

SBIR/STTR Program

Highly competitive

Tapping America's small business energies

High innovation performance

Demonstrated high transition and commercialization performance

Under-utilized by DoD

An opportunity to boost technology innovation and transition to the
Warfighter

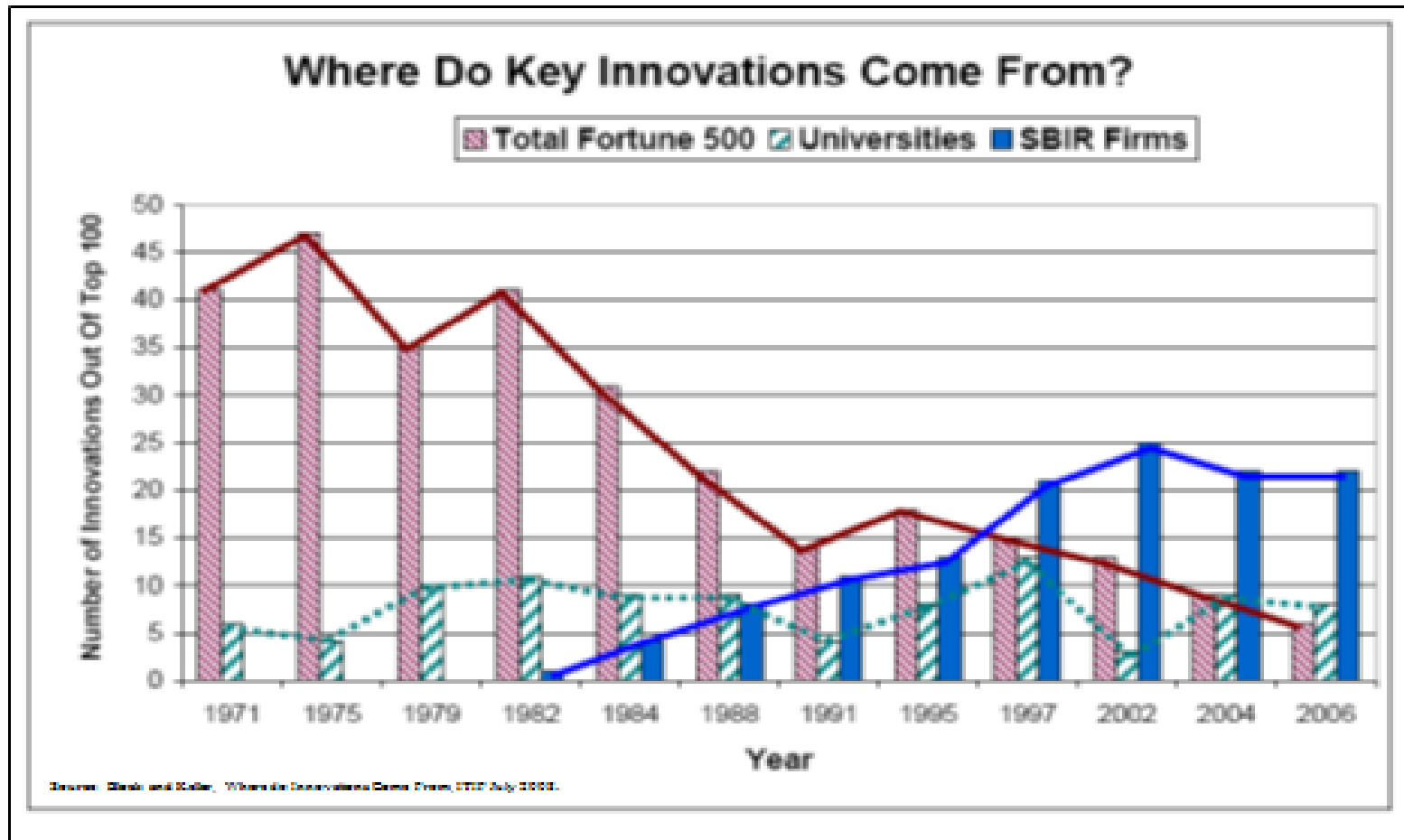
Presentation for Department of Defense Research, Technology and Laboratories,
Office of the Under Secretary of Defense for Research and Engineering
by Small Business Technology Council
March 27, 2019



