

Space
Small Bu
Small Bu

April 1, 2015



SBIR/STTR Program Overview



- 1982 Small Business Innovation Development Act
 - Agencies with \$100M in extramural research must have SBIR
 - Agencies with \$1B in extramural research must have STTR
 - Competitively awards funding to small businesses
 - Focused on meeting governments' requirements for technology
- The program's goals are four-fold:
 - Stimulate technological innovation
 - Meet Federal research and development needs
 - Foster and encourage participation in innovation and entrepreneurship by socially and economically disadvantaged persons
 - Increase private-sector commercialization of innovations derived from Federal research and development funding

Total SBIR/STTR Investment NASA Compared to Other Agencies



SBIR/STTR Agency Funding ~2.6 B

SBIR and STTR	SBIR Only
DOD - \$1,000M	USDA - \$18M
HHS - \$697M	DHS - \$16M
NASA - \$191M	ED - \$13M
DOE - \$184M	DOT - \$8M
NSF - \$153M	DOC - \$7M
	EPA - \$4M

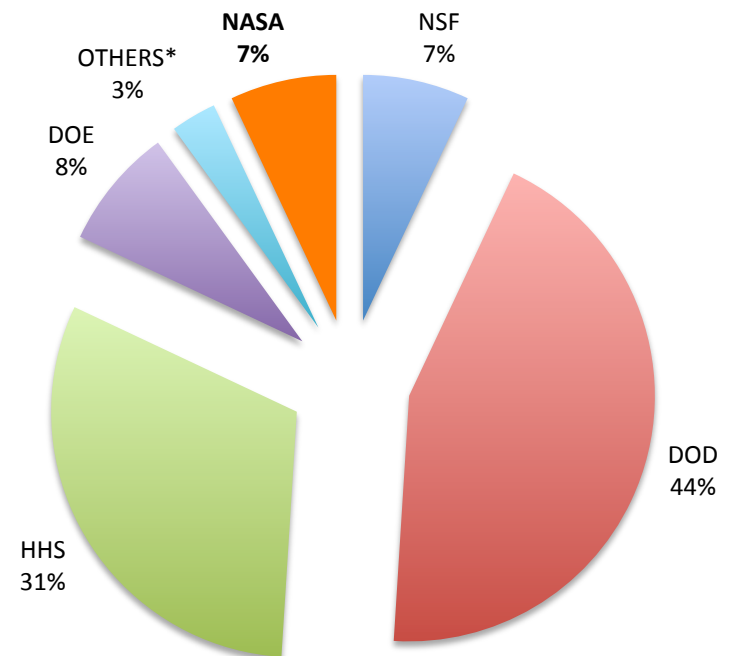
FY 2015:

- SBIR is 2.9% of extramural R&D
- STTR is 0.40% of extramural R&D

FY 2016:

- SBIR increases to 3.0%
- STTR increases 0.45%

SBIR/STTR Participation



*Others Indicate: DHS, DoC, DoT, EPA, ED, USDA

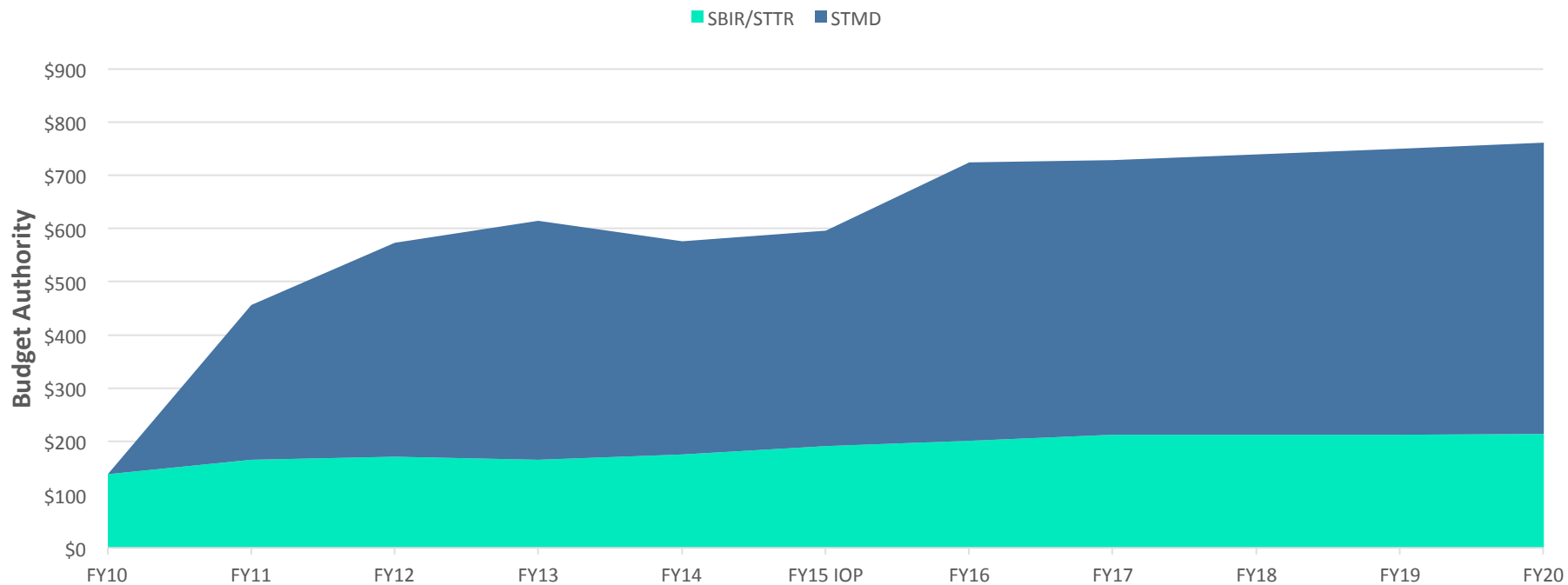


NASA SBIR/STTR Program Overview

- Agency SBIR and STTR Portfolios
 - \$190M+
 - Aligned with the technology needs of the MDs and Centers
- Within ARMD, HEOMD, SMD and STMD, SBIR investments:
 - Reduce risk
 - Improve schedule
 - Increase performance
 - Provide alternative solutions/fills technology gaps
- STTR is aligned with the STR TAs to address longer term technology needs and support Center competencies



NASA SBIR/STTR Budget



Budget Authority (\$M)

