

Handouts only available online

SBIR/STTR BASICS & PHASE I PROPOSAL PREPARATION

📅 Aug. 14-16, 2018 📍 Rosen Centre Hotel, Orlando, FL

**BEYOND PHASE II MENTOR
PROTÉGÉ TRAINING WEEK**
Collaborate. Innovate. Transition.

Presented by

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SBIR/STTR BASICS & PHASE 1 PROPOSAL PREPARATION

TENTATIVE AGENDA

8:45- 9:15 am	Registration, welcome, introductions
9:15-10:00 am	Brief Overview of the SBIR & STTR Programs
10:00-10:15 am	Break
10:15-11:00 am	SBIR/STTR Phase 1 Proposal Strategy
11:00-11:45 am	Phase 1 Proposal Draft
11:45-12:00 pm	Phase 1 Proposal Review & Debriefing

SBIR Defined

The Small Business Innovation Research Program (SBIR) provides

- over \$2 billion/year
- in non-recourse contracts and grants
- to small US-owned companies
- to develop new products and services
- that are based on innovative, unproven concepts and technologies.

SBIR PROGRAM OBJECTIVES

The purpose of the SBIR program as established by law is to:

- stimulate technological innovation in the private sector;
- strengthen the role of small businesses in meeting federal research and development needs;
- increase the commercial application of these research results; and
- encourage participation of socially and economically disadvantaged persons and women-owned small businesses.

--FY 14 NIST Solicitation

Firms with strong R&D capabilities...and with the ability to commercialize the results are encouraged to participate

--OSD FY10.3 solicitation

Projects should have...high potential commercial payback, and high-risk efforts

--NSF FY14.2 solicitation

THREE PHASES OF THE SBIR PROGRAM

Phase I. Evaluate scientific technical merit & feasibility of an idea.

- Up to \$150K
- 6-9 months

Phase II. Expand the results of, and further pursue the development of Phase I work.

- Main R&D activity
- May involve prototype creation & testing, clinical trials, etc.
- Up to \$1 million for 24 month period (varies by agency)

Phase III. “Commercialize” results of Phase II.

- No SBIR funds available for this phase
- May use private money, or non-SBIR federal funding
- DOD: “Transition: the innovation into hands of warfighter

*Note 1: Must enter program thru Phase I: Can't go directly to Phase II
(~~except pilot programs @ NIH, DOD, DoED~~)*

Note 2: Sole source procurement OK in Phase III

Relationship of SBIR/STTR to Mentor Protégé Program

- One example
 - Get SBIR/STTR Phases I & II
 - Including SBIR/STTR supplements, including Phase II enhancements, options, CRP
 - Get Rapid Innovation Funds
 - Go into Mentor Protégé Program to learn DoD procurement system for Phase III
 - Use SBIR/STTR sole source capability along the way

TWO TYPES OF SBIR AGENCIES

- Contract agencies
 - Have a specific problem or need
 - You must grasp & respond to that need
 - *“Only proposals submitted in response to topics in this solicitation will be considered” --DoD FY08.2*
 - *“Focus on what we asked for, not what you think we need”*
--Susan Nichols, DARPA SBIR Prog Mgr, 11/11
 - DoD is the ultimate Contract agency
- Grant agencies
 - Want to support “good ideas”
 - You must determine what they think “good” is
 - NSF is the ultimate Grant agency
- Caution: two grant agencies acts like a contract agency, & one contract agency acts like a grant agency!

SMALL COMPANY ELIGIBILITY FOR SBIR PARTICIPATION

- ≤500 employees, including affiliates
- Must be “for profit”
- ≥51% owned & controlled by US citizens or permanent resident aliens
 - Not more than 49% “entity owned”
- SBIR/STTR applicant firm can be owned/ controlled by one or more other small businesses, if parent company(ies):
 - ≤500 employees
 - 51+% owned by US citizens
 - Could have applicant w/as little as 25.5% US ownership!
 - 15% at all but NIH & NSF can go to firm majority owned by multiple VC/HF/PEFs if agency elects to do so
- Relationship between small business ownership and university/faculty members must be carefully managed
 - Caution: no consistent, firm rules here
 - Caution: what is allowed in Phase I may not be acceptable in Phase II
 - DOE: “none of the small business personnel can also be consultants or employees of a subcontractor (FY08 solicit)”

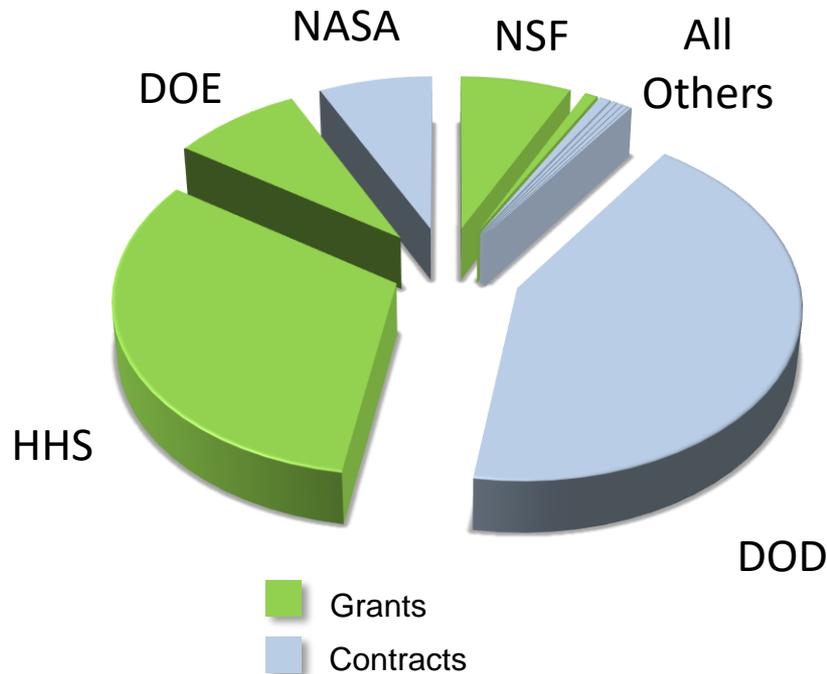
NOTE: Agencies getting tougher on faculty role

SUBCONTRACTOR ELIGIBILITY FOR SBIR

- May want to include consultants, subcontractors to round-out your team
 - Can subcontract $\leq 33\%$ of Phase I
 - Can subcontract $\leq 50\%$ of Phase II
 - For profit or non profit
 - Large or small
 - Individual consultant or company

However, all work must be done in the U.S.

SBIR/STTR Budgets by Agency, FY2015



~ \$2.5B in FY2015 across all agencies

Agencies with SBIR and STTR Programs	Budget
Department of Defense (DOD)	\$ 1.070 B
Department of Health and Human Services (HHS), including the National Institutes of Health (NIH)*	\$797.0 M
Department of Energy (DOE), including Advanced Research Projects Agency – Energy (ARPA-E)	\$206.1M
National Aeronautics and Space Administration (NASA)	\$ 180.1 M
National Science Foundation (NSF)	\$176.0 M
Agencies with SBIR Programs	Budget
U.S. Department of Agriculture (USDA)	\$20.3M
Department of Homeland Security (DHS): Science and Technology Directorate (S&T) and Domestic Nuclear Detection Office (DNDO)	\$17.7 M
Department of Commerce: National Oceanic and Atmospheric Administration (NOAA) and National Institute of Standards and Technology (NIST)*	\$8.4M
Department of Transportation (DOT)	\$7.9 M
Department of Education (ED)	\$7.5 M
Environmental Protection Agency (EPA)	\$4.2 M

*NIH also issues contracts

SBIR PHASE I SOLICITATION SCHEDULE

Agency	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
USDA							————	————				
DoC-NIST	————	————	————									
DoC-NOAA	—									————>		
DoD	————				————		————			—>
DoEd-IES	—										————>	
DoEd-NIDRR												
DoE	———— ▲						———— ▲		————>	
DHHS-NIH/CDC Contracts							————	————				
DHHS NIH/CDC/ FDA Grants>
DHS/HSARPA	—											—>
DOT										————	————	
EPA										————	————	
NASA	————	————										
NSF		

Agency		Release Date	Closing Date
USDA		Jul 5, 2017	Oct 5, 2017
Dept of Commerce	NIST	Jan 2, 2018	Feb 19, 2018
	NOAA	Oct 18, 2017	Jan 31, 2018
Dept of Defense	FY18.3	Aug 24, 2018	Oct 24, 2018
	FY19.1	Nov 29, 2018	Feb 6, 2019
	FY19.2	Apr 19, 2019	Jun 19, 2019
DoEducation-IES		Dec 11, 2017	Feb 12, 2018
DoEducation-NIDRR		Moved to NIH	
DoEnergy		Aug 13, 2018	Oct 15, 2018
▲ Letter of Intent		Nov 26, 2018	Feb 4, 2019
DHHS-NIH/CDC	Contracts	Jul 18, 2018	Oct 22, 2018
DHHS NIH/CDC/FDA	Grants	~Jan 25, 2018	Sep 5, 2018
		~Jan 25, 2019	Jan 5, 2019
			Apr 5, 2019
Dept of Homeland Security		Nov 22, 2017	~Jan 15, 2018
Dept of Transportation		Nov 16, 2017	~Jan 16, 2018
Environ Protect Agency		Oct 31, 2017	Dec 19, 2017
NASA		Jan 11, 2018	Mar 09, 2018
NSF		Mar 19, 2018	Jun 14, 2018
		~Sep 15, 2018	~Dec 5, 2018

MISCELLANEOUS

- SBIR Principal Investigator Involvement
 - Role
 - Must be primarily employed by the company during the contract or grant period
 - Cannot work full time for another employer
 - » Most agencies say <50%
 - Other agency-specific requirements
 - DOE: 111 hours on the Phase 1 project (3+ hrs/wk minimum)
 - NSF: PI must devote >1 FTE month on Phase 1 SBIR & 2 FTE on STTR, not more than 19.6 hours/week employed elsewhere
 - Don't assume leniency on this requirement
 - Can you say “jail time” if you violate?

SMALL BUSINESS TECHNOLOGY TRANSFER PROGRAM (STTR)

- Modeled after SBIR
- Small company must team with Federal Lab, University or other non-profit R&D entity
- Only 5 Federal agencies participating
 - DOD
 - Not all components, but MORE than pre-2014
 - DHHS/NIH
 - DOE
 - NSF
 - NASA
- “Small” compared to SBIR

SBIR vs STTR

	SBIR	STTR
Phase I duration	6-12 months	9-12 months
Phase II duration	24 months	24 months
Number of participating agencies	11	5
FY18 budget as % of outside R&D budget	3.2%	0.45%
Min. Phase I small business participation	67.0%	40.0%
Max. Phase I subcontractor participation	33.0%	60.0%
Min. Phase I subcontractor participation	0.0%	30.0%
Principal Investigator employer	Small Bsns	SB or RI *
Reauthorized through	2022	2022

Big increases in STTR funding & favorable treatment make STTR worth considering!

* STTR: PI can be at Research Institution (except at NSF).

NIH & NSF also have STTR-specific requirements on level of PI participation

RESEARCH ENTITY ELIGIBILITY FOR STTR PARTICIPATION

- Located in U.S. and meets one of the following:
 - Non-profit research institution per Stevenson-Wydler Technology Innovation Act of 1980
 - Owned/operated exclusively for scientific or educational purposes
 - No profits benefiting private shareholders or an individual
 - Non-profit college or university
 - Public or private
 - Non-profit medical or surgical hospital
 - Federal Laboratory
 - Only if it is a Federally Funded Research and Development Center (FFRDC)
 - www.federallabs.org

NOTE: a single research entity must qualify as the partner on an STTR (& receive $\geq 30\%$ but $\leq 60\%$ of funds)

STTR PARTICIPATING AGENCIES & SOLICITATIONS

Agency		Solicitation Released	Proposals Due
Dept of Defense	FY18.C	08/24/18*	10/24/18
	FY19.A	11/29/18*	02/06/19
	FY19.B	04/19/19*	06/19/19
Dept of Energy		08/13/18*	10/15/18**
		11/26/18*	02/04/19**
DHHS/NIH		~01/25/18	09/05/18
		~01/25/19	01/05/19
			04/05/19
NASA		01/11/18	03/14/18
NSF		03/19/18	06/14/18
		~09/15/18	~12/05/18
Dept of Homeland Security		n/a	n/a

* Reflects DOD & DOE pre-release of topics ~30 days before solicitation release date

** DOE requires mandatory letter of intent

PRIMARY DIFFERENCE SBIR vs STTR

Mandatory participation by
nonprofit R&D Institution in STTR

Participation by nonprofit R&D institution is
allowed but optional in SBIR

Secondary difference: STTR is an R&D “collaboration”
between the small business & the nonprofit

FINDING SBIR & STTR RESEARCH TOPICS

- Topics appear in Agency's SBIR & STTR Solicitation
 - a “Request for Proposals”
 - Aka “Funding Opportunities Announcement” (FOA) at DOE & NIH
 - Broad Agency Announcement (BAA) at DoD
- Proposals must be responsive to a topic or they will be tossed out (no technical review)
- Find agencies' SBIR/STTR solicitations/FOAs on their websites

MAJOR PH1 CHANGES IN 2011 REAUTHORIZATION

1. Increased budget (SBIR incr 29%, STTR incr 50% between FY11 & FY17), but this did not mean more Ph1 awards
2. Ph1 awards may not be needed to get Ph2s at DoD, NIH, DoEd
 - Pilot, expired 9/17
3. If start with Ph1 **SBIR**/STTR, you can switch in Ph2 to **STTR**/SBIR
 - Intentional strategy, maybe
 - Bail out on a bad relationship, maybe
4. Fraction of agency's SBIR budget can go to previously ineligible firms
 - Firms majority owned by multiple VC/HF/PEFs
 - Agencies have to elect to do this or not
5. Greater emphasis on commercialization & MOB/WOB participation

The 2016 Reauthorization

- SBIR & STTR Reauthorized “as is” through FY22 (9/30/2022)
 - Including funding levels
- Pilot programs under 2011 Reauthorization will expire 9/30/2017 unless additional Congressional action to continue
 - Direct to Phase II
 - NIH & DARPA already ended their DTP2 programs mid FY17
 - 3% Admin Tax
 - Commercialization Pilot Program at all agencies except
 - DoD (now CRP)
 - NASA (unique interpretation of policy)
- Plan: get security of 5 year reauthorization in place, then pursue legislation to make important changes
- Kudos to Small Business Technology Council (www.sbtc.org)

SBIR/STTR PHASE I DRAFT PROPOSAL STRATEGY

1st in a 4 step process for developing a competitive SBIR/STTR proposal

1. Formulate your proposal strategy

2. Draft the proposal
3. Get a review of the draft before submitting it
4. Get a debriefing after winners are announced

Step #1:

FORMULATE A STRATEGY

Simple translation: to what you should
give serious thought before you start
writing the proposal

THE 1ST THING TO THINK ABOUT

- *FROM A MARKET OPPORTUNITY PERSPECTIVE, WHY SHOULD THIS PHASE 1 TECHNICAL FEASIBILITY PROJECT BE UNDERTAKEN?*

--Paraphrasing NSF STTR FY12 Solicitation

- The agency's variation on this:
 - *What is the Phase 3 pay off if we fund Phase 1 and your innovation proves to be feasible?*
- Increasingly, if the agency can't see a reasonable market opportunity in Phase 3, then they won't fund a Phase 1 feasibility study
 - *"A recent National Academy of Sciences study of the DOE SBIR program found that 1/3rd of DOE Phase II SBIR/STTR awardees stop working on their technology after their Phase II award because they discover the market for their technology is too small. We don't want companies making this discovery after they complete their Phase II grant, but before they submit their Phase I proposal." DOE FY13.2*

SOME OTHER THINGS TO THINK ABOUT

- What can we afford to propose in our Phase I feasibility study?
- One of the most common Phase I problems (& criticisms of Phase I reviewers):
“overly ambitious work plan”
- How avoid?
 - Put the budget “horse” before the technical scope “cart”
 - Assume agency’s max is \$150k on Phase I proposals
 - Set aside your 7% profit/fee
 - $\$150k - (150k/1.07) = \$9,800$
 - Set aside your indirect allocation
 - Depends on your company’s unique indirect rate
 - We’ll use NIH max of 40% of all direct costs for newcomers without a negotiated indirect rate
 - $\$150k - 9.8k = \$140.2k - (140.2k/1.4) = \$40.1k$
 - What’s left over is what you can spend on the Phase I feasibility study
 - $\$150k - 9.8k - 40.1k = \$100.1k$
 - Therefore, do not scope more than a \$100k R&D project, including any consultants & subcontractors, materials, project travel, and other “direct costs”

SOME OTHER THINGS TO THINK ABOUT

- If we win, does this project take us toward our corporate goals?
- Do we possess the technical competence?
 - also, do we look like we're competent
- Are there other places we can submit a related proposal?
 - try to get double/triple duty out of the basic proposal
 - caution: don't plan to submit identical proposal to other agency or component
 - This area highlighted in "waste, fraud & abuse" witch hunt per the 2011 Reauthorization

MORE THINGS TO THINK ABOUT

- What's the agency's need/opportunity that you must focus on?

"...should be thinking re: Phase 3 from the time you write the Phase 1 proposal..."
John Williams, Navy SBIR Program Mgr, Natl Conf, 11/09

"...no warfighter can stab the enemy with a research paper" Ph2s: 12-18 months typically
Shawn Patterson, SOCOM SBIR Program Mgr, Natl Conf, 11/09

"DARPA is committed to the boldest, creative leaps..."

Susan Nichols, DARPA SBIR Program Mgr, Natl Conf, 11/11

- Where might you find Phase II matching funds & Phase III funding sources?
- What are the commercial applications, what's your competitive advantage, and how would you get to the market?

"Think as long, hard, deep and creatively about commercial applications as you do about the R&D effort"

-Roland Tibbitts, NSF (ret)

YET EVEN MORE THINGS TO THINK ABOUT

What agency(ies) should I submit to?

- Who has the topic I'm interested in?
- Do I like contract vs. grant agencies?
 - Contract: possible/probable Phase 3 customer
 - Grant: plan your R&D/product development years in advance
- Is there a particular agency with which I have an "in" or an affinity to?
- Will you require human or animal subjects in Phase 1? If so, caution re: DoD & NASA

FINDING AN AGENCY INTERESTED IN YOUR IDEAS, INNOVATIONS, TECHNOLOGIES

- Suggestion: check the websites

www.sbir.gov *and* _____??_____

for databases & search engines where you compare your keywords with topics in

- Currently open solicitations
 - Recently closed solicitations
-
- Why? Because you may not know what you do not know
(See next slide)

WHAT AGENCIES FUND TOPICS IN YOUR AREA OF INTEREST?

	Info Processing	Electronics	Materials	Mechanical Performance	Energy	Environ & Natural Resources	Life Sciences
DOD	•	•	•	•	•	•	•
DOE	•	•	•	•	•	•	•
NASA	•	•	•	•	•	•	•
NIH	•	•	•	•	•	•	•
NSF	•	•	•	•	•	•	•
DOT	•	•	•	•	•	•	•
EPA		•	•	•	•	•	•
ED	•	•	•	•	•	•	•
USDA	•	•	•	•	•	•	•
DOC	•	•	•	•	•	•	•
DHS HSARPA	•	•	•	•		•	•

*



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- Applicant



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- START A SMALL BUSINESS
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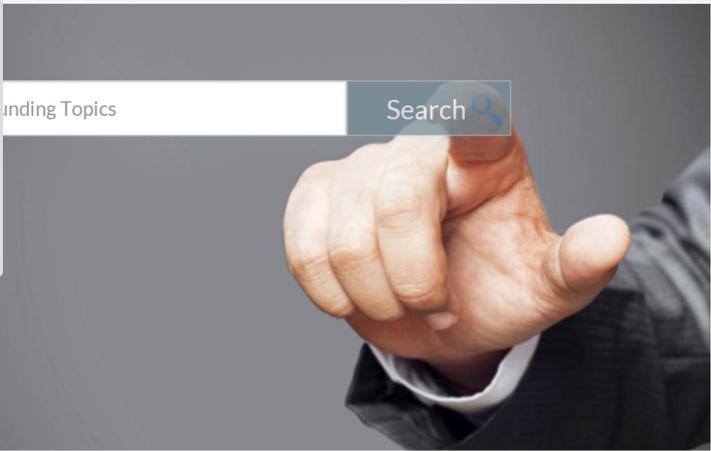
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- Agency**
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 - National Institute of Food and Agriculture (0)
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 - National Institute of Standards and Technology (0)
 - National Oceanic and Atmospheric Administration (0)
- Phase**
- Phase I (289)
 - Phase II (123)
- Program**

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solar [x] Search [Reset] Sort By: Close Date (ascending) ▾

! NOTE: The solicitations and topics listed on this site are copies from the various SBIR agency solicitations and are not necessarily the latest and most up-to-date. For this reason, you should visit the respective agency SBIR sites to read the official version of the solicitations and download the appropriate forms and rules.

