

調査資料

米国の情報産業技術振興政策の事例研究

—ATP (Advanced Technology Program)：先端技術プログラム—

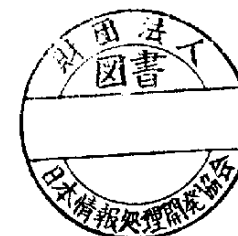
平成11年3月

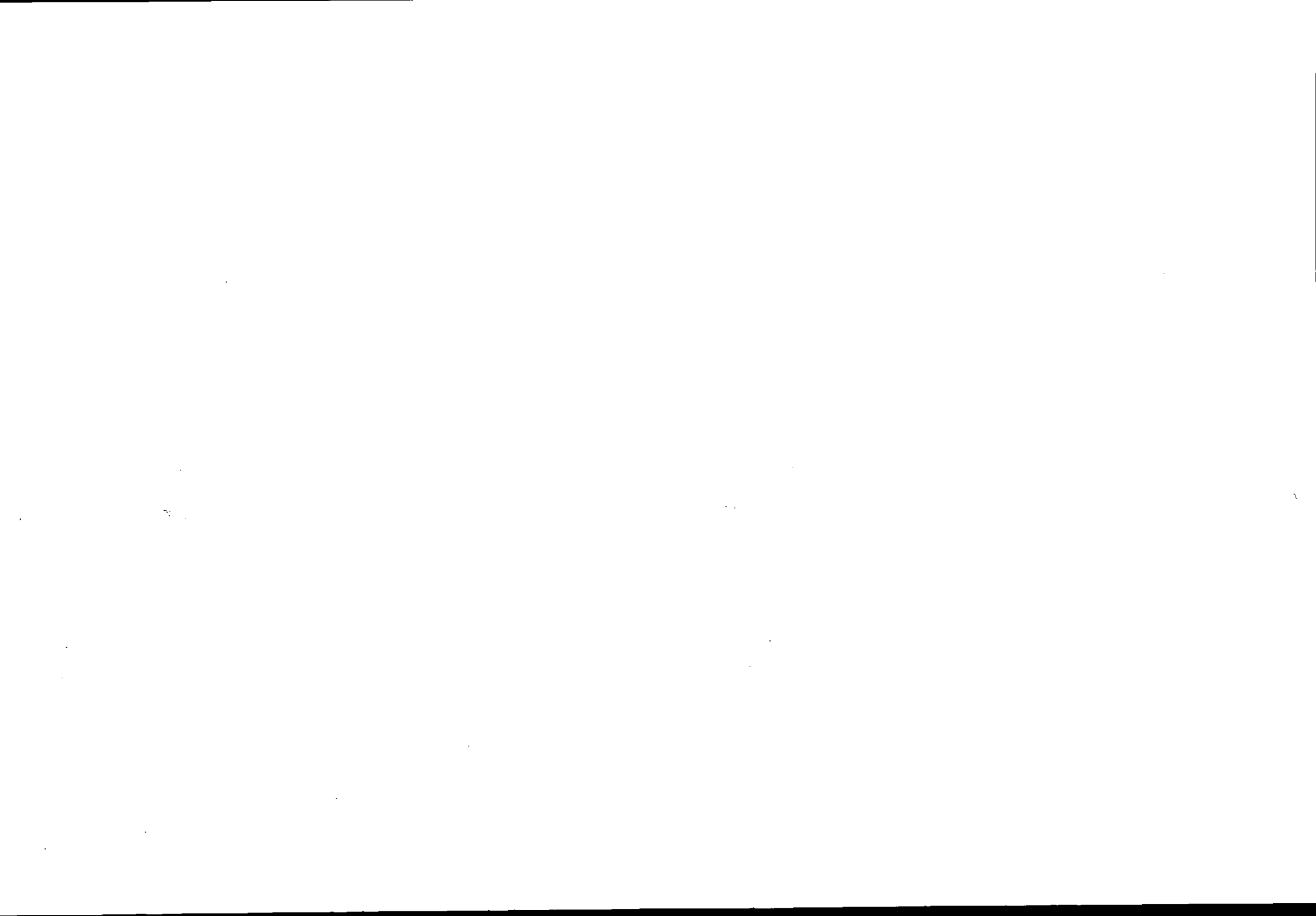
財団法人 日本情報処理開発協会
先端情報技術研究所

本調査資料は、平成10年度にMUSE Associates（MUSE社）に調査委託し、
入手した基礎資料やデータを取りまとめたものである。



この事業は、競輪の補助金を受けて実施したものです。

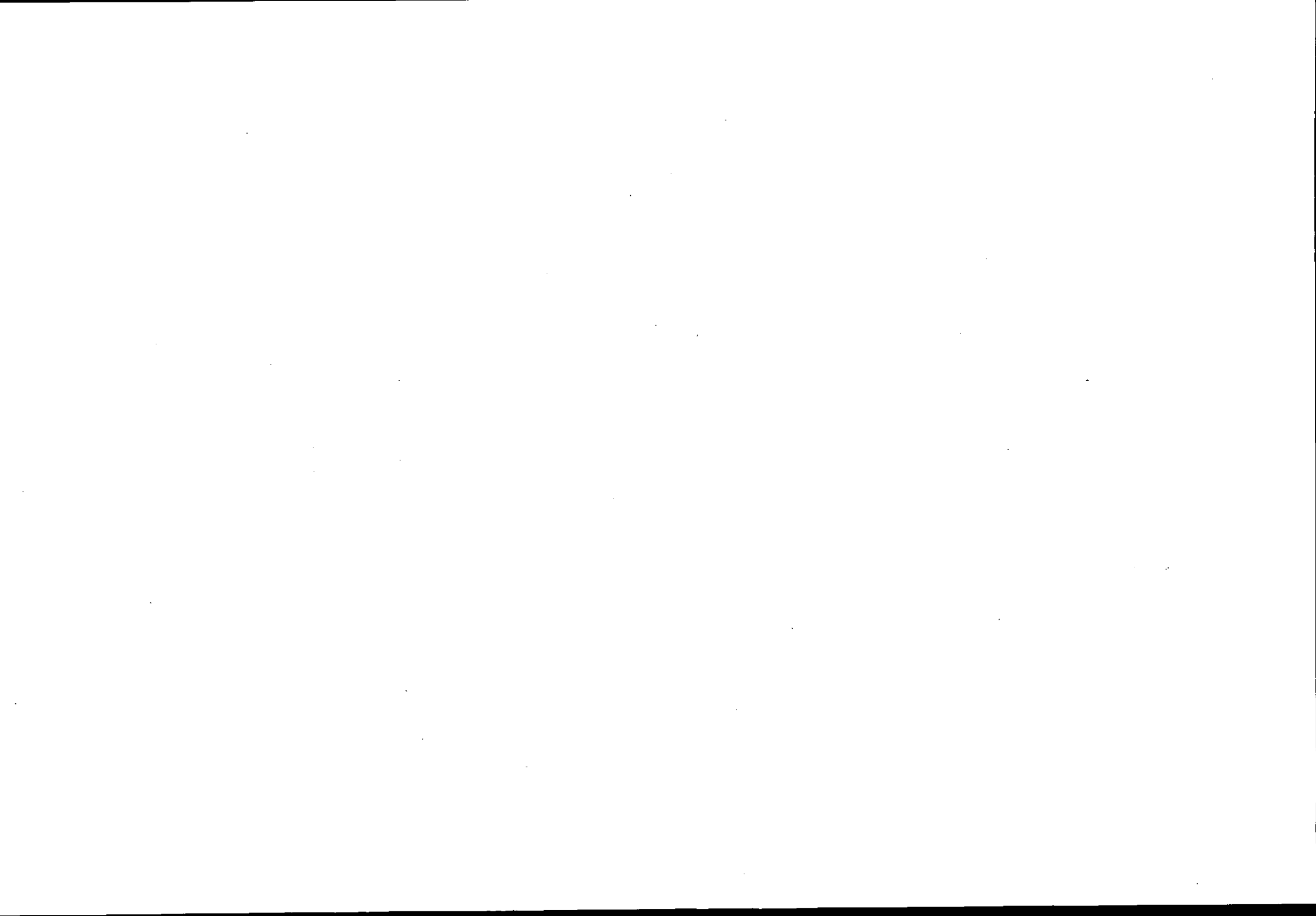




Introduction

米国ATP(Advanced Technology Program: 先端技術プログラム)

- During February and March 1999, MUSE Associates conducted a study of the US Advanced Technology Program (ATP)
- The purpose of the study was to focus in particular on four key questions:
 - 1 Under the shared cost policy of the ATP, in which industry must contribute a certain percentage of total project cost, what costs can be included and what not, and consequently what is the real meaning of the breakdown between industry and government?
 - 2 What happens to the Intellectual Property generated in ATP projects?
 - 3 Is there any policy or process by which company profits resulting from ATP research are transferred back to the government?
 - 4 When do ATP projects finish? In particular, if projects are not progressing well, how are they brought to a close?
- The layout of this report corresponds to these four questions directly:
 - Chapter 1 provides a general overview of the ATP and its history
 - Chapter 2 explains details of the funding mechanism (Question 1)
 - Chapter 3 explains the treatment of IP (Question 2)
 - Chapter 4 explains the philosophy behind treatment of profits (Question 3)
 - Chapter 5 explains the project goal-setting, monitoring and termination processes (Question 4)
- The original intention of this study was to examine three case studies in detail to determine the answers to these questions. In the course of the project, however, we determined that it would be more effective to illustrate the answers to these questions using a greater number of case studies, but covered in less detail. Consequently references to a number of cases are included throughout the report; in addition more detail on certain projects is provided in Appendix 1.