SBIR/STTR Facts

- SBIR/STTR is less than 3.5% of extramural R&D budget
- Topics selected by R&E with program office input
- Highly competitive: Only 1 in 20 Phase I proposals advanced to Phase II
- 60% of Phase IIs advance beyond SBIR
- SBIR firms have 136,000 Patents
- Heavily studied (17 National Academy of Sciences studies over 20 years, 4 Economic Impact Studies, DOD-wide study pending release)
- SBIR offers high leverage in transitioning Next Gen technology to Warfighter
- Competition makes SBIR/STTR virtually fraud-free: Less than 20 waste fraud and abuse lawsuits out of 150,000 total awards

Small business innovation a mainstay of American economic strength



THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine

Source: Block, Fred and Matthew Keller "Where do Innovations Come From", ITIF (2008)

<https://itif.org/publications/2008/07/09/where-do-innovations-come-transformations-us-national-innovation-system-1970>

SBIR is most commercially successful Government R&D Program

SBIR Commercialization record is remarkable

- DOD SBIR commercialization sales: \$125 billion 1995-2012: \$7+ billion/year¹
- DOD SBIR total economic impact: \$325 billion 1995-2012; 23:1 ROI
- Annual investment in SBIR by DOD \$1 billion

- DOD labs commercialization sales: \$20 billion 2000-2012: \$1.7 billion/year²
- Annual Investments in DOD labs \$20 billion

1. <https://sbtc.org/wp-content/uploads/2018/09/DoD-SBIR-Economic-Impact-Study-for-BPIIMPTW18.pdf>

2. <https://techlinkcenter.org/wp-content/uploads/2017/01/2016-DoD-Licensing-Study-E-Publication.pdf>

SBIR Economic Impact

Dollar amounts in millions

<u>Awards and Sales</u>	<u>Air Force ('00-'13)</u>	<u>Navy ('00-'13)</u>	<u>DOD ('95-'12)*</u>	<u>NCI ('98-'10)</u>
Total SBIR/STTR Award Investment	\$4,000	\$2,300	\$14,300	\$787
Rate of Commercialization	58%	64%		53%
Cumulative Sales	\$14,692	\$14,174	\$125,000	\$9,144
Military Sales	\$4,386	\$6,960	\$28,000	XXX
Military Sales % of Total	30%	49%	22%	XXX
Follow-on R&D	\$3,545	\$3,489		\$957
Total Acquisition Value of Acquired Firms	\$6,768	\$1,795		\$21,630
Total Outside Investment Funding	\$1,872	\$646		\$4,260
Total Economic Output	\$47,900	\$44,000	\$325,000	\$26,100
Return on Investment	12:1	19:1	23:1	33:1

Sales do not include follow on sales from licensees, spinoff and acquired firms.

source: Swearingen, Will and Jeffrey Peterson, "National Economic Impacts from the Air Force and Navy SBIR/STTR Programs, 2000-2013" (2018); and Swearingen, Will, et al, "1998-2018 National Economic Impacts from the National Cancer Institute SBIR/STTR Program" (2019)

**DOD-wide numbers are from a preliminary report and are not official yet*

SBIR technology saves DOD dollars

For example:

SBIR technology saved or avoided cost in Joint Strike Fighter over \$500 million

–Christopher C Bogdan, Lieutenant General, USAF, F-35 PEO

Source: “F-35 Small Business Success Stories”

Corporations having acquired multiple SBIR-involved *Italics=SBIR involved firms* March 2019

L3 Communications Recently, L3 divesting several	L3:44	28
<i>Titan Corporation</i> (acquired by L3)		16
General Electric Company		15
SAIC		14
Agilent Technologies, Inc.		12
BAE Systems; Lockheed Martin; Raytheon, Thermo Fisher Scientific		11
EDO Corporation; General Dynamics; Philips; Teledyne Technologies		10
JDS <i>Uniphase</i> ; Perkin-Elmer, Inc.; Pfizer Inc.;		9
Boeing Company;; Invitrogen Corporation; Johnson & Johnson; Northrup Grumman (Litton); Novartis AG;		8
Becton, Dickenson & Company; Bristol-Myers Squibb; Danaher Corporation; Medtronic, Inc.; <i>Sierra Nevada Corporation</i>		7
Allergan, Inc.; <i>Amgen</i> ; ATK Inc.; Beckman Coulter, Inc.; Charles River Laboratories; Corning, Inc.; <i>Genzyme Corporation</i> ; ICx Technologies, Inc.; ManTech International Corp. ; Qiagen NV; Roche Holdings AG; Sanofi-Aventis, SA; Ultra Electronic Holdings plc		6
3M, <i>Affymetrix, Inc.</i> ; <i>Apple Computer</i> ; <i>CACI International Inc.</i> ; <i>Cubist Pharmaceuticals Inc.</i> ; <i>Flir Systems, Inc.</i> , <i>Gilead Sciences, Inc.</i> ; GlaxoSmithKline; <i>II-VI, inc.</i> , Microsoft Corporation; Siemens AG; SRA International Inc; Tyco International; Veeco Instruments; W L Gore Inc,		5

