




Focus on Phase III

to win Phase I SBIR/STTR funding*

*financing new business starts,
new product/technology development
- without losing equity or building debt

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Ray Friesenhahn
SBIR & Technology Transition Manager
May 8, 2013

In the beginning...



...nurturing your idea.







"Common Sense" Says:

A good idea, hard work, a little luck, and
sufficient outside funding will lead to
successful product commercialization.

In Practice:

Those most effective at partnering and
collaborating are far more likely to
succeed in business and bring new
products to market.




Convince yourself it'll work
Start to build a team!

Conduct some realistic market research
Work on building your team!

Begin IP (Intellectual Property) protection
Continue building your team!

Build a prototype or test a crude demo
Do you have everyone you need?

Develop a business plan
Working with your team!

Now you need to finance this plan!

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Options for Financing your Innovative Technology Start-up

- Venture Capital (VC)
- Angel or Corporate Investors
- FFFF
- Loans & Bootstrapping
- Crowdfunding
- SBIR/STTR

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“Typical” Early-Stage Funding Levels:

(Traditional) **VC: \$4M – \$50M+** (Avg. \$7.2M, \$27B in 2012)
2/3 of VC invested in California and Massachusetts

Angels: \$25K - \$2M (Med. \$450K, \$22B in 2011)
< 1/3 invested in California and Massachusetts

FFFF: \$5K - \$100K (\$50B overall)

(Bank) **Loans: \$0~\$250K** (with good collateral)

Bootstrapping: Varies (see Greg Gianforte, e.g.)

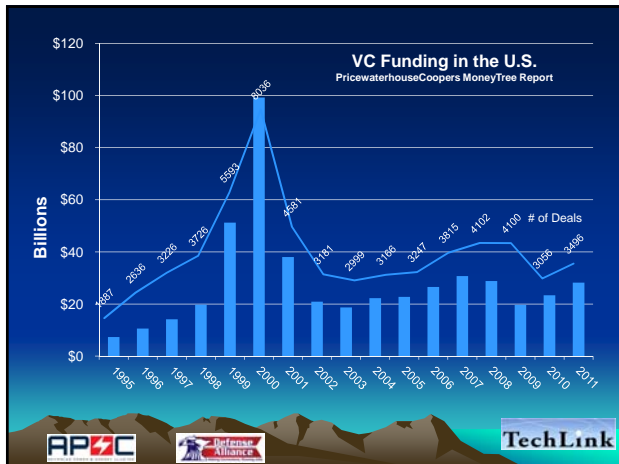
Crowdfunding: To \$10M? (Kickstarter \$435M on 37K proj.)
Pebble on Kickstarter

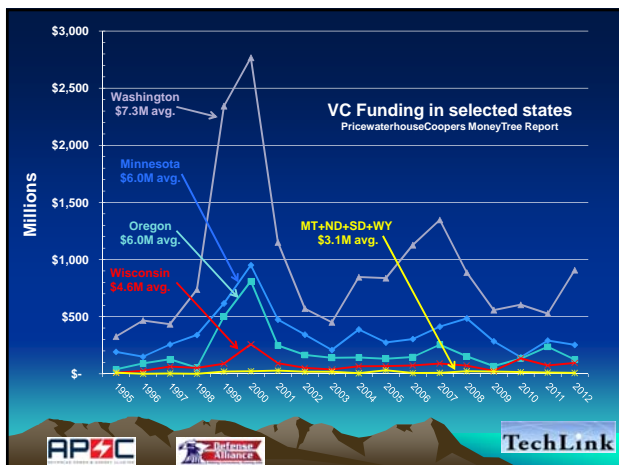
SBIR/STTR: \$70K - \$1M +++ (\$2.4B overall)

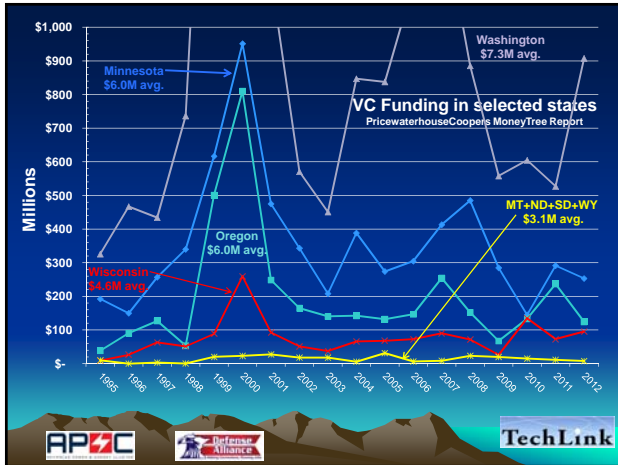
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Venture Capital & Angel Investors









VC Considerations:

- Looking for ROI: >10X 5 years
 - Need Scalability, Exit Strategy
- Odds of getting VC <1% (0.11% of new co's get VC)
- VCs looking for team experience
- Performance-driven (*ruthless*)
 - ~50% of founders forced out in 1st year
- VC need to bring value to your Board
- Earlier stage = more equity to VC
- "20-Minute Rule" for traditional VC

