United States General Accounting Office

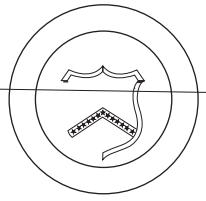
GAO

Report to Congressional Requesters

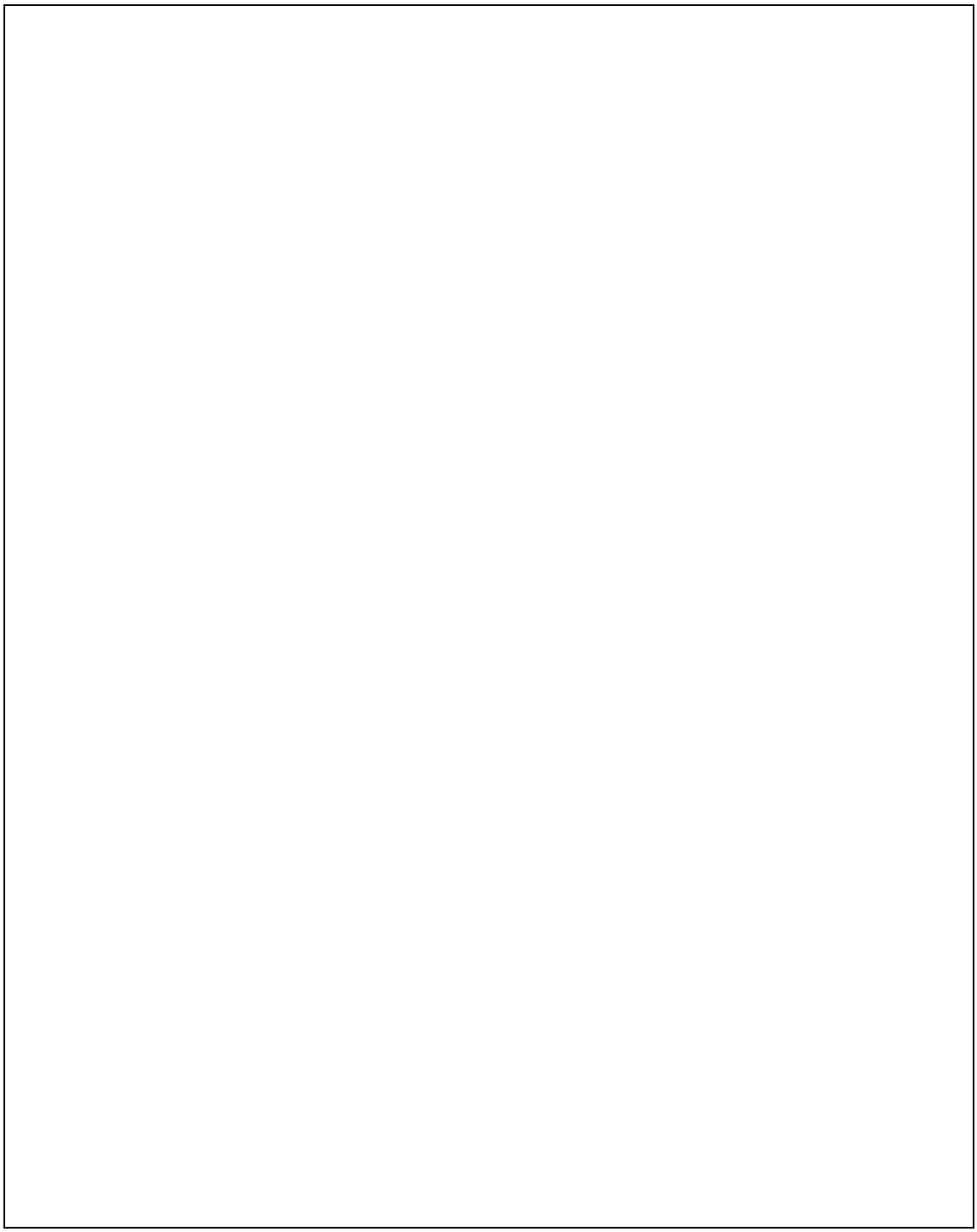
April 2000

ADVANCED TECHNOLOGY PROGRAM

Inherent Factors in Selection Process Could Limit Identification of Similar Research



Comments From the Department of Commerce



Consistent with the ATP statute, ATP assists "United States businesses in creating and applying the generic technology and research results necessary to (1) commercialize significant new scientific discoveries and technologies **rapidly**." The ATP accelerates high risk technologies that are unlikely to be developed in time to compete in rapidly changing global markets, or to be developed at all without Federal support. ATP funded projects are technically challenging and innovative, with objectives that are often well beyond state-of-the-art in their research field. They are technically so challenging that the probability of failure is high and the technical objectives may be only partially met. The GAO report contains no reference to the high technical risks associated with the specific projects funded by ATP, nor the competitive value of having differences in the technical approaches of the research within the broad research fields being addressed. Neither does the GAO report mention the national benefits which would result from accelerating the high-risk, yet critical technology resulting from specific projects.