目 次

第1章 概要	5
Overview	
第2章 助成のメカニズム	19
Project Funding	
第3章 ATPプロジェクトから生まれる知的財産権	29
IP from ATP Project	
第4章 ATPプロジェクトから生まれる利益	39
Profits from ATP Project	
第5章 プロジェクトの達成目標とパラメータ	49
Project Goals and Parameters	
付属資料	57
Appendix	

第1章 概 要

Overview

米国ATP(Advanced Technology Program: 先端技術プログラム)

1	Overview	p6
2	Project Funding	p20
3	IP from ATP Projects	p30
4	Profits from ATP Projects	p40
5	Project Goals and Parameters	p50
A	Appendices	
A1	Case Studies	p58
A2	List of Sources	p63

The Advanced Technology Program (ATP) seeks to stimulate U.S. economic growth by developing high-risk technologies through industry-driven partnerships

- As one of four parts of the National Institute of Standards and Technology (NIST), a non-regulatory agency within the Department of Commerce, the ATP's ultimate objective is to create benefit for the U.S. economy
- The ATP focuses on high-risk, enabling and high-payoff technologies that will lead to new, innovative products, services and industrial processes and result in the opening of new opportunities for U.S. business and industry in the world's markets
- The program is industry-driven in that for-profit entities conceive of, propose, co-fund and execute ATP projects and programs
- The ATP employs cooperative agreements, as opposed to grants, in order to ensure appropriate ATP involvement / management / oversight of projects to accomplish public purpose of support and / or stimulation



Since its foundation in 1988, the ATP has co-funded 431 projects with 1,010 participants through 9 General Competitions and 30 Focused Programs

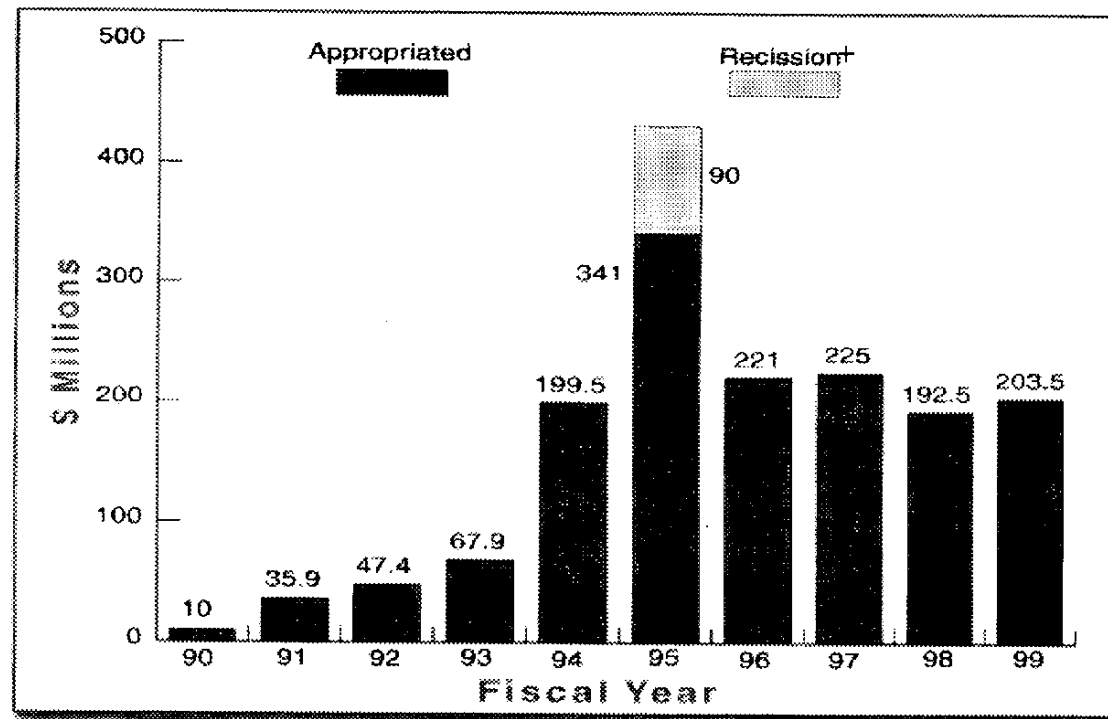
- The ATP was created by the Omnibus Trade and Competitiveness Act of 1988 and amended by the American Technology Preeminence Act of 1991
- The first General Competition (open to applicants in any industry / technological area) was held in 1990; a total of nine have been held (one per year) - proposals for the FY99 competition are due by April 14th 1999
- 30 Focused Program Competitions ('multi-year efforts aimed at achieving specific, well-defined technology and business goals') were held from 1994-1998 to provide critical mass support for particular technology areas identified by industry as offering exceptional opportunity; during these years, the Focused Programs received the bulk of ATP spending
- The Focused Program Competitions* were however discontinued recently:
 - The selection process was determined to be too cumbersome (often taking 18-24 months)
 - Additionally, the Focused Programs were found to be too 'exclusionary' - too many good ideas did not quite fit into a particular Program and did not receive funding from that program (but by competing for Focused Program funds, the applicant did not try in the General Competition)
- In total 3,585 proposals have been submitted; 431 (12%) received ATP funding

* Although Competitions were stopped, projects underway continued. For administrative purposes new applications received under General Competitions may be clustered with ongoing focused program groups

The ATP has so far received a total budget of \$1.544 billion

- The total ATP budget appropriation from 1990 to 1999 was \$1,544m
- During the ATP's first four years, the average annual budget was \$40.3m
- During the last four years, the ATP's average annual budget was \$210.5m*
- Of the \$203.5m appropriated to the ATP in 1999, \$66m will be spent on first-year funding of new awards

ATP historical budget profile



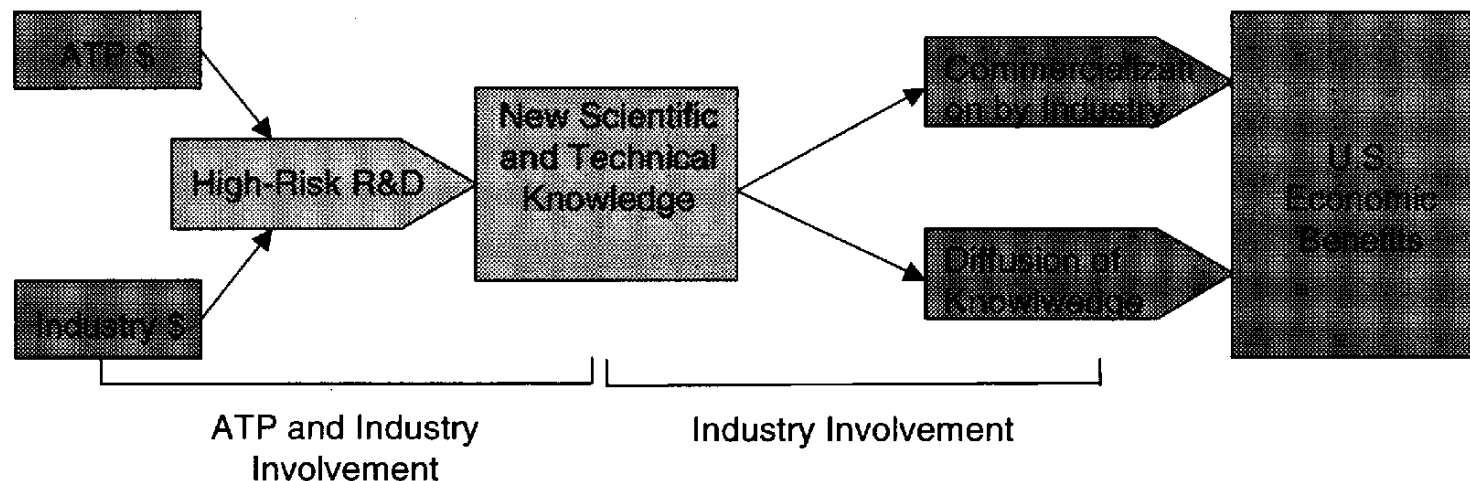
Source: ATP, November 1998

* The ATP's budget is determined largely by political factors. The large rise in 1994 was in Clinton's first budget - he was eager to raise the ATP's profile, and originally planned to raise its budget to \$680m by 1997. The drop in 1998 was the first budget of a more powerful Republican Congress (the Republicans view the ATP as 'corporate welfare')

+ The ATP was one of several federal agencies tapped to help pay for disaster relief (including costs associated with the Northridge Earthquake in LA) in 1995

The ATP partners with industry to fund high-risk R&D to develop new technologies; it does not take part in product development

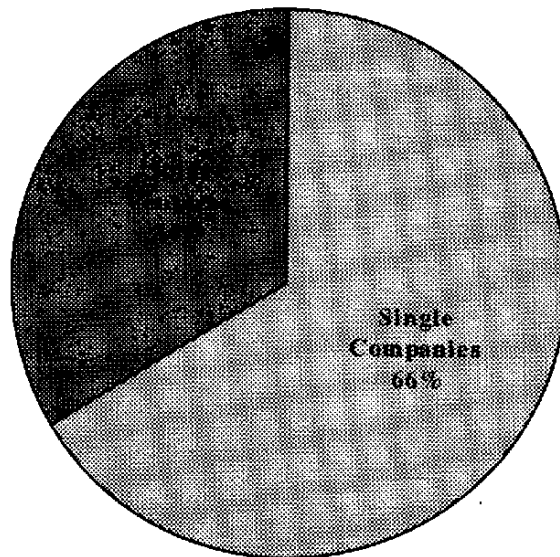
- The ATP funds applied technologies that have broad benefit to the U.S. economy through multiple applications, broad diffusion and significant commercial payoff
- It funds research up to the point where technological advancements make it feasible to begin product development, but it does not participate in the product development and commercialization activities



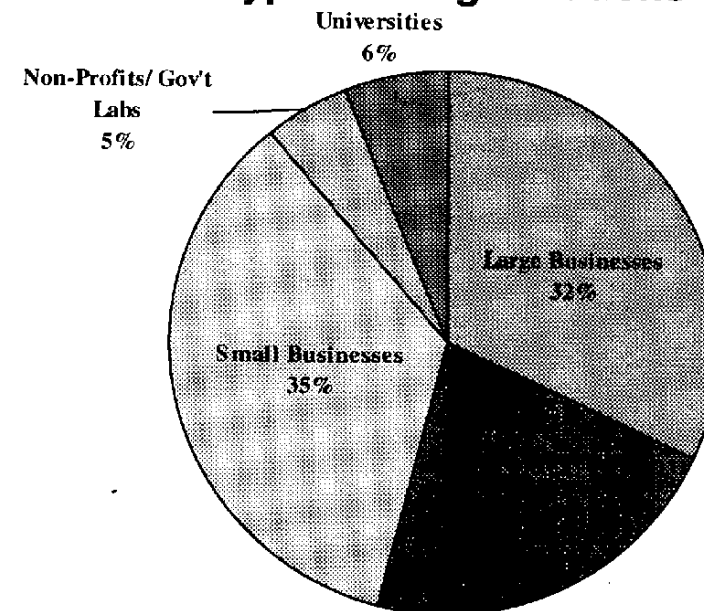
"The ATP helps companies get past the 'Valley of Death'—where there is no one else willing to invest, except maybe a foreign competitor—to achieve commercialization and economic spillover. Once a company has, or is closer to, a prototype, they can get money from the marketplace." —Marc Stanley, Associate Director, ATP

ATP project participants include single companies and joint ventures comprised of large, medium and small businesses, universities and federal research laboratories

Types of Projects



Types of Organizations



Source: ATP Business Progress Reports from 480 organizations in 210 ATP projects funded from 1993-1995. A small business is defined by fewer than 500 employees; a large business is defined as Fortune 500 or equivalent.