Logos: APAC, Defense Alliance, TechLink

Angel Considerations:

(From the Ewing Marion Kauffman Foundation)

- Of 500K annual new business starts, typically 50K receive some angel backing
- 2011: \$22B in 65,000 companies (VC: \$29B in 3,500)
- Up to 90% of companies receiving outside equity capital got it from angel investors
- Median angel investment: ~\$450K
- Investments tend to be local, within industry experience of investor (adding value to Board)
- Should come after self-financing, FFFF
- Typically take 20%-40% equity
- 2012: 11% structured as convertible notes (6% in 2011)

Logos: APAC, Defense Alliance, TechLink

SBIR/STTR Overview



Small Business Innovation Research (SBIR)

**\$2.4 Billion (FY12) federal set-aside
for U.S. Small Businesses**

Small Business Technology Transfer (STTR)

**\$300 Million (FY12) federal set-aside
for U.S. Small Businesses** *working with
Universities or Not-for-profit Research Institutions*



SBIR/STTR Overview

3-Phase Program:

- **Phase I: Feasibility Study**
 - "Typically" 6-month, \$80K - \$150K (\$225K)
- **Phase II: Proof of Principal/Prototype**
 - "Typically" 2-year, up to \$1M (or more)
- **Phase III: Commercialization** (or "Transition" to DoD)
 - No contract size limit
 - No SBIR/STTR funding
 - May be government contract/procurement
 - Possible Phase II "Enhancement" to get there



SBIR/STTR Overview

- o Federally mandated programs (since 1982/1992) for agency funding of small business (<500 empl.) R&D to develop new commercial products or services
- o FY13 Budgets:
 - o SBIR: ~\$2.4 Billion
 - o 2.7% of extramural R/R&D for agencies >\$100M (3.2% by FY17)
 - o STTR: ~\$300 Million
 - o 0.35% of extramural R/R&D for agencies >\$1B (0.45% by FY16)
- o Goal is **commercialization** of new innovations from U.S. small businesses



SBIR/STTR Highly Competitive

- Overall about 1 in 6 win Phase I
- For “Newbies” odds ~1:10
- 40 – 60 hours to write *decent* proposal
- Most companies lose money during Phase I
- Must prove feasibility and still compete for Phase II
 - Overall ~40% of Phase I awardees win Phase II



SBIR Importance to the Nation

- Nation's most successful program in moving cutting-edge technology into the marketplace
- Many other nations now copying it
- Largest source of early-stage technology financing
- Results meet important societal and/or government and Defense mission needs
- SBIR companies produce over:
 - 20X # patents/\$R&D as universities
 - 5X # patents/\$R&D as large companies
- SBIR-backed firms responsible for ~25% of the nation's most crucial innovations over last decade



SBIR/STTR Advantages:

- o Not a loan – no repayment required
- o No loss of equity ownership
- o Can be high-risk (high-payoff) innovation
- o Preferences, including sole source contracts, for follow-on government funding or procurement
 - o Not required, no guaranteed follow-on
- o Overall chances of winning ~1/6
 - o About 1/10 for first-timers



SBIR/STTR Disadvantages:

- o Government contracts and accounting can be onerous
- o Slow process (3-5 years through Phase II)
 - o Not appropriate for short windows of opportunity
- o Requires R&D capability and writing skills
- o Must propose what agencies ask for
 - o Very specific for contracting agencies (e.g. NASA, DoD)
 - o Much more leeway for granting agencies (e.g. NSF, NIH)



Companies Started with SBIR/STTR Funding







Sonicare Toothbrush

- Started as GEMTech (1988)
- 1990 NIH Phase I SBIR (\$50K) for “Sonic Brush”
- 1992 NIH Phase II: \$500K
- 1995 changed name to Optiva Corp.
- 2000: Optiva (Snoqualmie, Washington) had >600 employees, \$175 million in annual sales
- Acquired by Phillips (2000)

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Packbot (with bomb)



Roomba (vacuum cleaner)

iRobot

(Bedford, MA)

- 29 DoD SBIR/STTR awards (2001 – 2008)
- Total award value \$9.2M
- 2010:
 - 657 employees
 - \$400M annual sales
 - \$737M market value
 - 34% annual growth

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QUALCOMM

“With one of the grants, we developed some of the first chips we did at Qualcomm... making chips for cellphones is about two-thirds of our revenue today.” -Irwin Jacobs

1987-1990: 12 SBIRs (NSF & DoD), \$1.4M

Today:

- Over 21,000 employees
- \$15 billion sales (2011)
- 2011 1-yr growth: 36% sales, 21% employee
- Holds > 13,000 U.S. patents
- Pays more in taxes than SBA's annual budget!

