

From Concept to Practice

The NRC Assessment of the SBIR Program

The National Academies
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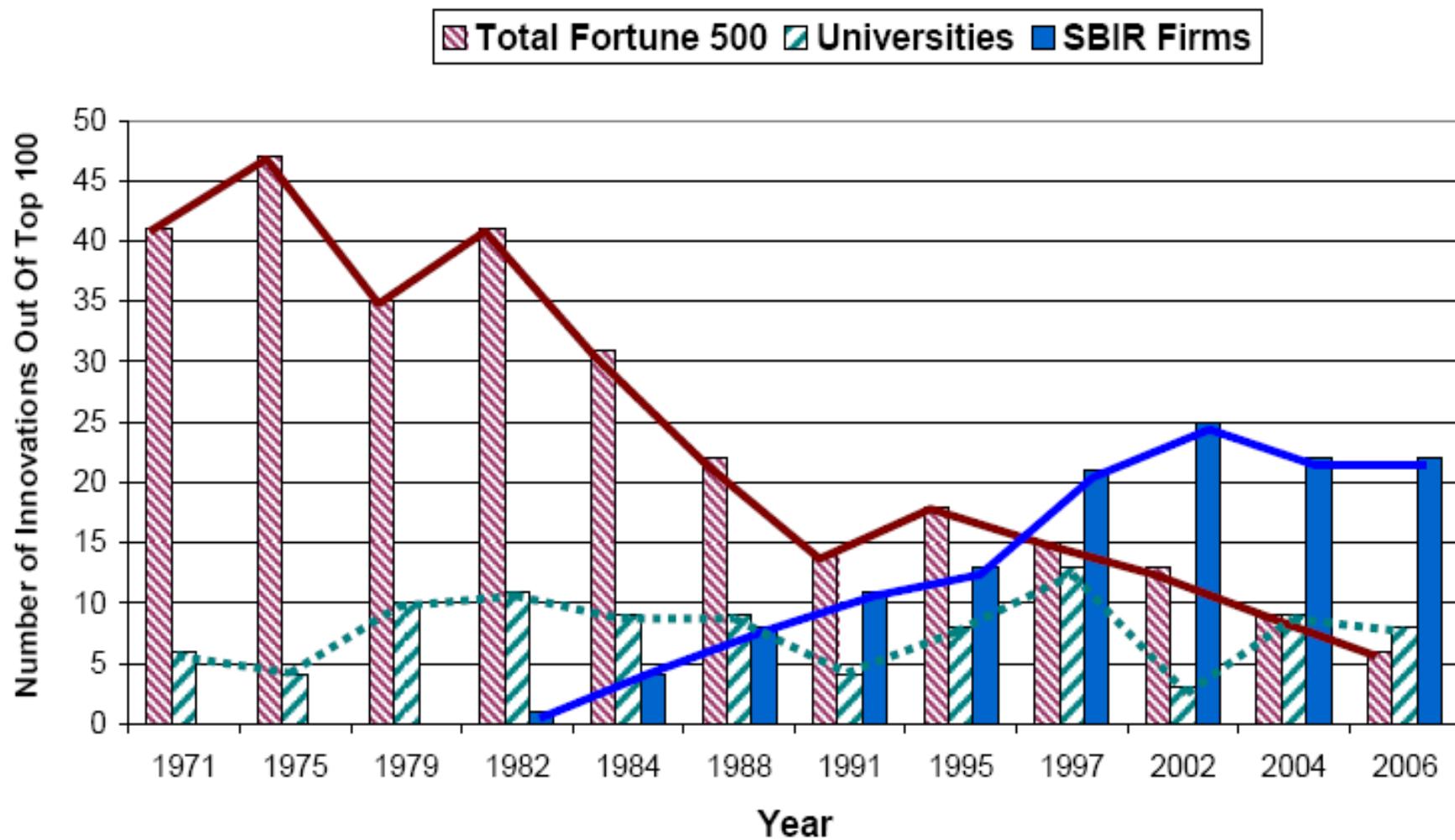
Innovation is Key to the Future Growth and Security of the United States and for Europe

We need to innovate to create
new products and new jobs and to
foster economic growth.

Small Companies Drive High-Technology Innovation

- Small Companies are Key Players in Bringing New Technologies to Market (Audretsch & Acs)
 - Large returns to national economic and strategic capabilities can result from relatively small national investments
 - Innovations—with the right policy support—can become new products and services for the market and provide support for government missions

Where Do Key Innovations Come From?

