

*File Harold U.*

NOTES-MEETING  
HARVARD RE AIMSCP  
2/3/89

I SUGGEST THAT OUR DISCUSSION CAN BE FACILITATED BY FOLLOWING THIS SIMPLE AGENDA. AFTER I PROVIDE A PERSPECTIVE ON OUR ACTIVITIES TO GAIN THE WIDER ADOPTION OF ADVANCED MANUFACTURING TECHNOLOGY. GARY BURKART WILL REVIEW THREE COOPERATIVE EFFORTS UNDER THE UMBRELLA OF THE OVERALL PROGRAM.

FIRST, I SHOULD COMMENT BRIEFLY ON THE WILLIAM C. NORRIS INSTITUTE, WHICH PROVIDES SUPPORT FOR THE ADVANCED MANUFACTURING PROGRAM. IT IS A NON-PROFIT ORGANIZATION, ESTABLISHED BY AN ENDOWMENT FROM THE CONTROL DATA CORPORATION. IN THE SIMPLEST OF TERMS, THE MISSION OF THE NORRIS INSTITUTE IS TO CATALYZE PUBLIC/PRIVATE COOPERATION TO ADDRESS MAJOR UNMET OR POORLY MET SOCIETAL NEEDS. THE ONLY WAY THESE WILL BE ADEQUATELY MET IS THROUGH COOPERATION TO MORE EFFICIENTLY UTILIZE OUR SCARCE RESOURCES.

HOWEVER, IN AMERICAN SOCIETY, WE HAVE YET TO ESTABLISH A CULTURE OF COOPERATION -- WHILE THERE IS MOVEMENT TOWARD

MORE COOPERATION, WE ARE STILL PRONE TO COMPETE AMONG OURSELVES RATHER THAN COOPERATE. AS A CONSEQUENCE, IT USUALLY TAKES A CATALYST TO GET ORGANIZATIONS TO COOPERATE TO THE REQUIRED EXTENT, AND THAT IS A MAJOR FUNCTION OF THE INSTITUTE. IN ORDER TO IMPLEMENT A NUMBER OF INSTITUTE INITIATIVES, CONSORTIA ARE BEING FORMED COMPRISED OF REPRESENTATIVES OF APPLICABLE PUBLIC/PRIVATE SECTORS WHO COME TOGETHER TO PLAN THE INITIATIVE, AGREE ON A COMMON STATEMENT OF PRINCIPLES AND PROCEED WITH IMPLEMENTATION. HERE IS A LIST OF CURRENT INSTITUTE PROGRAMS.

WHILE THE FOCUS OF THIS MEETING IS ON ADVANCED MANUFACTURING TECHNOLOGY, BEFORE WE ADJOURN, I WOULD LIKE TO COMMENT BRIEFLY ON THE COOPERATIVE PROGRAM IN PERSONALIZED COMPUTER TECHNOLOGY-BASED EDUCATION AND TRAINING.

AIMSCP

TURNING NOW TO ADVANCED MANUFACTURING, THE MAJOR THRUST OF THE WCNI EFFORT IS THE ADVANCED INTEGRATED MANUFACTURING SERVICES CENTER PARTNERSHIP. IT IS A NATIONWIDE COOPERATIVE PROGRAM ~~PRIMARY~~ FOR ACCELERATING THE *Development* WIDESPREAD UTILIZATION BY SMALL AND MEDIUM-SIZED COMPANIES

*of ADV MFG Technology Especially By*

OF COMPUTER-AIDED DESIGN AND COMPUTER-INTEGRATED, FLEXIBLE MANUFACTURING SYSTEMS.

