

Appendix B: 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 level one (first column) and level 2 (third column), with the related SBIR Select subtopic description (fourth column) and subtopics ID (fifth 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	STR Technology Area (TA) Level 2 Description	Subtopic Description	Subtopic
TA01	1.0.0 Launch Propulsion Systems	1.5.0 Unconventional/Other Propulsion Systems	Small Launch Vehicle Technologies and Demonstrations	Z9.01
			Affordable Nano/Micro Launch Propulsion Stages	T1.01
TA	STR Technology Area (TA) Level 1 Description	STR Technology Area (TA) Level 2 Description	Subtopic Description	Subtopic
TA02	2.0.0 In-Space Propulsion Technologies	2.1.0 Chemical Propulsion	Spacecraft Technology for Sample Return Missions	S4.03
			Cryogenic Fluid Management	Z10.01
		2.2.0 Non-Chemical Propulsion	Propulsion Systems for Robotic Science Missions	Z10.02
			Nuclear Thermal Propulsion (NTP)	Z10.03
			Cubesat Propulsion Systems	Z8.01
2.4.0 Supporting Technologies	Terrestrial Balloons and Planetary Aerial Vehicles	S3.05		
TA	STR Technology Area (TA) Level 1 Description	STR Technology Area (TA) Level 2 Description	Subtopic Description	Subtopic
TA03	3.0.0 Space Power and Energy Storage	3.1.0 Power Generation	Power Generation and Conversion	S3.01
			High Power Arrays for Solar Electric Propulsion	Z1.01
			Fission Surface Power Generation	Z1.03
		3.3.0 Power Management and Distribution	Intelligent/Autonomous Electrical Power Systems	T3.02
		3.4.0 Cross Cutting Technology	Power Electronics and Management, and Energy Storage	S3.03
			Bio-inspired Concepts for the Development of Power, Energy and Storage Technologies for Air and Space	T3.03

TA	STR Technology Area (TA) Level 1 Description	STR Technology Area (TA) Level 2 Description	Subtopic Description	Subtopic
TA04	4.0.0 Robotics, Telerobotics and Autonomous Systems	4.1.0 Sensing & Perception	Extreme Environments Technology	S4.04
			Contamination Control and Planetary Protection	S4.05
		4.3.0 Manipulation	Robotic Mobility, Manipulation and Sampling	S4.02
			Sample Collection for Life Detection in Outer Solar System Ocean World Plumes	S4.06
			Robotic Systems - Mobile Manipulation	Z5.02
		4.4.0 Human-Systems Integration	Augmented Hybrid and Virtual Reality (XR) Technology for Human & Robotics Exploration	Z5.01
		4.5.0 Autonomy	Autonomous Control Technologies (ACT) for Ground Operations	H10.02
			Resilient Autonomous Systems	H6.02
			Guidance, Navigation and Control	S3.04
			Command, Data Handling, and Electronics	S3.08
			Payload Technologies for Free-Flying Robots	Z5.03
			Information Technologies for Intelligent and Adaptive Space Robotics	T4.01
		Not Mapped	Unmanned Aircraft Systems (UAS) Technologies	T4.03
A2.02				
TA	STR Technology Area (TA) Level 1 Description	STR Technology Area (TA) Level 2 Description	Subtopic Description	Subtopic
TA05	5.0.0 Communication and Navigation	5.1.0 Optical Comm. And Navigation	Long Range Optical Telecommunications	H9.01
		5.4.0 Position, Navigation, and Timing	Flight Dynamics and Navigation Technology	H9.03
		5.5.0 Integrated Technologies	Communications for Distributed Small Spacecraft Beyond LEO	Z8.02
		5.6.0 Revolutionary Concepts	Transformational/Over-the-Horizon Communications Technology	H9.05
TA	STR Technology Area (TA) Level 1 Description	STR Technology Area (TA) Level 2 Description	Subtopic Description	Subtopic
TA06	6.0.0 Human Health, Life Support and Habitation Systems	6.1.0 Environmental Control Life Support & Habitation Systems	Wash System to Disinfect Fresh Fruit & Vegetables Grown in Spaceflight	H12.04
			Process Technologies for Water Recycling in Space	H3.01
			Waste Management and Resource Recovery	H3.02