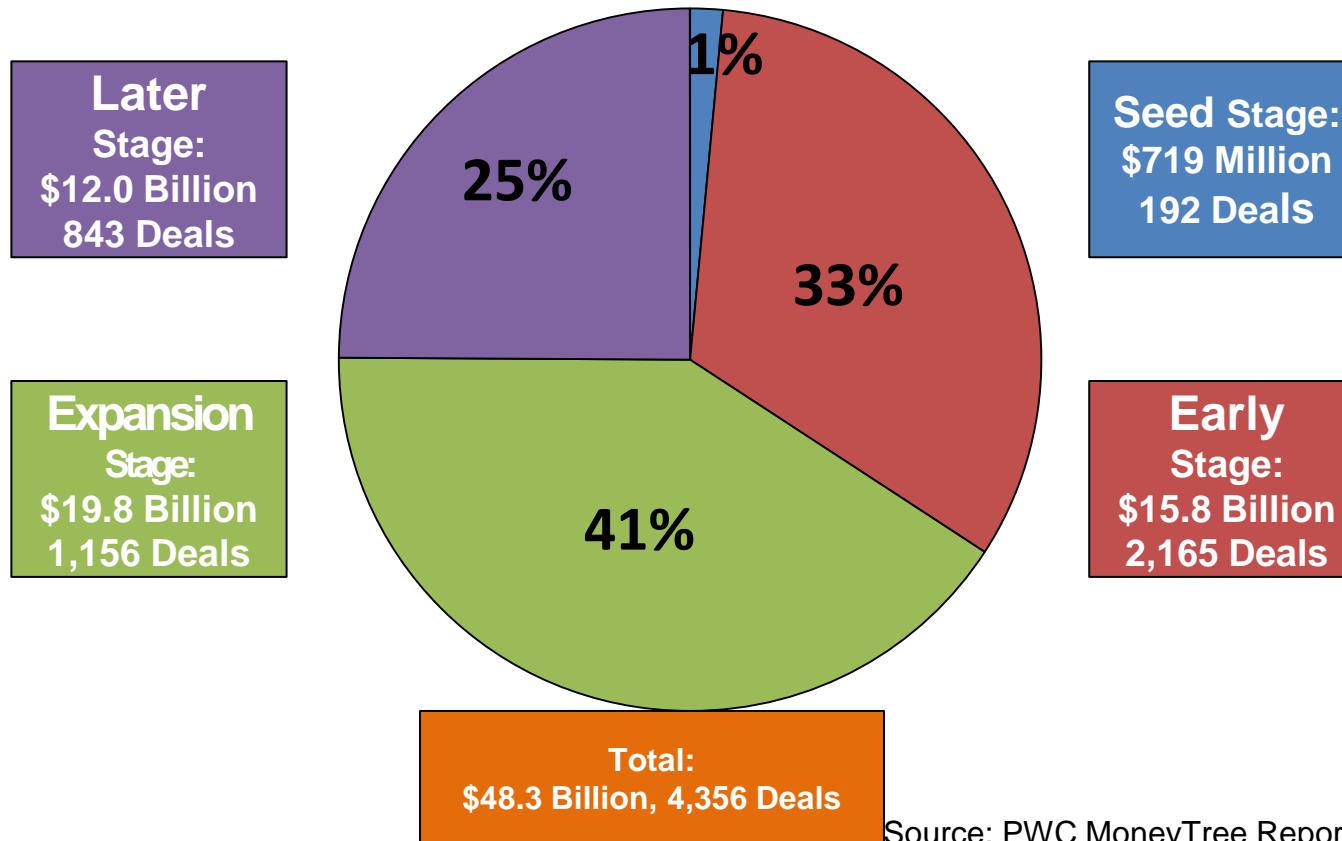


Source: Testimony of Robert Schmidt, National Co-Chair, Small Business Technology Council: Before the Committee on Small Business, UNITED STATES HOUSE OF REPRESENTATIVES, Washington, D.C., May 21, 2014.

