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BY THE U.S. GENERAL ACCOUNTING OFFICE

Report To The Secretary Of Commerce

Federal Efforts Regarding Automated Manufacturing Need Stronger Leadership

If the United States does not keep pace with other countries in adopting automated manufacturing technologies, our national economic and defense posture will be hurt. While the private sector has primary responsibility in this area, many Federal programs and policies affect how rapidly the private sector adopts and uses automated manufacturing. GAO believes it is both desirable and feasible for the Department of Commerce to take a stronger Federal leadership role in automated manufacturing.

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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

ACCOUNTING AND FINANCIAL
MANAGEMENT DIVISION

B-211810

The Honorable Malcolm Baldrige
The Secretary of Commerce

Dear Mr. Secretary:

We recently completed an inventory and general assessment of various Federal programs and policies that influence the rate at which the private sector adopts automated manufacturing technologies. These technologies--which include robotics, computerized numerically controlled tools, and related technologies--were singled out because their use is a key factor in the Nation's economic well-being. Our primary focus was on determining how Federal efforts collectively influence the adoption of automated manufacturing technologies and whether any changes in overall Federal involvement or leadership were indicated.

Based on our assessment, we are concerned about the uncoordinated approach the Federal Government is taking in its activities and policy decisions that can facilitate or impede private sector adoption of automated manufacturing. We believe a focal point is needed within the Government to (1) plan and coordinate Federal efforts related to automated manufacturing, (2) evaluate the impact of these Federal efforts, (3) identify research gaps, and (4) maintain an ongoing dialog with affected parties in both the public and private sectors.

We further believe your Department is well suited to assume this focal point role because

--its traditional responsibilities include many duties relating to the national economy;

--it has recently taken several initiatives, through the Office of Productivity, Technology, and Innovation, to facilitate the use of automated manufacturing in the private sector;

--it can assume this responsibility without major organizational change or budget increases; and

--Section 11 of Public Law 96-480, the Stevenson-Wydler Act, gives it the legislative authority it needs to act.

Also, Commerce officials who commented on a draft of this report agreed with the facts as stated and with the feasibility of Commerce assuming the lead in this area.

OBJECTIVES, SCOPE, AND METHODOLOGY

We undertook this assignment as part of our basic legislative responsibilities. The objective was to examine Federal involvement in the development and application of automated manufacturing in the United States and to identify possible changes that might make this involvement more effective.

To document the magnitude and diversity of Federal participation in the development and application of automated manufacturing, we reviewed pertinent reports, records, and files. We interviewed key officials at those Federal agencies with major efforts, including the Departments of Commerce and Defense, the National Aeronautics and Space Administration, and the National Science Foundation.

To assess the overall direction and interrelationships of Federal and private sector efforts, we met with many knowledgeable individuals in both sectors. In addition to representatives of those agencies already noted, these meetings included officials of the Office of Science and Technology Policy, the National Academy of Sciences, and the Office of Technology Assessment, as well as representatives of the Society of Manufacturing Engineers, the Robot Institute of America, the Machinery and Allied Products Institute, the National Machine Tool Builders Association, and the National Security Industry Association. We also met with individuals at numerous universities and private firms that develop and use automated manufacturing. Finally, we reviewed technical literature and attended related conferences.

Our study did not assess the results of individual Federal programs and did not include extensive coverage of related labor and employment issues, since they are the focus of other past and ongoing congressional studies and hearings.[1] The review was performed in accordance with generally accepted government audit standards. Field work was completed in March 1983.

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[1]"Advances in Automation Prompt Concern Over Increased U.S. Unemployment" (GAO/AFMD-82-44); "Automation in the Workplace: Barriers, Impact on the Work Force, and the Federal Role," GAO testimony before the Subcommittee on Labor Standards, Committee on Education and Labor, House of Representatives, June 23, 1982; and "Automation and the Workplace: Selected Labor, Education, and Training Issues," Office of Technology Assessment, Mar. 1983.

AUTOMATED MANUFACTURING IS IMPORTANT TO THE NATION

Automated manufacturing is becoming an essential element of the Nation's industrial strength. Rapid advances in this technology have enabled other nations to obtain a competitive edge in numerous products. Within the United States, automated manufacturing has not yet received the attention some believe it deserves. Compared to certain other countries, its use in this country has been limited, and research for future developments has not kept pace.

The effect of automated manufacturing on U. S. competitiveness and on the strength of the defense industrial base is of widespread concern. The private sector has made significant strides in recent years to develop and apply automated technology, as has the Federal Government. While we believe the private sector has and should continue to have the principal role in developing and using automated manufacturing technology, the Federal role needs to become more focused and directed toward facilitating private sector advances.

ACHIEVING MAXIMUM BENEFITS FROM AUTOMATED MANUFACTURING REQUIRES ADDRESSING MANY RELATED QUESTIONS

Notwithstanding American advances in new technology, several impediments that slow the progress demanded for international competitiveness and an improved defense posture are yet to be overcome. Some of the questions that need to be asked are the following:

--Is enough related research and development being carried out?

