

NASA IP Portfolio

Patents with Videos and/or Webinars

****Important!** The selections of NASA intellectual property (IP) in this file include extra details and webinars that may assist a team with development of their concept. However, a team may use any IP from the NASA patent portfolio as the basis for their business/proposal.

Category	NASA IP	TOPS #	Brief Description	Webinar Start Point	Video Length	Possible Applications
Aerospace	Active Turbulence Suppression System for Electric Vertical Take-Off and Landing (eVTOL) vehicles	TOP2-308	Suppression of Dutch-Roll Oscillations for Air Taxis Using Existing Propellers	27:10	19:30	Electric Vertical Take-Off and Landing (eVTOL) industry Air- Taxis industry Aerospace industry eVTOL manufacturers
Aerospace	Aeroelastic Wing Shaping	TOP2-251	Method for Aeroelastic Wing Shaping Using Distributed Propulsion	1:48:05	16:46	Commercial and military transports Unmanned Aerial Vehicles (UAV) General Aviation Rotorcraft High altitude long endurance vehicles
Aerospace	Affordable Vehicle Avionics (AVA)	TOP2-274	Common Modular Avionics System for Nano-Launchers offering affordable access to space	N/A	7:36	Nano/micro/small-spacecraft space launch vehicle industry If augmented by additional attitude-measurement sensors: Small-satellite industry including spacecraft attitude determination & control, orbit maintenance, and support of payloads for imaging, communications, and remote sensing Space industry
Aerospace	Airborne Background Oriented Schlieren Technique	TOP2-271	A novel method to render visible the density changes in air that cause a refractive index change by an airborne vehicle	0	30:22	Aerospace Industry Vortices tracking around airport Validate design models of future prototype and demonstrator low-boom aircraft

Category	NASA IP	TOPS #	Brief Description	Webinar Start Point	Video Length	Possible Applications
Aerospace	Aircraft Vertical Takeoff & Landing	LAR-TOPS-230	Vertical takeoff UAV enables long endurance missions and is easy to transport	N/A	1:54	Military applications such as intelligence, surveillance, and reconnaissance Commercial applications where extended mission UAV capabilities are beneficial, including law enforcement, firefighting, crop surveys, pipeline surveys, or oil field management
Aerospace	Co-Optimization of Blunt Body Shapes for Moving Vehicles	TOP2-196	design optimization method for optimal shapes for hypersonic vehicles with mid-range lift/drag ratios that enter or operate in planetary atmospheres, including Earth	2:05:12	8:11	Aeronautics Aerospace Computer Software Defense Industry Transportation
Aerospace	FACET: Future Air Traffic Management Concepts Evaluation Tool	TOP2-109	Comprehensive software eases air traffic management	1:06	12:48	Air traffic management Development of enhanced flightrouting strategies for saving fuel, perserving airline schedules, and reducing passenger delays and missed connections
Aerospace	Flight Awareness Collaboration Tool (FACT)	TOP2-273	An automation tool to improve airport operations during winter storms	38:12	9:58	Air traffic management system Aerospace industry Aviation industry Airport authority De-icing operators
Aerospace	Green aviation - improved aerodynamic efficiency and less fuel burn	TOP2-200	Variable Camber Aerodynamic Control Surfaces and Active Wing Shaping Control	1:17:47	14:36	Aircraft Aerospace Engineering UAV
Aerospace	Method and System for Air Traffic Rerouting for Air-space Constraint Resolution	TOP2-258	National Airspace System (NAS) Constraint Evaluation and Notification Tool (NASCENT)	13:55	13:09	Aerospace industry Air Traffic Management Airline Dispatchers Airline Air Traffic Control Coordinators
Aerospace	Method for Reducing Broadband Noise	LEW-TOPS-109	Thin and lightweight broadband acoustic absorbers inspired by nature	0	37:14	Aerospace (i.e., cabin, engine) Architecture and construction Enclosures Automotive Acoustic insulation (i.e., recording studios, gun ranges, highway barriers)

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Aerospace	Multi-Objective Flight Control Optimization Framework	TOP2-282	Method for Drag Optimization, Load Alleviation Control, and Modal Suppression for Flexible Aircraft	1:32:19	15:23	Aerospace industry/aircraft manufacturers (commercial and military, large and small, etc.); especially aircraft designed with flexible high-aspect ratio wing technology (perhaps using composites) UAV industry Urban Air Mobility (UAM) industry Flight control system providers Avionics industry
Aerospace	Multirotor Aircraft Noise Reduction	LAR-TOPS-325	Phase-locked rotors reduce noise	0	1:29	UAV Deliveries Air Taxis Professional and hobby drone pilots
Aerospace	Nanosatellite Launch Adapter System	TOP2-165	Maximizes the efficiency of satellite launch opportunities	N/A	13:45	Cubesats Launch vehicles Secondary payloads P-PODs Nanosatellites Actuator Management Sequencing Multi-spacecraft missions Constellation spacecraft Deployers
Aerospace	Propeller/Rotor Phase Control for Reduction of Community Noise from Distributed Propulsion Vehicles	LAR-TOPS-308	Method of adjusting relative angular positions of propeller and/or rotor blades to modify the spatial distribution of noise	N/A	1:47	Noise abatement system for aviation Industrial noise abatement (fans & rotors) Drones used in factories and warehouses Drones used for military operations requiring silence
Aerospace	Real-Time Drag Optimization Control Framework	TOP2-279	Adaptive wing real-time optimization and control solution	58:54	N/A	Aeronautics Industry - Passenger aircraft, cargo aircraft, or high performance supersonic jets, general aviation aircraft, drones Space Launch Vehicles, Space Entry Vehicles Automotive industry - Cars, trucks, race cars Marine industry - Ships, submarines

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Aerospace	Reliable Geo-Limitation Algorithm for Unmanned Aircraft	LAR-TOPS-244	Alleviates hazards with unmanned aircraft (UA) flying beyond their authorized perimeters and into no-fly zones	N/A	3:06	Private, commercial, and public sector operations in which range containment or prevention of entering no-fly zones is desirable Infrastructure inspection Cargo delivery Surveillance and monitoring Agriculture
Aerospace	Spacecraft with Artificial Gravity Modules	TOP2-311	Spacecraft capable of generating artificial gravity environments	47:26	N/A	Space industry Spacecraft manufacturing companies Artificial gravity spaceport developers to serve as a gateway for space exploration to other planets OG environment for research and industrial use Platform for spacecraft refueling/resupply, housing a fleet of spacecrafts, and space telescope observatory; platform for waste management system, supply and equipment storage, etc. Platform for waste management system, supply and equipment storage Space construction industry Artificial gravity space station
Aerospace	Supersonic Laminar Flow Control	LAR-TOPS-311	Controls laminar flow over all major components of the airframe	N/A	2:09	Commercial Supersonic aircraft UAVs Military strike aircraft
Aerospace	Transformable Hypersonic Aerodynamic Decelerator	TOP2-162	Transformable and Reconfigurable Entry, Descent & Landing Systems and Methods	N/A	6:30	Human and heavy payload Mars missions Robotic missions to Venus and Mars Small satellite retrieval missions

