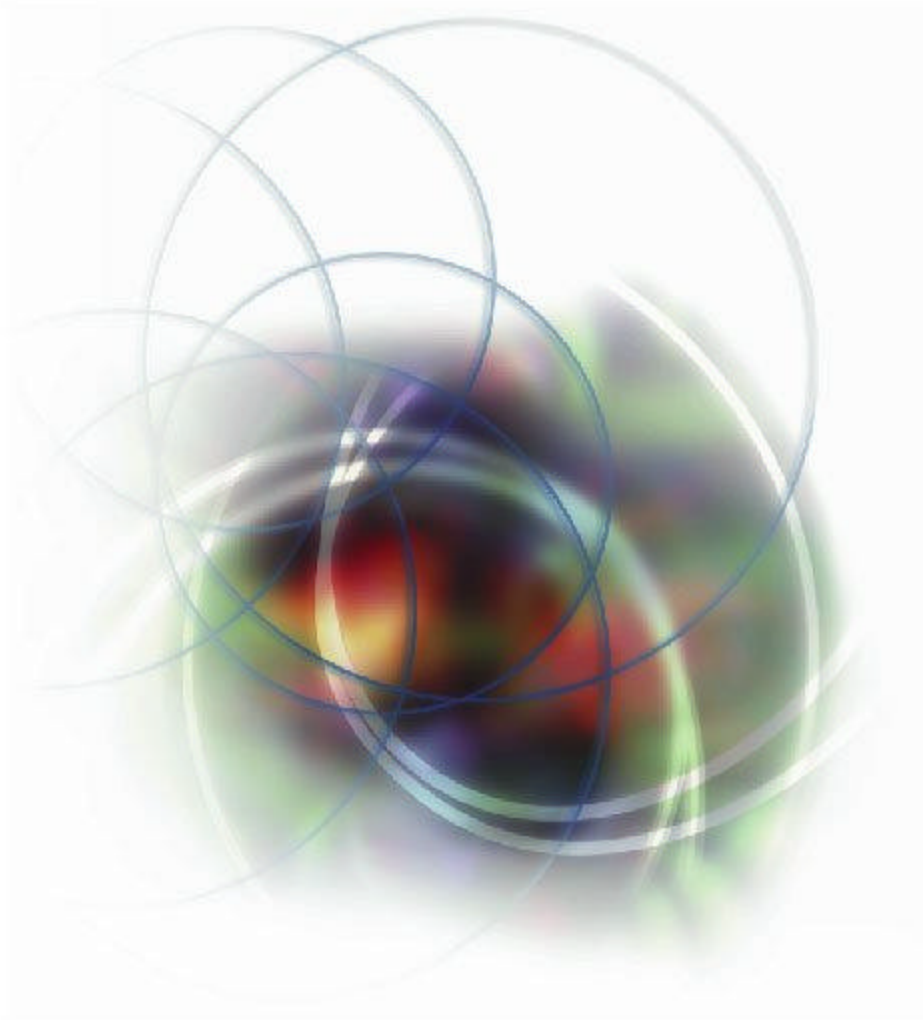
"Delivering Public Benefit With Private Sector Efficiency Through the ATP"



- A Decade of . . .
  - Innovation
  - Program Assessment
  - Benefits to the Nation

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Economic Assessment Office
Advanced Technology Program
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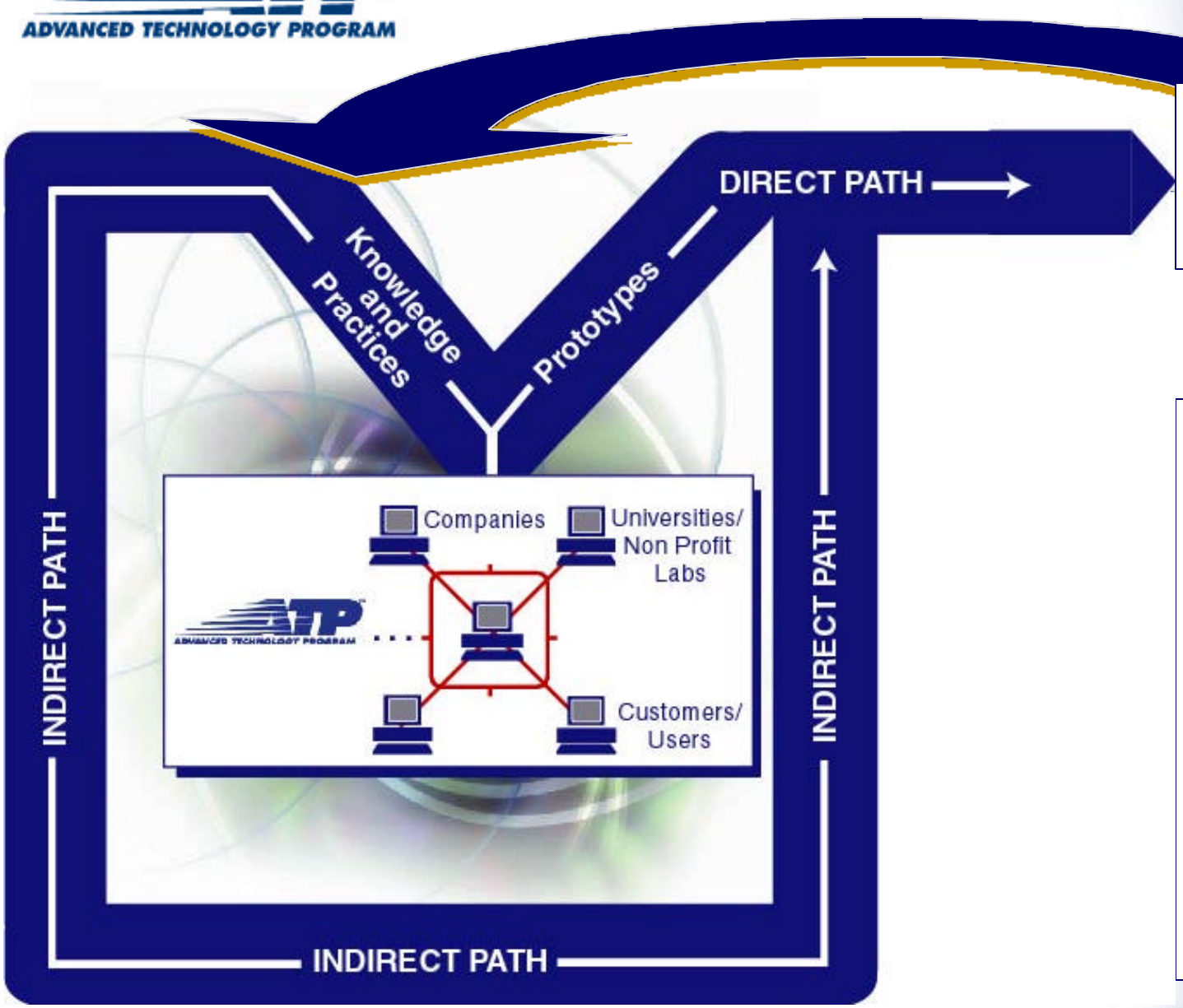
NAS/NRC/STEP Workshop on Assessing the ATP
Washington, D.C.
April 25, 2000

