

Research Focus Areas 02/2024

RFA - ID	RFA Description
RFA - 001	New technology development of spacecraft cabin/habitat CO ₂ removal systems: zeolite-based systems, liquid amine-based systems, and cold surface deposition systems utilizing cryocoolers.
RFA - 002	Characterization studies on newly developed CO ₂ sorbents: metal organic frameworks and ionic liquids, primarily focusing on CO ₂ capacity in relevant environments.
RFA - 003	Addressing Knowledge Gaps in Planetary Protection for Crewed Mars Mission Concepts
RFA - 004	Natural Transport of Contamination on Mars
RFA - 005	Ultra-High Temperature Ceramics (UHTC's) - physical chemistry of high-temperature materials used in atmospheric entry, low earth orbit (LEO), and interplanetary travel
RFA - 006	Thermal Barrier Coatings - physical chemistry of high-temperature materials used in atmospheric entry, low earth orbit (LEO), and interplanetary travel.
RFA - 007	Ablative Thermal Protection Systems Performance and Design - physical chemistry of high-temperature materials used in atmospheric entry, low earth orbit (LEO), and interplanetary travel
RFA - 008	Re-usable Thermal Protection Systems Performance and Design - physical chemistry of high-temperature materials used in atmospheric entry, low earth orbit (LEO), and interplanetary travel
RFA - 009	Experiment deriving the fundamental properties of thermal protection systems - physical chemistry of high-temperature materials used in atmospheric entry, low earth orbit (LEO), and interplanetary travel
RFA - 010	Microstructural Analysis - physical chemistry of high-temperature materials used in atmospheric entry, low earth orbit (LEO), and interplanetary travel
RFA - 011	Gas-Surface (heterogeneous) Interactions - physical chemistry of high-temperature materials used in atmospheric entry, low earth orbit (LEO), and interplanetary travel
RFA - 012	Gas-Gas Interactions - physical chemistry of high-temperature materials used in atmospheric entry, low earth orbit (LEO), and interplanetary travel
RFA - 013	Ablation and decomposition of meteorite materials during atmospheric entry.
RFA - 014	Thermal decomposition and pyrolysis of polymers and polymer composites materials.
RFA - 015	Simulation of orbital debris demise.
RFA - 016	Nitrogen/Methane Plasma Experiments Relevant to Titan Entry
RFA - 017	Predictive Modeling of Plasma Physics Relevant to High Enthalpy Facilities
RFA - 018	Thermostructural & Mechanical Properties of Ablative TPS Materials
RFA - 019	ICAN-C-Obscured Vision Enhancement
RFA - 020	Lox Methane HS Video Analysis
RFA - 021	Motion Mag in the Dark
RFA - 022	Foreign Object Debris (FOD) Detection Using Computer Vision
RFA - 023	EDL Precision Landing
RFA - 024	Development of Coating Materials for Nuclear Thermal Rocket Applications
RFA - 025	Development of Uranium based Fuels for Nuclear Thermal Rocket Propulsion
RFA - 026	In Space Transportation
RFA - 027	Compact, deployable dual polarized low frequency (40-200 MHz) Log Periodic Dipole Array (LPDA) antenna for remote sensing of magnetic field of distribution inside large expulsions of plasma from the Sun's corona.

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RFA - 028	Development of an algorithm to invert 3D capacitance data to estimate 3D dielectric profile
RFA - 029	Development of Characterization Techniques to Determine Rate and Temperature Dependent Composite Material Properties for the LS-DYNA MAT213 Model
RFA - 030	Formation of molecular clouds
RFA - 031	Molecular clouds and star formation
RFA - 032	The dense, warm interstellar medium
RFA - 033	Analytical and methodological pipelines that investigate organic molecular patterns to identify the source and physicochemical history of naturally occurring suites of compounds and developing metrics that can differentiate between biological and abiotic reaction products.
RFA - 034	Analytical and methodological pipelines that investigate the stoichiometry, elemental abundances, fluid chemistry and size distribution patterns of entrained particles in order to determine the probability for biological origin.
RFA - 035	Additive manufacturing and additive manufacturing of electronics
RFA - 036	LEO manufacturing support (additive, advanced materials, thin layer processing)
RFA - 037	Lunar manufacturing of solar cells and sensors
RFA - 038	Materials development for additive manufacturing
RFA - 039	Semiconductor Manufacturing in Microgravity
RFA - 040	Utilization of Machine Learning Approaches for Efficient Estimation of Vector Magnetic Fields from SDO/HMI and SoHO/MDI
RFA - 041	Improved Understanding of Solar Microflares using Data Science
RFA - 042	Electric motor technologies appropriate for eVTOL with high torque density and, concurrently, such motors being free of partial discharge and having a continuous power rating in the range 50 – 400 kW.
RFA - 043	High reliability, robustness, and fault-tolerance for inverter-motor systems as needed for safety-critical eVTOL propulsion.
RFA - 044	Lubrication and cooling technologies specifically optimized for long life and highly efficient eVTOL motors, including interest in single-fluid approaches for inverters, motors, and gearboxes.
RFA - 045	Modeling, analysis, and development support, including potential field data, for Venus related seismometer
RFA - 046	Seismometry to meteorology and other science measurement preparation
RFA - 047	Thermal Management Systems
RFA - 048	Surface Systems
RFA - 049	In Situ Monitoring of Additive Manufacturing
RFA - 050	Nondestructive Evaluation of Additive Manufacturing
RFA - 051	Transfer Function of Nondestructive Evaluation Response of Cracks and Notches
RFA - 052	High-Temperature Subsystems and Components for Long-Duration (months) Surface Operations
RFA - 053	Aerial Platforms for Missions to Measure Atmospheric Chemical and Physical Properties
RFA - 054	In-situ Astrobiology Instruments
RFA - 055	Lunar surface navigation using AI-assisted feature identification
RFA - 056	Using Multispectral Neural Radiance Fields (NeRFs) for Ground Detection & Characterization of Lunar Micro Cold Traps
RFA - 057	High-Resolution 3D Mapping of Lunar Shadowed Regions Using Neural Radiance Fields (NeRFs)

