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## **CRS Report for Congress**

# **The Advanced Technology Program**

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### **Summary**

The Advanced Technology Program (ATP) was created by P.L. 100-418, the Omnibus Trade and Competitiveness Act of 1988, to encourage public-private cooperation in the development of pre-competitive technologies with broad application across industries. Administered by the National Institute of Standards and Technology (NIST), a laboratory of the Department of Commerce, this activity has been targeted for elimination as a means to cut federal spending. Since FY2000, the original House-passed appropriation bills have not included funding for ATP. Many of the Administration's budget requests have proposed termination of the program. However, ATP continues to be supported, although at levels below that achieved in FY1995 when the activity was expanded significantly. The FY2005 appropriations were 20% lower than the earlier fiscal year. For FY2006, both the Administration's budget proposal and the original House-passed version of the appropriations bill, contained no funding for ATP although P.L. 109-108, the final FY2006 appropriation legislation, financed the program at \$79 million, 42% below the previous fiscal year (after a mandated rescission). The Administration's FY2007 budget request again did not include funding for ATP, nor did the appropriation bill passed by the House and reported by the Senate Committee on Appropriations in the previous Congress. While no final FY2007 appropriations legislation was enacted during the 109<sup>th</sup> Congress, a series of continuing resolutions financed ATP at FY2006 levels through February 15, 2007. In the current Congress, P.L. 110-5 provides the program \$79 million for FY2007. The President's FY2008 budget request contains no funding for ATP. This report will be updated as events warrant.

### **Program Rationale**

Title V of the Omnibus Trade and Competitiveness Act (P.L. 100-418) established the Advanced Technology Program (ATP). This effort grew out of concerns over the competitiveness of American companies in the global marketplace. While numerous factors affect the rate of technical progress in an economy, what was seen as critical is how quickly and successfully science and technology are transformed into new or better

products, processes, or services. The commercialization and diffusion of goods and services stood out as significant problems in the ability of U.S. industries to compete.

Underlying the structure of ATP is an effort to foster cooperation among government, industry, and academia to facilitate the generation of new technologies for the commercial market. While opponents argue that joint ventures stifle competition, proponents assert that they are designed to accommodate the strengths and responsibilities of various sectors. Collaborative projects attempt to utilize and integrate what the participants do best and to direct R&D activities toward the goal of meeting marketplace demands. Joint endeavors are seen as reducing risks and costs while permitting work that crosses traditional boundaries of expertise and experience.

## **Program Operation**

The Advanced Technology Program was designed “to serve as a focal point for cooperation between the public and private sectors in the development of industrial technology” and to help solve “problems of concern to large segments of an industry,” as noted in the Conference Report to accompany the bill. Placed within the National Institute of Standards and Technology (NIST), in recognition of the laboratory’s ongoing relationship with industry, ATP provides seed funding to single companies or to industry-led consortia of universities, businesses, and/or government laboratories for development of generic (broad-based), pre-competitive technologies that have many applications across industries. Awards, based on technical and business merit, are for high-risk work past the basic research stage but not yet ready for commercialization. Market potential is an important consideration in project selection. Scientific and technical review generally is performed by federal and academic experts. Business plan assessments are made by individuals from the private sector.

Awards are for either product or process (manufacturing) technology development. Individual firms are restricted to funding of \$2 million over three years. Money is to be used only for direct R&D costs. Large firms must provide at least 60% of total (direct and indirect) projects costs; small and medium-sized companies are not required to cost-share direct costs. Joint ventures may receive up to five years of financing for any amount limited only by availability. In such cases, the private sector must provide more than 50% of funding. While universities and federal laboratories can participate in collaborative work, the grant from ATP is made solely to companies. P.L. 102-245 modified the original law and required that the recipient of an ATP award be a firm that is U.S.-owned (“a company that has a majority ownership or control by individuals who are citizens of the United States”) or a business that is incorporated in the United States and has a parent company established in a country that affords American firms reciprocal opportunities.