A Decade of Innovation

- 468 projects co-funded
- 1,067 participants and 1,027 subcontractors
  - > 50% of projects led by small businesses
  - More than 145 Universities participating
  - Nearly 20 national laboratories participating
- $3 billion of advanced technology development funded
  - ATP Share = $1.496 billion
  - Industry Share = $1.499 billion

Direct & Indirect Paths to Impacts

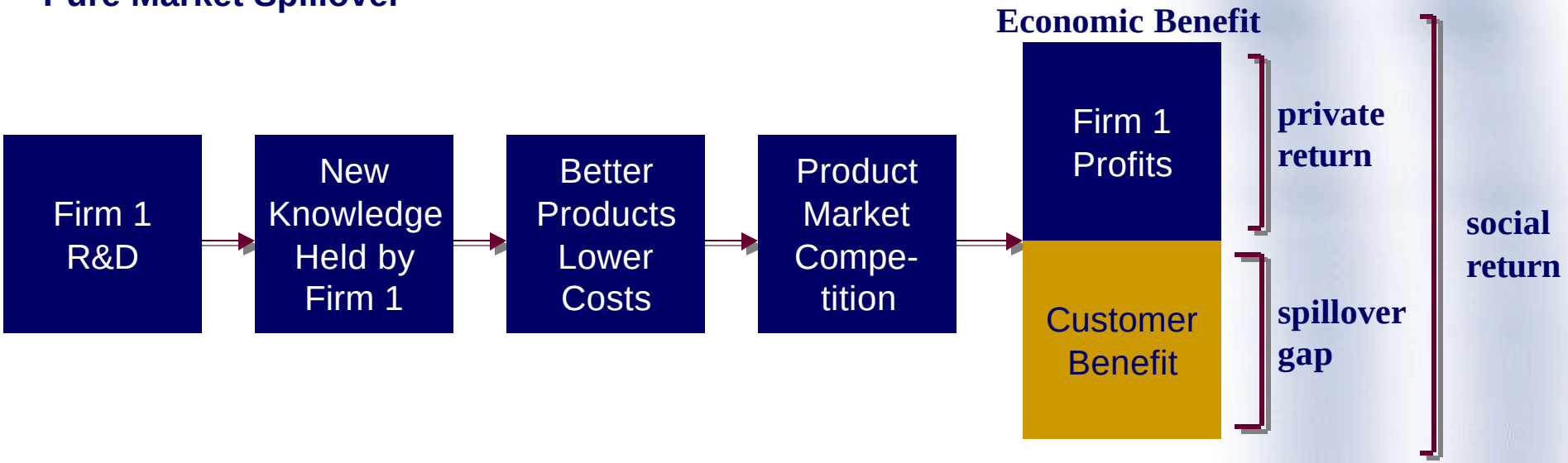


New/Improved Products and Services

- *Productivity Gains*
- *New Business Opportunities*
- *Employment Benefits*
- *Higher Standard of Living*
- *Quality of Life Gains*