55% of the total awards to-date (ie 237) have gone to small businesses or to joint ventures led by small businesses

Of the \$2.783 billion funding for the 431 ATP advanced technology projects, more than 50 percent has come from industry sources

- The 431 projects co-funded by the ATP have received total funding of \$2.783 billion
- Industry sources have contributed \$1.397 billion (50.2% of the total) to ATP sponsored projects, while the ATP has contributed \$1.386 billion (49.8% of the total)*
- The ATP funding guidelines relating to single-company applicants specify:
 - There is a \$2 million ATP funding limit over three years
 - The company must cover all indirect project costs
 - Large companies (defined as having revenues of at least \$2.721 billion / year) must cover **at least** 60 percent of the total costs
- The ATP funding guidelines relating to joint-venture applicants specify:
 - There is no ATP funding limit
 - The joint venture must cover **more than** 50 percent of the total costs
- The cost-sharing guidelines were developed by Congress and thus were heavily influenced by political considerations (i.e. the need to avoid the appearance of “corporate welfare” to big business)

* Note that this figure - \$1.386 billion - is the money the ATP has given to industry; the additional \$158m out of the \$1.544 billion that the ATP has been allocated by Congress has covered operating expenses and other costs (including a small ‘tax’ to the SBIR)

Successful applications have spanned a wide range of high technology areas

Focused Program Areas*	Active or completed projects	ATP funding	Industry funding	Average industry share	Average project size
Adaptive Learning Systems	3	\$5.1m	\$4.4m	46.3%	\$3.2m
Catalysis & Biocatalysis Technologies	18	\$68.3m	\$73.1m	51.7%	\$7.9m
Component-Based Software	21	\$43.4m	\$24.8m	36.4%	\$3.2m
Digital Data Storage	17	\$76.4m	\$80.1m	51.2%	\$9.2m
Digital Video in Information Networks	11	\$63.5m	\$71.7m	53.0%	\$12.3m
Information Infrastructure for Healthcare	32	\$140.2m	\$139.3m	49.8%	\$8.7m
Manufacturing Composite Structures	27	\$84.2m	\$84.6m	50.1%	\$6.3m
Materials Processing for Heavy Manufacturing	22	\$43.0m	\$40.0m	48.2%	\$3.8m
Microelectronics Manufacturing Infrastructure	11	\$63.8m	\$70.7m	52.6%	\$12.2m
Motor Vehicle Manufacturing Technology	26	\$85.9m	\$76.9m	47.2%	\$6.3m
Photonics Manufacturing	10	\$41.1m	\$44.1m	51.8%	\$8.5m
Premium Power	16	\$44.0m	\$42.9m	49.4%	\$5.4m
Selective-Membrane Platforms	16	\$31.3m	\$39.8m	56.0%	\$4.4m
Technologies for the Integration of Manufacturing Applications	11	\$57.2m	\$57.6m	50.2%	\$10.4m
Tissue Engineering	26	\$51.1m	\$68.5m	57.3%	\$4.6m
Tools for DNA Diagnostics	32	\$122.7m	\$114.4m	48.2%	\$7.4m
Vapor Compression Refrigeration Technology	7	\$12.7m	\$12.8m	50.2%	\$3.6m

Total ATP Focused Program funding = \$1,034 (= 75% of the total \$1386 spent)

Total industry Focused Program funding = \$1046 (= 75% of the total \$1397 industry spend)

* The 30 Focused Program Competitions channeled funds into 17 Focused Program Areas

All Intellectual Property (IP) generated from ATP projects is owned by the for-profit companies involved in the specific projects

- The ATP stipulates that all ATP-generated IP must be owned by for-profit companies incorporated in the United States
 - These companies may license the IP to others
 - NIST has the right to require the recipient to grant license to a responsible applicant upon reasonable terms
- The government reserves the right to royalty-free, non-exclusive license for government use
 - The government rarely invokes this right
 - The government generally respects 'non-disclosure' of the works - ie even if it uses them, it does not allow them to be used by third parties
- Universities and non-profit research organizations involved in joint ventures cannot own title to IP, but may be entitled to receive royalties

Because the ATP does not get involved in the product development/ commercialization phase of R&D, all profits reside with project participants and their partners

- The ATP does not participate in product development/commercialization activities, but rather funds research up to the point where technological advancements make it feasible to begin product development
- The ATP's philosophy is to let market forces determine the most efficient means to commercialization for new technologies
- However, the ATP/NIST retains IP licensing rights (see slide 8) to ensure proper commercialization avenues are being pursued
- The majority of companies strive to launch new products/services or license technology to others as their primary commercialization strategy

The ATP proposal process requires that project goals are clearly defined from the outset

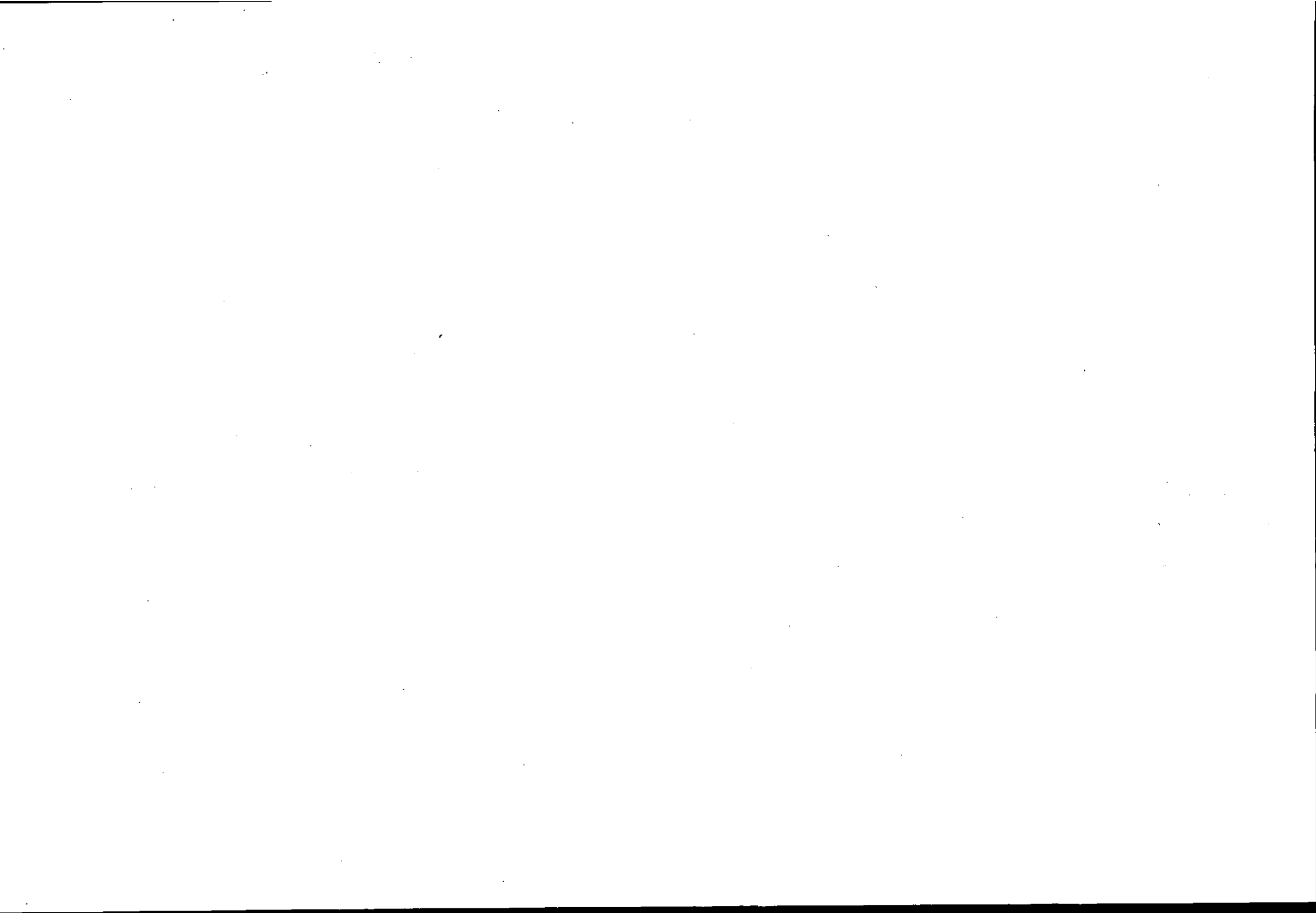
- ATP project proposals must clearly identify:
 - Project goals, along with a detailed research plan
 - Specific funding allocations
 - Established completion dates
- The ATP guidelines include certain parameters:
 - Projects are judged based on scientific and technical merit (50%) and broad-based economic benefits (50%)
 - There is a \$2 million limit for single-company applicants; however, there is no limit for joint-venture applicants
 - The project duration is limited to three years for single-company applicants and five years for joint-venture applicants
- While multi-year contract budgets may be revised* with ATP approval, the total project amount cannot be increased

* For example, moving money from one line item to another would be permissible. Shortly after their ATP project began, Third Wave Technologies, Inc. learned of a new assessment technology that had just come on the market and cost approx. \$80K. They had not budgeted for this, but the ATP allowed them to shift allocations from other areas of their budget to cover the cost. Because the new assessment technology increased the pace of their research threefold, they were able to shorten their research time and shift funds allocated for research labor and other research-related costs to cover the cost of the purchase

The ATP appears to be having a significant effect on encouraging industry to pursue high-risk R&D, increasing the scope of R&D and accelerating time-to-market of technological advances

- The ATP has funded projects focused in a wide array of technological disciplines including Information/Computer Systems, Manufacturing, Materials, Biotechnology, Electronics, Chemicals/Chemical Processing and Energy/Environment.
- The majority of ATP project participants indicate that industry R&D investment in the ATP-funded technology area has increased; and in many cases, it is predicted that without ATP funding, there would not have been a project
- Seventy percent of surveyed ATP project participants indicated that, as a result of ATP funding:
 - They had expanded the R&D scope
 - They were more willing to accept technical risk
- ATP funding has helped to accelerate R&D efforts in the ATP-funded area for 86 percent of project participants.