			Integrated System Health Management for Sustainable Habitats	H6.01
			ISS Utilization and Microgravity Research	H8.01
			Innovative Solutions to Carbon Dioxide Removal for Spacecraft, Surface Systems, and EVA Systems	T6.01
		6.2.0 Extravehicular Activity Systems	Advanced Space Suit Portable Life Support System (PLSS)	H4.01
			Controllable, Tinting, Polycarbonate Compatible Coatings for Advanced EVA Spacesuit Visor	H4.02
			Mass Produced, Minimal Capability, Disposable EVA Life Support System	H4.03
		6.3.0 Human Health and Performance	Crew Worn Accelerometers in spaceflight environment	H12.03
		6.5.0 Radiation	Radioprotectors and Mitigators of Space Radiation-induced Health Risks	H12.01
TA	STR Technology Area (TA) Level 1 Description	STR Technology Area (TA) Level 2 Description	Subtopic Description	Subtopic
TA07	7.0.0 Human Exploration Destination Systems	7.1.0 In-Situ Resource Utilization	Mars Atmosphere ISRU for Mission Consumables	H1.01
			Lunar Resources	H2.01
			Advanced Bioreactor Development for In Situ Microbial Manufacturing	T7.01
		7.2.0 Sustainability & Supportability	Space Exploration Plant Growth	T7.02
TA	STR Technology Area (TA) Level 1 Description	STR Technology Area (TA) Level 2 Description	Subtopic Description	Subtopic
TA08	8.0.0 Science Instruments, Observatories & Sensor Systems	8.1.0 Science Instruments	Lidar Remote Sensing Technologies	S1.01
			Technologies for Active Microwave Remote Sensing	S1.02
			Technologies for Passive Microwave Remote Sensing	S1.03
			Particles and Field Sensors and Instrument Enabling Technologies	S1.06
			In Situ Instruments/Technologies for Planetary Science	S1.07
			Atomic Interferometry	S1.10
			In Situ Instruments/Technologies and Sample Processing for Ocean Worlds Life Detection	S1.11
			NDE Sensors	Z11.01
		8.2.0 Observations	Proximity Glare Suppression for Astronomical Direct Detection	S2.01
			Advanced Optical Systems and Fabrication/Testing/Control Technologies for EUV/Optical and IR Telescope	S2.03

			X-Ray Mirror Systems Technology, Coating Technology for X-Ray-UV-OIR, and Free-Form Optics	S2.04
		8.3.0 Sensor Systems	Sensor and Detector Technology for Visible, IR, Far IR and Submillimeter	S1.04
			Detector Technologies for UV, X-Ray, Gamma-Ray and Cosmic-Ray Instruments	S1.05
			In-situ Sensors and Sensor Systems for Earth Science	S1.08
			Cryogenic Systems for Sensors and Detectors	S1.09
			Photonic Integrated Circuits	T8.02
TA	STR Technology Area (TA) Level 1 Description	STR Technology Area (TA) Level 2 Description	Subtopic Description	Subtopic
TA09	9.0.0 Entry, Descent and Landing Systems	9.1.0 Aeroassist & Entry	Entry Descent & Landing Sensors for Environment Characterization, Vehicle Performance, and Guidance, Navigation and Control	Z7.01
			Deployable Aerodynamic Decelerator Technology	Z7.03
		9.3.0 Landing	Lander Systems Technology	T9.01
TA	STR Technology Area (TA) Level 1 Description	STR Technology Area (TA) Level 2 Description	Subtopic Description	Subtopic
TA11	11.0.0 Modeling, Simulation, Information Technology and Processing	11.1.0 Computing	Spacecraft Autonomous Agent Cognitive Architectures for Human Exploration	H6.03
			Low Cost Radiation Hardened Integrated Circuit Technology	Z8.03
		11.2.0 Modeling	Integrated Science Mission Modeling	S5.04
			Fault Management Technologies	S5.05
			Space Weather R2O/O2R Technology Development	S5.06
		11.3.0 Simulation	Technologies for Large-Scale Numerical Simulation	S5.01
		11.4.0 Information Processing	Earth Science Applied Research and Decision Support	S5.02
			Machine Learning and Deep Learning for Science and Engineering	S5.03

