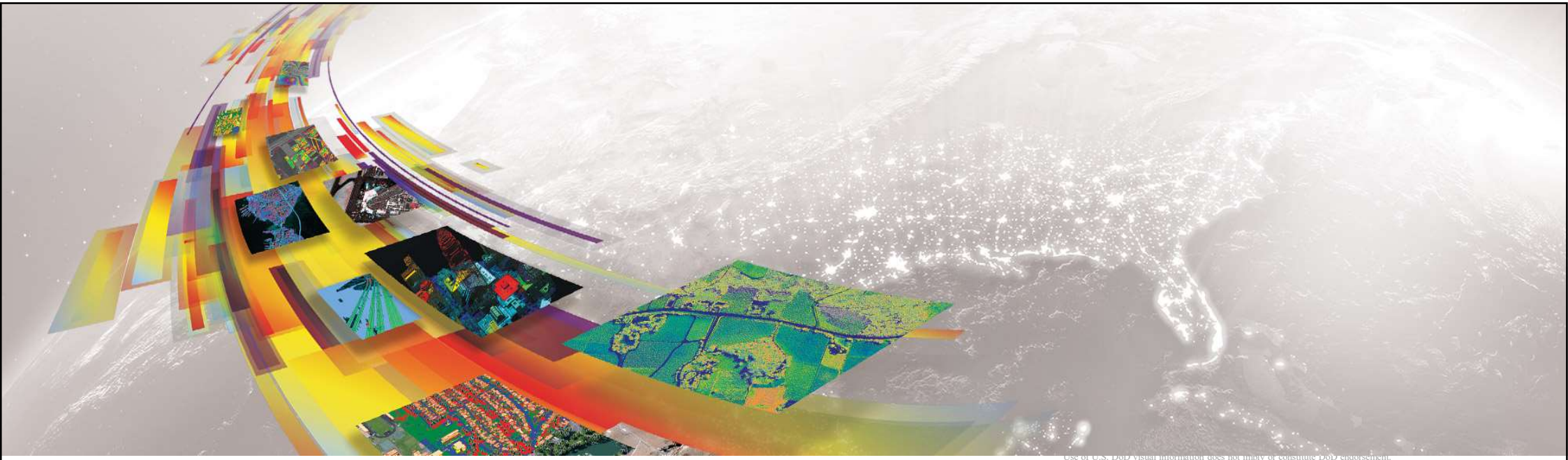


Use of U.S. DoD visual information does not imply or constitute DoD endorsement.

L3HARRIS™

Harris Geospatial Solutions ENVI Conference

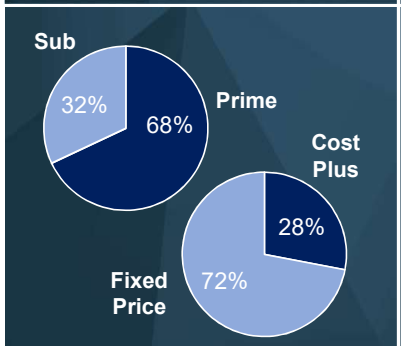
Tammy Owen - Worldwide Director of Defense, Ingelligence, and Security

L3Harris Merger Update – committed to excellence

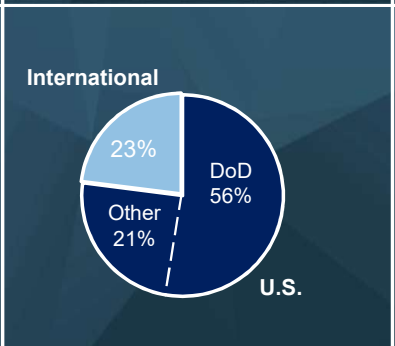
L3HARRIS™

L3Harris Technologies is an agile global aerospace and defense technology innovator, delivering end-to-end solutions that meet customers' mission-critical needs.

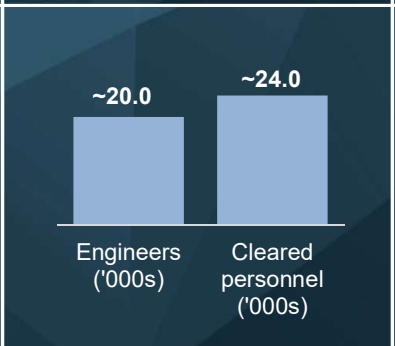
Diversified business mix[1]



Strong customer relationships[1]



Talent and culture of innovation



Global scale in ~130 countries

Visit L3Harris.com

1 CY18 financials. 2 EBIT excluding discontinued operations is defined as net income plus interest expense and income taxes. 3 Net cash from continued operations less net capex

Four mission - aligned segments

Integrated Mission Systems

Sean Stackley
President,
Integrated Mission Systems

Leading technology integrator to U.S. and international militaries for Intelligence, Surveillance and Reconnaissance, airborne and maritime platforms

Headquarters
Palm Bay, Florida

Space & Airborne Systems

Ed Zoiss
President,
Space & Airborne Systems

Mission solutions for space and airborne domain with defense, intelligence and commercial applications

Headquarters
Palm Bay, Florida

Communication Systems

Dana Mehnert
President,
Communication Systems

Ground and airborne communications and network systems for U.S./International militaries, and commercial customers