But small companies don't have
the capital needed to transform
ideas into innovations

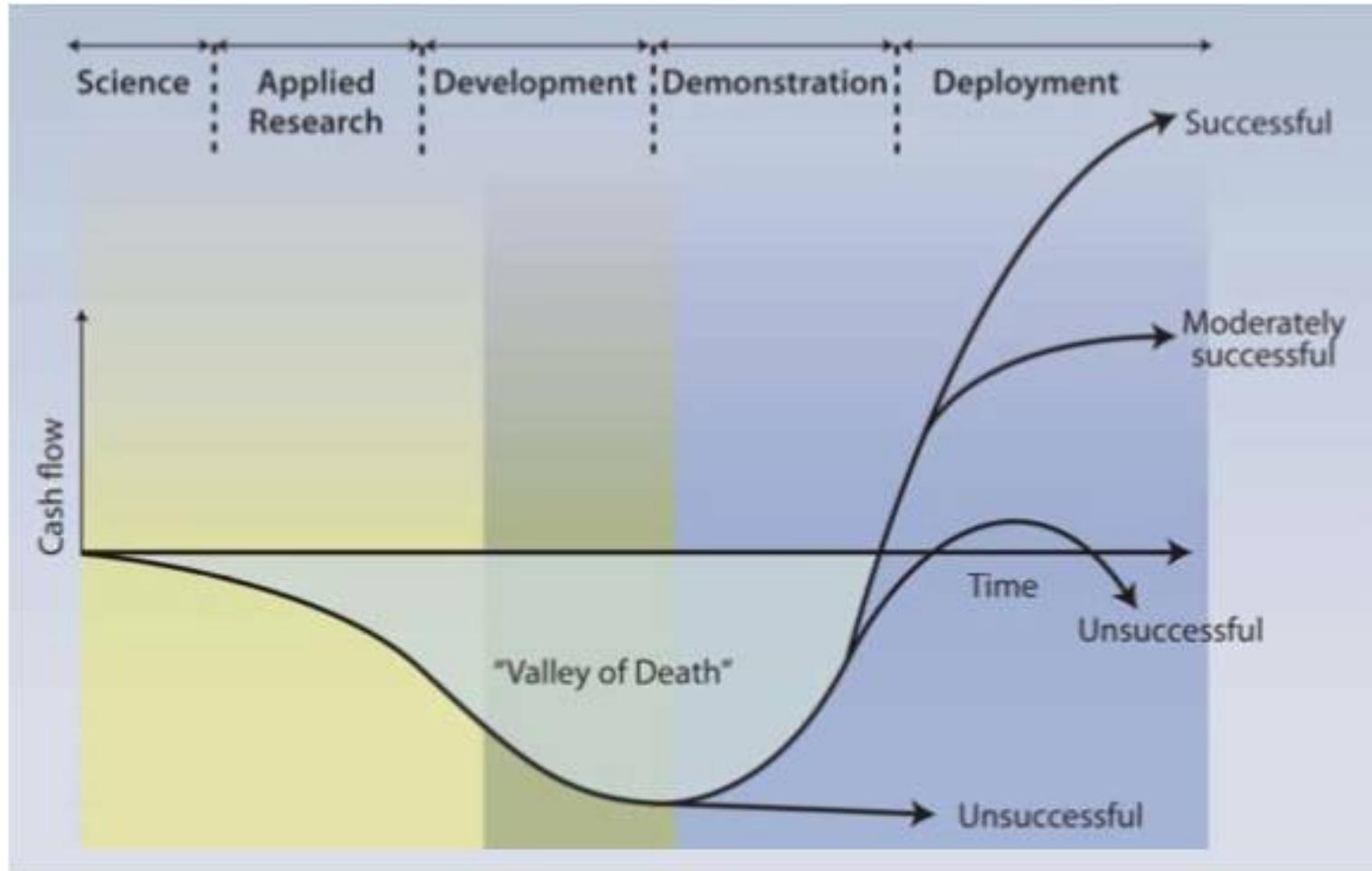
What about Venture Capital?

U.S. Venture Capital Investments by Stage (2014)