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Basic SBIR/STTR Eligibility Requirements



SBIR/STTR Eligibility Requirements

- Small by SBA definitions: <500 employees – *including all affiliates* (see VC ownership issues)
- For-profit
- At least 51% owned & controlled by U.S. individuals (see VC issues)
- Primary employment of the PI must be with the small business firm at the time of the award and during the conduct of the proposed effort (or with Research Institution for some STTR)
- All work must be done in U.S. (except with special approval)

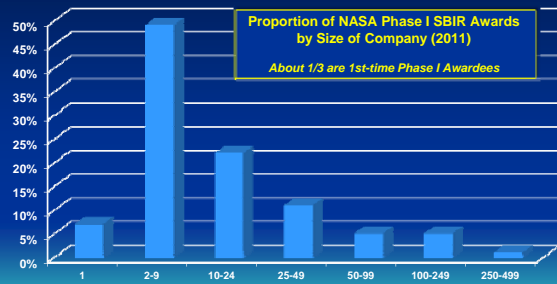


How Small is “Small”?

- 69% of Phase I SBIR award winners were 20 or fewer employees
- 41% of Phase I SBIR award winners were 10 or fewer employees



Company Size Distribution: NASA Phase I SBIR Awards



Basic Requirements for SBIR/STTR Success



Requirements for SBIR Success:

- **Innovation**
 - New Product or Technology
 - New Application of Existing Technology
- **Research**
 - Research of the Feasibility of the Project
 - Not Market Research
 - Not Strictly Product Development
- **Commercial Applications**
 - Societal Need and Commercial Potential and/or
 - Specific Agency Need and "Dual Use"



Additional Needs for Winning SBIR:

- o **Proposal Writing Skills**
 - o Blending of business & technical/scientific proposal
 - o Tip: Start with the Commercialization Plan
 - o Hiring a proposal writer *usually* not a good choice
 - o Having a reviewer and/or technical editor is very helpful
- o **Know Your Customer!**
 - o Significant agency differences in proposal requirements, technical focus, evaluation process
- o **Build a Team to Fill in Gaps**
 - o Use allowed subcontracts, consultants, collaborators to build research capabilities, path to commercialization



Unacceptable Objectives:

"Proposed efforts directed toward systems studies; market research; commercial development of existing products or proven concepts; straightforward engineering design for packaging; laboratory evaluations; incremental product or process improvements; evolutionary optimization of existing products; and evolutionary modifications to broaden the scope of an existing product or application are examples of projects that are not acceptable for SBIR."

— NSF FY2014 SBIR Program Solicitation



Planning Ahead for SBIR Success:

- o **Phase I is Required Step, Not Objective**
 - o Most companies actually lose money in Phase I
 - o Phase I required before Phase II
- o **Phase II Much More \$\$ - Still Just a Step**
 - o Strong Commercialization Plan is one key to winning
 - o Need to show intent and ability to develop the product or service and get it to the customer (market).
- o **Commercialization is Goal**
 - o Commercial or other sales ← **Phase III**
 - o Follow-on gov't contracts for DoD, NASA, others



SBIR/STTR Summary Info:

| | SBIR | STTR |
|---|---|--|
| Total Ann. Amt. | ~\$2.4 Billion | ~\$300 Million |
| Agencies | 11 | 5 <small>(DoD, DOE, NIH, NASA, NSF)</small> |
| Phase I (~15% win, much higher for STTR) | Typically to \$150K Usually 6 months | Typically \$150K Often 12 months |
| Phase II (~40% win) | Typically to \$1M 24 months | Up to \$1M 24 months |
| (University) Phase I: Subcontracts Phase II: | Allows up to 1/3 Allows up to 1/2 | Requires 30 – 60% to RI Requires 30 – 60% to RI |



Agency Participation in SBIR/STTR And Key Differences



SBIR/STTR Agency Participation

- o 11 different agencies participate in SBIR
 - o 5 of these also have STTR programs
- o Each agency manages its own programs
 - o Each (of 12) DoD Components manages its own programs, with some coordination by OSD
- o SBA sets general rules (SBIR & STTR Program Policy Directives)
 - o per law set by Congress (SBIR/STTR Reauthorization Act of 2011, in NDAA of FY2012, Public Law 112-81)
- o Agencies report as required to SBA



Participating Agencies

| Agency | Programs | Budget | Award Type | Review |
|---------------|-----------|-------------------|-------------------|--------|
| DoD | SBIR/STTR | \$1.2 B / \$135 M | Contracts | Line |
| HHS/NIH | SBIR/STTR | \$571 M / \$69 M | Grants +Contracts | Peer |
| DOE | SBIR/STTR | \$128 M / \$13 M | Grants | L/P |
| NASA | SBIR/STTR | \$102 M / \$12 M | Contracts | L/P |
| NSF | SBIR/STTR | \$96 M / \$11 M | Grants | Peer |
| DHS | SBIR/ - | \$25 M / - | Contracts | L/P |
| USDA | SBIR | \$18 M | Grants | Peer |
| ED | SBIR | ~\$14 M | IES: Contracts | Line |
| (IES & NIDRR) | | | NIDRR: Grants | Peer |
| DOC | SBIR | ~\$9 M | Contracts | Line |
| (NOAA & NIST) | | | | |
| EPA | SBIR | \$7 M | Contracts | L/P |
| DOT | SBIR | ~\$6 M | Contracts | Line |