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RFA - 058	Study the deployment of Large Language Models (LLMs) for Systems Engineering and Project Management at NASA
RFA - 059	Applied AI Ethics
RFA - 060	Scaled Video ML Object Detection and Alerts
RFA - 061	Trash Processing – Recycling and Resources Extraction from Space Logistical Waste
RFA - 062	Integrated Computational Materials Engineering (ICME) & Multi-Physics Modeling Work-Flows for Optimization of and Detailed Computational Characterization of Existing Materials and for Novel Materials Discovery.
RFA - 063	High-Temperature Subsystems and Components for Long-Duration (months) Surface Operations
RFA - 064	Aerial Platforms for Missions to Measure Atmospheric Chemical and Physical Properties
RFA - 065	In-situ Astrobiology Instruments
RFA - 066	Addressing Orbital Debris: Control the long-term growth of debris population
RFA - 067	Small Satellite Rendezvous, Proximity Operations, and Capture
RFA - 068	Arctic phytoplankton ecology, ocean color remote sensing and optical properties, particularly the Chukchi Sea.
RFA - 069	Charting a successful course for field campaigns on behalf of NASA missions, including coordinating and supporting laboratory analysis of field samples (particle absorption, carbon) and data processing and collection and analysis of plankton images using in-flow imaging cytometry.
RFA - 070	Orchestrating multiple community driven efforts to standardize data collection, analysis, and management approaches; an example technical manual can be found here: https://repository.oceanbestpractices.org/handle/11329/1705
RFA - 071	Phytoplankton pigments and derivation of phytoplankton composition
RFA - 072	Spearheading big data analysis using satellite ocean color remote sensing products and field measurements, and create and validate bio-optical algorithms.
RFA - 073	Studying phytoplankton ecology and community composition, both in situ and derived from ocean color remote sensing.
RFA - 074	IceSAT 2 applications
RFA - 075	Development of advanced soft magnetic materials for high-power electronic systems
RFA - 076	Development of high-temperature refractory alloys and coating systems
RFA - 077	Development of materials for extreme environments
RFA - 078	Development of materials and test techniques for hydrogen compatibility (with application to hydrogen-fueled turbines)
RFA - 079	Algorithm development for, and applications of, optical/thermal imagery for studying freshwater and coastal regions
RFA - 080	Multifunctional Structural Materials for Extreme Space Environments
RFA - 081	Astrophysics Research and Technology Development Program
RFA - 082	Mineralogy, geochemistry, and water-rock interactions
RFA - 083	Improve Thermal Performance of Sorbent and Catalytic Systems: Develop high thermal conductivity adsorbent materials, such as zeolite, for removing contaminants (e.g., carbon dioxide and humidity) in space missions. Design custom thermoelectric devices and systems for use in spacecraft life support adsorbent beds.

