The National Research Council Assessment of
The Small Business Innovation Research Program

♠

National Small Business Conference
San Diego, California
July 20, 2004

Jacques Gansler, Ph.D.
V.P. Research
University of Maryland
Presentation Topics

- The SBIR Program
- Advantages of the Program Concept
- Program Dimensions
- NRC Evaluation of SBIR
The Small Business Innovation Research (SBIR) Program

• Created in 1982, Renewed in 1992 & 2001
• Participation by all federal agencies with an annual extramural R&D budget of greater than $100 million is mandatory
  – Agencies must set aside 2.5% of their R&D budgets for small business awards
• To be a $2 billion per year program in 2004
  – Largest U.S. Partnership Program
Why is SBIR Important?

• Innovation is Key to Economic Growth, New Products, and New Jobs
  – The world looks to the U.S. economy as a model of productivity, growth, and innovation

• Innovation (i.e., Doing Things Faster, Better, and Cheaper) is also Essential to the U.S. Defense & Strategy

• SBIR Contributes Directly to Innovation across the Government and the Economy by Helping Companies Innovate
How Does SBIR Work?

• It Provides Early Encouragement to Innovators
  – The “first money is always the hardest money” to obtain
  – It provides new information to markets—a positive signal of quality and potential to investors

• It Capitalizes on Existing Federal Investments in Science & Technology
SBIR Model

Social and Government Needs

PHASE I
Feasibility Research

R&D Investment

$100K

$750K

Federal Investment

Private Sector Investment

PHASE II
Research towards Prototype

PHASE III
Product Development for Gov’t or Commercial Market

Tax Revenue

SCHOOL OF PUBLIC AFFAIRS
Excellence in Public Policy, Management and International Affairs

Jacques S. Gansler
Advantages of the Program Concept

Entrepreneur Friendly
Helps Address Agency Missions
Benefits to Society
SBIR’s Attraction to New Entrepreneurs

- Having a company not required to apply for a grant
- Companies and Researchers can apply to different agencies at the same time
- Agency outreach programs provide guidance and encouragement
- Entrepreneur can explore technical and commercial feasibility under Phase I before taking the full plunge
SBIR is Entrepreneur Friendly

• Why do Entrepreneurs like it?
  – No dilution of ownership
  – No repayment required
  – Grant recipients retain rights to IP developed using SBIR funds
  – No royalties owed to government
  – Awards attract private capital

• A Certification Effect of Technical Feasibility and Commercial Potential
SBIR’s Attraction to Policymakers

• Catalyzes the Development of New Ideas and New Technologies
  • Over time this transforms the economy with new products and new industries.
• No Budget Line—a Stable Program that has Grown Over Time and Allowed Learning to take Place
• Addresses Gaps in Early-Stage Funding for Promising Technologies
  • Attractive to Small Firms—political support
• Helps Small and Large Companies with Innovative Products for Export
SBIR Contributes to Government Missions

• Provides a Bridge between Small Companies and the Agencies for Procurement and Research
• Contributes New Methods and New Technologies to Government Missions
  • Cheaper, more effective defense solutions
  • Better, more cost effective health care
  • Environmental friendly technologies and transport
• Helps Bring New Suppliers to Meet Agency Needs
Program Dimensions

Program Growth & Agency Participation
SBIR: Congress Designated 4 Major Goals

- Increase Private-Sector Commercialization of Innovations Derived from Federal R&D
  - Raised to 1st priority in 1992
- Stimulate Technological Innovation
- Use Small Business to Meet Federal R&D Needs
- Foster & Encourage Participation by Minorities & Disadvantaged Persons in Technological Innovation
Steady Program Growth

- Growth in Amount of R&D budget to be set-aside for SBIR

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth</td>
<td>0.2+%</td>
<td>1.25%</td>
<td>1.5%</td>
<td>2.0%</td>
<td>2.5%</td>
</tr>
</tbody>
</table>

In 2004 ~$2 Billion Program
SBIR: Program Growth

Figure 4-18
SBIR awards and funding: 1983–2001

Number of awards (bars)  Millions of 1996 dollars (line)

Percentage Set Aside

- 0.2%
- 1.25%
- 1.5%
- 2%
- 2.5%

Budget

Number of Awards

SBIR Small Business Innovation Research

Science & Engineering Indicators – 2004
SBIR Program Growth at DOD

FY2003 DOD SBIR Budget = $894,949,718
Phase I Awards = 2113, Phase II Awards = 1080

Source: DOD SBIR Annual Report Summary
### SBIR Budget at Participating Agencies

Total ~$1.4 million in FY 2002

<table>
<thead>
<tr>
<th>Major SBIR Agencies</th>
<th>Minor SBIR Agencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defense DOD</td>
<td>Agriculture USDA</td>
</tr>
<tr>
<td>$652 million</td>
<td>$16 million</td>
</tr>
<tr>
<td>Health HHS</td>
<td>Commerce DOC</td>
</tr>
<tr>
<td>$420 million</td>
<td>$7 million</td>
</tr>
<tr>
<td>Space NASA</td>
<td>Education ED</td>
</tr>
<tr>
<td>$106 million</td>
<td>$7 million</td>
</tr>
<tr>
<td>Energy DOE</td>
<td>Environment EPA</td>
</tr>
<tr>
<td>$87 million</td>
<td>$6 million</td>
</tr>
<tr>
<td>Science NSF</td>
<td>Transportation DOT</td>
</tr>
<tr>
<td>$72 million</td>
<td>$6 million</td>
</tr>
</tbody>
</table>
DOD and NIH are Largest Participants