Headquarters
Rochester, New York

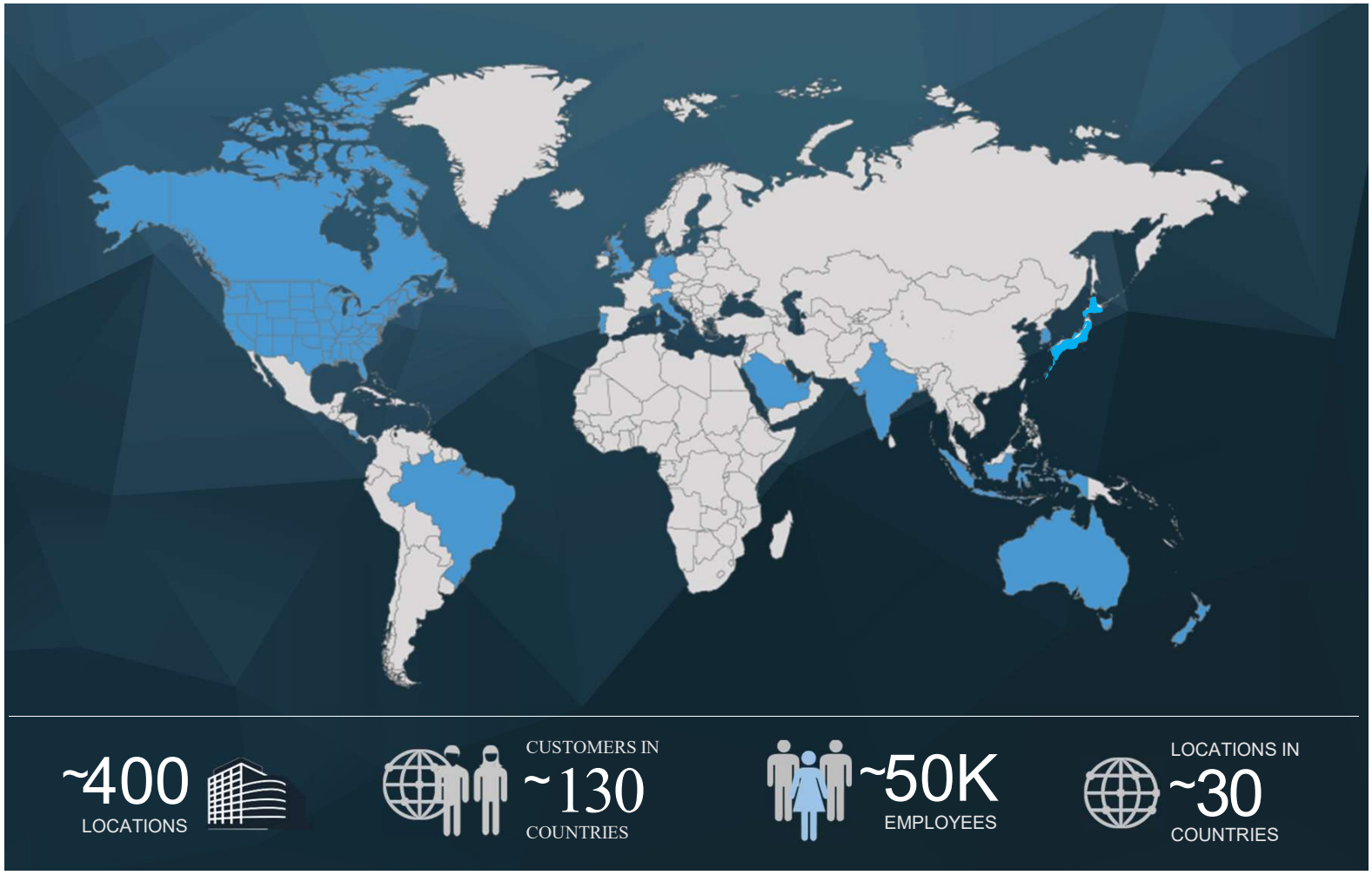
Aviation Systems

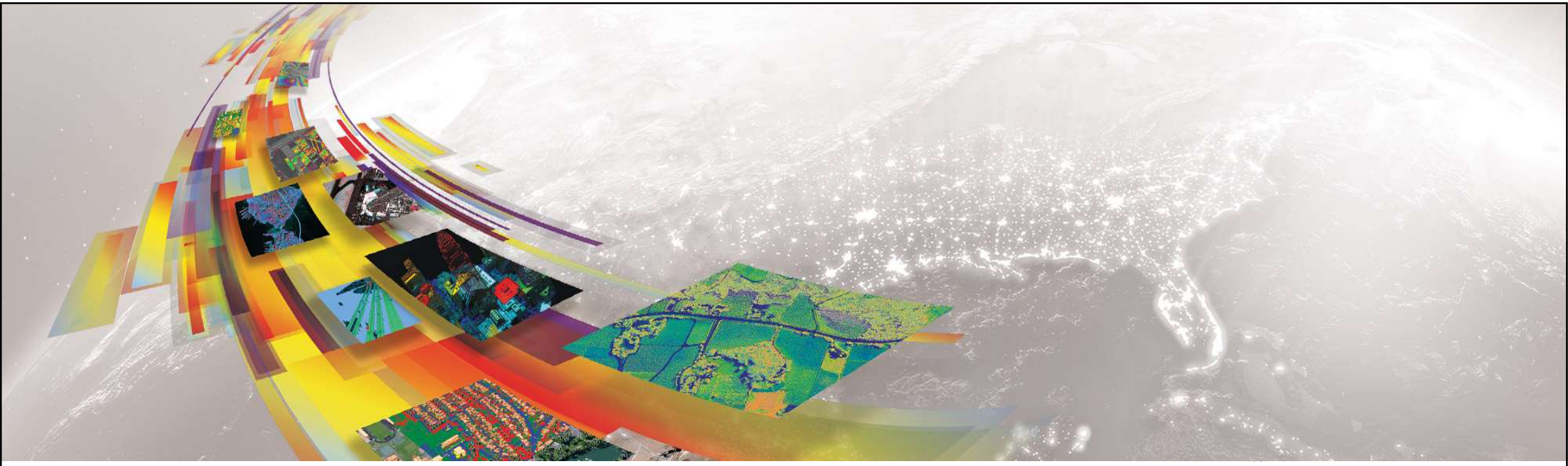
Todd Gautier
President,
Aviation Systems

Commercial and military aviation solutions, systems, networks and pilot training

Headquarters
Arlington, Texas

Global footprint





L3HARRIS™

Harris Geospatial Solutions ENVI Conference

Cherie Muleh - Asia Pacific Regional Manager

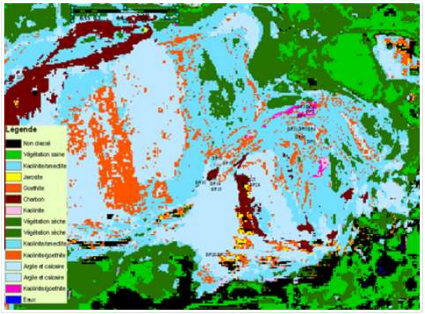
Challenges We Face

Socio-Economic Security

- Understand and protect critical components, including food, water, energy, health, and infrastructure

Sustainable Development Support

- Monitor stages of growth, manage resources, and integrate with Smart Cities for efficient development

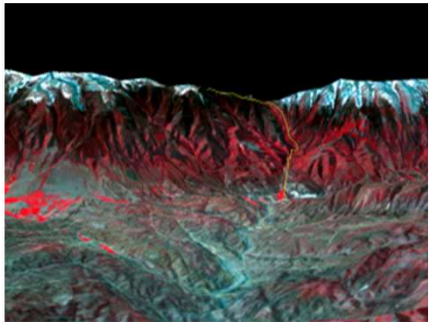


Emergency and Disaster Preparedness

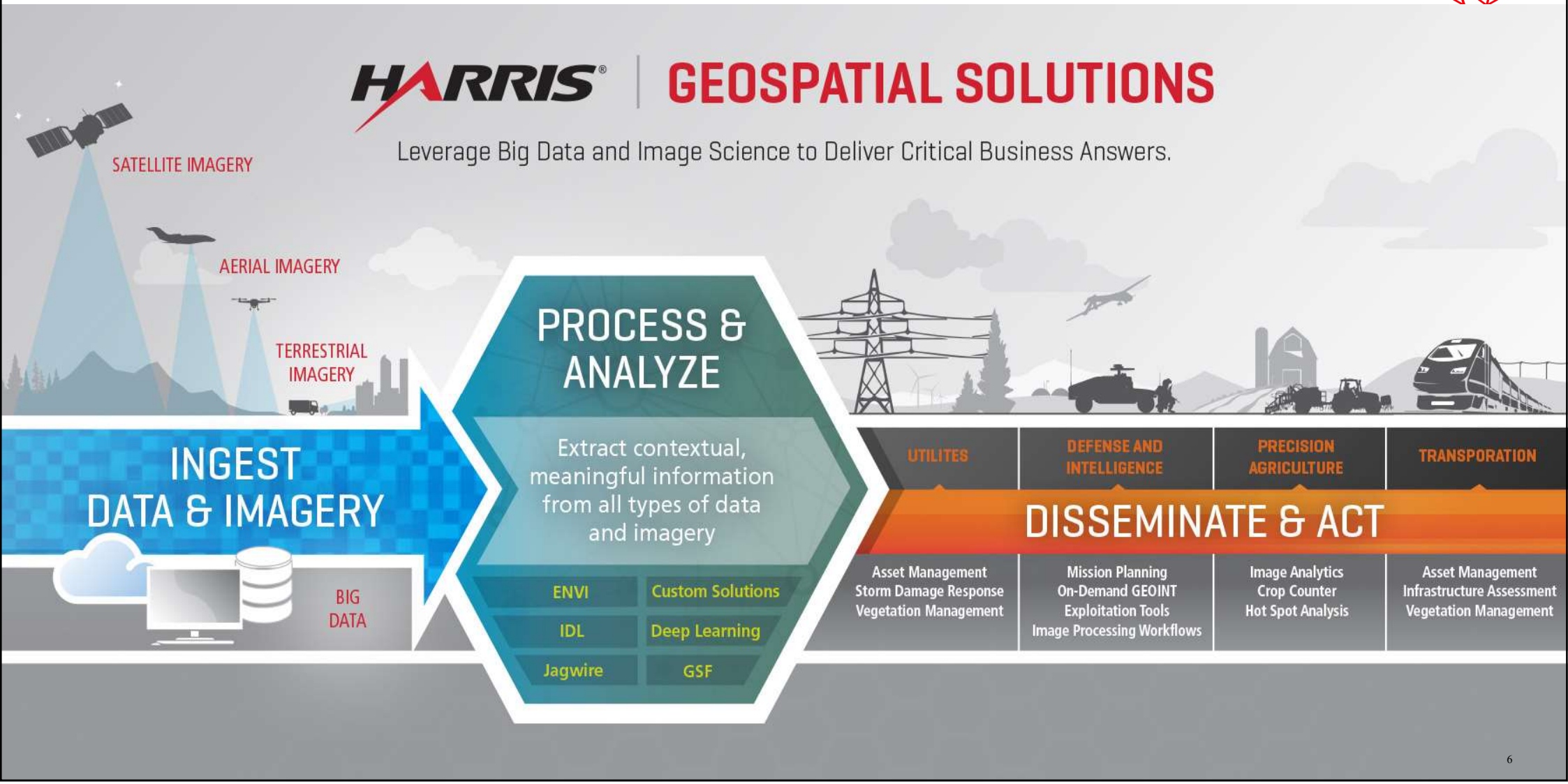
- Have the necessary tools to perform early and predictive detections and plan response and recovery efforts

National Security, Protection, and Governance

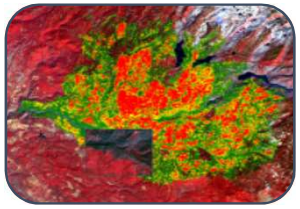
- Plan, monitor and execute national decision, manage disparate data sources, and disseminate products