If no search results for your keyword(s) were found, you are encouraged to review Agency omnibus solicitations for additional funding opportunities. Omnibus solicitations are structured to be broad, extensive Programmatic issuances with research areas related to the petitioning Agency and are not limited to predetermined Topics/Subtopics. If upon reviewing you have additional questions, you may consider reaching out to the respective Agency for clarification regarding acceptable proposals (<https://www.sbir.gov/agency-contacts>).

Displaying 1 - 10 of 315 results [Download ▾]

Increasing the Utility of Forest-Grown Material

Release Date: 07-14-2016 Open Date: 07-14-2016 Due Date: 10-06-2016 Close Date: 10-06-2016

Research to improve the yield of lumber, pulp fiber and specialty chemicals from trees; utilizing a greater percentage of the tree through improved techniques of production, for the creation of new or improved reconstituted products; developing better met ...

SBIR Department of Agriculture

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 - Department of Commerce (0)
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 - National Oceanic and Atmospheric Administration (0)
- Phase**
- Phase I (8)
- Program**
- SBIR (8)
- Year**
- 2017 (8)

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Displaying 8 result(s)

Development of technologies and services that protect or enhance the environment while promoting economic development

Release Date: 07-14-2016 Open Date: 07-14-2016 Due Date: 10-06-2016 Close Date: 10-06-2016

solar energy (excluding biofuels). Department of Agriculture ...

8.6: Rural and Community Development

Release Date: 07-14-2016 Open Date: 07-14-2016 Due Date: 10-06-2016 Close Date: 10-06-2016

Applications may be submitted for the development of new technology, or for the utilization of existing technology, that address important economic and social development issues or challenges in rural America.

Natural Resources and Renewable Energy

-
-
-
-
-
-

Greener Buildings



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The official link for this solicitation is: <https://www.fedconnect.net/fedconnect?doc=SOL-NC-16-00038&agency=EPA>

Agency:	Environmental Protection Agency
Branch:	n/a
Program / Phase / Year:	SBIR / Phase I / 2017
Solicitation:	SOL-NC-16-00038
Topic Number:	6

Release Date:	August 30, 2016
Open Date:	August 30, 2016
Application Due Date:	October 20, 2016
Close Date:	October 20, 2016 (closing in 38 days)

Description:

Interior Construction Materials

Floors, walls, and ceilings of homes are often made with materials that emit formaldehyde and other organic pollutants that are toxic to the people who live there. Developing non-toxic materials that can perform equally well in these interior construction applications will reduce the exposure to toxic off-gases by the residents. With this in mind, EPA is interested in supporting the development and commercialization of innovative technologies that address the following topic.

- **Topic Code 6A: Non-Toxic Interior Construction Materials for Homes:** Develop non-toxic alternatives for materials commonly used in the composition of floors, walls, and/or ceilings in homes. The technology must be affordable and at least as rugged and long-lasting as currently used materials.

Exterior Construction Materials

The exterior of buildings could be constructed with greener materials. They could include, for example, solar skins that produce energy for the building, cladding made with materials that are non-toxic, structural elements that weigh less and have less volume, materials that are easily re-cycled and re-used and do not leave parts that have to be sent to landfills or otherwise disposed, etc. As a result, there is a need for the development and commercialization of the following:

- **Topic Code 6B: Greener Exterior Construction Materials:** Develop construction materials for the exterior of buildings that are greener throughout their life cycle than currently used exterior construction materials. For example, the materials they are made of should be non-toxic, result from less polluting manufacturing processes than currently used, be easier to re-cycle and re-use than currently used materials. They should be stronger; more durable; last longer; weigh less; have lower volume; and cost less to produce, use in construction, re-cycle and re-use, and dispose than currently used materials. Comparison with currently-used materials

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 - Department of Commerce (5)
 - National Institute of Standards and Technology (0)
 - National Oceanic and Atmospheric Administration (4)
- Phase
- Phase I (270)
 - Phase II (1)
- Program

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N162-081: Expeditionary Medical Refrigeration Unit

Release Date: 04-22-2016 Open Date: 05-23-2016 Due Date: 06-22-2016 Close Date: 06-22-2016

TECHNOLOGY AREA(S): Biomedical ACQUISITION PROGRAM: MARCORSSYSCOM, Program Manager Combat Support Systems, Battalion Aid Station (BAS) - AMAL 635 OBJECTIVE: The objective is to develop an innovative, energy efficient, small human transportable field refrigeration unit for field medical operations. The unit will be used to keep temperature sensitive human blood products, vaccines, an ...

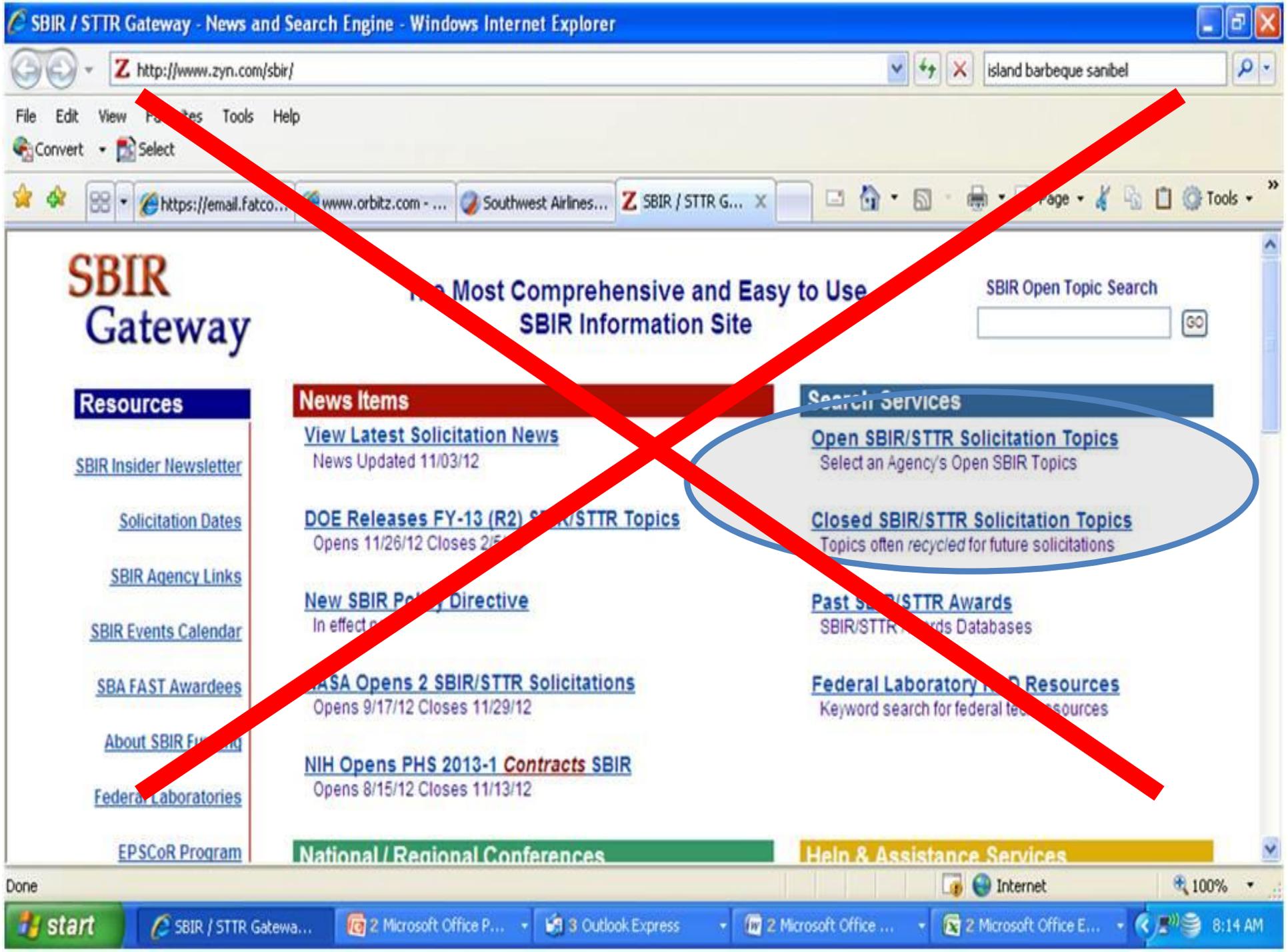
SBIR Navy Department of Defense

N162-082: Pocket-sized Surface Flotation Device for Cold-Water Aviation Survival

Release Date: 04-22-2016 Open Date: 05-23-2016 Due Date: 06-22-2016 Close Date: 06-22-2016

TECHNOLOGY AREA(S): Air Platform, Human Systems ACQUISITION PROGRAM: PMA-261, H-53 Heavy Lift

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Opens 11/26/12 Closes 2/5/13

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In effect 11/1/12

[NASA Opens 2 SBIR/STTR Solicitations](#)

Opens 9/17/12 Closes 11/29/12

[NIH Opens PHS 2013-1 Contracts SBIR](#)

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Topics often recycled for future solicitations

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SBIR/STTR Awards Databases

[Federal Laboratory Resources](#)

Keyword search for federal laboratory resources

[Help & Assistance Services](#)

National SBIR/STTR Gateway Search Service Results by Zyn Search©

Searched SBIR/STTR Topic files for "cancer" and found 2 matches.

Displaying hits 1 through 2.

1. [\(SBIR/STTR\) DHHS/NIH-NIA - Division of Aging Biology \(DAB\)](#)

Score: **** Division of Aging Biology (DAB) SBIR/STTR PHS 2015-2 Grants DHHS/NIH-NIA - National Institute on Aging (NIA) Opens: August 5, 2015 - Closes: Standard new NIH Receipt dates (see below) Division of Aging Biology (DAB) DAB sponsors research on the molecular, cellular, genetic, and physiological causes and consequences of aging processes...

2. [\(SBIR/STTR\) DHHS/NIH-NIA - Division of Geriatrics](#)

Score: **** Division of Geriatrics and Clinical Gerontology (DGCG) SBIR/STTR PHS 2015-2 Grants DHHS/NIH-NIA - National Institute on Aging (NIA) Opens: August 5, 2015 - Closes: Standard new NIH Receipt dates (see below) Division of Geriatrics and Clinical Gerontology (DGCG) DGCG supports clinical and translational research on health and disease in the aged and research on aging over the human life span and it...

[Perform New Search](#)
[Return to SBIR Gateway](#)

This Search Service is provided by The SBIR Gateway.
Please address your comments to: info@zyn.com

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Other Search Engines

1. grants.gov
2. sbir.defensebusiness.org
3. fbo.gov
4. Individual agencies, but...

The screenshot shows the SBIR/STTR Gateway search results page. The header includes the logo "SBIR • STTR America's Seed Fund™ POWERED BY SBA" and navigation links for HOME, ABOUT, FUNDING, AWARDS, NEWS, EVENTS, and RESOURCES. The search results are displayed under the heading "Open Topic Search". A search box contains the term "cancer", and the results are sorted by "Close Date (ascending)". A note states: "NOTE: The Solicitations and topics listed on this site are copies from the various SBIR agency solicitations and are not necessarily the latest and most up-to-date. For this reason, you should visit the respective agency SBIR sites to read the official version of the solicitations and download the appropriate forms and rules." Below the note, it says "Displaying 1 - 10 of 19 results". The first result is "001: Technologies for Improving Population Health and Eliminating Health Disparities (R41/R42)" with release, open, due, and close dates. A blue arrow points to the search results area.

OVERLAPPING TOPICS, BUT VERY DIFFERENT AGENCIES

“You need to know your agency. No two SBIR agencies are alike.”

–Charles Cleland, USDA SBIR Program Manager

SBIR/STTR AGENCY DIFFERENCES

DOD

- Pre- release of topics
 - Ok to ask topic author questions until black out period begins
 - CAUTION re: one Army office’s decision!
 - SITIS available during black out period

- Variations among components are increasing

DoD Component	Technical Volume Page Limit	Price	Duration	Phase I Option
Army	20 pages	Base NTE \$100,000 + Phase I Option NTE \$50,000	6 Month Base + 4 Month Phase I Option	Required
Navy	20 pages	Base NTE \$125,000 + Phase I Option NTE \$100,000	6 Month Base + 6 Month Phase I Option	Required
Air Force	20 pages	Base NTE \$150,000	9 Month Base	Not Applicable
CBD	20 pages	Base NTE \$150,000	6 Month Base	Not Applicable
DARPA	20 pages	Base NTE \$100,000 + Phase I Option NTE \$50,000	6 Month Base + 4 Month Phase I Option	Required
DHA	20 pages	Base NTE \$150,000	6 Month Base	Not Applicable
DLA	20 pages	Base NTE \$150,000	6 Month Base	Not Applicable
USSOCOM	20 pages	Base NTE \$150,000	6 Month Base	Not Applicable

USAF: FY18.2 had PhI “special” topics (\$50k, 60 day) for (a) an open topic and (b) several accelerated topics

- USAF: 9 month Phase I, but must prove feasibility in 1st 6 months
 - **New: Vol 2 template (modeled after NAVAIR’s)**
 - **New: Vol 5 to attach files to proposal (not used by Army or SOCOM)**
 - ALWAYS propose an option if component “allows” it
- 3 SBIR solicitations, 3 STTR solicitations per year
 - Not all components in all solicitations
 - More DOD components participating in STTR
 - Topics usually are not repeated



The New Submission Site is Here!

Better Tools | Additional Resources | Increased Functionality

Visit us at: <https://sbir.defensebusiness.org>



The DoD SBIR/STTR Help Desk is available Monday-Friday from 9:00 a.m. - 6:00 p.m. ET at [1-800-348-0787](tel:1-800-348-0787), or by email to the Help Desk at: sbirhelp@bytecubed.com.

DoD SBIR/STTR Awards by State - 2012



DEFENSE CONTRACT AUDIT AGENCY (DCAA)
 RESOURCE GUIDE FOR
 SMALL BUSINESS INNOVATION RESEARCH
 SMALL BUSINESS TECHNOLOGY TRANSFER

[CLICK HERE](#)

CONNECT WITH US:

OTHER SBIR/STTR AGENCY DIFFERENCES

- **NIH Grants**

- Its revised “Fast Track” Program: Submit combined Ph I & II proposal
- Electronic proposal submission thru Grants.gov & era.nih.gov (Contracts proposal thru eCPS)
- FOA being reissued ~1/18 with new Grants.gov form Version E
- PhI proposals can be resubmitted multiple times (alternate sub/resub)
 - PhII can be resubmitted as FastTrack or Direct to PhII (not req'd to have non-SBIR feasib\$)
- Special “focused grants” within SBIR/STTR programs: PA’s & RFA’s
- Differentiating Clinical Trial from non-Clinical Trial projects in SBIR & STTR FOAs
- iCorps program for Ph1 recipients (~50/year)
- The “scoop” on Preliminary Data
- Strict page limits on Ph1 proposal: 7 pp for the research strategy+aims
- Innovation: 1. Challenges to current research or clinical practice paradigms; 2. Novel theoretical concepts, approaches or methodologies, instrumentation or interventions; 3. Refinements, improvement or new applications of #2

- **NSF**

- “we fund almost anything that is a hi quality project” —Glen Larson 4/15
- ≤1 proposal/company/”solicitation cycle,” ≤1 proposal/PI
- 11 Broad Topics for FY18.1 SBIR & STTR solicitations
 - Educational Technologies and Applications (EA)
 - Information Technologies (IC)
 - Internet of Things (I), Semiconductors (S), and Photonic Devices and Materials (P4)
 - Electronic Hardware, Robotics and Wireless Technologies (EW)
 - Advanced Manufacturing and Nanotechnology (MN)
 - Advanced Materials and Instrumentation (MI)
 - Chemical and Environmental Technologies (CT)
 - Biological Technologies (BT)
 - Digital Health (DH) & Medical Devices (MD)
 - Biomedical (BM) Technologies
 - Other Topics (OT)
- Letters of support, commun w/NSF Program Director “highly encouraged”
- \$10k for accounting system/help, \$20k for I-Corps like “boot camp”
- Must submit proposal via NSF’s research.gov (vs. FastLane)

Slight Preference for project with “NSF lineage”

OTHER SBIR/STTR AGENCY DIFFERENCES

- **DOE**

- Makes awards as grants, but acts like a contract agency with many of its topics
- Eligible for SBIR & STTR funding if include research inst in proposal
- Only agency to allow patent cost (PhII)
- *“While NIH was exempting \$230 million in Stimulus \$\$\$s from SBIR/STTR, DOE actually put in another \$120 million in Phase 3 commercialization assistance”*
- 2 solicitations per year (but each DOE office only participates once per year)
- Pre-release of topics
- Letter of intent mandatory
- Commercialization Plan required in Phase I with \$revenue\$ estimates

- **NASA**

- 6/25-27/17 webinar conference to discuss FY18 topics
 - Sessions recorded, available at NASA website
- 20 PhI SBIR/STTR recipients selected for NSF I-Corps participation
- Topics are “evolutionary” year-to-year—Tom Stanley, NASA Stennis ‘17
- ≤10 SBIR & ≤10 STTR Proposals/Small Business/yr, ≤5 SBIR & ≤2 STTR awards/SB/yr

- **USDA**

- **Expected to strengthen commercialization reqmts in Ph1 proposals**
- 80-90% of winners have university/federal lab involvement
- Subcontract to univ/USDA Fed labs “permitted & encouraged”-J Williams
- *“Show connectivity to communities you serve”*-Bill Goldner
- Webinar series Aug-Sept ‘16 available at <https://wrdc.usu.edu/htm/sbir/>

- **DHS**

- 1 solicitation/year, combining S&T and Nuke
- Greater emphasis on PhII

- **NIST**

- Now making awards as grants but still acts like a contract agency
- But topics, “fairness of opportunity” are still like contracts

MAJOR AGENCY DIFFERENCE: ELECTRONIC SUBMISSION

Grant Agencies

- NIH, DOE, USDA use www.grants.gov
 - NIH also requires eRA Commons registration
 - “Grants.gov sucks”
--Anonymous SBIR Program Mgr
- Registration on grants.gov “can take up to 8 weeks” –
Samuel Smith, eRA Service Desk Mgr, NIH Webinar 7/11
- Allow time to correct errors: grants.gov is picky, & points out errors only 1 at a time!
 - Submit 5 days in advance of deadline
- NSF uses FastLane, not grants.gov

Contract Agencies

- No expectation that all will adopt same electronic submission mechanism
- None expected to use grants.gov

“One benefit of electronic submission is that we are no longer receiving proposals written in crayon...” --anonymous SBIR/STTR Program Leader

To curb drug abuse: (1) legalize all drugs. (2) require addict to purchase drugs on grants.gov

DETERMINE IF THE AGENCY REALLY CARES ABOUT THE TOPIC

- Is it a “hot” topic?
- Have they already funded a solution?
- Funny things happen that result in topics in the solicitation: make sure the one you care about isn't a fluke

FIVE SOURCES OF INFORMATION ON A SPECIFIC SBIR/STTR TOPIC

1. People

2. Literature

3. People

4. Internet

5. People

IMPORTANT SOURCE: PEOPLE

- High priority: talk to the people who wrote the topic, and who will evaluate and select proposals for funding
- Why? No way you know everything they're thinking about by just reading a few paragraphs in the solicitation
- What you want to learn
 - Is it a hot topic?
 - Is funding available?
 - Who are your competitors?
 - Context
 - Other: _____
 - Past related work
 - Sources of more info
 - Attitude toward your idea
 - Reauthoriz-based changes
- DoD applicant: called & learned topic had been deleted. Spent ~4 minutes, saved 50-80 hrs of proposal writing
- Cautions
 - Not as applicable to SBIR/STTR grant solicitations (vs. contract ones), but still important to talk with agency reps
 - Most contract agencies limit when you can speak with them about topic-specific issues
 - DOD: only OK to talk to them during 1st 30 days after solicitation released
 - Grant agencies more accessible cuz of external review process

ETIQUETTE ON TOPIC AUTHOR DISCUSSIONS

1. Set up call in advance (via email)
2. Thoroughly read solicitation & website 1st
3. Write down list of questions in priority order
4. Plan for ≤ 10 minutes
5. Don't exceed 10 minutes unless topic author wants to
6. Avoid sales pitch, but seek feedback on your approach

IMPORTANT SOURCE: PEOPLE

- Talk to potential users within a contract agency
 - #1 priority: understand their need, & find out if they like your approach to satisfying it
 - Golden rule applies: find out what they want, not what you think they should want
 - This does not usually apply to grant agencies

Important to do at
DoD, esp Navy

- Talk to other staffers in a grant agency
 - Program managers, grants management staff, etc
 - *“the person who has the most input into whether an application will be funded, or not, is the [NIH] Program Officer who is in charge of the specific program being targeted”*

--Russell & Morrison, The Grant Writer's Workbook

- Talk to potential customers, funders, partners
 - Public & private sector
 - Get letters of support, include in your proposal!