Sources: Silber & Associates Survey of ATP Awardees, 1996; ATP Business Progress Reports from 285 organizations in 179 ATP Projects after one or two years of ATP funding, 1993-1995.



第2章 助成のメカニズム

Project Funding

米国ATP(Advanced Technology Program: 先端技術プログラム)

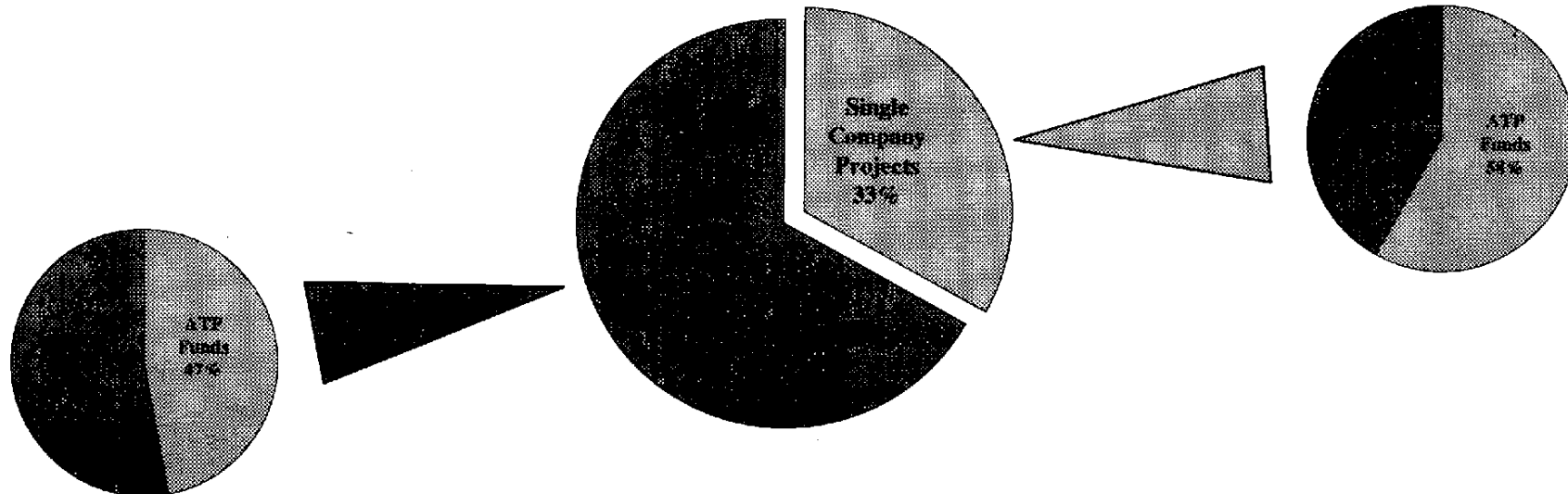
1	Overview
2	Project Funding
3	IP from ATP Projects
4	Profits from ATP Projects
5	Project Goals and Parameters
A	<i>Appendices</i>
A1	<i>Case Studies</i>
A2	<i>List of Sources</i>

Overall, the ATP has paid for more than 50% of the total cost of funded projects: 58% of single company projects, and 47% of joint ventures

**ATP/Industry
Breakdown: JV
[133 projects]**

**Total Funding
(ATP and Industry
Combined)
[408 projects]**

**ATP/Industry
Breakdown: Single Co.
[275 projects]**



Source: ATP reports on 408 ATP funded projects.

Funding guidelines are specifically determined by nature of applicant

	Small companies (<\$2.721billion)	Large companies* (>\$2.721billion)	Joint ventures
ATP will cover	<ul style="list-style-type: none"> ATP will cover all direct costs up to a limit of \$2m over a maximum period of three years 	<ul style="list-style-type: none"> ATP will cover all direct costs up to a limit of \$2m over a maximum period of three years, after the company's contribution of 60% of total project costs 	<ul style="list-style-type: none"> ATP will cover all direct costs for five years with no funding limit, after the JV's contribution of 50% of total project costs
Industry must cover	<ul style="list-style-type: none"> Company must cover all indirect costs, plus any direct costs over the government's contribution of \$2m 	<ul style="list-style-type: none"> Company must cover all indirect costs, plus some direct costs such that company contribution is >60% of the total project cost 	<ul style="list-style-type: none"> JV must cover all indirect costs, plus some direct costs such that JV contribution is >50% of the total project cost (costs may be shared in any fashion among JV partners)

* This rule was added in 1998 (until then large companies and small companies were not differentiated, and there were no % split requirements - simply a direct vs indirect cost split). The cost-sharing arrangements were developed by a Republican Congress to try to dispel the impression of 'corporate welfare' - donations to large companies

Determination of fair indirect costs is the key to ensuring adequate industry contribution

- For larger companies and joint ventures, industry contribution includes indirect costs which the company allocates to the project
- Theoretically, companies could claim company indirect expenses are related to the project which in practice are not, or could exaggerate the contribution (allocation of building space; need for new buildings; time of senior staff etc)
- This would make total project cost look bigger, but it would also make the company's (apparent) contribution seem larger - in other words, they could 'get away' with contributing less 'real money' to the project
- The ATP gets round this problem by maintaining strict rules on:
 - what direct and indirect costs are allowable and what are not - ie what can be counted towards the project and what cannot
 - industry standard tables of reasonable direct to indirect cost ratios (which vary tremendously from industry to industry)
- Applicants' proposed cost-sharing amounts tend to fall close to the minimum allowable!

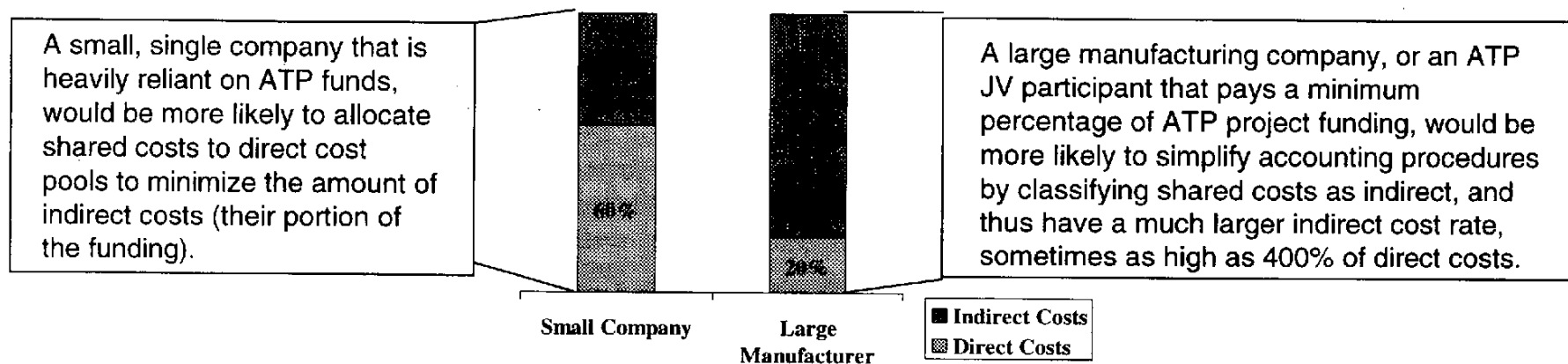
The ATP's definitions of direct and indirect costs are consistent with the generally accepted accounting principles (GAAP)

- Direct costs include costs that are readily identifiable with project-specific activities and are approved by the ATP subject to applicable federal cost principles
 - Salaries/wages of personnel working on the ATP project
 - Fringe benefits (i.e., medical insurance)
 - Project-related travel
 - Equipment specific to the ATP project
 - Materials and supplies
 - Subcontracts (billed to the lead contractor as 'total cost' - ie direct cost, indirect cost, and profit)
- Indirect costs include costs incurred for common or joint objectives that cannot be readily identified with ATP-related activities. Indirect cost rates are negotiated and / or approved by the ATP within 90 days of an award*
 - General administration (i.e., salaries and expenses of executive officers, personnel administration, accounting, library expenses, etc.)
 - Facility operating and maintenance costs
 - Depreciation of use allowance on buildings and equipment

* If a cost rate is determined to be too high (artificially inflating the contractor's proposed contribution) it is reduced and the total project budget drops. If this then means that the contractor's contribution is less than the minimum allowable (in the case of a large company or a JV), the ATP contribution would be reduced. In practice this situation is extremely rare.