Source: PWC MoneyTree Report

The Valley of Death: A Major Challenge for Innovators



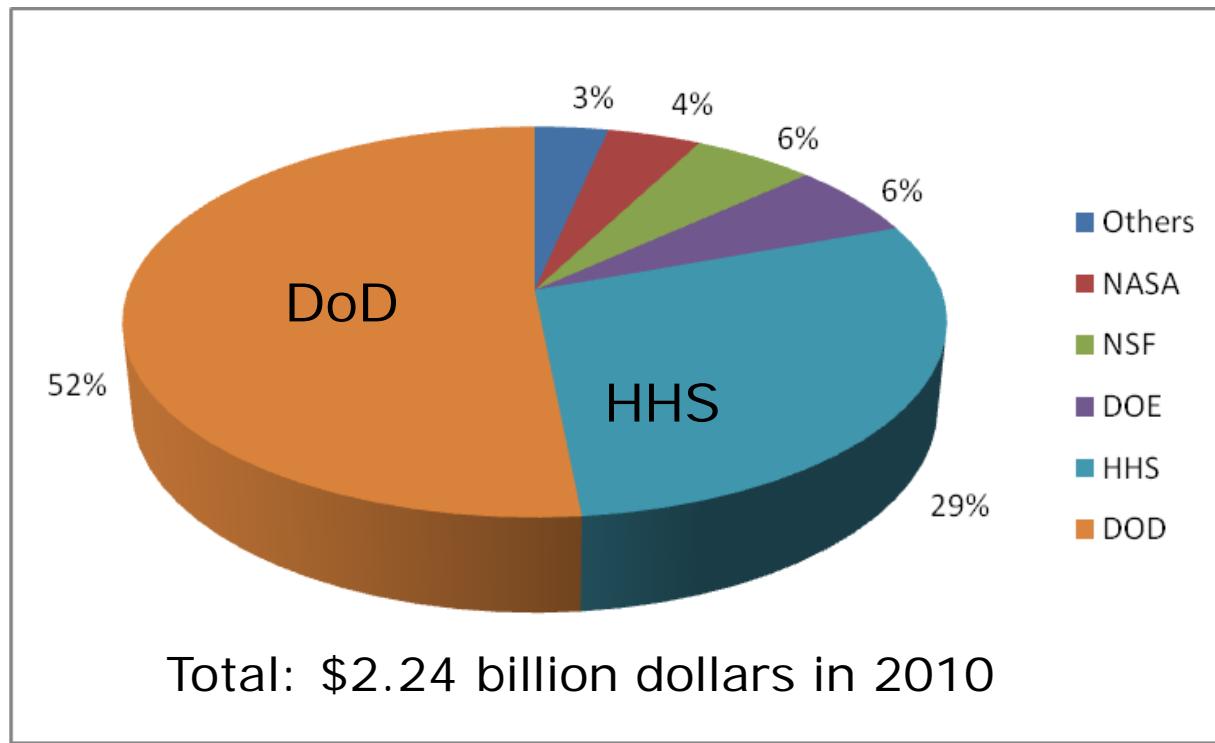
How can Innovative Small Firms Cross the Valley of Death?

One Proven Path is the Small Business
Innovation Research (SBIR) Program

The SBIR Concept

- Competitively awarded support for technological innovation
- Uses up to three-phased awards from federal research funds to address government mission needs.
- “SBIR provides funding for some of the best early-stage innovation ideas -- ideas that, however promising, are still too high risk for private investors, including venture capital firms.” **Roland Tibbetts**

SBIR is the single largest U.S. innovation program for small businesses.



The SBIR program at these five federal agencies together make up some 96 percent of SBIR program

SBIR/STTR funding, FY2010.

SOURCE: <http://www.sbir.gov>, accessed November 1, 2013.

SBIR's Best Practice Features

- **Focus on Valley of Death:** Funds Proof of Concept and Prototype: “The first money is the hardest”
- **Decentralized & Flexible:** Each Government Department or Agency uses its funds to support research by small companies to meet its unique mission needs
- **Competitive:** 20% success rate
- **No Program Capture:** One-third of participants are new to the program every year



After nearly 20 years of operation,
The Congress asked the National Academies:

How well is SBIR Working Overall?

The Committee's Round One Assessment of SBIR (2003-2008)

- Improved the public's understanding of the challenges of Early Stage Finance
- Documented the diversity and flexibility of the SBIR programs
- Assessed effectiveness of agency SBIR programs
- Highlighted benefits of SBIR to agency missions and to the US innovation system

The Committee's Key Finding



Academies Research Shows SBIR Impact on Firm Formation and Growth

- **Company Creation:** 20% of responding companies said they were founded as a result of a prospective SBIR award (25% at Defense)
- **Research Initiation:** SBIR awards played a key role in the decision to pursue a research project (70% claimed as cause)
- **Company Growth:** Significant part of firm growth resulted from award
- **Partnering:** SBIR funding is often used to bring in Academic Consultants & to partner with other firms

When is SBIR Effective?

When it addresses the needs of
Entrepreneurs, Universities, and
Government Agencies.