“Letters of support from potential customers, strategic partners or investors act as validation, add significant credibility, and are highly encouraged”

--NSF FY07.1 solicitation

- MDA, DARPA don't want DOD personnel writing these letters

AVOID THE TECHNOLOGY TRAP

Avoid this:

“I’ve got a nifty technology that I’m in love with, and let me tell you all about it”

- To avoid the technology trap, develop a theme
 - National priority/problem
 - Agency priority/problem
 - *Contract agencies may tell you what the theme should be in the topic description*
 - Examples:
 - lives or \$ saved
 - security
 - freedom
 - overcome discrimination
- Prepare to write the proposal around that theme
 - Develop the theme up front
 - Repeat it, concisely, throughout the proposal
 - 1 sentence reminder re: WHY agency should fund this

SUGGESTION: TRY TO FIND OUT HOW YOUR PROPOSAL WILL BE REVIEWED

- Importance in strategy: You want to know who you're writing to
 - tailor the level of your presentation
 - address the reader's hot buttons
- Problem: The review process varies tremendously among (and even within) agencies
 - single reviewer who wrote the topic
 - multiple levels, including peer review panel
- Check solicitation & agency website 1st for review process description, then ask the agency SBIR/STTR program manager re: any remaining questions
 - Never ask for specific reviewers' names

SBIR/STTR PHASE I PROPOSAL DRAFTING

2nd in a 4 step process for developing a competitive
SBIR/STTR proposal

1. Formulate your proposal strategy
- 2. Draft the proposal**
3. Get a review of the draft before submitting it
4. Get a debriefing after winners are announced

PHASE I EVALUATION PROCESS

I. Prescreening (aka “administrative review”)

- Responsive to a specific topic in agency’s current solicitation?
- Compliance with agency’s proposal requirements?
- ~5-10% of SBIR proposals get canned here
 - DOE FY11: 19% of 2,300 Ph1 proposals pre-screened out
 - NSF: 670 proposals rec’d, 600 got reviewed (FY08.2)
 - *“At least 10% of the [NIH] SBIR/STTR applications were RETURNED last round due to non-compliance with type size/page limitations”*
--JoAnn Goodnight, NIH, 3/28/03

II. Technical Review

a. R&D quality

- Scientific and technical quality of proposed research
- Anticipated benefits
- Qualifications of company and research staff
- Consistent with agency’s needs

b. Commercialization potential

III. Select Winners Based on Priorities

DOE FY11: 641 proposals were “fundable,”
but only 229 awards could be made

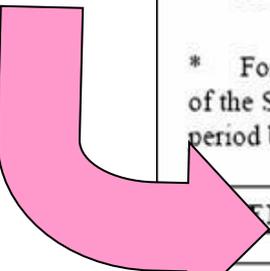
DOES THE APPLICATION SATISFY THE FOLLOWING REQUIREMENTS:

Use Drop-down
Menus

- √ DUNS # on cover page, if appropriate.
- √ One, and only one, topic from the Technical Topics Section identified on the cover page.
- √ One, and only one, subtopic from the Technical Topics Section identified on the cover page.
- √ The cover page is completed and signature blocks filled with **ALL CAPITAL NAME OF SIGNING AUTHORIZING PARTIES.**
- √ Principal Investigator will work a minimum of 195 hours or at least 5 hours/wk on the project.
- √ All certifications and questions on cover page marked Y (Yes) or N (No).
- √ Amount requested from Government is not in excess of Phase I (\$100,000) or Phase II (\$750,000) limit.
- √ Abstract contains no proprietary information and does not exceed space provided on the Project Summary Page (Appendix B).
- √ Main Text (technical content) is included as requested in Section 3.3.2
- √ Application should not be more than 25 pages. However, this checklist (Appendix D) and the Documentation of Multiple Phase II Awards (Section 3.3.4) will not be included in the 25-page count.
- √ No font smaller than 12 point times new roman in main text.
- √ Level of effort in compliance with Section 3.3.1c. (For SBIR, the small business must perform at least 2/3 of the research and analytical effort. For STTR, the small business must perform at least 40% and the research institution must perform at least 30%.)*

* For grant applications that are to be considered for both SBIR and STTR, prepare the grant application to meet the requirements of the SBIR Program. If the application is selected for STTR, budgetary adjustments can be completed during the negotiation period before the grant begins.

ATTENTION: GRANT APPLICATIONS NOT MEETING ALL THE ABOVE REQUIREMENTS WILL BE DECLINED WITHOUT FURTHER ACTION.



A KEY TASK

FOLLOW THE INSTRUCTIONS!

- Gets you through the prescreen
- Helps you organize & present the technical & commercial merits in the manner & order the agency wants

**DEPARTMENT OF DEFENSE
SMALL BUSINESS INNOVATION RESEARCH (SBIR) PROGRAM**

SBIR 18.2 Program Broad Agency Announcement (BAA)

April 20, 2018: DoD BAA issued for pre-release

May 22, 2018: DoD begins accepting proposals

June 20, 2018: Deadline for receipt of proposals no later than **8:00 p.m. ET**

Commented [JG1]: Because it is only "pre-released", you can call the TPOC for any given topic and ask them questions during this time period

Commented [JG2]: i.e., can't call & ask questions about a topic starting on this date

Participating DoD Components:

- Department of the Army
- Department of the Navy
- Department of the Air Force
- Defense Health Agency (DHA)
- Defense Logistics Agency (DLA)
- Defense Microelectronics Activity (DMEA)
- Defense Threat Reduction Agency (DTRA)
- Missile Defense Agency (MDA)
- National Geospatial-Intelligence Agency (NGA)
- Office of the Secretary of Defense (OSD)
- United States Special Operations Command (USSOCOM)

IMPORTANT

Deadline for Receipt: Proposals must be **completely** submitted no later than **8:00 p.m.** ET, June 20, 2018. Proposals submitted after 8:00 p.m. will not be evaluated.

Classified proposals will not be accepted under the DoD SBIR Program.

DoD BAA/Solicitation Changes:

New features implemented beginning with SBIR 18.2/STTR 18.B BAA cycle; see Sec. 5.1 for additional information:

- Volume 5 for Supporting Documents is optional and has been implemented for SBIR 18.2 BAA cycle.
- A Phase I Template is optional and provided to assist small businesses to generate a Phase I Technical Volume (Volume 2).

Commented [JG3]: this is a new, 5th volume (DOD has traditionally had 4 volumes). Note it is optional

Commented [JG4]: interesting... let's see if it is useful...

The Small Business Administration, through its SBIR/STTR Policy Directive, purposely departs from normal Government solicitation formats and requirements and authorizes agencies to simplify the SBIR/STTR award process and minimize the regulatory burden on small business. Therefore, consistent with the SBA SBIR/STTR Policy Directive, the Department of Defense is soliciting proposals as a Broad Agency Announcement.

SBIR/STTR Updates and Notices: To be notified of SBIR/STTR opportunities and to receive e-mail updates on the DoD SBIR and STTR Programs, you are invited to subscribe by e-mailing sbiroutreach@bytecubed.com.

Help Desk: If you have questions about the Defense Department's SBIR or STTR Programs, please call the DoD SBIR/STTR Help Desk at 1-800-348-0787, or email to sbirhelp@bytecubed.com, or visit the DoD SBIR/STTR Web site at <http://www.acq.osd.mil/osbp/sbir/>.

Allegedly appearing under FAQ page of DOD SBIR website once BAA opens mid May '18

3.0 DEFINITIONS

The following definitions from the SBA SBIR Policy Directive and the Federal Acquisition Regulation (FAR) apply for the purposes of this BAA:

3.12 Research Involving Human Subjects

All research involving human subjects shall be conducted in accordance with 32 C.F.R. § 219 “The Common Rule,” 10 U.S.C. § 980 “Limitation on Use of Humans as Experimental Subjects,” and DoDD 3216.02 “Protection of Human Subjects and Adherence to Ethical Standards in DoD-Supported Research,” as well as other applicable federal and state law and regulations, and DoD component guidance. Offerors must be cognizant of and abide by the additional restrictions and limitations imposed on the DoD regarding research involving human subjects, specifically as they regard vulnerable populations (DoDD 3216.02), recruitment of military research subjects (DoDD 3216.02), and informed consent and surrogate consent (10 U.S.C. § 980) and chemical and biological agent research (DoDD 3216.02). Food and Drug Administration regulation and policies may also apply.

“Human use” protocols apply to all research that meets any of the following criteria:

- a. Any research involving an intervention or an interaction with a living person that would not be occurring or would be occurring in some other fashion but for this research.
- b. Any research involving identifiable private information. This may include data/information/specimens collected originally from living individuals (broadcast video, web-use logs, tissue, blood, medical or personnel records, health data repositories, etc.) in which the identity of the subject is known, or the identity may be readily ascertained by the investigator or associated with the data/information/specimens.

See DoDD 3216.02 for definitions of these terms and more information about the applicability of DoDI 3216.02 to research involving human subjects.

All research involving human subjects, to include use of human biological specimens and human data, shall comply with the applicable federal and state laws and agency policy/guidelines for human subject protection (see Section 3.12).

Institutions to be awarded funding for research involving human subjects must provide documentation of a current Federal Assurance of Compliance with Federal regulations for human subject protection, for example a Department of Health and Human Services, Office for Human Research Protections Federalwide Assurance (<http://www.hhs.gov/ohrp>). Additional Federal Assurance documentation may also be requested by the awarding DoD Component. All institutions engaged in human subject research, to include subcontractors, must also have a valid Assurance. In addition, personnel involved in human subjects research must provide documentation of completing appropriate training for the protection of human subjects. Institutions proposing to conduct human subject research that meets one of the exemption criteria in 32 CFR 219.101 are not required to have a Federal Assurance of Compliance.

If selected, institutions must also provide documentation of Institutional Review Board (IRB) approval or a determination from an appropriate official in the institution that the work meets one of the exemption criteria with 32 CFR 219. As part of the IRB review process, evidence of appropriate training for all investigators should accompany the protocol. The protocol, separate from the proposal, must include a

Commented [J65]: whenever you see these double lines, you know that we have skipped some portions of the DOD instructions

Commented [J66]: many of you may be using “Human Subjects” and don’t realize it

Commented [J67]: if you are doing any of this, you may have “Human Subjects” who you have to worry about

Commented [J68]: these few paragraphs are excerpted from a later section of the instructions—moved here so you can see the full extent of the “Human Subjects” issue and requirements

Commented [J69]: check these exemptions out to see if you are lucky enough to NOT have to comply with “Human Subjects” requirements

Commented [J610]: IRBs are found at most universities, although some are private and can be contracted with

detailed description of the research plan, study population, risks and benefits of study participation, recruitment and consent process, data collection and data analysis.

The amount of time required for the IRB to review and approve the protocol will vary depending on such things as the IRB's procedures, the complexity of the research, the level of risk to study participants and the responsiveness of the Investigator. The average IRB approval process can last between one and three months. Once the IRB has approved the research, the awarding DoD Component will review the protocol and the IRB's determination to ensure that the research will be conducted in compliance with DoD and DoD Component policies. The DoD review process can last between three to six months. Ample time should be allotted to complete both the IRB and DoD approval processes prior to recruiting subjects. **No funding can be used towards human subjects research until ALL approvals are granted.**

Commented [JG11]: Be forewarned! Not only drag out your Phase I, but potentially knock you out of contention for Phase II consideration if your fellow Phase I winners are not having to jump through the "Human Subjects"/IRB hoops

3.20 Principal Investigator

The principal investigator/project manager is the one individual designated by the applicant to provide the scientific and technical direction to a project supported by the funding agreement.

For both Phase I and Phase II, the primary employment of the principal investigator must be with the SBC at the time of award and during the conduct of the proposed project. Primary employment means that more than one-half of the principal investigator's time is spent in the employ of the SBC. This precludes full-time employment with another organization. Occasionally, deviations from this requirement may occur, and must be approved in writing by the contracting officer after consultation with the agency SBIR Program Manager/Coordinator. Further, an SBC may replace the principal investigator on an SBIR Phase I or Phase II award, subject to approval in writing by the contracting officer.

Commented [JG12]: IMPORTANT. Note it is not necessary when submitting the proposal

Commented [JG13]: Unlike some agencies, DOD does not define "one-half" or "full-time" in terms of number of hours

Commented [JG14]: Again, unlike some agencies, DOD leaves open the possibility that exceptions will be made—but do not expect this to be routinely allowed, and discuss with DOD prior to submitting any proposal where PI isn't "primarily employed" at the applicant small business

4.0 PROPOSAL FUNDAMENTALS

Unless otherwise specified, Section 4 applies to both Phase I and Phase II.

4.1 Introduction

The proposal must provide sufficient information to demonstrate to the evaluator(s) that the proposed work represents an innovative approach to the investigation of an important scientific or engineering problem and is worthy of support under the stated criteria. The proposed research or research and development must be responsive to the chosen topic, although it need not use the exact approach specified in the topic.

Anyone contemplating a proposal for work on any specific topic should determine that:

- The technical approach has a reasonable chance of meeting the topic objective.
- This approach is innovative, not routine, with potential for commercialization and
- The proposing firm has the capability to implement the technical approach, i.e., has or can obtain people and equipment suitable to the task.

Commented [JG15]: Try to discuss any such "deviation" before submitting the proposal to see if TPOC is open to alternatives

Commented [JG16]: There should be some technical risk, but NOT A LOT

Commented [JG17]: Again, some technical risk is expected in your project

Commented [JG18]: Key point, with commercialization=component's use

4.15 Questions about this BAA and BAA Topics

- General SBIR Questions/Information.

- (1) **Help Desk.** The DoD SBIR/STTR Help Desk is prepared to address general questions about this BAA, the proposal preparation and electronic submission process and other program-related areas. The Help Desk may be contacted from 9:00 a.m. to 6:00 p.m. ET Monday through Friday at:
- Phone: 1-800-348-0787
 - E-mail: sbirhelp@bytecubed.com
- (2) **Web sites.** The DoD SBIR/STTR Program Web site at <http://www.acq.osd.mil/osbp/sbir> offers electronic access to the SBIR/STTR Program opportunities, answers to commonly asked questions, sample SBIR proposals, model SBIR contracts, abstracts of ongoing SBIR projects, the latest updates on the SBIR Program, hyperlinks to sources of business assistance and financing, and other useful information.

The DoD SBIR/STTR Portal at <https://sbir.defensebusiness.org/> mirrors the most frequently accessed information on the DoD SBIR/STTR Web site, including:

- SBIR and STTR Program opportunities
- Topics Search engine
- Technical Q&A through the SBIR Interactive Topic Information System (SITIS)
- Electronic Proposal Submission for Phase I and Phase II Proposals. Firms submitting through this site for the first time will be asked to register.

- (3) **SBIR/STTR Updates and Notices:** To be notified of SBIR/STTR opportunities and to receive e-mail updates on the DoD SBIR and STTR Programs, you are invited to subscribe by e-mailing sbiroutreach@bytecubed.com.

- b. **General Questions about a DoD Component.** General questions pertaining to a particular DoD Component should be submitted in accordance with the instructions given at the beginning of that Component's topics, in Section 12.0 of this BAA.
- c. **Direct Contact with Topic Authors.** From April 20 – May 21, 2018, this BAA is issued for Pre-Release with the names of the topic authors and their phone numbers and e-mail addresses. During the pre-release period, proposing firms have an opportunity to contact topic authors by telephone or e-mail to ask technical questions about specific BAA topics. Questions should be limited to specific information related to improving the understanding of a particular topic's requirements. Proposing firms may not ask for advice or guidance on solution approach and you may not submit additional material to the topic author. If information provided during an exchange with the topic author is deemed necessary for proposal preparation, that information will be made available to all parties through SITIS (SBIR/STTR Interactive Topic Information System). After this period questions must be asked through SITIS as described below.
- d. **SITIS Q&A System.** Once DoD begins accepting proposals on May 22, 2018, no further direct contact between proposers and topic authors is allowed, unless the Topic Author is responding to a question submitted during the Pre-release period. However, proposers may submit written questions through SITIS at <https://sbir.defensebusiness.org/topics>. In SITIS, the questioner and respondent remain anonymous and all questions and answers are posted electronically for general viewing. Questions are limited to technical information related to improving the understanding of a particular topic's requirements. Any other questions, such as those asking for advice or guidance on solution approach, will not receive a response. Proposing firms may locate the topic to which they want to submit a technical question by using the Topic Search feature on this Web site. Then, using the form at the bottom of the topic description page, enter and submit the question. Answers are generally posted within seven working days of question submission. (Answers will also be e-

Commented [JG19]: TAKE THIS OPPORTUNITY. Any questions?

Commented [JG20]: OK, but push for helpful information

Commented [JG21]: Ouch. So there is SOME chance your Q and DoD's A may appear for all your competitors to see. Maybe ask in advance if anything you are asking qualifies as such

Commented [JG22]: Peruse but don't use to ask your questions. See (c) for how you should ask your questions

mailed directly to the inquirer when the inquirer provides an e-mail address.)

The SITIS online service for this BAA opens on **April 20, 2018**, and closes to new questions on **June 6, 2018, at 8:00 p.m.** Typically questions and answers will be posted between **April 20 and June 15, 2018**. Once the BAA closes to proposal submission, no communication of any kind with the topic author or SITIS regarding your submitted proposal is allowed.

Proposing firms are advised to monitor SITIS during the BAA period for questions and answers. Proposing firms should also frequently check the SBIR/STTR Portal for updates and amendments to the topics.

4.16 Registrations and Certifications

Proposing firms **must be registered** in the DoD Submission system at: <https://sbir.defensebusiness.org/> in order to prepare and submit proposals.

Commented [JG23]: Not bad, as SBIR/STTR agency registrations go

Before the DoD Components can award a contract, proposing firms must be registered in the System for Award Management (SAM). If you were previously registered in CCR, your information has been transferred to SAM. However, it is in the firm's interest to visit SAM and ensure that all of the firm's data is up to date from SAM and other databases to avoid delay in award. SAM replaced the Central Contractor Registration (CCR), Online Representations and Certifications Application (ORCA), and the Excluded Parties List System (EPLS). SAM allows firms interested in conducting business with the federal government to provide basic information on business capabilities and financial information. To register, visit www.sam.gov.

Commented [JG24]: BUT, unlike some SBIR/STTR agencies, you don't have to register on SAM when submitting your proposal. Thanks, DOD!!

Follow instructions found on the SAM Web site on how to obtain a Commercial and Government Entry (CAGE) code and Data Universal Numbering System (DUNS) number. Once a CAGE code and DUNS number are obtained, update the firm's profile on the DoD Submission Web site at <https://sbir.defensebusiness.org/>.

Commented [JG25]: Oddly, it doesn't say so here, but you also must register at SBIR.gov

In addition to the standard federal and DoD procurement **certifications**, the SBA SBIR Policy Directive requires the collection of certain information from firms at time of award and during the award life cycle. Each firm must provide this additional information at the time of the Phase I and Phase II award, prior to final payment on the Phase I award, prior to receiving 50% of the total award amount for a Phase II award, and prior to final payment on the Phase II award.

Commented [JG26]: DO NOT underestimate importance of the certifications you sign off on throughout the application and receipt process—some agencies have used to persecute SBIR/STTR recipients who certified things that they didn't actually comply with—we're talking criminal charges and jail time!

4.17 Promotional Materials

Promotional and non-project related discussion is discouraged, and **additional information provided via Universal Resource Locator (URL) links or on computer disks, CDs, DVDs, video tapes or any other medium will not be accepted or considered in the proposal evaluation.**

Commented [JG27]: FYI. So don't expect (require) reviewers to look at a website to be able to evaluate your proposal's merits

5.0 PHASE I PROPOSAL

5.1 Introduction

This BAA and the DoD SBIR/STTR Submission Web site are designed to reduce the time and cost required to prepare a formal proposal. Since the guidance on allowable content may vary by Component, it is the proposing firm's responsibility to consult the Component-specific instruction for detailed guidance.

A complete proposal consists of:

- Volume 1: Proposal Cover Sheet
- Volume 2: Technical Volume
- Volume 3: Cost Volume
- Volume 4: Company Commercialization Report
- Volume 5: Supporting Documents – Optional

The Submission Web site provides a structure for providing these five sections, but the proposing firm must begin entering its proposal by providing information for the Proposal Cover Sheet. Once the firm begins a Proposal Cover Sheet they will be assigned a proposal number. **Please make note of this proposal number and print it for future reference.**

Beginning with the SBIR 18.2 BAA cycle, a new Volume 5, Supporting Documents, has been added.

