550 CORRIDOR MANUFACTURING INTITATIVE

CREATING A SUSTAINABLE WORKFORCE FOR RURAL ECONOMIC GROWTH

Cliff Hudson, CEO
Emerging Technology Ventures, Inc.
Alamogordo, NM

July 14, 2021

ETV Emerging Technology Ventures Inc.

EMERGING TECHNOLOGY VENTURES (ETV) develops integrated, cross-domain autonomous system solutions and data analytics in the precision agriculture, critical infrastructure inspection, renewable energy, public safety, and Defense sectors.

Our leadership team has over 50 years of combined experience in robotics and autonomous systems across the Department of Defense and commercial industry in research & development, program management, manufacturing, and life-cycle management.

MULTI-DISCIPLINED TEAM Our engineering team provides the full spectrum of electrical, software, manufacturing, and system engineering support for a customer-centric design approach.

LEADING-EDGE TECHNOLOGY Our team maintains strategic relationships with academia and the national laboratories to commercialize the latest enabling technologies for continued capability growth in autonomous operations and data analytics.

KeenAi

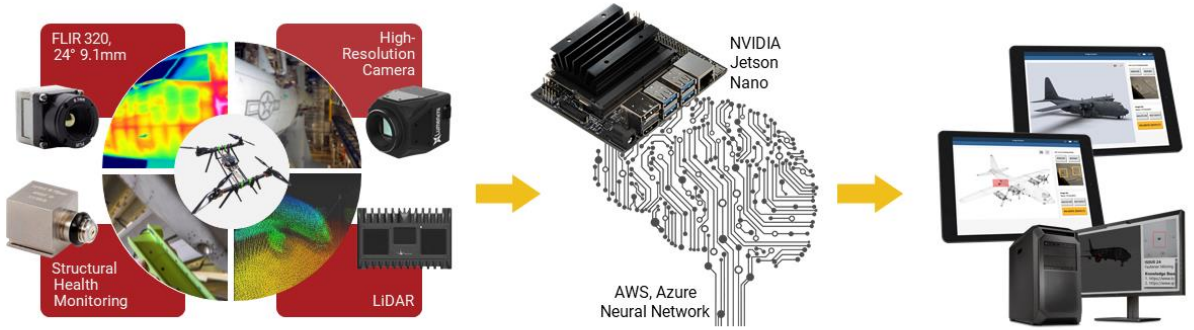
Precision Sensing and Analytics in Complex Environments

SkyAi

Autonomous Inspection and Analytics for Wind Turbine Inspection and Aviation Maintenance

GreenAi

Precision Crop Scouting and Predictive Analytics for Agriculture

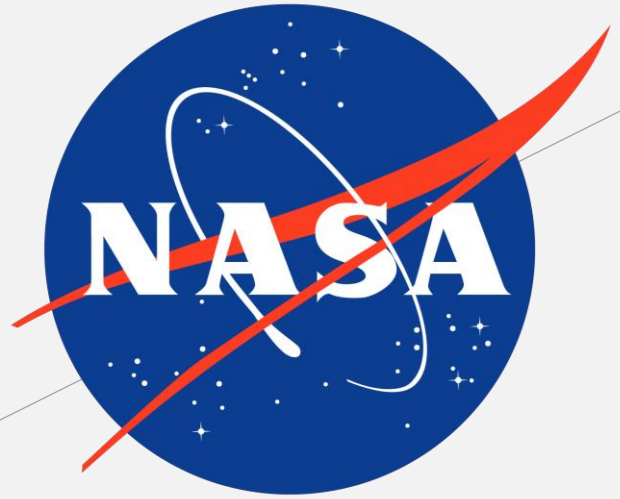


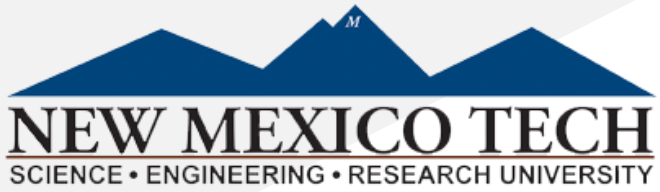
ETV Emerging Technology Ventures Inc.

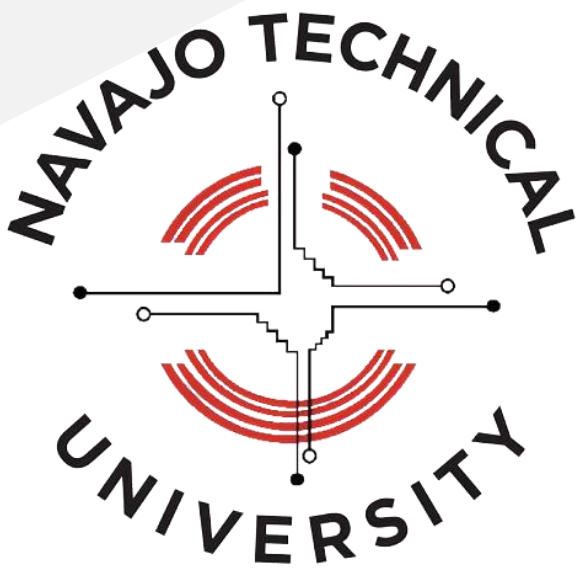
Workforce Development Strategies

A ***trained, sustainable*** workforce is essential for rural economic growth

- STEM outreach, mentorship, internships complement formal training
- Industry skills forecast shapes curriculum development to enable responsive, relevant workforce training
- NMEDD Job Training Incentive Program (JTIP) provides outstanding support to small businesses