"Direct Path" Benefits
Private and Social Returns to R&D

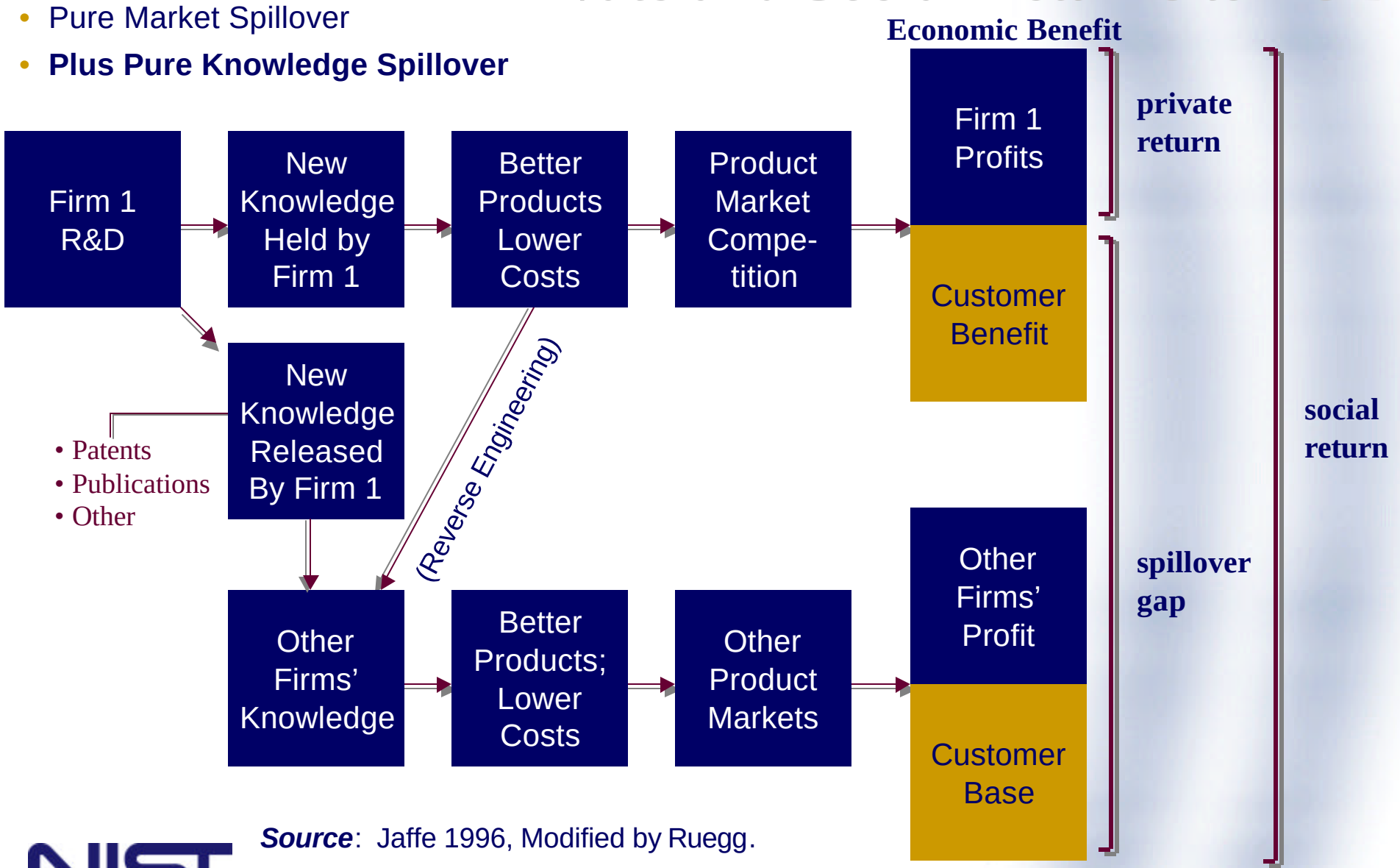
- **Pure Market Spillover**



Source: Jaffe 1996, Modified by Ruegg.

"Direct & Private and Social Returns to R&D

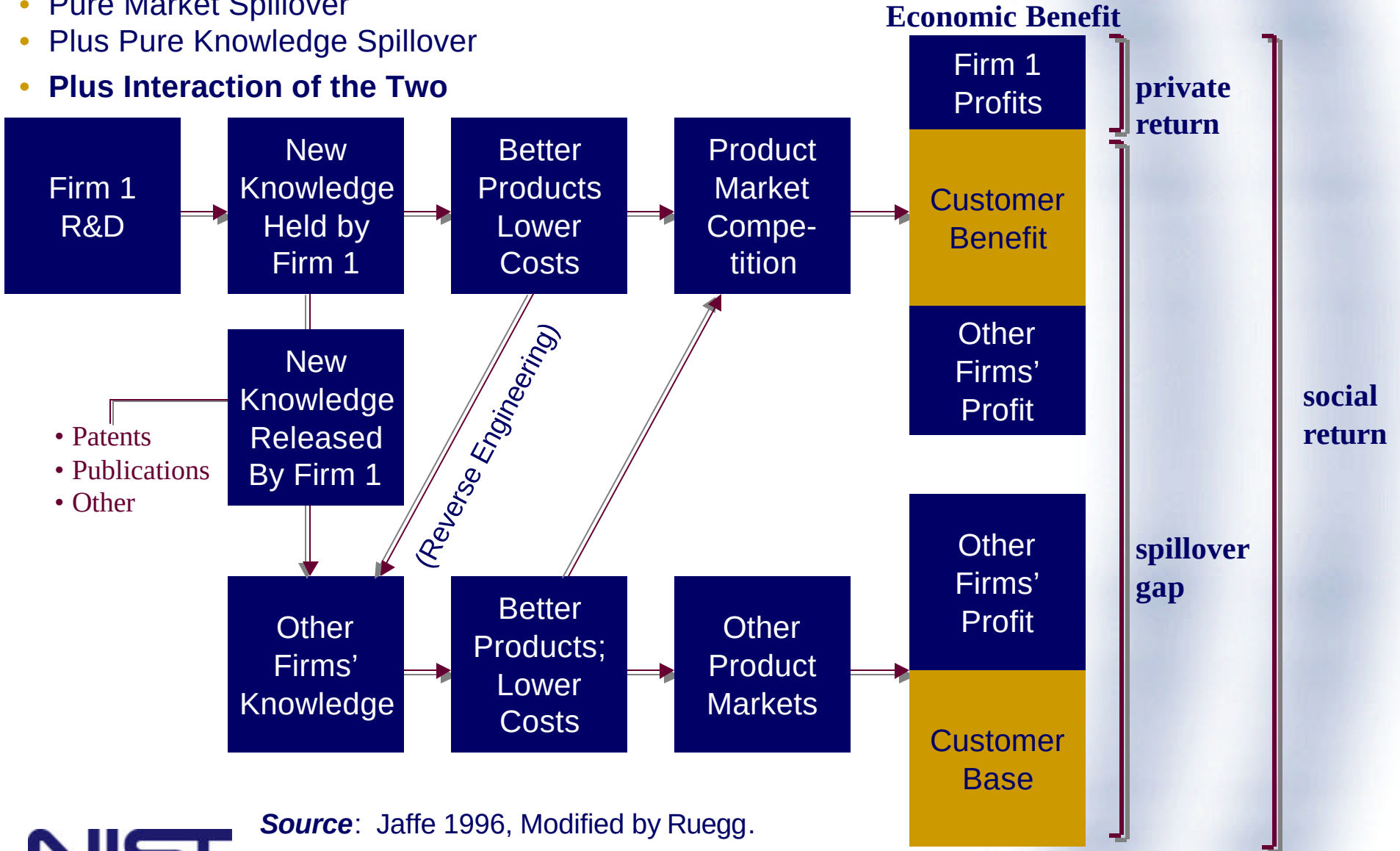
- Pure Market Spillover
- **Plus Pure Knowledge Spillover**



Source: Jaffe 1996, Modified by Ruegg.