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Aerospace	Unmanned Aerial Systems (UAS) Traffic Management	TOP2-237	Safe and efficient UAS operations at lower altitude airspace	48:33	14:46	Wildfire mapping Agriculture monitoring Disaster management Law enforcement Telecommunication Weather monitoring Aerial imaging and mapping Freight transport Delivery of goods and services, like medical service delivery Television news coverage, sporting events, movie making Oil and gas exploration
Aerospace	Vision-based Approach and Landing System (VALS)	TOP2-322	Alternative Position, Navigation, and Timing (APNT) solution for Advanced Air Mobility aircraft in environments where GPS is not available	49:50	12:12	Advanced Air Mobility (AAM) UAM aircraft (e.g., drones and other UAV, and eVTOL aircraft) Air-Taxi industry Commercial aircraft with downward-facing cameras may also apply this approach and incorporate a landing system based on the landing lights or fiducials on the runway Airports, heliports, and vertiports with landmarks or landing lights or fiducials can leverage the technology to assist incoming aircraft during approach and landing
Aerospace	Wind-Optimal Cruise Airspeed Mode for Flight Management Systems (FMS)	TOP2-319	A new energy-efficient speed mode for FMS	N/A	6:48	Avionics Industry (Original Equipment Manufacturer): - FMS - Performance Management System (PMS) - Electronic Flight Bag (EFB) Urban Air Mobility (UAM)/Advanced Air Mobility (AAM): - Provider of Services for UAM/AAM - UAM/AAM Operators Unmanned Aircraft System Traffic Management (UTM): - UAS Service Supplier (USS) - UAS Operators Aircraft manufacturing companies: - Electric Vertical Take-Off and Landing (eVTOL) aircraft - Unmanned Aircraft Systems (UAS) - Jet aircraft, turbo-prop aircraft, gas-electric hybrid aircraft and aircraft using alternative sources of power such as hydrogen

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Communications (Comms)	Fine-pointing Optical Communication System Using Laser Arrays	TOP2-287	Space optical data transmission from satellites using laser arrays to provide fine pointing capability	1:24:21	12:09	CubeSat communications - CubeSats in Low Earth Orbit (LEO) - Artemis Program, CubeSats in Low Lunar Orbit (LLO) Spacecraft industry Space communication: - Optical multiple access (OMA)
Comms	Heterogeneous Spacecraft Networks	TOP2-253	Multiple spacecraft operating with various platforms use wireless technology to communicate	10:19	6:20	Micro and Nanosatellite Systems Manufacturing Electronic Technology Energy Management Transportation Intelligence Systems
Comms	Microwave Power Combiner	LEW-TOPS-72	Enables MMIC amplifiers to be combined more efficiently for use in near-Earth and deep-space communications	0	N/A	Near-Earth and deep-space communication Microwave/Millimeter-wave frequency solid-state power amplifiers
Comms	NanoWire Glass Switch for Radio Frequency	LEW-TOPS-24	Invisible switch outlasts MEMS switches for RF applications	0	N/A	Conformal antennas for automotive collision avoidance systems and navigation (e.g., GPS) Phased arrays for communications and data storage, especially in broadcasting and radar (mobile device data streaming, military, satellite television) Rectennas in smart keys, safety devices, and other radio-frequency identification (RFID)-based devices Sensing and diagnostic systems (health care, oil & gas, utilities)
Comms	Smart Enclosure using RFID for Inventory Tracking	MSC-TOPS-72	Inventory tracking for containers such as waste receptacles or storage containers	N/A	1:27	Inventory management Emergency medical equipment and supplies Smart shelves, drawers, and containers Trash receptacles Medical Storage Shipping containers Grocery store shopping carts and conveyor belts Refrigerator inventory Security
Electrical	Concept Development for Advanced Spaceborne Synthetic Aperture Radar	GSC-TOPS-323	Advanced spaceborne radar system for the measurement of terrestrial biomass and ecosystem structure	N/A	17:33	Remote Sensing Environmental Modeling

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Electrical	Location Corrections Through Differential Networks System	LAR-TOPS-296	Improving the Global Positioning System (GPS) positioning accuracy for internet capable mobile devices	N/A	1:53	Using a mobile phone to GPS-mark a location (i.e., Drone based package delivery) e911 calls that provide accurate GPS locations for first responders
Electrical	Serial Arrayed Waveguide Grating	GSC-TOPS-302	An arrayed waveguide grating (AWG) that splits up an optical signal into wavelength channels to enable higher spectral resolution	0	31:28	Optical communications Remote sensing/LIDAR Beam steering
Environment (Environ)	Advanced Supercritical Water Oxidation Reactor	LEW-TOPS-146	Based on a Hydrothermal Flame-Piloted Vortex Flow	N/A	38:51	Aerospace: water processing and reclamation for human spaceflight Agriculture: treatment and reclamation of agricultural runoff Manufacturing: treatment of waste streams from making chemicals, pharmaceuticals, semiconductors, paper, and food Marine: treatment of discharge to conform to international treaties Military: destroying hazardous waste during weapons demilitarization Oil, Gas and Power: treatment and reclamation of water used for fracking and treatment of radiation contaminated organic waste streams Purification: water treatment and reclamation (e.g., desalination of unusable aquifers, treatment of algae blooms in freshwater lakes) Waste Management: sewage processing and water treatment and reclamation
Environ	Algae Photobioreactor Using Floating Enclosures With Semi-Permeable Membranes	TOP2-219	Grow algae, clean wastewater, capture carbon dioxide to ultimately produce biofuel	20:43	49:57	Diesel fuel production Lipid-based chemical production High-value products (e.g., cosmetics, nutraceuticals, food additives) Fertilizer and animal food products Advanced sewage treatment Pharmaceutical products Renewable energy

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Environ	Contaminated Water Treatment	TOP2-106	A portable and low-cost method for recycling contaminated liquid	26:40	49:57	Space missions Army missions Water source for developing world Extreme environments like hiking/camping, yachting, and mountaineering Antarctic exploration missions, etc.
Environ	Habitat Water Wall for Water, Solids, and Atmosphere Recycle and Reuse	TOP2-197	A mechanism to recover and reuse water and waste treatment residuals	10:27	49:57	Aerospace Planetary Exploration Waste Water Treatment Plants
Environ	Microwave-Based Water Decontamination System	MSC-TOPS-53	Chemical free water purification method and device	N/A	2:48	Potable Water Purification Heat Exchangers and Water Cooling Systems Isolated Geographical Locations Hospital and Research Facilities Commercial Space Flight Decontamination Systems
Environ	Pre-Treatment Solution for Water Recovery	MSC-TOPS-68	Enhances water recovery in urinary water extraction systems by reducing precipitates	N/A	2:22	Desalination plants Brackish water treatment Mining water treatment Solvent for surface scaling caused by gypsum and sulfate minerals Urinary water extraction Oil and gas exploration and production water supply Transportation and storage of concentrated wastewater products Pre-treatment for membrane-filtering water treatment systems used in space
Environ	Tool for Rapid Identification of TCE in Plants	MFS-TOPS-53	Hyperspectral Estimator for Site Characterization and Monitoring	N/A	18:59	Screening sites to determine the presence of TCE and/or to locate potential TCE hotspots at those sites Assessing the progress of remediation activities at contaminated sites Monitoring phytoremediation projects without destroying or damaging the vegetation established for cleanup activities Monitoring wetland health

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Environ	Wastewater Treatment and Remediation	KSC-TOPS-36	Closed loop system for recovering ammonia from wastewater	0	N/A	Agricultural wastewater (swine/dairy farms, etc.) Food processing plants Fertilizer plants (urea) Chemical plants Textiles (wool) Electroplating Municipal water treatment Recycled water Reclaimed water Grey water Multi-unit housing complexes
Instrumentation (Instrum)	Device for Providing Real-Time Rotorcraft Noise Abatement Information	LAR-TOPS-282	Mitigating blade-vortex interaction noise	N/A	1:45	Improving helicopter design Use in rotorcraft flight simulators
Instrum	Generation of Polystyrene Latex Spheres with Incorporated Fluorescent Dyes	LAR-TOPS-295	Use in wind tunnel experiments to monitor airflow	N/A	2:02	Seed materials for wind tunnel applications Staining of histological or other biological sample Time-delayed drug release A broad variety of government-sponsored research projects and high impact academic research to new product development and process innovation in industry across a wide variety of applications and disciplines
Instrum	Method of Non-Destructive Evaluation of Composites	LAR-TOPS-120	Using trapped energy analysis to characterize hidden damage	N/A	1:52	Aerospace: in-service damage assessment (e.g., fuselage collisions with ramps or baggage carts) Automotive: in-service inspection of composite structures Wind turbines: may reduce inspection time for large scale inspection of turbine blades
Instrum	Multi-Parameter Aerosol Scattering Sensor	LEW-TOPS-19	A highly accurate, lightweight, low-cost miniaturized environmental monitoring sensor system	1:05	2:50	Environmental monitoring First responders Military Health monitoring Process control Protective gear Remote sensing Sensors Unmanned vehicles Security