Corporations having acquired multiple SBIR-involved *Italics=SBIR involved firms* March 2019

Abcam plc.; Alion Science & Technology; ANSYS; Argon ST; BASF; Bayer AG; Corixa Corporation; DRS Technologies; E I du Pont de Nemours & Co.; Eli Lilly & Company; Goodrich Corporation; Honeywell International; Integra Life Sciences; Intel Corporation; Intermagnetics General Corporation; Inverness Medical Innovations; ITT Corporation; Merck & Company Inc.; Monsanto; Moog Inc.; MSC Software Corporation; OSI Systems, Inc; QuinteIQ Group; Rockwell Collins Inc.; Shire plc; Sigma-Aldrich Corporation; Smiths Group plc; Stryker Corporation; Takeda; Thermo Electron Corporation

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A123 Systems; AbbVie Inc.; Advanced Medical Optics; Affiliated Computer Services; Alexion Pharmaceuticals; Ametek; Astellas Pharma Inc.; Avant Immunotherapeutics Inc.; Baxter International Inc.; Bio-Rad Laboratories; Bio-Tech Corporation; Boston Scientific Corp.; Cardinal Health Inc.; Coherent, Inc.; Cree, Inc.; Curtis Wright Corp.; DSM NV; Dynavox Technologies; Eastman Kodak Company; Elan Pharmaceuticals; Endo Pharma.; Entegris, Inc.; Exelixis Inc.; Finisar; Fisher Scientific International; Foster-Miller, Inc (a QinetiQ co.); Genomic Solutions; Google Inc.; Harvard Bioscience, Inc.; Hitachi; Hologic Inc.; IBM; Illumina Inc.; Immusoft; ITT Industries; Koninklijke Philips NV; Ligand Pharmaceuticals; Luna Innovations; Mallinckrodt Inc.; Millennium Pharma Inc.; Molecular Devices Corp.; MTS Systems Corp.; Nanogen Inc.; Nokia Corporation; Nuance Communications.; OrthoLogic Corp.; PAR Technology Corp; Photon Dynamics Inc.; Physical Sciences Inc.; Quidel Corporation; SAS; Schering-Plough; Schlumberger; Serologicals Corp.; SM&A Corp.; Sterling Software Inc.; Synopsys Inc.; Teleflex Inc.; Trinity Biotech plc; Varian Medical Systems Inc.; Waters Corporation

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163 Firms – to include 42 themselves
SBIR-involved - have Acquired TWO (2)
SBIR Awardees

1273 Firms - to include 216 themselves
SBIR-involved - have acquired ONE SBIR
Awardee:

Some SBIR Success Stories

- Broadcom, Qualcomm, Symantic, Biogen, Genzyme, Illumina, Genentech
- AlsoSymantec (computer security), Genzyme (biotech therapies), Affymetrix (GeneChip), Amgen (biopharmaceuticals), Jarvick Heart (artificial heart), Titan (now Intersection, interactive computer graphics) Chiron (pediatric vaccines), AMTI (advanced materials, radars), Amorworks (military armor), Biogen (Idec, neurological, autoimmune therapies), American Biophysics (mosquito control), Millennium Pharma (gene databases), Geron (telomerase inhibitors for cancer treatment), Neocrine Bioscience (neurological and endocrine pharmaceuticals), ABIOMED (world's smallest heart pump), Aerovironment (unmanned aircraft), A123 Systems (lithium-ion batteries), iRobot (unmanned robotic vehicles, vacuum cleaning, Roomba), JDS Uniphase (fiber optics, lasers, software), Stem Cells Inc. (cell based therapies for CNS and liver disorders), and Nanosys (quantum dot displays) As well as thousands of others

