



*Bridging the Gap Between the Laboratory
and the Marketplace*



In cooperation with ...



SEMI/SEMATECH



Microelectronics Manufacturing Workshop

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1999 ATP National Meeting, November 15-17, 1999

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ATP and Microelectronics Manufacturing Program Update

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<http://www.atp.nist.gov/epto>



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Background

- *Industry-led Planning Committee*

- James Hutchby, SRC
- James McElroy, NEMI
- Marshall Andrews, ITRI



- *Focus on Top Issues Facing Future Electronics Manufacturing*



- *Bring Value to American Companies*



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Why Are We Here?

- *Explore highest priority technical barriers confronting electronics manufacturing*
- *Discuss opportunities for future ATP EPTO partnerships*
- *Assist American companies in competing in future ATP electronics competitions*
- *Review activities of ATP projects and NIST supported metrology R&D*



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The Question



**What is ATP and
EPTO to Someone
in Microelectronics
& Supporting
Industries?**

Electronics Manufacturing

Critical Global and National Enterprise

— Electronics Industry

- Markets Worldwide: \$1.217 T (est. 1999)
USA: \$389 B (est. 1999)
- U.S. Jobs 1.96 M (1997) in Electronics Manufacturing
leverages an additional ...
2.50 M (1997) in Electronics Services

— Semiconductors

- Markets
 - Worldwide: \$135.6 B (est. 1999)
 - Americas: \$45.7 B (est. 1999)
- U.S. Jobs
 - 267,000 in 1997
 - 14% of all Electronics Manufacturing

— Electronic Components

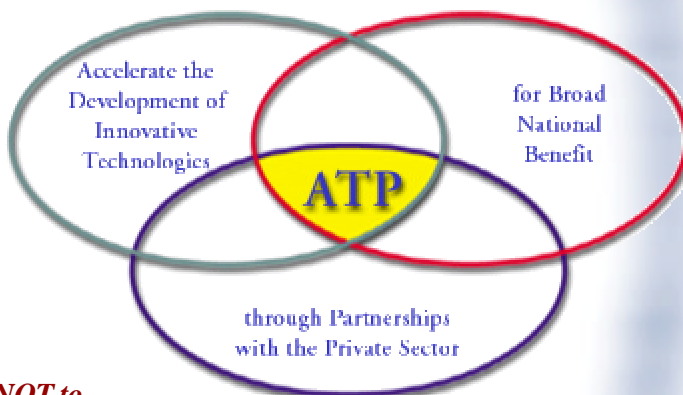
- Markets
 - Worldwide: \$363 B (est. 1999)
 - U.S.: \$102 B (est. 1999)
- U.S. Jobs
 - 364,000 in 1997
 - 19% of all Electronics Manufacturing

Sources: Reed Electronics Research
U.S. Bureau of Labor Statistics



To Tackle the R&D Challenges of the 21st Century

ATP Mission . . .



But, NOT to ...

- Supplant private capital
- Fund basic research
- Fund product development



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Electronics & Photonics Technology Office (EPTO)

***Working with American companies to fill the gap
between the laboratory and the marketplace
through early stage investment in new ideas and
new technologies in electronics and photonics***

- **Focused on supporting projects in:**
 - Microelectronics
 - Optoelectronics & Optics technology
 - Power technologies
 - RF electronics
 - Organic electronics
 - Manufacturing



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Who We Are

EPTO Technical Managers

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EPTO Project Relationships with Industry

- **Development**
 - Support industry efforts to define high-risk, innovative projects
 - Explore highest priority technical opportunities and barriers with American industry
 - Enable greater understanding of ATP criteria & objectives through education and outreach
- **Selection**
 - Main group responsible for evaluating and recommending electronics & photonics proposals that best meet ATP criteria
- **Management**
 - Collaborate with companies to ensure project success
 - Government's technical & business representatives
 - monitor project technical and business progress against agreed milestones and expenditures