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Instrum	Portable Medical Diagnosis Instrument	TOP2-246	Compact In-Flight Medical Diagnostic Technology for Deep-Space Missions	N/A	33:44	Space missions Health care industry Homeland security Field-testing and clinical diagnostics Military and disaster response Remote/harsh environments
Instrum	Robotic Inspection System for Fluid Infrastructures	MSC-TOPS-70	Surveys interior volume, interrogates structure integrity, and displays real-time video and sonar	N/A	2:26	Sub-sea oil and gas platform structures Deep sea exploration Pipelines at least partially containing a fluid
Instrum	Selective Reinforcement of Near-Net-Shape Formed Structures	LAR-TOPS-264	Reinforces specific regions of a structure that need enhanced strength	N/A	2:28	Space applications High-pressure gas storage vessels
Instrum	Standoff Ultra-Compact Micro-Raman Sensor	LAR-TOPS-280	Easy to use Raman sensor for numerous applications	N/A	2:15	Precious metals and jewelry analysis Narcotics identification Explosive detection Inspection of incoming raw materials, final product QC, and other applications in the pharmaceutical industry Contaminant detection and identification on silicon wafers Geological research
IT/Software	Additive Manufacturing Model-based Process Metrics (AM-PM)	TOPS-368	Computational tool to model and evaluate additively manufactured parts	N/A	2:15	Additive manufacturing: build correctness modeling before, during, and after manufacturing for any additive manufacturing process Additive manufacturing: rapid development of build strategies customized to each part geometry and sub-geometries
IT/Software	Centralized Data Management Platform	TOP2-314	A method and a system for managing complex interconnection of data and its derivatives	33:09	N/A	Data management and Analysis Manage Product Lifecycle Data Internet of Management Things (IMT)

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IT/Software	Enhancing Fault Isolation and Detection for Electric Powertrains of UAVs	TOP2-305	Embedding Failure Mode and Effect Analysis (FMEA) and Bayesian Framework for Real-time diagnostics/ prognostics	37:14	16:43	Fault Diagnostics and Prognostics for Vehicle Systems Health Management Industrial Internet of Things (IIoTs) Aviation - Unmanned Aerial Vehicles (UAVs) Drone/Unmanned Aircraft Management (UAM) industry Automotive industry Commercial R&D for prognostic health management/condition-based maintenance Companies developing software products for system health management Aviation ground support Space industry (satellites) Manufacturing and factory settings (e.g., CNC machine monitoring), power plants, gas turbines, drilling system, and wind turbines
IT/Software	Inductive Monitoring System	TOP2-175	Automated monitoring techniques for complex systems	28:51	12:31	Aeronautics Space (on-board or mission control center) Surface transportation Medicine Research facilities and data Infrastructure Manufacturing/ process monitoring Military/security
IT/Software	Space Traffic Management (STM) Architecture	TOP2-294	Highly scalable, decentralized, open-architecture data exchange platform for STM	11:54	12:36	The Space Traffic Management (STM) Service Supplier (S3) Space Situational Awareness Supplier (SSA) Conjunction Assessment Supplier (CAS) Supplemental Data Supplier Owner/Operator (O/O) - already commercialized, STM will allow seamless interaction between operators Universities and research institutions
IT/Software	Traffic Aware Strategic Aircrew Requests (TASAR)	LAR-TOPS-148	Using software to provide pilots with traffic aware optimized flight trajectories to increase air traffic control (ATC) approval of beneficial change requests	N/A	1:00:47	Flight optimization for commercial and general aviation Incentive for ADS-B IN equipage
IT/Software	Traffic Aware Strategic Aircrew Requests (TASAR)	LAR-TOPS-148	Using software to provide pilots with traffic aware optimized flight trajectories to increase air traffic control (ATC) approval of beneficial change requests	N/A	1:00:47	Flight optimization for commercial and general aviation Incentive for ADS-B IN equipage

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Manufacturing (Manuf)	Calibration System for Automated Fiber Placement	LAR-TOPS-339	Creating accurate defect standards for an in-situ inspection system	0	16:05	Aerospace and Aviation Automotive Commercial Space Composites Marine Unmanned Vehicles
Manuf	Cladding and Freeform Deposition for Coolant Channel Closeout	MFS-TOPS-81	A better way to manufacture combustion chambers and nozzles	N/A	34:31	Aerospace Propulsion: Rocket engine combustion chambers, nozzles Oil and Gas: Heat exchangers Nuclear Power: Heat exchangers
Manuf	Fabricating printable electronics and biosensor chips	TOP2-218	Atmospheric Pressure Plasma Based Fabrication of Printable Electronics and Functional Coatings	0:58	16:08	Biomedical technology Consumer electronics, e-paper Intelligent / Security Communications
Manuf	Fiber-Metal Laminate Manufacturing Technique	LAR-TOPS-170	Synthesis of fiber-metal laminates by RF plasma spray deposition	0	1:36	Aerospace lighting strike protection Blast protection Impact resistance Controlled electrical/ thermal conductivity Radiation shielding
Manuf	High Flow Differential Cleaning	MFS-TOPS-99	Clean Complex Additively Manufactured Parts in Minutes - Not Hours or Days	0	1:22	Powder-based additive manufacturing, including direct metal laser sintering (DMLS), electron beam melting (EBM), selective heat sintering (SHS), selective laser melting (SLM), and selective laser sintering (SLS) Post-processing of complex additively manufactured parts
Manuf	Improving Formability of Al-Li Alloys	MFS-TOPS-61	Novel heat treatment enables spin forming and stretch forming of Al-Li 2195	N/A	1:28	Al-Li alloys are used in aerospace for rocket and fuel tank domes and other large panels or extruded structures produced by stretch forming or spin forming. Improving heat treatments for other Al-Li alloys would expand potential applications in aerospace as well as in recreation, transportation, and other industries in which high-strength, lightweight structures are needed.

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Manuf	Internal Friction Reduction (IFR) Tool	MFS-TOPS-102	Cost-effective pin tool for self-reacting friction stir welding	0	32:56	Aerospace Railway cars Construction Storage tank or cylinder manufacture Ship building Plastic welding Micro-scale electronics
Manuf	Method and Means to Analyze Thermographic Data Acquired During Automated Fiber Placement	LAR-TOPS-284	Non-destructive testing of items made of carbon fiber by automated machinery	N/A	1:58	Higher quality, lower cost carbon fiber parts for aircraft, helicopters, and wind turbines
Manuf	Modular Artificial-Gravity Orbital Refinery Spacecraft	TOP2-299	Space mining and in-situ resource utilization	18:33	10:32	Space industry Deep space industry Mining and refining asteroid and Mars moon mass In-situ space resource utilization Orbital refinery Orbital debris recycling Orbital construction Space manufacturing
Manuf	Pyramid Image Quality Indicator	GSC-TOPS-250	A scalable, inexpensive tool and methodology to ascertain real life computed tomography system performance for a wide range of industrial applications	0	48:55	Non-destructive evaluation Manufacturing quality control Medical x-ray equipment manufacturing
Manuf	System for In-situ Defect Detection in Composites During Cure	LAR-TOPS-327	Enhance processing via real-time, non-destructive defect tracking	0	27:52	Aerospace and Aviation: parts for spacecraft (e.g., satellites, landers), launch vehicles, and aircraft (e.g., fuselage, wing) Architecture and Construction: building sections Automotive: composite components in vehicles Composites: high-performance structural parts Marine: hull sections Transportation: high-speed rail sections Turbines: wind turbine blades Unmanned vehicles: parts for UAVs