Agency Success Stories

- SBIR Success Stories: <https://www.sbir.gov/news/success-stories>
- DOD: <http://www.acq.osd.mil/osbp/sbir/about/success-stories.shtml>
- NIH: <https://sbir.nih.gov/statistics/success-stories>
- DOE: <http://science.energy.gov/sbir/highlights/>
- NIST/DOC: <http://www.nist.gov/tpo/sbir/sbir-success-stories.cfm>
- USDA: <http://nifa.usda.gov/impacts>
- EPA: <http://www.epa.gov/sbir/sbir-success-stories-and-highlights>
- Tibbett's Award & SBIR Hall of Fame: <https://www.sbir.gov/about-tibbetts-awards>

The market appreciates SBIR technology

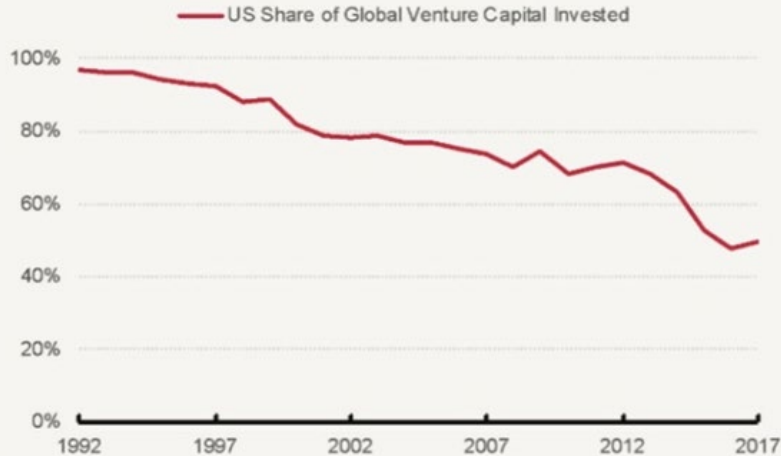
- SBIR success stories include blue ribbon list of major new tech companies
- 10% of all VC dollars goes to SBIR firms
- 19% of IN-Q-Tel investments are in SBIR
- 829 SBIR related firms have gone public
- 1300 or 9% of SBIR firms have been acquired
- L3 Com, GE, SAIC,BAE,Lockheed Martin, Raytheon, Gen Dynamics, Philips, Teledyne - Have all acquired 10 or more SBIR Firms
- Despite focus in areas useful to Warfighter but not typically VC-supported:
Tech creation/early development Military markets Hardware Not necessarily scalable

In-Q-Tel loves SBIR, but may not even know it

- 19% of In-Q-Tel investments have been in 42 SBIR related firms.
- In-Q-Tel's SBIR firms have raised 1.6 Billion from non-In-Q-Tel VCs
- Firms are widely disbursed through the US and in a number of industries and technologies.
- 60% from DOD 15% from NIH and 9% from NSF
- 22 have been acquired and 5 have gone public. Only 5 have failed.

China is Eating America's Lunch

FIGURE 1: AMERICA'S DECLINING SHARE OF GLOBAL VENTURE CAPITAL INVESTMENT

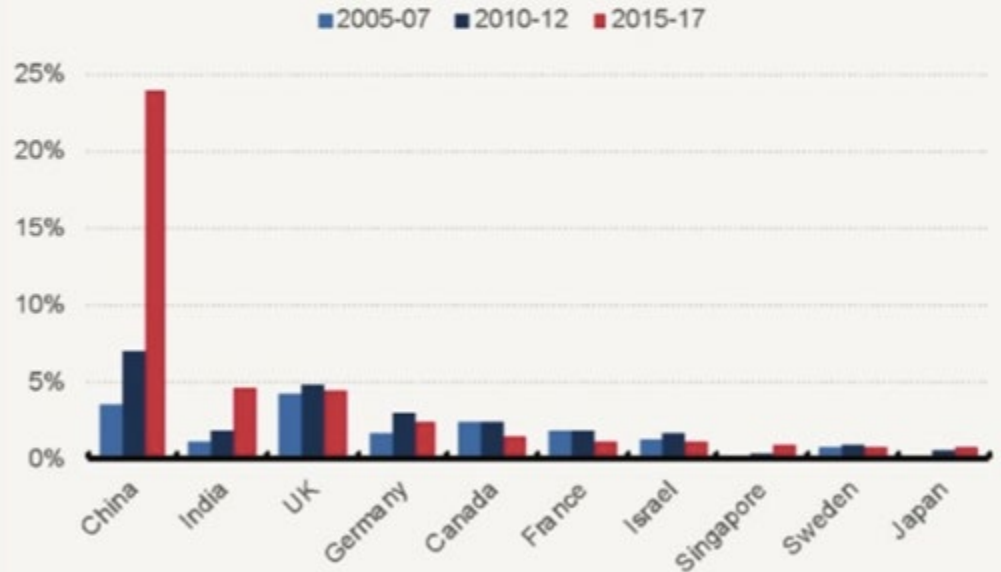


Analysis of PitchBook and VentureSource data. (Richard Florida and Ian Hathaway)

The US has dropped from receiving 95% of Venture Capital to 50% now.