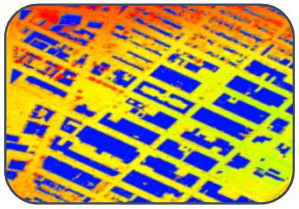


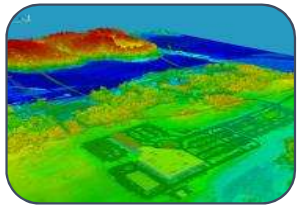
How We Solve Those Challenges

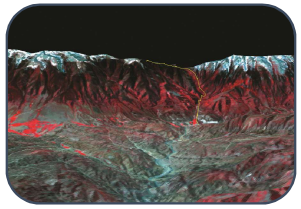


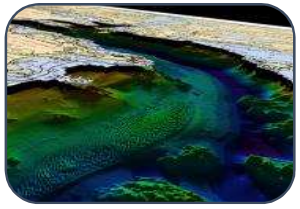
ENVI Image Analysis Platform

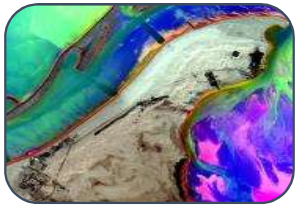

ENVI

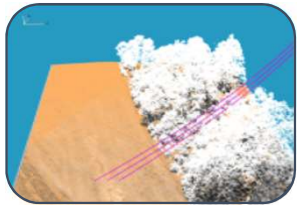

Photogrammetry

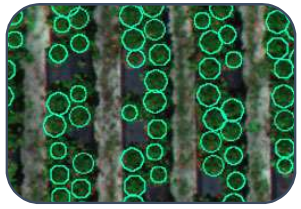

Feature Extraction


DEM Extraction

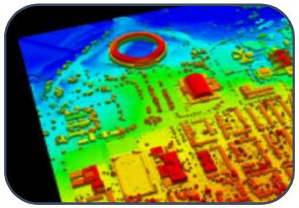

Atmospheric Correction

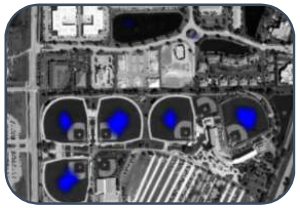

SARscape Suite of Tools


NITF Data


Crop Science

ENVI Services Engine


ENVI Drone Solutions

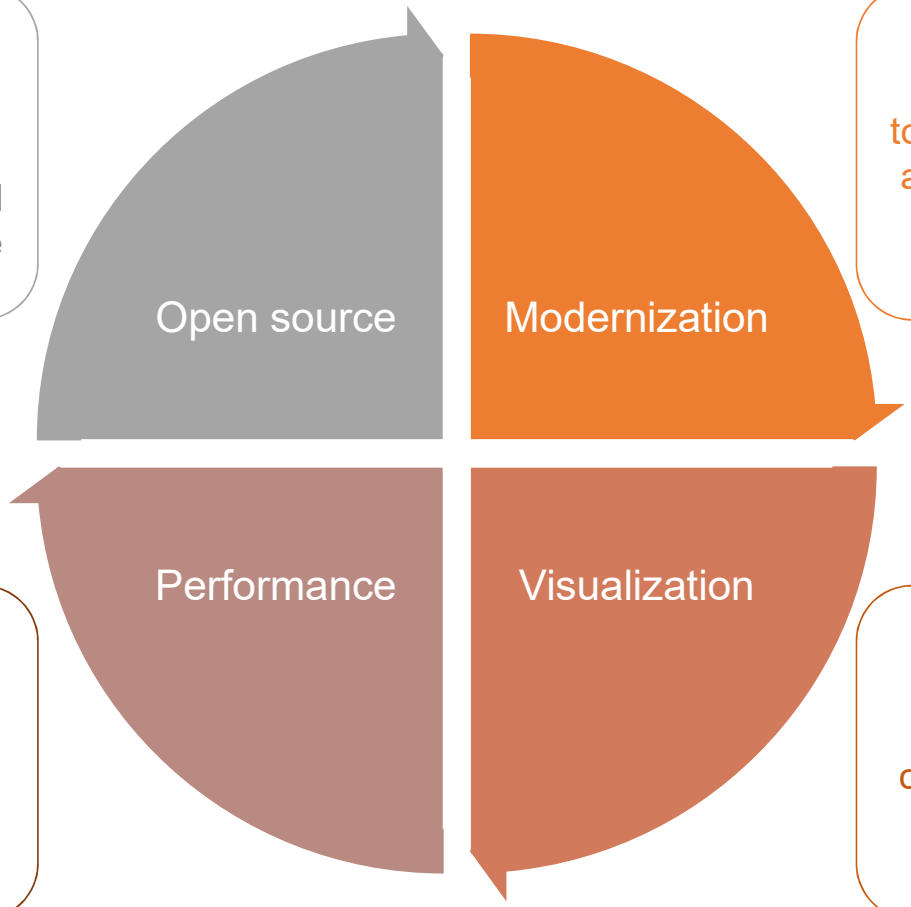

Deep Learning

IDL Extensibility

Desktop or Enterprise

ENVI and IDL Vision

Open source software connectivity to allow users to easily use Python in ENVI + IDL. Users can have open source and commercially supported software



Follow best practices with today's software development for ability to quickly update libraries and use modern tools

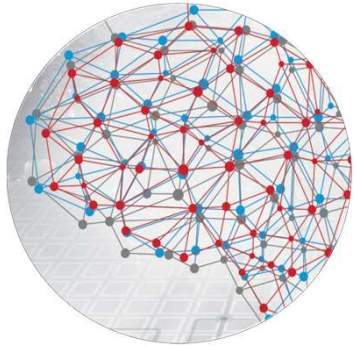
Improve ENVI + IDL performance and improving data processing speed for all formats

Provide industry leading visualization capabilities for complex data, large file formats, and web services

ENVI and IDL Roadmap

2019 (Completed)

- ENVI Deep Learning Module 1.0
- ENVI SARscape Analytics for ArcGIS Pro
- Opticalscape Terrestrial 5.5.2
- ENVI: ROI tool updates, Feature Counting tool updates, and pan-sharpening improvements



2019-2020

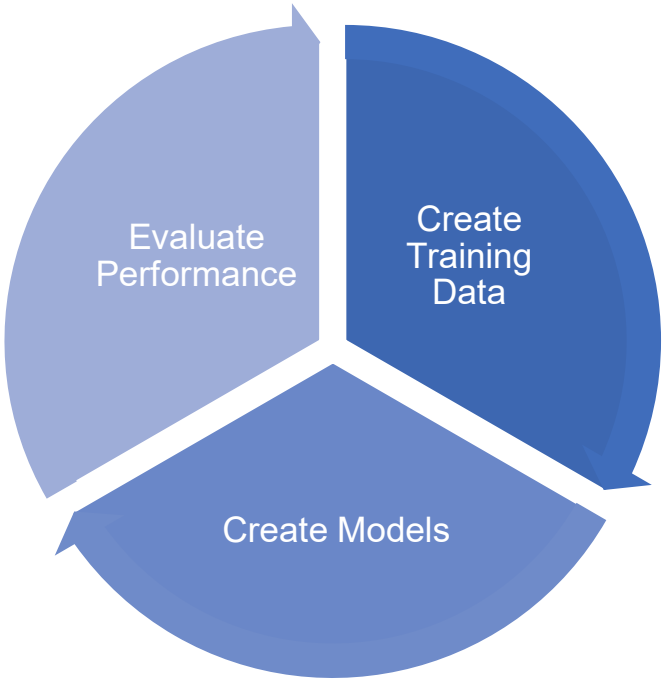
- ENVI Deep Learning Module 1.1
  - Multi-class support
  - Data augmentation
- ENVI and IDL Next
  - IDL True parallel processing
  - In ENVI we can read + process the data in parallel for faster performance
  - Spectral library enhancements
  - Defense analyst workflow enhancements

Next

- Library Updates: Better performance in IDL for matrix multiplication and additional options with the latest version of GDAL
- Innovative routines for working with vectors for re-projecting and generating polylines from masks (example: road extraction)
- Licensing updates
- Web-based labeler for Deep Learning
- Crop Science, Displacement, forestry services

Latest Product Updates: ENVI Deep Learning

Applied deep learning for geospatial imagery in ENVI, the leading remote sensing and image analysis software