According to NIST, through the end of 2004 (when the last new awards were made), 768 projects were funded, of which about 30% were joint ventures. Approximately \$2.3 billion in federal funds have been matched by \$2.1 billion from the private sector. Small businesses or cooperative efforts led by such firms make up 65% of the awardees. The first four competitions (ending August 1994) were general in nature. However, in 1995 NIST restructured part of ATP to focus on various groups of projects in “well-defined” programmatic areas designed for long-range support. These were selected in conjunction with industry. Since FY1999 one competition has been held in all areas of technology.

In its first year, FY1991, ATP was funded at \$36 million. Appropriations increased to \$48 million in FY1992, \$67.9 million in FY1993, and \$199.5 million in FY1994. For FY1995, financial support expanded significantly to \$431 million. However, P.L. 104-6 rescinded \$90 million of this amount. Funding for FY1996 was \$221 million with a small increase to \$225 million in FY1997 but reduced to \$218 million by P.L. 105-18. For FY1998, P.L. 105-119 appropriated \$192.5 million. P.L. 105-277 provided \$197.5 million in FY1999 support for ATP, 3% above the previous year. This figure reflected a \$6 million rescission contained in the same law that accounts for “deobligated” funds resulting from early termination of certain projects. In FY2000, the appropriations bill that originally passed the House included no funding for ATP, since, as stated in the accompanying report, “the program has not produced a body of evidence to overcome those fundamental questions about whether the program should exist in the first place.” Yet, P.L. 106-113 did finance ATP at \$142.6 million, 28% less than FY1999. In FY2001, while the original House-passed appropriations bill did not fund the program, P.L. 106-553 provided \$145.7 million, 2% above the previous year’s financing.

The Bush Administration’s FY2002 budget proposed suspension of new ATP projects pending a program evaluation, although \$13 million was to be provided for ongoing financial commitments. Again, the initial appropriations bill passed by the House terminated ATP. The final legislation, P.L. 107-77, financed the effort at \$184.5 million, almost 27% more than FY2001. The following year, the President requested \$107.9 million in FY2003 funding for ATP. Several Continuing Resolutions financed the program until the 108<sup>th</sup> Congress enacted P.L. 108-7 which funded ATP at \$178.8 million (after a 0.65% rescission), 3% below the earlier fiscal year.

The Administration’s FY2004 budget requested \$27 million for ATP (an 85% decrease) to cover on-going commitments; no new projects would be financed. The original House-passed appropriations bill provided no support for the program. However, P.L. 108-199 funded ATP at \$170.5 million after mandated rescissions, 4.5% below FY2003 support. The next year, while the FY2005 budget proposal and the original appropriations legislation passed by the House did not include funding for ATP, P.L. 108-447 provided the program with \$136.5 million (after mandated rescissions), a decrease of 20% from the previous fiscal year.

Both the President’s FY2006 budget and the original House-passed version of H.R. 2862, the FY2006 Science, State, Justice, and Commerce appropriations bill, again did not provide any support for ATP. The final FY2006 appropriation for ATP in P.L. 109-108 was \$79 million, 42% below FY2005 funding (after mandated rescissions).

For FY2007, the Administration’s budget did not include funding for ATP nor did the appropriations bill initially passed by the House and reported from the Senate Committee on Appropriations during the 109<sup>th</sup> Congress. While no relevant FY2007 appropriations legislation was enacted in the previous Congress, ATP was financed at FY2006 levels through February 15, 2007 by a series of continuing resolutions. P.L. 110-5 provides \$79 million in FY2007 funding for the program, the same amount as FY2006.

The President’s FY2008 budget request contains no support for ATP.