SBIR/STTR

% of Total Budget

STMD Total

Enacted

Proposed

Notional

FY10

FY11

FY12

FY13

FY14

FY15 IOP

FY16

FY17

FY18

FY19

FY20

138

165

172

165

175

191

201

213

213

213

214

NA

36%

30%

27%

30%

32%

28%

29%

29%

28%

28%

NA

456

574

615

576

596

724

728

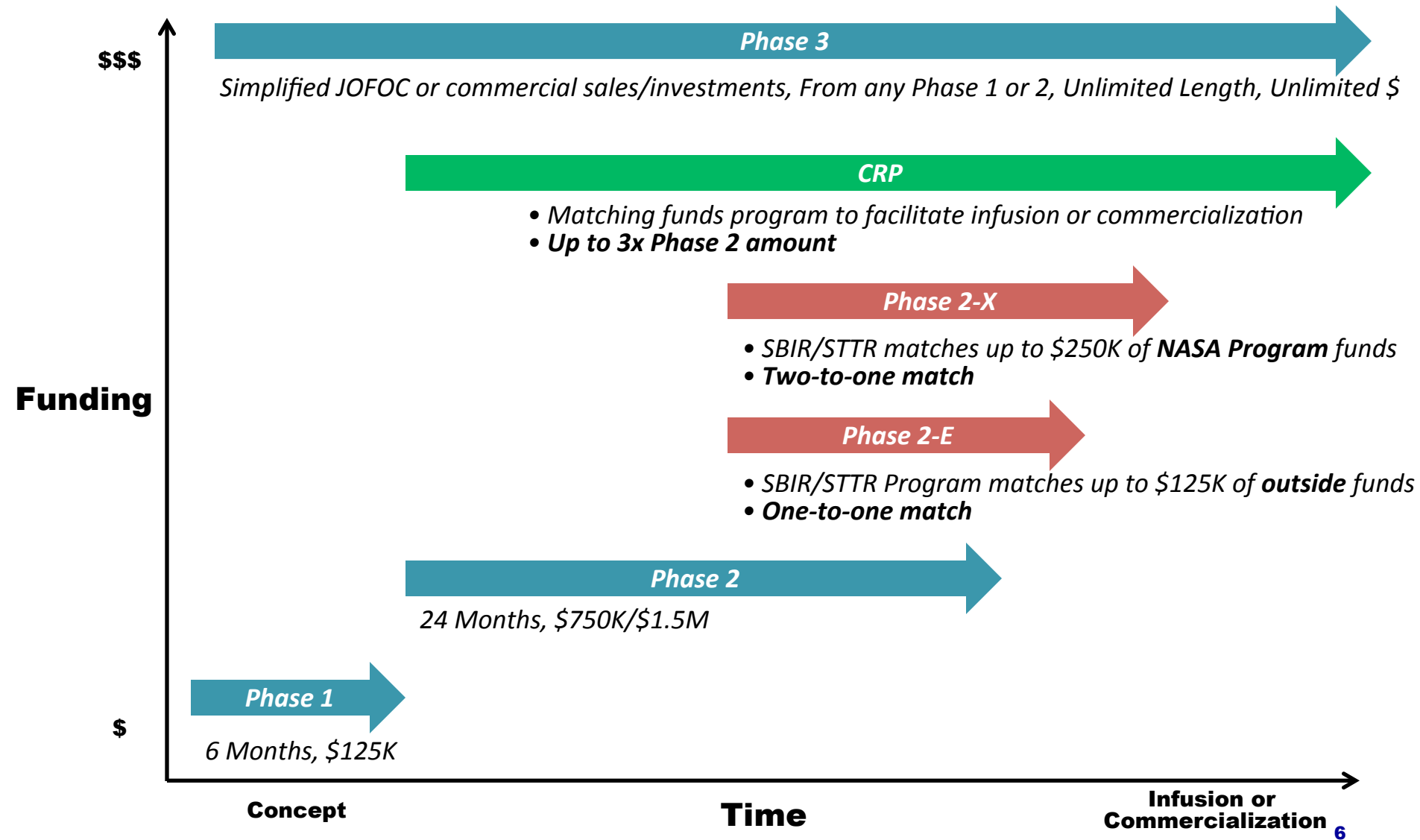
739

750

762



SBIR/STTR Integrated Portfolio



Solicitation Development



FY14: Fourth Quarter	November 2014	FY15: Second Quarter	FY15: Third Quarter
With Mission Directorates and Centers- define Subtopics for annual Solicitations	Released annual SBIR and STTR Solicitations	Phase 2 selections from FY 2014 Awards	Phase 1 selections from 2015 Solicitations
Phase 3 Identified Throughout the Year			

Examples of Topics from the 2015 Solicitations include:

- Integrated Flight Systems
- Space Transportation
- Autonomous and Robotic Systems
- Sensors, Detectors and Instruments
- Information Technologies

Review & Selection Process

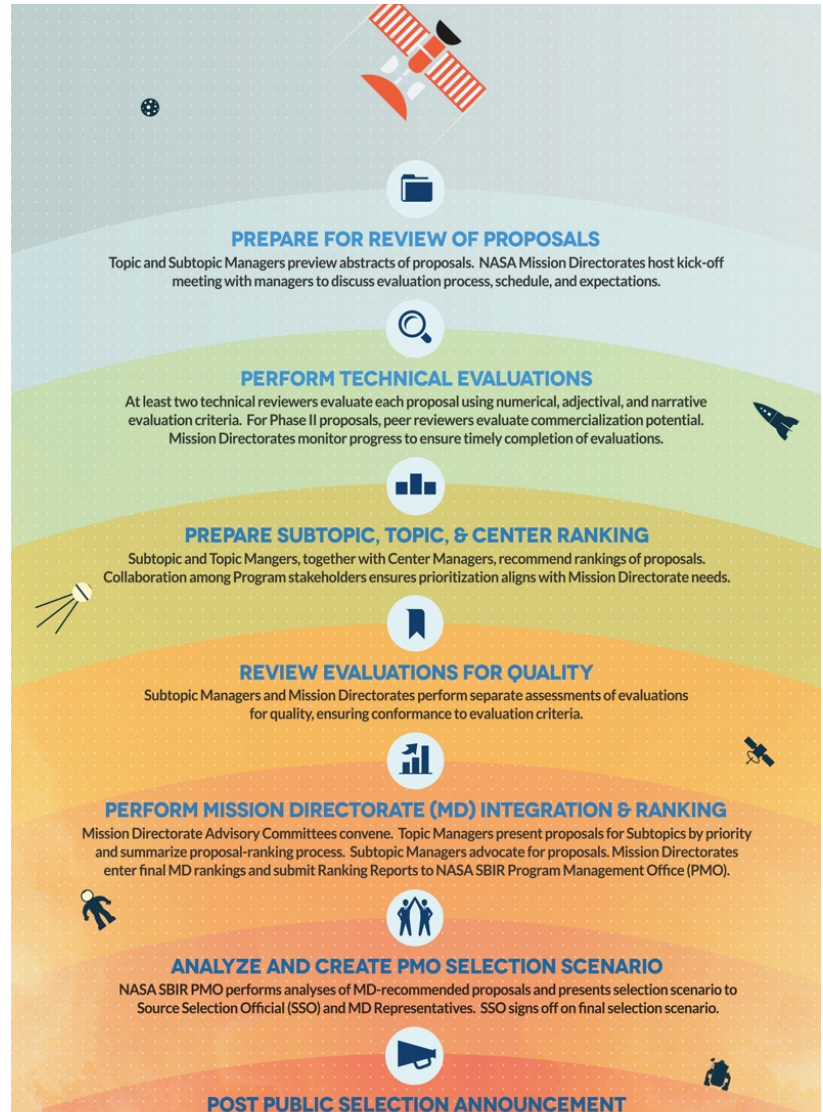


FY14: Fourth Quarter	November 2014	FY15: Second Quarter	FY15: Third Quarter
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Phase 3 Identified Throughout the Year

SBIR and STTR technologies continue to support numerous Space Technology projects including:

- Providing critical self-supporting multi-layer insulation into the Green Propellant Infusion Mission (Aspen Aerogels),
- Providing a cryocooler design for eCryo (Madison CryoGroup LLC.),
- Compact Iodine Hall Thrusters (Busek Company Inc.)