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Manuf	Thin-Films with Integrated Structural and Functional Elements	LAR-TOPS-203	Low mass, large-scale hierarchical thin-film structural systems with enhanced performance	N/A	2:20	Solar space sails, arrays, and concentrators Space antennas and sun shades Inflatable structures (both earth and space based) Chemical and radiation sensors
Manuf	Ultrasonic Stir Welding	TOP8-95	A new solid-state weld process for better weld quality and longer tool life	N/A	0:58	Aerospace - hardware for severe environments, launch vehicles, aircraft Automotive - pistons, struts, vehicle structure Marine - shipbuilding, platforms Civil - bridges, trains, pressure vehicles
Manuf	Woven Thermal Protection System	TOP2-167	Heatshield for Extreme Entry Environment Technology, also known as HEEET	28:25	29:33	Aerospace Systems Engineering Thermal Management Systems Manufacturing Technologies
Materials and Coatings	Atomic Number (Z)-Grade Radiation Shields from Fiber Metal Laminates	LAR-TOPS-201	Shapeable radiation shields	N/A	29:32	Radiation protection for electronic instrumentation Nuclear reactor shields Radioactive fluid piping shields Radiation protection clothing Spacecraft and satellite shielding
Materials and Coatings	Carbon Fiber-Carbon Nanotube Yarn Hybrid Reinforcement	LEW-TOPS-154	Triaxial Braid Material for Polymer Matrix Composites	0	30:18	Aerospace and Aviation: aircraft components Automotive: PMC auto parts High-performance sports: advanced equipment (e.g., football helmets, hockey sticks) Medical devices: prosthetics Oil and Gas: high pressure gas storage vessels Power: wind turbine blades Unmanned Vehicles: drone components
Materials and Coatings	Carbonated Cement for Production of Concrete with Improved Properties	MFS-TOPS-68	Supporting CO2 Emissions Reduction in Cement Manufacturing	N/A	1:25	Energy and manufacturing – Cement manufacturing process with integrated carbon capture and storage Materials – Novel cement material composition with improved properties

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Materials and Coatings	Conductive Polymer/Carbon Nanotube Structural Materials and Methods	LAR-TOPS-292	Carbon nanotube structural composites	N/A	1:44	Light weight structural material for aerospace vehicles including high altitude aerospace flights and space exploration Electromagnetic Interference shielding materials including automobile, solar energy housing and buildings, cosmetics, clothing, blankets, helmets, etc. Lightning protection for aerospace vehicles Flexible structural materials Highly conductive flexible materials for electrodes and supercapacitors Catalysts embedded in flexible membranes Organic thermoelectric materials Chemical sensors High temperature resistive heating materials
Materials and Coatings	Holey Carbon Allotropes	LAR-TOPS-165	Innovative manufacturing methods for bulk preparation of holey graphene and holey carbon nanotubes	N/A	45:17	Energy storage (supercapacitors, batteries) Membranes for gas separation, water desalination, biomolecular separation Gas and drug delivery Chemical and biological sensors Thermoelectrics Coatings
Materials and Coatings	Holey Graphene Mesh from Solvent-Free Manufacturing and Composites Thereof	LAR-TOPS-302	Solvent-free method to create arrays of holes to form holey graphene mesh	N/A	1:37	Battery/energy storage applications
Materials and Coatings	How to Train Shape Memory Alloys	LEW-TOPS-32	Low cost, time-saving technique to prepare shape memory alloys for use	N/A	1:00:32	Aerospace Aviation Automotive (actuators, engine mounts and suspension, car frames) Medical (e.g., stents/angioplasty, bone repair clamps, robotics actuators and micromanipulators that simulate human movement) Household appliances (fasteners, seals, connectors, and clamps)
Materials and Coatings	Hydrophobic Epoxy Coating for Insect Adhesion Mitigation	LAR-TOPS-182	Fluorinated alkyl ether containing epoxies	N/A	3:00	Aerospace Marine Automotive Wind Energy

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Materials and Coatings	Molecular Adsorber Coating (MAC)	GSC-TOPS-28	Capturing outgassed volatiles using a simple spray coating	N/A	2:52	General gas and water adsorption Collection and containment of contaminants and volatiles
Materials and Coatings	Multifunctional Ablative Thermal Protection System	TOP2-244	3-Dimensional Multifunctional Ablative Thermal Protection System (3DMAT)	0	22:49	Material handling Aerospace systems Manufacturing Thermal Protection Systems
Materials and Coatings	Multilayered Fire Protection System	LAR-TOPS-212	New heat retardant materials based on vehicle reentry thermal protection systems	24:10	N/A	Insulation for walls Fire containment Insulation for flammable trailers cargo Vertical barrier Personal emergency fire shelter Blanket Protecting property Fire protection system for apartments
Materials and Coatings	New Methods in Preparing and Purifying Nanomaterials	LEW-TOPS-107	New processes greatly improve the properties of boron nitride nanomaterials	0	30:40	Advanced composite materials for use in aircraft engines, coatings, and armor Microelectronics Piezoelectric devices, including sensors and robotics Thermal management Electrical insulators High temperature seals and gaskets Biomedical treatments and therapies Radiation and UV shielding devices Energy harvesting
Materials and Coatings	Oxide Dispersion Strengthened Medium Entropy Alloy	LEW-TOPS-151	An Additively Manufactured Alloy Tailored for High-Temperature Applications	0	30:44	Aerospace: high-temperature components for space launch systems and jet turbine engines Industrial machinery: chemical processing and waste processing systems Marine: turbine engines for ships Oil and gas: oil refining process Power: steam turbines and gas turbines for electricity generation, structural components for solar thermal power plants, heat exchangers for nuclear reactor systems Propulsion: rockets, jet engines, etc.

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Materials and Coatings	Puncture-healing Engineered Polymer Blends	LAR-TOPS-224	Several puncture healing engineered melt formulations, consisting of a non-healing and a self-healing polymer	0	30:13	Radiation shielding Fuel tank liners Healing layers in ballistic protection for armor, helmets, and other personal protective equipment Packaging material Human prosthetics Wire insulation material Space habitats and structures Micrometeoroid and orbital debris protective liners
Materials and Coatings	Silicon Carbide Fiber Tows	LEW-TOPS-131	Rapid processing method produces stronger materials, even heals lower-quality fibers	N/A	56:12	Aerospace (e.g., engines, thermal protection systems, and turbopumps) Propulsion (e.g., reusable rocket and thruster nozzles) Power (e.g., gas turbine engines, nuclear reactor fuel cladding, radiation blankets) Chemical manufacturing (e.g., heat exchangers, reformers, reactors, filters) Industrial machinery (e.g., preheaters, recuperators, and radiant tubes) Furnaces Turbines
Mechanical & Fluid Systems	3D-Printed Injector for Cryogenic Fluid Management	MFS-TOPS-104	Minimize Boil-off When Filling Cryogenic Tanks	N/A	1:05	Aerospace: propellant resupply, long-term cryogenic fluid storage, etc. Cryogenics: transferring and storing liquid oxygen, hydrogen, helium, nitrogen, ISRU-produced propellant liquefaction, and more Industrial machinery: cryogenic fluid supply, transport, and equipment/tank manufacturing Oil and gas: liquid natural gas transfer Propulsion: liquid propellant storage/transfer
Mechanical & Fluid Systems	Compact Vibration Damper	LAR-TOPS-189	Tunable damper capable of tailoring the structural damping for individual modes of vibration using minimal space or weight	N/A	2:39	Wind tunnel models Launch vehicles Smokestacks Helicopters Wind turbines Skyscrapers

