Appendix D: SBIR/STTR and the Space Technology Roadmaps

Research and technology topics/subtopics for the SBIR Program are identified annually by Mission Directorates and Center Programs. The Directorates identify high priority research and technology needs for respective programs and projects. Research and technology topics for the STTR Program are aligned with needs associated with the research interest and core competencies across NASA Centers. Both programs support a broad range of technologies defined by a list of topics and subtopics that vary in content within each annual solicitation.

The following table relates these SBIR/STTR topics and subtopics to the Technology Area Breakdown Structure (TABS) in the Space Technology Roadmaps (STR). The table is organized by the OCT Technology Area (first column), with the related SBIR/STTR topics (third column) and subtopics (fourth column) listed as well. The Aeronautics area is included for completeness, though this is beyond the scope of the STR.

TA	STR Technology Area (TA) Level 1 Description	SBIR Topic	SBIR Subtopic Description	SBIR Subtopic
TA01	Launch Propulsion Systems	N/A	N/A	N/A
		STTR Topic	**STTR Subtopic Description**	**STTR Subtopic**
		Launch Propulsion Systems	Launch Vehicle Propulsion Technologies	T1.01
TA	**STR Technology Area (TA) Level 1 Description**	**SBIR Topic**	**SBIR Subtopic Description**	**SBIR Subtopic**
TA02	In-Space Propulsion Technologies	Spacecraft and Platform Subsystem	Propulsion Systems	S3.03
		Space Transportation	Cryogenic Fluid Management Technologies	H2.01
			In-Space Propulsion Systems	H2.02
		STTR Topic	**STTR Subtopic Description**	**STTR Subtopic**
		In-Space Propulsion Technologies	Space Power and Propulsion	T2.01
TA	**STR Technology Area (TA) Level 1 Description**	**SBIR Topic**	**SBIR Subtopic Description**	**SBIR Subtopic**
TA03	Space Power and Energy Storage	High Efficiency Space Power Systems	Fuel Cells and Electrolyzers	H8.01
			Ultra High Specific Energy Batteries	H8.02
			Space Nuclear Power Systems	H8.03
			Advanced Photovoltaic Systems	H8.04
		Spacecraft and Platform Subsystem	Power Generation and Conversion	S3.02
			Power Electronics and Management, and Energy Storage	S3.04
		STTR Topic	**STTR Subtopic Description**	**STTR Subtopic**
		Space Power and Energy Storage	Energy Harvesting Technology Development	T3.01

TA	STR Technology Area (TA) Level 1 Description	SBIR Topic	SBIR Subtopic Description	SBIR Subtopic
TA04	Robotics, Telerobotics and Autonomous Systems	Autonomous and Robotic Systems	Spacecraft Autonomy and Space Mission Automation	H6.01
			Human-Robotic Systems - Manipulation Subsystem	H6.03
			Unmanned Aircraft and Sounding Rocket Technologies	S3.05
		Robotic Exploration Technologies	Robotic Mobility, Manipulation and Sampling	S4.02
			Spacecraft Technology for Sample Return Missions	S4.03
		STTR Topic	**STTR Subtopic Description**	**STTR Subtopic**
		Robotics, Tele-Robotics and Autonomous Systems	Information Technologies for Intelligent and Adaptive Space Robotics	T4.01
			Dynamic Servoelastic (DSE) Network Control, Modeling, and Optimization	T4.02
			Extreme Particle Flow Physics Simulation Capability	T4.03
TA	**STR Technology Area (TA) Level 1 Description**	**SBIR Topic**	**SBIR Subtopic Description**	**SBIR Subtopic**
TA05	Communication and Navigation	Space Communications and Navigation	Long Range Optical Communications	H9.01
			Long Range Space RF Communications	H9.02
			CoNNeCT Experiments	H9.03
			Flight Dynamics Technologies and Software	H9.04
			Game Changing Technologies	H9.05
		STTR Topic	**STTR Subtopic Description**	**STTR Subtopic**
		Communication and Navigation	Autonomous Navigation in GNSS-Denied Environments	T5.01
TA	**STR Technology Area (TA) Level 1 Description**	**SBIR Topic**	**SBIR Subtopic Description**	**SBIR Subtopic**
TA06	Human Health, Life Support and Habitation Systems	Life Support and Habitation Systems	Advanced Technologies for Atmosphere Revitalization	H3.01
			Environmental Monitoring and Fire Protection for Spacecraft Autonomy	H3.02
			Crew Accommodations and Water Recovery for Long Duration Missions	H3.03
		Extra-Vehicular Activity Technology	Space Suit Pressure Garment and Airlock Technologies	H4.01