Why do Entrepreneurs like SBIR?

- Additional Research Funds
- No dilution of ownership
- No repayment required
- Grant recipients retain rights to IP developed using SBIR funds
- No Royalties owed to Government
- Certification of Quality attracts private investments

Why do Universities Like SBIR?

- SBIR links the University with Industry and helps Spin-outs
 - **Lowers Risk:** Faculty do not have to give up University post to apply
 - **Lowers Overhead:** Don't need to have a company to apply
 - 15 to 20% success rates—comparable to other grants
- SBIR Innovation Awards Directly Cause Researchers to create New Firms
- New firms help grow the region and provide returns on R&D investments

Why do Government Ministries like SBIR?

- A low-cost technological probe
 - **Fast:** Enables government to explore more cheaply and quickly ideas that may hold promise
 - **Cost Effective:** Identifies dead-ends before substantial investments are made
- Enhances Competition
 - **Diversifies** the Government Supplier-base
 - **Brings in competition**, low-cost solutions, new approaches to address mission needs
 - **Sole source** procurement for R&D Contractors

Our Study had a Major Impact on the 2011 SBIR Reauthorization

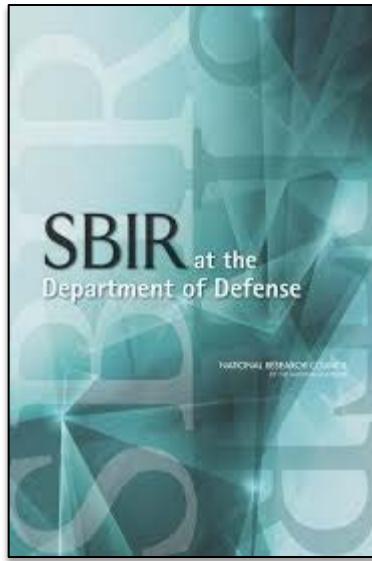
- Many contributions to the 2011 Congressional Reauthorization of the SBIR Program including
 - Extension of the program: until 2017
 - Increase in award size: \$150,000 for Phase I and \$1 million for Phase II.
 - Increase in set-aside: From 2.5% to 3.2%
 - Enhanced Agency Flexibility: Can use Phase I from another agency for Phase II award
 - Expanded Management Resources: Up to 3% of program funds
 - Commercialization: Incentives to use SBIR technologies in agency acquisition programs
 - Evaluation: Congress requested further NAS assessments

SBIR/STTR Assessment: Round 2

Now underway...

Focus of the Second Round Assessment:

- How can the Agency SBIR programs work better to address the four Congressional Objectives of the Program:
 - Stimulate technological innovation
 - Use small businesses to meet federal R&D needs
 - Foster participation by women-owned and minority-owned small businesses
 - Increase private sector commercialization of innovation derived from federal R&D



The Committee has
published its report on the
DOD SBIR Program

What are the major findings?

SBIR Projects at DoD Commercialize at a Substantial Rate

- Projects funded by the SBIR program are reaching the market.
 - Attracting substantial amounts of follow-on investment.
 - More than 45% of Phase II projects report sales (NRC 2011 Survey).
 - Over time, about 70 percent of Phase II projects at DoD reach the market.

SBIR projects at DoD are in broad alignment with the agency's mission needs.

- There is substantial evidence that outputs from the program are taken up by federal agencies and in particular by DoD and by its prime contractors.
- Also some outputs have been picked up in civilian markets.