Determining indirect costs is 'more of an art than a science' — rates typically can range from 25% to 400% of direct costs

- There are no real 'norms' for determining indirect cost rates, although key drivers in the process include:
 - Size of company and scale of overhead costs
 - Type of company: manufacturing companies have much higher overhead/indirect costs than do service companies
 - Cost allocation base: manufacturing companies usually use total direct costs; service companies usually use direct salaries
 - Sources of funding: funding arrangements impact the company's approach to accounting for direct and indirect costs



The ATP defines permissible sources for the industry portion of the ATP project funding

- Allowable sources of industry's cost-share of the funds cover most non-federal sources of funding
 - Cash contributions from state, county, city or other non-federal source
 - In-kind contributions from recipient or non-Federal third-party, other than subcontractor (i.e., equipment, research tools, software, supplies, etc.)
 - The value of in-kind contributions shall be determined in accordance with OMB Circular A-110, Subpart C, Section 23, except as specified in Section 295.25 of the ATP implementing regulations, and shall be prorated according to the share of total use dedicated to the ATP project
 - The total value of in-kind contributions that can be used for cost-sharing purposes is limited to 30 percent of the non-federal share of the total project costs
- Unallowable sources of industry's cost-share include
 - Other federal funds
 - Sunk costs
 - Subcontractors (to prevent subcontractor 'discounting', whereby the subcontractor's fee is artificially inflated to boost industry's apparent cost-share)

There are certain types of costs that are not permitted in ATP projects even though they would typically be allowed under the Federal Acquisition Regulations (FAR) or OMB cost principles

- Typically, federal contracts are a 'business venture' for the contractors, and consequently are intended to be profitable
- The purpose of ATP projects, however, is to enable recipients to generate commercial profits in the marketplace
- Hence recipients are not allowed to 'make a profit' on ATP-funded research

Unallowable costs

- Construction of new buildings or extensive renovations of existing laboratory buildings
 - However, (depreciation on the) construction of experimental R&D facilities is allowable, provided equipment or facilities are 'essential' for carrying out the project
- Indirect costs for single companies are not reimbursable (although large single companies may use these costs to meet their cost-sharing requirement)
- Profit, management fees, interest on borrowed funds or facilities capital cost of money*
- Bid and proposal costs, tuition costs, marketing surveys, commercialization studies and general business planning, unless they are incorporated into a Federally-approved indirect cost rate
- Subcontract work to another part of the same company or to another company with identical or nearly-identical ownership

The duration and amount of ATP funding varies greatly by project type and scope

<u>ATP Project</u>	<u>Type</u>	<u>Duration</u>	<u>Total Funds</u>	<u>ATP %</u>
Affymetrix, Inc. <i>DNA Diagnostics</i>	JV	5.0 years	\$62.97 M	49.9%
Kopin Corp. <i>Display Technology</i>	JV	3.2 years	\$12.44 M	49.0%
AI Ware <i>Artificial Intelligence Software</i>	JV	4.7 years	\$7.62 M	49.7%
Texas Instruments <i>Integrated Circuitry Insulation</i>	Single	3.0 years	\$5.56 M	35.5%
Third Wave Technologies, Inc. <i>DNA Diagnostics</i>	Single	2.0 years	\$2.77M	72.2%
Nonvolatile Electronics, Inc. <i>Magnetoresistive Computer Memory</i>	Single	3.0 years	\$2.61 M	66.7%

第3章 ATPプロジェクトから生まれる知的財産権

IP from ATP Project

米国ATP(Advanced Technology Program: 先端技術プログラム)

1	Overview	p6
2	Project Funding	p20
3	IP from ATP Projects	p30
4	Profits from ATP Projects	p40
5	Project Goals and Parameters	p50
A	<i>Appendices</i>	
A1	<i>Case Studies</i>	p58
A2	<i>List of Sources</i>	p63

The ATP's motive is to place IP with the organization that is most likely to carry the development work to commercialization: the for-profit program participants

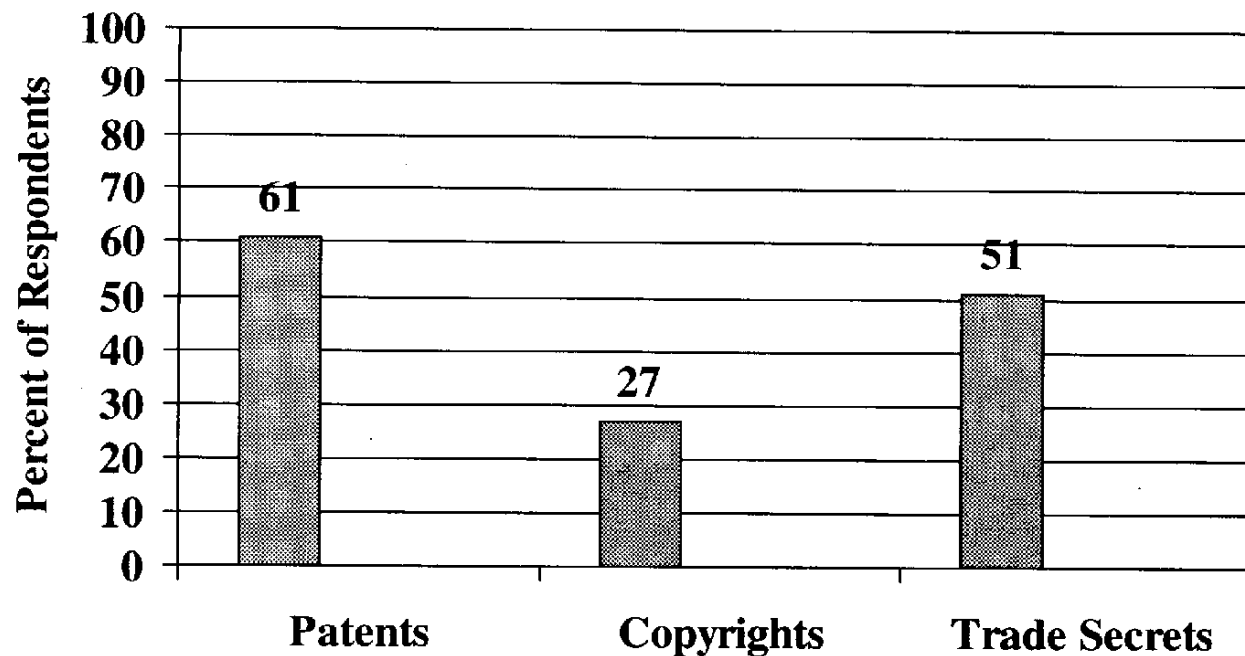
- In line with the ATP's mission of stimulating the U.S. economy, all ATP-generated patents must be owned by for-profit organizations incorporated in the United States
 - Universities and non-profits involved in ATP projects cannot own title to patents, but can receive royalties from the title holder (this provision is currently under review by Congress)
- ATP-generated copyrights reside with the creator, as is standard with copyrights
- Ownership issues are clearly defined in the case of single-company applicants
- In the case of joint-venture applicants, the members of the joint venture must negotiate IP issues among themselves, subject to ATP requirements
- Owners of IP can license IP to others

Despite the fact that the IP ownership rests with industry participants, the ATP cooperative agreement maintains certain ATP IP rights as protective measures

- The government reserves the right to a royalty-free, non-exclusive license to IP for government use
 - This right has never been invoked
 - Non-disclosure of proprietary information
- NIST maintains “march-in rights” to require recipient to grant license of patents if necessary to achieve commercialization
 - “to a responsible applicant or applicants, upon terms that are reasonable under the circumstances”
 - In an extreme case, if it were determined that the title holder’s intent was to deceive, there would be no obligation to compensate the title holder for the license
 - NIST has never exercised this right, to date

The primary intellectual property strategies pursued by ATP funding recipients include patents, copyright protection and the maintenance of trade secrets

Primary Elements Included in IP Strategy



Source: ATP Business Progress Reports from 480 organizations funded 1993-1995.

The ATP is not involved in the negotiation of IP agreements among joint venture partners, which tend to vary widely depending on the nature of the joint venture

- A typical arrangement in a joint venture comprised of one large company and several smaller companies might be structured as follows
 - The large “lead” company holds title to all project-generated IP
 - The smaller JV participants have the right to a non-exclusive license, usually involving the payment of royalties to the title holder
- When a JV is comprised of two or more comparably-sized companies, typically a modular approach is applied
 - Each company patents their own work
 - The other company(ies) have the right to a non-exclusive license, again usually involving royalty payments

“Each participant signs a cooperative agreement specifying which intellectual property belongs to whom, and who gets to publish what when the project wraps up. That can sometimes be kind of tricky, but there really is a willingness to cooperate.”

—Thomas Lettieri, Project Manager, ATP

The ATP has clearly defined procedures regarding the reporting and treatment of patents and copyrights

- Recipients' "patent representative" must disclose patent inventions to the ATP within two months of the author's disclosure to the patent representative
 - The ATP must also be informed upon issuance of the patent
- Funding recipients must acknowledge Government sponsorship in applicable copyright notices
- The decision on whether or not to publish research results will be made by the funding recipient(s)

ATP-generated IP can be applied to the title holder's in-house products/processes and/or licensed to other companies to generate one-time and/or ongoing payment streams

ATP Project

Affymetrix/Molecular Dynamics
DNA Diagnostics

Nonvolatile Electronics, Inc.
Magnetoresistive Computer Memory

Sample IP Results

- Generated multiple patents
- Launched several new products/systems based on research
- Resulted in more than 30 licensing agreements and joint-venture R&D studies (i.e. Beckman Coulter Inc., Eos Biotechnology, Hewlett Packard, Incyte Pharmaceuticals, Merck, OncorMed, Parke-Davis Pharmaceutical Division)
- Licensed technology to Honeywell, Inc.
- Commercializing technology in JV with Motorola, Inc.
- Launched new spin-off application products

ATP-generated IP can be applied to the title holder's in-house products/processes and/or licensed to other companies to generate one-time and/or ongoing payment streams (*continued*)

