

ARE simplifies the process of collecting, managing and utilizing information through on-site engineering, UAS (drone) technology, and software solutions for infrastructure and environmental markets. Through customized deliverables, we provide clients with the insight and data to help manage their assets. Services include rail bridge management and engineering, railroad line assessment, UAS infrastructure and environmental inspections, aerial LiDAR and photogrammetry, UAS program management, GIS post-processing, and training.

ENGINEERING



- Bridge Management Program Preparation
- Bridge Inspections and Load Rating (Detailed, Annual, Underwater, Ultrasound, Load Testing)
- Movable-Bridge Engineering Experience
- Rail & Bridge Design (Repairs, Upgrades, Replacement)
- Damage Assessment & Repair Recommendations
- ARE Software for Rail Bridge Inspections
- Capital Improvement Planning & Assessments
- Contractor Bidding Documents
- On-site Construction Observation
- Civil & Rail Engineering for Spurs and Siding
- GIS/CAD - Watershed delineation, slope analysis, volumetric measurements, planimetric mapping, LiDAR Point cloud classification, topographic mapping

UAS

INFRASTRUCTURE INSPECTION

Utilities, bridges, buildings, roads, highways

LiDAR SCANNING

Utility line assessment, accurate terrain modeling, environmental monitoring, site planning

MAPPING & PHOTOGRAMMETRY

Construction monitoring, coastal monitoring, 3D building models

GIS POST-PROCESSING

Point clouds, orthomosaics, DSMs, DEMs, DTMs

MULTISPECTRAL (IR / NDVI)

Right-of-way vegetation management, precision agriculture

THERMOGRAPHY

Solar arrays, utility transmission and distribution, concrete structures, building envelope/roof inspection

UAS TRAINING & CONSULTING

Basic & Advanced UAS training, proximity flying, mapping, night operations, post-processing training, UAS program setup, on-going support, data processing



DIFFERENTIATORS



- FAA Licensed Pilots (manned and unmanned)
- Experienced & Trained UAV Operators
- Fully Insured Nationwide
- Nighttime Operations Approved
- Rapid Response Capabilities
- In-House Software Development Team
- Licensed PEs in 20 States
- Level 1 Infrared Thermography Trained
- Comprehensive Safety Management System
- Certified Flight Instructors
- OSHA Training & Certified
- Railway Workers Program Trained
- End-to-End Solutions
- Custom UAS Integrations

KEY PERSONNEL

Dave Anderson, PE, CEO

David R. Anderson, PE brings over 40 years of experience in all aspects of railroad and highway bridge design, construction, and maintenance. During his career, Dave has participated in the design and construction of over \$2 billion of private and public railroads and public works projects for cities, counties, and state DOT's.

Sam Johnson, Dir. of UAS Operations

Sam Johnson brings 10 years of experience in aerial data collection utilizing cutting edge UAS flight technology. With a Master's Degree in Aerospace Engineering from Penn State, Sam is responsible for day-to-day UAS operations, project management, and oversees UAS standard operating procedures.

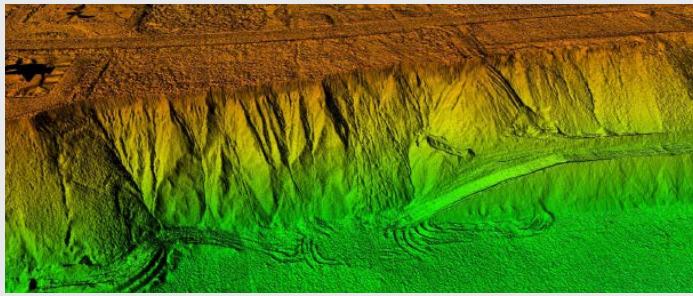
OFFICES

Hampton, NH

Irvine, CA

Portland, ME

Burnsville, MN



BEACH SHORELINE MONITORING

NANTUCKET, MASSACHUSETTS
2018

ARE mapped six miles of the beach, bluff, and nearby infrastructure using LiDAR and photogrammetry. Traditional survey methods were also employed and when compared to UAS-based methods, excellent correlation was found. Both UAS methods proved to be more accurate than the transects on steep portions of the bluff due to lack of access for surveyors which required significant interpolation of the ground survey data.

ENVIRONMENTAL

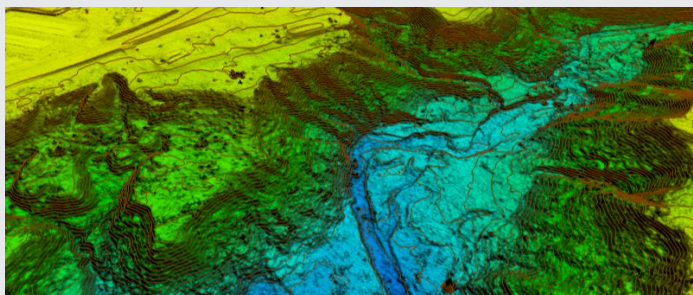


GALENA CREEK BRIDGE INSPECTION

RENO, NEVADA
2018

ARE provided multi-sensor inspection data in collaboration with Stantec Inc. and NVDOT of a seven-span, 1,725-ft long concrete cathedral arch bridge outside of Reno, NV. Inspection images and video were captured to inspect each member of the concrete superstructure and substructure. Additionally, thermal and ultra-high resolution RGB still images were orthorectified to create a Digital Surface Model (DSM) of the deck.

TRANSPORTATION

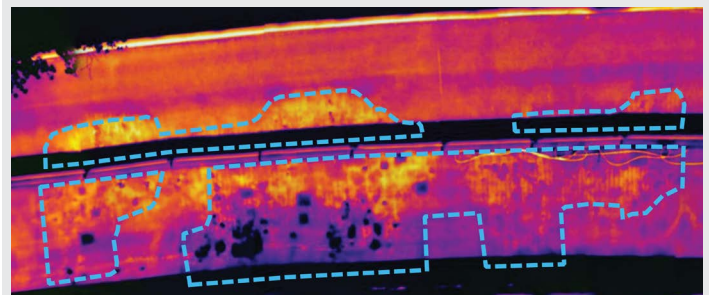


GEORGIA WATERSHED ANALYSIS

GEORGIA, VERMONT
2018

ARE's LiDAR capture allowed for the reliable collection of high density point cloud data of a heavily vegetated, problematic gully area near the center of Georgia, VT. A classified LiDAR point cloud, Digital Elevation Model, 2-ft Contours, and High-Resolution Orthomosaic were used for watershed analysis. This allowed for overall stormwater planning, evaluating upland green infrastructure retrofits, and designing future stabilization measures for the gully.

ENVIRONMENTAL



BRIDGE DECK DELAMINATION STUDY

PITTSFIELD, MAINE
2017

ARE was tasked with studying the effectiveness and accuracy of UAS based TIR mapping of a compromised, concrete bridge deck spanning 245 feet. Thermal and RGB orthomosaics were created, and from these orthomosaics, delaminated sections of decks were identified based on thermal discontinuities and resulting thermal gradients. A strong correlation was found with areas identified using traditional chain drag and sounding techniques.

TRANSPORTATION