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Informational session on the USDOT Small Business Innovation (SBIR) funding notice



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The logo for MTRI, Inc., featuring a stylized antenna icon above the text "MTRI, Inc." in a bold, sans-serif font.

MTRI, Inc.

What is the SBIR / STTR program?

- **Small Business Innovation Research (SBIR)**
 - “Awards contracts to small business to pursue research on & develop innovative solutions” (USDOT)
 - Encourage U.S. small business to pursue Federal research with potential for commercialization (sbir.gov/about)
- **SBIR vs STTR**
 - Many agencies also have a STTR (Small Business Technology Transfer) program
 - Small business must be the lead
 - Partnerships with research institutions (RI, usually a higher education institution) encouraged for SBIR, required for STTR
 - SBIR – Principal Investigator must be primarily employed at small business (>50% when funded); STTR – PI – can be at RI or small business
 - SBIR – max 33% for RI at Phase I; up to 50% at Phase II
 - STTR – up to 60% can be subcontracted to RI

What is the SBIR / STTR program?

- **Small business is < 500 employees, American-owned, for-profit entity**
- **Early stage / high risk funding with potential for commercialization**
 - SBIR Phase I funding is typically \$150,000 max with 6 month period of performance (POP) – design for or a working prototype
 - SBIR Phase II funding varies; \$300k to \$1 million is typical (varies by agency) – normally 18-24 months POP – full scale prototype with lab/field testing
 - Phase III – commercial availability stage, likely with partner or spin-off company with investors
- **Federal agencies design R&D topics & accept proposals; can often talk with program managers at agencies ahead of time**
- **More information:**
 - <https://www.sbir.gov/sites/all/themes/sbir/dawnbreaker/img/documents/Course1-Tutorial3.pdf>
 - <https://www.sbir.gov/about>
 - <https://www.volpe.dot.gov/work-with-us/small-business-innovation-research>

What is MTRI Inc.?



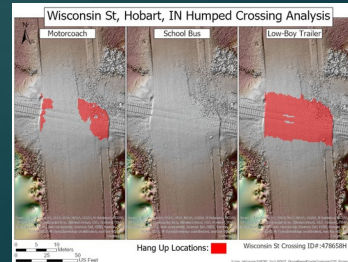
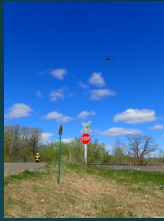
- <https://mtriinc.com/>
- **“MTRI Inc. (MI) facilitates the commercialization of intellectual property (IP) of Michigan Tech University - Michigan Tech Research Institute. MI will sell products and services at commercial market prices.”**
 - MTRI Inc. (MI) is small business focused on commercializing research
 - MTRI (<https://www.mtu.edu/mtri/>) is a research center of Michigan Tech
- **Strong focus on developing & commercializing remote sensing research**
- **MI can be the small business lead on SBIR & STTR proposals**
 - anyone at MTRI can be the PI if interested (>60 full time research staff)
 - While MI has SBIR or STTR funding, MI PI works >50% time for MI; rest of time is still with Michigan Tech
 - Other MTRI staff can be part-time staff on MI projects & provide expertise
 - MI has won 3 SBIR and 2 STTR projects so far – 2 SBIR & 1 STTR are partnerships with campus colleagues

Examples of previous MTRI Inc. – Michigan Tech partnerships resulting in SBIR/STTR funding

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- **Crossing-i: drone-enabled rail grade crossing inspection system**