TA	STR Technology Area (TA) Level 1 Description	STR Technology Area (TA) Level 2 Description	Subtopic Description	Subtopic
TA12	12.0.0 Materials, Structures, Mechanical Systems and Manufacturing	12.1.0 Materials	Development of Higher Strength Feedstocks for In-Space Manufacturing	H7.01
			Thin-Ply Composite Technology and Applications	T12.01
		12.2.0 Structures	Mars Surface Solar Array Structures	H5.01
			Hot Structure Technology for Atmospheric Entry Vehicles	H5.02
			Precision Deployable Optical Structures and Metrology	S2.02
			In-Space Sub-Modular Assembly	Z4.02
		12.4.0 Manufacturing	In-situ monitoring and development of in-process quality control for in-space manufacturing (ISM) applications	H7.02
			Plasma Jet Printing Technology for Printable Electronics in Space	H7.03
		12.5.0 Cross-Cutting	Advanced Metallic Materials and Processes Innovation	Z3.01
			MISSE Experiments	Z4.01
Extensible Modeling of Metallurgical Additive Manufacturing Processes	T12.02			
TA	STR Technology Area (TA) Level 1 Description	STR Technology Area (TA) Level 2 Description	Subtopic Description	Subtopic
TA13	13.0.0 Ground and Launch Systems Processing	13.1.0 Technologies to Optimize the Operational Life-Cycle	Advanced Propulsion Systems Ground Test Technology	H10.01
			Intelligent Sensor Systems	T13.01
TA	STR Technology Area (TA) Level 1 Description	STR Technology Area (TA) Level 2 Description	Subtopic Description	Subtopic
TA14	14.0.0 Thermal Management Systems	14.2.0 Thermal Control Systems	Thermal Management	Z2.01
		Not Mapped	Hypersonic Seal Technology Development	A1.10
TA	STR Technology Area (TA) Level 1 Description	STR Technology Area (TA) Level 2 Description	Subtopic Description	Subtopic
TA15	15.0.0 Aeronautics	15.1.0 Safe, Efficient Growth in Global Aviation	Vehicle Safety - Inflight Icing Hazard Mitigation Technology	A1.09
			Advanced Air Traffic Management Systems Concepts	A3.01
			Aircraft Design, Optimization, and Scaled Model Test	T15.01
		15.3.0 Ultra-Efficient Commercial Vehicles	Quiet Performance - Propulsion Noise Reduction Technology	A1.02
			Computational Tools and Methods	A1.05

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			Vertical Lift Technology and Urban Air Mobility	A1.06
		15.4.0 Transition to Low-Carbon Propulsion	Low Emissions/Clean Power - Combustion Technology/Emissions Measurement Techniques	A1.03
			Electrified Aircraft Propulsion & Concepts	A1.07
		15.5.0 Real-Time System-Wide Safety Assurance	Future Aviation Systems Safety	A3.03
		15.6.0 Enable Assured Machine Autonomy for Aviation	Increasing Autonomy in the National Airspace Systems (NAS) (not vehicles)	A3.02
		Not Mapped	Structural Efficiency - Aeroelasticity and Aeroservoelastic Control	A1.01
			Supersonic Technology - Reduce Take-off and Landing Noise	A1.04
			Aeronautics Ground Test and Measurement Technologies	A1.08
			Flight Test and Measurement Technologies	A2.01