*I'd like first about the deployment of ADU MGS*

~~THE MAJOR IMPETUS FOR THE PROGRAM, AS WE KNOW, IS THAT U.S. INDUSTRY IS NOT GETTING ADVANCED MANUFACTURING TECHNOLOGY IN USE SOON ENOUGH BY EITHER MOST LARGE OR SMALL COMPANIES.~~ <sup>*especially by medium-sized and*</sup> OF COURSE, THIS IS PARTICULARLY SERIOUS WITH RESPECT TO SMALL BUSINESS BECAUSE OF ITS IMPORTANT ROLE IN MANUFACTURING AND ADVANCING TECHNOLOGICAL INNOVATION.

THERE ARE MANY REASONS FOR THIS CONDITION. THEY INCLUDE THE RELUCTANCE OF MANY MANUFACTURING COMPANIES TO ACCEPT THE GRAVITY OF THE THREAT FROM OVERSEAS; THE LACK OF COMMON STANDARDS TO GUIDE THE COMPATIBILITY OF ENABLING TECHNOLOGIES AND THEIR ASSEMBLY INTO COHERENT INTEGRATED SYSTEMS; THE LOW LEVEL OF RELEVANT TECHNICAL CAPABILITIES IN MOST MANUFACTURING COMPANIES; AND, AS POINTED OUT IN THE KELLY BROOKS REPORT, THERE ARE THE IMPEDIMENTS OF LACK OF CAITAL AND ;HIGH RISK DUE TO UNCERTAINTY IN PREDICTING DEMAND FOR PRODUCTS MANUFACTURED. ADDITIONALLY, AND RELATED TO THE LAST POINT, IS THAT SMALL FIRMS WILL NOT USUALLY BE ABLE TO JUSTIFY THE MULTIFOLD CAPACITY INCREASE RESULTING FORM THE INVESTMENT IN AN AUTOMATED FACILITY.

THERE ARE A NUMBER OF WAYS FOR HELPING TO OVERCOME THOSE BARRIERS WHICH INCLUDE:

- 0 ASSISTANCE BY TECHNOLOGY EXTENSION SERVICES, I.E., ASSESSMENT AND CONSULTING;
- 0 EDUCATION AND TRAINING; WHICH INCLUDES DEMONSTRATION CENTERS OR SO-CALLED TEACHING FACTORIES;
- 0 SHARED MANUFACTURING;
- 0 SHARED MANUFACTURING, PLUS COOPERATION IN OTHER AREAS, I.E., MARKETING, PURCHASING, ACCOUNTING AND PERSONNEL ADMINISTRATION;
- 0 MANUFACTURING UTILITY, ALTERNATIVELY CALLED MANUFACTURING SERVICES; I PREFER THE LATTER TERM.

FURTHER, IN DETERMINING THE MOST EFFECTIVE WAY TO HELP SMALL COMPANIES UTILIZE ADVANCED MANUFACTURING TECHNOLOGY, IT MUST BE KEPT IN MIND THAT THERE ARE THREE TYPES OF COMPANIES TO BE SERVED:

- (1) PARTS MANUFACTURERS (JOBS SHOPS)
- (2) PRODUCT MANUFACTURERS
- (3) START-UP PRODUCT MANUFACTURING COMPANIES

CONSIDERING THE SPECTRUM OF COMPANIES WITH VARYING MANUFACTURING TECHNOLOGY NEEDS, OUR CONVICTION IS THAT MANUFACTURING SERVICES, MERITS THE MAJOR EMPHASIS, BECAUSE IT OFFERS THE BEST ANSWER, IN THE LONG RUN, FOR OVERCOMING THE FORMIDABLE BARRIERS FACED BY SMALL AND MEDIUM-SIZED COMPANIES UNTIL AT LEAST THE TURN OF THE CENTURY.

IN SOME TYPES OF MANUFACTURING, THAT PERIOD WILL BE LONGER. IN ADDITION TO MANUFACTURING SERVICES, EDUCATION AND TRAINING IS PROVIDED AND, TO SOME DEGREE, CONSULTING. IN OUR DISCUSSION, WE CAN TALK ABOUT EACH TYPE OF ASSISTANCE.