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Mechanical & Fluid Systems	Composite Joint Connector	LAR-TOPS-198	Structural joint with multi-axis load carrying capacity	N/A	1:30	Aerospace Automotive Outdoor structures Sporting goods
Mechanical & Fluid Systems	Floating Piston Valve	SSC-TOPS-2	A Novel Approach to Low Maintenance Actuator-less Valves	N/A	2:58	Power plants Petrochemical plants Chemical industry Refineries Pressurized storage tanks Cryogenic fluid systems Pharmaceutical manufacturing industry Severe duty, extremely high pressure or temperature Fast actuation applications
Mechanical & Fluid Systems	Flow Control Devices	LAR-TOPS-36	Two fluidic oscillators with no moving parts optimize flow control for better system performance	N/A	1:56	Aerospace - Boundary layer control - Separation control - Lift enhancement -- Drag reduction - Mixing Shipbuilding - flow control Gas turbines - Heat transfer enhancement - Separation control Hydrotherapy equipment - different modes of massaging.
Mechanical & Fluid Systems	Fluid Structure Coupling Technology	MFS-TOPS-2	Passive method controls coupling between fluids and structures to disrupt and/or control the dynamics of a structure	N/A	1:59	Structural: Multistory buildings, stacks, towers, bridges, pools for spent nuclear fuel Oil and gas: Offshore oil rigs, above-ground storage tanks Municipal: Water tanks/towers Marine: Multi-directional stabilization of vessels or platforms
Mechanical & Fluid Systems	Full-Size Reduced Gravity Simulator For Humans, Robots, and Test Objects	MSC-TOPS-60	Reacts Real-Time to Human Impulses Within a Fixed Volume in All Three Dimensions	N/A	1:56	The system has many commercial possibilities, wherever individuals have to interact with heavy objects within a confined volume Material handling in a warehouse or Industrial facility Physical Therapy Commercial shipping/transportation of packages, luggage, or other heavy objects Moving vans Personal hoist systems for home, office, or garage Assembly and maintenance, automotive repair, etc.

Category	NASA IP	TOPS #	Brief Description	Webinar Start Point	Video Length	Possible Applications
Mechanical & Fluid Systems	High-Speed Droplet Generator	LEW-TOPS-170	Propels Large Water Droplets to High Velocity	N/A	0:06	Aerospace Research: Sensor calibration and icing studies Agriculture: Precision spraying of pesticides and nutrients Food/Pharma Manufacturing: Optimizing spray drying operations Atmospheric Science: Water droplet generation for cloud physics Winter Sports: Efficient snowmaking requiring 100-300 micrometer droplets Coatings Testing: Controlled water impact on protective coatings Coating Deposition and Testing: Controlled application of coating materials and water impact testing on protective coatings
Mechanical & Fluid Systems	Improving VTOL Proprotor Stability	LAR-TOPS-374	Adaptive control methodology provides tiltrotor aircraft improved operational boundary and vibration reduction	N/A	2:19	Urban Air Mobility: Active Ride Control for Passenger Comfort and possible extension as flight controller for changing conditions Aerospace: Controllers for surface actuators or hydraulic systems Military: Rotorcraft & Payload Stabilization Other dynamic systems that employ active controls
Mechanical & Fluid Systems	Integral Tuned Mass Absorber for Turbine Blades	MFS-TOPS-111	Additive manufacturing enables novel turbine blade and blisk designs	0	30:46	Rocket engine turbopumps Jet engines Land-based gas turbines for power generation APU's and turbochargers All components in turbomachine flow-path (impellers, stators, vanes)
Mechanical & Fluid Systems	Low Separation Force Quick Disconnect Device	KSC-TOPS-84	A Self-Aligning, Self-Healing System for Pneumatics and Cryogenics	0	29:42	Aerospace and Aviation Marine Oil and Gas Satellites Unmanned Vehicles
Mechanical & Fluid Systems	Low-Cost, Long-Lasting Valve Seal	MFS-TOPS-71	A simple and new valve seat installation technique for leak prevention	N/A	0:46	Solenoid valves Check valves Manual valves Disconnects Regulators Relief valves

Category	NASA IP	TOPS #	Brief Description	Webinar Start Point	Video Length	Possible Applications
Mechanical & Fluid Systems	Micro scale electro hydrodynamic (EHD) modular cartridge pump	GSC-TOPS-139	EHD modular cartridge pump that is designed and engineered to be the smallest and simplest iteration in NASA's arsenal	N/A	25:39	Computer thermal control Aerospace Automotive
Mechanical & Fluid Systems	Pilot Assisted Check Valve for Low Pressure Applications	MFS-TOPS-79	Maintains sealing load at low pressure differentials, resulting in lower leakage rates	N/A	1:31	Cryogenic propulsion applications Cryogenic manufacturing Liquid Natural Gas (LNG) storage and transport Nuclear Safety Systems Vacuum Jacketed Systems Any low-pressure environment that has strict requirements against chemistry mixing or venting
Mechanical & Fluid Systems	Shape Memory Alloy Rock Splitters (SMARS)	LEW-TOPS-122	Provides a compact, powerful, non-explosive method for fracturing rocklike materials	N/A	53:46	Oil and gas Hydraulic fracturing Mining (gemstone, precious metal mining) Archaeology Search and rescue Commercial space Civil Engineering Search and Rescue
Mechanical & Fluid Systems	Shape Memory Alloy Tubular Structure	LEW-TOPS-161	Revolutionary Technology Eliminates Pneumatic Tire Risks	0	29:31	Vehicle tires aircraft, agricultural machinery, off-road vehicles, trucks, motorcycles, automobiles, bicycles, etc. Energy absorbers: sports helmets, military equipment, etc. Seals and couplings Compliant connectors Biomedical

Category	NASA IP	TOPS #	Brief Description	Webinar Start Point	Video Length	Possible Applications
Mechanical & Fluid Systems	Soft Mate Lifting Device	MFS-TOPS-107	Below-the-Hook Device Enabling Gentle Crane Placements to Decrease Property Damage Risk	N/A	0:52	<p>Aerospace and aviation: precision assembly of large components for satellite, spacecraft, and aircraft manufacturing</p> <p>Construction: gentle lifting and lowering of heavy parts</p> <p>Consumer goods: moving and positioning property that is fragile, expensive, or otherwise problematic to move via conventional rigging</p> <p>Industrial machinery: building and maintaining heavy machinery</p> <p>Manufacturing: assembly of heavy components with threaded connections or precision load placement requirements, particularly where minimal clearances or tight tolerances are involved, such as the installation of hydraulic cylinders and load cells</p> <p>Marine: shipbuilding</p> <p>Power: placement of power generation equipment</p> <p>Transportation: railway construction</p>
Mechanical & Fluid Systems	Tension Element Damping (TED) With Hydraulics for Large Displacements	MFS-TOPS-109	Disruptive modal coupling damps large structure vibrations using small footprint devices	N/A	0:52	<p>Wind turbines</p> <p>Solar arrays</p> <p>Liquid nitrogen gas (LNG) platforms</p> <p>Commercial space mobile launchers</p> <p>Towers</p> <p>Industrial process stacks and equipment</p>
Mechanical & Fluid Systems	Variable-Aperture Reciprocating Reed (VARR) Valve	MFS-TOPS-65	Proportional flow control back and forth between two chambers	N/A	1:11	<p>Air conditioning systems</p> <p>Flow control and exhaust management for two-cycle engines used in lawn equipment, jet skis, motorbikes, and snowmobiles, etc.</p> <p>Flow-limiting devices such as variable flow/variable delta pressure response flow meters</p> <p>Linearized delta pressure flow meters, expanded operationally range flow meters</p> <p>Vibration control enhancement for fluid, tuned mass, and hydropneumatic systems</p> <p>Shock absorbers and transient shock attenuators</p> <p>Burst diaphragms</p> <p>Pressure relief valves</p>