"Direct & Indirect Path" Benefits
Private and Social Returns to R&D

- Pure Market Spillover
- Plus Pure Knowledge Spillover
- **Plus Interaction of the Two**



Source: Jaffe 1996, Modified by Ruegg.

"Direct Path" Benefits: Example

ADVANCED TECHNOLOGY PROGRAM

Hi-Temp Superconducting Thick-film Materials

- Improved signal transmission capability

Extended/improved cellphone service

Impact

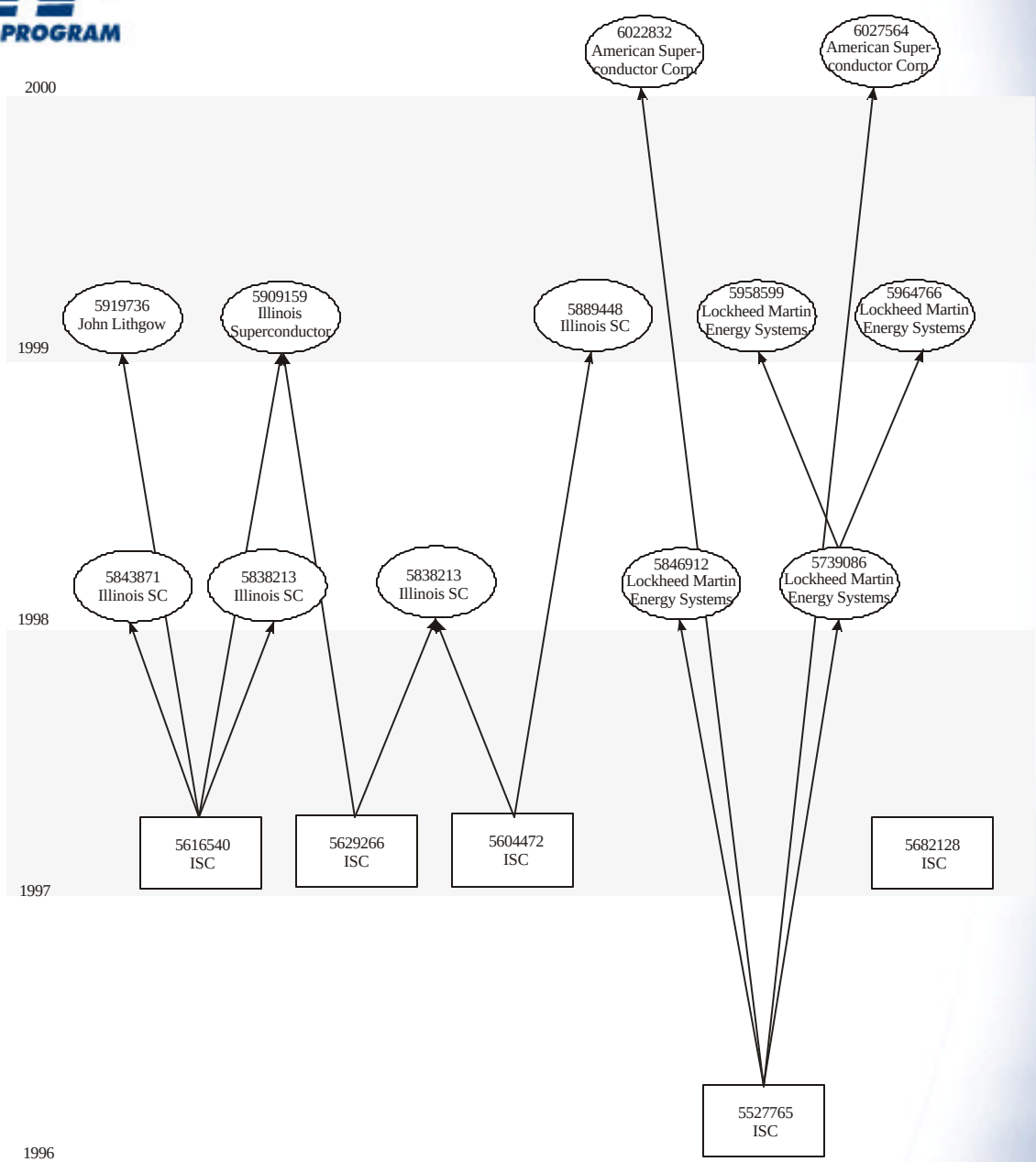
For a given area of cell phone reception, a 40% reduction in number of tower sites required.

Source: Status Report, Vol. I

❑ Illinois Superconductor Corp, (ISC)
Mt. Prospect, IL
plus subcontractors and research partners

- ❑ Startup funded by ATP in 1990
- ❑ 8 employees at project start
- ❑ ATP funding = $1.98 Million
- ❑ Company funding = $1.56 Million
- ❑ Project duration = 3/1/93 – 2/29/96
- ❑ Successful IPO
- ❑ Built production plant
- ❑ Producing products based on ATP work
- ❑ 75 employees in 1997