			Space Suit Life Support and Avionics Systems	H4.02
		Radiation Protection	Radiation Prediction (Integrated Advanced Alert/Warning Systems for Solar Proton Events)	H11.01
		Human Research and Health Maintenance	Exploration Countermeasure Capability - Portable Activity Monitoring System	H12.01
			Exploration Medical Capability - Medical Suction Capability	H12.02
			Behavioral Health and Performance - Innovative Technologies for A Virtual Social Support System for Autonomous Exploration Missions	H12.03
			Advanced Food Systems Technology	H12.04
			In-Flight Biological Sample Analysis	H12.05
		STTR Topic	**STTR Subtopic Description**	**STTR Subtopic**
		Human Health, Life Support and Habitation Systems	Space Synthetic Biology and Food Production Technologies for Space Exploration	T6.01
TA	**STR Technology Area (TA) Level 1 Description**	**SBIR Topic**	**SBIR Subtopic Description**	**SBIR Subtopic**
TA07	Human Exploration Destination-Systems	In-Situ Resource Utilization	In-Situ Resource Utilization	H1.01
		Ground Processing and ISS Utilization	ISS Demonstration & Development of Improved Exploration Technologies	H10.02
		STTR Topic	**STTR Subtopic Description**	**STTR Subtopic**
		N/A	N/A	N/A
TA	**STR Technology Area (TA) Level 1 Description**	**SBIR Topic**	**SBIR Subtopic Description**	**SBIR Subtopic**
TA08	Science Instruments, Observatories and Sensor Systems	Sensors, Detectors and Instruments	Lidar Remote Sensing Technologies	S1.01
			Microwave Technologies for Remote Sensing	S1.02
			Sensor and Detector Technology for Visible, IR, Far IR and Submillimeter	S1.03
			Detector Technologies for UV, X-Ray, Gamma-Ray and Cosmic-Ray Instruments	S1.04
			Particles and Field Sensors and Instrument Enabling Technologies	S1.05
			Cryogenic Systems for Sensors and Detectors	S1.06

			In Situ Sensors and Sensor Systems for Lunar and Planetary Science	S1.07
			Airborne Measurement Systems	S1.08
			Surface & Sub-surface Measurement Systems	S1.09
		Advanced Telescope Systems	Proximity Glare Suppression for Astronomical Coronagraphy	S2.01
			Precision Deployable Optical Structures and Metrology	S2.02
			Advanced Optical Component Systems	S2.03
			Optics Manufacturing and Metrology for Telescope Optical Surfaces	S2.04
		STTR Topic	**STTR Subtopic Description**	**STTR Subtopic**
		Science Instruments, Observatories and Sensor Systems	Innovative Subsystems for Small Satellite Applications	T8.01
			Technologies for Planetary Compositional Analysis and Mapping	T8.02
			Science Instruments for Small Missions (SISM)	T8.03
TA	**STR Technology Area (TA) Level 1 Description**	**SBIR Topic**	**SBIR Subtopic Description**	**SBIR Subtopic**
TA09	Entry, Descent and Landing Systems	Robotic Exploration Technologies	Planetary Entry, Descent and Landing Technology	S4.01
		STTR Topic	**STTR Subtopic Description**	**STTR Subtopic**
		Entry, Descent and Landing Systems	Technologies for Aerospace Experimental Capabilities	T9.01
TA	**STR Technology Area (TA) Level 1 Description**	**SBIR Topic**	**SBIR Subtopic Description**	**SBIR Subtopic**
TA10	Nanotechnology	N/A	N/A	N/A
		STTR Topic	**STTR Subtopic Description**	**STTR Subtopic**
		Nanotechnology	Innovative Refractory Materials for Rocket Propulsion Testing	T10.01
TA	**STR Technology Area (TA) Level 1 Description**	**SBIR Topic**	**SBIR Subtopic Description**	**SBIR Subtopic**
TA11	Modeling, Simulation, Information Technology and Processing	Autonomous and Robotic Systems	Radiation Hardened/Tolerant and Low Temperature Electronics and Processors	H6.02
		Spacecraft and Platform Subsystems	Command, Data Handling, and Electronics	S3.01