Category	NASA IP	TOPS #	Brief Description	Webinar Start Point	Video Length	Possible Applications
Medicine/ Biotech	3D Construction of Biologically Derived Materials	TOP2-256	System for the 3D Construction of Biologically Derived Materials, Structures, and Parts	39:06	11:22	Biomaterials, biotechnology Organic-inorganic composite materials On-demand manufacturing In situ resource utilization Space stations Military Infrastructure materials
Medicine/ Biotech	Apparatus and Method for Biofeedback Training	LAR-TOPS-289	Virtual reality / Augmented reality / Mixed reality implementation of method and apparatus for performance optimization through perturbation of task virtual elements	N/A	N/A	Simulations and video games Police/military training
Medicine/ Biotech	Carbon nanotube mesh bucky paper capsules	TOP2-195	Making Mesh Buckypaper Capsules for Transplantation of Cells and Implantation of Medical Devices	1:09:04	27:04	Nanobiotechnology Nanomedicine Molecular nanotechnology Biomolecular computing Medical devices
Medicine/ Biotech	Electroactive Material for Wound Healing	LAR-TOPS-194	Wound healing facilitated by electrical activity	N/A	2:39	Military personnel wounded in the field Hospital patients who have undergone surgery General patients who have suffered a serious wound Astronauts in space
Medicine/ Biotech	Electrochemical Sensors Based on Enzyme-Linked Immunosorbent Assay	TOP2-307	Electrochemical ELISA Microelectrode Array Biosensor	11:22	12:08	Biomedical diagnostic devices market Electrochemical biosensors market Point-of-care diagnostics market
Medicine/ Biotech	Human-Powered Ventilator	MSC-TOPS-86	Portable analog technology is designed to stabilize a patients respiratory distress.	0	18:14	Any location which may lack electricity Any confined military or commercial vehicle Can provide relief of supply-chain challenges for ventilators in cases of mass distress
Medicine/ Biotech	Methylophilic Microorganisms Expressing Soluble Methane Monooxygenase Proteins	TOP2-283	Methane Metabolism by Yeast	1:02	10:13	Space industry - Habitat construction, astronaut nutrition, and biomedical applications Terrestrial methane-based microbial bio-manufacturing Biotechnology industry

Category	NASA IP	TOPS #	Brief Description	Webinar Start Point	Video Length	Possible Applications
Medicine/ Biotech	Nanosensor Array for Medical Diagnoses	TOP2-169	A low-power, and compact nanosensor array chip	50:47	17:51	Medical diagnosis Nanotechnology Health monitoring Homeland security Biomedicine Aerospace
Medicine/ Biotech	Oculometric Testing for Detecting/Characterizing Mild Neural Impairment	TOP2-268	Comprehensive Oculomotor Behavioral Response Assessment (COBRA)	14:22	N/A	Sports training and medicine Military and Aerospace readiness-to-perform Medicine - Hospitals (ER and Trauma Centers) - Ophthalmology clinics - Universities - Clinical research facilities
Medicine/ Biotech	Passive Porous Tube Nutrient Delivery System	KSC-TOPS-73	A technology developed to grow plants in microgravity	N/A	36:35	Vertical Farming Green walls
Medicine/ Biotech	Rapid Nucleic Acid Isolation Method and Fluid Handling Devices	TOP2-276	Smaller, simpler sample-preparation system for complex biology - analysis of gene expression	11:49	12:40	Life sciences industry Diagnostic Industry including mobile diagnostics Biosystems industry Pharmaceutical industry Medical diagnosis Research institutions Commercial and academic research labs Space research stations (gene expression, microbial monitoring) Food quality testing companies Military Bio-threat detection Cruise line pathogen detection Disease or microbial monitoring in remote areas
Medicine/ Biotech	Self-Contained Device Isolates Biological Samples	MSC-TOPS-42	Pipette-free technology enables DNA/RNA isolation/analysis outside of the laboratory using a self-contained device	N/A	28:45	Remote clinical operations Arctic operations Forensic investigations Agribusiness Space vehicles

Category	NASA IP	TOPS #	Brief Description	Webinar Start Point	Video Length	Possible Applications
Medicine/ Biotech	Surface Attached BioReactor (SABR) for Microbial Cell Cultivation	TOP2-148	Capillary driven micro-organism cultivation platform for human life support	24:40	13:49	Cultivate lipid-producing microorganisms for biofuel feedstock Harvest bioactive molecules High value food supplements Cultivate shear-sensitive cells Biological life support for humans in space Fermentation CO2 scrubbing
Optics	Fast Optical Shutter, Chopper, Modulator, and Deflector	LAR-TOPS-223	New application of a Digital Light Processing mirror/aperture as an optical shutter as a means of improving performance of existing optical instruments	N/A	1:50	High speed optical imaging in medical, communications, and scientific research High speed photography or spectroscopy in luminous environments Lithography and laser beam shaping Instruments for pharmaceutical detection, chemical analysis and consumer food analysis
Optics	Fluid Lensing System for Imaging Underwater Environments	TOP2-284	Next-generation sensing technologies for seeing through waves to explore ocean worlds	N/A	13:25	Marine industry Remote sensing missions sUAS-based science missions Science-based airborne and space-borne remote sensing Submerged asset imaging Marine debris
Optics	Free-space Fiber Optic Laser Rod	LAR-TOPS-259	An innovative approach that removes the limitation on peak power densities that exist for fiber lasers	N/A	2:02	Medical Military Telecommunications Aeronautics and Space
Optics	LIDAR System Noise Reduction	LAR-TOPS-323	Polarized LIDAR with photon sieve boosts signal-to-noise ratio (SNR)	N/A	1:20	Remote sensing for autonomous sensing for navigation Provides additional communication security layer for sensitive content Aerosol monitoring of industrial sites Emissions monitoring of vehicles

Category	NASA IP	TOPS #	Brief Description	Webinar Start Point	Video Length	Possible Applications
Optics	Multispectral Imaging, Detection, and Active Reflectance (MiDAR)	TOP2-262	A novel next-generation remote sensing instrument	N/A	5:51	<p>Multispectral Remote Sensing from aircraft, robotic explorers, spacecraft, and underwater environments in both low-light and normal lighting conditions</p> <p>Hyperspectral Imaging</p> <p>Simultaneous Optical Communications</p> <p>Fluid Lensing for cm-scale benthic imaging</p> <p>Mineral identification</p> <p>UV/fluorescent imaging from UAVs</p> <p>3D imaging using Structure from Motion (SfM)</p> <p>Mass-limited robotic exploration of Earth and the solar system</p> <p>Noninvasive medical imaging and diagnosis</p> <p>Semiconductor imaging and engineering structure analysis</p>
Optics	Reflection-Reducing Imaging System for Machine Vision Applications	LAR-TOPS-347	Compact system that leverages a co-linear, high-intensity LED unit to minimize window reflections	N/A	1:47	<p>Wind tunnel testing: Background-oriented schlieren (BOS), Tomographic BOS, and photogrammetric measurements with retroreflective targets</p> <p>Other testing leveraging similar measurement techniques: these could include thermal systems management, gas flow imaging, heat transfer measurements, biomedical R&D, and others</p>
Optics	Ruggedized Infrared Camera	MFS-TOPS-108	High Vibration and Harsh Environment Operation	0	1:55	<p>Satellites and spacecraft: imaging systems for satellites in LEO, including SmallSats, CubeSats, and other spacecraft</p> <p>Aerospace: aircraft-mounted IR cameras for surveillance and thermal analysis of aircraft engines</p> <p>First responders: night vision and enhanced imaging capability in fog, rain, and smoke for search and rescue, firefighting, threat detection, and surveillance</p> <p>Military: IR cameras requiring high tolerance to vibration</p> <p>Unmanned vehicles: collision avoidance systems</p> <p>Automotive: vision systems for autonomous vehicles</p> <p>Industrial machinery: process control and quality control</p> <p>Consumer goods: rugged IR cameras for outdoor use</p>
Power Generation	Advanced Efficiency Flexible Solar Film	LAR-TOPS-319	Flexible composite film offers tailored solution for various applications	N/A	1:42	<p>Small high performance solar chargers for portable devices</p> <p>Higher output solar panels for stationary use</p>