The GAO's review hand picked 3 of 38 completed projects, presumably with the intent of making the strongest possible argument, and draws conclusions which are unreasonably far reaching. Even in the case of these three projects, however, the report fails to adequately assess the unique technical approaches taken in these projects, factors which played an important role in their selection. I append a short outline of these unique technical approaches taken by each of these projects.

If it were to review all 199 ATP projects completed to date, the GAO might still have come to the same conclusion, i.e., that the research goals may have been similar to those funded by the private sector. However, it would utterly fail to capture the impact of the ATP. On April 4, GE Medical Systems recognized the ATP as a "Partner in Vision" for its support in the development of an innovative manufacturing technology to produce large-area, flat-panel amorphous silicon detectors for X rays. These panels are the heart of a unique new digital mammography system hailed as "the biggest breakthrough in mammography in more than 20 years," according to Senator Connie Mack. The ATP-funded research significantly reduced the number of processing steps required to manufacture these panels and increased the yield. In the sense that it was previously possible to make the panels, the ATP goal was not "unique", but the processing innovations can significantly reduce the cost of these panels, making the new mammography more affordable and more widely available to women. That is a clear benefit to rapidly bringing high-risk technologies to improve the quality of life for Americans.

In the 10 years that ATP has been in operation, if there was concern that ATP was funding research which duplicated that performed by other organizations, ATP would have received numerous complaints from those organizations. This is not the case. ATP's record speaks for itself in complying with the spirit of the law of funding high risk, high pay-off, emerging and

ENCLOSURE

ATP PROJECTS REFLECT UNIQUE TECHNICAL APPROACHES

I. Communication Intelligence Corporation (CIC) - Handwriting Recognition

The goal of the Communication Intelligence Corporation (CIC) project was to develop user-independent, cursive handwriting recognition software. This project was innovative in that the algorithms to be used would require the system to be "trained" to recognize a specific user's handwriting, and would recognize contiguous characters not separated by discrete spaces. The project was unique in its combination of specific algorithms and programming methodologies which, together, would lead to better speed and accuracy than theretofore attained. (The project had a target of 10 characters per second with 99% accuracy.) Also, differentiating this project from other ongoing efforts, the CIC software was intended to be unconstrained and adaptable to European languages.

II. Accuwave Corporation - Capacity Expansion of Fiber Optic Cables

At the time the award was made, only a few WDM wavelengths had been multiplexed successfully in commercial systems. Accuwave's approach was both high-risk and unique. They proposed wavelength multiplexing using volume holography -- holograms "written" in the interior of thick crystals of photorefractive materials. In the demultiplexer crystal, for example, the multi-wavelength light enters one end of the crystal and encounters a series of holographic gratings, each tuned to reflect a separate and specific wavelength of light while passing all other wavelengths with minimal loss. When the award was made, Accuwave had already demonstrated the individual elements of a system that could multiplex wavelengths more than 10 times better than the current art at visible wavelengths. Under the ATP, Accuwave attempted to extend this technology to the infrared wavelengths used for long-distance telecommunications. If completely successful with this high-risk innovation, Accuwave's technology would have had the potential to increase the number of WDM wavelengths by almost three times the number commercialized by the companies mentioned in the report, which would have greatly accelerated the adoption of very high-capacity telecommunications systems.

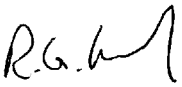
III. Tissue Engineering, Inc. (TE) - Regenerating Tissues and Organs

Tissue Engineering was funded by ATP to investigate the combination of the technologies of traditional weaving via fabric weaving machinery and the use of animal-derived extracellular matrix (ADMAT). The resultant matrix is to be used for a scaffold for a variety of tissue engineering applications. The use of extracellular matrix from particular animals thought to be very close to that of human beings are less likely to be rejected when used in a scaffold created from tissue woven on traditional weaving machines. The scaffold can be seeded in a variety of ways to encourage cell growth. It will also resorb into the body as cellular growth takes place, thereby replacing the matrix with a body equivalent. The matrix would be a generic solution for many applications varying from relatively simple to complex including skin, ligaments, tendons, and vascular systems. At the time of the funding of this project, early 1993, this was a unique technical approach toward achieving the broad research goal of replacing human tissue in the body. Based on our information it is still a unique methodology that is not being pursued by others. This was a very high risk technology and offered a unique approach which, if successful, held the promise of widespread applicability. A variety of pilot studies have indicated that the basic hypotheses of this research have proven to be correct.

enabling technologies. To do this, ATP runs a competitive peer review process which has been applauded by the Department's Office of Inspector General as a program which "constitutes a best practice that should be used in other funding programs" (Audit Report No. DEN-10960-9-0001, ATP Award Process Promotes Merit-Based Decisions). It is a merit based program which uses technical and business experts to review proposals to ensure that ATP does not fund existing or planned research that would be conducted in the same time period.

Thank you for the opportunity to provide comments.

Sincerely,



Raymond Kammer
Director

Enclosure

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Acknowledgments

Phil Amon, Shannon Bondi, and Diane Raynes also made key contributions to this report.

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