2015 SBIR Topics – No. of Proposals



SBIR Topic Title	No. of Proposals
A1 Air Vehicle Technology	106
A2 Integrated Flight Systems	60
A3 Airspace Operations and Safety	55
H1 In-Situ Resource Utilization	13
H2 Space Transportation	70
H3 Life Support and Habitation Systems	41
H4 Extra-Vehicular Activity and Crew Survival Systems Technology	23
H5 Lightweight Spacecraft Materials and Structures	50
H6 Autonomous & Robotic Systems	17
H7 Entry, Descent, and Landing Technologies	16
H8 High Efficiency Space Power Systems	29
H9 Space Communications and Navigation (SCaN)	36
H10 Ground Processing	8
H11 Radiation Protection	19
H12 Human Research and Health Maintenance	12
H13 Non-Destructive Evaluation	17
H14 ISS Demonstration & Development of Improved Exploration Technologies	39

2015 SBIR Topics – No. of Proposals (Cont.)



SBIR Topic Title	No. of Proposals
S1 Sensors, Detectors and Instruments	168
S2 Advanced Telescope Systems	35
S3 Spacecraft and Platform Subsystems	152
S4 Robotic Exploration Technologies	44
S5 Information Technologies	62
Z1 Advanced Power and Energy Storage Systems for Cross-Cutting Space Applications	12
Z2 Lightweight Materials, Structures, and Advanced Manufacturing/Assembly	12
Z3 Entry, Descent, and Landing	2
Z4 Small Spacecraft Technology	33
Z5 Assistive Free-Flyers	11
Z6 Advanced Metallic Materials and Processes Innovation	21
Total	1163

SBIR Select Topic Title	No. of Proposals
H20 Human Exploration and Operations Mission Directorate	8
S20 Science Mission Directorate	20
Total	28



2015 STTR Topics – No. of Proposals

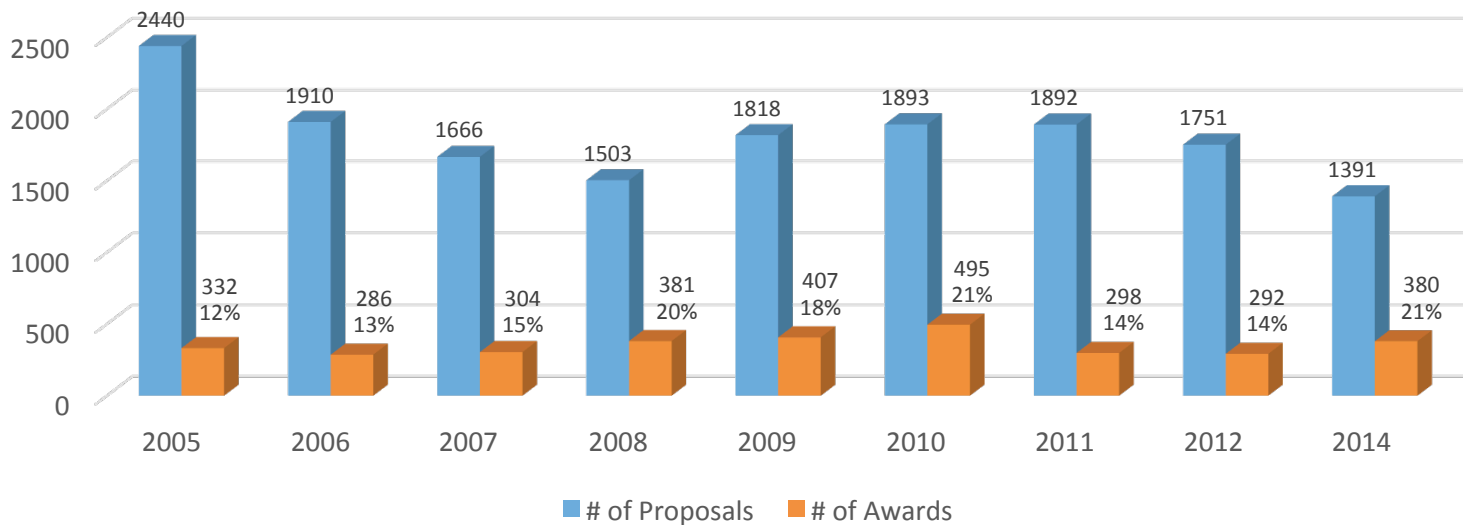
STTR Topic Title	No. of Proposals
T1 Launch Propulsion Systems	7
T3 Space Power and Energy Storage	5
T4 Robotics, Tele-Robotics and Autonomous Systems	12
T5 Communication and Navigation	4
T6 Human Health, Life Support and Habitation Systems	10
T8 Science Instruments, Observatories and Sensor Systems	12
T9 Entry, Descent and Landing Systems	7
T11 Modeling, Simulation, Information Technology and Processing	16
T12 Materials, Structures, Mechanical Systems and Manufacturing	29
T13 Ground and Launch Systems Processing	1
Total	103