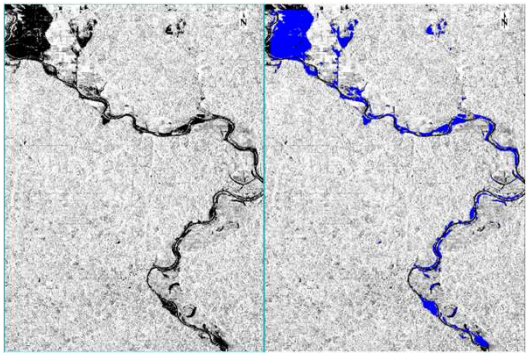


Deep learning workflow in ENVI, built on TensorFlow and Keras

Without needing to program, capabilities include:

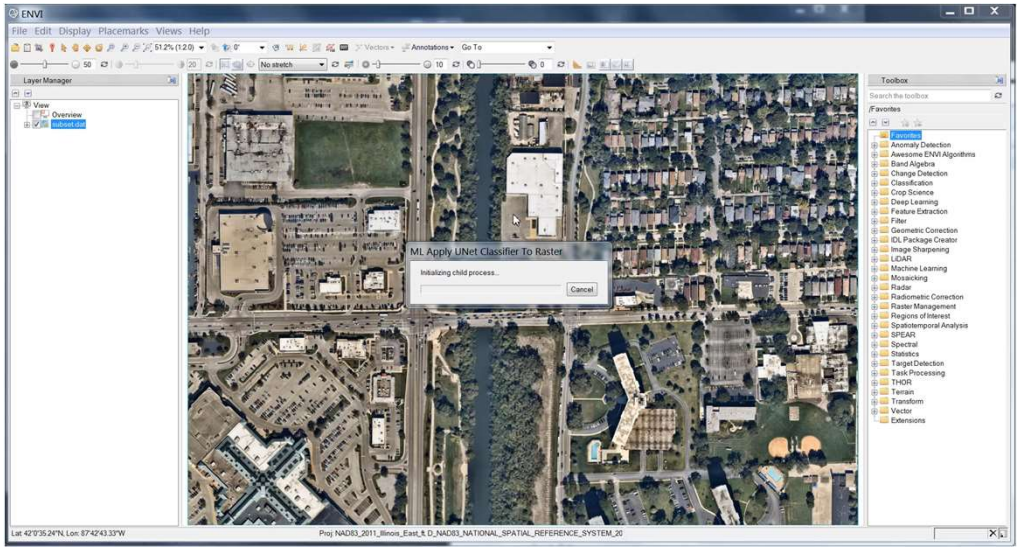
- Segmentation (i.e. cloud masking)
- Object detection (i.e. cars or ships)
- Linear feature extraction (i.e. roads)
- Support for nearly any image format and data modality

Assess building damage after hurricanes and tornadoes



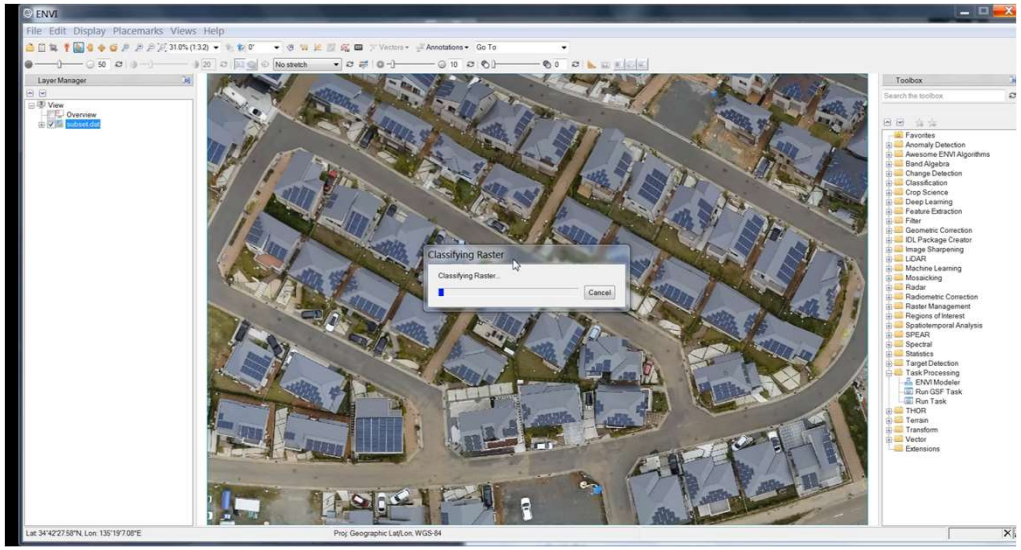
Automated flood detection using SAR

Deep Learning Examples

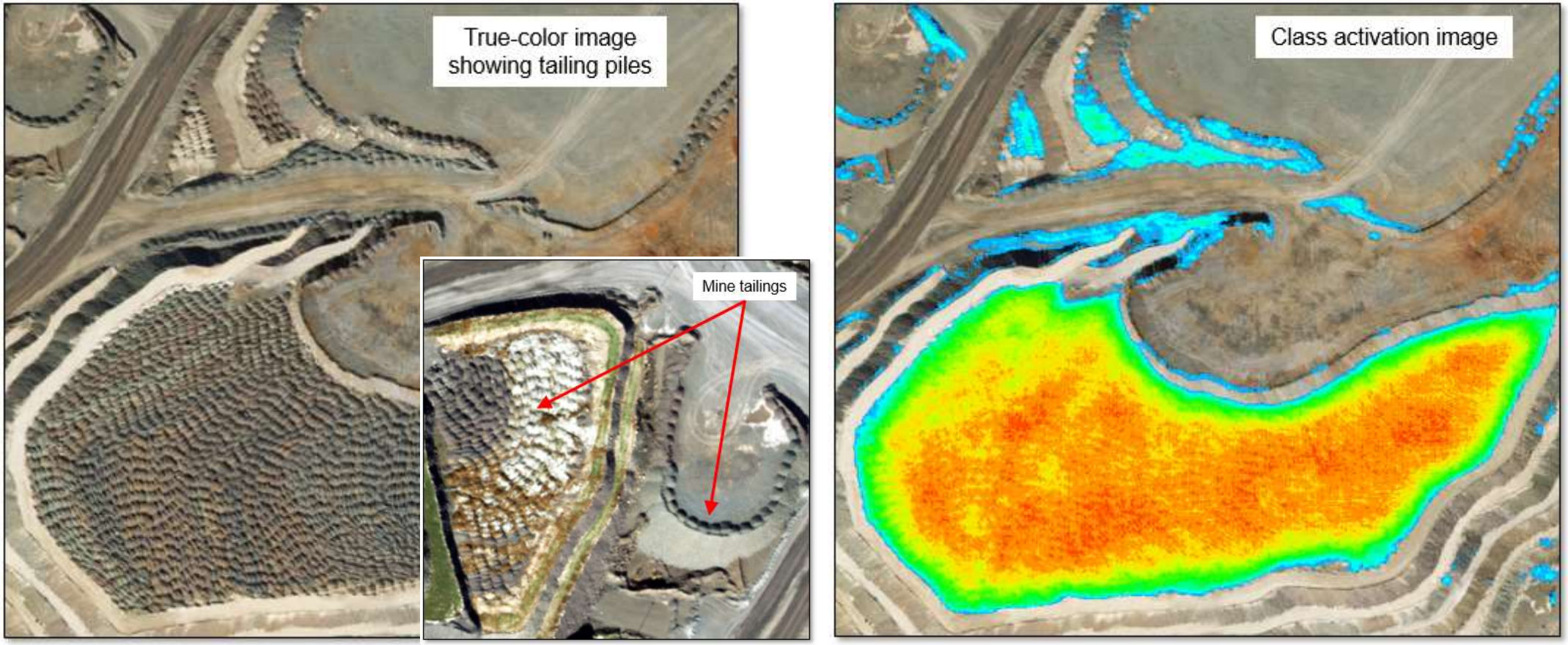


Automatically extract road networks from high-resolution UAV, satellite, or aerial imagery