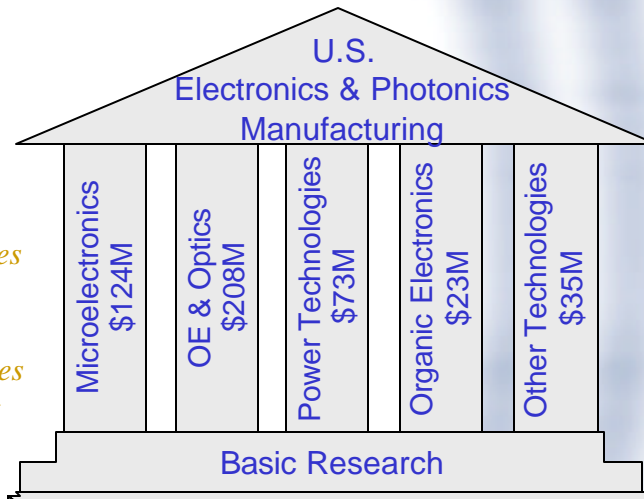


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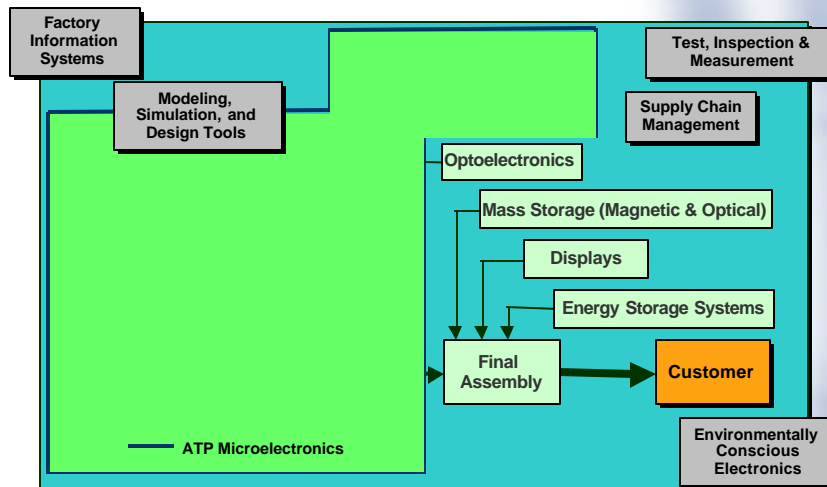
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EPTO Current Funding

*EPTO:
Collaborating with
American companies
to strengthen our
Electronics &
Photonics industries
for national benefit*



ATP Microelectronics Projects



(modified and shown with NEMI approval)

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ATP's Aim in Microelectronics

- *Promote market-driven, industrial integration*
- *Catalyze vertical and horizontal partnerships between American supplier and user companies*
- *Tackle high technical risk R&D that cuts across both technological and business boundaries*
- *Fund companies that are the innovators of tomorrow's electronics technologies*

Stimulate joint venture and single applicant proposals that meet these goals



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The Difference ATP Makes

- Higher risk
- Leap-frog technology
- Multiple applications
- Expanded company & national competencies
- Broad diffusion

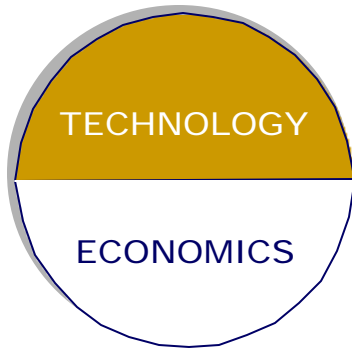
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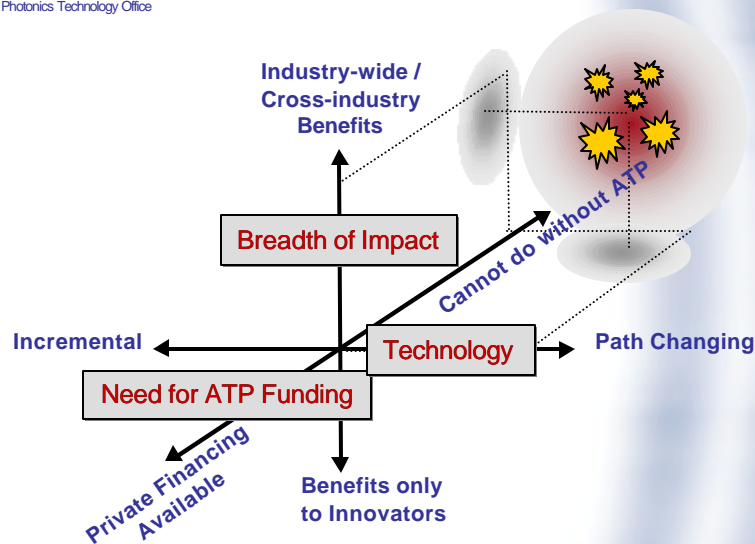
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Critical Proposal Elements