"Indirect Path" Example: ISC



"Direct Path" Benefits: Example

ADVANCED TECHNOLOGY PROGRAM

Stem Cell Expansion Technology

- New approach to Bone Marrow Transplant for Cancer Treatment

Other uses; e.g., immunotheraphy tissue repair

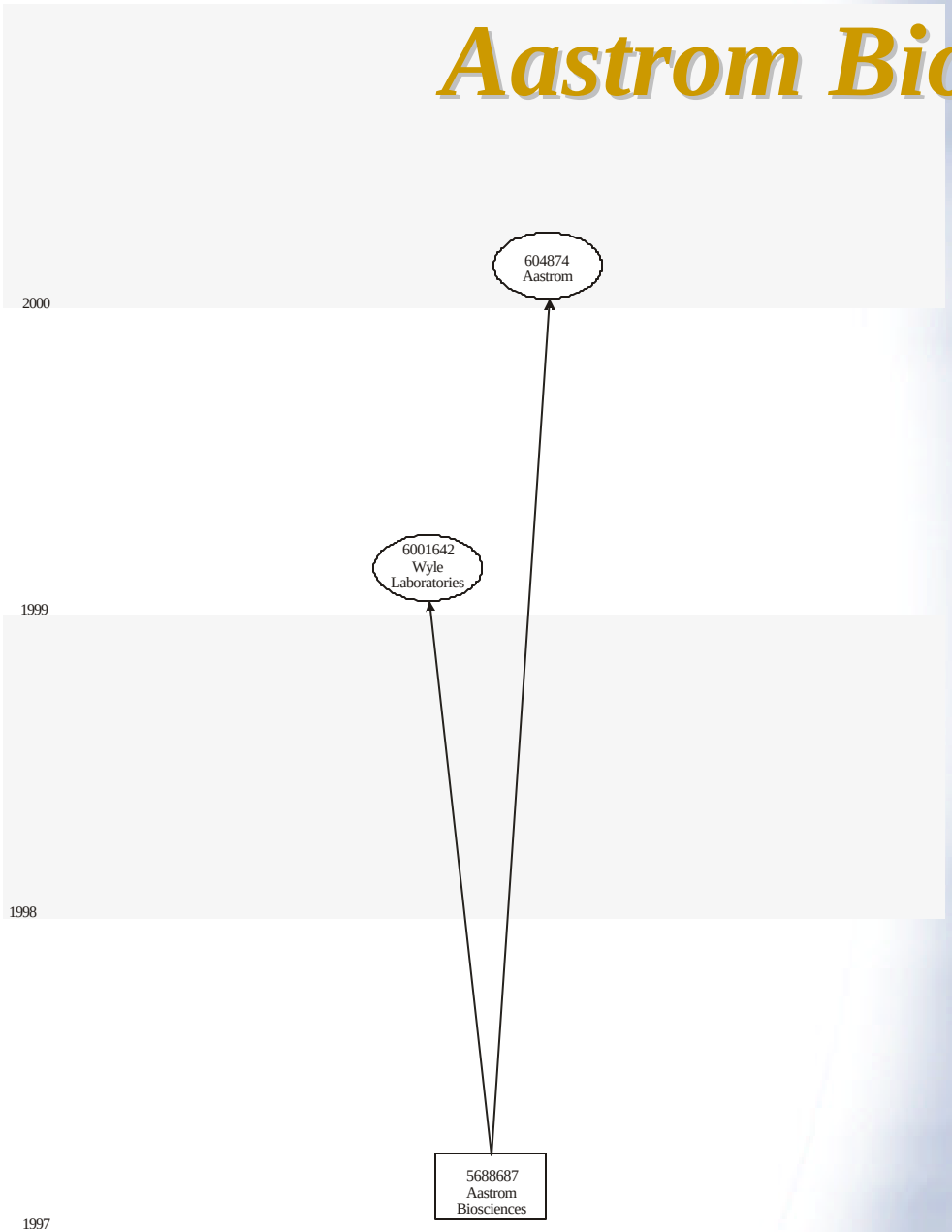
- **Aastrom Biosciences, Inc.**
  - Startup funded by ATP in 1991
  - ATP funding = $1.2 Million
  - Company funding = $1.5 million
  - Subsequent private investment for clinical trials and commercialization

Impacts (estimated *vs.* best alternatives)

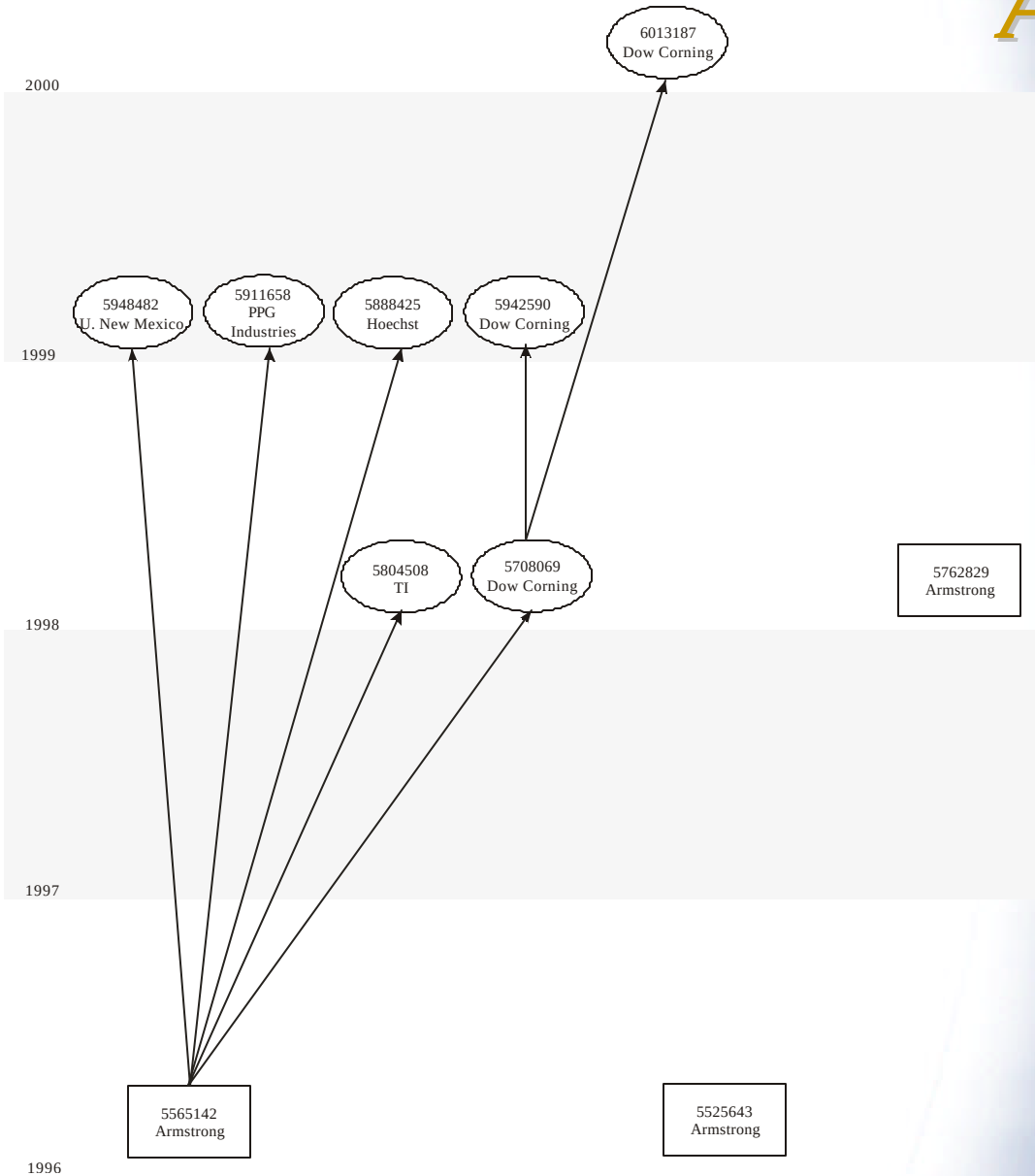
	Conventional	Peripheral Blood Progenitor Cell Collection	(ATP) CPS
Donor Visits	8	21	2
Procedures Hours	16	39	1-3
Needle Sticks	100-140	22	4-10
Treatment Cost (1996 $)	$10K-15K	$12K-$20K	<$12k
Medical Staff Advantages			Easier to do Requires less training
Patient Benefits			Less pain Fewer side effects Better treatment outcome