AIMSC NETWORK: THE ESSENCE OF THE PLAN FOR THE IMPLEMENTATION OF THE SERVICES APPROACH IS TO ESTABLISH A NATIONWIDE NETWORK OF VARIOUS TYPES OF ADVANCED INTEGRATED MANUFACTURING SERVICE CENTERS, ABBREVIATED AIMS CENTERS, AIMSC.

THEY WOULD PERFORM DESIGN AND MANUFACTURING ON A SERVICE BASIS WHERE COMPANIES PAY FOR THE SERVICE AS IT IS USED WITH NO INVESTMENT REQUIRED IN CENTER FACILITIES. EACH COMPANY WOULD UTILIZE THE CENTER THROUGH A WORKSTATION ON ITS OWN PREMISES CONNECTED BY A TELEPHONE CHANNEL. AT ANY TIME, A COMPANY CAN LICENSE ALL OR PART OF THE MANUFACTURING SYSTEM FOR USE ON ITS OWN PREMISES -- OR A GROUP OF COMPANIES CAN SET UP A SHARED MANUFACTURING FACILITY.

THE AIMS CENTER PARTNERSHIP IS CATALYZING THE FORMATION OF A NATIONAL NETWORK OF AIMS CENTERS. TELECOMMUNICATIONS WILL LINK THESE CENTERS, WHICH WILL USE A COMMON SET OF

STANDARDS FOR COMPUTER SOFTWARE, DATA BASES AND COMMUNICATIONS PROTOCOLS.

MASTER CENTERS: THE AIMS CENTERS OBTAIN THEIR TECHNOLOGY FROM MASTER CENTERS WHICH INITIALLY ASSEMBLE, INTEGRATE AND DEMONSTRATE CURRENTLY AVAILABLE TECHNOLOGY. THROUGH ONGOING DEVELOPMENT, THE TECHNOLOGY IS IMPROVED SO THAT AIMS CENTERS HAVE CONTINUING ACCESS TO THE MOST ADVANCED TECHNOLOGY.

PROBABLY SEVEN OR EIGHT OF THE MASTER CENTERS WILL BE REQUIRED, EACH DEVELOPING SPECIFIC, BUT COMPLIMENTARY, TECHNOLOGIES.

TECHNOLOGIES TENTATIVELY SELECTED ARE:

METAL CUTTING  
METAL FORMING  
ELECTRONIC ASSEMBLY  
MECHATRONICS  
POLYMERS  
COMPOSITES  
NANO-MECHANISMS  
FOOD PROCESSING

ORGANIZATION AND FINANCING: MASTER CENTERS WOULD BE ORGANIZED AND OPERATED BY NON-PROFIT PUBLIC/PRIVATE

PARTNERSHIPS AND LOCATED CLOSE TO, BUT NOT PART OF, UNIVERSITIES.

INITIALLY, THE COST OF ESTABLISHING AND OPERATING MASTER CENTERS WOULD BE SHARED BY FEDERAL, STATE AND LOCAL GOVERNMENTS AND COMPANIES. ULTIMATELY, THESE CENTERS WOULD BECOME SELF-SUPPORTING THROUGH LICENSING OF THEIR TECHNOLOGY TO COMPANIES OF ALL SIZES.

A SIMILAR COURSE IS TAKEN FOR FINANCING EACH OF THE DIFFERENT TYPES OF ~~THE~~ AIMS CENTERS, EXCEPT IT IS PLANNED THAT AFTER THE CENTERS ARE IN OPERATION FOR A PERIOD OF TIME, THEY WILL BE SOLD TO COMPANIES AND OPERATED AS FOR-PROFIT BUSINESSES -- LIKE COMPUTER SERVICE CENTERS, FOR EXAMPLE.

THERE IS MUCH MORE TO BE SAID ABOUT AIMS CENTERS; HOWEVER, GARY WILL PROVIDE ADDITIONAL INFORMATION.