Category	NASA IP	TOPS #	Brief Description	Webinar Start Point	Video Length	Possible Applications
Power Generation	Battery Management System	MSC-TOPS-40	Simple, reliable, and safe battery management for high-voltage battery systems	N/A	1:48	Electric vehicles (EVs), plug-in hybrid (PHEV), and hybrid electric vehicles (HEVs) Telecommunications backup systems Space mission critical battery backup systems Uninterruptible power systems Electric utility storage for renewable energy High-voltage critical battery systems
Power Generation	Li-ion Cell Calorimeter	MSC-TOPS-77	Cell Thermal Runaway Calorimeter	0	45:42	Consumer Electronics Energy Storage Battery Safety Electric Vehicles Electric Bikes Cordless Tools Lawn Equipment
Power Generation	Novel, Solid-State Hybrid Ultracapacitor Battery	MFS-TOPS-75	Solid-state perovskite material offers exceptional capacitance with battery-like power delivery	N/A	0:56	Pulsed power for in-space satellite propulsion systems Rechargeable batteries for use in electric vehicles, electric grid energy storage, cell phones, and other electronic devices
Power Generation	Relaxor Piezoelectric Single Crystal Multilayer Stacks for Energy Harvesting Transducers (RPSEHT)	LAR-TOPS-186	System to increase the effective piezoelectric constant and mechanical energy input to energy harvesting transducers	N/A	34:08	Powering portable electronic devices Harvesting waste mechanical energy for aircraft, automobile, and other transportation equipment to increase energy efficiency of a dynamic system Harvesting electrical power from various vibration sources across a broad range of frequencies Powering wireless sensors for structure health monitoring
Power Generation	Solid-State Lithium-Sulfur Battery Tech Portfolio	LEW-TOPS-167	New battery paradigm for energy density, power, reliability, and safety	N/A	7:24	Aviation: Battery-powered propulsion systems for next generation electric aircraft Automotive: Lightweight batteries that can offer improved safety, sustainability, and driving range of electric cars and trucks. Other: Military/Defense, Electronics, etc.
Propulsion	One-piece Liquid Rocket Thrust Chamber Assembly	MFS-TOPS-93	Rapid additive manufacturing of a lightweight chamber for regeneratively-cooled liquid rocket engines	N/A	2:04	Aerospace: Regeneratively cooled liquid rocket engines for booster engines and upper stage engines

Category	NASA IP	TOPS #	Brief Description	Webinar Start Point	Video Length	Possible Applications
Robotics	Adaptive wind estimation for small unmanned aerial systems using motion data	TOP2-281	A unified approach to autonomous flights of multi-rotor vehicles in urban environment	20:53	7:04	Commercial sUAS manufacturing industry (UAVs/drones/Airtaxies) Aerospace industry Air Traffic Management
Robotics	Airborne Machine Learning Estimates for Local Winds and Kinematics	TOP2-277	GPS-free Estimations using COTS Sensors for UAS and Air Taxi Operations in Complex Urban Environments	1:00	13:08	Urban air taxis/Urban Air Mobility (UAM) Urban UAS Package delivery UAS Emergency Medical Services (EMS) services (like: toxic plume/smoke/ash prediction for urban fires and pollution spills) UAS-based surveillance and infrastructure inspection services Defense and Intelligence operations Ship air wake predictions for safe maritime UAS operations Landing zone wind field predictions for precision parachute airdrops Detailed wind field predictions at urban airports Wind predictions in mountain valleys, canyons, etc. Improved local ballistic trajectory predictions
Robotics	Amorphous Surface Robots	LAR-TOPS-156	Multiple techniques for amorphous robotic locomotion	N/A	1:51	Search & Rescue Pipeline Inspection
Robotics	Characterization and Inspection of Additive Manufacturing Deposits using Transient Infrared Thermography	LAR-TOPS-265	Superior in-situ, non-destructive, online inspection	N/A	1:33	Production efficiency Zero tooling costs Ubiquitous
Robotics	Cost Optimized Test of Spacecraft Avionics and Technologies(COTSAT) Modular Spacecraft Software Architecture	TOP2-267	Rapidly produced low cost spacecraft	N/A	12:27	Small satellites Space launch vehicles Remote sensing satellite Small spacecraft
Robotics	Low Cost Star Tracker Software	TOP2-265	Highly accurate attitude information for low cost COTS hardware	N/A	6:19	Small satellites Space launch vehicles Remote sensing satellite Small spacecraft

Category	NASA IP	TOPS #	Brief Description	Webinar Start Point	Video Length	Possible Applications
Robotics	Modular Robotic Vehicle (MRV)	MSC-TOPS-74	Battery powered electric vehicle with full drive by wire system	N/A	2:47	Automotive Industrial Vehicles Entertainment Motorized Wheelchairs Transportation, Delivery, and Service Airport Transportation Miniaturized Mobility Systems
Robotics	Monitoring and Control of Each Nanosatellite within a Cluster of Nanosatellites	TOP2-213	A low-cost propulsion, navigation, and power sharing technology	N/A	13:55	Space Exploration Earth Observation Systems Scientific Research CubeSat/NanosatelliteSystems
Robotics	Robo-Glove	MSC-TOPS-37	Wearable technology that reduces the force needed to operate tools	0	2:07	Construction Hazardous material handling Medical Automotive Repair Manufacturing Repetitive motion work Oil and gas exploration
Robotics	Robotic Assembly of Photovoltaic Arrays	MFS-TOPS-105	Adaptable automation that reduces manufacturing time and costs	0	37:51	Military: unmanned aerial vehicles (UAVs), person-portable use, assembly of solar arrays in remote environments Space: solar arrays for satellites, assembly of large Power sails for deep space missions, solar-powered electric propulsion Transportation: lower cost, flexible solar arrays can enable range extension on cars, solar refrigeration units, small appliances in buses and RVs, street and traffic lights
Robotics	Safe2Ditch Technology	LAR-TOPS-243	Autonomous crash management to a safe and clear ditch site for small UAVs	N/A	46:14	The Safe2Ditch system will reside on small UAVs as one of several onboard systems A large commercial UAV market is emerging to serve the urban/suburban environment -Home/business deliveries -Live remote transmission -Many others (roof inspection, real estate, etc.)