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RFA - 084	Utilizing Artificial Intelligence/Machine Learning Approaches: Conduct literature search surveys for spacecraft life support technologies using AI/ML; Employ AI/ML for crew use during Earth-independent operations.
RFA - 085	Develop High Thermal Conductivity Polymer Adsorbent Materials: Focus on materials that do not emit Volatile Organic Compounds.
RFA - 086	Development of Odor Detection Sensors: Create sensors specifically for use in space missions.
RFA - 087	Develop Microfluidic Systems for Chemical Processes in Space Missions: Facilitate gas and liquid mass transfer; separate miscible and immiscible liquids; and process corrosive liquids; and remove contaminants for the liquid or air streams.
RFA - 088	Multiscale Modeling of Heterogeneous Materials with NASMAT
RFA - 089	Fundamental Physics
RFA - 090	Soft Matter Physics
RFA - 091	Quantum Optics
RFA - 092	Quantum Clock Synchronization
RFA - 093	Deep Learning and Neural Networks for Optical Communications
RFA - 094	Orbital Angular Momentum for Space Communications
RFA - 095	Low Cost Space Optical Communications
RFA - 096	Quantum Characterizations of classical optical communications links
RFA - 097	Novel QKD+Chaotic Communications
RFA - 098	Quantum Computing as a Service
RFA - 099	Multi-Physics Modeling: Thermal, fluid dynamics, electrochemical modeling for a wide range of reactor and device applications.
RFA - 100	AI/ML algorithms to obtain and improve 3-dimensional remote sensing of the Earth's aerosols, clouds, oceans and lands using combined lidar and polarimeter data, such as from the PARASOL/POLDER-3 polarimeter and the CALIOP/CALIPSO lidar, and the upcoming observations from the NASA PACE SPEXone and HARP2 polarimeters and the EarthCARE ATLID lidar.
RFA - 101	Zero Trust, Cybersecurity Mesh Architecture, and Leveraging Artificial Intelligence for Realtime Cyber Defense
RFA - 102	Verification of AI/ML algorithms for Spacecraft
RFA - 103	Augmenting and Analyzing Requirements with Natural Language Processors
RFA - 104	Chemical Heat Sources: High specific enthalpy systems including lithium-sulfur hexafluoride reactors for long-lived heat for planetary and lunar missions
RFA - 105	Thermal Batteries: Includes new cell chemistries and spacecraft applications.
RFA - 106	Wide operating temperature Li-ion batteries (+120oC to -30oC) for lunar surface missions
RFA - 107	High capacity anode and high capacity/high voltage cathode
RFA - 108	Li-ion and beyond Li-ion battery technologies such as metal-air
RFA - 109	Battery technology enabling low/ultra-low temperature performance or efficient thermal management
RFA - 110	Solid-state electrolytes including polymer/composite polymer electrolyte
RFA - 111	Whole atmospheric analysis and separation for multiphase samples (gases, liquids, particulates, aerosols, etc.)
RFA - 112	Tissue and Data sharing for space radiation risk and mitigation strategies
RFA - 113	Self healing metals in space environments
RFA - 114	An autonomous method of structural repair of spacecraft

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RFA - 115	Photogrammetric methods to measure dynamic motions of structures and validate dynamic models
RFA - 116	Structural health monitoring and damage detection algorithms
RFA - 117	CO2 capture
RFA - 118	CO2 removal
RFA - 119	CO2 utilization
RFA - 120	CO2 conversion to value-added products
RFA - 121	High specific energy cells (>250 Wh/kg) with extreme temperature range capability from -60 to +100 °C
RFA - 122	High-rate cells (>20C discharge capable) with high specific energy (>250 Wh/kg)
RFA - 123	Crew-worn restraints and mobility aids for microgravity spacecraft cabin environments
RFA - 124	Crew quarters internal architectures compatible with both microgravity and fractional gravity domains
RFA - 125	Repair, Manufacturing, And Fabrication (RMAF) Facility for the Common Habitat Architecture
RFA - 126	Phytoplankton Biodiversity of Inland Waters (South Africa – NASA BioSCape Project)
RFA- 127	Development of Characterization Techniques to Determine Rate and Temperature Dependent Composite Material Properties for the LS-DYNA MAT213 Model
RFA-128	AI/ML algorithms to obtain and improve 3-dimensional remote sensing of the Earth's aerosols, clouds, oceans and lands using advanced lidar and polarimeter data
RFA - 129	Inorganic Solid-electrolytes Processing and Scale-Up
RFA - 130	Quantum gravitational sensors: Robust cold atom sensors for space-based gravity gradiometry and gravimetry. Development of low size, weight and power systems utilizing high flux cold or ultra cold atom interferometers based on Rb, Cs or other alkali species for gravity or inertial sensing.
RFA - 131	Laser optical systems for cold atom sensors: Development of high power (>1 W), ultra narrow linewidth (<1 kHz) modular laser systems at 780nm or 852nm for integration with cold atom interferometers, cold atom inertial sensors and optical lattice clocks.
RFA - 132	Quantum magnetometry for space systems: Spin- or defect-based magnetometers with wide bandgap semiconductors or laser cooled atom systems. Capabilities for low size, weight and power, radiation hardening and operation in extreme environments
RFA - 133	Optical lattice clocks for space applications. Ultra-precise time keeping with low size, weight and power for deep space position, navigation and timing. Optical time transfer methods for dissemination of ultra precise clocks.
RFA - 134	Fundamental physics requiring quantum sensing in space. Astrophysical, cosmological or fundamental physics concepts requiring quantum systems and sensors in space. Examples include gravitational wave observation, dark matter or dark energy searches, quantum foundations
RFA - 135	In-space joining: enabling technology for the space economy
RFA - 136	Develop autonomous systems for weld and Additive Manufacturing microscopy (e.g. polishing, etching, imaging)
RFA - 137	Balloon-based remote sensing of geophysical activity on Venus using infrasound
RFA - 138	Fluid Physics
RFA - 139	Combustion Science
RFA - 140	Materials Science
RFA - 141	Bacteria, Archaea, and Fungi are capable of altering terrestrial materials as a way to acquire organic carbon and or trace nutrients.
RFA - 142	GNSS radio occultation (RO) for PBL
RFA - 143	Earth Science Remote Sensing
RFA - 144	Remote Sensing of Land Use/Cover Changes, Vegetation (forestry, agriculture), Fires