Grants vs. Contracts:

Contracting Agencies

- o Highly focused topics
- o Agency establishes plans, protocols, requirements
- o More fiscal requirements
- o Subject to FARs, DFARs
- o Restricted communications
- o Agency may be buyer – procurement mechanism for DoD, NASA
- o Usually line-reviewed

Granting Agencies

- o Less-specific topics
- o Investigator initiates approach
- o Assistance mechanism
- o More flexibility
- o More open communication
- o Usually peer-reviewed



Line vs. Peer Review:

Line Review

- o Contracting agencies (DoD, NASA, DHS) use SBIR to develop new technologies they need, want to eventually buy
- o "Dual-use" is important
- o Program Manager and knowledgeable cohorts review proposals
- o Personal knowledge, "insider" terminology useful

Peer Review

- o Markets and approach defined by submitter, meeting societal need of interest to agency
- o Technical reviews by outside experts, usually university faculty
- o Some use separate business review panel
- o Agency PM makes final recommendation to fund



Critical Need for SBIR:

o Know Your Customer!

- o Significant agency differences in proposal requirements, technical focus, evaluation processes
- o For "peer review" agencies (e.g. NSF, NIH), reviewers are typically subject matter experts at universities – consider what they might want to see
- o For "line review" agencies (e.g. DoD, NASA), personal knowledge, interaction, & relationships are much more important
 - o Talk to TPOC before solicitation opens, if at all possible
 - o Do in-depth background research before talking to TPOC, to leave a good impression



Plan Ahead: Registration Reqs

| | DoD | HHS/NIH | DOE | NASA | NSF | DHS | USDA | ED | DOC | EPA | DOT |
|-----------------------------|-----|---------|-----|------|-----|-----|------|----|-----|-----|-----|
| SBIR.gov | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| SAM (sam.gov) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| DUNS (dnb.com) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| EIN (irs.gov) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Grants.gov | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| DoDSBIR.net | ✓ | | | | | | | | | | |
| eRA Commons (NIH.gov) | | ✓ | | | | | | | | | |
| FastLane (nsf.gov) | | | | | ✓ | | | | | | |
| PAMS (energy.gov) | | | ✓ | | | | | | | | |
| ASAP (asap.gov) | | | ✓ | | | | | | | | |
| FedConnect (fedconnect.net) | | | ✓ | | | | | | | | |
| EHB (nasa.gov) | | | | ✓ | | | | | | | |



Agency Perspectives: DoD

General DoD Descriptions

- o Primary focus is on the warfighter
 - o Additional Service requirements also
- o Topics may cover nearly any technology area
 - o Many medical topics in Army solicitation
- o DARPA seeks most advanced technologies
 - o Moving back to longer-range insertion
 - o Applicants should show strong connections to Service users
 - o DARPA PMs may serve just 4 years, often "adopt" other Phase II proposals
- o SOCOM wants quick deployment of practical technology
- o Other Services in-between in level of technology
- o Navy has had most successful Phase III program
 - o Other Services modifying programs to improve transition



Agency Perspectives: DoD

12 participating DoD Components

- Each with its own culture, needs, requirements, and SBIR solicitation (6 with STTR)
- Organizations within Services may vary as well



| FY10 | SBIR (STTR) \$ | Topics | Ph I proposals | Ph I awards | Award Rates | Ph II awards |
|-----------|----------------|----------|----------------|-------------|---------------|--------------|
| Navy | \$343M (\$41M) | 232 (50) | 4,098 (804) | 666 (151) | 16.3% (18.8%) | 310 (46) |
| Air Force | \$331M (\$40M) | 181 (37) | 2,494 (309) | 501 (125) | 20.1% (40.5%) | 282 (59) |
| Army | \$244M (\$29M) | 176 (29) | 3,240 (446) | 434 (64) | 13.4% (14.3%) | 202 (22) |
| MDA | \$90M (\$11M) | 35 (4) | 553 (33) | 126 (25) | 22.8% (75.8%) | 77 (12) |
| OSD | \$86M (\$6M) | 64 (6) | 915 (54) | 143 (9) | 15.6% (16.7%) | 41 (3) |
| DARPA | \$67M (\$8M) | 27 (0) | 833 (0) | 107 (9) | 12.8% (N/A) | 127 (16) |
| CBD | \$15M | 10 | 127 | 21 | 16.5% | 19 |
| SOCOM | \$10M | 8 | 142 | 23 | 16.2% | 6 |
| DTRA | \$8M | 17 | 307 | 21 | 6.8% | 5 |
| DLA | \$2.4M | 1 | 55 | 6 | 10.9% | 2 |
| DMEA | \$2.2M | 2 | 35 | 4 | 11.4% | 0 |
| NGA | N/A | 0 | 0 | 0 | N/A | 0 |



2013.2 DoD SBIR Solicitation

Key Dates:

- April 24th – topics posted (solicitation pre-release)
- May 23rd – last day to contact TPOC
 - See “Background Research” before contacting
- May 24th – solicitation opens
 - “Blackout” begins
- June 11th – last day to post questions on SITIS
- June 25th – proposal submission deadline
 - Technically June 26th at 0600 ET
- Soon thereafter – update your CCR (Company Commercialization Report)
 - Up to 5 pages in “Add a Brief Narrative”



2013.2 DoD SBIR Solicitation

Participating Components:

- Army – 27 topics
 - 13 health/medical, 4 materials, 6 power/energy, etc.
- Navy – 61 topics
 - 1 health/medical, 10 materials, 5 power/energy, etc.
- Missile Defense Agency (MDA) – 32 topics
 - Rocket science, target ID, High Energy Lasers, etc.
- Defense Health Program (DHP) – 17 topics
 - Medical technologies, disease vector (arthropod) control
- Defense Adv. Research Projects Agency (DARPA) – 5 topics
- Defense Microelectronics Activity (DMEA) – 2 topics
- Air Force – 1 topic
 - Air Force normally participates in just 20XX.1 SBIR



2013.2 DoD SBIR Solicitation

Component Proposals (all now 20-page Tech. Vol.)

- o DHP – Phase I: 6 month/\$150K, \$1M Phase II
- o DMEA – Phase I: 6 month/\$150K, \$1M Phase II
- o Air Force – 9 months/\$150K Phase I, \$750K Phase II
- o MDA – Phase I: 7 month/\$125K (past Phase II were to \$1M)
- o Army – Phase I: 6 month/\$100K Base + 4 month/\$50K Option*, \$1 million Phase II (4 specific Phase II submission cycles)
- o Navy – Phase I: 6 month/\$80K Base + 6 month/\$70K Option*, Phase II varies by Navy SYSCOM (may include Base, Option, Phase II.5, 2nd Phase II - Based on Transition Potential, may >>\$1M)
- o DARPA – Phase I: 6 month/\$100K Base + 4 month/\$50K Option*, Phase II was \$1M + \$500K Option

*Phase I Option must be included in proposal – funded only if selected for Phase II award (to provide continuity)



Strategies for SBIR/STTR Success



Keys to Long-Term Success:

- o **Focus Strategically**
 - o Don't chase money opportunities "just because we can"
 - o Focus on opportunities that take you towards goals
 - o Work with customers (agencies) to create new opportunities
- o **Network, Collaborate, Partner!**
 - o Work with university researchers wherever possible
 - o Biggest single factor in winning Phase I SBIR
 - o Partner with fed. labs, esp. if agency is target customer
 - o Cooperative R&D Agreements (CRADAs), Test Service Agreements may be paid for with SBIR/STTR funds
 - o Work with Prime Contractors where relevant
 - o Can be subcontractor on SBIR/STTR
 - o Other partners for design, mfg., dist., service, etc.



Partner for SBIR (& Business) Success

- o Few small businesses have all the skills and resources required to convince reviewers of their ability to innovate, develop viable new technology, and successfully commercialize it:
 - o Research experience, lab facilities
 - o Marketing skills
 - o Manufacturing capabilities
 - o Government accounting experience
 - o Access to new, relevant markets (and servicing them)
- o *The most successful firms are best at partnering!*



Consider a First Strategic Partnership:

The single greatest factor for SBIR (Phase I) success is partnering with a research institution (esp. a university).

- Observation noted by top SBIR experts and Program Managers

- Recognized scientific expertise adds credibility
- University labs are significant sources of innovation
- University laboratory research facilities may be needed
- University scientists have lots of technical proposal experience
 - Don't let them take lead in writing full proposal!!



Partnering with Federal Labs:

Advantages of a CRADA (Cooperative R&D Agreement):

- Tie into significant R&D capability at little or no cost
- Utilize specific R&D capability available nowhere else
- Increase your perceived credibility based on partnership
- Become familiar with Agency (customer) needs, culture
- Agency personnel become familiar with your capabilities for potential advantages
- Often opens doors for other funding opportunities
 - SBIR/STTR plus the OTHER 96% - tremendous long-term value!

Note: federal law prohibits payment to company under a CRADA, while companies may pay lab for services, which may now be allowed as an SBIR/STTR subcontract.



One Client's Perspective:

"Especially, I would like to thank Ray for his suggestion to put in place a CRADA with DMEA. Daniel ** from DMEA was well connected with the Air Force decision makers and gave [us] very valuable guidance that helped us focus our efforts on what the Air Force wanted to see. I believe this relationship played an important role in our [Air Force SBIR Phase II] win."

- TechLink client company with
~40 SBIR/STTR awards, 4/5/13



Transition: Critical Focus for DoD SBIR

Goal is to convince the customer (DoD reviewers) that you have a clearly defined pathway to their end-product:

- Credible R&D Capability
- Strategic Partnerships
- Alliances with appropriate Primes
- Thorough familiarity with customer's need and product use



Transition: Bridging the Gap from
R&D to Systems Applications

Partnering with Primes:

DoD Perspective:

Partnering with
Primes is
intertwined
technology, and
capability to do so.