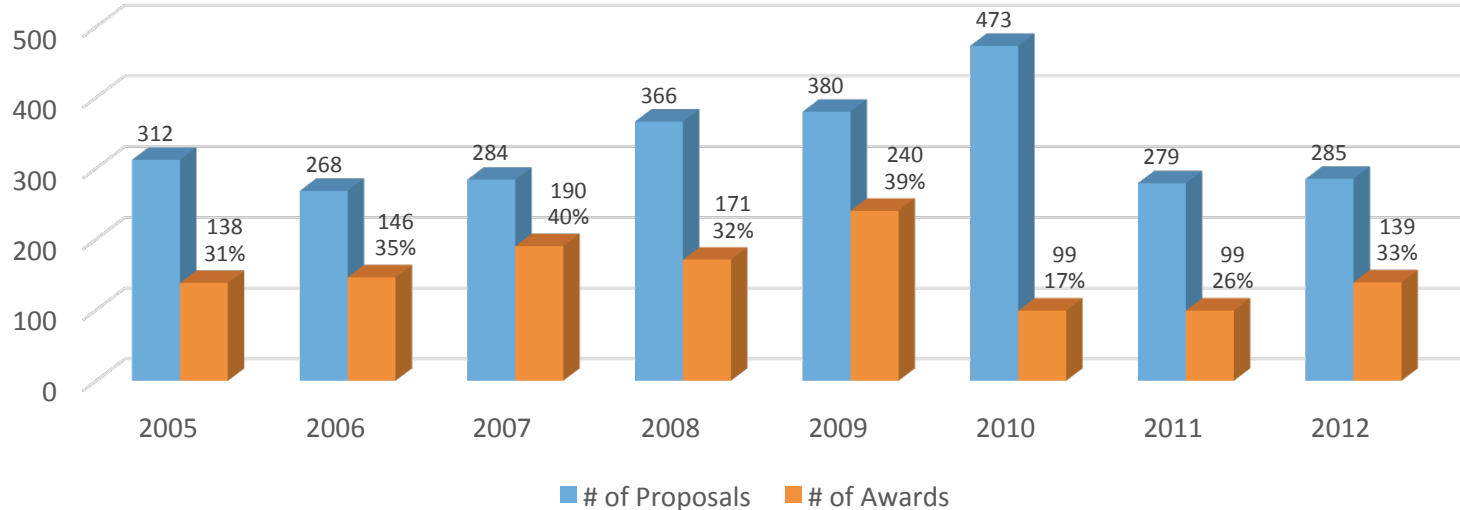
SBIR/STTR Proposals vs. Awards Stats 2005 - 2014



Phase 1



Phase 2



Statistics on SBIR Awards 2005 - 2014



SBIR

Program Year	Ph 1 Proposals	Ph 1 Awards	Ph 2 Awards	% of Ph 1 to P2	P2-E Awards	P3 Awards	% of Ph 2 to P2-E and P3
2005	2208	297	120	40.4%	N/A	14	11.7%
2006	1709	259	134	51.7%	N/A	26	19.4%
2007	1500	277	169	61.0%	24	43	39.6%
2008	1403	349	153	43.8%	18	25	28.1%
2009	1705	365	213	58.4%	16	37	24.9%
2010	1769	450	89	19.8%	25	29	60.7%
2011	1707	258	85	32.9%	10	13	27.1%
2012	1363	233	106	45.5%	N/A	4	3.8%
2014	1136	312	N/A	N/A	N/A	N/A	N/A

SBIR Select

Program Year	Ph 1 Proposals	Ph 1 Awards	Ph 2 Awards	% of Ph 1 to Ph 2	P2-E Awards	P3 Awards	% of Ph 2 to Ph 2-E and Ph 3
2012	143	26	10	38.5%	N/A	0	0%
2014	154	36	N/A	N/A	N/A	N/A	N/A



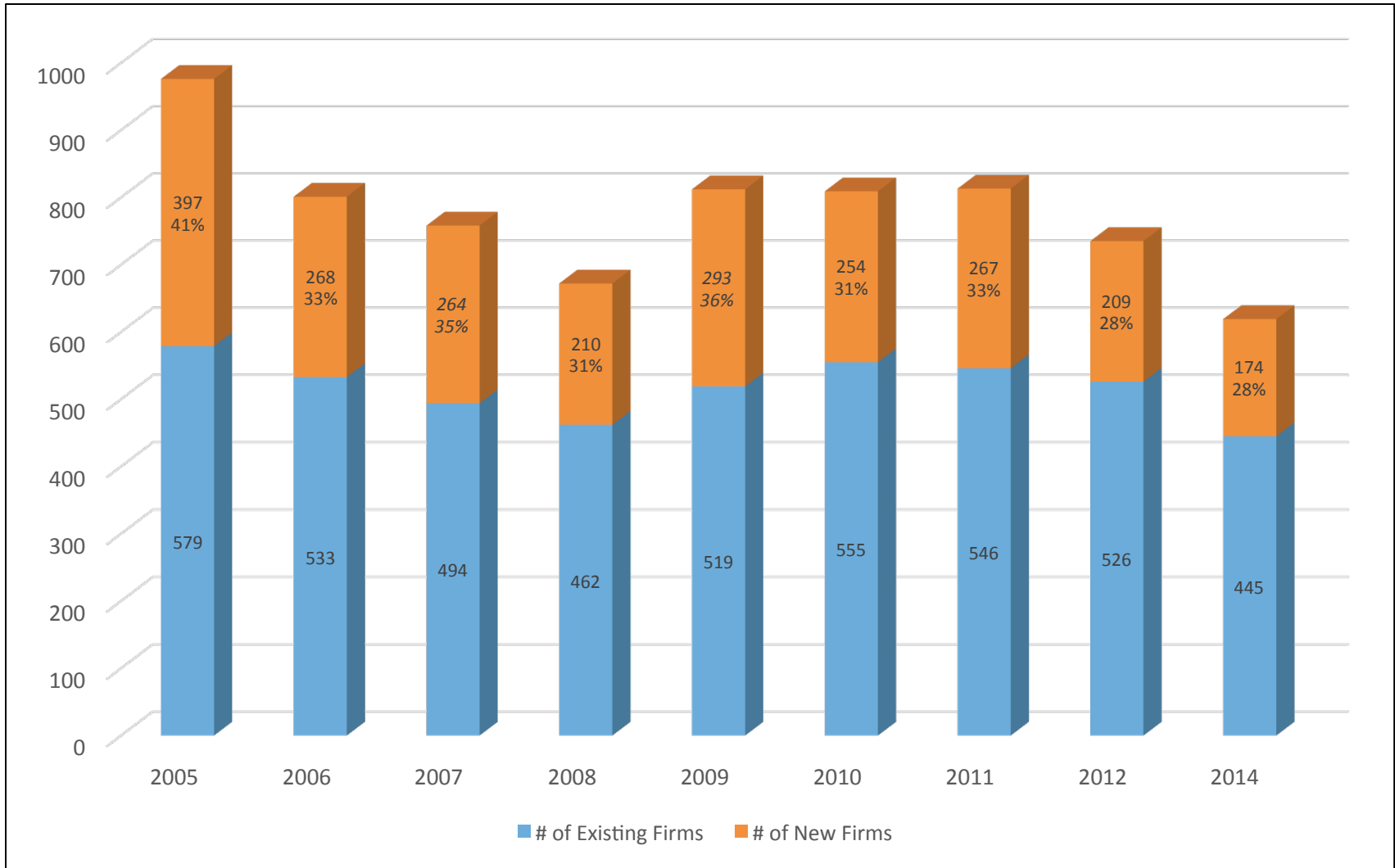
Statistics on STTR Awards 2005 - 2014



Program Year	Ph 1 Proposals	Ph 1 Awards	Ph 2 Awards	% of Ph 1 to Ph 2	Ph 2-E Awards	P3 Awards	% of Ph 2 to Ph 2-E and Ph 3
2005	232	35	18	51.4%	N/A	1	5.6%
2006	201	27	12	44.4%	N/A	1	8.3%
2007	166	27	21	77.8%	0	3	14.3%
2008	100	32	18	56.3%	2	1	16.7%
2009	113	42	27	64.3%	5	1	22.2%
2010	124	45	10	22.2%	1	2	30.0%
2011	185	40	14	35.0%	1	1	14.3%
2012	245	33	23	69.7%	N/A	N/A	N/A
2014	101	32	N/A	N/A	N/A	N/A	N/A