Use UAV imagery to determine the locations of solar panels in a neighborhood

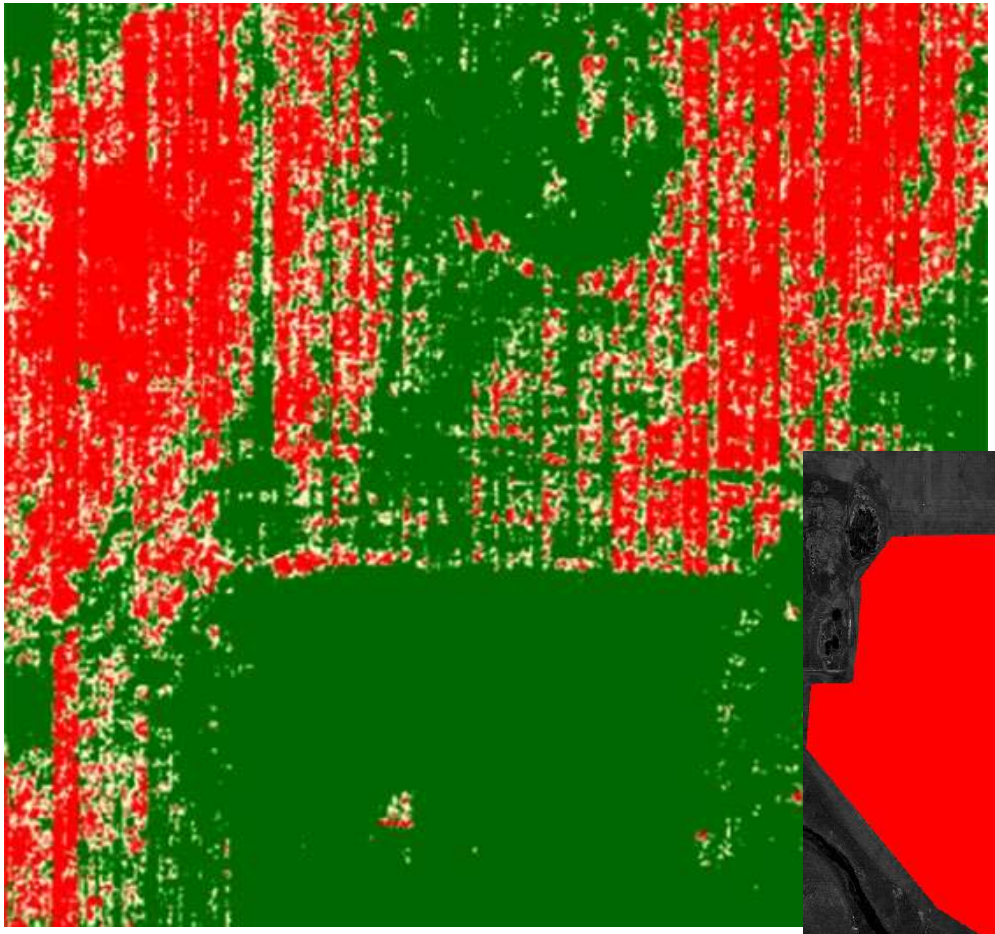


Deep Learning Case Study: Environmental Monitoring



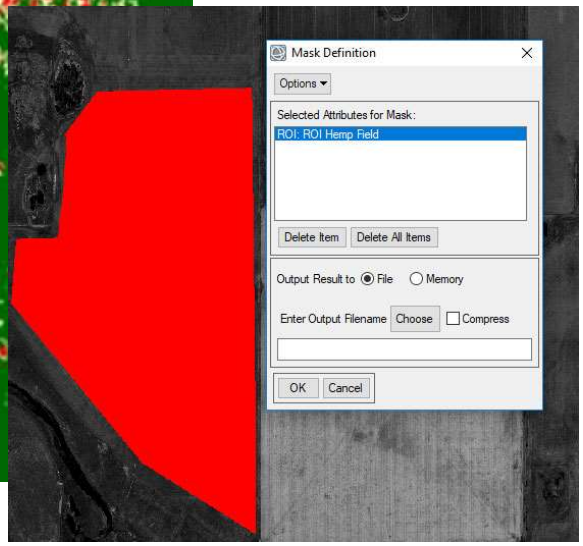
Deep learning model accurately located other mining tailing piles in a different image than it was trained on for Environmental Consultants

Deep Learning Case Study: Agricultural Hot Spots



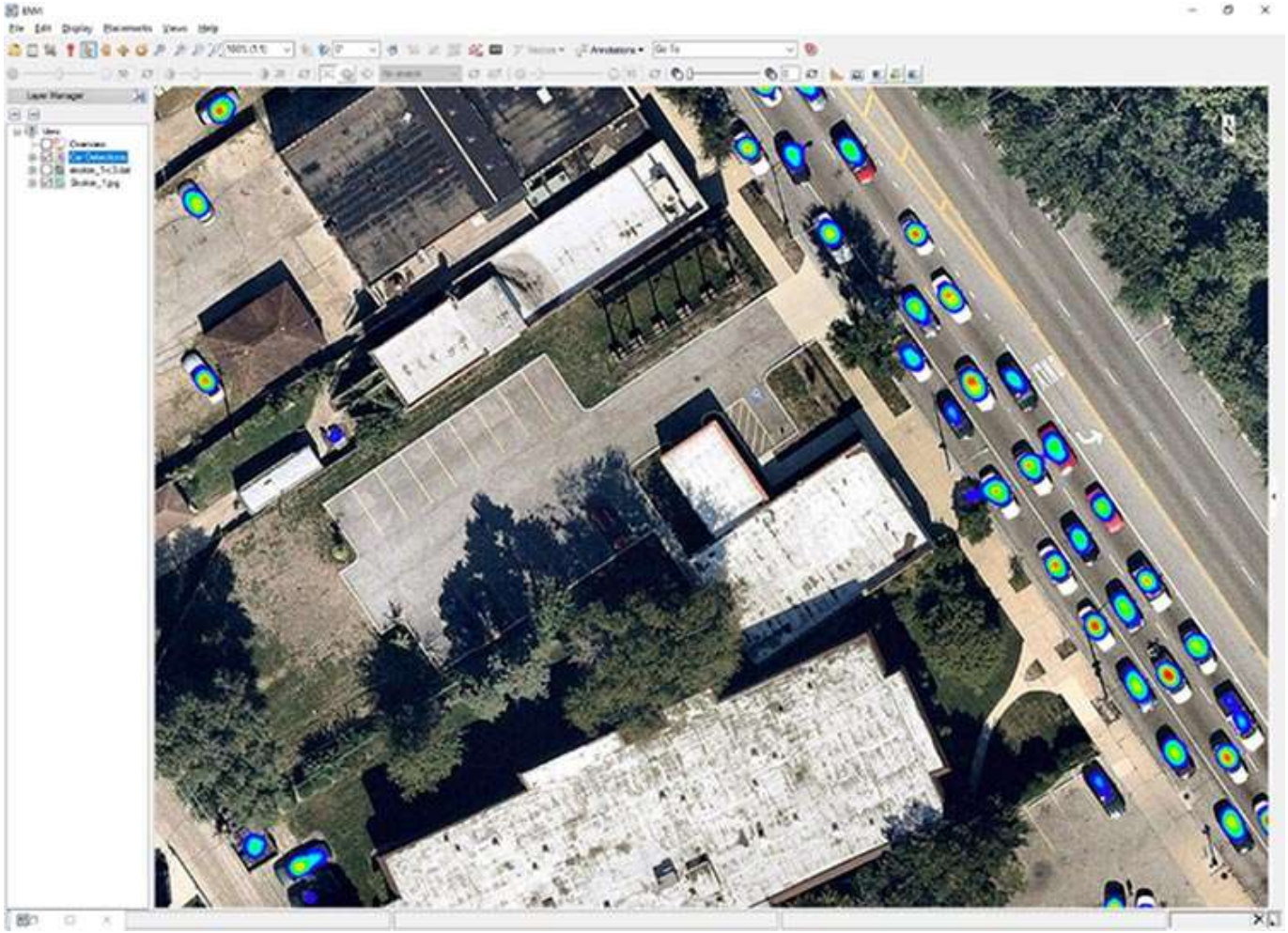
Deep learning model trained to find crops and perform hot spot analysis, using Broadband Greenness Vegetation Index in ENVI.