--Is the equipment to be used sufficiently standardized?

--Is the new technology becoming widely diffused throughout industry?

Both the private sector and the Federal Government have addressed these questions to some extent. Even so, continued attention to these and similar questions will be required for many years if the Nation is to achieve the maximum possible benefits from automated manufacturing.

PUBLIC AND PRIVATE SECTORS HAVE BOTH INDIVIDUAL AND JOINT ROLES

The private sector's role in furthering automation is to overcome the financial and organizational barriers it faces; the Government's is to provide better leadership for its ongoing activities. In addition, both sectors must work together for the benefit of the national economy.

The private sector's role is critical, but some barriers exist

While the private sector in the United States has developed many new technologies that aid automated manufacturing, it still faces major barriers, both financial and technical. It remains to be seen whether the private sector's progress will keep pace with our international competitors. One critical remaining barrier is the limited amount of research and development being devoted to industry needs.

In this regard, the Commerce Department has recently initiated innovative research and development funding approaches which would probably be beyond the financial or technical ability of even the largest U.S. company acting alone. One approach involves the use of Research and Development Limited Partnerships to develop new products or proprietary processes. In this, very large sums of interest-free capital can be made available without liability to the company for repayment if the research effort is unsuccessful. Commerce contends that, if structured properly, the limited partnership mechanism avoids major antitrust problems. It can also supply the lead time critical for maintaining a competitive edge internationally. The limited partnership concept is a promising example of cooperation between the private and Federal sectors.

Federal efforts to encourage automated manufacturing need stronger leadership

Numerous Federal policies and programs influence the adoption and degree of use of automated manufacturing in the private sector. These efforts, however, are not clearly focused. They are not developed as part of an overall Government strategy but are designed individually by the departments and agencies with no coordination among top policymakers.

Two types of Federal activities affect the development of automated manufacturing:

--Programs that create and develop automated manufacturing technology. These exist at the National Bureau of Standards, the National Science Foundation, the National Aeronautics and Space Administration, and the Department of Defense.

--Tax and other regulatory policies that indirectly discourage or encourage private sector research and development and investment in automated manufacturing.

We found that the Federal programs operate largely independently of one another. Although informal advice and consultation does occur at the program level, Federal policies are sometimes made "in a vacuum." Little consideration is given to other Federal efforts or to the views of all affected parties.

Recent initiatives promise improvement in the overall focus and direction of Federal involvement in automated manufacturing.

--The Commerce Department's Office of Productivity, Technology, and Innovation has taken several initiatives, such as the limited partnership discussed earlier, that encourage the private sector to look more closely at the possibilities of automated manufacturing technology.

--The Defense Department's new (1982) Office of Industrial Productivity is developing comprehensive "packages" of various contractual agreements to increase defense contractor productivity. While it will be some time before significant results are produced, a better framework is evolving for dealing with the large defense contractor community.

--A White House Conference on Productivity that is scheduled for October 1983 will address issues related to (1) organizing the Government to promote private sector productivity, (2) improving labor, management, and Government cooperation for productivity improvement, (3) keeping industry informed about foreign technological advances, and (4) improving the transfer of Government-developed technological advances to industry. These issues have important implications for automated manufacturing. The Conference, which is expected to bring together representatives from labor, business, government, and academia, could help clarify the Federal role in automated manufacturing and improve existing efforts in this area and in others related to national productivity.

To improve the effectiveness of Federal automated manufacturing efforts, more focused leadership is needed. This would not require significant policy changes. Section 11(e) of Public Law 96-480 provides legislative authority to bring together interested parties and ensure that Federal efforts to encourage automated manufacturing are rational and cost effective.

We believe the Department of Commerce should be assigned this focused leadership role. Commerce need not usurp the roles of other Federal agencies to do this; it could simply work closely with the agencies and with private industry to reach agreement on the appropriate roles and relationships of each.

RECOMMENDATIONS

We recommend that the Department of Commerce assume leadership in guiding Federal efforts related to automated manufacturing. Specifically, Commerce should work with affected agencies and industries to develop an appropriate Federal mechanism for

--planning, assessing, and coordinating Federal efforts related to automated manufacturing;

--evaluating the impact of these Federal efforts;

--identifying research gaps; and

--maintaining a continuing dialog with affected parties in both the public and private sectors.

In addition, Commerce should work closely with all Federal agencies to recognize and agree on appropriate roles for each.

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As you know, Title 31 U.S.C §720 requires the head of a Federal agency to submit a written statement on actions taken on our recommendations to the Senate Committee on Governmental Affairs and the House Committee on Government Operations not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report.

We are sending copies of this report to the Director of the Office of Management and Budget and the Chairmen of the Joint Economic Committee; the Senate Committee on Commerce, Science and Transportation; and the House Committee on Science and Technology. We are also sending copies to the Secretary of Defense, the Administrator of the National Aeronautics and Space Administration, the Director of the National Science Foundation, the Director of the National Bureau of Standards, and other interested parties.

Sincerely yours,

W. D. Campbell
Acting Director

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