## Results

NIST has undertaken numerous studies of ATP; the General Accounting Office (GAO, now the Government Accountability Office) has also studied the program. In its first evaluation (1994), NIST concluded the program had stimulated research that would not have been done without the federal support; that R&D cycles within companies have been abbreviated; and that “valuable business alliances” had been created.<sup>1</sup> However, in a May 1995 report, GAO argued that these conclusions can not be adequately substantiated by the information provided in the NIST study on which they are based.<sup>2</sup> Acknowledging that it was too early to determine the long-term impact of ATP, the GAO report stated that some of the indicators NIST utilized “may create false expectations of the program’s economic success.” NIST vigorously defended its methodology.

Additional studies funded by NIST found that ATP shortened R&D cycles by half and accelerated technological progress within the firm; stimulated productive collaborative activities among companies and between firms and universities; facilitated commercialization; and increased private sector investment in high risk technology development.<sup>3</sup> An April 2000 progress report reinforced these earlier findings.<sup>4</sup> This study indicated that “participants in 261 projects have identified more than 1,200 different applications (or uses) of the technologies under development,” and that the majority of these are new solutions to market needs or improvements in existing products or processes. Product cycles are being reduced, and while 24% of respondents said that they would not have undertaken the project without ATP funding, most others noted that the R&D would have been significantly slower without such support. NIST found that “organizations are pursuing different R&D than they would have undertaken without ATP funding,” and that this work is more technically advanced and risky. The ATP financing also stimulated additional private sector money in these technical areas than otherwise would be the case. Over half of the companies are now able to make a new or improved product. According to March 9, 2000, testimony by Raymond Kammer, then director of NIST, approximately 120 new technologies have been commercialized.

The concern over whether ATP supports projects that could reasonably attract private sector investment has been an issue throughout the life of the program. In a report examining award winners and “near winners” during the first four years of ATP, GAO found the program funded both projects that would not have progressed without this

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<sup>1</sup> National Institute of Standards and Technology, *Setting Priorities and Measuring Results at the National Institute of Standards and Technology*, January 31, 1994.

<sup>2</sup> General Accounting Office, *Performance Measurement, Efforts to Evaluate the Advanced Technology Program*, GAO/RCED-95-68, May 1995.

<sup>3</sup> Silber and Associates, *Company Opinion about the ATP and Its Early Effects*, January 30, 1995; *Acceleration of Technology Development by the Advanced Technology Program: The Experience of 28 Projects Funded in 1991*, by Frances Jean Laidlaw, for the National Institute of Standards and Technology, Economic Assessment Office, October 23, 1997; National Institute of Standards and Technology, *Advanced Technology Program: Development, Commercialization, and Diffusion of Enabling Technologies*, by Jeanne W. Powell, December 1997; National Institute of Standards and Technology, *Advanced Technology Program Performance of Completed Projects, Status Report Number 1*, by William F. Long, March 1999.

<sup>4</sup> National Institute of Standards and Technology, *Development, Commercialization, and Diffusion of Enabling Technologies: Progress Report*, by Jeanne W. Powell and Karen L. Lellock, April 2000.

federal support and those that would have been financed by the private sector.<sup>5</sup> Half of the awardees stated that they would have continued without ATP financing. Of the “near winners,” 50% pursued their efforts in the absence of federal money but took longer to achieve their goals. According to GAO, while 63% of the applicants did not look elsewhere for funds, about half of the applicants who did “were told by prospective funders that their projects were either too risky or ‘precompetitive’ — characteristics that fulfill the aims of ATP funding.” Respondents also noted that the program facilitated development of joint ventures to pursue ATP activities.