TOTAL ~ $1.4 Billion FY 2002

SBIR at Participating Agencies

- DOD $652 million
- NIH $420 million
Program Evaluation

The Challenge of Assessing SBIR
Past SBIR Assessments

• Despite its size and 20 year history, there is little prior assessment of SBIR
  – Academic Analysis is Limited as is Government Analysis
  – Existing reviews are anecdotal, or do not factor the many complex facets of the program
  – Most Agencies have Limited or no External Assessment, and
  – Most internal reviews are never released

• DOD was the first to conduct a rigorous assessment of its SBIR Fast Track Program, undertaken by the National Research Council
Assessment of DOD Fast Track

- The National Academies Study* found:
  - SBIR was contributing to the achievement of DOD mission goals
  - Valuable innovation projects were being funded
    - a significant portion of DOD’s projects would not have been undertaken in the absence of SBIR
  - The Fast Track program increased the effectiveness of SBIR at DOD
    - encouraged the commercialization of new technologies
    - Encouraged the participation of companies new to the program

NRC Findings and Recommendations

- Properly Managed SBIR Grants to Small Business are Effective
- Program could be improved through Regular Evaluation
  - Internal review
  - External assessment
- The National Academies called for More, & More Systematic, Evaluation of SBIR
New Multi-Year, Multi-Agency NRC Study of SBIR

Congress Agreed and requested the NRC review the 5 largest agencies that account for 97% of the program’s funding in 2003

- Department of Defense
- National Institutes of Health
- Department of Energy
- National Aeronautics and Space Administration
- National Science Foundation

• A $5 million, 3-year study
The NRC’s SBIR Committee

- Chair: Jacques Gansler, University of Maryland*
- Tyrone Taylor, Capitol Advisors on Technology
- David Audretsch, Indiana University
- Jon Baron, Coalition for Evidence-Based Policy*
- Michael Borrus, The Petkevich Group, LLC
- Gail Cassell, Eli Lilly and Company
- Elizabeth Downing, 3D Technology Laboratories*
- Kenneth Flamm, University of Texas at Austin*

*Direct Experience in Management or Receipt of SBIR Awards.
The NRC’s SBIR Committee, Cont…

- Christina Gabriel, Carnegie Mellon University*
- Trevor Jones, BIOMEC Inc*
- Charles Kolb, Aerodyne Inc*
- Henry Linsert, Martek*
- Clark McFadden, Dewey Ballantine
- Duncan Moore, University of Rochester*
- Kent Murphy, Luna Innovations
- Linda Powers, Toucan Capital
- Charles Trimble, Trimble Navigation*
- Patrick Windham, Windham Consulting

*Direct Experience in Management or Receipt of SBIR Awards.
Current Status of NRC Study of SBIR

- **Phase I** has been completed,
  - Gathered initial information about agency operations of the SBIR program
  - Developed a methodological approach to evaluation, and
  - Developed surveys, case study templates, and other research tools needed to carry out the evaluation.
- **Phase II** is underway
  - NRC’s researchers are sending out surveys, finalizing others, and beginning case studies
- **Phase III** is coming up
  - The NRC’s SBIR Steering Committee will assess the results and publish its findings and recommendations to improve the program
Issues for the NRC Committee

• Modify Program Structure?
  – Should Phase I be larger?
  – Should Phase II be larger?
  – Should there be a Phase III Award?
    • like NSF’s Phase II-B

• Should VC Backed firms be Participants?
  – ...as they have previously been

• Possible Administrative Improvements
  – How to better align Program Cycles to Research Cycles?
  – How to reduce Paperwork Burdens without losing Quality that comes from careful Oversight
  – Do Firms need Support in the Application Process? Do State Programs Help?
Flexibility & Diversity Across Agencies

• The NRC Committee’s First Report Identifies Multiple Administrative Systems
  – Each agency typically has its own manner of choosing awardees and screening applications
  – Different metrics reflecting unique agency missions and needs
  – Different Metrics by industrial sector, e.g., software vs. drug development vs. weapon components

• This Flexibility & Diversity appears to make program better adapted to Agency Missions and to Entrepreneurs’ Goals
We Need your Help in Evaluating SBIR

• Understanding SBIR is Complicated
• Need to Better Understand its Role in Early-stage Finance
• What Works Well and What Could be Improved?
• We seek your input
  – We look forward to hearing from you
THANK YOU

Jacques S. Gansler
V.P. Research
Roger C. Lipitz Chair in Public Policy and Private Enterprise
Director, Center for Public Policy and Private Enterprise
University of Maryland
301-405-4794
jgansler@umd.edu