Source: RTI, 1998.

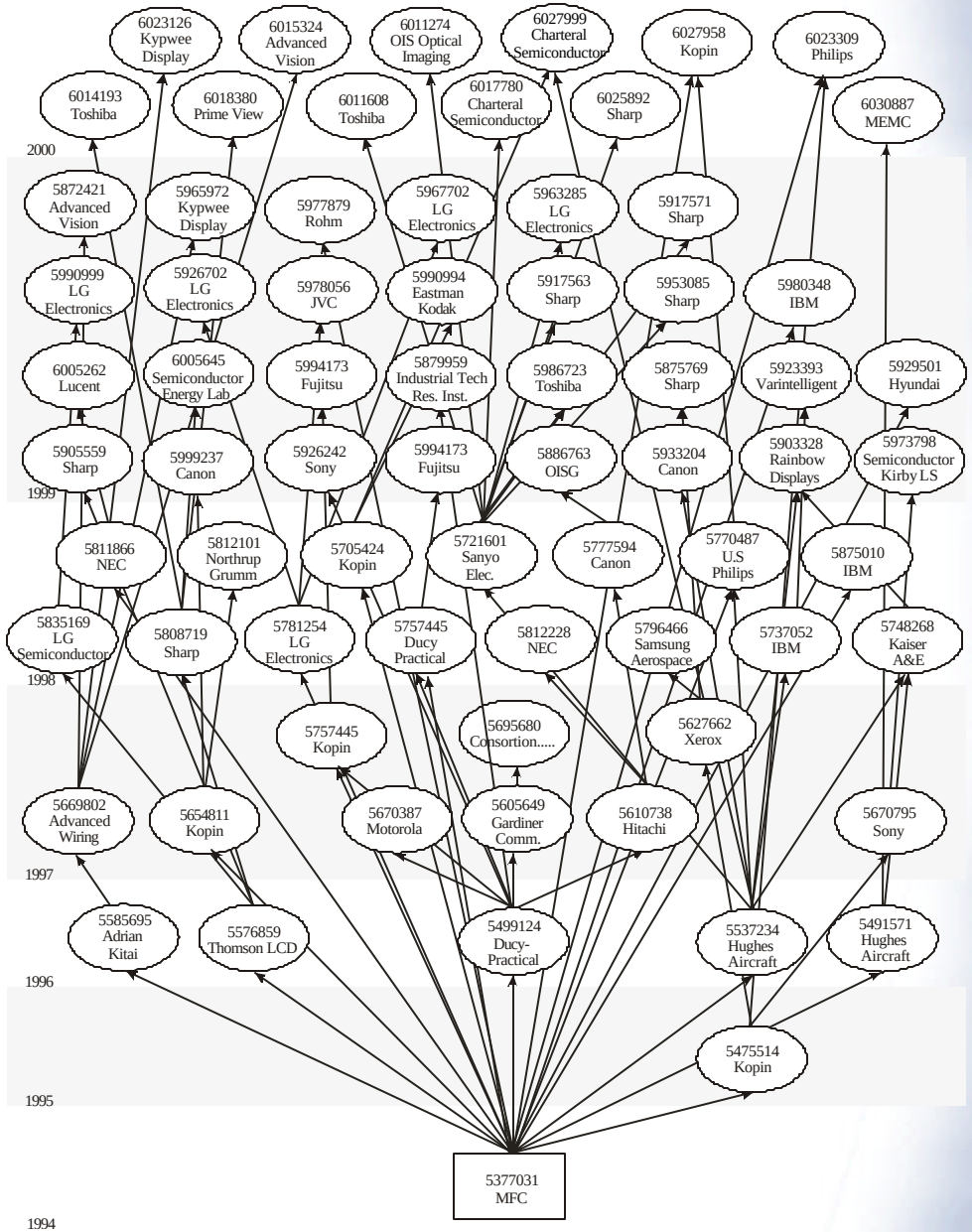
"Indirect Path" Example: Aastrom Biosciences