Poor Health
Healthy Vegetation



Hotspot results from North American Hemp Field

Deep Learning Case Study: Commercial and Retail Studies

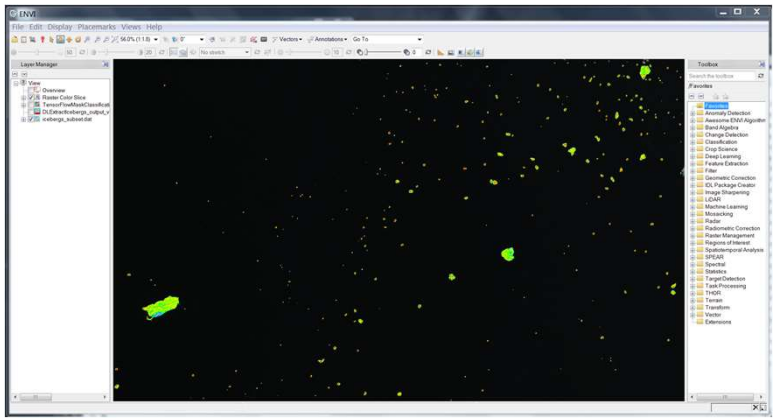


Provide near real-time insight into consumer base

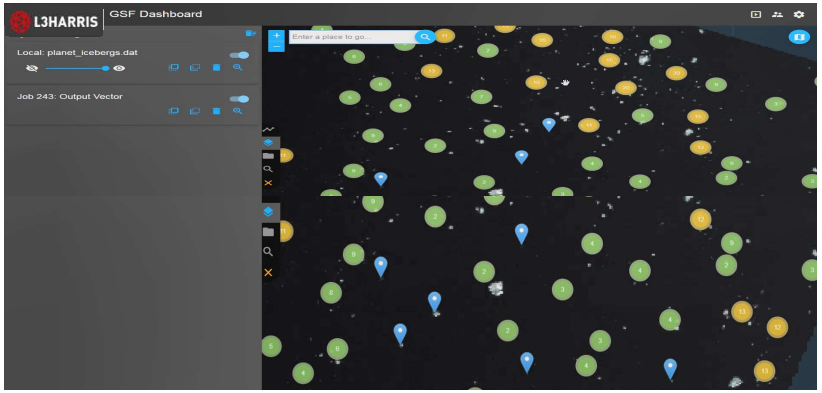
Anticipate store trends and locations

Understand consumer spending by counting the number of cars in store parking lots

Enterprise Solutions



Example: Transition a deep learning classifier from the desktop to an enterprise application that anyone can access

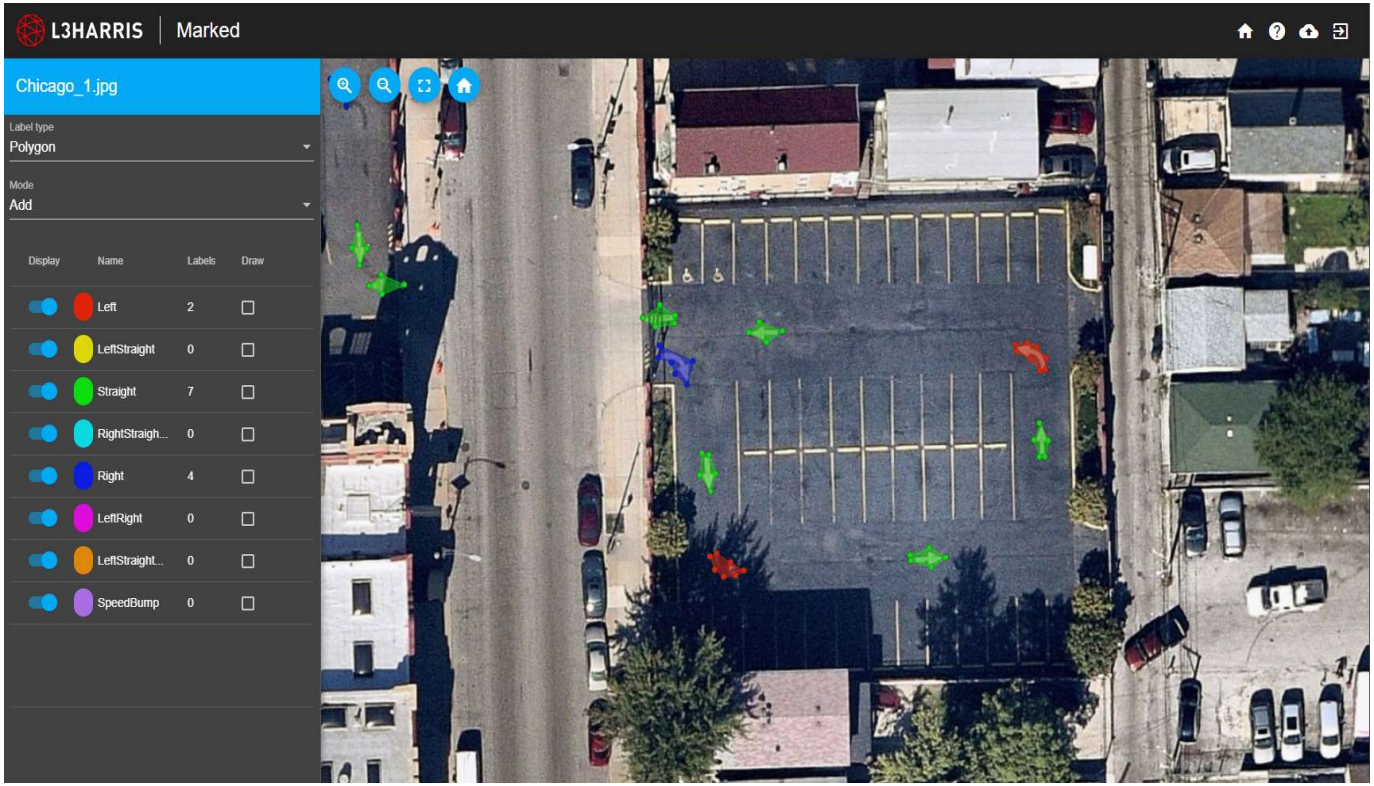


Create analytics once, with the ability to deploy on premises or in the cloud

Connect to your users with desktop, mobile, or web applications

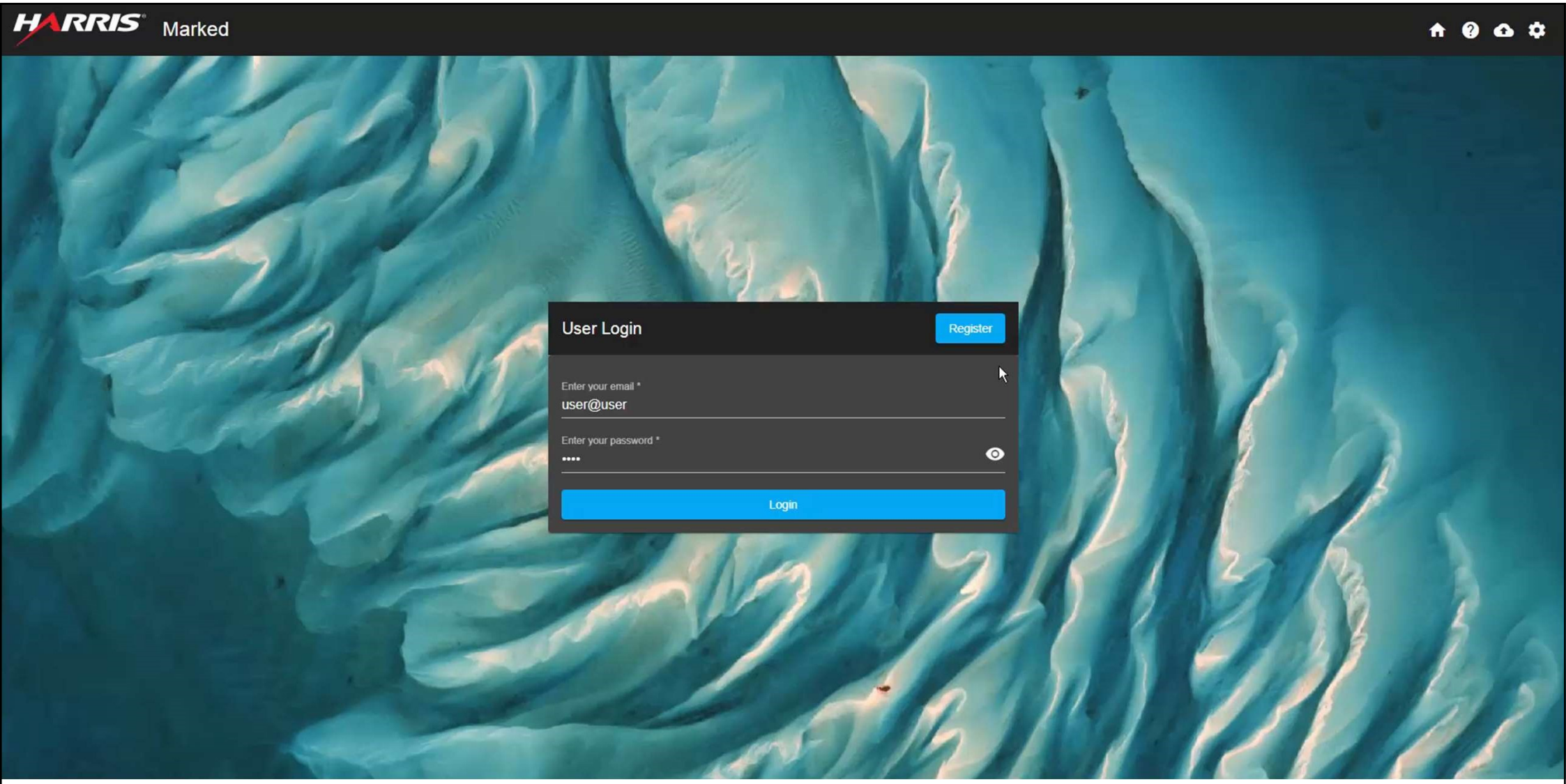
Customize user experiences that enhance decision making and increase performance