Don't expect Venture Capital to save America. They are fleeing America for China.

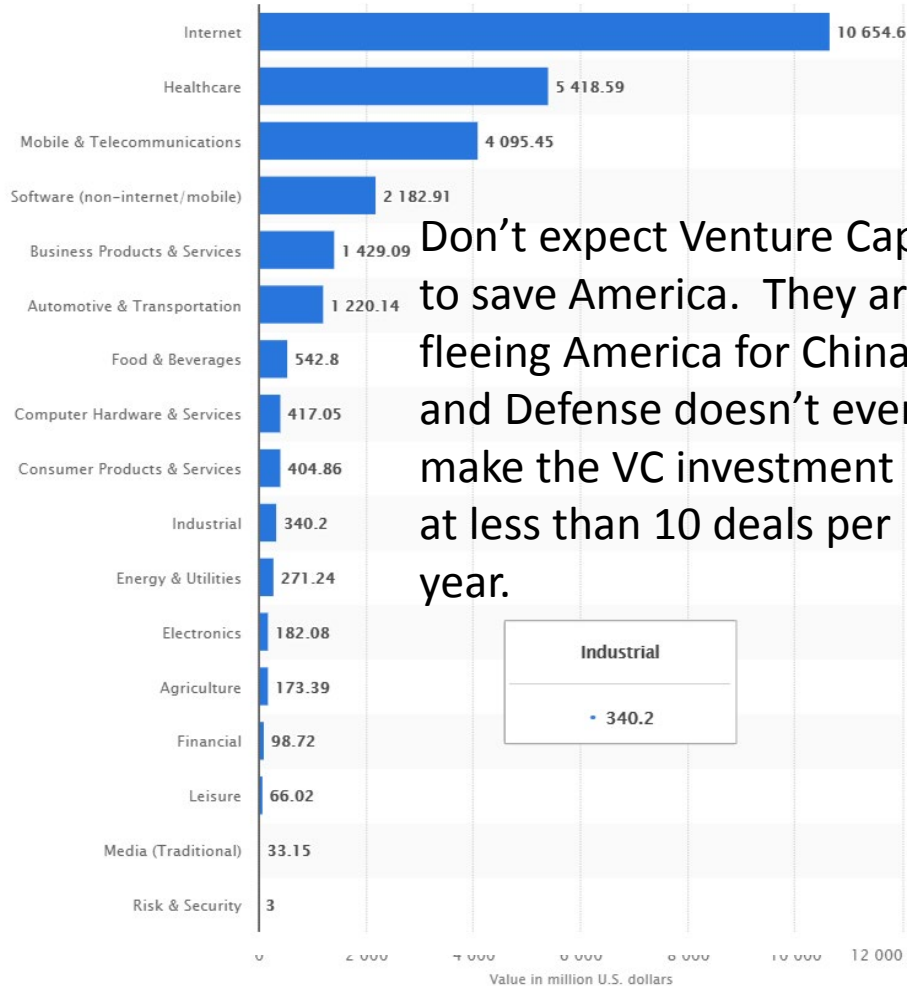
FIGURE 5: SHARE OF GLOBAL VENTURE INVESTMENT IN LEADING NATIONS OUTSIDE THE U.S.



Analysis of PitchBook data. Note: Values are the country share of global activity spanning each of the three-year periods. (Richard Florida and Ian Hathaway)

China is Eating America's Lunch

Value of venture capital investment in the United States in 3rd quarter 2018, by industry (in million U.S. dollars)



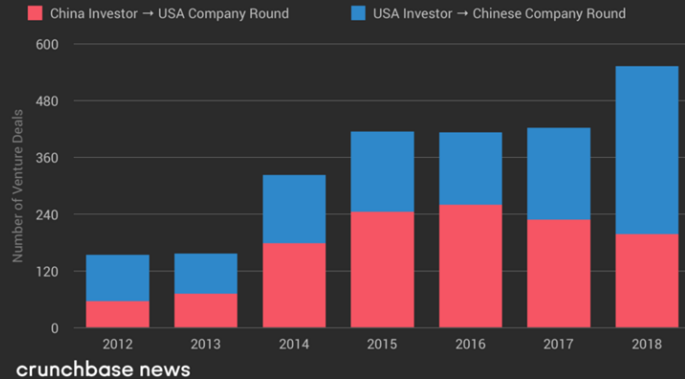
Don't expect Venture Capital to save America. They are fleeing America for China, and Defense doesn't even make the VC investment list at less than 10 deals per year.



