MITRE National Security Engineering Center (NSEC) - Defense Holiday Patents (January 2026), contact: Allison Reardon, AREARDON@mitre.org					
Patent Number	**Patent Title**	**Brief Technical Summary**	**First Inventor (Last Name Only)**	**Refined Commercial Use Cases**	**Potential Commercialization Markets**
US 12,188,971	Rydberg atom-based vector and polarization sensor	Quantum RF sensor that uses multi-photon laser excitation of atoms to Rydberg states in a vapor cell, then compares optical responses across orthogonally polarized beams to infer the incident field's direction-of-arrival and polarization. It measures angle-of-arrival and polarization in a single measurement using phase/intensity contrasts, enabling compact broadband field sensing.	Marlow	5G/6G site surveys and interference localization EMC/EMI compliance diagnostics without metal probes Non-invasive antenna beam/polarization mapping in labs Spectrum monitoring in dense urban environments Calibration standards for RF test equipment Polarization-aware IoT gateway diagnostics	RF test & measurement instruments / software-defined test Photonics components & quantum sensing accessories
US 12,451,021 / US2024/0046804 A1	Microscale weather hazard products for urban aviation transportation	Algorithms and data products that convert microscale wind/obstacle fields in urban terrain into actionable hazard metrics for UAS/AAM routing. It fuses fast-time urban micro-meteorology with derived turbulence/shear indicators to output route- and pad-level hazard overlays.	Robinson	UAM vertiport siting and approach path hazard scoring UAS delivery route planning with microscale wind risk avoidance City operations centers: real-time AAM hazard dashboards Drone insurance underwriting using objective hazard indices Construction crane & high-rise safety wind alerts Event airspace micro-weather nowcasting (stadiums, marathons)	Advanced air mobility ops software & services Advanced air mobility ops software & services Enterprise/municipal UAS fleet management Aviation insurance tech/analytics Avionics weather & navigation systems Weather intelligence platforms & APIs
US 10,605,895	Radar operation in a nuclear-scintillated environment	Breaks a wideband LFM chirp into consecutive narrowband segments below the medium's correlation bandwidth, reassembles echoes into a composite waveform, and applies matched filtering to recover target returns through scintillation. Enables detection/ID when conventional wideband waveforms distort in time-varying plasma channels.	Forrest	High-reliability weather/traffic radar in severe ionospheric disturbances Space situational awareness ground radars under scintillation Resilient coastal/harbor surveillance in ducting/scintillation Autonomous shipborne radar performance in adverse propagation Ruggedized perimeter radar for critical infrastructure	Air/ground surveillance radars Air/ground surveillance radars Coastal security & VTS radar systems Maritime radar systems Compact solid-state radars for security
US 10,158,160	Devices and method for metamaterials	A negative-index metamaterial based on orthogonal S-shaped split-ring resonator unit cells that receive/guide EM waves independent of polarization. The geometry is scalable and 3D-printable, supporting polarization-agnostic operation around designed resonant frequencies.	McMichael	Compact polarization-agnostic microwave lenses/beam shapers RFID/IoT tag enhanced coupling surfaces Steerable in-building mmWave repeaters Non-metallic 3D-printed RF waveguides for SATCOM terminals EMI shielding panels with tuned passbands	Microwave/antenna components mmWave repeaters & beamforming surfaces mmWave automotive & telecom front-ends Telecom research & advanced components In-building DAS and materials mmWave IC ecosystems
US 11,966,571	PFAS Remediation Option Explorer Tool	Interactive decision-support tool that aggregates PFAS remediation data across multiple methods (e.g., adsorption, oxidation, membranes) and criteria (efficacy, cost, waste, volume). Users adjust criterion weights and thresholds; the interface re-ranks and visualizes options dynamically, improving transparency behind recommended remediation choices.	Klein	Water utilities selecting PFAS treatment trains Industrial pretreatment planning (e.g., plating, paper) Consulting firms comparing lifecycle costs of PFAS removal State regulators evaluating technology pilots Engineering firms optimizing retrofit designs	Municipal drinking water treatment Industrial wastewater treatment Environmental consulting & remediation services Regulatory decision support platforms EPC water infrastructure projects

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US 11,404,861	System and Methods for Mitigating Ground Induced Currents on Commercial Power Infrastructure	Senses geomagnetically induced DC currents on AC distribution lines and separates/filters the DC component to assess risk and trigger mitigation. Improves grid reliability during solar storms by detecting harmful quasi-DC flows and enabling corrective actions.	Britan	Utilities monitoring GIC on transmission/distribution feeders Equipment OEMs integrating GIC sensors in substations Grid operators for storm impact dashboards Insurance risk analytics for critical infrastructure Microgrid controllers adding DC-offset protection	Transmission & distribution utilities Substation protection & automation Grid operations software Energy infrastructure insurance/actuarial services Microgrids & DER management