		Information Technologies	Technologies for Large-Scale Numerical Simulation	S5.01
			Earth Science Applied Research and Decision Support	S5.02
			Algorithms and Tools for Science Data Processing, Discovery and Analysis, in State-of-the-Art Data Environments	S5.03
			Integrated Science Mission Modeling	S5.04
			Fault Management Technologies	S5.05
		STTR Topic	**STTR Subtopic Description**	**STTR Subtopic**
		Modeling, Simulation, Information Technology and Processing	Software Framework & Infrastructure Development of Spaceborne Hybrid Multicore/FPGA Architectures	T11.01
			Distributed Simulation for Design and Manufacturing	T11.02
TA	**STR Technology Area (TA) Level 1 Description**	**SBIR Topic**	**SBIR Subtopic Description**	**SBIR Subtopic**
TA12	Materials, Structures, Mechanical Systems and Manufacturing	Lightweight Spacecraft Materials and Structures	Expandable/Deployable Structures	H5.01
			Advanced Manufacturing and Material Development for Lightweight Metallic Structures	H5.02
		STTR Topic	**STTR Subtopic Description**	**STTR Subtopic**
		Materials, Structures, Mechanical Systems and Manufacturing	High Temperature Materials and Sensors for Propulsion Systems	T12.01
			Materials and Manufacturing Technologies	T12.02
TA	**STR Technology Area (TA) Level 1 Description**	**SBIR Topic**	**SBIR Subtopic Description**	**SBIR Subtopic**
TA13	Ground and Launch Systems Processing	Space Transportation	Advanced Technologies for Propulsion Testing	H2.03
		Ground Processing and ISS Utilization	Ground Processing Optimization and Technology Infusion	H10.01
		STTR Topic	**STTR Subtopic Description**	**STTR Subtopic**
		Ground and Launch Systems Processing	Risk Engineering, Sciences, Computation, and Informed Decisions	T13.01
TA	**STR Technology Area (TA) Level 1 Description**	**SBIR Topic**	**SBIR Subtopic Description**	**SBIR Subtopic**

TA14	Thermal Management Systems	Life Support and Habitation Systems	Thermal Control Systems	H3.04
		Entry, Descent and Landing Technology	Ablative Thermal Protection Systems	H7.01
		STTR Topic	**STTR Subtopic Description**	**STTR Subtopic**
		N/A	N/A	N/A
		Aviation Safety	Aviation External Hazard Sensor Technologies	A1.01
		Aviation Safety	Inflight Icing Hazard Mitigation Technology	A1.02
		Aviation Safety	Flight Deck Interface Technologies for NextGen	A1.03
		Aviation Safety	Vehicle Level Diagnostics	A1.04
		Aviation Safety	Data Mining and Knowledge Discovery	A1.05
		Aviation Safety	Assurance of Flight-Critical Systems	A1.06
		Air Traffic Management Research and Development (ATM R&D)	Unmanned Aircraft Systems Integration into the National Airspace System Research	A2.01
		Air Vehicle Technologies	Structural Efficiency - Airframe	A3.01
		Air Vehicle Technologies	Quiet Performance	A3.02
		Air Vehicle Technologies	Low Emissions/Clean Power	A3.03
		Air Vehicle Technologies	Aerodynamic Efficiency - Drag Reduction Technology	A3.04
		Air Vehicle Technologies	Controls/Dynamics - Propulsion Systems	A3.05
		Air Vehicle Technologies	Physics-Based Conceptual Design Tools	A3.06
		Air Vehicle Technologies	Rotorcraft	A3.07
		Air Vehicle Technologies	Propulsion Efficiency - Turbomachinery Technology	A3.08
		Air Vehicle Technologies	Ground and Flight Test Techniques and Measurement Technologies	A3.09