- This new Volume 5 is optional and is provided for small business to submit additional documentation to support the Technical Volume (Volume 2) and the Cost Volume (Volume 3).
- Volume 5 is available when submitting Phase I and Phase II proposals.
- Please refer to the Component-specific Instructions for your topics of interest to see how each program office will be handling the Volume 5 information.
- Note: The Army and USSOCOM SBIR Programs will not be using any of the information in Volume 5 during the evaluation.

In addition, a new Phase I Proposal Template is available on the Submission Web site to provide helpful guidelines for completing each section of your complete Phase I technical proposal.

To submit a proposal, the proposer must click the green "Submit Proposal" button. If the proposal status is "In Progress" it will not be considered "Submitted". For a more detailed explanation, visit FAQs at: <https://sbir.defensebusiness.org/faqs>.

The proposer may add the remaining volumes or modify the Proposal Cover Sheet until BAA close. It is the proposing firm's responsibility to verify that the Technical Volume does not exceed the page limit after upload to the DoD SBIR/STTR Submission site by clicking on the "Verify Technical Volume" icon.

Please refer to Component-specific instructions for how a technical volume in excess of 20 pages is handled. Some Components will reject the entire technical proposal if over 20 pages.

Signatures are not required on the electronic forms at the time of submission. If the proposal is selected for award, the DoD Component program will contact the proposer for signatures at the time of award.

Commented [JG28]: DOD organizes the SBIR/STTR proposal into "volumes," of which 4 are mandatory and 1 is optional

Commented [JG29]: Good advice. Assigns proposal #, prepopulates some fields on other forms/volumes

Commented [JG30]: Interesting. Where to stick letters of commercializ support & interest

Commented [JG31]: i.e., waste of time to use Vol 5 in Army or SOCOM proposal

Commented [JG32]: sounds logical but wasn't req'd in the past

Commented [JG33]: Once you've submitted, you can only update/revise by "deleting" the original submitted version

Commented [JG34]: one of many examples where DOD components are diverting. MUST ALSO LOOK AT COMPONENT-SPECIFIC INSTRUCTIONS IN ADDITION TO THESE OVERALL DOD ONES. Very Important to do if you are submitting to USAF!

5.2 Summary of Component Programs

DoD Component	Cost	Duration	Phase I Option	Discretionary Technical Assistance
Army	Base NTE \$100,000 + Phase I Option NTE \$50,000	6 Month Base + 4 Month Phase I Option	Required	\$5,000
Navy	Base NTE \$125,000 + Phase I Option NTE \$100,000	6 Month Base + 6 Month Phase I Option	Required	\$5,000
Air Force	Base NTE \$150,000	9 Month Base	Not Applicable	Not Available
Air Force *	Base NTE \$50,000	2 Month Base + 1 Month Reporting Period	Not Applicable	Not Available
DHA	Base NTE \$150,000	6 Month Base	Not Applicable	Not Available
DLA	Base NTE \$100,000	9 Month Base	Not Applicable	\$5,000
DMEA	Base NTE \$150,000	6 Month Base	Not Applicable	\$5,000
DTRA	Base NTE \$150,000	7 Month Base	Not Applicable	\$5,000
MDA **	Base NTE \$100,000 + Phase I Option NTE \$50,000	6 Month Base + 6 Month Phase I Option	Required	\$5,000
NGA	Base NTE \$100,000	9 Month Base	Not Applicable	Not Available
OSD (SCO)	Base NTE \$225,000	6 Month Base	Not Applicable	Not Available
USSOCOM	Base NTE \$150,000	6 Month Base	Not Applicable	Not Available

* Air Force has special pricing as stated in the Phase I and Phase II description for topics [AF182-001](#), [AF182-002](#), [AF182-003](#), [AF182-004](#), [AF182-005](#), and [AF182-006](#) – AF will accept Phase I proposals up to \$50,000 with a technical period of performance of 2 months and a final reporting period of 1 month. AF will accept from Phase I Awardees Phase II proposals of up to \$750,000 and 15 months of technical and final reporting. Please refer to the Air Force SBIR 18.2 Instructions for additional information about Phase I and Phase II requirements.

Commented [JG35]: very odd!

** MDA Phase I Option is only exercised for firms who are selected for Phase II award.

Commented [JG36]: Yeah, and what's unusual about that?

5.3 Marking Proprietary Proposal Information

Offerors that include in their proposals data that they do not want disclosed to the public for any purpose, or used by the Government except for evaluation purposes, shall:

- (1) Mark the first page of each Volume of the proposal submission with the following legend:

"This proposal includes data that shall not be disclosed outside the Government and shall not be duplicated, used, or disclosed-in whole or in part-for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this offeror as a result of-or in connection with-the submission of this data, the Government shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in pages [insert numbers or other identification of sheets]"; and

- (2) Mark each sheet of data it wishes to restrict with the following legend:

"Use or disclosure of data contained on this page is subject to the restriction on the first page of this volume."

The DoD assumes no liability for disclosure or use of unmarked data and may use or disclose such data for any purpose.

Restrictive notices notwithstanding, proposals and final reports submitted through the DoD Submission Web site may be handled, for administrative purposes only, by support contractors. All support contractors are bound by appropriate non-disclosure agreements.

5.4 Phase I Proposal Instructions

a. Proposal Cover Sheet (Volume 1)

On the DoD Submission Web site at <https://sbir.defensebusiness.org/>, prepare the Proposal Cover Sheet. The Cover Sheet must include a brief technical abstract of no more than 200 words that describes the proposed R&D project with a discussion of anticipated benefits and potential commercial applications. **Do not include proprietary or classified information in the Proposal Cover Sheet.** If your proposal is selected for award, the technical abstract and discussion of anticipated benefits may be publicly released on the Internet. Once the Cover Sheet is saved, the system will assign a proposal number. You may modify the cover sheet as often as necessary until the BAA closes.

b. Format of Technical Volume (Volume 2)

- (1) Type of file: The Technical Volume must be a single Portable Document Format (PDF) file, including graphics. Perform a virus check before uploading the Technical Volume file. If a virus is detected, it may cause rejection of the proposal. **Do not lock or encrypt the uploaded file. Do not include or embed active graphics such as videos, moving pictures, or other similar media in the document.**
- (2) Length: The Technical Volume is limited to 20 pages. Please refer to Component-specific instructions for how a technical volume in excess of 20 pages is handled. Some Components will reject the entire technical proposal if over 20 pages.
- (3) Layout: Number all pages of your proposal consecutively. Those who wish to respond must submit a direct, concise, and informative research or research and development proposal of no more than 20 pages (no type smaller than 10-point on standard 8-1/2" x 11" paper with one-inch margins). The header on each page of the Technical Volume should contain your company name, topic number, and proposal number assigned by the DoD SBIR/STTR Submission Web site when the Cover Sheet was created. The header may be included in the one-inch margin.

c. Content of the Technical Volume (Volume 2)

The Technical Volume should cover the following items in the order given below:

- (1) **Identification and Significance of the Problem or Opportunity.** Define the specific technical problem or opportunity addressed and its importance.
- (2) **Phase I Technical Objectives.** Enumerate the specific objectives of the Phase I work, including the questions the research and development effort will try to answer to determine the feasibility of the proposed approach.

Commented [JG37]: Also true if you don't mark it as required here

Commented [JG38]: Vol 1 is just this one sheet

Commented [JG39]: Versus Vol 2 is 20 pages!

Commented [JG40]: Both a warning, and another example of DOD component variability

Commented [JG41]: REALLY? I'd never thought of it...

Commented [JG42]: OBEY or you may get canned by the Rules Police

Commented [JG43]: FOLLOW THE INSTRUCTIONS!

Commented [JG44]: IN YOUR OWN WORDS, what is the DOD component's problem or need? Show "you get it." Show you embrace it as your own and you are dedicated to its resolution. NEVER cut & paste from BAA topic description

Commented [JG45]: PLURAL, so have more than one. These are the milestones you reach along the way to proving feasibility of your innovation and competing Phase I—they are NOT the end point objectives of the Phase I project, IMHO

Commented [JG46]: You ought to include, but admittedly many do not

(3) **Phase I Statement of Work (including Subcontractors' Efforts)**

- a) Provide an explicit, detailed description of the Phase I approach. If a Phase I option is required or allowed by the Component, describe appropriate research activities which would commence at the end of Phase I base period should the Component elect to exercise the option. The Statement of Work should indicate what tasks are planned, how and where the work will be conducted, a schedule of major events, and the final product(s) to be delivered. The Phase I effort should attempt to determine the technical feasibility of the proposed concept. The methods planned to achieve each objective or task should be discussed explicitly and in detail. This section should be a substantial portion of the Technical Volume section.
- b) This BAA may contain topics that have been identified by the Program Manager as research or activities involving Human/Animal Subjects and/or Recombinant DNA. In the event that Phase I performance includes performance of these kinds of research or activities, please identify the applicable protocols and how those protocols will be followed during Phase I. Please note that funds cannot be released or used on any portion of the project involving human/animal subjects or recombinant DNA research or activities until all of the proper approvals have been obtained (see Sections 4.7 - 4.9).

Commented [JG47]: A KEY SECTION of the proposal

Commented [JG48]: i.e., option tasks also must be described here (& objective(s) stated in preceding section)

Commented [JG49]: A KEY to achieving the level of detail that reviewers expect

Commented [JG50]: Should include a timeline or Gantt Chart

Commented [JG51]: Typically, in Ph1, it's just a report. But ask TPOC when you call him/her

Commented [JG52]: You MUST prove its feasibility or no hope for Ph2 award

Commented [JG53]: DETAILS, DETAILS, DETAILS

Commented [JG54]: DoD Template suggests ~9-10 pages!

- (4) **Related Work.** Describe significant activities directly related to the proposed effort, including any conducted by the principal investigator, the proposing firm, consultants, or others. Describe how these activities interface with the proposed project and discuss any planned coordination with outside sources. The technical volume must persuade reviewers of the proposer's awareness of the state-of-the-art in the specific topic. Describe previous work not directly related to the proposed effort but similar. Provide the following: (1) short description, (2) client for which work was performed (including individual to be contacted and phone number), and (3) date of completion.

Commented [JG55]: So, there are 2 things here: 1. Your awareness of the State-of-the-art. 2. Your relevant experience. INCLUDE BOTH

Commented [JG56]: Be sure to differentiate from current proposed project

(5) **Relationship with Future Research or Research and Development**

- a) State the anticipated results of the proposed approach if the project is successful.
- b) Discuss the significance of the Phase I effort in providing a foundation for Phase II research or research and development effort.
- c) Identify the applicable clearances, certifications and approvals required to conduct Phase II testing and outline the plan for ensuring timely completion of said authorizations in support of Phase II research or research and development effort.

Commented [JG57]: Briefly describe what will do in Ph2 if Ph1 proves feasible

- (6) **Commercialization Strategy.** Describe in approximately one page your company's strategy for commercializing this technology in DoD, other Federal Agencies, and/or private sector markets. Provide specific information on the market need the technology will address and the size of the market. Also include a schedule showing the quantitative commercialization results from this SBIR project that your company expects to achieve.

Commented [JG58]: Make it 2 PAGES, per DoD template

Commented [JG59]: This is the "commercialization" that DOD cares about, IMHO, so focus 85% of discussion on this component's use

Commented [JG60]: Odd terminology, but try to project # units or sales/revenues

- (7) **Key Personnel.** Identify key personnel who will be involved in the Phase I effort including information on directly related education and experience. A concise technical resume of the principal investigator, including a list of relevant publications (if any), must be included (Please do not include Privacy Act Information). All resumes will count toward the 20-page

Commented [JG61]: MUST include bio for PI

limitation for Volume 2.

Commented [JG62]: So KISS definitely applies

- (8) **Foreign Citizens.** Identify any foreign citizens or individuals holding dual citizenship expected to be involved on this project as a direct employee, subcontractor, or consultant. For these individuals, please specify their country of origin, the type of visa or work permit under which they are performing and an explanation of their anticipated level of involvement on this project. Offerors frequently assume that individuals with dual citizenship or a work permit will be permitted to work on an SBIR project and do not report them. This is not necessarily the case and a proposal will be rejected if the requested information is not provided. Therefore, firms should report any and all individuals expected to be involved on this project that are considered a foreign national as defined in Section 3.5 of the BAA. You may be asked to provide additional information during negotiations in order to verify the foreign citizen's eligibility to participate on a SBIR contract. Supplemental information provided in response to this paragraph will be protected in accordance with the Privacy Act (5 U.S.C. 552a), if applicable, and the Freedom of Information Act (5 U.S.C. 552(b)(6)).

Commented [JG63]: Be careful about university subcontractor's intentions re: use of students, post-docs, etc

Commented [JG64]: Disclose, but also help reassure reviewer if possible

Commented [JG65]: Make sure it is the right kind of visa.

- (9) **Facilities/Equipment.** Describe available instrumentation and physical facilities necessary to carry out the Phase I effort. Justify equipment purchases in this section and include detailed pricing information in the Cost Volume. State whether or not the facilities where the proposed work will be performed meet environmental laws and regulations of federal, state (name), and local Governments for, but not limited to, the following groupings: airborne emissions, waterborne effluents, external radiation levels, outdoor noise, solid and bulk waste disposal practices, and handling and storage of toxic and hazardous materials.

Commented [JG66]: Again, pertains to applicant, subs, consultants

Commented [JG67]: Only if being made as direct purchases (vs being bought out of indirect/overhead or profit)

Commented [JG68]: Include this canned statement, substituting actual state name where "(name)" appears

- (10) **Subcontractors/Consultants.** Involvement of a university or other subcontractors or consultants in the project may be appropriate. If such involvement is intended, it should be identified and described according to the [Cost Breakdown Guidance](#). A minimum of two-thirds of the research and/or analytical work in Phase I, as measured by direct and indirect costs, must be carried out by the proposing firm, unless otherwise approved in writing by the Contracting Officer. SBIR efforts may include subcontracts with Federal Laboratories and Federally Funded Research and Development Centers (FFRDCs). A waiver is no longer required for the use of federal laboratories and FFRDCs; however, proposers must certify their use of such facilities on the Cover Sheet of the proposal.

Commented [JG69]: Sub=organization, consultant=individual (but not a firm definition)

Commented [JG70]: Explain sub/consultant's role and quals

- (11) **Prior, Current, or Pending Support of Similar Proposals or Awards.** If a proposal submitted in response to this BAA is substantially the same as another proposal that was funded, is now being funded, or is pending with another Federal Agency, or another or the same DoD Component, you must reveal this on the Proposal Cover Sheet and provide the following information:

Commented [JG71]: Hurray! Progress...

Commented [JG72]: Note that no letter from the sub/consultant is required at DOD

Commented [JG73]: VERY IMPORTANT SECTION disguised as boring, ho-hum one. Disclose, Differentiate, Avoid Duplication (i.e., state you understand the law and won't accept duplicative awards for same R&D)

- a) Name and address of the Federal Agency(s) or DoD Component to which a proposal was submitted, will be submitted, or from which an award is expected or has been received.
- b) Date of proposal submission or date of award.
- c) Title of proposal.
- d) Name and title of principal investigator for each proposal submitted or award received.
- e) Title, number, and date of BAA(s) or solicitation(s) under which the proposal was submitted, will be submitted, or under which award is expected or has been received.
- f) If award was received, state contract number.
- g) Specify the applicable topics for each SBIR proposal submitted or award received.

Note: If this does not apply, state in the proposal "No prior, current, or pending support for proposed work."

d. **Content of the Cost Volume (Volume 3)**

Complete the Cost Volume in the format shown in the Cost Breakdown Guidance by using the on-line cost volume form on the DoD Submission Web site. Some items in the Cost Breakdown Guidance may not apply to the proposed project. If that is the case, there is no need to provide information on each and every item. What matters is that enough information be provided to allow us to understand how you plan to use the requested funds if a contract is awarded.

- (1) List all key personnel by name as well as by number of hours dedicated to the project as direct labor.
- (2) While special tooling and test equipment and material cost may be included under Phases I, the inclusion of equipment and material will be carefully reviewed relative to need and appropriateness for the work proposed. The purchase of special tooling and test equipment must, in the opinion of the Component Contracting Officer, be advantageous to the Government and should be related directly to the specific topic. These may include such items as innovative instrumentation or automatic test equipment. Title to property furnished by the Government or acquired with Government funds will be vested with the DoD Component, unless it is determined that transfer of title to the contractor would be more cost effective than recovery of the equipment by the DoD Component.
- (3) Cost for travel funds must be justified and related to the needs of the project.
- (4) Cost sharing is permitted for proposals under this BAA; however, cost sharing is not required nor will it be an evaluation factor in the consideration of a Phase I proposal.
- (5) A Phase I Option (if applicable) should be fully costed separately from the Phase I (base) approach.
- (6) All subcontractor costs and consultant costs must be detailed at the same level as prime contractor costs in regard to labor, travel, equipment, etc. Provide detailed substantiation of subcontractor costs in your cost proposal. Enter this information in the Explanatory Material section of the on-line cost proposal form. The Supporting Documents Volume (Volume 5) may be used if additional space is needed.

When a proposal is selected for award, you must be prepared to submit further documentation to the Component Contracting Officer to substantiate costs (e.g., an explanation of cost estimates for equipment, materials, and consultants or subcontractors). For more information about cost proposals and accounting standards, see the DCAA publication titled "Audit Process Overview – Information for Contractors" available at: <http://www.dcaa.mil>.

e. **Company Commercialization Report (Volume 4)**

The Company Commercialization Report is the fourth section of a complete proposal package. The Company Commercialization Report is prepared through the DoD Submission Web site (<https://sbir.defensebusiness.org/>). A Company Commercialization Report is required even if the proposing firm has not previously received SBIR or STTR awards. Follow the instructions on the SBIR/STTR Submission Web site and enter the quantitative commercialization results of your firm's prior Phase II projects. Include the items listed below as well as other information relative to your firm's commercialization track record.

Commented [JG74]: Here's Vol 3

Commented [JG75]: A challenge, because how DOD asks you to enter the data isn't helpful in understanding the DOD format (or even content) of the budget. And sample of cost proposal isn't readily available.

Commented [JG76]: Translation: if you buy any equipment as a Direct charge to the DOD contract, then DOD owns it (you don't)

Commented [JG77]: Important to provide separate option budget if your DOD component requires you include an option

Commented [JG78]: Sure, look at it, but it isn't that useful, IMHO

Commented [JG79]: Here's Vol 4

Commented [JG80]: KEY POINT because it is going to feel strange to be filling out this Volume when you are a newbie. Welcome to the club, it feels strange for ~99% of companies using it

- (1) Sales revenue from new products and non-R&D services resulting from Phase II technology;
- (2) Additional investment from sources other than the federal SBIR/STTR Program in activities that further the development and/or commercialization of Phase II technology;
- (3) Whether the Phase II technology has been used in a fielded DoD system or acquisition program and, if so, which system or program;
- (4) The number of patents resulting from the contractor's participation in the SBIR/STTR Program;
- (5) Growth in number of firm employees; and
- (6) Whether the firm has completed an initial public offering of stock (IPO) resulting, in part, from a Phase II project.

All prior DoD and non-DoD Phase II projects must be reported, regardless of whether the project has any commercialization to date.

The Web site will compare these results to the historical averages for the DoD SBIR Program to calculate a Commercialization Achievement Index (CAI) value. Only firms with four or more Phase II projects that were awarded at least two years prior to this BAA will receive a CAI score; otherwise the CAI is not applicable (see the Company Commercialization Report section of the DoD Submission Web site for more details). Firms with a CAI at the 20th percentile or below will be rated no higher than "Marginal" for this factor. This report shall only be prepared once and submitted with all your proposals for this BAA. A report showing that a firm has received no prior Phase II awards will not affect the firm's ability to obtain an SBIR award.

Additional explanatory material relating to the firm's record of commercializing its prior SBIR or STTR projects may be included in the Commercialization Track Record Narrative section of the Company Commercialization Report. Examples of the additional information include: commercialization successes in government or private sector markets that are not fully captured in the quantitative results (e.g. commercialization resulting from your firm's prior Phase I projects); any mitigating factors that could account for low commercialization; and recent changes in the firm's organization or personnel designed to increase the firm's commercialization success.

f. Supporting Documents (Volume 5) – Optional

The Supporting Documents Volume is optional and provided for small businesses to submit additional documentation to support the Technical Volume (Volume 2) which is limited to 20 pages, and the Cost Volume (Volume 5). The Supporting Documents Volume is available for use for submitting Phase I and Phase II proposals for both the DoD SBIR and STTR Programs.