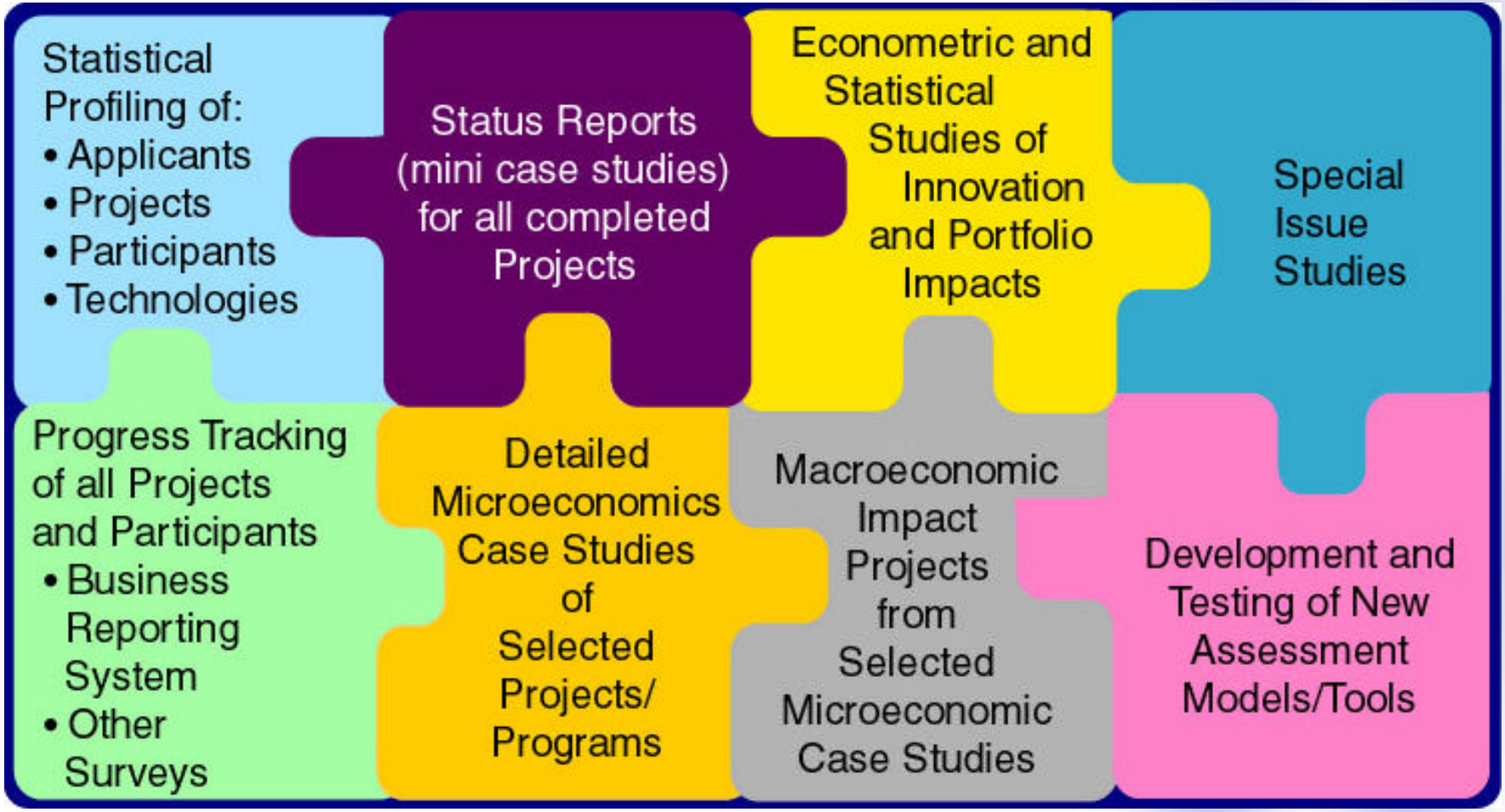
"Indirect Path" Example: Armstrong



"Indirect Path" Example: MFC



ATP's Multi-Component Assessment Measures "Direct" and "Indirect" Effects



Who Does the Studies?

EAO Staff

- *Designs*
- *Conducts*
- *Manages*

Evaluation Studies

With help from others

- National Bureau of Economic Research (NBER)
- University Centers with Relevant Specialties
- Consulting Universities, Institutions, and Individuals with Expertise

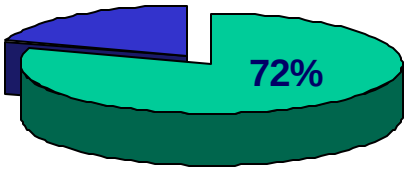
Early Program Results

- **Leap-frog technologies developed**
  - ✓ 37% of applications represent “new-to-the-world” solutions
  - ✓ 63% of applications represent dramatic cost reductions or performance improvements
- **Rich technology platforms developed with multiple uses**
  - ✓ Many prize-winning technologies
  - ✓ 4.5 applications per project
- **Emphasis on collaborations among companies, universities, and non-profit organizations**
  - 157 Joint Ventures
  - Most “single applicants” have alliances and subcontractors
  - Many benefits and few costs of collaborating reported
- **High Risk R&D Accelerated**
  - ✓ 86% ahead in R&D cycle
- **Estimated public benefits from several projects alone exceed total ATP costs**

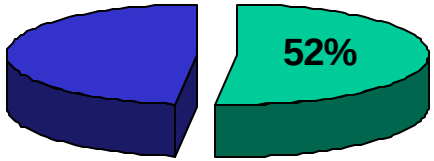
Performance Data for First 50 ATP Projects Completed

ADVANCED TECHNOLOGY PROGRAM

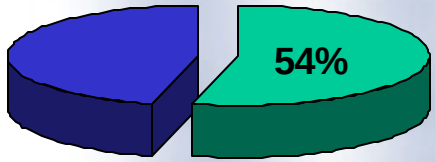
Completed All Research Goals



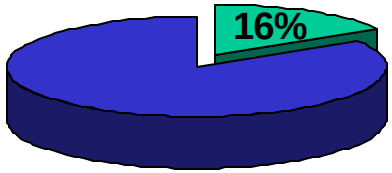
Published Technical Results



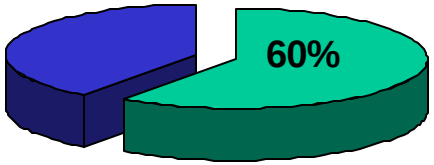
Awarded Patents*



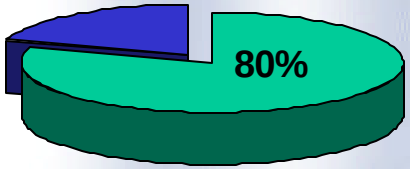
Technology Recognized By Outside Award



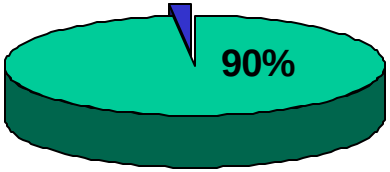
Technology Incorporated in Product(s) on the Market



