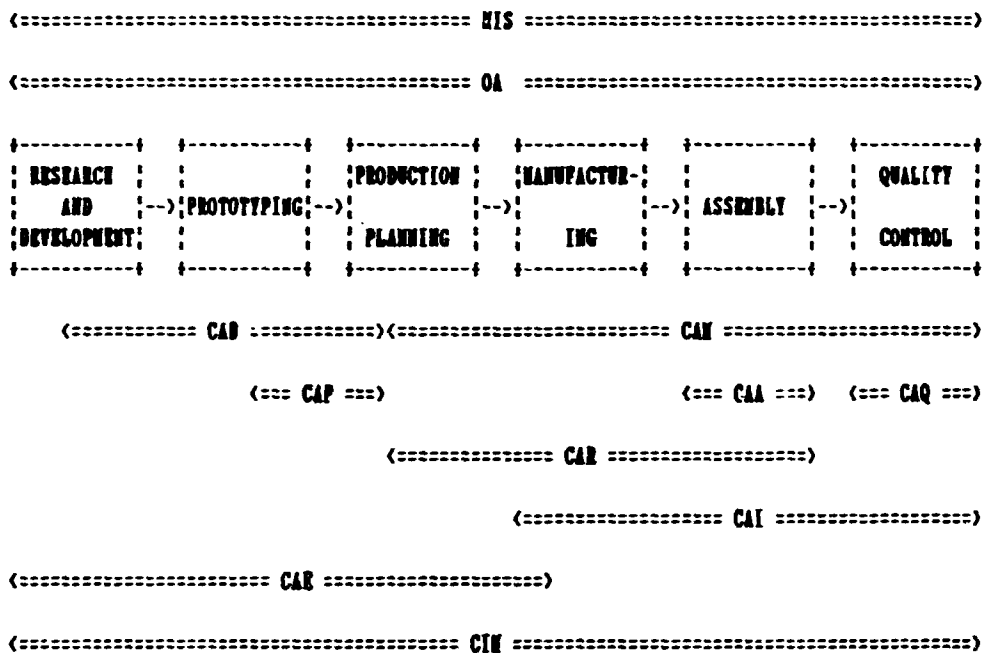
In connection with software installation the vendor should provide detailed software start-up procedures. The vendor must also assist to make a test data base which can be used in forthcoming CAD-D training to be provided by the Unit. This data base (or a redesigned one later) will be the foundation of all CAD training classes.

In connection with the installation of prototyping equipment, the vendor should :

- Provide detailed installation procedures (power support, foundations, air supply etc.
- Make installation technicians available at least one week after equipment installation.
- Provide a checklist, and instruction on elementary maintenance such as oil change/filters, cleaning, tool care/changing
- Provide such instructions as necessary to assist the operator in the normal use of machines.

Assist with connection of machine tool controllers to DNC system.

ANNEX XV  
APPLICATION OF COMPUTERS TO INDUSTRIAL ACTIVITIES



**HIS:** Management Information System  
**OA :** Office Automation  
**CAD:** Computer Aided Design  
**CAM:** Computer Aided Manufacturing  
**CAP:** Computer Aided Planning  
**CAA:** Computer Aided Assembly  
**CAQ:** Computer Aided Quality Assurance  
**CAR:** Computer Aided Robotics  
**CAI:** Computer Aided Inspection  
**CAE:** Computer Aided Engineering  
**CIN:** Computer Integrated Manufacturing