- USDOT Volpe Center SBIR funding – 2019 to 2022
 - Federal Railroad Administration led development of the topic
- Partnership between MI staff (PI Colin Brooks, Co-PI Rick Dobson) and Pasi Lataula (Director, Rail Transportation Program / Assoc. Prof. CEGE)
 - Built from previous work on high-resolution 3D drone sensing lead by C.Brooks, R.Dobson, & colleagues, and rail expertise of Dr. Lataula including focus on grade crossing safety
- <https://mtriinc.com/rail-crossing-assessment/>
- Won both Phase I (\$149,989) and Phase II (\$299,996) SBIR funding
 - Working on a potential Phase III topic to extend capabilities to inspect transit tunnels
- Phase I & Phase II developed the technology, enabled demonstrations and creation of commercialization plans; now doing outreach to get paying customers
 - USDOT Volpe Success Story feature: <https://www.volpe.dot.gov/sbir/success-stories/crossing-i-drone-based-inspection-system>
- Technical and Business Assistance (TABAs) included to work with USDOT-selected firm to advise on commercialization including market size, potential collaborators, end users
- New MEDC funding to advance commercialization in 2022-2023
 - [Michigan Translation Research and Commercialization \(MTRAC\) for Advanced Transportation Innovation Hub](#) – funding via U-Mich from Michigan Economic Development Corporation
 - \$58k funding with \$19 match



Examples of previous MTRI Inc. – Michigan Tech partnerships resulting in SBIR/STTR funding

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- **Online and Offline Terrain Strength Estimation using Remote Sensing for Ground Vehicle Mobility**

- U.S. Army STTR Phase I award – program manager at Ground Vehicle Systems Center (formerly TARDEC) in Warren, MI
- Partnership between MI staff (PI Rick Dobson, Co-PI C.Brooks) and Thomas Oommen (Prof. – GMES) and Keweenaw Research Center (KRC)
 - Built from previous work on demonstrating hyperspectral, thermal, and 3D drone sensing to estimate terrain strength / trafficability in off-road areas for Army vehicles, including for NATO, in collaboration with KRC
- Phase I funding: \$172,928 (work complete in 2022); Phase II funding applied for (\$1,150,000) with potential summer 2023 start for 2-year project
 - Michigan Emerging Technologies (MIEFT) funding provided \$25k in matching funding to help advance technology including outreach - <https://www.mietf.org/#/> - MI SBDC
 - Can provide Phase II funding when lead has investor funding

Remote sensing based determination of terrain strength for mobility planning



Michigan Tech

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Michigan Technological University, Houghton, MI

Rick Dobson, Dr. Colin Brooks

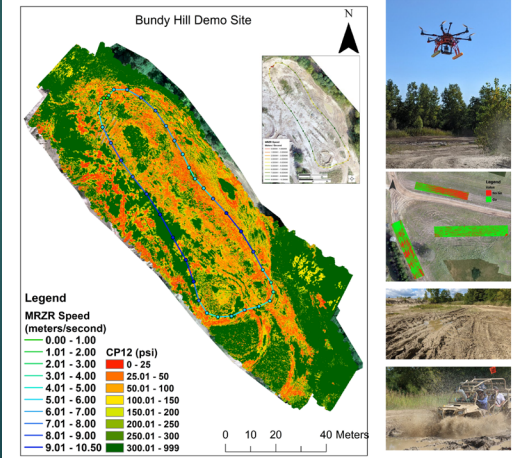
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MTRI Inc., Ann Arbor, Michigan, USA



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- MTR Inc. / Michigan Tech terrain strength estimation tool has been demonstrated through U.S. Army STTR Phase I project
- Uses UAS thermal sensing to estimate soil strength
- Uses UAS hyperspectral sensing for soil type characterization
- Combines thermal & hyperspectral with machine learning algorithms
- Predicts Go / No-Go status for different vehicle types
- Being used to help U.S. Army Ground Vehicles System Center (GVSC / TARDEC) develop Next-Generation NATO Reference Mobility Model (NG-NRMM)



U.S. Army GVSC Program Manager: Michael Cole; Technical Advisor: Paramsothy Jayakumar