Deep Learning Web-Based Labeling Tool

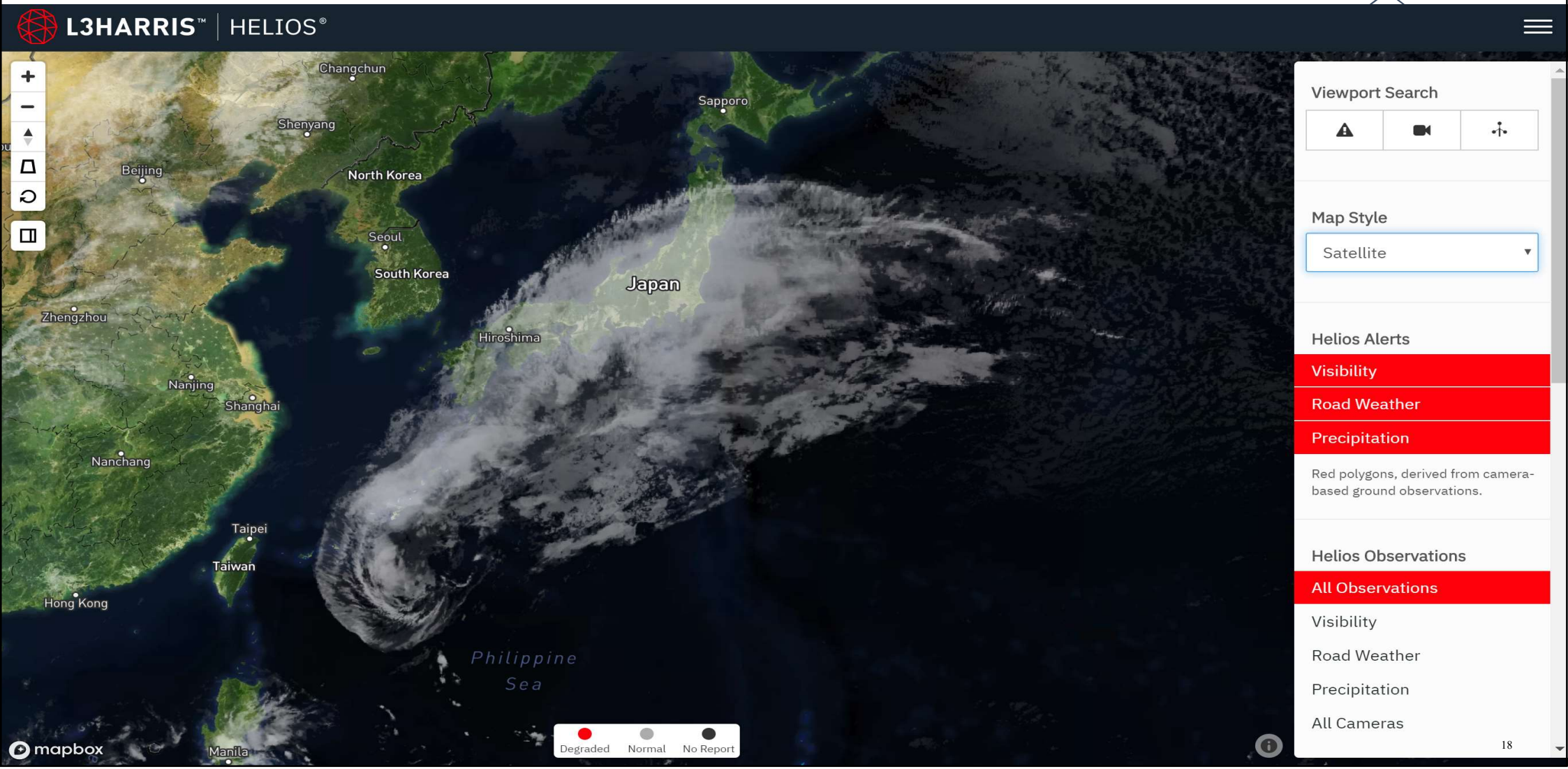


Labeling turn arrows on roads

- Support for nearly any format of data
- High performance visualization of geospatial data
- Real-time collaboration
- Multi-class labeling for points, polylines, and polygons
- Labels are tracked, providing information based on:
  - Recent activity for users and projects
  - User contribution

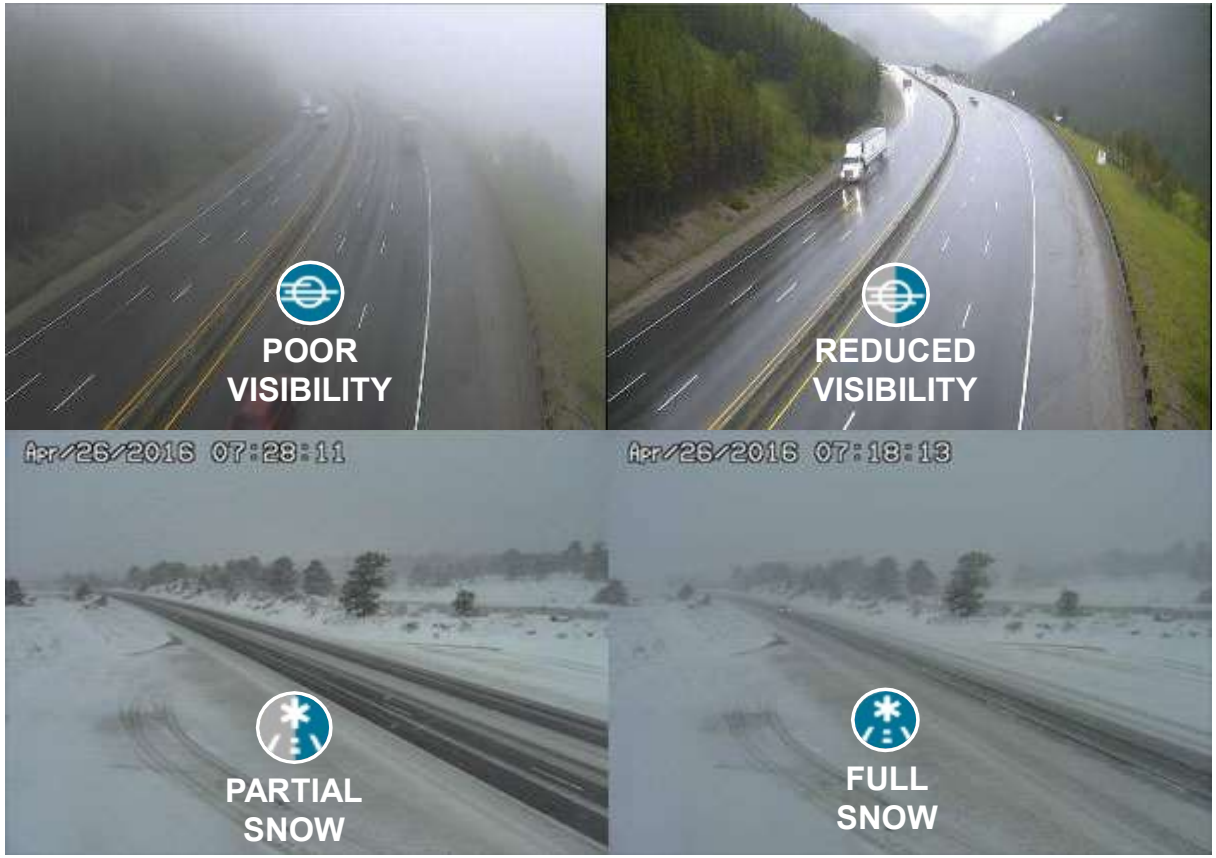

HARRIS Marked
User Login
Register
Enter your email *
user@user
Enter your password *
••••
Login