Category	NASA IP	TOPS #	Brief Description	Webinar Start Point	Video Length	Possible Applications
Robotics	Space Suit RoboGlove (SSRG)	MSC-TOPS-80	Advancements in spacesuit robotic glove may yield terrestrial benefits	N/A	36:31	Manufacturing: operation of hand tools and hand-gripping manual labor for extended periods of time Healthcare: development of rehabilitation aids and assistance of patients with impaired hand muscle strength
Robotics	Upper Body Robotic Exoskeleton	MSC-TOPS-85	Portable device provides upper extremity motor rehabilitation for patients with neurological impairments	0	35:51	Upper-limb motor rehabilitation Assistance with upper-limb activities of daily living Human performance augmentation: enhancing human strength and reducing muscle fatigue for industrial and military applications Spacesuit designs: providing astronauts with additional strength to accomplish safer, more efficient spacewalks
Sensors	Combined Pressure and Temperature Sensor for Hot Harsh Environments	LEW-TOPS-156	Enables Real-time Pressure Measurements, Corrected for Temperature Effects	0	28:58	Nuclear power: monitors pressure at high temperature Aircraft: monitors engine health to control safety and optimize combustion efficiency Aerospace: enables feedback control to watch for thermo-acoustic instabilities Engine Simulations (general): provides data to validate computational fluid dynamic codes used in engine model prediction
Sensors	Cord Tension Measurement Device (C-Gauge)	MSC-TOPS-83	A non-invasive load cell for sensing axial-loaded cord tension	0	21:29	Aerospace Consumer goods Military Parachutes Inflatable structures Hot air balloons High-altitude balloons Blimps Sails and parasails

Category	NASA IP	TOPS #	Brief Description	Webinar Start Point	Video Length	Possible Applications
Sensors	Electric Field Imaging System	LAR-TOPS-116	Low-cost, noncontact imaging through electrical properties	N/A	46:54	Medical: remote, noncontact respiratory and vascular system monitoring, brain imaging, cancer detection, cardiac polarization wave imaging Nondestructive evaluation - flaw detection in composites, evaluation of electrical properties of insulators, electrical shielding evaluation Security: baggage and personnel screening, personnel detection, intrusion detection Crime scene: forensic evaluation for history of events, what was touched with or without gloves, where people walked Meteorology: lightning strike detection or prediction, guidance for lightning protection designs
Sensors	Fiber Optic Sensing Technologies	DRC-TOPS-37	Dramatic improvements for structural health monitoring and tank gauging applications	N/A	2:36	Structural health and integrity Tank gauging Active control Safety and protection Non-destructive evaluation Medical uses
Sensors	Gateway Integrates Wireless Sensors with Existing Aircraft Systems at "the Speed of Software"	DRC-TOPS-42	Architecture advances convergence of new wireless technology into preexisting systems	0	28:00	Testing: Aeronautic and automotive vehicles Systems health monitoring: Systems in long-term storage Industrial: Infrastructure, manufacturing, and the Internet of Things
Sensors	Hyper-Distributed RFID Antenna (HYDRA) System	MSC-TOPS-111	Novel multiplexing RFID antenna system improves range while reducing cost and complexity	N/A	38:32	Aerospace: locates inventory of mission items in and around vehicle Agriculture: helps farmers determine health condition of produce; technology allows supply chain to add information remotely to tag Medical: helps staff manage medical devices and supplies; can track patients Retail: tracks inventory and shipment check-in, automates ordering

Category	NASA IP	TOPS #	Brief Description	Webinar Start Point	Video Length	Possible Applications
Sensors	Inexpensive Microsensor Fabrication Process	LEW-TOPS-78	Sensors can be easily fabricated using nanostructures	N/A	43:36	Environmental monitoring (fire detection, gas detection) System monitoring (leak detection) Health monitoring Oil and gas Remote sensing Fabrication Security Nanomaterials Composites
Sensors	Lightning Mitigation and Damage Detection	LAR-TOPS-128	Proven wireless sensing platform capable of measuring the electrical impedance of physical matter in proximity to the sensor based on a change in its resonance response	N/A	2:08	Wind turbines Tall structures
Sensors	Lightweight Fiber Optic Sensors for Real-Time Monitoring of Structural Health	DRC-TOPS-9	To improve efficiency and safety in aerospace, civil engineering, transportation, oil and gas, renewable energy, and medicine	0	40:09	Aerospace: Sensing shape and structural health monitoring Medical: Monitoring medical robotics, catheters, MRI machines, and radioactive environments Renewable wind energy: Monitoring wind turbine blade deformation Civil structures: Designing and monitoring bridges, tunnels, buildings, and dams Automotive: Monitoring frame stress for improved safety and performance Transportation and Rail: Monitoring integrity of train and tracks Marine: Monitoring oil tankers, navy vessels, competitive yachts, and submarine hulls Oil and Gas: Detecting leaks, monitoring pipelines, and downhole drilling Power: Monitoring nuclear power plant vibration and temperature Seismology: Monitoring shifts in the earth's crust Mining: Monitoring integrity of shafts Military: Detecting chemical or biological agents

Category	NASA IP	TOPS #	Brief Description	Webinar Start Point	Video Length	Possible Applications
Sensors	Low Mass Antenna Boosts RFID Device Performance	MSC-TOPS-117	Antenna employs dual resonance modes to facilitate more accurate tag location	N/A	38:32	Agriculture: tracking produce health and transport Enclosed vehicles and vessels: tracking hardware, devices, consumables, and occupants Manufacturing: tracking workforce, equipment, supplies, merchandise, and shipments Medical: tracking supplies, devices, workforce, and patients Retail: tracking merchandise inventory and shipments
Sensors	MMOD Impact Detection and Location	LAR-TOPS-245	Micrometeoroid/Orbital debris impact detection and location using fiber optic strain sensing	N/A	2:18	Of possible interest to all aerospace companies engaged in spacecraft work, such as commercial crew providers and developers of elements of the Deep Space Gateway and transport system Complex unmanned vehicles such as satellites and UAVs may also benefit from automated object impact detection
Sensors	Multidimensional Damage Detection System	KSC-TOPS-30	Multidimensional system for detecting damage to surfaces and vessels	<u>0</u>	34:44	Aircraft Military Shelters Solar Arrays Critical Hardware Enclosures Spacecraft Space Habitats Inflatable Structures Smart Garments
Sensors	Multivariate Monitoring for Human Operator and Machine Teaming	TOPS-301	Instrumentation for biosignal, posture and behavioral gesture sensing for automation decision making	N/A	1:45	Automotive – autonomous cars and other driverless vehicles Industrial automation Assessing commercial driver safety Monitoring of machine operator cognition Any other software where psychophysiological monitoring is useful
Sensors	Novel Solid-State Humidity Sensor	MFS-TOPS-80	Unparalleled sensitivity, response, recovery time, and robustness	N/A	1:46	Aerospace Automotive Industrial Health care Marine Consumer Defense

Category	NASA IP	TOPS #	Brief Description	Webinar Start Point	Video Length	Possible Applications
Sensors	Passive Smart Container	MSC-TOPS-36	RFID technology to quantify and track liquids and bulk goods	N/A	1:27	Pharmaceuticals: Applicable to items difficult to tag such as drugs and tablets Health care: Useful in monitoring medication and other health care-related items Consumable supply management: Track consumable items in a variety of industries
Sensors	Photo-Acoustic Sub Part-Per-Billion Chemical Sensing	LAR-TOPS-214	Photo-acoustic sensing based laser vibrometer for the measurement of ambient chemical species	N/A	1:54	Airborne and space based chemical detection Hand-held chemical detection
Sensors	Robust Sensors Detect Material Ablation and Temperature Changes	TOPS-83	Embedded and arrayed sensors enable large-area sensing in thermal protection systems and more	0	5:34	Vehicles: braking systems Thermal protection systems: space vehicles, missiles, hyper-loop vessels Oil and gas: pipe erosion System monitoring: nuclear containment, infrastructure erosion
Sensors	Scintillating Quantum Dots for Imaging X-rays (SQDIX) for Aircraft Inspection	LAR-TOPS-112	A revolutionary system that enables characterization of microcracking in composites or x-ray inspection of in-service turbine engines	N/A	2:00	Aircraft inspection Medical imaging
Sensors	Wind Event Warning System	LAR-TOPS-229	High-energy Doppler LIDAR to protect wind turbines and aircraft from severe wind events	N/A	1:23	Off-shore Wind Energy Applications Airport long-range wind event monitoring and detection