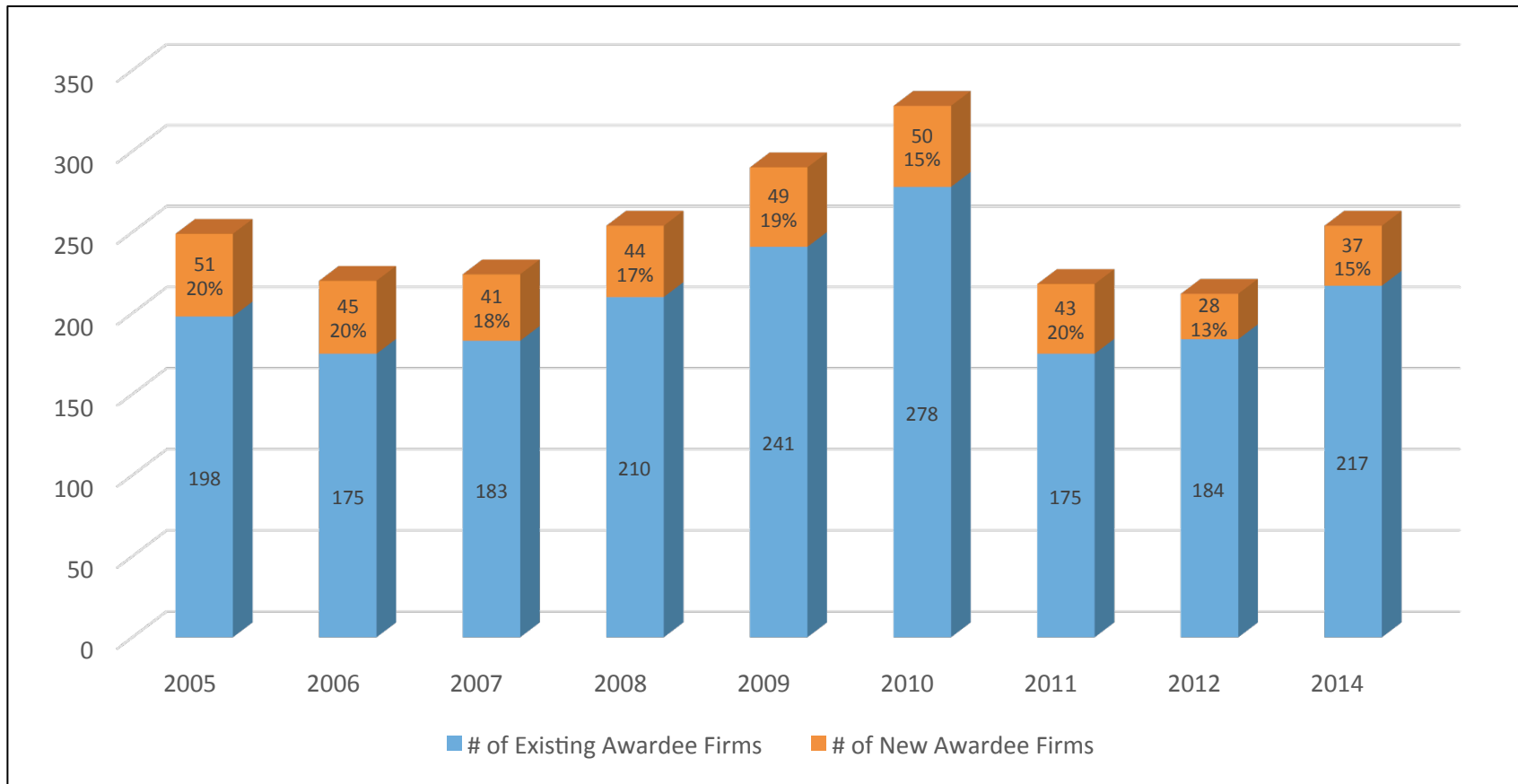


SBIR/STTR Phase 1 Proposing Firms by Program Year



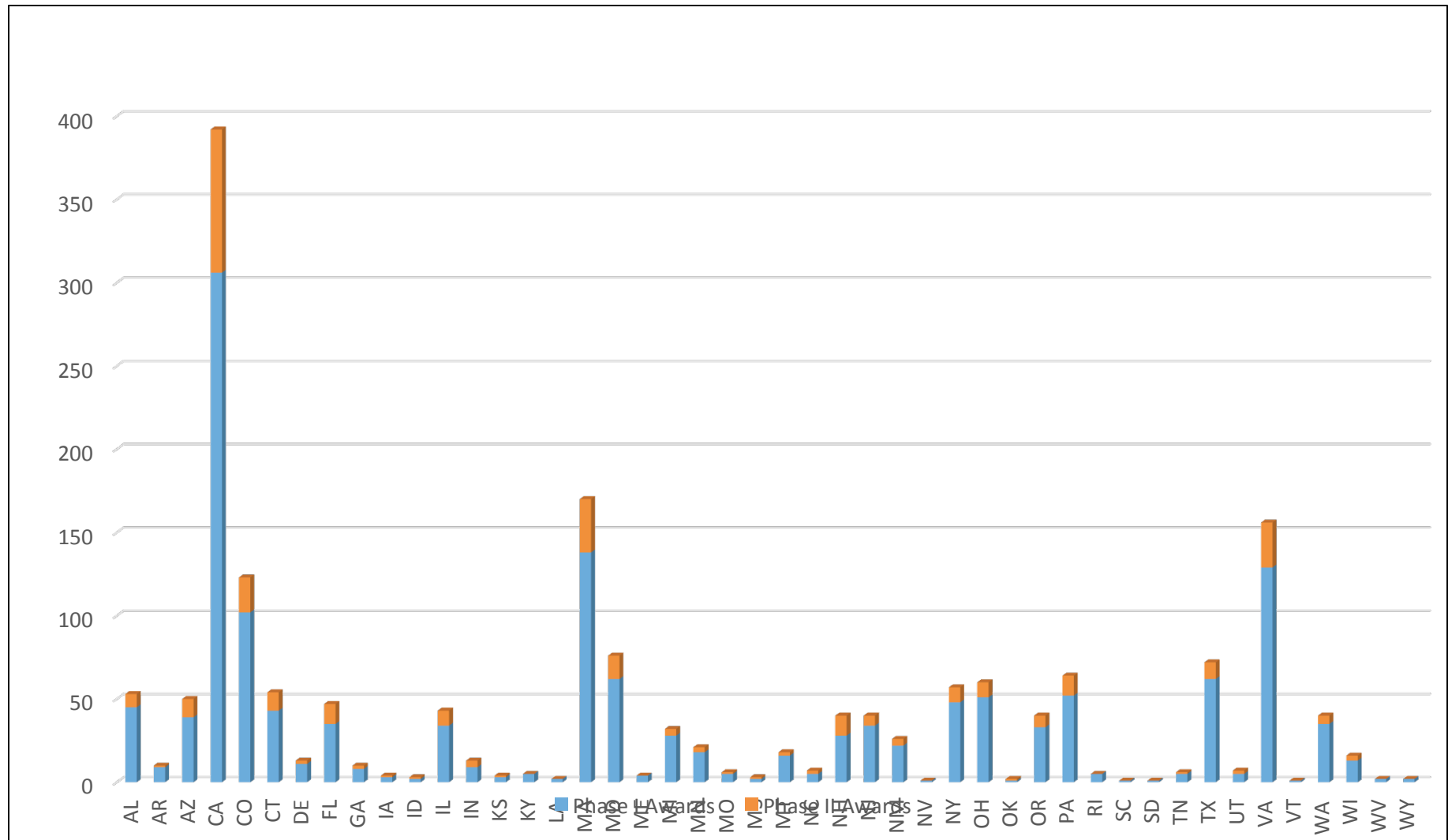


SBIR/STTR Phase 1 Awardee Firms by Program Year



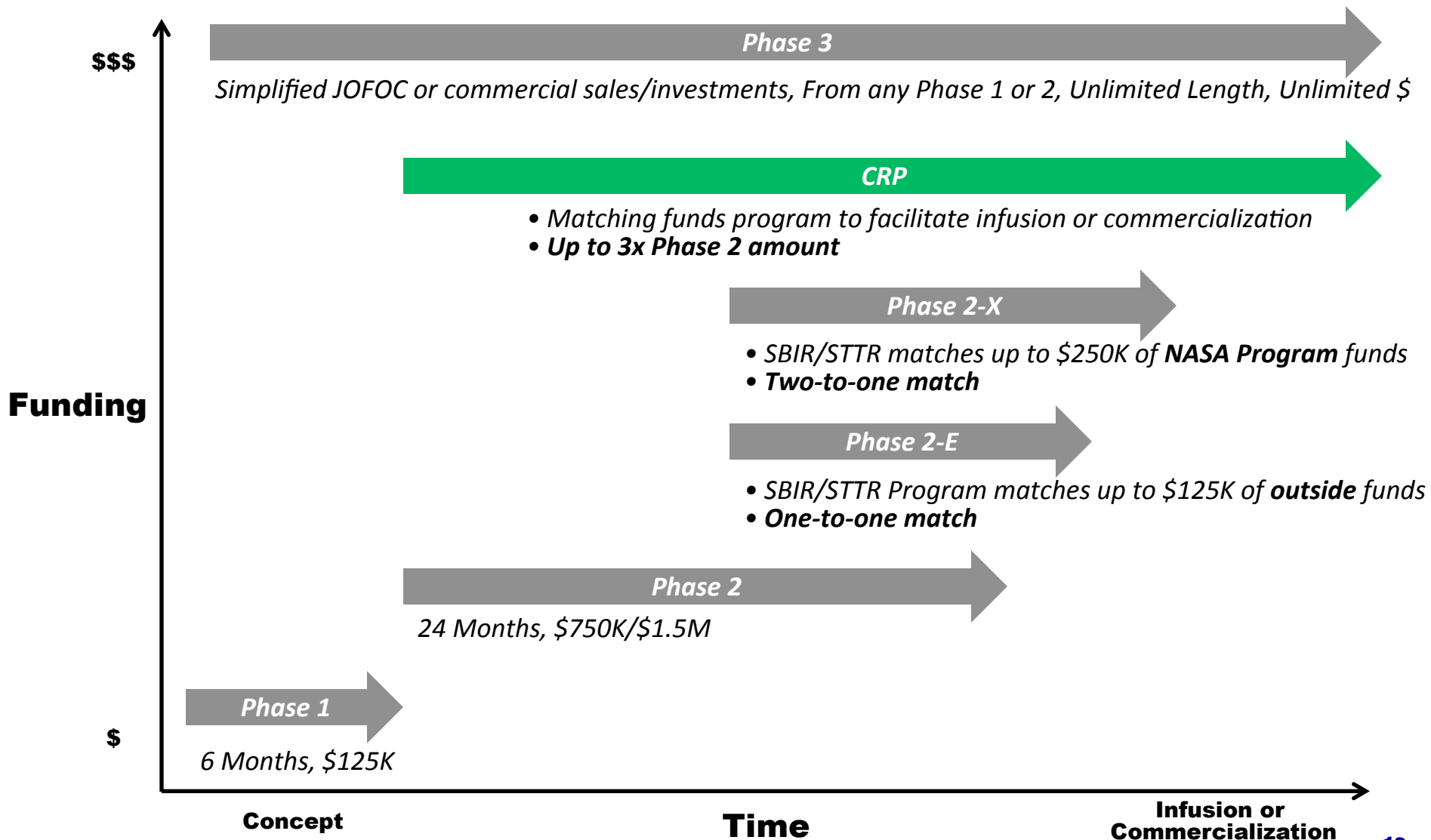


SBIR/STTR Phase 1 and 2 Awards by State Program Years 2010 - 2014





SBIR/STTR Integrated Portfolio





Commercialization Readiness Pilot



- Allowed for civilian agencies as a result of reauthorization legislation
- Enables technology maturation for infusion and commercialization
 - Agencies are allowed to set aside up to 10% of their SBIR/STTR allocation
 - Awards up to 3X's the standard Phase 2 award are allowed
- NASA programs and industry act as Advocates providing matching funds
- Two Cycles – December & May 2015
- Budget
 - FY 2014 (actual): \$3.5M
 - FY 2015 (planned): \$6M (3.9%)
 - FY 2016 (planned): \$7M (4.3%)



Initial CRP Efforts FY 2014



- During FY 2014, NASA worked with a few targeted programs to pilot a tiered approach to partnering and jointly funding a project. A major participant in this effort was Game Changing Development (GCD) Program, a sister program to SBIR/STIR in STMD.
- A total of 9 CRP efforts were funded in this pilot year, out of 17 applications. The SBIR/STTR CRP investment from these initial projects is as follows:

	FY2014	FY2015	FY2016	FY2017
CRP Approved in FY 2014	\$3.6M	\$2.3M	\$0.7M	\$0.3M



Project Funding

Initial CRP Efforts FY 2014



Proposal Title	Mission Directorate	FY14 SBIR Funding	FY15 SBIR Funding	FY14 MD & External Funding	FY15+ MD & External Funding
Lower Cost Higher Performance RL-10 Nozzle	HEOMD	\$225K	\$360K	\$535K	\$5065K
Cold Atom Gravity	SMD	\$1000K		\$507K	\$2782K
GSE Engines	SMD	\$130K		\$132.5K	\$57.5K
High-Performance Power Processing Unit for Hall Thruster	SMD/STMD	\$675K	\$625K	\$811K	\$787K
3DMAT	STMD	\$139.7K	\$139.7K	\$139.7K	
Phase Change Material Heat Exchanger	STMD	\$150K		\$2295K	\$1818K
Weaving Thick 3D Woven Preforms for Extreme Entry Environment TPS Applications	STMD	\$650K		\$684K	
Cryocooler	STMD	\$500K	\$1350K	\$50K	\$3430K
Resin Infusion of 3D Woven Preforms for Extreme Environment TPS Applications	STMD	\$130K		\$132.7K	
		\$3.6M		\$5.3M	



Cycle 1 CRP Proposals FY 2015 (Cycle 2 Opens May 2015)



Proposal Title	Mission Directorate	FY15 Funding Requested	FY15 MD & External Matching
Lunar Resource Prospecting Drill	HEOMD	\$250K	\$350K
Modular High Power Solar Array for BioSentinel	HEOMD*	\$75K	\$35K
Attitude Determination and Control System (ADCS) for Cubesats	HEOMD*	\$75K	\$25K
BioSentinel Cold Gas Propulsion System (GN&C System for Maneuverable Pico-Satellites)	HEOMD	\$25K	\$15K
Software-Defined Near-Earth Space Transceiver (SD-NEST)	HEOMD	\$250K	\$250K
Multi-Purpose Variable-gravity Platform (MVP) Development	HEOMD	\$690K	\$690K
High-Performance Infrared Laser Sensor Technology Readiness & Maturation Project	HEOMD	\$389K	\$389K
Loom Modification Required for Weaving Thick 3D Woven Preforms for Extreme Environments TPS Applications	STMD*	\$440K	\$174K
NASA /Army Forward Operating Base Gray Water Recycling System	Army/ARC*	\$75K	\$70K
Electrostatically Cleaned CubeSat Solar Panels	STTR	\$29K	\$29K
		\$2.3M	\$2.0M

* - Leverages DoD funding



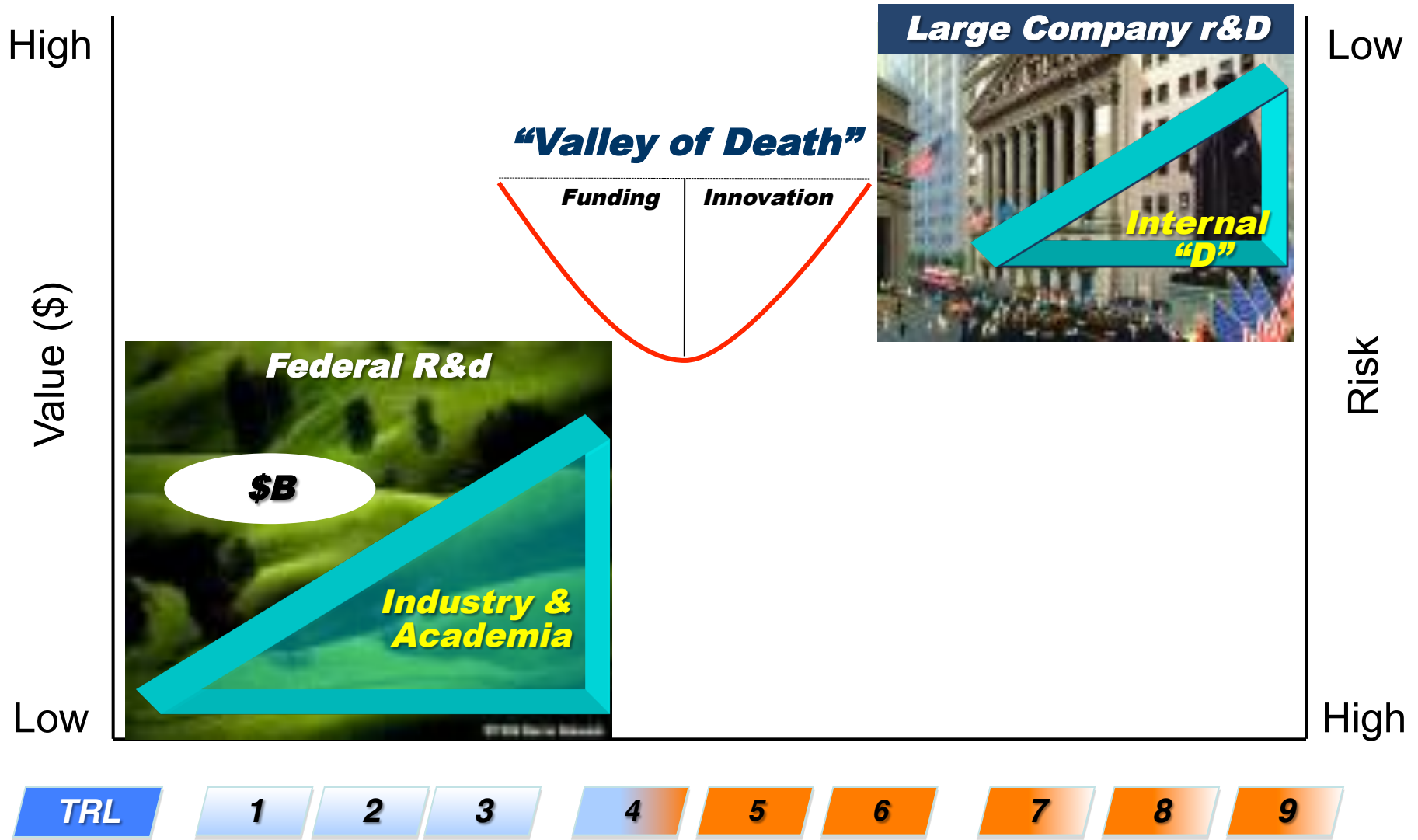
New Initiatives



- During the first quarter, SBIR/STTR introduced new initiatives to increase the overall efficiency with which the program interacts with their customer and stakeholder base.
 - The In-Reach Initiative will promote program visibility and value within NASA by connecting SBIR/STTR awardee firms with Agency missions and projects.
 - The Outreach Initiative will work on building better external awareness of the features of NASA's SBIR and STTR programs. Particular emphasis will be placed on reaching under-represented groups.
 - The Integrated Investment Initiative will be looking at NASA's technology needs to ensure future topic areas and awards have the greatest impact on future missions and programs.



Bridging the Valley of Death





Infusion Event

Bridging the Valley of Death (Cont.)

By Invitation Only!