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RFA - 145	Advanced Manufacturing
RFA - 146	Soft matter with specific focus on granular materials, colloidal science, rheology and other non-Newtonian Fluids
RFA - 147	Uses of generative AI to dynamically create Photo realistic 3D content in real-time for use in XR applications
RFA - 148	Use of a Brain Computer Interface (BCI) system as a novel computer interface
RFA - 149	Cognitive State Determination System to Support Training, Education, and Real-Time Operations in an XR environment
RFA - 150	Automatic XR friendly procedure creation using videos
RFA - 151	Video based mocap system
RFA - 152	Cryo Fluid Management
RFA - 153	Collaborative platforms for capturing data analytics workflows
RFA - 154	Development and Thermal/Mechanical Properties of Carbon Nanotube-Polymer Composites
RFA - 155	Lunar and Martian Sustainability of Additively Manufactured Materials
RFA - 156	Development of thermoelectric devices for aerospace applications.
RFA - 157	Solar power from the cell to the array level, ground and in-space testing of photovoltaic systems, mission support of solar powered spacecraft
RFA - 158	Clean Energy and Emissions Technologies
RFA - 159	U.S. Climate Change Research Program
RFA - 160	Space Power & Energy Storage
RFA - 161	Pilot studies to adopt terrestrial precision health solutions for astronauts
RFA - 162	Pilot studies to demonstrate the utilization of full systems biology approaches in addressing human spaceflight risks
RFA - 163	Application of Machine Learning to LNOx Estimation from Satellite Lightning Mappers
RFA - 164	Autonomy and GNC for multi-agent systems including formation flying, and spacecraft swarms
RFA - 165	Artificial Intelligence and Machine Learning Methods for Distributed Planning, Scheduling, and Execution Robust to Communication Delays
RFA - 166	Multiscale Modeling of Heterogeneous Materials with NASMAT
RFA - 167	Entry, Descent and Landing (EDL)
RFA - 168	Entry, Descent, and Landing
RFA - 169	Sensors and Instruments
RFA - 170	Flight Vehicle Systems
RFA - 171	Guidance, Navigation, & Control
RFA - 172	Impacts of human activity on coastal physical, geomorphological and ecological variability
RFA - 173	Sea level rise, coastal erosion/retreat, ocean acidification, and salt-water intrusion, and their impacts on ecosystems
RFA - 174	Linkages between aquatic dynamics and land subsidence and its impacts on aquatic ecosystems
RFA - 175	The role of urban development on land subsidence and aquatic ecosystems; biophysical coupling and feedbacks within the aquatic-land interface
RFA - 176	Impacts of hazards related to climate extremes, such as storms, wildfires, and heat waves, on biogeophysical and ecological aspects of the coast
RFA - 177	Impacts of upstream activities on coastal communities
RFA - 178	Integration of existing and upcoming observational and modeling assets into a conceptual or (better) digital aquatic-land framework that enables the dynamical coupling of key processes within the aquatic-land interface
RFA - 179	Exposure and vulnerability to geohazards (e.g., infrastructure and flooding, landslides, etc.), land cover/use change and their impacts on water and marine ecosystems

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RFA - 180	Characterizing and predicting the presence and impacts of marine debris in coastal ecosystems
RFA - 181	Effects of sea ice melting, permafrost thaw, and warming on coastal Arctic ecosystems
RFA - 182	Modelling assessments of carbon dioxide removal strategies in coastal ecosystems – feasibility, uncertainties, and risks
RFA - 183	Fisheries health and the role of harmful algal blooms in coastal communities
RFA - 184	Partial analogs on Earth for icy ocean worlds in our solar system (ice/ocean interactions, sea ice algae, and extreme pressure environments)
RFA - 185	The role of coastal biodiversity in coastal resilience
RFA - 186	Elastocaloric/ magnetocaloric materials and system development
RFA - 187	Additive manufacturing of shape memory alloys
RFA - 188	Dust Mitigation