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Project Number : DP/BUL/86/006

Establishment of a Traning and Consultancy Centre in Advanced Manufacturing Technologies

Prepared by

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FINAL REPORT

PROJECT TITLE: Establishment of a Training and Consultancy Centre in Advanced Manufacturing Technologies

PROJECT NUMBER : DP/BUL/86/006

SUBCONTRACT TITLE: Development of an Intergrated Multimedia Microcomputer-based Class for Training Trainers and Specialists in Robotics

CONTRACT NUMBER : 91/077
    between the
        UNIDO, located at Vienna International Centre, P.O.Box 300, A-1400, Vienna Austria
    and
        JK MICRO (S) PTE LTD, located at 37 Kallang Pudding Road, Blk B Tong Lee Bldg #08-03, Singapore 1334

PURCHASE ORDER NUMBER : 15-1-2077H

CONSIGNEE: INSTITUTE OF INDUSTRIAL CYBERNETICS AND ROBOTICS, located at Bulgarian Academy of Sciences Acad. 6. Bonchev Str., Blk 2, 1113 Sofia Bulgaria.

CONTENTS

ABSTRACT:

The objectives of the project are :

To raise the technological capabilities and efficiency of the Bulgarian industry through the accelerated introduction of computers in automation of manufacturing, and to further develop, on a large-scale basis, new highly productive technologies in industry through :

a) carrying out research and development in integration of different elements of Advanced Manufacturing Technologies, such as CAD/CAM, FMS cells, industrial robotics, computerized factory management, automated inventory and distribution systems;

b) providing consultancy services and information support to industry; .

c) developing computer-based training systems and demonstrational facilities needed for updating of qualification of certain categorior of specialists from industry dealing with introduction of advanced methods of manufacturing and process control.

INTRODUCTION :

The Centre will be mainly responsible for developing integrated solutions for introduction of advanced manufacturing technologies into industry in order to achieve a higher level of production automation. This is planned to be achieved through adaptation of technical solutions existing in many industrialized countries, according to the technological level of Bulgarian industry. Its activities will be focused on networking, interfacing to host mainframes, designing overall structure of various automated production and management systems. The branches of the Centre will be responsible for development of individual modules of automated manufacturing as CAD systems, CAD tools for design drawing and simulation, NC/CNC machine tools, adaption of robots into production processed, development and introduction of automated materials handling systems, manufacturing planning and control software, design and development of integrated series of hardware interface products etc.

Apart from solving problems of integration of various elements of AMT, the Centre will be actively involved in development of training capabilities in this field, which includes not only design and development of software, demonstration and training systems, but also building-up highly qualified staff for training instructors and trainers

FEATURES OF THE SYSTEM :

Allows various levels of teacher intervention. Several levels of in-class teacher intervention are planned. These include :
a) Full Intervention -- the teacher enters all assignements;

b) Partial Intervention -- the teacher either accepts or rejects the system's recommendation;

and c) Low Intervention -- the teacher allows the system to make the decisions.

The system will provide teachers with the ability to do "what-if " experiments by changing their assumptions and storing and comparing the different schedules that are produced.

Allows student selection of activity options. The system need not always give the student one and only one choice for the next activity. The system will be able to provide a menu of several possible activities and then accomodate the student's choice.

Organizes group activities. The system will be able to organize group activities by surveying the progress of students, determining those who are now or will soon be ready for the activity, scheduling the selected students for the work area, and prompting student when the activity is about to begin.

Foresees possible scheduling conflicts and attempts to resolve them. As a result of realtime monitoring of classroom activities, the system will be able to anticipate scheduling problems of "bottlenecks". If the system is unable to determine a solution, it will notify the tracher of the problem in advance.