US 10,697,952	Determining the Age of a Tunnel	Chemical-signature method for estimating the age of an underground space by analyzing soil samples for compounds (e.g., $CaCO_3$, iron oxides, asphalt markers) and comparing to baselines. Uses spatial sampling and ratios to infer construction timing without direct records.	Latham	Forensic dating of illegal mining shafts Civil infrastructure asset age verification Insurance claims investigation after ground failure Archaeology and urban history studies Construction QA/QC audit trails when records are incomplete	Materials testing labs & forensics Civil engineering & asset management Property & casualty insurance analytics Geospatial software integrations Environmental & geotech consulting
US 10,991,935	Structural Lithium-Ion Batteries with Carbon Fiber Electrodes	Structural battery architecture where carbon-fiber reinforced polymer layers form the current-carrying electrodes; metallic tabs are embedded and the battery can be molded into load-bearing parts. Enables combined energy storage and structure, reducing mass/volume vs. conventional packs.	Hudak	eVTOL/UA airframes with embedded energy storage Automotive body panels as batteries Satellites/space structures with structural energy storage Consumer electronics casings doubling as batteries Robotics arms/chassis weight reduction	Advanced composites manufacturing Electric vehicles Urban air mobility Aerospace/space platforms Premium consumer devices & robotics
US 10,741,317	Method of Fabrication of Composite Monolithic Structures	Manufacturing method for composite monolithic structures that minimizes air inclusion during curing/winding to improve electrical, thermal, and mechanical properties. Uses staged curing and layering to form dense, high-performance composites around conductive arrays or fibers.	Hudak	High-voltage busbars with integrated insulation Lightweight composite pressure vessels EV motor housings with improved thermal paths Antenna masts with embedded conductors Wind turbine blades with built-in cabling	Power transmission components Renewables (wind/solar storage hardware) Automotive e-powertrain Aerospace structures Industrial equipment enclosures
US 10,147,557	Enhanced Structural Supercapacitors	Structural supercapacitor device and electrodes using carbon-fiber layers augmented with CNTs, redox-active groups, and/or conducting polymers plus a solid electrolyte. Delivers high mechanical strength while boosting capacitance and energy density relative to conventional CFRP laminates.	Hudak	Drones with structural power buffering Wearables and sports gear with impact-resistant energy storage Regenerative braking buffers in micromobility High-power bursts for robotics actuators Grid frequency-support modules embedded in enclosures	Unmanned aerial systems Wearables & protective equipment Micromobility & e-bikes Industrial robotics Grid ancillary services hardware
US 10,163,356	Systems and Methods for Displaying Aircraft Separation Information	ATC visualization that computes potential converging pairs before final approach and displays separation metrics earlier than conventional tools. Supports dynamic updates as tracks move, helping controllers sequence arrivals and reduce excess spacing safely.	Britan	Arrival management tools for commercial airports Tower simulators/training systems Digital twin analytics for runway throughput UAM vertiport traffic displays Airline ops centers predicting arrival de-spacing	Air traffic management software Airport operations optimization Airline operations control Advanced air mobility traffic services Simulation & training

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US 10,634,584	Device for Microscopic Sample Collection	Handheld tape-lift collection device with a work stand that reduces contamination risk and improves repeatability. Features a collection platform and slit geometry for depositing and handling microscopic samples from a target surface.	Farris	Cleanroom residue monitoring Forensic surface evidence collection Aerospace contamination control (FOG/particulates) Electronics manufacturing QA sampling Museum/conservation particulate sampling	Forensics & crime labs Semiconductor & pharma cleanrooms Aerospace manufacturing MRO Electronics assembly QA Museums & conservation labs
US 2023/0325704	Quantum State Vector Implementation Toolkit (QuaSIT)	Parses text-based quantum algorithms that specify initial and target state vectors, builds syntax trees, derives transition information, and auto-generates quantum circuits implementing the transformation. Bridges algorithm specification and executable circuits.	Carignan	Automated circuit synthesis in quantum IDEs Curriculum tools for quantum education platforms Compiler plug-ins for algorithm-to-circuit translation Consulting toolkits to port algorithms across hardware Verification frameworks comparing intended vs. generated circuits	Quantum software development kits STEM education platforms Enterprise quantum consulting Circuit compilers & transpilers EDA & simulation tooling
US 9,599,564	Quantum Dot–Polymer Nanocomposite Sensor Array for Chemical Vapor Sensing	Sensor array formed from multiple quantum-dot/polymer films with distinct sorption responses. Excite with light and measure fluorescence dynamics across films to classify vapor analytes via pattern recognition.	Li	Industrial leak detection & VOC monitoring Wearable exposure badges for workers Food spoilage/gas sensing in packaging Indoor air quality monitors Smartphone clip-on environmental sensors	Industrial safety & gas detection Occupational health wearables Food logistics & packaging Smart home & building IAQ Mobile accessories & consumer electronics