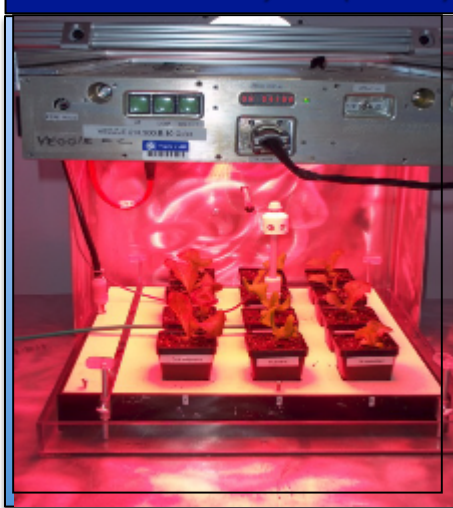
NASA Glenn Welcomes Attendees to Cleveland

- Over 25 small businesses
- 28 presentations
- 64 one-on-one sessions
- NASA staff, OGA representatives, and Prime Contractors

A Sampling of Successes from the SBIR/STTR Program

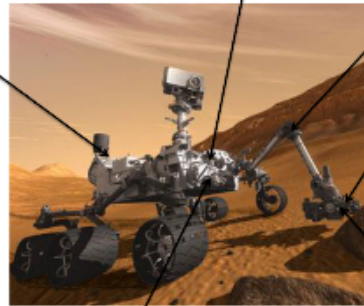


VEGGIE Production System (VEGGIE)



Yardney Technical Products, Pawcatuck, CT
Lithium ion batteries

Creare, Hanover NH
Space-qualified vacuum pump



Starsys Research, Boulder, CO
Gearboxes for robotic arm

Honeybee Robotics, NY, NY
Dust removal tool

InXitu, Campbell, CA
Chemistry and Mineralogy experiment (CheMin) instrument

Grammtech, Ithaca NY -
Software for rover operations

"The tests that we are conducting with Smart SPHERES will help NASA make better use of robots as assistants to and versatile support for human explorers -- in Earth orbit or on long missions to other worlds and new destinations"

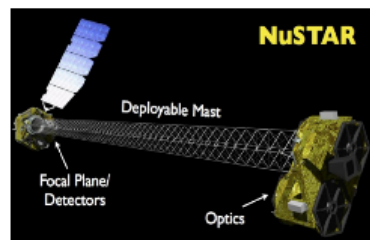
-Terry Forgy, Project Manager of the Human Exploration Telerobotics project and Director of the Intelligent Robotics Group (Ames)

Aurora Flight Sciences Corp. -- receives Phase III funding in July 2012 to further develop the Synchronized Position Hold, Engage, Reorient, Experimental Satellites (SPHERES). These are bowling-ball sized spherical satellites that are used inside the space station to test a set of well-defined instructions for spacecraft performing autonomous rendezvous and docking maneuvers.



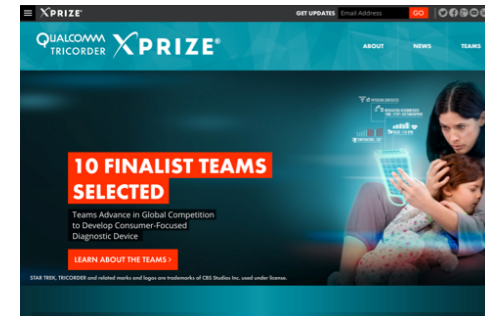
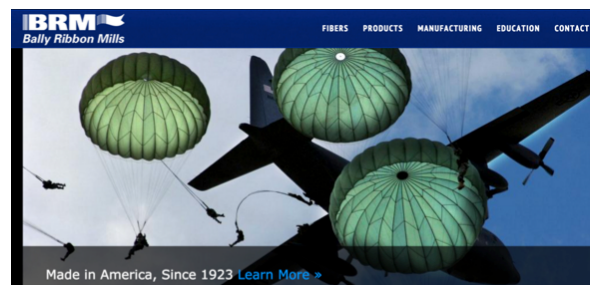
"NuSTAR will help us find the most elusive and most energetic black holes, to help us understand the structure of the universe"

-Fiona Harrison, NuSTAR principal investigator



AEC-Able Engineering Company developed a 10 meter long boom for the Nuclear Spectroscopic Telescope Array (NuSTAR). The boom supports key focusing elements of the high energy X-ray observatory.

NuSTAR, a NASA SMD SMEX mission, successfully deployed the first focusing telescopes to image the sky in the high energy X-ray region of the electromagnetic spectrum on June 13, 2012 with the boom following on June 21, 2012.

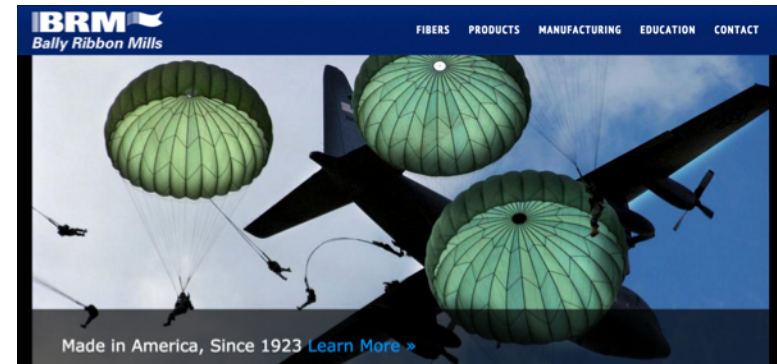


Upcoming Articles

Positive Results from SBIR Contracts



- Bally Ribbon Mills
 - NASA Phase 3 on AFRL SBIR investments
 - Unique resource in non-aerospace business
 - Technology with several space and science applications
 - Tight collaboration to take an idea from concept to reality
- DNA Medicine Institute
 - Earth-driven need and space-driven need intersect
 - Benefits from non-aerospace investments
 - Idea to working prototype
 - Previous X-Prize winner and current X-prize finalist
- Pulsar Informatics
 - Firm collaborator has world expert in field
 - Software integrates multiple data sources
 - Provides context for NASA surgeons' diagnoses
 - Working prototype desired by NASA
- Marotta Controls
 - From Apollo to Space-X
 - Small NASA SBIR investment
 - Working with number of commercial space firms
 - Working with NASA primes



DMI's rHEALTH X1



SBIR Program Points-of-Contact



SBIR Support Contact Name		POC
HEOMD	Jitendra Joshi	Laura O'Neal-Weis Maneesh Arya
STMD	Ryan Stephan	Katie Holt
ARMD	Mike Dudley	Gynelle Steele
SMD	Parminder Ghuman	Rich Terrile
REI	SBIR Helpdesk	
HQ's Team	Bob Yang	
	Joseph Grant	

Center	Technology Infusion Manager	Center	TIM Name
AFRC	Mark Davis	JSC	Kathy Packard
ARC	Jana Killebrew	KSC	Mike Vinje
GRC	Hung Nguyen	LaRC	Kimberly Graupner
GSFC	Aprille Ericsson	MSFC	Lynn Garrison
JPL	Carol Lewis	SSC	Tom Stanley