- Prime Contractors (Boeing, Raytheon, Lockheed, etc.) often seek out SBIR companies for partnering.
- SBIR subcontract not significant to Prime, but consider future system enhancements, contract opportunities.
- For SBIR company, tremendous future business opportunities for subcontracting, even business acquisition.
- Caveat: Get professional advice on IP, SBIR Data Rights ("7018 Clause"), before signing any agreements.

Boeing SBIR/STTR PM
adriana.s.ocampo@boeing.com
Lockheed Martin SBIR Team
Sbir.Fc-LMC@lmco.com
orysia.d.buchan@lmco.com



Key Phase III Contracting Advantage

DoD Perspective:

If a Program Manager can get a needed technology faster, and with less paperwork...



Note: Phase III contracting advantages can be novated to a company acquiring the SBIR firm.

Per SBIR Program Policy Directive:

- For Phase III, Congress intends that agencies ...give preference, including sole source awards, to the [SBIR] awardee that developed the technology. ...SBA will report such instances [contracts to other than SBIR awardee] ...to Congress.

Per FAR Part 5 (5.202), Exceptions [to publicizing federal contracts]:

- (7) The proposed contract action results from acceptance of a proposal under the Small Business Innovation Development Act of 1982 (Pub. L. 97-219)

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Additional Keys to DoD SBIR Success

Build long-term relationships with appropriate DoD labs and organizations

- Plan to be in for the long haul
- Seek, build mutually beneficial relationships
 - CRADAs, Licenses, other Partnerships
- Emphasize Service, Value to DoD and the Warfighter
 - Other funding opportunities may arise
 - Potential "slice of the pie," vs. SBIR "seed money"
- Plan for "Dual-Use" Success!



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Other Useful Partnerships:

Advantages of an Industry Cluster for SBIR/STTR:

- Build your perceived capability/credibility through collaborations with suppliers, researchers, SMEs, Primes
- Take advantage of subcontract allowances (1/3 in Phase I, 1/2 in larger Phase II, up to 60% in STTR) to build team
- Network with Cluster members to find someone with existing relationship with or knowledge of customer

Work with local MEP (Mfg. Extension Partnership)

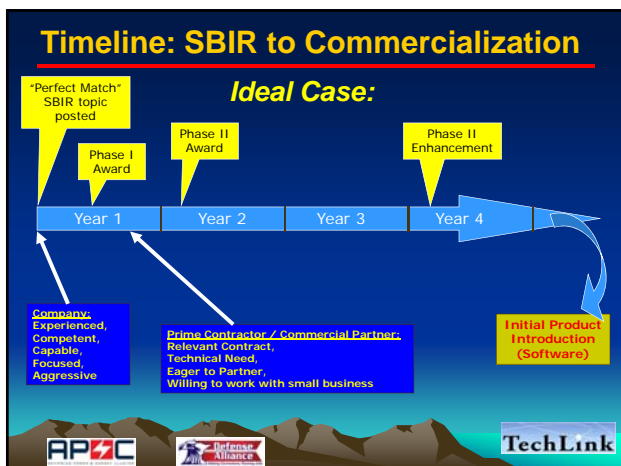
- For future production, letter of support from MEP for Phase I proposal demonstrates commitment to future production
- MEP can also be Phase II subcontractor for mfg, production, outsourcing, quality control to work with Primes, etc.



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SBIR and the Business Development Timeline

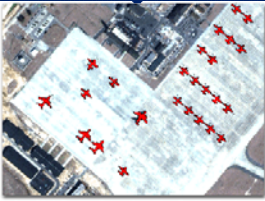




Client Example: Visual Learning Systems, Inc. Transition Success: Feature Analyst™ Software


Technology: Software for automated feature extraction in hyperspectral or panchromatic images. Learning algorithms are orders of magnitude faster than manual digitizing, also easy to train.

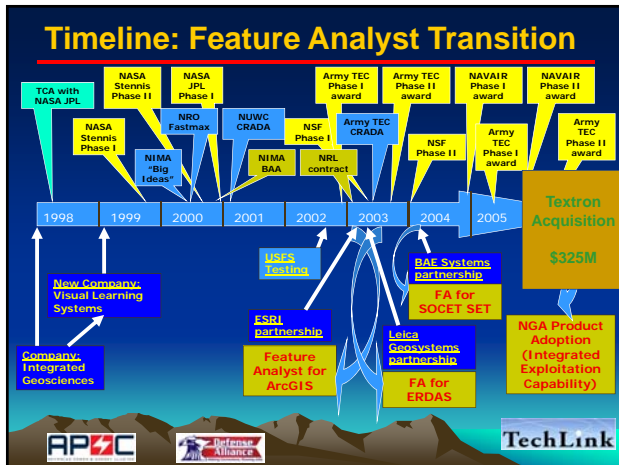
- Developed under multiple SBIRs:
 - 3 NASA SBIR awards, 3 NSF
 - Army TEC Ph. I & II, NAVAIR Ph. I & II
- CRADAs & Partnerships with Gov't:
 - Army TEC & NUWC CRADAs
 - NASA TCA
 - NIMA & NRO partnerships
- Partnered with Primes:
 - ESRI, Leica, BAE, Intergraph



One Click Feature Extraction using Feature Analyst

Chosen by NGA for deployment across all NGA's Integrated Exploitation Capability (IEC) workstations – Now Dual-Use (Commercial & Military) Success!