Accommodates new kinds of knowledge. The system is intended to be flexible enough to accommodate additional variables, constraints, resources, etc., as they are recognized and articulated.
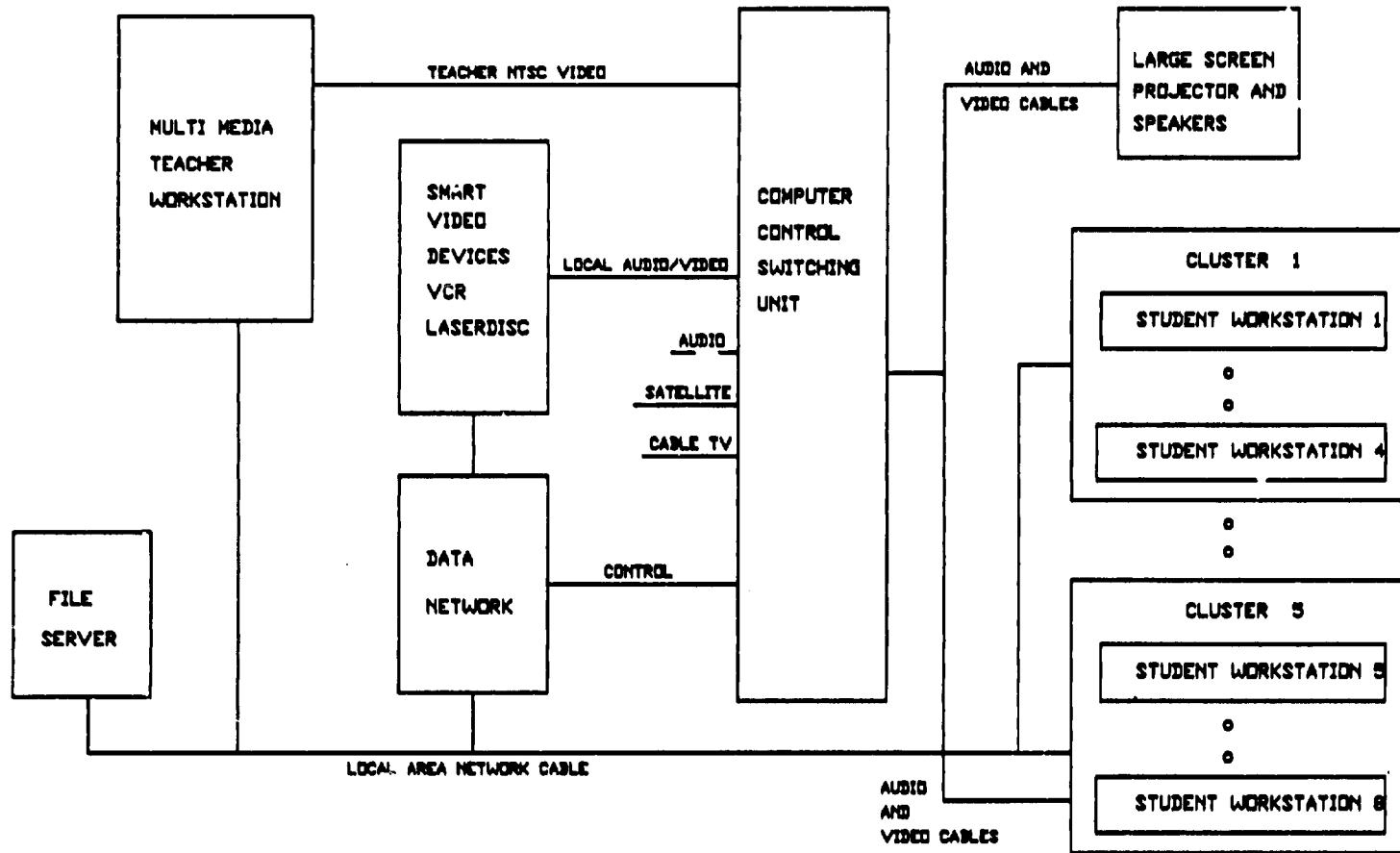
Constantly analyzes the kinds of answers it gets and automatically adjusts to the students' learning speeds and styles by offering additional and different material for those who are having trouble.

DESCRIPTION OF THE SYSTEM :

The project means a multi-media instructional delivery system/s, including both hardware and software, that uses an interactive computer network to connect teachers and students in a classroom. The network transports data, audio, and video sources, thereby allowing multiple available technology resources to be incorporated into the curriculum. Courseware derived from various media, including, for example, satellite TV, cable TV, laser disks, VCRs, CD ROMs, and video camcorders, is automatically delivered to each students' computer screen, according to the student's individual learning needs. Audio and video learning resources are delivered to individual students via a computer-controlled switching unit.