U.S. ↔ China Venture Capital Flows

Sum Of U.S.-China Cross-Border Venture Deal Volume

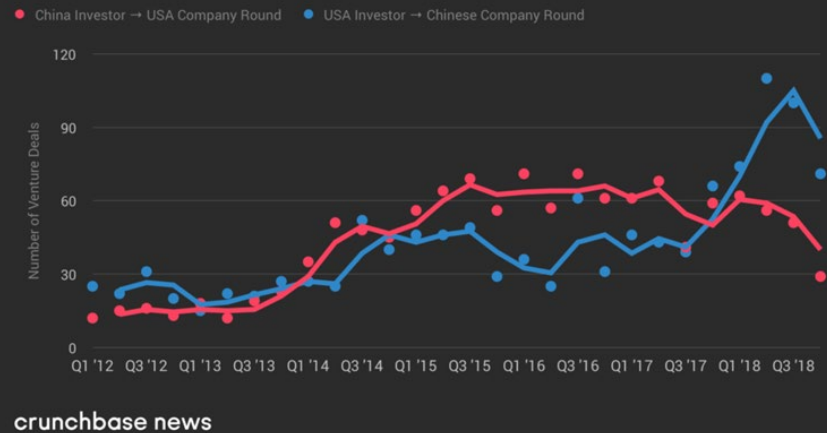
Based on data in Crunchbase current through mid-December 2018. Recent quarters may be affected by reporting delays.



U.S. ↔ China Venture Capital Flows

Two-Quarter Moving Average Of U.S.-China Cross-Border Venture Deal Volume

Based on data in Crunchbase current through mid-December 2018. Recent quarters may be affected by reporting delays.



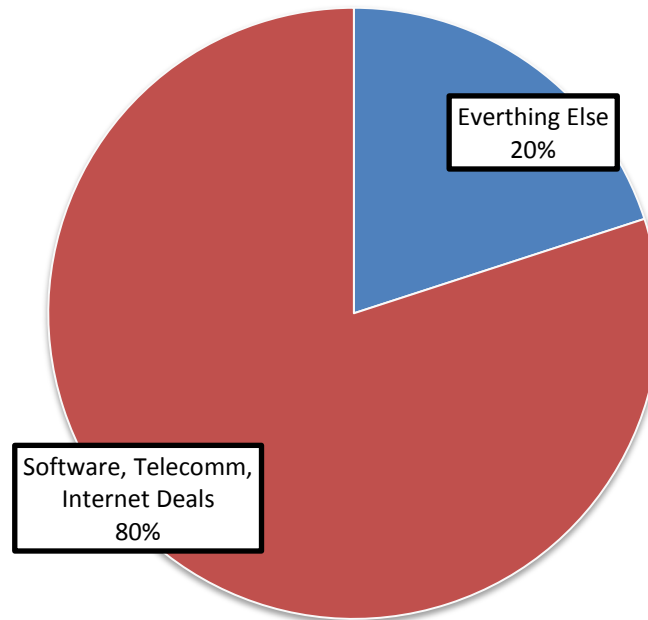
See Also, Rubio China Report and The Hill Op-Ed

https://thehill.com/opinion/technology/435072-rubios-pragmatic-thinking-on-china?mc_cid=aadf892e40&mc_eid=4cb05cd5b3

<https://www.rubio.senate.gov/public/cache/files/0acec42a-d4a8-43bd-8608-a3482371f494/262B39A37119D9DCFE023B907F54BF03.02.12.19-final-sbc-project-mic-2025-report.pdf>