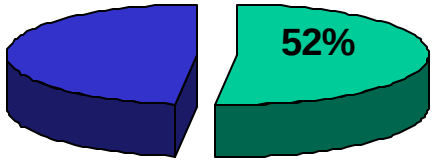
Products on the Market Or Expected Shortly



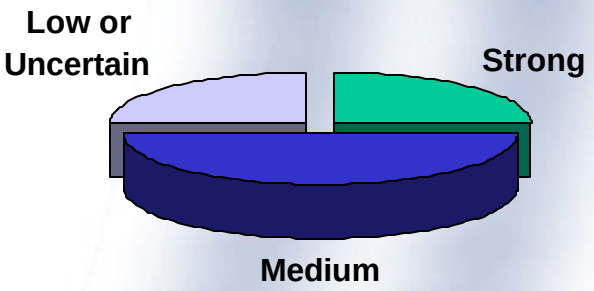
Knowledge or Product Outputs



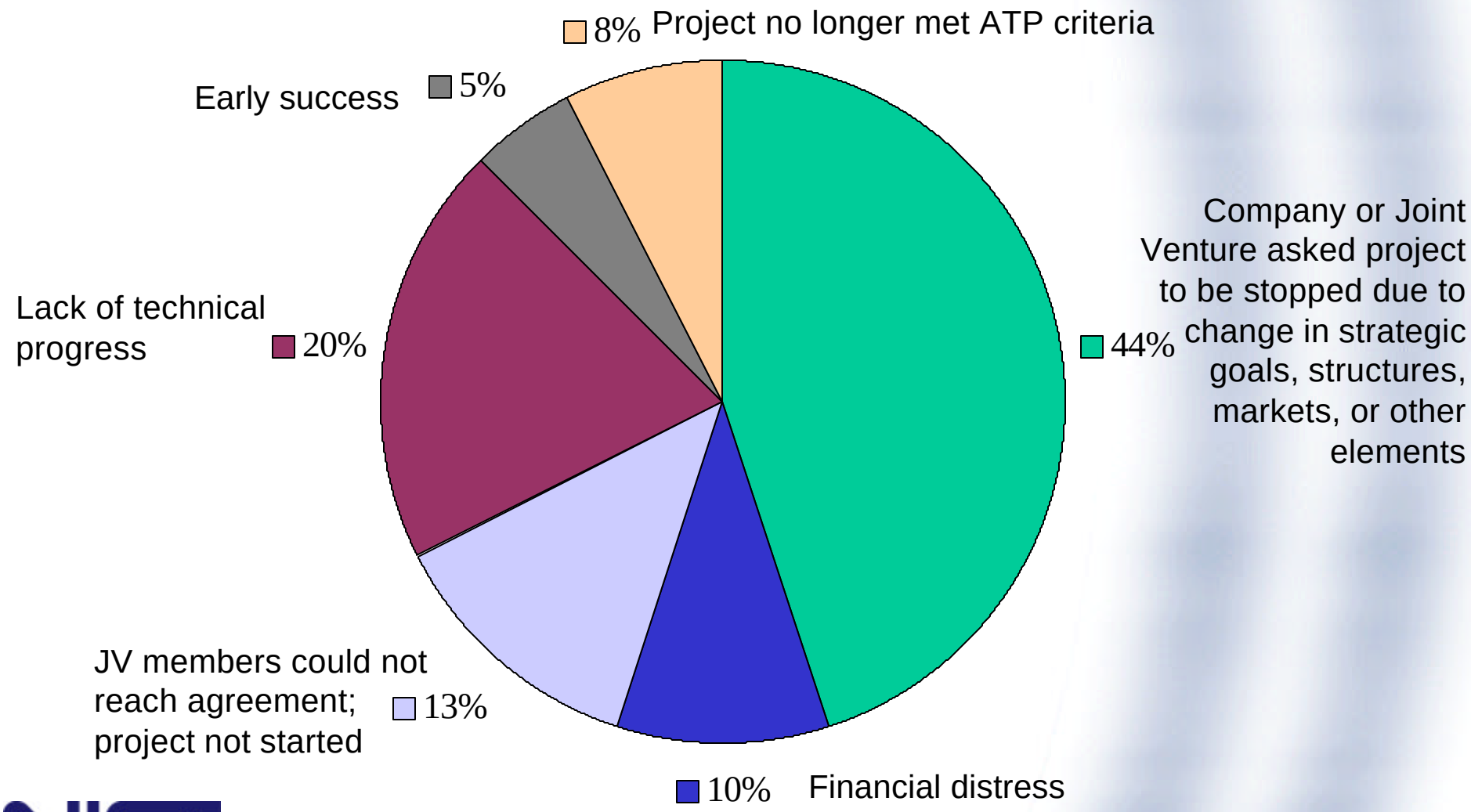
Both Knowledge and Product Outputs



Outlook (approximate)



Terminated Projects (40 of 468, as of April 2000)



Contact Information

www.atp.nist.gov

To Get on the ATP Mailing List:

Call toll-free:	800-ATP-FUND (800-287-3863)
Fax your name and address to:	(301) 926-9524
Send an e-mail message to:	atp@nist.gov

Key Features of the ATP

- Emphasis on innovation for broad national economic benefit
- Industry leadership in planning and implementing projects
- Project selection based on technical and economic merit
- Project selection rigorously competitive, based on peer review
- Focus on the civilian sector
- Focus on enabling technologies with high spillover potential
- Focus on overcoming difficult research challenges

Key Features of the ATP (cont'd)

- Encouragement of company-university-laboratory collaboration
- Positioned after basic science and before product development
- Requirement that projects have well-defined goals/sunset provisions
- Demonstrated need for ATP funding
- Coordination with other public and private funding sources
- U.S. companies planning and organizing for technology applications
- Program evaluation from the outset

ATP's "Business Reporting System" Tracks Progress
(During Project and Post-Project)

- Project goals/Expected commercial advantage
- Strategies for commercialization
- Collaborative activities and experiences
- Effect of ATP on project timing/scale/scope/ risk level/ability to do long-term R&D/private investment dollars ($)
- Commercialization progress
- Knowledge dissemination
- ID of customers and competitors
- International standing