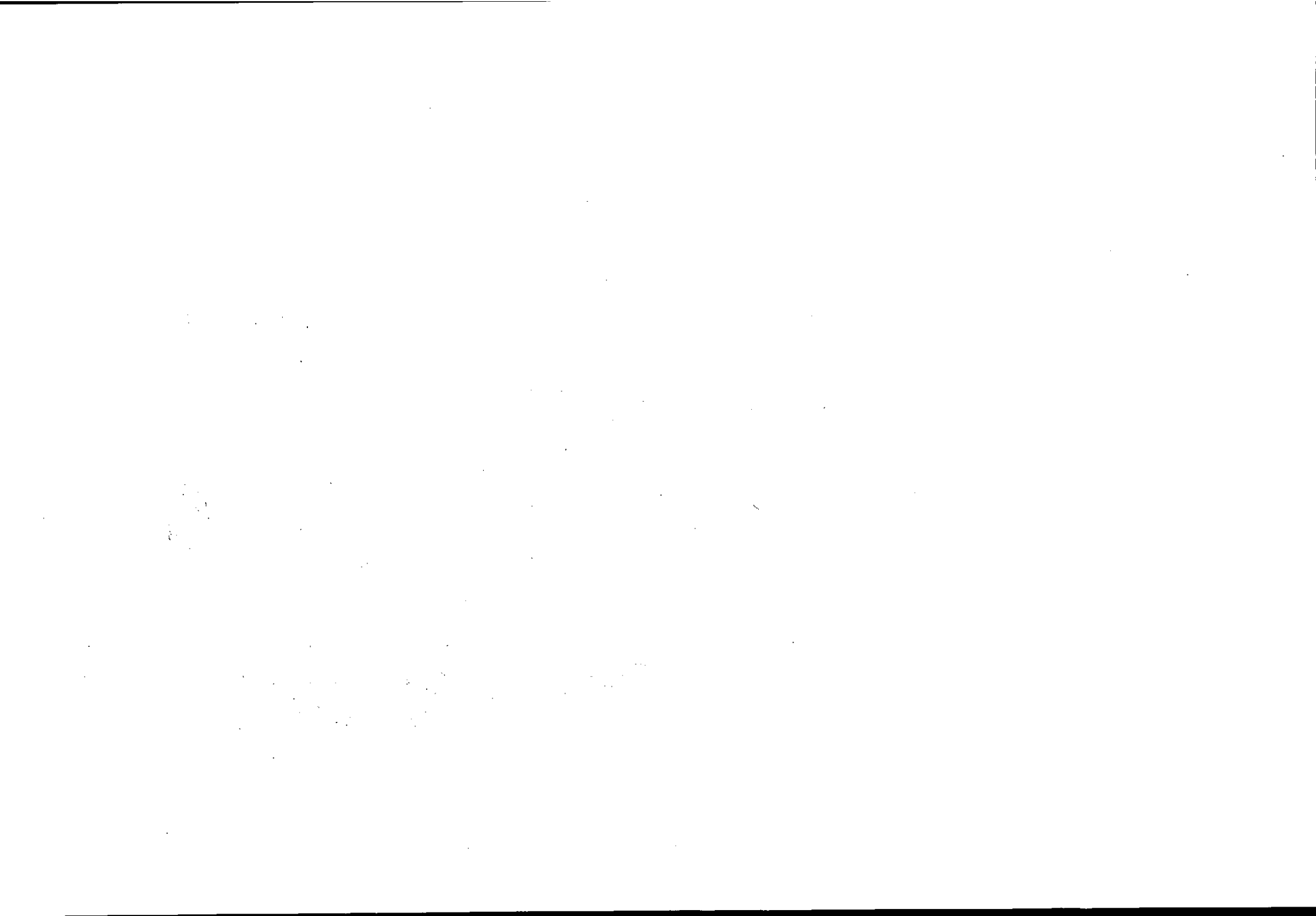
ATP Project

Texas Instruments
Integrated Circuitry Insulation

Third Wave Technologies, Inc.
DNA Diagnostics

Sample IP Results

- Generated about 20 patents
- Published 10 technical papers
- Strategy to license processing methods to insulator material customers (i.e. semiconductor and integrated circuit manufacturers)
- Generated about 20 patents, with many more expected to follow during the next five years
- Launched three new products based on technology
- Negotiating licensing agreements with several large pharmaceutical companies



第4章 ATPプロジェクトから生まれる利益

Profits from ATP Project

米国ATP(Advanced Technology Program: 先端技術プログラム)

1	Overview	p6
2	Project Funding	p20
3	IP from ATP Projects	p30
4	Profits from ATP Projects	p40
5	Project Goals and Parameters	p50
A	<i>Appendices</i>	
A1	<i>Case Studies</i>	p58
A2	<i>List of Sources</i>	p63

Any profits that may derive from successful ATP projects are the property of the company that achieves them

- The federal government does not employ any mechanism other than corporate taxation*to retrieve profits that may result from ATP-funded research
 - The government does not demand a 'profit share'
 - The government does not own IP, and consequently does not take royalties
- Federal research as a whole, and the ATP in particular, aims to secure the 'economic benefit of the United States'; that purpose is better served by allowing private sector profits to remain in the private sector, where they act as an incentive, and where they can be put to practical use in funding further growth
- The federal government is prohibited by law from acting as a business - it is not allowed to receive a direct 'return on investment'
- Because of this policy, federal funds are effectively a tremendous bonus to private companies - free money, for needed research, with no direct payback. This acts as an encouragement to competition for the funds, which means that only 'better' projects get funding in the first place

* Including payroll tax - Third Wave Technologies had 6 employees at the commencement of the ATP project in 1994, but had 72 when the project finished in 1996 (today they have 92)

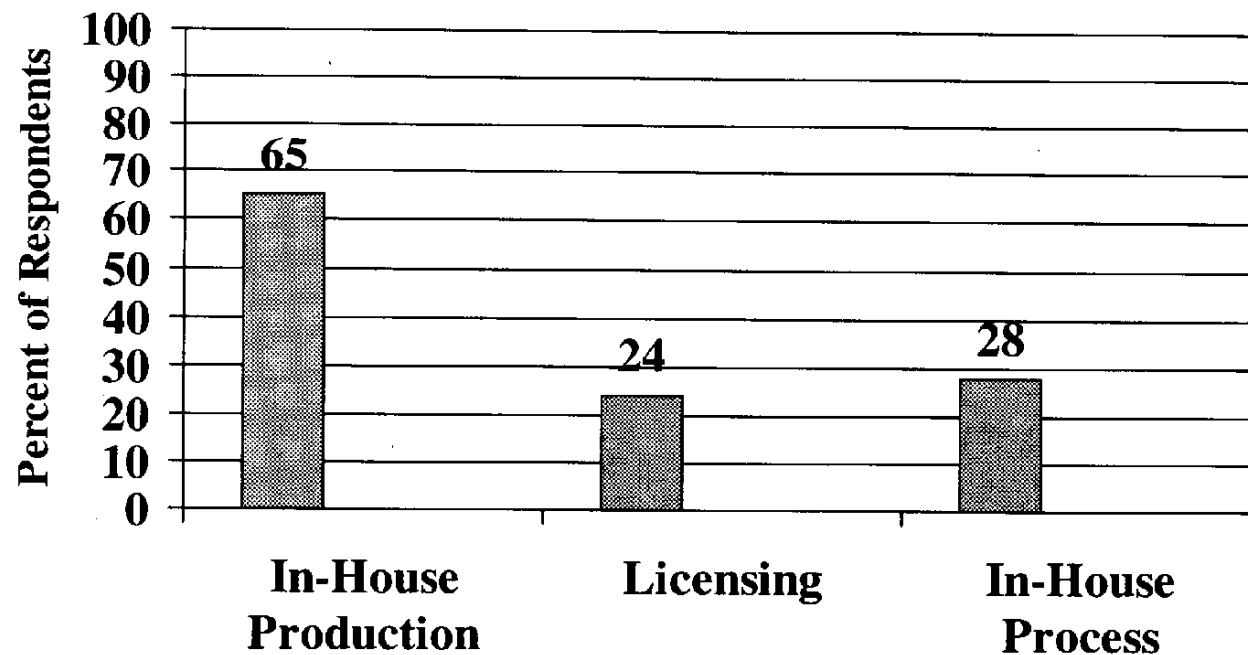
Profits from successful ATP projects are realized within the commercial sector by project participants and their partners via several different avenues

- Participant companies indicate that ATP-related technology developments will translate into improved bottom line results by achieving performance improvements, cost reductions, a reduction in time-to-market or some combination of the above
 - 29 percent anticipate a performance improvement of 100 percent or greater
 - 28 percent expect a cost reduction of 25 percent or more
 - 80 percent expect to reduce the time-to-market by at least one year, and 62 percent anticipate a reduction of two or more years
- Companies pursue several different strategies for commercialization
 - 65 percent plan in-house production of the product or service as part of their primary commercialization strategy
 - 79 percent indicate that licensing is a possible means to commercialization, with 24 percent planning to use it as part of their primary strategy
 - 28 percent plan to adopt the new process for in-house use

Source: ATP Business Progress Reports from 207 projects funded 1993-1995.

In-house production is the most common primary commercialization strategy, although most companies pursue several strategies simultaneously

Primary Commercialization Strategy



Source: ATP Business Progress Reports from 480 organizations funded 1993-1995.

Based on a survey of ATP project participants funded during 1993-1995, participants had either begun to or were on track to earn revenues from the ATP-related technologies

- The majority (59 percent) anticipate developing new commercial opportunities, while 41 percent anticipate achieving product or process improvements as a result of the technology
 - 35 percent of the applications were deemed to represent “new-to-the-world” solutions to a market need or problem
- More than two-thirds of the new technologies (65 percent) are deployed in manufactured products, with the remainder being applied to manufacturing processes and services
- Twenty-six of the projects surveyed had achieved “early” revenues after one or two years of funding
 - More than \$20 million from sales of prototypes and early spin-off products
 - \$445,000 from licensing royalties
- Most participants expect revenues within four years of ATP funding

Source: ATP Business Progress Reports from 207 projects funded 1993-1995.

ATP funding helps companies move from a “scientifically demonstrable” technology to a prototype, at which point the market assists companies in reaching commercialization

- To take their ATP-generated research through to the commercialization stage, companies typically pursue the following paths
 - Secure external venture capital, corporate or government (non-ATP) funding
 - Go public
 - Form an alliance with a large company
 - Become acquired by a large company
 - Utilize internal resources to support commercialization efforts

“We wouldn’t have been able to do [this research] without the ATP. The ATP money helped to validate what we were doing for our partners and in the eyes of the investment community.”

—Robert Lipshutz, Vice President of Corporate Development, Affymetrix, Inc.

“[The ATP helps companies make] a difficult transition from technological innovation to product commercialization. Unproved technology is difficult to market.”

—Greg Merrill, President and CEO, HT Medical Inc.

“[The ATP] primes the pump for future federal and venture capital support.”

—Francis Barany, Professor of Microbiology, Cornell University Medical Center

ATP funding recipients leverage their ATP-sponsored activities to commercialize new products, secure additional funding and establish partnerships to achieve their business goals

ATP Project

Affymetrix, Inc.
1994-99

DNA Diagnostics

AI Ware
1994-99

Artificial Intelligence Software

Sample Commercialization/Profit Activities

- First product (GeneChip® Systems) commercialized mid-1996, resulting in \$4.8m in revenues in 1997
- Follow-on funding from NIH and other federal and corporate partners
- IPO, June 1996, raising \$92m
- 377% increase in product revenues from 1997 to 1998 to \$22.8m resulting from growth of GeneChip sales
- Commercialized Process Advisor artificial intelligence technology
- Company acquired by Computer Associates Int'l in 1997

ATP funding recipients leverage their ATP-sponsored activities to commercialize new products, secure additional funding and establish partnerships to achieve their business goals (*continued*)

ATP Project

Sample Commercialization / Profit Activities

Kopin Corp.