Getting Started in SBIR/STTR

- o Sign up for PNNL's free SBIR Alert:
 - o <http://www.pnnl.gov/edo/opportunities/sbir.stm>
- o Attend SBIR conferences and workshops as able
- o Network at relevant industry & technology conferences
 - o For Defense, check out NDIA
- o Other relevant SBIR resources:
 - o SBIR Gateway: www.zyn.com/sbir
 - o "Insider" news, agency links, calendar, and best historical topic database to search - can help determine relevant agency interests, find DoD contacts.
 - o SBIR.gov – "Official" central government SBIR website
 - o Greenwood Consulting Group, proposal writing tips:
 - o http://www.g-greenwood.com/sbir_proposal_writing_articles.htm

Logos at the bottom: APZC, Defense Alliance, TechLink.

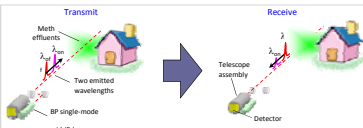

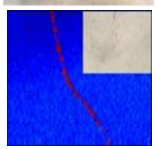


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Bridger Photonics (Bozeman)

✦ **20 SBIR & STTR Awards since 2007 (\$5.7M):**

- ✦ Fast Adaptive Optics
- ✦ Ultrafast Lasers
- ✦ Biomedical Sensors
- ✦ Meth Lab Detection
- ✦ LADAR for Helo Brownout
- ✦ CO₂ Detection/Meas.
- ✦ 3D Imaging
- ✦ Precision Metrology
- ✦ Target Identification, Compressive Imaging

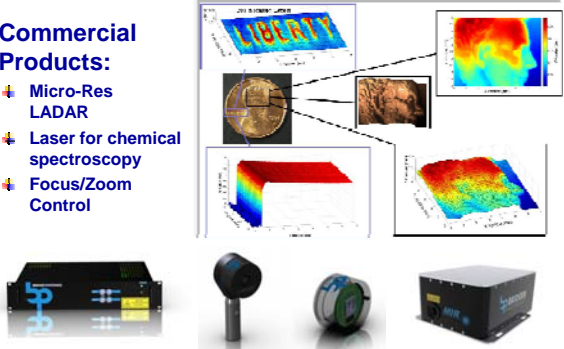
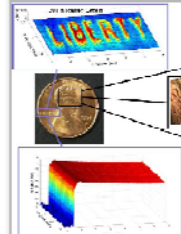
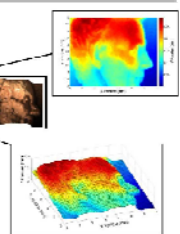




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Bridger Photonics

✦ **Commercial Products:**

- ✦ Micro-Res LADAR
- ✦ Laser for chemical spectroscopy
- ✦ Focus/Zoom Control






TechLink


Bridger Photonics


- ✦ **2011 Inc. 500 ranking among "Fastest Growing Private Companies"**
 - ✦ Ranked #1 among Engineering Firms
- ✦ **2012 National Tibbetts Award among "the very best of the SBIR program"**
- ✦ **>20% revenue from commercial sales (50% next year)**





Reducing Brownout Hazards

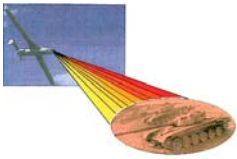



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| <p>Objective: Provide rotorcraft with enhanced situational awareness, including wire detection and obstacle avoidance in landing zones, in zero-visibility brownout conditions.</p> <p>Benefits:</p> <ul style="list-style-type: none"> Increased rotorcraft safety Expanded operational capabilities Reduced time and risk in combat LZs <p>Participants:</p> <ul style="list-style-type: none"> NAVAIR (Patuxent River, MD) Bridger Photonics, Inc. (Bozeman, MT) TechLink (Bozeman, MT) <p>Status: NAVAIR has awarded a Phase II SBIR to Bridger Photonics for N08-138 Non-Mechanical High Resolution LADAR Based Around A Frequency Swept Optical Source</p> | <p>Technology: Bridger Photonics is developing a highly compact LADAR (Laser Detection And Ranging) system that provides extremely fast, high-resolution 3D imaging with no moving parts. The optically-scanned eye-safe laser provides accurate object positioning, and can detect wires unseen by pilots even in clear conditions.</p>  |
|--|---|