Digital Twin Data Acquisition System for Institutional Facility Management

2021 INTERN PROJECT

T11.05-1825 - Digital Twin Data Acquisition System for Institutional Facility Management

PI: Gary Bullock , Emerging Technology Ventures Inc. - Alamogordo, NM

SBIR·STTR America's Seed Fund™ POWERED BY NASA

NASA

NON-PROPRIETARY DATA

IDENTIFICATION AND SIGNIFICANCE OF INNOVATION

Emerging Technology Ventures Inc. and its research and development partners, Navajo Technical University and New Mexico Institute of Mining and Technology , are proposing to develop and demonstrate a "Digital Twin (DT) Data Acquisition System for Institutional Facility Management". The innovation addresses Industry 4.0 digital transformation initiatives in Building Information Modelling (BIM) and Facility Management (FM) which have created critical demand for up-to-date digitized building assets for effective implementation in predictive, condition-based maintenance (CBM) strategies in FM. The team's proposed use of autonomous, multi-modal systems and analytics to create DTs representing near real-time status of the built environment for FM offers an opportunity for responsive, labor efficient CBM.

The effort responds to NASA's digital transformation goals for model-based solutions in the area of "Digital Twin" Institutional Management of Health/Automated Decision Support of Agency Facilities that would greatly enhance operational efficiencies in its aging facilities.

TECHNICAL OBJECTIVES AND PROPOSED DELIVERABLES

The proposed innovation addresses NASA's articulated STTR needs in the delivery of an end-to-end DT system for integrated BIM and FM. The proposed MVP will couple the STTR efforts with the core architecture and neural network engine (NNE) from ETV's internal R&D and Navy Phase I ADAPT SBIR effort to deliver an overall system capability to support the Phase I STTR feasibility analysis. These outcomes will support NASA as it implements its Digital Transformation objectives and moves towards a "smart city" environment for its facility constellation.

The proposed deliverables include:

- First generation end-to-end DT system to develop automated 3D visualization layers for exterior and interior facility assets using multi-modal sensing (camera, LiDAR) and photogrammetry
- UxS (air, ground) platforms and nests to provide on demand data acquisition for DT generation using multi-modal sensing (camera, LiDAR)
- Fixed, gimballed multi-modal (camera, LiDAR) sensing to provide on demand data acquisition for DT generation
- MVP demonstration of Phase I concept system utilizing ETV testbed facilities
- First generation BIM and FM workstation with analysis of human systems integration issues and challenges that will affect deployed system design
- Feasibility assessment and Phase II recommendations based on research and evaluation of concepts

TRL

Estimated

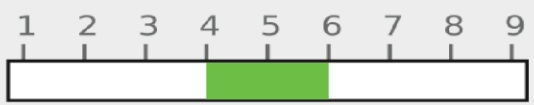
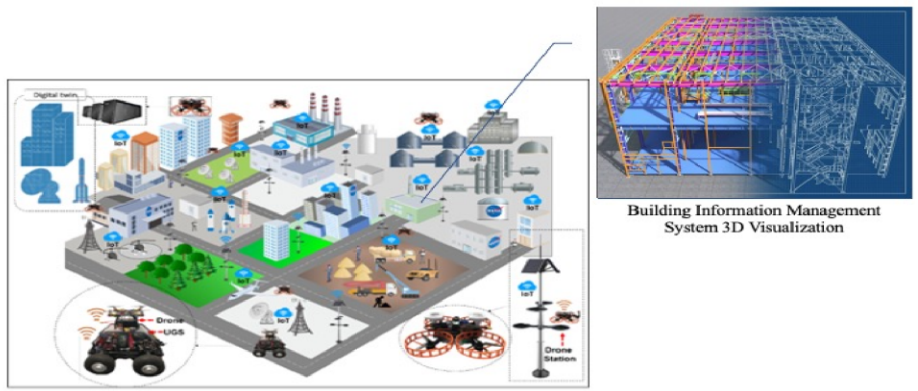


IMAGE TITLE: Operational Concept View



Building Information Management System 3D Visualization

NASA APPLICATIONS

The effort responds to NASA's digital transformation goals for model-based solutions in the area of "Digital Twin" Institutional Management of Health/Automated Decision Support of Agency Facilities that would enhance operational efficiencies in its aging facilities. The proposed solution will support localized and distributed management of NASA's facility constellation providing near real-time status of the facility environment for predictive condition based maintenance and offer possible adaptation for application in space environments.

NON-NASA APPLICATIONS

Grandview Research reports that the global non-destructive inspection market size for this vertical was valued at USD 4.19 billion in 2017. It is projected to expand at a Cumulative Annual Growth Rate of 6.2% over the forecast period (2018-2025). The commercial real estate and industrial manufacturing markets offer excellent opportunities for expansion.

FIRM CONTACTS

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Meet Our 2021 Summer Interns

- 2021 Summer Interns (From Left):
  - Mario Escarcega, New Mexico Institute of Mining and Technology
  - Nicholas Brinegar, Alamogordo High School
  - Aidan Leon, New Mexico State University
  - Felisha Arellano (incoming, not pictured), New Mexico State University - Alamogordo

Meet Our 2021 Summer Interns

YouTube viewing link:
https://youtu.be/v1RYy7Nscb0

Thank You for the Opportunity to Share an Important Part of Our Story, Our Interns!

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