1994-98

Display Technology

- Formed alliance with Motorola to develop, manufacture and market products (including new categories of products) based on CyberDisplay™ technology
- Additional agreements with other OEM partners (Siemens Wireless, Gemplus and FujiFilm Microdevices)
- 77% increase in product revenues from 1997 to 1998 (from \$13.1m to \$23.2m), due in part to the shipping of more than 100,000 CyberDisplay units
- Winner of Industry Week's 1998 "25 Technologies of the Year" award

Nonvolatile Electronics, Inc.

1991-94

Magnetoresistive Computer Memory

- Alliance with Motorola to commercialize MRAM chips, expected in 1999
- Motorola acquisition of 12% equity stake in company
- Commercialization of spin-off GMR sensors, with revenues of more than \$500,000

ATP funding recipients leverage their ATP-sponsored activities to commercialize new products, secure additional funding and establish partnerships to achieve their business goals (*continued*)

ATP Project

Texas Instruments

1994-97

Integrated Circuitry Insulation

Sample Commercialization / Profit Activities

- Alliance with NanoPore, Inc. to develop materials
- NanoPore spin-off acquired by Allied Signal, Inc. in 1998 to market Nanoglass material
- Expectation to license processing method to Nanoglass customers (i.e. semiconductor and integrated circuit manufacturers)

Third Wave Technologies, Inc.

1994-96

DNA Diagnostics

- First product kit commercialized mid-1996, with \$300,000 in revenues by YE 1996
- Follow-on funding from NIH and DOE
- Launched three new products by mid-1998 and projects revenues of over \$100m within five years
- Negotiating deals to sell/license technology to major pharmaceutical and agricultural companies

第 5 章 プロジェクトの達成目標とパラメータ

Project Goals and Parameters

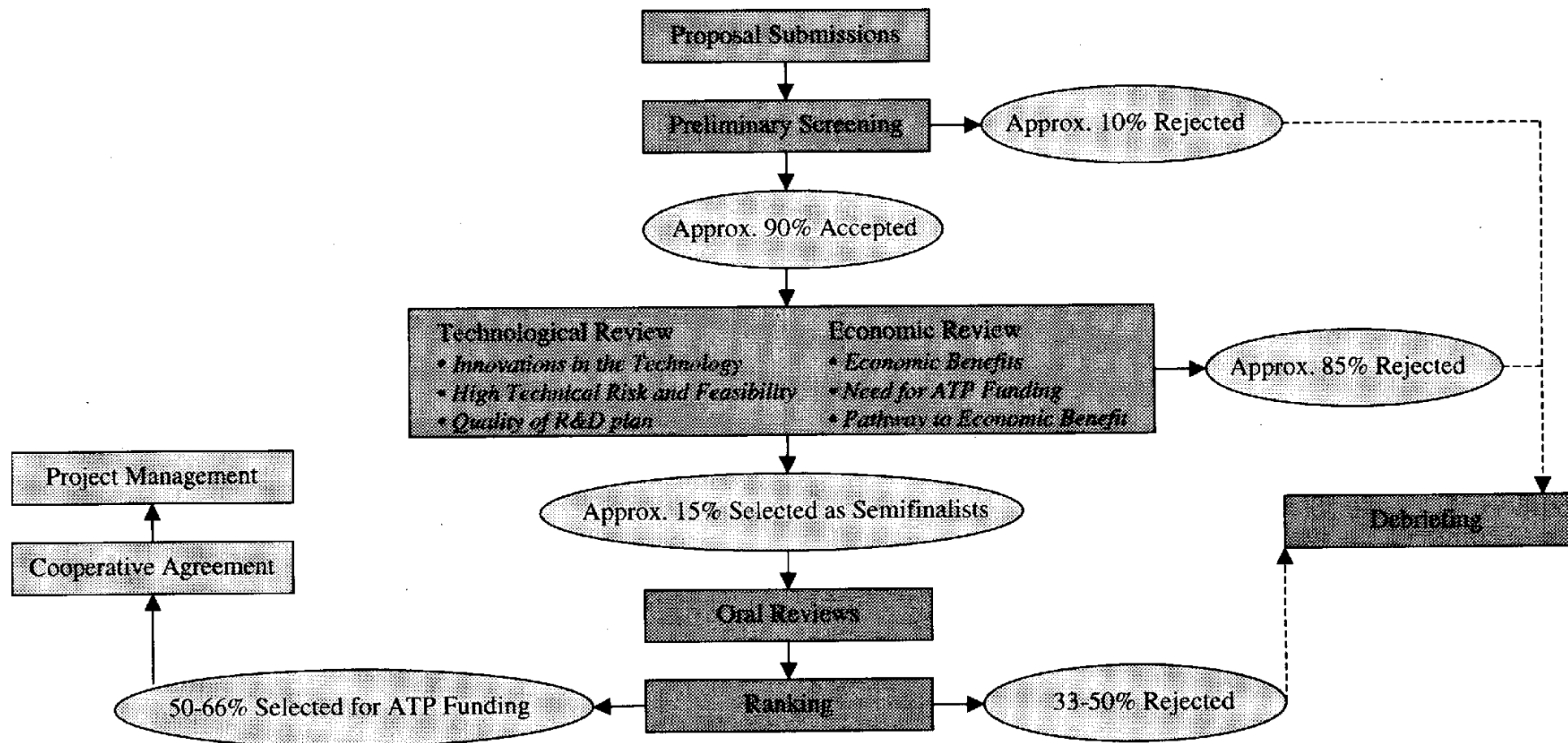
米国ATP(Advanced Technology Program: 先端技術プログラム)

1	Overview	p6
2	Project Funding	p20
3	IP from ATP Projects	p30
4	Profits from ATP Projects	p40
5	Project Goals and Parameters	p50
A	<i>Appendices</i>	
A1	<i>Case Studies</i>	p58
A2	<i>List of Sources</i>	p63

The parameters of ATP projects are defined during the proposal process, in which the project goals, duration and budget are specified

- ATP proposals are judged based upon scientific and technical merit (50 percent) and broad-based economic benefits (50 percent)
- All proposals must be led by for-profit entities and project guidelines specify a \$2 million/three-year limit for single applicants and a five-year limit for joint-venture applicants
- While multi-year contract budgets may be revised with ATP approval, the total project amount cannot be increased
- Proposals must identify
 - Potential commercial benefits and a strategy for achieving them
 - Existing technical barriers to realizing commercial benefits
 - Relationship between existing technical barriers and specific R&D objectives
 - Detailed R&D plan for breaking through technical barriers

The proposal selection process includes pre-screening, peer-review by scientific, technical and business experts, oral review and final ranking



The ATP requires certain oversight and audit activities of recipients in order to monitor the progress of the projects

- Recipients are required to participate in project kick-off meetings, annual reviews and closeout sessions with the ATP technical and business project managers assigned to their project
- Recipients submit quarterly financial, technical and business reports to the ATP
- Occasionally, recipients are asked to participate in special studies conducted by NIST to evaluate the effectiveness of the ATP
- If a recipient company undergoes major structural changes, new management must provide the ATP with written confirmation of continued commitment consistent with approved project goals
- In the case of joint ventures, the “lead” company is responsible for the management of the project among JV partners and acts as the ATP liaison

The ATP pays funds in installments matched by the industry cost share, enabling swift withdrawal if necessary

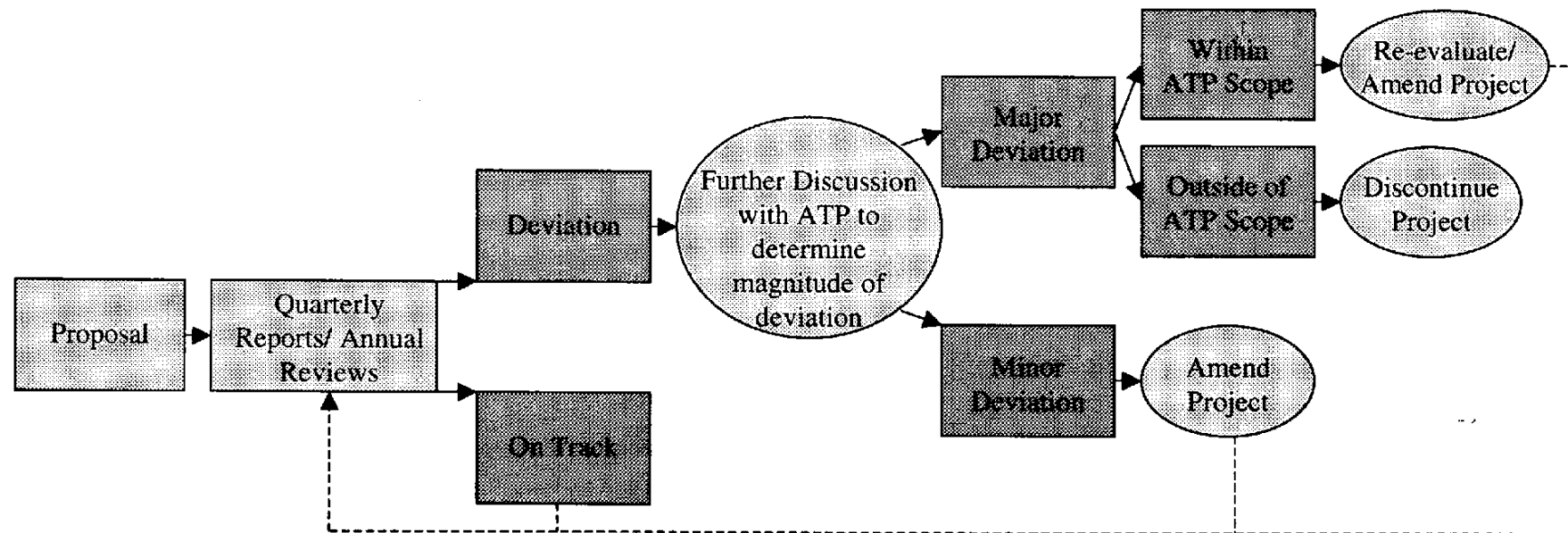
- The ATP funds are supplied to the project in installments (usually quarterly); these funds must be 'matched' by the industry funds - in other words the recipient must provide its percentage share at each funding stage
- This step-by-step approach means that if the project review process uncovers any nefarious activity, or determines that the project is going seriously astray of its targets, the government can call an immediate halt with loss only of funds spent to date*
- Similarly, if the project goals are changed or found to be inappropriate, or the circumstances of the recipient change (for example if it was bought by a foreign company), Public Law 102-245 authorizes immediate suspension of the project funding
- As a final check, projects and subcontractors over \$300k must be professionally audited by either an independent auditor or the 'Resident Cognizant Federal Auditor' (a government auditor appointed by the ATP) at ATP-defined intervals⁺ (the cost can be considered a direct cost and paid for by the government)