Documents that are acceptable and may be included in Volume 5 are:

1. Letters of Support
2. Additional Cost Information
3. Funding Agreement Certification
4. Technical Data Rights (Assertions)
5. Lifecycle Certification
6. Allocation of Rights
7. Other

Commented [JG81]: Remember this when you feel so inadequate after filling out Vol 4. And remember that lots of other small companies are filling out this irrelevant form, too

Commented [JG82]: Mostly used to explain why your Phase III successes aren't as good as they should be, so don't feel compelled to use this subsection if you didn't get a CAI score because you've had too few Phase IIs per the preceding paragraph

Commented [JG83]: The NEW volume 5. Remember that some DOD components are not using—is yours? Check the component specific instructions to find out

Commented [JG84]: Should be COMMERCIALIZATION letters from real potential customers, funders, or licensees

Please refer to the Component-specific Instructions for your topics of interest to see how each program office will be handling the Volume 5 information.

- Please note: The Army and USSOCOM SBIR Programs will not be using any of the information in Volume 5 during the evaluation.

g. Phase I Proposal Checklist

The Offeror's proposal shall be in accordance with Section 5.0. **A complete proposal consists of:**

- Volume 1: Proposal Cover Sheet
- Volume 2: Technical Volume
- Volume 3: Cost Volume
- Volume 4: Company Commercialization Report
- Volume 5: Supporting Documents – Optional

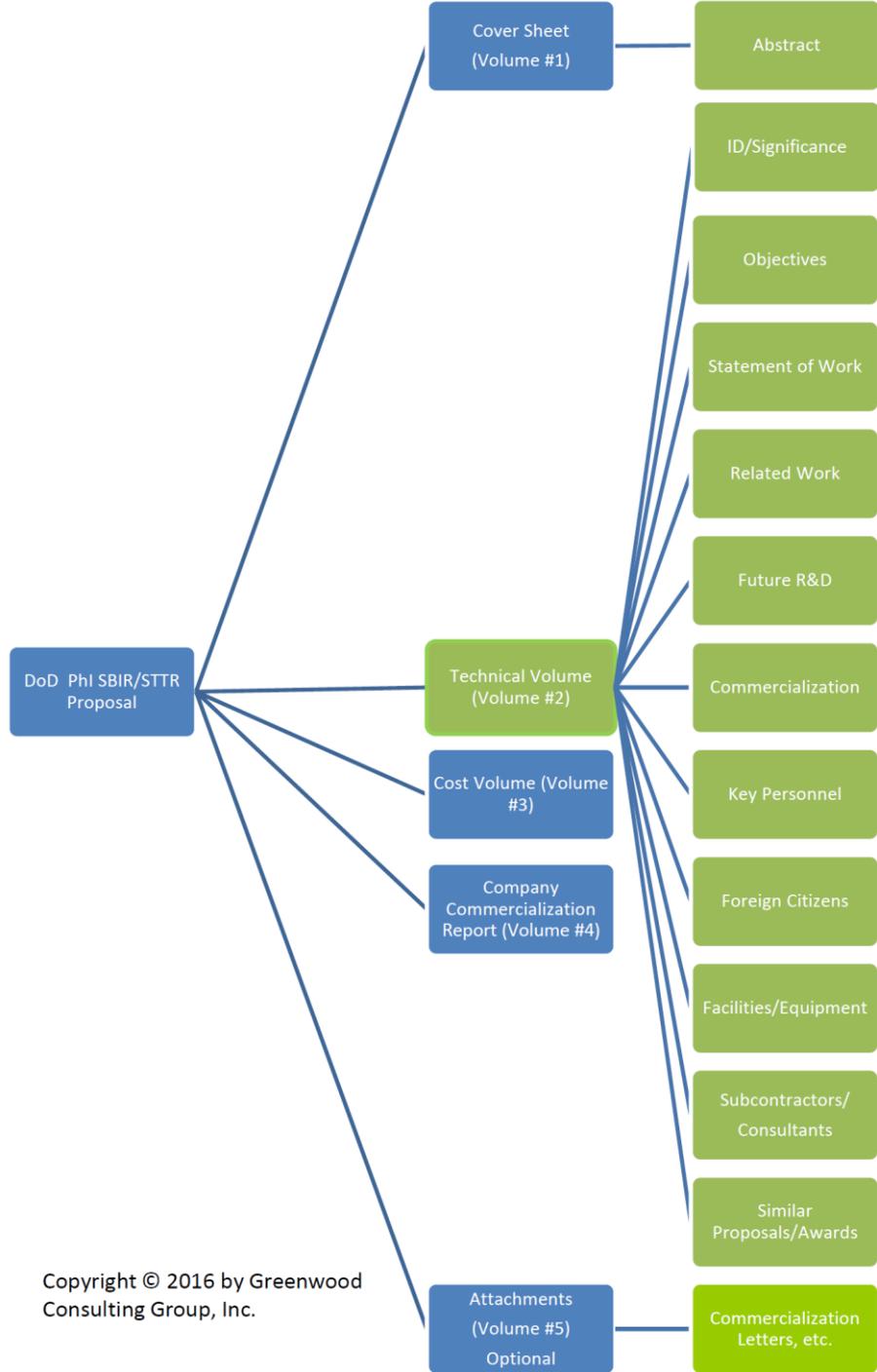
Commented [JG85]: UNLESS it is Army/SOCOM, or you decide not to include Vol 5. So Vol 4 is mandatory even when it isn't relevant, but Vol 5 is not

Those responding to this BAA should note the proposal preparation tips listed below:

- a. Read and follow all instructions contained in this BAA, including the instructions in Section 12.0 of the DoD Component to which the firm is applying.
- b. Register the firm on the secure, password-protected DoD Submission Web site at <https://sbir.defensebusiness.org/> and, as instructed on the Web site, prepare the firm's submission.
- c. Register the firm with SBA's Company Registry at www.sbir.gov and provide the SBA SBC Identification Number on each proposal Cover Sheet submitted in response to this BAA.
- d. Check **that the cost adheres to the Component criteria specified and the cost on the Cover Sheets matches the cost in the Cost Volume.**
- e. Check that the Project Abstract and other content provided on the Cover Sheets contain NO proprietary information.
- f. Mark proprietary information within the Technical Volume as instructed in Section 5.3.
- g. The content in the Technical Volume, including the option (if applicable), includes the items in Section 5.4.c.
- h. That the header on each page of the technical volume should contain the company name, topic number, and proposal number. (The header may be included in the one-inch margins.)
- i. The Company Commercialization Report is submitted online in accordance with Section 5.4.e. This report is required even if the firm has not received prior SBIR funding.
- j. **Limit your Technical Volume to 20 pages.** Please refer to Component-specific instructions for how a technical volume in excess of 20 pages is handled. Some Components will reject the entire technical proposal if over 20 pages.
- k. A Phase I Template to assist in preparing your Technical Volume is available on the SBIR/STTR Submission Web site at <https://sbir.defensebusiness.org/>.

Commented [JG86]: Pay particular attention to maximum funding allowed in base vs option portions of the project

Commented [JG87]: Allegedly under FAQ tab



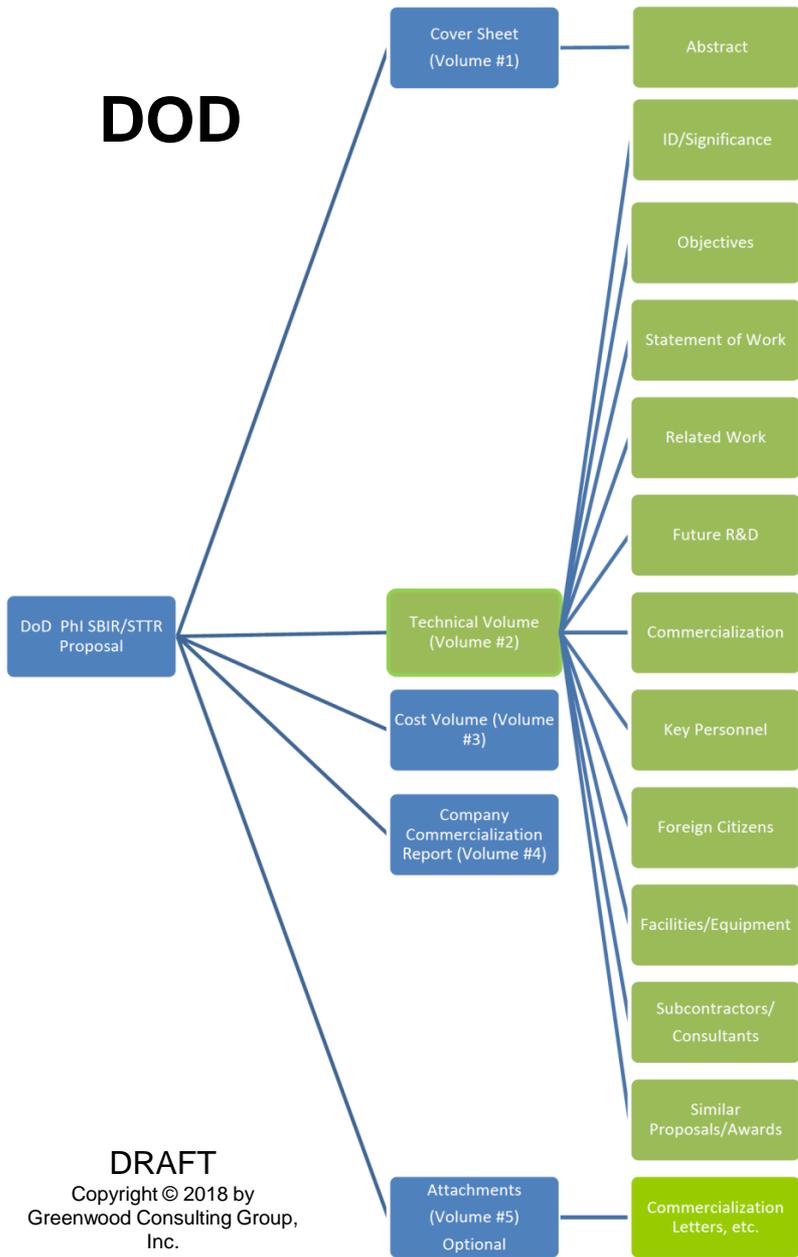
Now let's look at NSF's Phase I Instructions...

WHY, YOU ASK?

Why Are We Showing You NSF Instructions?

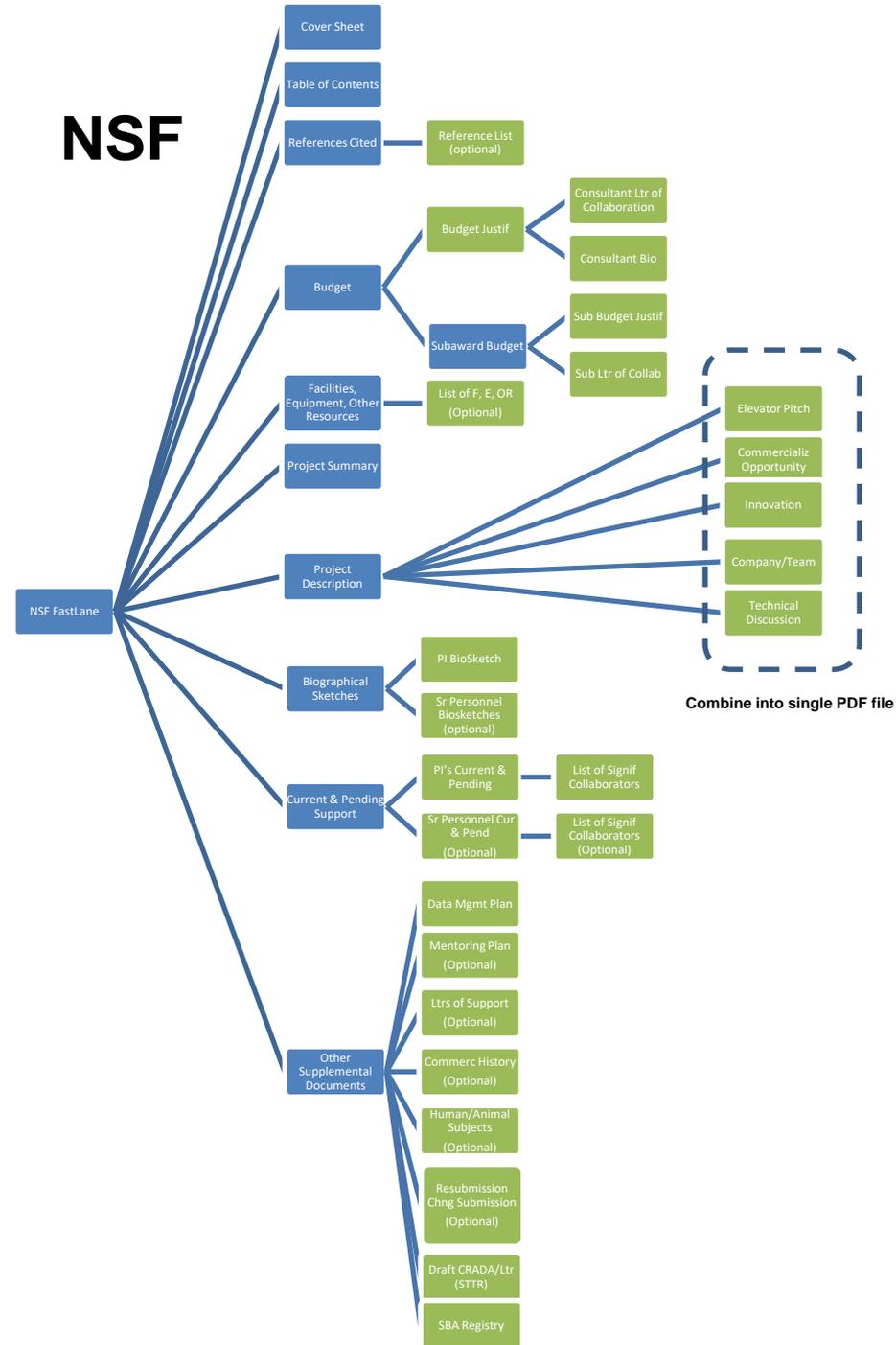
- Because NSF considers any “high quality proposal” on any topic
- Therefore, you can always submit
 - a version of your DoD Phase I proposal to NSF
 - Be sure you disclose to NSF that you have submitted it to DoD already
 - a proposal that DoD “ought to be interested in,” but for which there is no DoD SBIR/STTR topic
 - But beware: NSF emphasis on commercialization says you better have a DoD/Prime client on board!
 - Recall USAF had a broad topic in FY18.2 solicitation for such ideas

DOD



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NSF



Combine into single PDF file

“Must Cover” Items for Typical PhI Proposal Sections

1. Identification/Significance

- Include the theme
- What’s innovative about your approach
- What’s the feasibility question/measure/success criterion?
- Why should the reader care about this project?
- *“It doesn’t matter how good the approach is, how innovative the idea is, how great the PI/team is, how excellent the research facilities are if what you are proposing lacks significance...”*

--JoAnn Goodnight, NIH Program Manager

2. Technical objectives

- Determination of feasibility should be one objective

3. Work plan

- Relationship of tasks to objectives (see #2 above)
- Tasks required to conclude feasibility
- Timeline
- Clarify how each task is being done, and by whom

4. Related R&D

- What your people have done/are currently doing relevant to this?
- How do these experiences give you credibility on this project?
- How is the current project different from the other work?
 - Important in “Waste, Fraud & Abuse” environment of the reauthorization
- Summarize key contributions to state-of-the-art

“Must Cover” Items for Typical PhI Proposal Sections

5. Key players

- Updated resumes, showing position with proposing company
- Relevant education & experience
- KISS the publications & presentations
- Emphasize small company, but include subs & RIs
- Clarify roles of each player
- Justify why subs & RIs were chosen for this project
- Limit # of players in Phase 1
- Avoid gaps in technical expertise and Phase 3 application/market

6. Future R&D

- Phase 2 vision
- Other Phase 1's that might come from success of this project
- Filling the Phase 2 \Rightarrow 3 gap

7. Commercialization

- Contract agencies: how will you get this into their hands in Phase 3?
- Quantify but state and justify assumptions
- Avoid WAGS and voodoo assumptions

8. References

- KISS & Relevant

9. Cost Proposal

- Always ask for indirect/G&A/F&A/overhead
- Always ask for fee/profit
- Advanced or Partial payments, not progress payments

A CRITICAL PART OF THE PROPOSAL: THE ABSTRACT

- Assume the reviewer is bored from reading dull proposal after dull proposal...
 - Your abstract needs to wake him or her up
- Assume the reviewer already has read more good proposals than he or she can fund
 - Convince him/her quickly that yours deserves consideration
- Assume you win an SBIR/STTR award
 - The abstract will be published--what do you want the world to know about your project?

ADVICE ON THE ABSTRACT

- Always follow your agency's requirements re: content, length, etc.
- Avoid long-winded background descriptions
- Avoid typos, misspellings, bad grammar, etc
 - You only have one chance to make a good first impression
- Do not use, verbatim, sentences or paragraphs in abstract that also appear in proposal body

Title:	Durable, Low Friction Coating for Variable Speed Refueling Drogue (VSRD)	Award Amount:	\$149,984.00
Agency:	DOD		

Abstract:

ABSTRACT: Current surface modification and lubricant technologies are either ineffective or too expensive and difficult to apply on US Air Force refueling drogue components. A low-cost, non-toxic, environmentally benign, easy to apply lubricant could significantly reduce US Air Force cost burdens to perform aerial refueling exercises and missions. We propose an advanced lubricant technology that, in its first-generation form, exhibited full compliance to MIL-L-23398 performance specifications, and has been fully characterized using sophisticated optical, FTIR, XPS, and AFM spectroscopic techniques. Our permanent, ultra-low coefficient of friction, durable, extreme-pressure resistant lubricant is offered as a cost-effective surface pre-treatment that will synergistically enhance the hydrodynamic performance of liquid lubricants and greases presently in service. Management of friction and wear of drogue refueling components with our lubricant technology will allow the US Air Force to achieve its performance and operating cost targets. An added benefit of our technology will be to extend the service life of the lubricated part and ultimately the life of the drogue refueling system. BENEFIT: Air Force personnel will be pleased with the immediate cost, performance and application benefits from our proposed low-cost, ultra-low coefficient of friction, non-toxic, zero-VOC, environmentally benign, non-flammable, corrosion inhibiting, durable, high load-carrying capacity lubricant coating. Our lubricant technology will have a very low cost relative to mechanical grinding and polishing processes, and traditional lubricants and greases. In addition to outperforming those dated, well-worn products and expensive procedures, our lubricant provides application simplicity through HVLP, VOC-compliant aerosol spray, dip or brush application. We have direct experience developing a successful first-generation lubricant technology through the SBIR program. Advancements to this technology will be conducted to meet further US Army, ASTM, SAE and STLE tribological test standards, specifications and efficiency improvement requirements. Potential Commercial Applications include aerospace servomotor applications, camshaft lobes, recreational rifle bolts and actions, tracked vehicle pins, ring and pinion gear sets, piston skirts, aircraft engine thrust bearings, ring and bore assemblies, and valve seats.

