

AIM CENTERS PARTNERSHIP

NEXT, I WILL REVIEW THE ADVANCED INTEGRATED MANUFACTURING CENTERS PARTNERSHIP, ABBREVIATED AIM CENTERS PARTNERSHIP. IT IS A NATIONWIDE COOPERATIVE PROGRAM FOR ACCELERATING THE DEVELOPMENT AND WIDESPREAD UTILIZATION OF COMPUTER-AIDED DESIGN AND COMPUTER-INTEGRATED FLEXIBLE MANUFACTURING SYSTEMS.

CONSEQUENTLY, THE PROGRAM HAS TWO MAJOR THRUSTS: THE DEVELOPMENT OF ADVANCED MANUFACTURING TECHNOLOGY AND RAPID DEVELOPMENT OF ADVANCED TECHNOLOGY. FIRST, I WILL ADDRESS THE DEVELOPMENT OF TECHNOLOGY. (DIAGRAM)

DEVELOPMENT OF TECHNOLOGY: WHILE THERE ARE MANY ADVANCED MANUFACTURING SYSTEMS WITH VARYING CAPABILITIES ALREADY FUNCTIONAL, SUBSTANTIAL ADDITIONAL RESEARCH AND DEVELOPMENT IN BOTH HARDWARE AND SOFTWARE SYSTEMS ARE NECESSARY TO ASSURE THAT THE U.S. WILL BE AT THE FOREFRONT IN IMPORTANT AREAS OF ADVANCED MANUFACTURING TECHNOLOGY.

RESULTS FROM CURRENT R&D PROGRAMS ARE FAR SHORT OF WHAT IS POSSIBLE BY BETTER COORDINATION AND INCREASED COOPERATION. THEREFORE, WE MUST TAKE THOSE ACTIONS TO UTILIZE RESOURCES

PRESENTLY ALLOCATED MUCH MORE EFFICIENTLY. AT THE SAME TIME, ADDITIONAL FUNDING IS REQUIRED, AT LEAST HALF OF WHICH WILL HAVE TO BE PROVIDED BY THE FEDERAL GOVERNMENT.

HOWEVER, AS NOTED EARLIER, GETTING ADDITIONAL FEDERAL FUNDING IN THE CURRENT BUDGET DEFICIT ENVIRONMENT IN THE FACE OF MANY OTHER DEMANDS WILL REQUIRE A STRONG CONSENSUS WITHIN INDUSTRY, STATE GOVERNMENT AND OUR COMMUNITIES. HELPING TO BUILD THAT CONSENSUS IS ONE OF THE OBJECTIVES OF THE AIM CENTERS PARTNERSHIP. A SECOND OBJECTIVE IS TO HELP DEFINE AN R&D PROGRAM WHICH IS MUCH BETTER COORDINATED WITH A HIGH DEGREE OF COOPERATION AMONG UNIVERSITIES, INDUSTRY, FEDERAL AND STATE GOVERNMENTS AND COMMUNITIES.

MASTER CENTER: MASTER CENTERS ARE HIGHER LEVEL INSTITUTIONS CHARGED WITH THE DEVELOPMENT AND ASSEMBLY INTO INTEGRATED SYSTEMS OF THE NECESSARY CORE TECHNOLOGIES (HARDWARE & SOFTWARE) TO ASSURE MANUFACTURING PREEMINENCE FOR THE NATION IN SELECTED FIELDS. THE RESPONSIBILITY WOULD INCLUDE THE DEMONSTRATION OF COMMERCIAL FEASIBILITY AND BE A PRINCIPAL SOURCE OF THE TECHNOLOGY UTILIZED BY THE MANUFACTURING SERVICES AND SHARED MANUFACTURING CENTERS.

MASTER CENTERS ARE NOT CONCEIVED AS INSTITUTIONS FOR BASIC RESEARCH. THEY RELY UPON UNIVERSITIES FOR THAT FUNCTION. AT THE SAME TIME, UNIVERSITIES CAN UTILIZE MASTER CENTER TECHNOLOGY TO SET UP FACTORIES FOR USE AS TEST BEDS TO FACILITATE BASIC RESEARCH AND HANDS-ON INSTRUCTION FOR STUDENTS AND MID-CAREER AND INDUSTRY PROFESSIONALS.

THE NUMBER OF MASTER CENTERS REQUIRED AND THE AREAS OF FOCUS HAVE YET TO BE DETERMINED. HOWEVER, CANDIDATE CORE TECHNOLOGIES INCLUDE:

- METAL CUTTING
- METAL FORMING
- ELECTRONIC ASSEMBLY
- ELECTROMECHANICAL ASSEMBLY
- POLYMERS
- COMPOSITES
- NANO-MECHANISMS
- FOOD PROCESSING
- ELECTRO-OPTICAL

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

INITIALLY, THE COST OF ESTABLISHING AND OPERATING MASTER CENTERS WOULD BE SHARED BY FEDERAL, STATE AND LOCAL

COMMUNITIES AND COMPANIES. ULTIMATELY, THESE CENTERS WOULD BECOME SELF-SUPPORTING THROUGH LICENSING OF THEIR TECHNOLOGY.