Multimode 3D Target ID

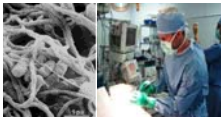


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| <p>Objective: Use Feature Specific Imaging (FSI) with high resolution LADAR and acoustic vibrometry to rapidly identify targets in 3D</p> <p>Benefits:</p> <ul style="list-style-type: none"> Improved target ID and classification Reduced computational requirements 20km range for UAS-transportable unit Advanced machine vision applications <p>Participants:</p> <ul style="list-style-type: none"> AFRL/RY (WPAFB, OH) Bridger Photonics, Inc. (BPI - Bozeman, MT) TechLink (Bozeman, MT) <p>Status: AFRL/RY has awarded a Phase II SBIR to Bridger Photonics for AF083-149 A Compact, Multimode LADAR For Target Identification Based Upon Joint Optimization of Optical and Computational Resources</p> | <p>Technology: BPI's fast, compact LADAR (Laser Detection And Ranging) provides unmatched resolution for 3D imaging at long range. FSI greatly reduces required data sets and computational requirements for rapid target identification, and the frequency-scanned LADAR also measures the target vibration spectra to aid in target recognition.</p>  |
|---|---|



CRADA after SBIR: Compounds for Infection Prevention





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| <p>Objective: To improve healing of wounded warfighters through the use of new anti-infective antibiofilm compounds.</p> <p>Benefits: Fewer wound infections and faster recovery, with reductions in mortality, hospitalization, and long-term impairment.</p> <p>Participants:</p> <ul style="list-style-type: none"> U.S. Army Inst. of Surgical Research (USAISR) Microbion Corp. TechLink <p>Status:</p> <ul style="list-style-type: none"> Following NIH Phase I SBIR, this CRADA for Dev. of Military/Field Hospital Therapeutic Anti-infective, Antibiofilm Acute Wound Care Gel Product led to major contracts | <p>Technology: Company's Bismuth-Thiol (BT) compounds disrupt the formation of bacterial biofilms and allow significantly improved wound treatment. Biofilm formation increases the antibiotic resistance of infectious bacteria, making treatment much more difficult.</p>  <p>Bacterial biofilm growth in wounds (left) complicates medical treatment</p> |
|--|---|




Company's CRADA Results



- Research contract award from Orthopaedic Trauma Research Program (OTRP)**
 - \$500K/year, for up to 5 years, some testing by USAISR
- 
Partnership in AFIRM Consortium
 - Armed Forces Institute of Regenerative Medicine: two consortia will develop better treatments for seriously injured warfighters in \$250 million program.
 - Additional major funding opportunities being pursued.






Client Example: Scientific Materials Corp. (SMC) Transition Success: Monoblock Laser (STORM)

Technology: Manufacturing method for eye-safe rugged solid-state microlaser developed at Army CECOM under ManTech (2000 – 2001)


- SMC used SBIR (30 awards, \$7.5M) to develop world's highest-quality laser & opto-electronic crystal growth processes (1992 – 2004)
- License to SMC completed 2003
- TechLink/MilTech assisted with monoblock production improvement
- Used in Small Tactical Optical Rifle Mounted (STORM) Micro-Laser Rangefinder (MLRF)
 - Thousands now deployed
- SMC bought by FLIR for \$13 M

Background

- SMC focused on adv. laser crystal growth**
 - Developed via 30 SBIR/STTR awards '89 – '04
 - Very close university (MSU) collaboration
- SMC participant in \$1M ManTech project**
 - SMC cost share \$566K in 2000 – 2001 project
 - Monoblock laser enabled by adv. laser xtals
- TechLink (PIA) assisted license application**
 - Submitted April 2001, signed April 2003
- MilTech (MEP/PIA) aided design, production**
 - Shock-resistant adhesive bonding
 - Manufacturing/production scale-up
- SMC sold to FLIR Systems (2005) for \$13M**
 - Purchased solely for monoblock capabilities
 - Over 7,000 units produced, SMC growth to 60 empl. locally
 - Primary application is STORM (2-6 km range)
 - Larger unit in FLIR Star SAFIRE III (25 km range) - >500 units sold





Fielded Applications:





AN/PSQ-23
STORM-mLRF
(Small Tactical Optical
Rifle Mounted Micro-Laser Range Finder)



FLIR Systems AN/AAQ-22
Star SAFIRE III



UH-60 Blackhawk



MQ-8B Fire Scout



MQ-1 Predator



Aerostat and Tower
Ground Surveillance



Common Remotely Operated
Weapon Station (CROWS) II



Stryker Remote Weapon Station



MQ-1 Predator



Aerostat and Tower
Ground Surveillance



STORM-mLRF Contract



- June 2011: 5-yr IDIQ contracts issued for AN/PSQ-23 STORM-mLRF
 - DRS Technologies Reconnaissance, Surveillance and Target Acquisition (RSTA) Group: up to \$514.3 million for 150 – 32,000 STORM-mLRF units
 - L-3 Warrior Systems Division (Insight Tech): up to \$438.8 million for 150 – 32,000 units
- STORM used on M16/M4 light weapons, M240/M249 machine guns, M107/M110 sniper rifles, Stryker vehicle, light artillery, CROWS II, etc.
- SMC is only manufacturer of Monoblock Laser used in STORM-mLRF