Principal Investigator:

Aureliano P. Jr
President

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Business Contact:

Aureliano P. Jr.
President

[\(512\) 217-9973](tel:5122179973)

alopez4@yahoo.com

Small Business Information at
Submission:

Texas High Energy Materials
7301 Ranch Road 620 N. Suite
155.276 Austin, TX -

EIN/Tax ID:	273330689
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DUNS:	N/A
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Number of Employees:	
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Woman-Owned:	No
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Minority-	Yes
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Title: A mechanism-based computational tool to optimize pulmonary drug delivery

Agency: HHS

Contract: 1R43HL120517-01

Award Amount: \$196,237.00

Abstract:

DESCRIPTION (provided by applicant): Coronary artery disease (CAD) is a national and worldwide epidemic that places the largest clinical and economic burden on the healthcare system of any disease condition. Patients with stable and acute coronary conditions are often treated with percutaneous coronary intervention (PCI), including stenting. Up to 85% of all coronary stents are under-deployed leading to higher target revascularization rates (TVR), in-stent restenosis, in-stent thrombosis, and therefore, higher mortality. Under-deployment is related to several factors, including inaccurate manufacturer ex vivo versus in vivo pressure/diameter compliance relationships, and thus requires further post-dilatation typically with a stiffer, non-compliant balloon. However, post-dilatation balloons still fail to provide adequate expansion because, similar to the stent deployment balloons, they also rely on ex vivo compliance charts to determine in vivo size. Consequently, a tool is needed to provide accurate balloon sizing information to the clinician in real-time during balloon inflation. A novel conductance balloon (CB) catheter system has been developed that functions as a typical post-dilatation catheter, but with additional functionality for accurate measurement and display of real-time balloon size. The CB catheter utilizes a simple physical law (Ohm's Law) to determine the balloon cross-sectional area (CSA)/diameter through electrical voltage measurements made inside the device during inflation. The sizing results are displayed in-real time on a simple bed-side console display to aid the physician during balloon expansion (i.e., similar to current displays that show pressure during inflation). Preliminary results with the CB catheter system on the bench and in vivo in healthy swine showed excellent accuracy (1.4% diameter error), repeatability (1.1% diameter error), and safety. However, additional work is needed to update the console and catheter and further validate the system in atherosclerotic swine (this Phase I application) before translation to the clinic (future Phase II application). Therefore, in this Phase I application, we propose the creation of a clinically-ready CB catheter system and its validation in vivo in atherosclerotic swine. Based on the strong physics foundation of the technology, the excellent preliminary results, and the previously known safety of a related system, the CB catheter system is expected to provide highly accurate and repeatable real-time digital display of balloon size across the entire coronary stent range in any type of diseased vessel condition with virtually no physician training required. After the completion of this Phase I project, we expect a quick and logical translation of the CB catheter system to a Phase II project in man. This project has the ability to impact patients with multiple comorbidities and reach across various NIH Institutes and Centers including the NIDDK, NHLBI, and NINDS. PUBLIC HEALTH RELEVANCE PUBLIC HEALTH RELEVANCE: A post-dilatation device that does not rely on inaccurate pressure/diameter compliance charts is needed to ensure minimal stent area and stent apposition during percutaneous coronary intervention. The purpose of this Phase I proposal is the development and validation (in atherosclerotic swine) of a clinically relevant conductance balloon catheter system that relies on electrical voltage measurements to provide accurate, real-time sizing measurements during stent post-dilatation.

Principal Investigator:

Template for Volume Two: Technical Proposal

1. Identification and Significance of the Problem or Opportunity.

Define the specific technical problem or opportunity addressed and its importance. (one page)

2. Phase I Technical Objectives.

Enumerate the specific objectives of the Phase I work, including the questions the research and development effort will try to answer to determine the feasibility of the proposed approach.

3. Phase I Statement of Work (including Subcontractors' Efforts).

- (a) Provide an explicit, detailed description of the Phase I approach. If a Phase I option is required or allowed by the Component, describe appropriate research activities which would commence at the end of Phase I should the Component elect to exercise the option. The Statement of Work should indicate what tasks are planned, how and where the work will be conducted, a schedule of major events, and the final product(s) to be delivered. The Phase I effort should attempt to determine the technical feasibility of the proposed concept. The methods planned to achieve each objective or task should be discussed explicitly and in detail. This section should be a substantial portion of the Technical Volume section.

- (b) Due to the short timeframe associated with Phase I of the SBIR process, the Navy does not recommend the submission of Phase I proposals that require the use of Human/Animal Testing, or Recombinant DNA. This solicitation may contain topics that have been identified by the Program Manager as research or activities involving Human/Animal Subjects and/or Recombinant DNA. In the event that Phase I performance includes performance of these kinds of research or activities, please identify the applicable protocols and how those protocols will be followed during Phase I. Please note that funds cannot be released or used on any portion of the project involving human/animal subjects or recombinant DNA research or activities until all of the proper approvals have been obtained. (see DoD 2013.1 SBIR Solicitation Sections 4.7 – 4.9).

(Objectives and Statement of Work, 10-12 pages)

4. Related Work.

Describe significant activities directly related to the proposed effort, including any conducted by the principal investigator, the proposing firm, consultants, or others. Describe how these activities interface with the proposed project and discuss any planned coordination with outside sources. The technical volume must persuade reviewers of the proposer's awareness of the state-of-the-art in the specific topic. Describe previous work not directly related to the proposed effort but similar. Provide the following: (1) a short description, (2) the client for which work was performed (including the individual to be contacted and phone number), and (3) date of completion. (one page)

5. Relationship with Future Research or Research and Development.

- (a) State the anticipated results of the proposed approach if the project is successful.
- (b) Discuss the significance of the Phase I effort in providing a foundation for a Phase II research or research and development effort.

Navsea Ph1 "Template" at
<http://www.navsbir.com/navsea>
(10-12 pp objectives + work plan)

[Template]
Volume 2: Technical Volume

[Note: Remove the disclosure statement below if not applicable to your proposal. Refer to Instructions.]

This proposal includes data that must not be disclosed outside the Government and must not be duplicated, used, or disclosed – in whole or in part – for any purpose other than to evaluate this proposal. If, however, a contract is awarded to this offeror as a result of – or in connection with – the submission of this data, the Government has the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit the Government's right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in pages <insert numbers or other identification of sheets>.

1. Identification and Significance of the Problem or Opportunity.

[Define the specific technical problem or opportunity addressed and its importance.] (one page)

2. Phase I Technical Objectives.

[Enumerate the specific objectives of the Phase I work, including the questions the research and development effort will try to answer to determine the feasibility of the proposed approach.]

3. Phase I Statement of Work (include Subcontractors and/or Research Institutions)

(a) [Provide an explicit, detailed description of the Phase I approach. If a research institution is used, for the Phase I Option, describe appropriate research activities that would commence at the end of Phase I should the awarding Agency elect to exercise the Option. (See Section 5.2 of the DoD SBIR/STTR Broad Agency Announcement (BAA) Instructions.)



DoD Components which require PHASE I OPTION	SBIR Phase I Option	STTR Phase I Option
Army	4 Mo. Option NTE \$50,000	(NA)
Navy	6 Mo. Option NTE \$125,000	6 Mo. Option NTE \$100,000
DARPA	4 Mo. Option NTE \$50,000	4 Mo. Option NTE \$50,000
MDA	6 Mo. Option NTE \$50,000	6 Mo. Option NTE \$25,000

(b) The Statement of Work should indicate what tasks are planned, how and where the work will be conducted, a schedule of major events, and the final product(s) to be delivered. The Phase I effort should attempt to determine the technical feasibility of the proposed concept. The methods planned to achieve each objective or task should be discussed explicitly and in detail. This section should be a substantial portion of the Technical Volume.

(c) Some topics may be identified by the Program Manager as research or activities involving Human/Animal Subjects and/or Recombinant DNA. In the event that Phase I performance includes performance of these kinds of research or activities, please identify the applicable protocols and how those protocols will be followed during Phase I. Please note that funds cannot be released or used on any portion of the project involving human/animal subjects or recombinant DNA research or activities until all of the proper approvals have been obtained. (See DoD SBIR/STTR BAA Instructions, Sections 3.1.1-3.1.2 and 4.7-4.9, or Component

[Remove this statement if not applicable.] Use or disclosure of data contained on this page is subject to the restriction on the first page of this volume.

THE KEY QUESTIONS YOUR PROPOSAL MUST CLEARLY ANSWER

1. What is the proposed innovation?
2. What are the technical risks/unknowns associated with the proposed innovation?
3. What is the technical feasibility question to be addressed in the project?
 - List all relevant questions about unknowns, explain why this one is “the” key one
 - State that other questions will be answered in Phase 2
4. What is the project plan that clearly answers the feasibility question & meets the research objectives?
5. What set of metrics will you use to assess the success of the innovative research described in that plan?
6. How are you going to know if the Phase 1 feasibility study is successful?

--after NSF Program Manager correspondence to proposer, 6/06

CAREFULLY DO THE COMMERCIALIZATION DANCE

- Commercialization is a high priority, even in Ph I
Many of the weakest proposals scored low on...the potential for commercial application...
--DARPA FY07.2 solicitation
- But Phase I still a technical project
- Convincingly discuss markets & commercialization strategy
 - A few well conceived markets beats a slew of vague ones
- Avoid the “dreaded words of sin,” BS & SB (smoke blowing)
 1. _____
 2. _____
 3. _____
 4. _____
- And remember, the DoD likes to use the term “transition” to mean “commercialization” (sometimes)—see the following page for more on this mystery...

CAUTION: COMMERCIALIZATION PRIORITY DIFFERS BY AGENCY (& by Contract vs Grant Agency)

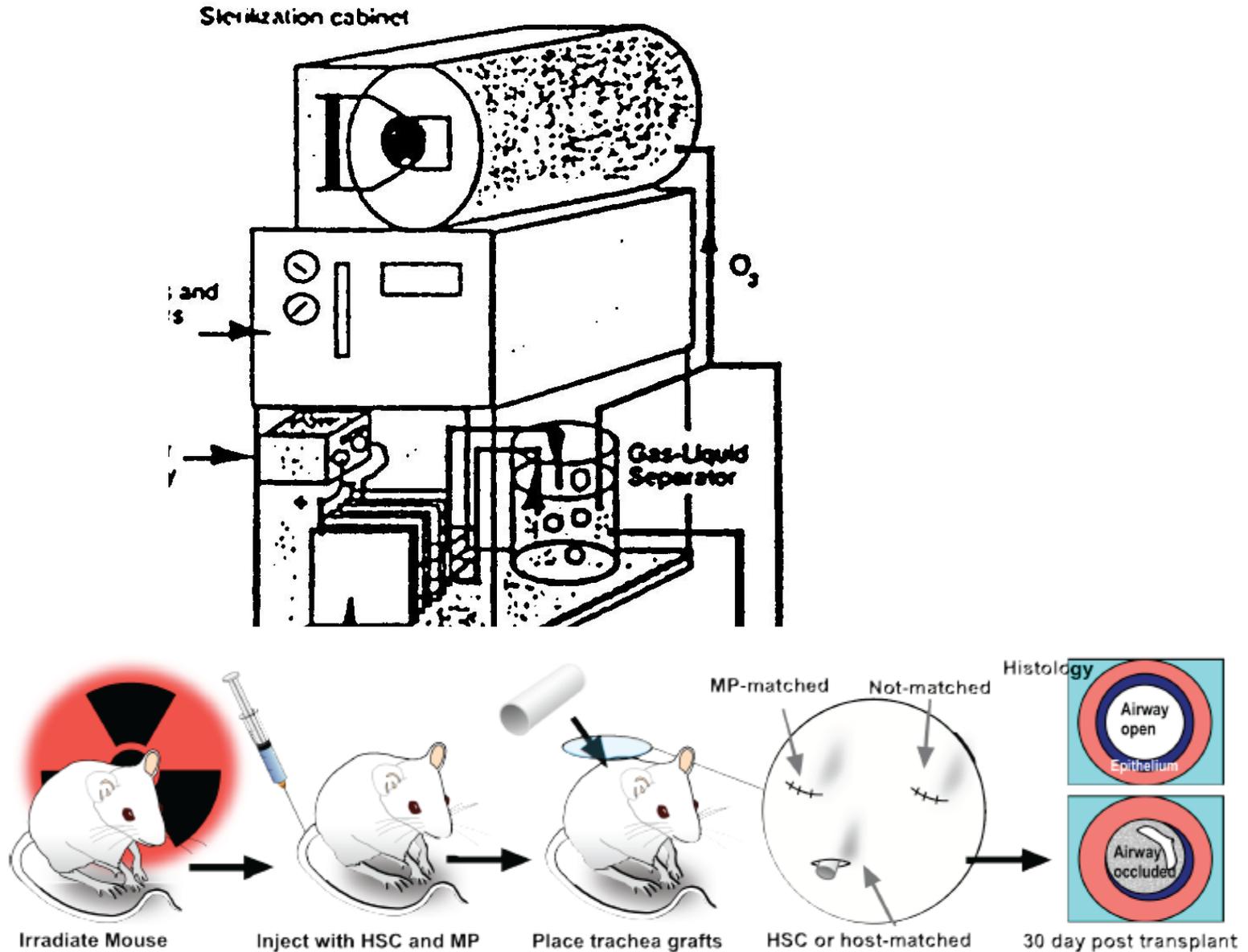
- “Commercialization” means different things to different agencies
 - NSF: “emphasizing private sector commercialization” --FY14 solicit
 - DoD, NASA: Primarily for its own use
 - *“The small business should include their transition vision in their commercialization strategy. The small business must understand the end use of their effort and the end user, i.e., Army, Navy, AF, SOCOM, etc.”*
--DARPA FY2004.2 solicitation
 - “Dual Use” (non DOD uses) given secondary consideration
 - Find DOD Acquisition Programs at www.dodsbir.net/liaisons.htm
 - DOD terminology: “transition”; NASA: “insertion”
 - Other Agencies: Use by government or private sector (or both) as appropriate
 - 2011 Reauthorization has primarily a DoD Ph3 contract tone

ADVICE: all agencies require that you describe how you will commercialize the technology. Your 1st job is to understand what your agency/component/technical monitor thinks it is, and respond accordingly

SUGGESTION: USE GRAPHICS IN YOUR PROPOSAL

- A picture is worth a thousand words
 - Show how Phase I links with Phase II
 - Show how the elements of Phase I link together
 - Flow chart
 - Show your vision of the prototype and/or final product
 - See next slide for example
 - Show the Phase I schedule
 - Timeline or Gantt Chart
- But beware:
 - Make sure its the right thousand words
 - Not amateurish or hand-drawn
 - Reference & describe the graphic in the text
 - USE but do not RELY ON color
 - “Most proposals will be printed out on black and white printers so make sure all graphics are distinguishable in black and white” --
USAF 10.3 STTR solicitation*

A SIMPLE PICTURE WORTH 1000+ WORDS



Timothy Fong, Cellerant Therapeutics, sample winning proposal posted by NIAID at <http://www.niaid.nih.gov/researchfunding/sb/apply/Pages/Samples.aspx>

DOE Phase 0 Program

- Assistance for
 - a. Minority and Women Owned Businesses
 - b. Companies in “underrepresented states”
 - AK, DC, GA, HI, IA, ID, IN, KS, LA, ME, MN, MS, MT, NC, ND, NE, NY, OK, PA, PR, RI, SC, SD, WA, WI
 - c. Companies teaming with a DOE Federal Lab in an “underrepresented state”
 - IA: Ames Laboratory
 - ID: Idaho National Laboratory
 - NY: Brookhaven National Laboratory
 - SC: Savannah River National Laboratory
 - WA: Pacific Northwest National Laboratory
- Services available if applying for DOE SBIR/STTR Program
 - LOI submission assistance
 - Phase I proposal prep, review, submission assistance
 - Training & mentoring
 - Communication & market research assistance
 - Technology advice & consultation
 - IP consultation
 - Indirect rate & cost proposal assistance
- Apply at <http://www.dawnbreaker.com/doephase0/>

**DoE Ph0 on hold pending
Congressional action (?) on return
of 3% admin tax**

IF WE HAD A NICKEL FOR EVERY TIME WE SAW THESE COMMON PROPOSAL WEAKNESSES...

- Lack of clarity, consistency
 - *The strategy to be followed by the UJCL would be a project management path to ensure an objective, reliable and practical project implementation approach for accomplishing the project output towards satisfying the desired result.*
- Lack of technical detail
 - Especially vague research/work plans
- No evidence of innovation or uniqueness
- No statement of the feasibility question, risk, or solution measure
- Much too much background stuff: the technology trap discussed earlier
- Fail to present a credible commercialization story
- Lack of credible PI &/or team
- Lack of credible/defensible/sensible cost proposal

SBIR/STTR PHASE I DRAFT PROPOSAL CRITIQUE

3rd in a 4 step process for developing a competitive SBIR/STTR proposal

1. Formulate your proposal strategy
2. Draft the proposal
- 3. Get a review of the draft before submitting it**
4. Get a debriefing after winners are announced

BEWARE OF THE TYPO....

- Meant to write *“Bridge monitoring system”*
 - Actually wrote *“Bride monitoring system”*
- Meant to write *“turnkey system”*
 - Actually wrote *“turkey system”*
- Meant to write *“Due to the threat of nuclear war”*
 - Actually wrote *“Due to the treat of nuclear war”*
- Meant to write *“...a member of the burn unit of the hospital”*
 - But wrote *“..a member of the bum unit of the hospital”*
- Wrote *“...useful in rug screening and testing...”*
- Wrote *“Ass president/CEO of our firm, he designed...”*
- *“...capable of withstanding...a 3 foot drop test onto a herd surface.”*
- *“...for this technology from Lockheed Martin Missiles and Fir Control...”*
- *“...will be taught by a certified Tai Chi mater...”*
- *“...to identify each functional requirement and asses...”*
- *“...in order to reduce engine fowling...”*
- *“We have two millstones in our Phase I project...”*
- *“The PI has access to the field tasting range at Tyndall AFB...”*
- *“...establish a mentor broad...”*
- *“...urgent massage from ...”*
- *The PI’s roll in this project will be...”*
- *“..bipartisan leadership grop of Senators and Representatives agreed...”*
- *“We propose to tie a wench to a post and apply pressure...”*

NOTE: Spellchecker caught none of these!

GETTING A PRE-SUBMITTAL REVIEW OF YOUR SBIR/STTR PROPOSAL

- Why?
 - Get some “fresh eyes” on the proposal
 - Get different perspective
 - Take advantage of other experience & expertise
 - ADA Technologies: 75% of their proposals that got a pre-submittal review have led to SBIR awards
 - Waste, Fraud & Abuse gives xtra incentive to get another opinion re: accuracy & complying with instructions
- Who?
 - University profs (technical)
 - Federal Lab scientists, engineers (technical)
 - SBDC, Consultants (marketing, commercialization)
 - DoEd SBIR Program Mgr (Inst of Educ Sci)
 - The Greenwoods (Logic flow, readability, completeness, responsiveness to topic & agency preferences)
 - Teenage daughter (Nit-picks)
- When?
 - Not the last week before due date

SBIR/STTR PHASE I PROPOSAL DEBRIEFING

4th in a 4 step process for developing a competitive SBIR/STTR proposal

1. Formulate your proposal strategy
2. Draft the proposal
3. Get a review of the draft before submitting it
- 4. Get a debriefing after winners are announced**

GET A POST-SELECTION DEBRIEFING

- After agency picks winners, non-winners are entitled to a debriefing
 - Some agencies provide them automatically; you must request it from others
 - Most debriefings are written, usefulness varies
- It points out strengths & weaknesses of your proposal, in the eyes of the reviewer(s)
- Use to decide if you should consider resubmitting
 - Good idea presented poorly vs a bad idea
- Learn things to do differently on your next proposal
 - *“Debriefings are provided to help improve the offeror’s potential response to future solicitations”* –DTRA, DoD FY11.2 Solicitation
- Always ask for a debriefing, even if you won

A WINNER
IS JUST
A LOSER
WHO TRIED
ONE
MORE
TIME.

-GEORGE M.
MOORE JR.

NIH: “COMMON REASONS CITED BY REVIEWERS FOR AN APPLICATION’S FAILURE TO GAIN THEIR ENTHUSIASM”

1. Unconvincing case for commercialization/societal impact
2. Poorly defined feasibility test
3. Methods unsuited to the objectives
4. Problem is more complex than proposer seems to realize
5. Not significant to health-related research
6. Lacking detail in the research plan, incl no recognition of pitfalls
7. Overly ambitious work plan
8. Direction or sense of priority not well defined
9. Lack of focus in the hypotheses, aims, and/or research plan
10. Lack of innovation
11. Investigator(s) inexperienced
12. Driven by technology rather than a problem or pressing need
13. Relevancy of tasks to objectives not clear
14. Lack of alternatives if primary approach does not work out
15. Proposed model system inappropriate for proposed questions
16. Relevant controls not included
17. Insufficient consideration of statistical needs
18. Not clear what data are from the company and what are from other sources

Share this:

SBIR/STTR Sample Applications

The SBIR (R43/R44) and STTR (R41/R42) programs support domestic small businesses to engage in research and development with the potential for commercialization.

PI and Grantee Institution	Sample Application
Jose M. Galarza of Technovax, Inc. "Broadly protective (universal) virus-like particle (VLP) based influenza vaccine" (SBIR Phase I / R43)	Full Application
Mark Poritz* of BioFire Diagnostics, LLC. "Rapid, automated, detection of viral and bacterial pathogens causing meningitis" (SBIR Phase I / R43)	Full Application
Patricia Garrett of Immunetics, Inc. "Rapid Test for Recent HIV Infection" (SBIR Phase II / R44)	Full Application
Michael J. Lochhead of MBio Diagnostics, Inc. "Point-of-Care HIV Antigen/Antibody Diagnostic Device" (SBIR Phase II / R44)	Full Application
Kenneth Coleman of Arietis Corporation "Antibiotics for Recalcitrant Infection" (SBIR Fast-Track)	Full Application
Timothy C. Fong of Cellerant Therapeutics, Inc. "Novel indication for myeloid progenitor use: Induction of tolerance" (STTR Phase I / R41)	Full Application
Raymond Houghton, InBios International, and David AuCoin, University of Nevada School of Medicine "Antigen Detection assay for the Diagnosis of Melioidosis" (STTR	Full Application



Firm
InformationCover
SheetsTechnical
VolumeCost
VolumeCompany
Commercialization
ReportVerify
Proposal
SubmissionPrint
Proposal
SubmissionSF298
Final
ReportPhase
Enhance

7. Key Personnel
8. Foreign Citizens
9. Facilities and Equipment
10. Subcontractors/Consultants
11. Prior/Current/Pending support of similar proposals or awards
12. (And a Cost Volume, if not using the web site's online Cost Volume form)

Q Where do I find a sample Technical Volume?

