

# NASA Ignite 2024-II Solicitation

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## Proposal Details

**Proposal Number:** Ai02.24-17

**Subtopic Title:** undefined

**Proposal Title:** Next Generation, Aviation-Ready Modular Energy Storage Solution for Electric and Hybrid Aircraft

## Small Business Concern

**Firm:** Physical Sciences Inc.

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## Principal Investigator

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## Summary Details

**Estimated Technology Readiness Level(TRL Begin - TRL End):** 3 - undefined  
**Technical Abstract (Limit 2000 characters):**

Imperia Batteries® , a division of Physical Sciences Inc. (PSI), will prototype and validate an abuse tolerant, high energy density, modular energy storage solution for integration into electric aviation platforms in the 1500 to 5000 lbs. size class. During the Phase I, Imperia conducted a trade study on cell level components to design its modular battery solution. Imperia's module is 2.2 kWh and is designed to have an energy density >180 Wh/kg and be able to support power density >1000 W/kg. Imperia's modular design includes safety considerations across multiple levels, including through the cell chemistry, the mechanical housing, and the electronic systems. During the Phase II, Imperia will prototype the energy module and validate the electrochemical performance, physical robustness, and abuse tolerance. Imperia will work with industry partners to integrate the battery prototypes with powertrain systems and validate them against scaled mission relevant conditions. This data will be used to update and improve the module design to best meet the demanding requirements of electric aviation applications. Successful completion of these efforts will demonstrate the readiness of the technology for low-rate initial production and certification activities.

**Duration:** 18

## Proposal Details

**Proposal Number:** Hi02.24-10

**Subtopic Title:** undefined

**Proposal Title:** E-Drive: Electromagnetic Zero-Emission Valve Drive

## Small Business Concern

**Firm:** MagDrive Technologies, Inc.

**Address:** 10 Innovation Ln, Unit A, BOZEMAN, MT, 59718-9459

**Phone:** 406-580-3228

## Principal Investigator

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## Summary Details

**Estimated Technology Readiness Level(TRL Begin - TRL End):** 3 - undefined  
**Technical Abstract (Limit 2000 characters):**

MagDrive Technologies' "E-Drive: Electromagnetic Zero-Emission Valve Drive" project proposes a novel valve drive for zero emission cryogenic systems, particularly for space and harsh environments. This technology aims to eliminate valve leaks using a hermetically sealed, electromagnetically actuated design. Key features include: -No external dynamic seals -Precise flow control -Miniaturization - Robustness Phase II objectives focus on transitioning from a virtual to a physical prototype, including motor fabrication, testing, and assembly into a functional E-Drive valve for cryogenic conditions. Funding will support subcontractors, hardware procurement, fabrication, testing, personnel, and technical and business assistance consulting. Target markets include aerospace (NASA, Space Force, private spaceflight) and terrestrial sectors like oil & gas, chemical, cryogenics, and refining. Commercialization strategy includes licensing, pilot programs, channel partnerships, direct sales, and IP protection. Expected outcomes include a functional prototype, performance validation, increased market interest, pilot programs, and strengthened IP. This project aims to significantly advance valve technology, enhancing reliability, efficiency, and safety in extreme environments.

**Duration:** 18

## Proposal Details

**Proposal Number:** Hi02.24-11

**Subtopic Title:** undefined

**Proposal Title:** FuseBlox System for Robotically-Assisted Cryogenic Applications

## Small Business Concern

**Firm:** SpaceWorks Enterprises, Inc.  
**Address:** 2960 Brandywine Road, Atlanta, GA, 30341-5509  
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## Principal Investigator

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## Summary Details

**Estimated Technology Readiness Level(TRL Begin - TRL End):** 3 - undefined  
**Technical Abstract (Limit 2000 characters):**

SpaceWorks proposes FuseBlox CryoFlow, a modular cryogenic fluid interface designed for in-space refueling and ground infrastructure applications, addressing NASA's identified Capability Gap for Moon-2-Mars objectives. CryoFlow integrates fluid transfer, power, and data pass-through in a compact form factor, leveraging proven FuseBlox platform technologies. IGNITE Phase 2 funding will support the development and testing of a ground-rated prototype. By serving multiple market verticals with a scalable platform, CryoFlow is poised to enable next-generation cryogenic flight platforms across the space industry.

**Duration:** 18

## Proposal Details

**Proposal Number:** Hi02.24-18  
**Subtopic Title:** undefined  
**Proposal Title:** CryoGuard PEEK-N Seals

## Small Business Concern

**Firm:** Beacon Industries Inc  
**Address:** 549 Cedar Street, Newington, CT, 06111-1814  
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## Principal Investigator

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## Summary Details

**Estimated Technology Readiness Level(TRL Begin - TRL End):** 3 - undefined  
**Technical Abstract (Limit 2000 characters):**

Beacon Industries, Inc. proposes a novel multi-disc cryogenic seal made from PEEK-N for cryogenic valves, couplers, quick disconnects, and fuel transfer systems. Traditional seals use a single surface that deforms under extreme cold and pressure, causing leaks. Our solution uses ten thin, stacked discs that compress and adapt under pressure, creating multiple barriers to stop leaks even after 66,000 pressure cycles at -253°C and 14,500 psi. This design resists brittleness, hydrogen embrittlement, and particle damage, ensuring safe, long-term operation in space and launch systems. The seal is additively manufactured (3D-printed) for custom fit and lower weight, solving critical challenges for NASA and commercial cryogenic systems.