Helios®: Traffic Cameras as Street Sensors



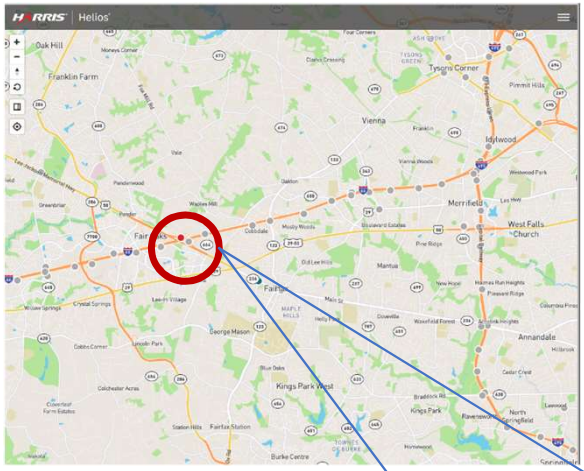
Helios®: Traffic Cameras as Street Sensors

- Road snow, wetness, flooding
- Visibility
- Precipitation
- Traffic Congestion and Incidents
- Road transitions and trending
- Scene Activity, car classifiers, vehicle tracking

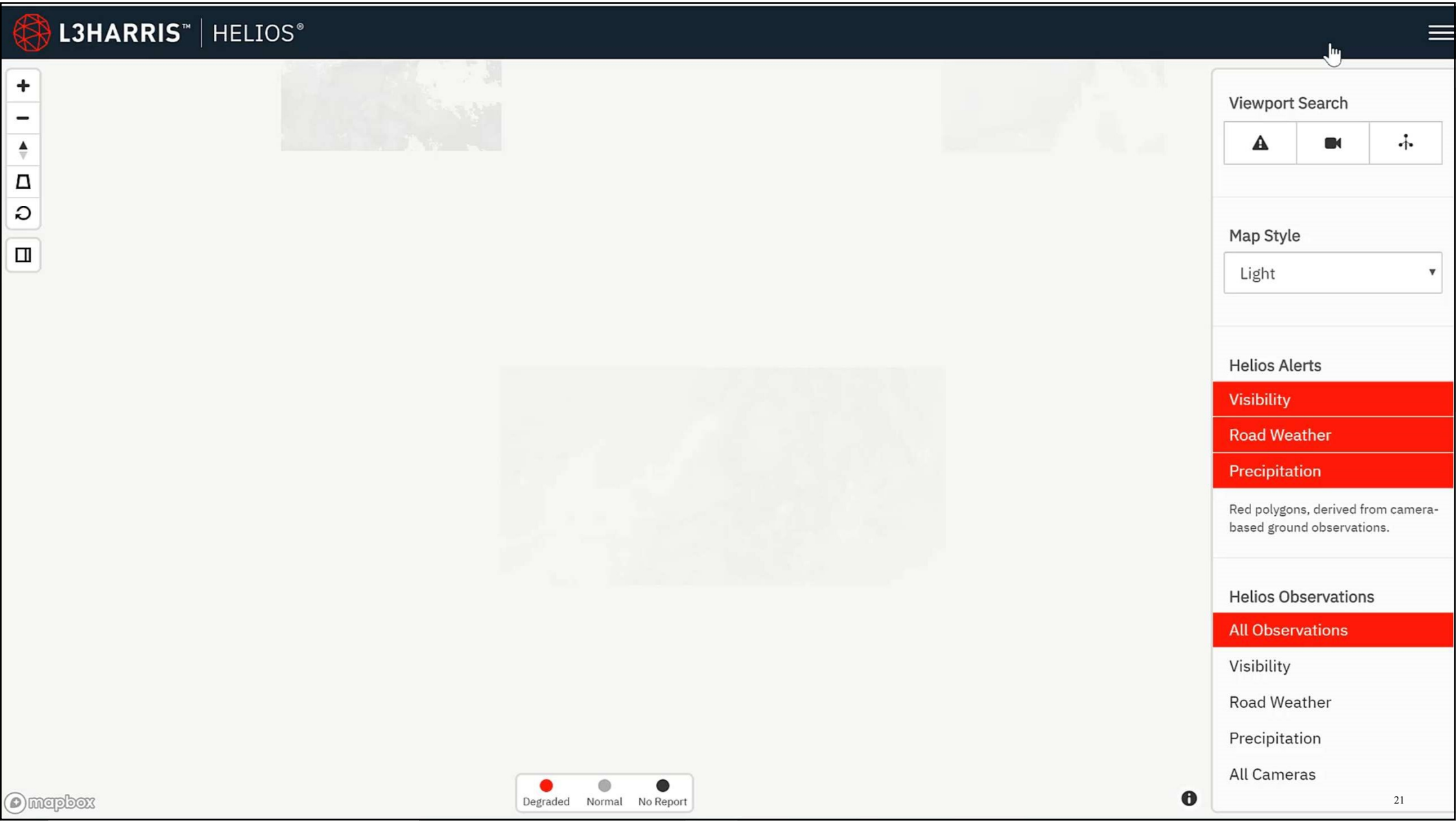


Analytics from from machine learning

Helios®: Traffic Cameras as Street Sensors



Vehicle Tracking Congestion Incident Wet Roads Fog


L3HARRIS™ | HELIOS®
Viewport Search
Map Style
Light
Helios Alerts
Visibility
Road Weather
Precipitation
Red polygons, derived from camera-based ground observations.
Helios Observations
All Observations
Visibility
Road Weather
Precipitation
All Cameras
Degraded
Normal
No Report
mapbox

Amplify – Enterprise Imagery Management for Utilities

Enterprise intelligent imagery solution to manage large collections of lidar, video, and imagery, to deliver automated imagery analytics about utility assets

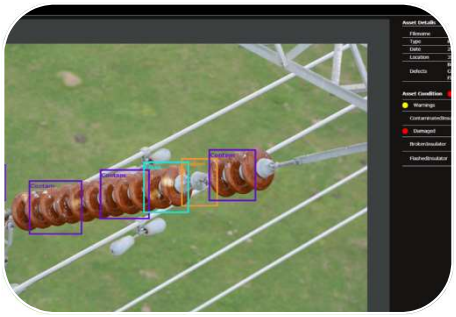
Transmission and Distribution

- Locate and identify infrastructure
  - Identify assets on the pole
  - Material identification
- Identify and capture damage
  - Generate inspection reports/work orders
  - Improve prep time and efficiency in making repairs
- Monitor Change
  - Track asset condition over time to predict repairs needed before failure

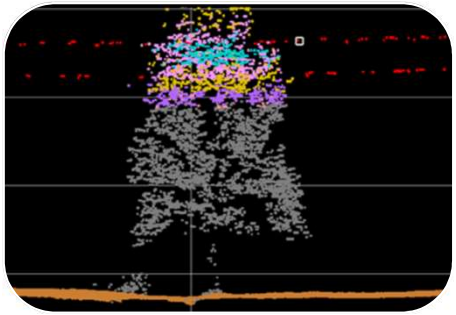
Manage Vegetation encroachments

- Species identification from hyperspectral imagery to determine potential growth rates
- Measure clearances
  - Reduce fees for non-compliance

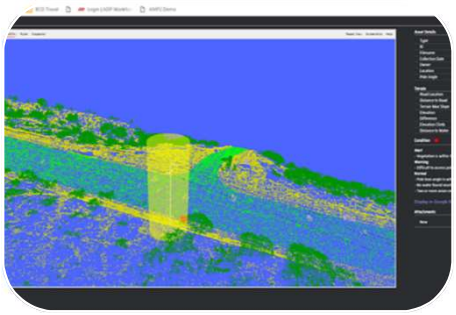
Amplify – Enterprise Imagery Management for Utilities



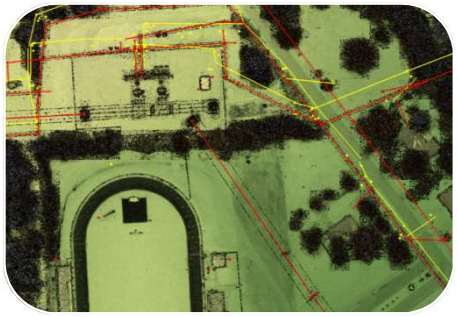
Defect Identification



Tree identification and measurement



Measure vegetation encroachment



Database location improvement

- Data Management
  - Create a centralized, shared repository for imagery, LiDAR, and associated data
  - Allow users to attach, edit/replace, and remove documents/reports
  - Support batch processing to associate files to one or more GPS locations
- Results through Analytics
  - Identify presence/absence of asset components
  - Determine vegetation encroachment with LiDAR
  - Identify pole tilt angle, set alerts
  - Determine if pole is accessible from nearest road
- Operational Integration
  - Export results to update existing GIS system
  - Access GIS layers to answer planning questions; identify if there is water nearby structure, archeological areas, and more

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https://twitter.com/GeoByHarris

www.youtube.com/user/ExelisVis