A Follow the links to a [sample Phase I Technical Volume](#) or a [sample Phase II Technical Volume](#)

Q What do I upload?

A The DoD SBIR program is requesting all technical uploads be in PDF format. You are responsible for checking for viruses on the Technical Volume file prior to upload. Uploaded files with viruses will be deleted immediately.

Q Am I required to upload a Technical Volume?

A All agencies (Air Force, Army, CBD, DARPA, DHP, DIA, DMEA, DTRA, MDA, Navy, NGA, OSD and SOCOM) require

DOD Sample Phase I Proposal

SUPERADHERENT HARD COATINGS BY ION BEAM ENHANCED DEPOSITION

(FIGURES AND TABLES ARE UNAVAILABLE ON THIS WEBSITE.)

1. COVER SHEET (see attached)

2. IDENTIFICATION & SIGNIFICANCE OF THE OPPORTUNITY

The objective of this proposal is to demonstrate the feasibility of producing superadherent protective coatings at low processing temperatures using energetic ion beams in conjunction with conventional deposition techniques. This process, coined Ion Beam Enhanced Deposition (IBED), is depicted in Figure 1 and promises a new generation of exotic coatings with superior adhesion, near theoretical densities, very high hardness, and, at the same time, capable of being deposited at low temperature. The effect of the ion beam (e.g., N) is to initially "intermix" the deposited atoms (e.g., Ti) with the substrate for superior adhesion as well as to provide energy to the grown layer for effectively "high temperature" processing at low substrate temperatures. Highly adherent coatings of "TiN" with low friction (Figure 2) have already been demonstrated by Kant et al(1) at Naval Research Laboratory by N-bombardment of deposited Ti. This proposal is to extend the range of protective coatings produced by IBED to include HfN, Al₂O₃ and to characterize such films for mechanical and chemical properties as well as microstructural analyses. Evaluation of mechanical properties will include adhesion tests and wear tests. Initially laboratory pin-on-disc tests will be used for screening purposes with in-situ component tests planned for later. Microstructural analyses deemed necessary include 1) sputter Auger electron spectroscopy for compositional analysis, 2) sputter ESCA for composition and chemical bonding information, 3) glancing x-ray analysis for lattice structure, 4) ion backscattering for nondestructive composition vs. depth information, and 5) SEM and TEM for grain structure and lattice microstructure information.

Hard, extremely adherent hard coatings synthesized by the ion beam enhanced deposition technique will be of immediate use to SDI. Primary candidates for these (ultra) thin coatings would be for i) precision aerospace bearings and ii) precision micropositioning platforms where a very thin (i.e., 0.1-0.5 micrometer) antifriction antiwear coating could be used without remachining or respecifying dimensions of critical components. Besides being an end-of-line process not requiring production changes, IRED coatings promise a convenient retrofit to existing tribological problems involving precision mechanisms.

2.1 BACKGROUND

There is an acute need for development of high quality, low temperature thin film deposition techniques that can achieve thin film qualities found in high temperature processes. Present low temperature thin film deposition techniques sometimes result in inferior microstructural features within the film such as columnar growth and not the preferred equiaxed grain structure ordinarily found in high temperature processes. Conventional methods of laying down films result in a greater or lesser degree of departure from bulk material properties (density, grain structure, etc.) depending, among other things, on the energy of the atoms as they arrive at and arrange themselves on the substrate surface.

Table 1 shows the typical energy ranges associated with various physical vapor deposition and ion beam based techniques.

The three PVD processes in the table above, namely evaporation, sputtering, and ion plating are discussed here briefly since eventually any coating produced by a new method, such as IBED, will have to be compared with

The Spire tribology laboratory is equipped to characterize the mechanical properties of the hard coatings. For hardness measurements, either Tukon microhardness tester or Mhos scratch tests can be used. To measure wear resistance and mechanical integrity, several pin-on-disc testers are available. A Dectak surface profile plotter is available to analyze resultant wear and decohesion areas.

The services of Cornell University will be used to provide Rutherford Backscattering analysis and the services of SUNY at Stony Brook will be used to provide SEM, TEM and x-ray measurements.

10. CONSULTANTS

No consultants are presently foreseen for the Phase I program. If a need should arise, Spire has several well known consultants available from the facilities of M.I.T., Harvard, Boston University and other local universities.

11. PRIOR, CURRENT OR PENDING SUPPORT

Spire has no prior, current or pending support for a similar proposal.

12. COST PROPOSAL

See attached.

13. REFERENCES

1. R.A. Kant and B.D. Sartwell, Proc. of 1983, MRS Symposium, North Holland, NY, in press.
2. R. Bunshah, ed., "Deposition Technologies for Films and Coatings", Noyes Publications, (1982).
3. J. Thornton, Ref. 2.
4. D. Niattox, Ref. 2.
5. J.M.E. Harper and R.J. Gambino, "Combined Ion Beam Deposition and Etching for Thin Film Studies", J. Vac. Sci. Tech. 16 (6), (1979), pp. 1901-1905.
6. L. Pranevicius, "Structure and Properties of Deposits Grown by Ion Beam Activated Vacuum Deposition Techniques", Thin Solid Films 64 (1979), pp. 77-85.
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No date on proposal,
but you guess it

A11-095 TITLE: Edge Enabled Systems for ISR Applications

XYZ Title: Cognitive Information Processing for Edge Enabled Operations

ABSTRACT:

XYZ has developed fundamental technologies to improve situation awareness and agility in dynamic, uncertain environments. For instance, in a USMC SBIR CPP, XYZ is developing real time situation awareness for Sense and Respond Logistics. In a Phase II DARPA SBIR, XYZ is developing a graphical user interface collaborative whiteboarding application incorporating distanced teams for problem solving and rapid response. XYZ is completing an Army Phase II SBIR that has developed a cognitive fusion architecture enabling models to continuously evolve. We propose to combine these core technologies to design and develop an edge enabled system (EES) for ISR applications. Using our framework called We-Share, warfighters will develop, extend and combine ISR applications for their particular needs. Situation awareness and response time will improve through sensing and reasoning applications that evolve out of the common needs of individual soldiers. In addition to improving access to information for the dismounted soldier, our approach to EES will increase the relevance of incoming information to a soldier's mission by allowing them to customize how the information is acquired, processed and interpreted. We-Share will be developed for Android-based devices with secure access to the warfighter network, such as the General Dynamics GD300 wearable computer.

COMMERCIAL POTENTIAL/DUAL-USE APPLICATIONS:

Technologies developed in this proposed effort will be directly applicable to security, law enforcement and homeland security missions including border patrol and counter narcotics missions. They can also be used for emergency response to provide a common operating picture and customizability to rescue personnel.

The commercial potential of We-Share is derived from the emerging need to integrate human intelligence and coordinate distributed action. Many commercial applications have been imagined that harvest and integrate dynamic human feedback from cell phones, social networking sites, focus groups, blogs, on-line opinion polls to form solutions to multi-scale problems. We see We-Share and our related graphical user interface (GUI) products providing the technical foundation for these commercial pursuits. The complete line of GUI products will leverage human insight for prediction, social problem-solving and decision-making. These tools have the potential to change the way communities, agencies, political and non-profit organizations address pressing issues affecting world societies– such as inflation, unemployment, natural disasters, climate change and energy sustainability.

KEYWORDS: Edge Enabled Systems, Mobile Applications, Application development, Intelligence, Surveillance, Reconnaissance, ISR, Situation Awareness

1 Identification and Significance of the Problem or Opportunity

1.1 The Problem

The community-oriented nature of recent US military operations has blurred the line between the battlefield and neutral territory. Warfighters at the “edge” of the network who are interacting with civilians, community leaders and adversaries need to adapt to changing situations that emerge in unconstrained environments. A successful mission may involve quick changes in tactics based on unexpected threats and obstacles. The Network Centric Operations concept aims to increase agility through the addition of distributed technologies and automated information sources. However this may actually result in information overload for the warfighter, complicating an already difficult mission. What the warrior at the edge needs is a means to acquire and manage the information most relevant to him at the moment, much like how we seek out information using the tools that make us most productive.

The primary objective of edge enabled systems (EES) is to provide greater situation awareness for dismounted soldiers and in turn greater understanding for the commander who provides mission intent and objectives. In EES the soldier is both the producer and consumer of information, and as such he plays a central role in forming shared situation awareness. Edge enabled systems seek to improve agility and adaptability by allowing the soldier to acquire realtime and relevant information he needs to accomplish a mission and (we argue) to configure how the information should be *processed* and *interpreted*. Since the soldier will often be on foot, accessing these capabilities through thin-client (mobile or web-based) systems is a necessity.

Providing low level intelligence, surveillance and reconnaissance (ISR) information such as enemy identity, location and track is the first step to information superiority for the soldier. However, low level information may have different significance depending on the commander’s intent and mission objectives. For instance, if the goal is to evade a group of insurgents in pursuit of a higher value target, the soldier or unit commander may only need to know if the group’s activities indicate a potential attack. However, if the group of insurgents is the soldier’s primary target, he would benefit from additional interpretation of the group’s evasion techniques. Therefore having only the facts about location and movement may not be sufficient for situation understanding.

The recent wave of collaborative situation awareness and visualization tools such as CPOF, TIGR and the crowdsourcing tool Ushahidi have provided the military and crisis responders with sophisticated means to share information and visualize a situation within a common operating picture (COP). Thanks to these tools, collective *sensing* has been achieved through collaboration across organizations and military echelons. Combining data fusion and collaborative visualization tools has provided ISR that enables soldiers and commanders to see where coalition forces and enemies are located, determine the trajectories of attacking forces, and sometimes even determine the enemy’s activities. However, high level fusion has not yet caught up with the advances in low level fusion, leaving interpretation up to the individual. This means that each person viewing the common operating picture may have a different interpretation of the information’s significance, leading not to shared understanding but potentially miscommunication and misdirected resources. If a true COP is desired, such that the commander sees what the soldier sees and the soldier understands his commander’s mission objectives within the context of the COP, a means for organizations to collectively interpret a situation is needed to fill the gaps in reasoning technologies.

1.2 The Opportunity

We propose to develop a framework that will leverage and enhance warfighter acumen. Using our envisioned system called *We-Share*, warfighters will develop, extend and combine ISR applications for their current mission. Situation awareness and response time will improve through sensing and reasoning applications that evolve out of the common needs of individual soldiers. In addition to improving access to information for the dismounted soldier, our approach to EES will increase the *relevance* of incoming information to a soldier's mission by allowing them to customize how the information is *acquired*, *processed* and *interpreted*.

Direct Access to the Soldier's Collective

Dismounted soldiers will use We-Share to access information sources and applications using a thin-client interface to a storehouse located within "the cloud" (in other words the data's specific location is irrelevant to the soldier). Information sources may include sensor output, streamed reports, text message alerts and "live" experts such as commanders, analysts and other soldiers. The warfighter's community may provide insights into developing situations and help form shared situation awareness. For instance, imagine that a Coast Guard observes a vessel with unknown insignia. Using a wearable computer interfacing the Joint Unified Multi-capable Protection System (JUMPS) the We-Share user would post a picture of the insignia to the *Unknowns* section of *We-Share*. An officer familiar with this insignia might provide the origin and meaning of the insignia and remove the picture from *Unknowns*.

Evolving Functionality

While every situation a warfighter encounters is unique, there may be commonalities between them that can be abstracted to inform future missions. Similarly, the applications developed to address novel situations are likely to have generalizable functionality. For example, suppose that a Coast Guard using *We-Share* composes a simple application to filter out information about fishing boats less than 15 feet but to infer the identity and intent of fishing boats between 20 and 30 feet. In another situation, a Guard creates an application to infer the intent and origin of fishing boats under 20 feet. The two applications may use similar reasoning to infer intent, which can be extracted and combined to form a more general application template for inferring surface vessel intent (i.e. by forming variables for vessel size, contents, flags and markings, speed and track, etc.). Alternatively, the two applications could be combined to create a single application for monitoring harbors.

Over time, fundamental application templates that encapsulate commonly needed functionality will emerge from the *collective*— composed of warfighters with overlapping needs and experiences. These in turn will be adapted to address new situations. In this manner, *We-Share* will enable stages of continual application evolution:

1. *Seed*: A warfighter develops an application for a need that has not yet arisen or that he did not find in the "cloud." The seed developer pushes the app to the cloud for reuse.
2. *Customization*: A warfighter retrieves an application that he developed for a different situation or that someone else developed. He adapts the application for his current needs and pushes the adaptation back to the cloud. Alternatively, he combines two applications, each of which provides partial functionality.

Each warfighter at the edge is a member of a networked community containing his unit's members, commanders and other individuals with access to the secure network. This "collective" is accessible through the "cloud" as are all applications and unmanned information sources. When a warfighter needs

an application he will briefly describe what he needs using his wearable computer. If an appropriate application is available *We-Share* will push the app to the soldier. If not, the soldier creates a new “seed” application and adds it to the cloud. This application may be customized by other warfighters and returned to the cloud. The first fielded version of *We-Share* will be seeded with basic applications appropriate for the domain.

Remotely Developing Multi-level Fusion Applications

In order to more fully understand their dynamic environment warfighters we will produce the *We-Share* Remote Developer Kit to create fusion applications that interpret incoming data. In automated sensor fusion applications there are multiple fusion levels of increasing abstraction. Likewise, the warfighter will create fusion applications that provide increasing levels of functionality.

1. *Acquisition*: The first step to building situation awareness is determining and accessing the data sources needed to achieve a mission (including people, sensors, reports, stored digital information, etc...). The warfighter may configure connections to his own data sources (such as a video feed or motion detector) or he may utilize sources available wirelessly through the cloud. The RDK will create a placeholder for each data source.
2. *Processing*: This level of functionality is roughly equivalent to levels 0 (Sub-object assessment) and 1 (object assessment) data fusion¹. The *We-Share* RDK will assist the app developer in configuring various processing tasks such as translating the raw data into a desired format, applying filters, discretizing analog data as necessary and detecting objects and simple patterns.
3. *Interpretation*: This level of application functionality corresponds to levels 2 (situation assessment) and 3 (impact assessment) fusion tasks. Remote app developers will build reasoning models using mechanisms available to them from the cloud. This approach will enable developers to build intelligent applications using basic deterministic rules and more sophisticated probabilistic rules for dealing with uncertain environments. The *RDE* will assist app developers in using the GUI for building graphical models representing their reasoning problem without requiring the developers to understand the mathematical foundation that enables inference.

Scaling Access to the Collective

As the size of the warfighter network, or “cloud” grows, so does communication complexity if each individual has direct access to everyone else. To increase scalability we propose a semi-distributed communication approach in which an *We-Share Matchmaker* agents monitor the activity of and manage application and information sharing for tight networks of individuals. The agents will share information and apps relevant to other agents, leveraging the viral nature of social networks in which high value information spreads rapidly throughout loosely connected individuals.

to spending our research efforts on new methods to ensure secure communication, we propose to develop our EES for mobile devices that will allow secure access through at least two GOTS/COTS mobile platforms. Android has been selected by the Army for the Joint Battle Command-Platform (JBP-C Handheld)² framework.

¹ Steinberg et al. Revisions to the JDL data fusion model. In Proceedings of SPIE (1999)

² Claire Heininger, Army develops smartphone framework, applications for the front lines. <http://www.army.mil/article/55096/army-develops-smartphone-framework-applications-for-the-front-lines/>

1.3 Details of The Technical Approach

Cornerstone Technologies for a Light Weight Cognitive Edge Enabled System

The following three technologies were developed by in prior programs and will be used to bootstrap *We-Share* development.

1. Graphical User Interface

In an ongoing contract has developed a tool for collective problem solving for a DARPA SBIR Phase II program entitled *Massively Distributed Problem Solving*. The **GUI** is motivated by the “wisdom of the crowds” philosophy that proposes that a solution can *emerge* from a large, diverse group that is superior to a solution formed by a small group of individuals. The **GUI** framework’s minimalist design provides building-blocks for problem solving while encouraging the emergence of new problem-solving processes. **GUI** enables users to collaboratively decompose complex problems into manageable components and work on these components asynchronously. It then recomposes the components to form a *collective* solution (also called solution fusion) from the diverse contributions and feedback of many problem-GUIs. The **GUI** framework will manage the complexities of coordinating and integrating distributed knowledge sources, allowing people to concentrate on what they do best – reason about problems matched to their intuitions, skills and experiences.

GUI will form some of the foundation for *We-Share*. In particular, the tools developed to elicit problem definitions and explore the solution space can be used to elicit and build reasoning applications for situation awareness. In addition, the mechanisms for solution fusion form the basis for automated application abstraction.

2. Cognitive Decision Support Toolkit (CDST)

We-Share developers will create rule and reasoning applications that extend a Bayesian architecture developed for situation awareness and distributed decision support problems. *CDST* employs three cognitive levels of representation, combining three of the most powerful forms of knowledge representation in AI. At the top level, schemas encode cognitive “design patterns”, i.e., patterns for the large scale organization and interpretation of sensor data to derive information. Domain knowledge is encoded at the middle level into probabilistic rules and probabilistic facts Finally, this general time-independent domain knowledge is dynamically compiled into Situation Specific Bayesian Models (SSBM) at the bottom level using an algorithm called Knowledge-Based Model Construction (KBMC).

The NETT Warrior end user device (EUD) is a Sony tablet that lets people send e-mails and other data. The Blue Force Tracker (BFT) display is a color moving digital map that shows the precise locations of buildings, roads, fellow soldiers (blue) and known enemies in red. If images from a drone are available the BFT can be displayed on the image. Once the EUD is connected to a AN/PRC-154 Portable Rifleman Radio (PRR) or other tactical radio, the soldier can exchange text, imagery, and other ISR data with others on the battlefield, as well as gain access to the Tactical Internet to access streaming video from unmanned aerial vehicles. The radio interface kit (RIK) docks onto the bottom of the so that as radio networks change, the EUD computer does not have to be replaced, instead you can just modify the RIK itself.

The EUD is a Swiss Army Knife packed with intuitive Smart Phone features the troops want and need. The EUD with rechargeable battery is a great piece of equipment because the soldier can see and dissect the info he needs, securely transmit that information to other soldiers in a way that is easy to read by

looking at the markings on the display even in the heat of battle, in bright sunshine, at night, when hunkered down or crawling. The Android operating system enables the army to add and delete commercial and military software programs, including the Tactical Ground Reporting System (TIGR).

Graphical Remote Developer Kit

The *We-Share* RDK will enable the warfighter to create applications on a handheld computer. The desktop RDK will enable a subject matter expert (SME) with very little programming experience. The developer begins by loosely defining the components of the problem he is trying to solve. This may include sensors supplying incoming information, output states that the application should be detecting (such as 'normal', 'corroded', 'frozen'), and a brief description of the application's functionality. The developer then specifies any functions needed to process incoming raw values, such as any signal processing, smoothing and conversion to discrete values (such as 'low', 'medium' and 'high'). Finally, the developer graphically defines the relationships between the variables, processing functions and output variables using block diagrams. For instance humidity and temperature may first be converted to discrete variables. If humidity is 'high' and temperature is low the chance of 'frozen' is increased. The developer may annotate the relationship deterministically, in other words low temperature and high humidity means that 'frozen' is true. However, the more realistic situation is that the probability of 'frozen' is increased but not certain. The RDK, backed by CDST, allows both deterministic and probabilistic rules. Deterministic rules may be appropriate in some situations and can be evaluated quickly. Figure 1 shows a screenshot of the desktop RDK with a partial model for applying a smoothing function to a number of data channels and then converting the average to Fahrenheit.

