TECHNOLOGY TRANSFER

FRANK E. PENARANDA
NASA HEADQUARTERS
"If America is to maintain and strengthen our competitive position, we must continue not only to create new technologies but learn to more effectively translate those technologies into commercial products."

President George Bush
November 13, 1990

International Comparison of R & D Expenditures in 1989

<table>
<thead>
<tr>
<th>United States</th>
<th>West Germany</th>
<th>Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>$111.1</td>
<td>$21.9</td>
<td>$45.9</td>
</tr>
</tbody>
</table>

Note: $ in Billions of Constant 1982 Dollars
Source: National Science Foundation
## International Comparison of R & D Expenditures in 1989

<table>
<thead>
<tr>
<th></th>
<th>United States</th>
<th>Japan</th>
<th>West Germany</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Billions of Constant 1982 Dollars</strong></td>
<td>$111.1</td>
<td>$45.9</td>
<td>$21.9</td>
</tr>
<tr>
<td><strong>Source of Funds:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td>45</td>
<td>19</td>
<td>33</td>
</tr>
<tr>
<td>Industry</td>
<td>51</td>
<td>72</td>
<td>65</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>9</td>
<td>2</td>
</tr>
</tbody>
</table>

**Source:** National Science Foundation

---

## Technology Transfer

**Research & Development**
- Sourcing
- Technology Deployment
- Diffusion
- "Push"

**Technology Application**

**Producers**
- Federal R&D Agencies
  - Laboratories
  - Contractors
  - Universities

**Intermediary Programs/Organizations**
- Federal Agency/TT Programs
- Federal Lab ORTAs
- NTTC/RTTCs
- State-Level Activities
  - Business/Technology Assistance
  - Incubators, Seed-Capital Funds, Research Parks

**End-Users**
- U.S. Private Sector
  - Individual Firms
  - Industry/Business Groups

**Stakeholders**
- Federal/State Agencies
- Federal/State Legislatures
- U.S. Industry/Business Communities
- U.S. taxpayers

---

CU-3206-3 2/92

L-3
NASA Technology Transfer Program

Two Basic Roles

- **Traditional Role:** Transfer NASA technology for secondary use throughout the U.S. private and public sectors

- **Emerging Role:** Develop the **National Technology Transfer Network** in cooperation with all Federal R&D agencies

---

NASA Technology Utilization Program

**Thrusts for FY 1992 and FY 1993**

- Establish and operate a National Technology Transfer Network
  - Facilitate the transfer of all Federal technology to the private sector
  - Assist the Nation's industrial competitiveness objectives

- Streamline and expedite the identification, documentation and dissemination of NASA's emerging technologies

- Shorten the time between technology development and commercial applications

- Increase number of "cooperative agreements" and/or technology applications projects

- Emphasize and maximize economic benefits potential for NASA's technology applications projects
National Technology Transfer Network

- Core Structure
  - National Technology Transfer Center (NTTC)
  - Six Regional Technology Transfer Centers (RTTCs)
- Other Key Elements
  - Federal R&D Agencies
  - Federal R&D Labs and Centers
  - Federal Laboratory Consortium for Technology Transfer
  - State/Local Agencies and Programs
  - Business/Industry Groups and Associations

NTTC Roles

- Research/Analysis
  - Technology transfer issues
  - Industry technology needs
- Clearinghouse/Network "Hub"
- Outreach to Industry
- Training and education
- Network development

National Niches
Core, Cross-Cutting Capabilities and Services
RTTC Roles

- Link together Federal labs, state/local programs and the national network to serve the technology needs of each region's business and industry

- Provide value-added service to business and industrial clients:
  - **Information Services** involving computerized searches of Federal technology databases
  - **Technical Services**, including the assessment of technology requirements and potential solutions
  - **Commercialization Services** assisting the commercial application of Federal technologies

- Promote regional awareness of technology transfer resources and opportunities
NATIONAL TECHNOLOGY TRANSFER NETWORK

"Technology... from the lab to the marketplace."

NATIONAL TECHNOLOGY TRANSFER CENTER

At the direction of Congress, NASA initiated in April 1991 a five-year development program to establish the NTTC as a national resource for Federal technology transfer.

The NTTC’s principal mission is to assist all Federal agencies in executing the Federal-wide technology transfer mandate as a means of enhancing U.S. competitiveness. To this end, the NTTC serves as the national 'hub' for the network, providing core capabilities and cross-cutting services that accelerate and expand the transfer of Federal technologies to the U.S. private sector.