WE ARE SEEING MOVEMENT IN THE DIRECTION OF THE CONCEPT OF MASTER CENTERS BY SUCH ACTIVITIES AS THE AUTOMATED MANUFACTURING RESEARCH FACILITY UNDER THE AEGIS OF THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY, THE NATIONAL INSTITUTE FOR MANUFACTURING SCIENCES AND SEMATECH. ALSO, TO BE MENTIONED, IS THE POSSIBILITY, NOTED BY A STUDY SPONSORED BY THE NATIONAL RESEARCH COUNCIL, FOR THE CONSTRUCTION OF A LARGE EXPERIMENTAL GOVERNMENT SUPPORTED FACILITY TO DEMONSTRATE THE STATE-OF-THE-ART OF ELECTRONICS ASSEMBLY FACTORY AUTOMATION AND MAKE THE TECHNOLOGY AVAILABLE TO INDUSTRY. AS A RESULT OF THESE AND OTHER INITIATIVES AND THE URGENT NEED, IT IS TIMELY TO MAKE A CONCENTRATED EFFORT TO ESTABLISH MASTER CENTERS.

UTILIZATION OF TECHNOLOGY: THE SECOND PART OF THE AIM CENTERS PROGRAM PROVIDES THE MEANS FOR ACCELERATING THE ADOPTION OF ADVANCED MANUFACTURING TECHNOLOGY. THERE ARE NUMEROUS REASONS FOR THE DEPLORABLY SLOW RATE AT WHICH IT IS BEING APPLIED BY MOST U.S. COMPANIES. THEY INCLUDE THE RELUCTANCE OF MANY MANUFACTURING COMPANIES TO ACCEPT THE GRAVITY OF THE FOREIGN COMPETITIVE THREAT; 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; SMALLER COMPANIES CAN'T AFFORD THE TECHNOLOGY OR ASSUME THE HIGH RISK DUE TO UNCERTAINTY IN PREDICTING DEMAND FOR PRODUCTS MANUFACTURED AND ARE USUALLY UNABLE TO JUSTIFY THE MULTIFOLD CAPACITY INCREASE RESULTING FROM THE INVESTMENT IN AN AUTOMATED FACILITY.

WAYS FOR HELPING TO OVERCOME THOSE BARRIERS INCLUDE:

- 0 ASSESSMENT AND CONSULTING ASSISTANCE BY TECHNOLOGY EXTENSION SERVICES;
- 0 EDUCATION AND TRAINING; WHICH INCLUDES DEMONSTRATION CENTERS OR SO-CALLED TEACHING FACTORIES;
- 0 SHARED OWNERSHIP OF MANUFACTURING FACILITIES;
- 0 FLEXIBLE MANUFACTURING NETWORKS WHICH MAY INCLUDE SHARED OWNERSHIP OF MANUFACTURING FACILITIES AND COOPERATION IN ONE OR MORE OTHER AREAS, SUCH AS, MARKETING, PURCHASING, ACCOUNTING AND PERSONNEL ADMINISTRATION;
- 0 MANUFACTURING SERVICES

FURTHER, IN DETERMINING THE MOST EFFECTIVE WAY TO HELP SMALL COMPANIES APPLY 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 MANUFACTURING COMPANIES

CONSIDERING THE SPECTRUM OF COMPANIES WITH VARYING MANUFACTURING TECHNOLOGY NEEDS, IT IS CLEAR THAT MANUFACTURING SERVICES MERITS THE MAJOR EMPHASIS. AS WILL BE ELABORATED LATER, IT OFFERS THE BEST ANSWER FOR OVERCOMING THE FORMIDABLE BARRIERS FACED BY SMALL AND MEDIUM-SIZED COMPANIES. AT THE SAME TIME, LARGE BUSINESSES WILL BENEFIT IN SIGNIFICANT WAYS.

AIM CENTERS NETWORK: THE ESSENCE OF THE PLAN FOR THE IMPLEMENTATION OF THE MANUFACTURING SERVICE CENTERS APPROACH IS TO ESTABLISH A NATIONWIDE NETWORK OF VARIOUS TYPES OF SUCH CENTERS. THEY PROVIDE DESIGN AND MANUFACTURING SERVICES, WHERE COMPANIES PAY FOR THE SERVICES AS THEY ARE USED WITH NO INVESTMENT REQUIRED IN CENTER FACILITIES. TELECOMMUNICATIONS WILL LINK AIM CENTERS, WHICH WILL USE A COMMON SET OF STANDARDS FOR COMPUTER SOFTWARE, DATA BASES AND COMMUNICATIONS PROTOCOLS. USERS WILL TASK AIM CENTERS THROUGH WORKSTATIONS ON THEIR OWN PREMISES CONNECTED BY A TELEPHONE LINE.

~~TELEPHONE LINE.~~ EACH CENTER HAS THE CAPABILITY OF MANUFACTURING PRODUCTS WITH SHORT SET-UP AND THROUGH PUT TIME, HIGH QUALITY AND LOW COST, EVEN FOR SMALL QUANTITIES.