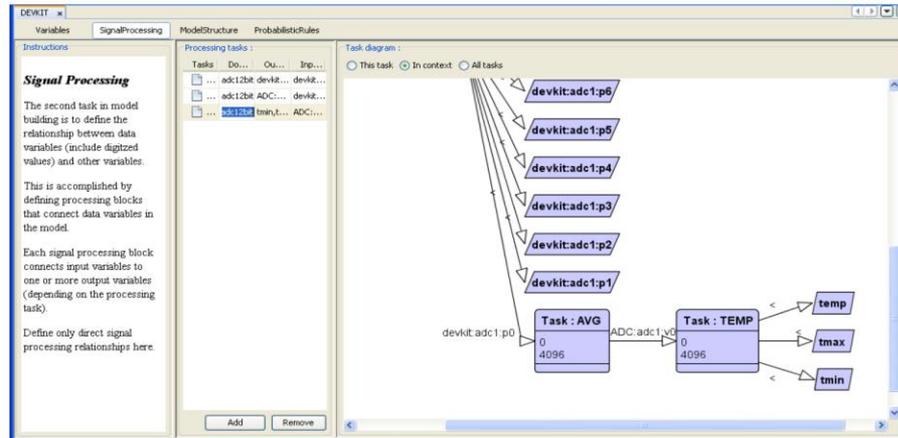


Figure 1 Screenshot of the existing Desktop RDK for creating fusion and reasoning models.

The handheld RDE will borrow visual concepts from Lego® Mindstorms programming environment called NXT. The environment, designed for non-programmers to develop robot control programs, is highly graphical. Programmers select buttons with icons to insert variables, control statements and functions and link them together graphically³. Figure 2 shows a mock-up of the proposed *We-Share*'s RDK within the EUD device. As in NXT, the program components are added graphically using icons.

³<http://www.mindstorms.lego.com>, http://www.ortop.org/NXT_Tutorial/

Selecting *Input* brings up three ways to acquire input: from a wireless sensor, from “the cloud” and from a camera (others may be available in a RDK prototype). Selecting one of these options will bring up further options for acquisition. Once acquired, the input will become a blue oval in the diagram representing the task called “HarborWatch”. The green diamonds are added using the *Fn* button (for function). The yellow rectangle is added using the *Rule* button.



Figure 2: Mockup of We-Share's RDK on a Smartphone.

The buttons along the top of the mockup in Figure 2 access *We-Share* functionality outside of the RDK. The following describes each button:

***FindApp*:** If the *FindApp* button is toggled, *We-Share* will seek out apps (containing one or more tasks) in the cloud that have significant similarities to the soldier's current task. Similarities may be found in the task description, variable names, inputs, outputs or the structure of the reasoning problem. The developer can grab part or all of a retrieved app and customize it or combine it with his current app simply by selecting a sub-graph from one app and connecting it to nodes in another app. Several existing model scoring mechanisms will be compared to develop an algorithm that searches by structure, including motif discovery⁴, maximum likelihood estimation⁵ and Bayesian scoring⁵.

***Alerts*:** The *Alerts* button will display current alerts and allow the warfighter to submit critical observations that are of value to others in his network.

***UNK*:** The *UNK* button is for viewing and adding open questions and issues submitted by anyone within the network. Once an issue has been answered or clarified, it can be used in an application or moved to the *COP*. Information in the *Alerts* and *UNK* displays that are sent to the warfighter will be targeted to his situation and expertise. *We-Share* will increase its awareness of warfighters using initial interviews and continually mining the apps that they use and create.

***COP*:** The *COP* button displays the current common operating picture in a geographic or spatial display (available through a third party application such as TIGR). These *We-Share* features will provide bi-directional access from each warfighter at the network's edge to his collective.

⁴ Matsuda H, Taniguchi F, Hashimoto A. An approach to detection of protein structural motifs using an encoding scheme of backbone conformations. *Proc. of 2nd Pacific Symposium on Biocomputing*: 280–291, 1997.

⁵ Serafin Moral. Learning Bayesian Networks 4: Score+Search Methods, August 2003, <http://www.dina.dk/phd/s/s6/learning4.pdf>.

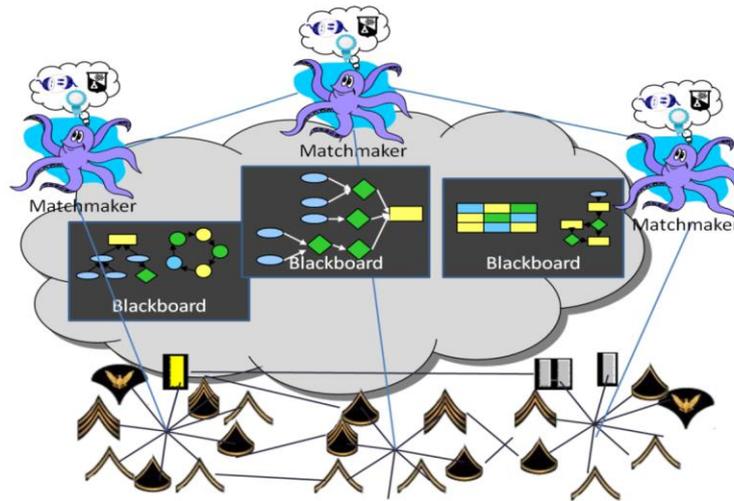


Figure 3: Conceptual *We-Share* architecture. The Army insignias at the bottom represent individual soldiers and officers.

The *We-Share* architecture, shown in Figure 3, is based on a Blackboard fusion architecture developed for an Army Phase II SBIR. The architecture is also being extended for large scale human problem-solving in a DARPA SBIR Phase II. The original blackboard architecture was designed to enable many independent “knowledge sources” to work in parallel on different parts of a problem, posted on the blackboard⁶. In the same manner, *We-Share* networked users will post apps and related issues to the blackboard, giving access to other individuals that have a need for or something to contribute to the applications.

The management and control of information and application exchange will be managed by Matchmakers— automated agents that oversee the activities of a tight network of warfighters. Matchmakers will enable scalability and rapid sharing of information by leveraging the effects of social networking. Each matchmaker will act as the center for group of individuals with high *cohesion* (measure of the connectedness of a group of individuals)⁷. Matchmakers will be connected to each other and may share applications and information they see as significant (due to its popularity within a network). In the same way that catchy memes spread rapidly throughout social networks, clever apps or important information will spread throughout the warfighter network. As the network grows, higher level Matchmakers could be added to manage large numbers of Matchmakers interfacing with individual soldiers. The “cloud” is composed of the soldiers and the information and applications they share.

Matchmakers will have a number of roles that help provide the warfighter network with greater functional structure than a social network such as Facebook.

⁶ Corkill, D. Blackboard Systems. *AI Expert*, 6(9):40-47.

⁷ Wasserman and Faust (1994). *Social Network Analysis*. Cambridge: Cambridge University Press.

Application Fusion

Application fusion will automatically combine the functionality and reasoning of multiple applications. The need for fusion derives from the fact that different sources may agree or disagree on an observation and its implication. In application or model development, a number of slightly different situations may result in duplicate functionality and wasted effort if a new application is created for each situation. *We-Share* will address these issues using a combination of fusion mechanisms.

Our approach to address consensus is based on a hybrid of Bayesian reasoning and Dempster Shafer theory. Prior work has developed an aggregation approach that ensures that all significant beliefs are maintained and information loss is reduced⁸. Similarly, conflicting interpretations can be combined in a reasoning model, enabling all possible outcomes to be considered.

Application fusion can also be applied to more traditional imperative programs or deterministic rules. Since each application can be represented as a tree or graph, *We-Share* will automatically combine functional subgraphs that are complementary or frequently used together. The search methods used for the *We-Share* RDK *FindApp* feature can also be used to identify candidates for fusion.

2 Phase I Technical Objectives

Phase I will be dedicated to developing a feasibility study to ensure that an effective framework can be built that enables warfighters at the edge of the network to develop and customize their own acquisition and reasoning applications. Since the feasibility of some of the core functionality (in particular graphical programming and collective reasoning) has been tested in previous contracts, we will be able to focus on more advanced features of our approach in the first Phase.

1. **Develop an architecture that enables shared access to evolving ISR applications:** The *We-Share* framework will need to be effective for remote warfighters with no access to the “cloud” as well as providing supporting access to the soldier’s network when available. This means that core functionality must be accessible on the device, enabling the warfighter to use local sensors and other information acquisition tools (such as cameras) as well as providing seamless access to information and tools when connected to the secure network. A core component of the architecture will be Matchmaker agents that manage communication, encourage application reuse and enable scalability. In Phase I we will define the roles of the Matchmaker and develop a demonstration of core *We-Share* functionality.
2. **Develop a prototype RDK for Android handheld devices:** A key challenge of this objective is to ensure that the remote developer kit provides access to rich functionality while being easy to understand and use in a small handheld device. In particular, the applications that warfighters develop will involve not just information acquisition, but how to use that information to make inferences about the current situation. Typically models for high level fusion and reasoning require understanding in the core mathematics. However, these models can also be a natural way to graphically represent a reasoning problem. The prototype will demonstrate powerful reasoning capabilities while “hiding” the tedious mathematical foundation from producer/consumers.

⁸K. Greene, Collective belief models for representing consensus and divergence in communities of Bayesian decision-makers. Doctoral dissertation, University of New Mexico, 2010.

3 Phase I Work Plan

Tasks

1. *Requirements*: Develop *We-Share* requirements with help from the Army.
2. *Research*: Investigate existing tools and reasoning models for ISR, algorithms for model and application comparison, and graphical approaches to application development
3. *Prototyping*: Develop mockups and software prototypes for *We-Share* RDK interface and Matchmaker functionality including application retrieval algorithms and application abstraction mechanisms.
4. *Demonstrate*: Demonstrate the soldier’s workflow for creating an ISR application using the RDK and the supportive role of the Matchmaker. For the Option we demonstrate additional functionality using a scenario relevant to JUMPS
5. *Program Management*: Kickoff, regular progress reports and frequent discussion with Army representative.

Milestones

K= Kickoff

D= Demonstration and final briefing

S= Status report

F= Final report

Schedule

Month	1	2	3	4	5	6	7	8	9	10
Requirements										
Research										
Prototyping										
Demonstration										
Program Management	K		S			FD				FD

4 Related Work

Our company is known for its foundation work to place embedded sensors and electronics in systems to intelligently acquire data for recording, analysis and prognostication. The following are contracts that relate directly to this proposal.

DARPA SBIR: Massively Distributed Problem Solving

The *GUI* is motivated by the “wisdom of the crowds” philosophy that proposes that a solution can *emerge* from a large, diverse group that is superior to a solution formed by a small group of individuals. We believe that if society is given a sufficient framework and appropriate incentives to solve problems, they will be able to collectively solve many of the world’s difficult problems. The *GUI* motivates large groups of problem GUIs to 1) decompose complex problems into manageable components, 2) asynchronously solve these components, and then 3) recombine them to form a collective solution integrating all significant points of view. The goal of the project is to develop a simple, flexible framework that will enable users to solve problems using social networking tools and features that they are already familiar with. Problem-GUIs will be able to extend the framework as they see fit- forming an emergent system from the synergies of social-networking technology and human ingenuity. The *GUI* research and development is ongoing.

Army SBIR Phase II, Evidential Reasoning for Collecting Signals Intelligence

This SBIR research is to develop a cognitive framework and toolset for processing Signals Intelligence (SIGINT) data. The architecture will have a solidly theoretical foundation with a Turing Complete Bayesian Inference Calculus for fusing data into higher and higher distillations not just collecting it. The toolset will work by using evidential fusion in combination with frames of reference to pick out important features and patterns in a track and test them against hypotheses to identify the track develop an understanding of its meaning in the context of current operations. The toolset will be used to support the work of SIGINT operators as they evaluate tracks for patterns and trends in support of the detection, identification, and tracking of potential threats.

USAF SBIR – Cognitive Decision Support Toolset (CDST)

This contract developed an exciting new methodology that provides mechanisms for the effective transformation of data into information and the dynamic integration of information into higher-level cognitive structures for decision support, situation assessment, and decision-making. CDST employs multiple cognitive levels of representation, combining three of the most powerful forms of knowledge representation in AI. At the top level, schemas encode cognitive “design patterns,” i.e., patterns for the large-scale organization and interpretation of information. Domain knowledge is encoded at the middle level into probabilistic rules and probabilistic facts in a first order probabilistic logic with recursion called Loopy Logic.

4.1 Related Work by Others

Blackboard Architectures

A Blackboard is a centralized approach to describe a problem format that needs to be solved using a common communication, but enables individuals to work on the problems in a distributed fashion using their own preferred techniques. A Blackboard architecture is framework for enabling multiple knowledge sources to work asynchronously on several aspects of a complex problem⁹. The blackboard architecture concept is easy to visualize as a group of experts or specialists watching information being posted onto a blackboard. New information can be used to help other problem-GUIs work on their parts of the problem. A Bayesian blackboard enables problems to be solved involve forming and proving hypotheses about possible eventualities based on the incoming data. The Bayesian blackboard combines knowledge sources that handle inference at many levels of abstraction, including low-level fusion such as object detection and feature classification, to higher-level reasoning about relationships, intent and behavior. Bayesian reasoning forms the foundation for decision networks (also known as influence diagrams) that will be included as a problem-solving technique for We-Share.

Group Decision-making

Computer supported collaborative work and group decision support systems focus on group decision-making that utilizes computer technology to assist in decision-making tasks such as enable communication and information sharing, mediation, knowledge management and synthesis. Some tools have focused specifically on problem solving and decision-making. Many of these systems do not provide explicit problem-solving tools but instead provide a common visualization for distributed individuals and a means of providing feedback on the visualization.¹⁰¹¹

⁹ Corkill, D. Blackboard Systems. *AI Expert*, 6(9):40-47. 1991.

¹⁰ General Dynamics. Command Post of the Future, information brochure. 2008.

These are just a few of many computer-based systems for collaborative problem solving. These tools are for use in small groups and as such do not need to deal with the complexities brought about by massive-scale problem solving. Nor do they stimulate the emergent behavior that can come about by leveraging the wisdom of the crowds.

Social/Online Decision-making

In recent years web developers have leveraged the communication power of the internet to develop applications that harvest the “wisdom of the crowds”, also known as “crowd sourcing” to solve problems that require human insight. *Wikipedia* has become the classic example of using crowd sourcing to generate knowledge. Despite naysayers’ expectations that *Wikipedia* would not have sufficient quality to be used for significant reference activities, it has become the first place many individuals- researchers, professionals and laypeople go to gain an understanding on a topic and to find resources.

A new type of crowd-sourcing method has arisen in recent years in which people are tasked to do simple tasks that help identify images, scanned text, common sense knowledge and other information that is difficult for machines to understand. Several games utilize a game style-interface to add a fun and competitive edge to an otherwise mundane task, such as image recognition (*Peekaboom*, *ESP*, *Squigl* and *Phech*). Similarly, *Captcha* [captcha.net] integrates text recognition into user verification tasks and helps machines understand enormous amounts of scanned text that would otherwise be very expensive and time-consuming to process. These tools all aim to reduce the expense of hiring experts to input common knowledge and human inference into computational systems using ingenious, simple interfaces that are easily accessible.

Amazon’s *Mechanical Turk* system uses crowd sourcing to enable people who need an online task completed to hire people inexpensively. Typically these problems are independent, basic tasks such as tagging and labeling an image (tasks similar to those described above) as well as finding information on the web and writing short reviews. Again, they reduce the cost to companies that need help on simple but labor-intensive tasks.

5 Relationship with Future Research or Research and Development

Our company has successfully launched its software products for real time prediction and situation awareness into a multi-million dollar business. We see *We-Share* as an extension of the existing *GUI* framework, enabling access and application development from warfighters (and other individuals) at the edge of their networks. The tools like *GUI* and *We-Share* that are built for real time (or real timely) cognition, reasoning and data fusion complement the social problem-solving area. The *We-Share* framework will integrate new and existing technologies and make them available to warfighter networks.

6 Commercialization Strategy

The commercial potential of *We-Share* is derived from and augments the commercialization strategy for the *GUI* (Section 4.1). Both answer the need to harvest and integrate dynamic human feedback from sources such as cell phones, social networking sites, focus groups, blogs, on-line opinion polls to form solutions to multi-scale problems. We see *We-Share* products changing the way communities, agencies, political and non-profit organizations address pressing issues affecting world societies such as inflation,

¹¹ Stock, C. et al. SIEVE: Collaborative decision-making in an immersive online environment. *Cartography and Geographic Information Science*, 35(2): 133-144. 2008.

unemployment, natural disasters, climate change and energy sustainability. The complete line of tools will leverage human insight for social problem-solving, decision-making and prediction.

Marketing Experience: Our company over twenty years in successfully commercializing products and we are skilled at adapting existing architectures and functionality to specific needs and domains.

Defense and Intelligence Markets: The largest market potential for *We-Share* is US military and intelligence applications. Almost every agency is seeking answers to help give our warfighters an information advantage to overcome the challenges of asymmetric warfare. Providing tools for warfighters to create their own information acquisition and reasoning tools will increase agility and reduce pressure on application developers who do not quite understand the situations that warfighters encounter.

International Product Sales: The market is not limited to energy conservation, and is readily expanded to federal agencies in other countries. In preparing for this proposal we investigated the commercial potential for the *We-Share* in collective decision-making for energy management and community environmental concerns. In researching the market need we met with federal facilities managers; public utility managers; and commercial building owners. We found significant cross cutting markets to use the line of products to provide shared situation awareness as a means to track, incentivize and achieve facility, utility and consumer goals and decision tools to aid in policy-making and implementation.

Federal Markets: We have investigated the potential of using AI to generate enthusiasm for energy saving programs with corporate managers. We found that managers of county governments welcome the opportunity to use AI to exploit “group twitter”, “suggestion box”, “focus forums”, and “energy cost savings program” that provide feedback for state, local, and community thrusts as well as pride. These facilities are typical of hundreds of federal, state, and local governments who will benefit by having employees and the public participate in joining in efforts to improve community spirit and quality of life through more intentional and effective decision-making.

Commercial Markets: Our market research found that corporations understand the potential economic and social benefits of collective sharing and collaboration in a net-centric, community-wide effort such as to achieve common goals of reducing energy bills. In the US the market extends to businesses and commercial property owners in thousands of towns, cities and regions which are affected by rising energy costs, costs of services and have desire to improve energy efficiency *as well as* increase the sense of public pride through opinion and information sharing. Again, the market extends to commercial enterprises in other areas and other countries that can benefit by social awareness and cooperative goal seeking. The market extends to any firm requiring opinions and feedback of new product thrusts, consumer desires and consumer usability.

Schools and Universities: The societal nature of public/private schools and universities make them natural markets for *We-Share* products; not only for group research projects, but to aid in the complex decision-making that is involved in educational institutions. For example, public schools are troubled with squeezing budgets reducing teacher pay and increasing classroom size, yet more demands to increase student performance. They need a better method for collective awareness and decision-making without increasing demands on teachers and administrators.

Public Utilities: One of the major difficulties that energy managers are faced with is encouraging consumers to reduce their energy use. Public utilities will use the technology as a way to tap into public opinions and provide problem-solving and tips for saving energy and reducing consumption. The

worldwide market of public utilities includes not only major utilities but also thousands of local energy cooperatives.

City, County and State Agencies: All public service agencies that need public feedback to make policy judgments will benefit from using the toolset to complement other social networking tools like Facebook disseminate information and gain input from their constituency. We see the potential for small and large agencies to utilize our framework and toolset to help make policy and handle emerging or critical situations such as response to natural disasters. The market is at least 10,000 entities in the US. There is at least another 100,000 in the world that would benefit.

7 Key Personnel

Principal Investigator

Education: Ph.D. University of New Mexico I

M.S. University of New Mexico, Mathematics and Computer Sciences.

_____ has developed software for almost 30 years. In the past 20 years, Dr. _____ has supervised all software research and development and is responsible for overall architecture for all company software products.

Recent Projects:

2012 - present Lead software architect, developer, and software manager for embedded and desktop systems for missile connector condition based maintenance.

2010 – 2012, PI and Lead software architect, DARPA Phase II, Social Network GUI.

2009 - 2010 Lead software architect, developer, and software manage for prognostic health management of radar systems.

2009 - 2010 PI for Navy SBIR “Cognitive Optimization Algorithms for Optimized Monitoring and Management”

2009 - present Manager and Developer of SBIR Army Ph II “Probabilistic Evidential Reasoning for Collecting SIGINT Data” software programs

2005 - 2008 Manager and developer of USAF SBIR Cognitive Decision Support software programs

8 Use of Foreign Nationals

Because of ITAR restrictions, we will not use foreign nationals without prior approval from the Army.

9 Facilities/Equipment

Our company is located in _____, _____. Our facility comprises approximately 5336 square feet of office space. Our equipment includes the computers, support software, high-speed internet access, and secure networking platforms with class 2 firewalls. Our facilities meet environmental laws and regulations of federal, __<<state>>__, and city of _____, governments for, but not limited to, the following groupings: airborne emissions, waterborne effluents, external radiation levels, outdoor noise, solid and bulk waste disposal practices, and handling and storage of toxic and hazardous materials.

10 Subcontractors/Consultants

None.

11 Prior, Current, or Pending Support of Similar Proposals or Awards

None.