The NTTC, now in its initial phase of development, is currently establishing key capabilities and services to:

- Serve as the national clearinghouse for Federal technology transfer, linking U.S. firms and industry with Federal agencies and laboratories, the RTTCs, and state and local agencies;
- Provide training and education services to government and industry to develop the individual skills and organizational approaches critical to technology transfer.

In addition, the NTTC conducts national outreach and promotional activities to improve U.S. private sector awareness of technology transfer resources and opportunities. Overall, NTTC activities in these and other areas complement and support private and public sector technology transfer efforts across the United States.

REGIONAL TECHNOLOGY TRANSFER CENTERS

The RTTCs, established in six regions spanning the United States, began operations in January 1992. The new centers, which replaced NASA’s longstanding network of Industrial Applications Centers, reflect NASA’s initiative to upgrade and restructure its technology transfer program in order to better serve U.S. business and industry in the 1990s and beyond.

The regional deployment, aligned with the six Federal Laboratory Consortium regions and covering all 50 states, allows the centers to work closely with a wide range of Federal, state and local programs in serving the technology and related business needs of the firms and industry in each region.

The RTTCs also utilize the NTTC and the national network to access technologies from throughout the Federal R&D base and link together additional capabilities and services from the NTTC and others across the United States to best meet their client’s technology and related needs.

The RTTCs provide value-added services to meet the technology needs of individual business and industrial clients. These include:

- Information Services: computerized searches of Federal technology databases and other technology sources.
- Technical Services: assessment of technology requirements, analysis of technology applications, and engineering reports.

For further information, contact the National Technology Transfer Network.
NATIONAL TECHNOLOGY TRANSFER NETWORK

"If America is to maintain and strengthen our competitive position, we must continue not only to create new technologies but learn to more effectively translate these technologies into commercial products."

- President George Bush
November 13, 1990

PURPOSE AND OBJECTIVES

• The Federal R&D base - involving over 600 laboratories and centers - produces a robust supply of proven and promising technologies that have secondary applications throughout the commercial and industrial sectors.

• The purpose of the National Technology Transfer Network is to provide an effective, market-oriented means of deploying technologies from the Federal R&D base to meet the technology needs of the U.S. private sector.

Objectives of the network include:

• Facilitate rapid access by U.S. firms and industry to the Federal R&D base and to the full range of technology transfer capabilities and services available throughout the United States; and,

• Foster cooperation and partnerships with Federal, state and local organizations and programs working to advance the technological competitiveness of U.S. firms and industry.

NETWORK ELEMENTS

The National Technology Transfer Center (NTTC) and the six Regional Technology Transfer Centers (RTTCs) form the core structure for the overall network. Other key elements are:

• Federal agency technology transfer programs and activities;

• Federal laboratories and centers;

• Federal Laboratory Consortium for Technology Transfer;

• State and local agencies and programs, including technology centers and business/technical assistance services; and,

• Business and industry consortia, associations, and communities.

Overall, the network provides a national framework for the public and private sectors to work together productively to enhance the economic competitiveness of the United States.

A researcher from Sandia National Laboratories demonstrates a robot using a new software program that enables a robot to "program itself."

NATIONAL TECHNOLOGY TRANSFER NETWORK

FAR WEST RTTC
University of Southern California
3718 South Hope Street, Suite 220
Los Angeles, CA 90007-4444
(213) 743-6132
Mr. Robert L. Berk, Director

MID-WEST RTTC
Battelle Memorial Institute
Great Lakes Technology Transfer Center
39000 Great Northern Corporate Center
Cleveland, OH 44120
(216) 734-0294
Dr. Joseph W. Fox, Director

NORTHEAST RTTC
Center for Technology Commercialization
Massachusetts Technology Park
100 North Drive
Westonborough, MA 01581
(908) 870-0342
Dr. William Geske, Director

MID-ATLANTIC RTTC
University of Pittsburgh
823 William Pitt Union
Pittsburgh, PA 15260
(412) 648-7620
Mr. Len S. Hummel, Director

NATIONAL TECHNOLOGY TRANSFER CENTER
Wheeling Jesuit College
816 Washington Avenue
Wheeling, WV 26003
(304) 234-3445
Mr. Lee W. Rivera, Executive Director

SOUTHEAST RTTC
Southern Technology Application Center
University of Florida, College of Engineering
Box 94, One Progress Boulevard
Athens, FL 32615
(352) 491-3613 (local)
800-225-0398 (national)
Mr. J. Ronald Thornton, Director

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Office of Commercial Programs
Technology Utilization Division
Code OU
Washington, D.C. 20546
(703) 324-6100

*Alaska and Hawaii included in Far West Region