* In practice, it is difficult for the government to 'lose' money, since the government can recover misspent funds through the courts if necessary

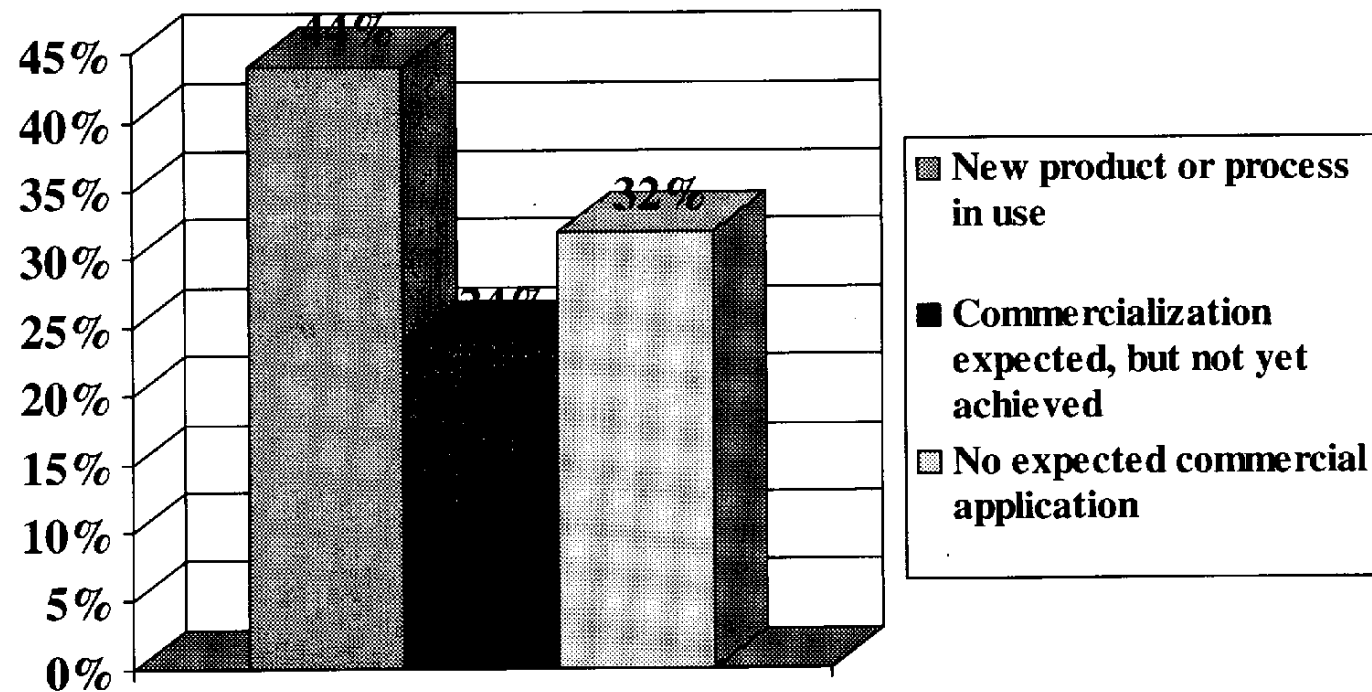
+ If project is less than two years, audit at end; if project is 2-4 years, audit at end of 1st year and at end of project; if project is 5 years, audit at end of 1st, 3rd and 5th years.

While it is “quite common” for recipients to make minor amendments to their plan (with ATP approval), it is rare that a recipient undergoes a major change of course

- The ATP maintains that it is “flexible” in its approach to project management as long as the results are consistent with the original intent of the project; however, a recipient “would need to make a *really* good case to have a major change of course”



Early estimates suggest strong results for the ATP, based on the progress of the first 50 ATP projects four to six years after the commencement of ATP funding



Of the 16 'No expected commercial application' projects, 4 simply did not generate a commercial result; however 12 projects were terminated for a variety of reasons such as for example an inability to resolve IP agreements, financial difficulty on the part of the company, ATP cut-off of funding due to lack of goal achievement, a change in corporate priorities/strategic direction. Source: ATP

付属資料

Appendix

米国ATP(Advanced Technology Program: 先端技術プログラム)

1	Overview	p6
2	Project Funding	p20
3	IP from ATP Projects	p30
4	Profits from ATP Projects	p40
5	Project Goals and Parameters	p50
A	<i>Appendices</i>	
A1	<i>Case Studies</i>	p58
A2	<i>List of Sources</i>	p63

<i>Project Description</i>	Develop next generation liquid-crystal projection display technology capable of producing the high-quality, high-resolution images needed for monitors, multimedia applications and high-definition TV
<i>Type of Project</i>	Joint Venture
<i>Project Participants</i>	Kopin Corp., Philips Electronics North America, Massachusetts Institute of Technology
<i>Project Commencement</i>	November 1994
<i>Project Duration</i>	3.17 years
<i>ATP Funds</i>	\$6.1 M
<i>ATP Percentage</i>	49.0%
<i>Total Funds</i>	\$12.4 M
<i>Outcomes</i>	Commercialization of CyberDisplay™ technology; entered marketing alliances with Motorola, Siemens Wireless, Gemplus and FujiFilm Microdevices; winner of Industry Week's 1998 "25 Technologies of the Year" award

<i>Project Description</i>	Develop a Miniature Integrated Nucleic Acid Diagnostic (MIND) device, suitable for use in hospitals, clinics or doctors' offices, to provide rapid, accurate diagnosis of a wide variety of diseases
<i>Type of Project</i>	Joint Venture
<i>Project Participants</i>	Affymetrix, Inc., Molecular Dynamics, Inc, Lawrence Livermore National Laboratory, Stanford University, UC Berkeley, California Institute of Technology, University of Washington
<i>Project Commencement</i>	October 1994
<i>Project Duration</i>	5 years
<i>ATP Funds</i>	\$31.5 M
<i>ATP Percentage</i>	49.9%
<i>Total Funds</i>	\$63.0 M
<i>Outcomes</i>	Multiple patents; approximately 30 licensing/ joint venture R&D agreements with such partners as Eos Biotechnology, Hewlett Packard, Incyte Pharmaceuticals, Parke-Davis, etc.; GeneChip® Systems first commercialized in 1996 (two years into the project); IPO June 1996.

<i>Project Description</i>	Develop a fast, dense nonvolatile memory capable of unlimited read/write cycles, based on a unique magnetoresistive memory (MRAM).
<i>Type of Project</i>	Single company
<i>Project Participants</i>	Nonvolatile Electronics, Inc.
<i>Project Commencement</i>	March 1991
<i>Project Duration</i>	3 years
<i>ATP Funds</i>	\$1.7 M
<i>ATP Percentage</i>	66.7%
<i>Total Funds</i>	\$2.6 M
<i>Outcomes</i>	Alliance with Motorola to commercialize MRAM chips; commercialization of spin-off GMR sensors; licensing agreement with Honeywell, Inc.;

The ATP Component-Based Software Program funded 21 projects over three competitions (1994, 1995 and 1997), with an estimated \$43.3 M in ATP funding and \$24.8 M in industry funding

- The program emerged from more than 100 “white papers” submitted from industry sources proposing programs areas in various fields of software and information technology
 - Five regional workshops were held to refine the program focus
 - The goal of the program is to develop the technologies needed to enable systematically reusable software components suitable for a broad array of applications
- Some examples of funded projects include:

Company	Project Description	Dates	ATP Funds	Total Funds
Aesthetic Solutions	A component technology for virtual reality based applications	1994-97	\$1.7 M	\$2.3 M
Andersen Consulting	An architecture-driven approach to component integration	1994-97	\$2.0 M	\$4.0 M
Sagent Corporation	Cost-based generation of scalable, reliable, real-time software components	1995-97	\$1.9 M	\$2.1 M
Reliable Software Tech.	Certifying security in E-commerce components	1997-00	\$2.0 M	\$2.4 M

Source: ATP website: Component- Based Software Focused Program

米国ATP(Advanced Technology Program: 先端技術プログラム)

1	Overview	p6
2	Project Funding	p20
3	IP from ATP Projects	p30
4	Profits from ATP Projects	p40
5	Project Goals and Parameters	p50
A	<i>Appendices</i>	
A1	<i>Case Studies</i>	p58
A2	<i>List of Sources</i>	p63

ATP Website

ATP Proposal Preparation Kit, November 1998

ATP Proposers' Conference Presentation, November 1998

A Guide for Program Ideas, ATP, September 1996

Development, Commercialization and Diffusion of Enabling Technologies, Jeanne Powell, ATP, December 1997

Evaluation Plan and Progress, Rosalie Ruegg, ATP, November 1997

Marc Stanley, Associate Director, ATP, interview

Jeanne Powell, Senior Economist, ATP, interview

Stanley Abramowitz, Program Manager, ATP, interview

Barbara Lambis, Administrative Support Group, ATP, interview

George White, Financial Assistance Group, ATP, interview

Katie McKevit, Indirect Cost Coordinator, Office of the Inspector General, interview

Mary Ann Brow, Co-founder, Senior Scientist, Third Wave Technologies, Inc, interview

Anne Bodich, Investor Relations, Affymetrix, Inc, interview

本書の全部あるいは一部を断りなく転載または複写（コピー）することは、
著作権・出版権の侵害となる場合がありますのでご注意ください。

米国の情報産業技術振興政策の事例研究
－ATP(Advanced Technology Program)：先端技術プログラム－

©平成11年3月発行

発行所 財団法人 日本情報処理開発協会

先端情報技術研究所

東京都港区芝2丁目3番3号

芝東京海上ビルディング4階

TEL (03) 3456-2511