Growing use of SBIR in DoD Acquisitions

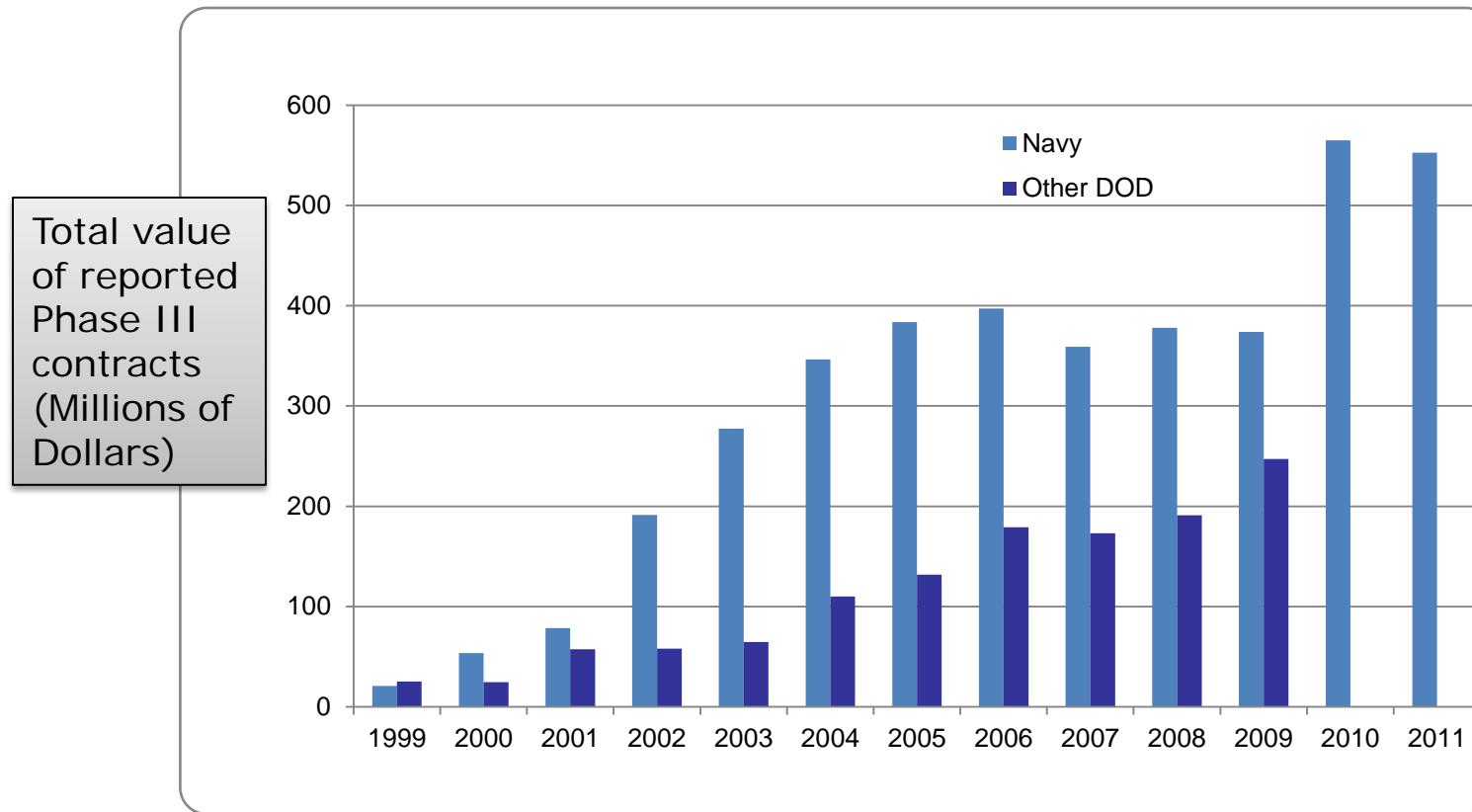


Chart (from Navy) shows aggregate Phase III contracts by FY. Note the steady increase outside Navy.

Examples of Successful DoD SBIR Investments

- Contributions to Sub-Systems
 - *Sikorsky Super-Stallion Helicopter*: 14 SBIR Companies
 - *Virginia-class Submarines*: 15 SBIR Companies
 - *F-35 Joint Strike Fighter*: 17 SBIR Companies
- Specific Technologies
 - **Cyber attacks**: Intruder and alert sub-system for network attacks
 - **Materials**: Large-format carbon nanotube sheets for use in aircraft
 - **Technology Insertion**: Improved sonar performance for submarines