**Duration:** 18

## Proposal Details

**Proposal Number:** Si02.24-2

**Subtopic Title:** undefined

**Proposal Title:** Continuous Snow Monitoring for Improved Water Supply Management

## Small Business Concern

**Firm:** Applied Research Team, Inc.

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## Principal Investigator

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## Summary Details

**Estimated Technology Readiness Level(TRL Begin - TRL End):** 6 - undefined

**Technical Abstract (Limit 2000 characters):**

Population growth and shifting weather patterns are putting unprecedented pressure on the water supply for 40 million people in the Western United States and for one-sixth of the global population. The primary source of this water is snowmelt from remote mountain regions, which is challenging to measure. However, accurate tracking of snowpack is essential for predicting how much water will be available to support cities, agriculture, hydropower, and ecosystems as the snow melts each year. We are developing a robust decision support tool that leverages NASA remote sensing assets, including satellite optical and synthetic aperture radar. These, combined with weather radar, ground sensors, and physics-guided machine learning, will provide continuous monitoring of the temporal evolution of snow water equivalent throughout the snow year. Our prototype focus is development of a commercial offering that delivers operational snow water equivalent maps at spatial and temporal resolutions tailored to water management needs. We will enhance algorithms, test geographic transferability, and develop the commercial offering with stakeholder input. This decision support tool will provide actionable insights for water resource management in near real-time supporting decisions for timing and magnitude of recharge, reservoir release, diversion, and curtailment. The target markets for our tool are organizations that rely heavily on snowmelt for their water supply. Our market analysis highlights key segments such as water conservancy and conservation districts, irrigation districts, and industrial users. Other important stakeholders include reservoir managers responsible for flood and drought mitigation, recreation and environmental flow releases, those managing water rights and interstate compacts, municipal and regional water utilities involved in water storage, and hydropower generators allocating flow for energy production.

**Duration:** 24**Proposal Details****Proposal Number:** Si02.24-17**Subtopic Title:** undefined**Proposal Title:** FireVision: An AI-Powered Decision-Support Platform Leveraging NASA Earth Science Data for Wildfire Risk, Mitigation, and Response**Small Business Concern**

**Firm:** Opal AI Inc.

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## Summary Details



**Estimated Technology Readiness Level(TRL Begin - TRL End):** 4 - undefined  
**Technical Abstract (Limit 2000 characters):**

FireVision is a next-generation AI-powered wildfire decision-support platform developed by Opal AI, designed to transform NASA Earth Science data into actionable tools for wildfire risk prediction, mitigation, and emergency response. Built on a multi-modal foundation model using remote sensing inputs (e.g., NISAR, MODIS, Landsat-8, VIIRS), FireVision generates high-resolution (30m) dynamic fuel maps, Fire Potential Indices (FPIs), and real-time fire spread simulations. The Phase II effort will extend FireVision's capability to Wildland-Urban Interface (WUI) areas and integrate uncertainty analysis, a web-based simulation dashboard, and an AI-powered decision-support assistant. Funding will support the development, testing, and validation of the platform across high-risk areas in California and Texas. Commercialization will be accelerated through collaborations with fire agencies and utilities, including LADWP and Austin Energy. Key deliverables include an operational web tool, immersive simulation interface, and a comprehensive WUI vulnerability model. FireVision aims to empower emergency responders, utilities, and planners with data-driven insights to reduce wildfire risk, protect communities, and improve decision-making.

**Duration:** 15

## Proposal Details

**Proposal Number:** Si02.24-25  
**Subtopic Title:** undefined  
**Proposal Title:** dMRV for cropland burning informatics

## Small Business Concern

**Firm:** Mitti Labs  
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## Summary Details

**Estimated Technology Readiness Level(TRL Begin - TRL End):** 4 - undefined  
**Technical Abstract (Limit 2000 characters):**

This SBIR builds and deploys digital Measurement, Reporting, and Verification (dMRV) science and technology for Greenhouse Gas (GHG) inventory and Voluntary Carbon Markets (VCM). The Phase 2 prototype will track and quantify cropland burning emissions using remote sensing, physical models, and field data with a “Geo-AI”™ architecture. Phase 2 will be deployed over 3 burning hot-spot geographic domains: Arkansas, Dakotas, and northwest India. This SBIR will deliver data products that characterize field scale cropland residue management practices and emissions informatics for 2025-2028, wall-to-wall, at field scale. Multi-source remote sensing (Landsat, MODIS/VIIRS, Sentinels, L-band, Planet) are used for physical retrievals and driving deep learning models. The SBIR improves NASA's Global Cropland Burned Area (GloCAB) and Global Fire Emissions Database (GFED) products with high resolution analytics and precise emissions quantification (burn area x burn type x combustion efficiency x emission factors) and further supports NASA Carbon Monitoring System (CMS) activities. Commercial applications are geared at generating high integrity carbon credit by integrating burning emissions and residue into “carbon credits”™ for Voluntary Carbon Markets (VCM) and Article 6 compliance.

**Duration:** 24