A study undertaken by the American Enterprise Institute concluded that ATP “has had only limited success” in choosing projects that could not raise private sector funds. According to the authors, this has occurred because companies are not interested in pursuing R&D that fails to complement work performed for profit. In addition, the ATP selection criteria focus on commercial sales and job creation, not on projects for which there are “broad social benefits” and insufficient private investment. An April 2000 report by GAO, reinforced by May 26, 2005 testimony, noted that “two inherent factors in ATP’s current award selection process — the need to guard against conflicts of interest and the need to protect proprietary information — make it unlikely that ATP can avoid funding research already being pursued by the private sector in the same time period.”<sup>6</sup>

## Issues and Observations

There have been efforts in the past several years to terminate the Advanced Technology Program. These actions, along with additional attempts to withdraw government support for other technology development efforts, appear to reflect a philosophy that eschews direct federal financing of private sector R&D efforts aimed at the commercialization of new technologies and production processes. Such activities are seen by opponents as “industrial policy,” the means by which government rather than the marketplace “picks winners and losers.” Instead, measures that would occasion a better investment environment for industry to expand their innovation-related efforts would, proponents argue, be preferable to government funding.

This signals a change from the existing varied approach to facilitating technological advancement. Legislative initiatives have resulted in a body of laws, programs, and policies that involve both indirect and direct measures to stimulate technology advancement in the private sector. Indirect incentives include a research and experimentation tax credit; changes to the antitrust laws to encourage collaborative R&D and cooperative manufacturing ventures; alterations of patent ownership policies to facilitate government-industry-university interaction; and practices to promote technology transfer. Direct measures involve, among other things, federal funding for ATP and the Small Business Innovation Research Program. These cost-shared programs have been supported, in part, because of their potential contribution to the country’s national or economic security.

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<sup>5</sup> General Accounting Office, *Measuring Performance: The Advanced Technology Program and Private-Sector Funding*, GAO/RCED-96-47, Jan. 1996.

<sup>6</sup> General Accounting Office, *Advanced Technology Program: Inherent Factors in Selection Process Could Limit Identification of Similar Research*, GAO/RCED-00-114, April 2000, 5.

The mix of approaches was developed with bipartisan support in Congress. Under former President Reagan, public-private cooperation in research and development was promoted by the executive branch. The George H. Bush Administration adopted a policy in which the government's role was "to support the development of generic or enabling technologies at the pre-competitive stage of R&D." The Clinton Administration expanded this concept to include additional direct federal funding to achieve increased commercialization of the results of R&D. ATP reflects such ideas; thus discussions over its proposed elimination have called into question many of the underlying assumptions shaping the environment within which industry works toward technological advancement.

Proposals to terminate or severely limit ATP have renewed the debate over the role of the federal government in promoting commercial technology development. In arguing for less direct federal involvement, advocates believe that the market is superior to government in deciding technologies worthy of investment. Mechanisms that enhance the market's opportunities and abilities to make such choices are preferred. It is suggested that agency discretion in selecting one technology over another can lead to political intrusion and industry dependency. On the other hand, supporters of direct methods argue that it is important to focus on those technologies that have the greatest promise as determined by industry and supported by matching funds from the private sector. They assert that the government can serve as a catalyst for cooperation.

Technological progress is important to the nation because of its contribution to economic growth and a high standard of living. How best to achieve this continues to be debated. Critics view ATP as a means for a federal agency to select commercial firms and/or technologies for support. They maintain that the absence of market-generated decisions will result in technologies that can not be utilized productively by participating companies. Such a program encourages selection of well-written proposals rather than assistance for truly important technologies. However, proponents stress that ATP is market driven and that the technical areas for investment have been developed in conjunction with industry. In addition, companies have to put up significant amounts of funding and survive a rigorous business review; procedures that make the Advanced Technology Program different from other federal efforts.

Perhaps most crucial to the debate is the way cooperative R&D is viewed. Today, American companies appear to be more competitive in the global marketplace than when the 1988 Act was being considered. While there are many factors contributing to this improving situation, proponents of joint R&D efforts, such as ATP, point to the benefits derived from increased technical collaboration and the development and application of the resulting new technologies and production processes. Questions remain whether direct federal funding for such programs is the most effective or efficient means to secure these outcomes. Is the approach embodied in ATP the preferable one, or could other mechanisms such as permanent tax credits for R&D, changes in capital gains treatment, and/or liability and regulatory reform be more effective?