The Unit switches the workstation monitor between the computer and a composite video mode. The Unit may also provide a monaural audio output for delivery of audio from the audio network or the computer to the headset. The Unit is controlled through the parallel port of the computer's central processing unit (CPU). The CPU sends control signals that determine the mode of operation of the unit in this centre, a teacher and each student have workstations that include a personal computer, keyboard, computervideo monitor, unit, and headset. The workstations are connected to a data network and an audio/video network. All of the resources of the centre are managed by the FMS software.

The system is able to present relevant information that will help the teacher to determice what each student should do next. At the teacher's discretion, the system also is able to make this determination and then proceed to implement the various decisions

MULTI MEDIA TEACHER WORKSTATION

SMART VIDEO DEVICES VCR LASERDISC

COMPUTER CONTROL SWITCHING UNIT

LARGE SCREEN PROJECTOR AND SPEAKERS

FILE SERVER

DATA NETWORK

TEACHER NTSC VIDEO

LOCAL AUDIO/VIDEO

AUDIO

SATELLITE

CABLE TV

CONTROL

AUDIO AND VIDEO CABLES

CLUSTER 1

STUDENT WORKSTATION 1
o
o
STUDENT WORKSTATION 4
o
o

CLUSTER 5

STUDENT WORKSTATION 5
o
o
STUDENT WORKSTATION 8

LOCAL AREA NETWORK CABLE

AUDIO AND VIDEO CABLES

Accordingly, the system has a knowledge base comprised of rules and other representations needed for making expert instructional management decisions. This knowledge must be acquired from master teachers and educational researchers, then augmented and refined by local educators serving as "knowledge engineers" for their own teaching environments.

The knowledge base should take into account :

a) knowledge or curruculum such as the relatibe importance of particular learning activities and their recommended sequence, the range and probable effectiveness of different teaching approaches, and possible alternative activities;

d) knowledge of available resources (both human and nonhuman), such as teachers, teacher's assistants, student partners, work sites, computer workstations, discussion areas, instructional media, etc.;

c) knowledge about students, including performance historied, attitudes, etc.;

and d) knowledge about the passage of time and the temporal characteristics of the curriculum activities and resource utimization. The system is able to generate instructional schedules for many students over minutes or months, as well as to alter or adjust the schedules in response to realtime events.

The system is highly flexible. It should be able to organize small-group and large-group activities as well as those for individuals. The use of the system is not limited to a particular grade level or subject area. The system is refinable to the point that the teacher can rely on it to perform a wide variety of instructional task, such as resource scheduling, testing, recordkeeping, and diagnosis of impasses in learning.

EXECUTION OF THE ACTIVITIES OF THE CONTRACT:

Subcontract Title: Development of an Integrated Multimedia Microcomputer-based Class for Training Trainers and and Specialists in Robotics.

Contract Number : 91/077
Purchase Number : 15-1-2077H

The contract is between the **UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO)** and **JK MICRO (S) PTE LTD**, for the provision of services and equipment related to this project.

1) In accordance with point 3.3. Training of the Terms of Reference of the Contract (Appendix No. 1), a 20 days training was conducted from 03 to 22 of June 1991 of the following specialists :

a) Prof. Nedko Shivarov

b) Dr. Jordan Kissiov

c) Dr. Velitchko Dobrinov

2) In accordance with point 3.3. Equipment of the Terms of Reference (Appendix No.1) the whole purchased equipment was send and received at the Training and Consultancy Centre.

At the Training and Consultancy Centre, the equipment have been installed and tested. As the system networked has been completely linked and functioning, the conditions of the contract on our part is fulfilled.

CONCLUSION:

The Training and Consultancy Centre works as a tool aimed at raising the technological capabilities and efficiency of the Bulgarian insdustry. Equipped with the lastest facilities, the Centre provides a practice-oriented environment for developing various types of automated manufacturing system.

To achieve excellence, the system of the Centre is intended to be flexible and capable of adapting new state of the art. Correspondingly, the facilities of the Centre should up-grade constantly so as to offer the most up-to date training facilities.