VC Investment is Highly Concentrated by Sector

VC Seed Deals By Industry Sector



Source: Venture Capital data provided by PricewaterhouseCooper MoneyTree Report

VC does not invest in Defense or Aerospace Seed Stage Deals

Filtered by Industry: Aerospace & Defense OR Stage: Seed Stage

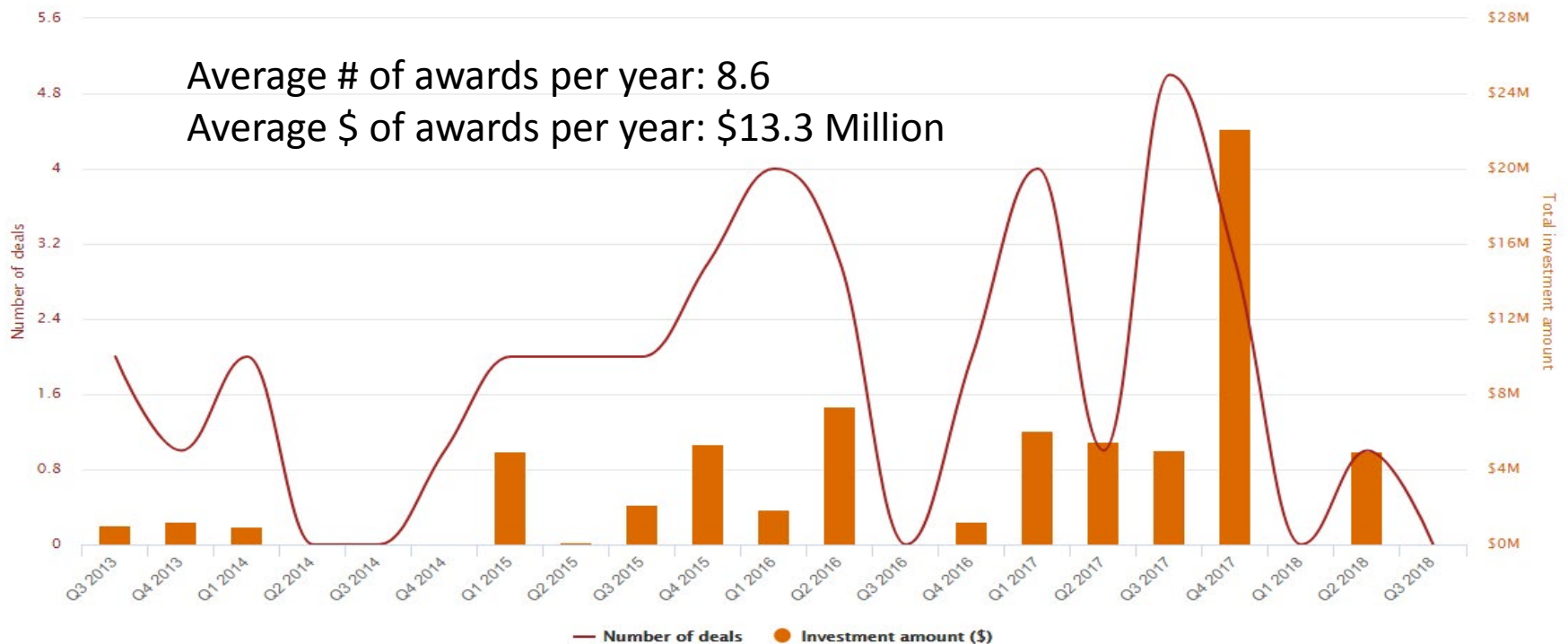
Showing investments and deals from

Q3 2013

to

Q3 2018

Click or tap a quarter to drill further



Source: <https://www.pwc.com/us/en/industries/technology/moneytree/explorer.html>

DoD is the only real source of funding
for new Defense technology

Many opportunities to further improve SBIR effectiveness:

E.g. DOD Hasn't Implemented Many Congressionally-Mandated Improvements

List of Congressionally-passed SBIR Provisions Not Yet Implemented

	Law
1	Fy2012 NDAA: Sec. 5108 "To the greatest extent practicable, Federal agencies and Federal prime contractors shall issue Phase III awards relating to technology, including sole source awards, to the SBIR and STTR award recipients that developed the technology."
2	Fy2012 NDAA: Sec. 5122 (5) SBIR/STTR Phase III Goals and Reporting for Prime Contractors
3	Fy2012 NDAA: Sec. 5122 (6) Government goals for SBIR/STTR Phase IIIs
4	Fy2012 NDAA: Sec. 5122 (6) (C) Reporting on SBIR/STTR Phase IIIs
5	Fy2012 NDAA: Sec. 5138 (kk) SBIR/STTR Phase III Reporting
6	Fy2018 NDAA: Sec. 864 OTHER TRANSACTION AUTHORITY to include SBIR/STTR
7	Fy2018 NDAA: Sec. 1709 (B) Award SBIR/STTR Phase III "without further justification"
8	Fy2018 NDAA: Sec. 1710 - Streamlining SBIR/STTR Transitions
9	Fy2018 NDAA: Sec. 1714 REPORT ON UTILIZATION OF SMALL BUSINESS CONCERNS FOR FEDERAL CONTRACTS. (related to multiple award contract)
10	Fy2019 NDAA: Sec 220 ESTABLISHMENT OF INNOVATORS INFORMATION REPOSITORY IN THE DEPARTMENT OF DEFENSE.
11	Fy2019 NDAA: Sec 854 ACCELERATING SBIR AND STTR AWARDS (A) Simplified and Standardized Contracts for SBIR Phase I