Other funded MTRI Inc. (MI) projects

- ▶ Global Optimization of Graph Learning Structures (GOGLS)
 - ▶ Defense Threat Reduction Agency (DTRA) – Phase 1 SBIR funding
 - ▶ MI partnership with MTRI research staff
 - ▶ Led by Dr. Richard Chase
- ▶ Tool for Automous Terrain Exploration of Remote Space (TATERS)
 - ▶ NASA funding – lunar exploration focus – Phase 1 STTR funding
 - ▶ MI partnership with MTRI research staff
 - ▶ Led by Dr. Joe Paki

USDOT 2023 Phase I SBIR solicitation



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- **2023 solicitation opened Feb. 7, 2023; goes through March 7, 2023 at 3:00 pm ET**
- <https://www.volpe.dot.gov/work-with-us/small-business-innovation-research/solicitations>
 - **10 topics for 2023**
 - **4 Administrations within USDOT as leads – FHWA, FRA, NHTSA, PHMSA**
 - **Annual release of new topics**

U.S. DOT Operating Administration	Topic Number & Title	Estimated Award Amount Phase I*	Estimated Award Amount Phase II**
Federal Highway Administration (FHWA)	23-FH1: Addressing Stormwater Runoff with a Self-Contained Portable Treatment System	\$150,000	\$1,000,000
	23-FH2: Traffic Monitoring and In Situ Information Processing Using Edge Computing	\$150,000	\$1,000,000
Federal Railroad Administration (FRA)	23-FR1: Concrete Crosstie Inspection Technology	\$150,000	\$300,000
	23-FR2: Novel Design for Passenger Railcar Glazing Securement	\$150,000	\$300,000
National Highway Traffic Safety Administration (NHTSA)	23-NH1: Child Presence Detection CO2 Release Test Device	\$150,000	\$500,000
	23-NH2: Immersive Virtual Reality Training on Impaired Driving for Law Enforcement	\$150,000	\$350,000
Pipeline and Hazardous Materials Safety Administration (PHMSA)	23-PH1: Bioremediation for Hazardous Material Spills	\$200,000	\$1,000,000
	23-PH2: Integrated RFID Trackers and Sensors for Hazardous Material Communication in Transportation	\$200,000	\$1,500,000
	23-PH3: Portable State-of-Charge Sensor for Lithium Batteries	\$200,000	\$1,000,000
	23-PH4: Wearable PPE-integrated Sensors for First Responders	\$200,000	\$1,000,000

Interesting 2023 topics

- ▶ **23-FH1: Addressing Stormwater Runoff with a Self-Contained Portable Treatment System (FHWA)**
 - ▶ “This proposal seeks to develop a mechanism to remove suspended and dissolved pollutants and other emerging stormwater pollutants from highway construction and urban stormwater runoff sources.”
- ▶ **23-FH2: Traffic Monitoring and In Situ Information Processing Using Edge Computing (FHWA)**
 - ▶ “The eventual deliverables are envisioned to include edge computing integrated traffic monitoring sensors and efficient in-site information extraction computer algorithm for the edge computing devices.”
 - ▶ Could build from previous Michigan Tech (Kuilin Zhang) and MTRI (Brooks et al.) collaborations on drone-enabled traffic monitoring efforts for MDOT

Interesting 2023 topics

▶ **23-FR1: Concrete Crosstie Inspection Technology (FRA)**

- ▶ “Proposed solutions shall be non-destructive and shall provide quantitative inspection data to allow for informed decisions regarding tie condition replacement.” & “A complete solution will report external and internal crosstie feature conditions in an automated manner.”
- ▶ Could build from previous collaborations with T.Oommen on thermal & 3D inspection of concrete infrastructure (bridge decks) for MDOT & P.Lataula knowledge of rail safety issues

▶ **23-NH1: Child Presence Detection CO2 Release Test Device (NHTSA)**

- ▶ “This project will aim to develop test equipment that simulates a human child breathing by releasing CO2 inside a vehicle cabin. The awardee will have to develop the test equipment to release CO2 and record various test parameters, like the amount of CO2 released and the overall amount of CO2 in the vehicle cabin.”
- ▶ Could build from previous MTRI efforts in gas detection & sensor deployment