INITIALLY, AIM CENTERS ARE ESTABLISHED AS COMMUNITY-BASED NON-PROFIT PARTNERSHIPS, FINANCED BY A COMBINATION OF FEDERAL, STATE AND LOCAL GOVERNMENT AND PRIVATE FUNDS. ULTIMATELY, THESE NON-PROFIT ORGANIZATIONS WILL BE CONVERTED TO FOR-PROFIT BUSINESSES.

BENEFITS: ONCE IMPLEMENTED, THE BENEFITS OF THE AIM CENTERS NETWORK TO INDUSTRY AND THE NATION WILL BE GREAT. MOST IMPORTANTLY, IT IS A KEY TO ACCELERATING THE TRANSFER OF TECHNOLOGY FROM THE LABORATORY TO THE MARKETPLACE.

LARGE COMPANIES WILL BENEFIT FROM THE ABILITY TO REPLICATE ALL OR PART OF ANY ADVANCED MANUFACTURING SYSTEM UNDER LICENSE WITH KNOWN COST AND MINIMAL RISK. THEY WILL ALSO BENEFIT GREATLY BECAUSE THEIR SUPPLIERS CAN ACCESS AN AIM CENTER TO IMPROVE PERFORMANCE.

AIM CENTERS WILL BE OF EVEN GREATER BENEFIT TO THE SMALL BUSINESS SECTOR WHICH IS EXTREMELY IMPORTANT TO THE U.S. ECONOMY, BECAUSE SIXTY PERCENT OF OUR MANUFACTURED GOODS COME FROM SMALL BUSINESS AS WELL AS MANY TECHNICAL ADVANCES.

ADVANCES. YET CASH-STRAPPED MEDIUM-SIZED AND SMALL COMPANIES ARE UNABLE TO UTILIZE ADVANCED MANUFACTURING TECHNOLOGY AND MUST WAIT UNTIL RELIABLE, AFFORDABLE, TURNKEY SYSTEMS ARE AVAILABLE. THAT DAY IS AT LEAST TEN YEARS AWAY OR LONGER FOR MOST COMPANIES.

MEANWHILE, THE AIM CENTERS NETWORK WILL PROVIDE WIDE PRODUCT DIVERSITY AVAILABLE THROUGHOUT THE COUNTRY. FOR EXAMPLE, A PRODUCT DEVELOPMENT ENGINEER SITTING AT A WORKSTATION IN A SMALL COMPANY IN <sup>NEBRASKA</sup> WISCONSIN COULD DESIGN A PRODUCT FOR MANUFACTURE IN AN AIM CENTER IN <sup>MINNESOTA</sup> KANSAS. SUCH ACCESS WILL PERMIT SMALL BUSINESSES TO CONTINUE TO COMPETE WITH SHORT RESPONSE TIME, INNOVATIVE, HIGH QUALITY PRODUCTS AT COMPETITIVE PRICES.

PROGRESS: CURRENTLY, THE AIM CENTERS PARTNERSHIP IS HELPING TO ESTABLISH THREE ADVANCED MANUFACTURING CENTER NETWORKS:

- 0 ADVANCED MANUFACTURING NETWORK - MEMBERS ARE COMMUNITY-BASED ORGANIZATIONS IN PENNSYLVANIA, CALIFORNIA, MINNESOTA AND MISSISSIPPI.
- 0 NORTH-CENTRAL REGIONAL ADVANCED INTEGRATED MANUFACTURING SERVICE CENTERS PARTNERSHIP - MEMBERS ARE COMMUNITY-BASED ORGANIZATIONS IN ILLINOIS, MINNESOTA, KANSAS, NEBRASKA, NORTH DAKOTA AND SOUTH DAKOTA.

0 MINNESOTA ADVANCED MANUFACTURING TECHNOLOGY CENTERS - MEMBERS WILL BE COMMUNITY-BASED ORGANIZATIONS IN SIX REGIONS OF THE STATE.

IN ADDITION TO HELPING ESTABLISH THOSE THREE NETWORKS, A STUDY IS BEING CONDUCTED BY THE AIM CENTERS PARTNERSHIP IN COOPERATION WITH THE NORTHWEST AREA FOUNDATION TO IDENTIFY POTENTIAL SHARED FLEXIBLE MANUFACTURING NETWORKS WITHIN THE STATE OF MINNESOTA. THE CONCEPT, AS NOTED EARLIER, NOT ONLY INCLUDES THE OPTION OF SHARED OWNERSHIP OF A MANUFACTURING FACILITY, BUT COOPERATION MAY BE EXTENDED TO OTHER AREAS SUCH AS A MARKETING, PROCUREMENT, PERSONNEL ADMINISTRATION AND TRAINING. FINALLY, FLEXIBLE MANUFACTURING NETWORKS ARE BEING SUCCESSFULLY OPERATED IN A NUMBER OF EUROPEAN COUNTRIES. THEY CAN FUNCTION EQUALLY WELL IN THE UNITED STATES.

*I'll skip talking — John de Beer  
Will provide more information on the  
status of the Manufacturing Networks.  
In addition he will comment on  
the Midwest Manufacturing Technology  
Data Base and the National Conference  
being planned on Advanced Manufacturing.*