Some DoD Departments/Agencies are innovating to streamline and further improve effectiveness, speed, and transitions

A few examples:

- Air Force Pitch Day
 - 51 Small Businesses competitively awarded simplified one-page SBIR Phase I Contracts
 - \$8.75 million paid by government credit card over 2-day event
 - SBTC letter to President Praising Sec Roper and AF Team
- GSA Phase III Assisted Acquisition
 - GSA pilot program provides contracting service to DOD SBIR offices who want to award Phase III, other post-Phase II funding
- Navy Stackley Memo and many SBIR program innovations, e.g. latest ADAPT "out-of-cycle" Direct to Phase II DoD BAA
(<https://sbir.defensebusiness.org/topics/instructions?solicitationId=128>)

Letter to President Trump

March 18, 2019

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Co-Chairmen*

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Phase III Committee
Chair*

*Russ Farmer
DCAA Committee
Chair*

President Donald Trump
The White House
Washington, DC 20500

Re: Assistant Secretary of the Air Force Dr. Will Roper

Dear Mr. President,

On behalf of small and innovative businesses in America, the Small Business Technology Council (SBTC) would like to offer our commendation to your Assistant Secretary of the Air Force for Acquisition, Technology, and Logistics Dr. Will Roper, and his team, for their innovative and highly effective new Small Business Innovation Research (SBIR) initiative, the "Air Force Pitch Day".

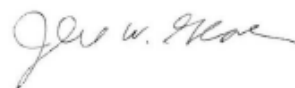
This two-day event brought small high tech businesses, prime contractors, and government acquisition officials together to expedite acquisition and contracting and ensure that the innovative next generation technology developed by the SBIR program gets into the field and the warfighter's hands faster. Over the course of the event 51 small businesses were competitively awarded \$8.75 million in simplified SBIR Phase I contracts to develop new technologies for the warfighter. The winning high technologies, and the determination with which they were evaluated and supported, will be of immense value not only to the American warfighter, but also America's innovation economy and high-tech small businesses.

The Air Force Pitch Day took the SBIR Program, the Government's most commercially successful innovation program, with over a 12:1 return on investment, and accelerated the process of getting technology commercialized and to the warfighter¹.

Your administration has prioritized reducing administrative and regulatory burden to ensure that American taxpayer dollars are being spent more efficiently and effectively. The "Air Force Pitch Day" is a terrific example of that principle put into practice. SBTC hopes that you will recognize Dr. Roper and his team for their initiative and hard work, and encourage other branches and agencies to follow the Air Force's example with their own Pitch Days.

The Small Business Technology Council (www.SBTC.org) is the nation's largest association of small, technology-based companies in diverse fields. SBTC advocates on behalf of firms who participate in the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs.

Sincerely,



Jere W. Glover
Executive Director
Small Business Technology Council

¹ Techlink, 2014: "The Air Force Impact to the Economy via SBIR/STTR, 2000-2013"

Conclusions

- DoD R&E has a powerful innovation & transition tool in the SBIR/STTR program
- Small Business entrepreneurial drive + agile innovation + performance
- Legally-mandated Phase III transition authorities enable very rapid transition
- In past, OSBP focused on the 8(a) minority businesses and not SBIR.
- Still, SBIR has demonstrated high innovation & commercialization performance
- SBIR is now the fastest route to innovations and to transition to the warfighter.
- R&E can further leverage this high performance potential
- Unleash American entrepreneurship in support of the warfighter.
 - Make Phase III transitions fast and real
 - Issue a Stackley-like memo directing use of SBIR technology where available
 - Create simplified, standardized contracts/procedures for Phase I, Phase II and Phase III
 - Require reporting by PM, PEOs and Prime contractors of all SBIR phase III awards
 - Provide incentives for use of SBIR technologies.
 - Push to implement the 809 Committee recommendations to double SBIR and RIF funding.