- **Scientific and Technological Merit (50%)**
 - ✓ Innovations in the Technology
 - ✓ High Technical Risk & Feasibility
 - ✓ Quality of R&D Plan
- **Broad-Based Economic Benefits (50%)**
 - ✓ Economic Benefits
 - ✓ Need for ATP Funding
 - ✓ Pathway to Economic Benefits

The ATP "Sweet Spot"





Pre-Proposals

Year-round submission ...

- *Written feedback in approximately 2 weeks*
- *Pre-proposals can be submitted twice*
- *4 pages plus cover*
- *5 questions on technical and economic merit*



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EPTO Projects in Microelectronics

(excluding power and oe/optics)

- **Semiconductor Technologies**
\$71.0 M total / \$32.9 M ATP
- **Packaging, Assembly and Test**
\$32.9 M total / \$15.2 M ATP
- **Integration**
\$19.0 M total / \$9.6 M ATP
- **RF Electronics**
\$4.6 M total / \$2.2 M ATP
- **Organic Electronics**
\$21.4 M total / \$10.3 M ATP



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Directions in Electronics

- *The Pace of Silicon Technology is Quickening*
 - 64 billion transistor DRAMs
 - 0.5 billion transistor / 6 GHz micro-processors by 2009
 - 100 nm and beyond device technology is occurring sooner rather than later.
- *Suppliers of advanced equipment, materials, and devices are increasingly becoming the focal point of innovation for tomorrow's systems.*
- *Integration of added electrical, optical and mechanical function within existing technologies holds the key to future products.*
- *Manufacturing technologies and efficiencies underscore many of industry's biggest issues and are central to continued U.S. global participation.*



What's Happening in FY 2000?

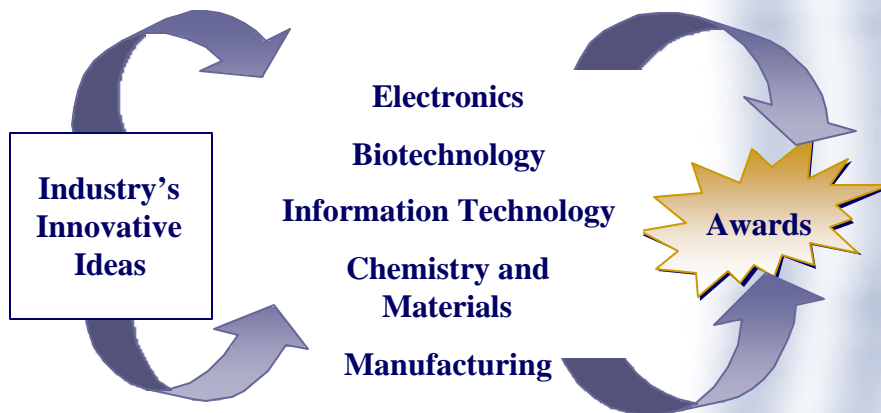
- *ATP National Meeting*
- *EPTO Workshops and Town Meetings*
- *Continuous pre-proposal evaluations*
- *FY 2000 Competition with an Electronics Source Evaluation Board*

Visit EPTO's website for the latest information

<http://www.atp.nist.gov/epto>

Competition Structure

Technology-Specific Source Evaluation Boards



Workshop Goals

Day's End Success Means ...

- *Assisting American companies*
 - Identifying technical and business factors confronting competitive development and manufacture of micro-electronics and supporting infrastructure technologies
 - Distilling ideas, ie **ATP Sweet Spots** - R&D topics appropriate for industry-ATP partnerships
 - Guiding ATP priorities in Microelectronics Manufacturing
 - Forming future potential partnerships
 - Competing in ATP's FY 2000 competition

... and not identifying or promoting any specific technical plan or proposal

If You Wish to Compete



- *Use every opportunity to discuss, plan, and distill your ideas*
- *When doubt or questions arise, call EPTO*
- *Send us your pre-proposals for evaluation and feedback*
- *Begin your proposal planning NOW!*

Industry Leadership is Essential!

• **Questions**