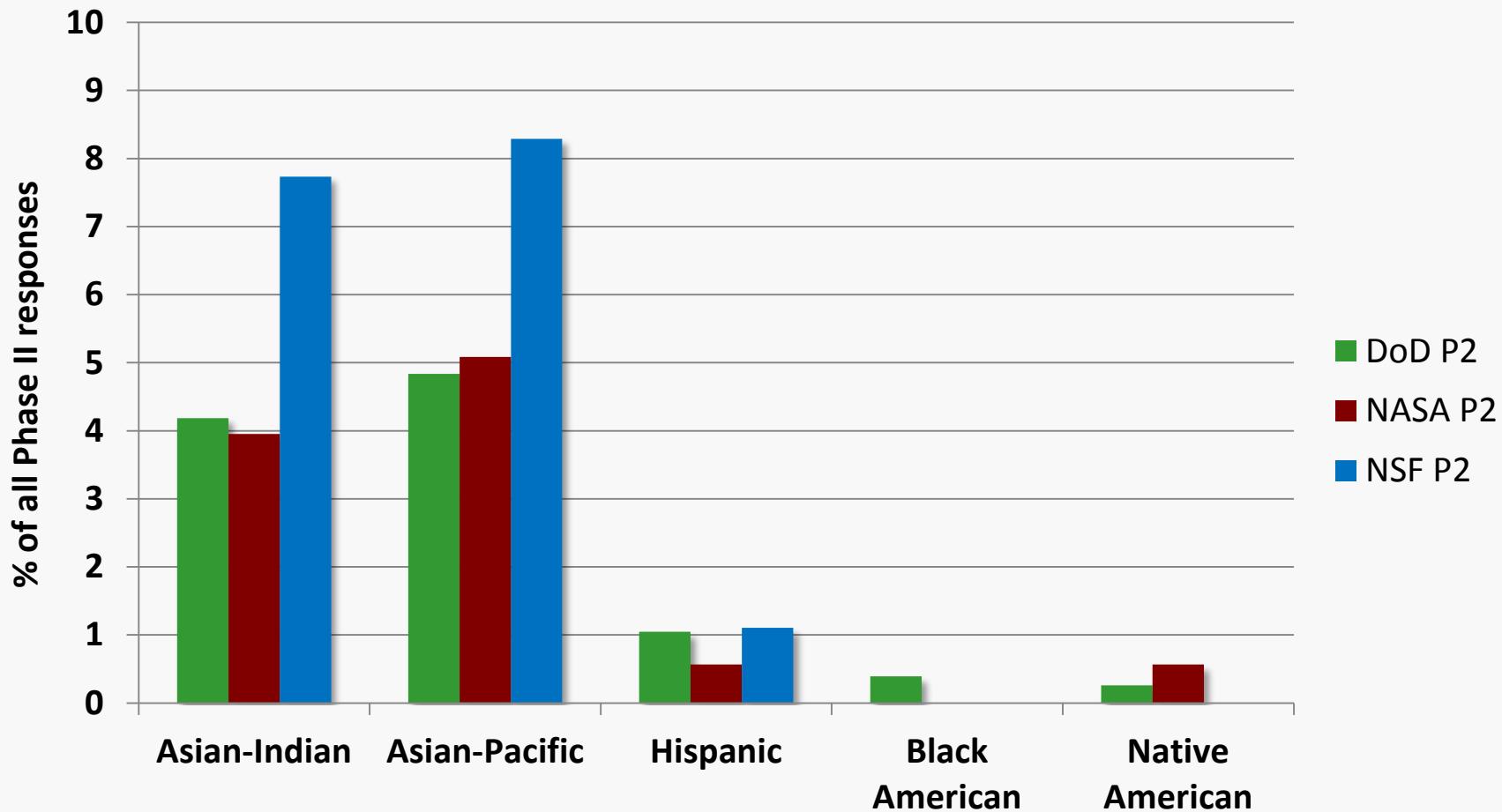
Growing Linkages to Universities

- More than one-third of DoD Phase II survey respondents reported a link to a university for the surveyed project
 - Including use of faculty as Principal Investigators (PIs), use of graduate students as researchers, licensing of technology from universities, and use of a university as a subcontractor,
 - Participation level has increased from the 2005 survey.

Improvement Needed on Participation by Women and Minorities

- The committee's survey found that levels of participation are low and not increasing.
 - About 15% of awards surveyed went to women owned firms and 7% to minority owned firms.
 - African-American, Hispanic and Native American firms are each less than one percent of all survey respondents.

Phase II - PI's by ethnicity and agency



Recommendations for Operational Improvements at DoD

- **Linkages:** Incentivize prime contractors to work more effectively—and more often—with SBIR firms.
- **Outreach:** Improve outreach and education programs focused on expanding the participation of women and minorities.
- **Data & Assessment:** Align data collection, and use assessment tools to guide program management.
- **Audits:** Develop less onerous and more effective auditing procedures for small businesses that can be completed in a timelier manner.



Forthcoming Reports from the Academies SBIR Committee

Round 2 Reports on the SBIR and STTR Programs at NSF, NASA, NIH, and DOE will highlight operational improvements.



Thank You

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