sky wave™ at CDM Smith

Leveraging digital data and machine learning to analyze the environment

Sky Wave™ couples remote sensing drones and artificial intelligence to track and analyze surface changes

**Are you working on a project that is running into the following challenges?**

- Incomplete site knowledge
- Time-consuming and expensive data collection
- Overwhelming data volume
- Concerns over field worker safety
- Wanting data that traditional methods can not address

Sky Wave™ is your solution!

Our multi-discipline team can create a custom plan integrating data collection, analysis, and delivery to solve problems. We bring all the pieces—data collection, management, processing, and analysis—together in an efficient digital pipeline to produce site-specific results and support decision making.
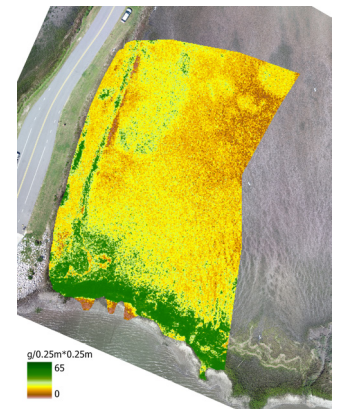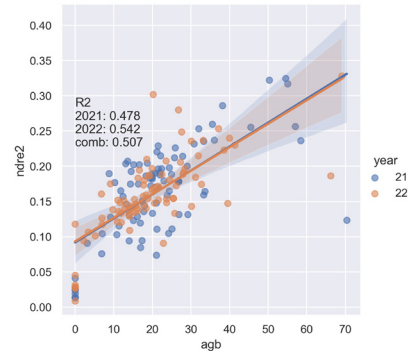
How it works: the digital pipeline

Pick a part or combination of our digital pipeline process. Sky Wave™ can help you fit pieces together to turn your data into solutions!

Digital data → Machine learning model → Automated analysis and reporting
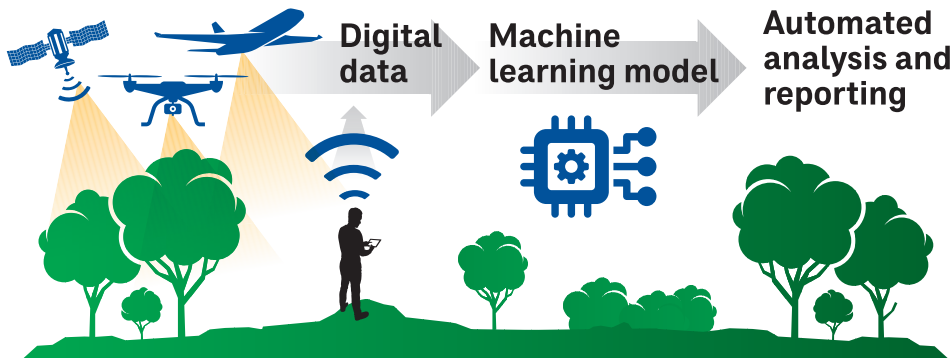
Patent-pending data collection methods

R2
2021: 0.478
2022: 0.542
comb: 0.507

year
● 21
● 22

g/0.25m*0.25m
65
0

Biomass represented in Sky Wave™ delivery products

Sky Wave™ is led by multi-disciplinary experts who create integrated solutions to your challenges.

- Surveyors
- Scientists
- Artificial intelligence engineers
- Engineers
- FAA-certified drone pilots
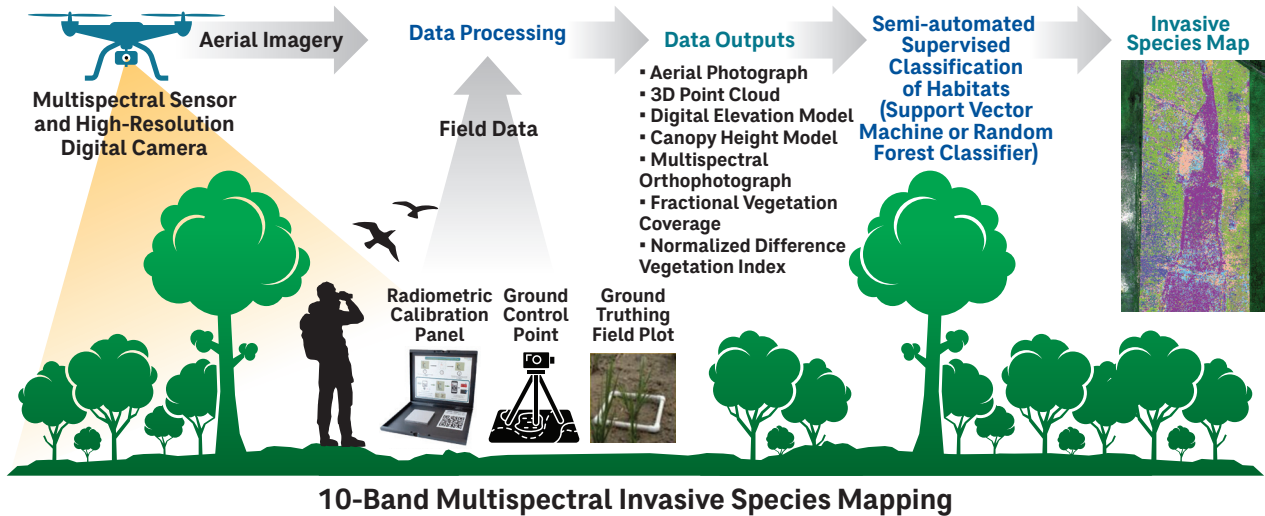- Geologists
- Remote sensing scientists

CDM Smith

Mapping Invasive Species

Hillsborough County, Florida

- **Challenge:** The County needed to identify invasive species and assess native species success on restoration lands, but traditional methods were time-consuming, labor-intensive, and potentially dangerous for field staff.

- **Solution:** The Sky Wave™ team mapped two 100-acre sites with 10-band multispectral sensors on drones. **They covered an area in less than an hour that would have taken field crews days to complete.** Patent-pending field data collection methods allowed the team to incorporate a greater volume of ground-truthing data, leading to more accurate model training and validation. Applying machine learning, the team sorted through gigabytes of multispectral data to identify the target native and invasive species based on their unique spectral signature. The team provided the County with maps of over 30 native and invasive species. The machine learning models were over 80 percent accurate, resulting in spatially explicit data on invasive species.

Aerial Imagery → **Data Processing** → **Data Outputs** → **Semi-automated Supervised Classification of Habitats (Support Vector Machine or Random Forest Classifier)** → **Invasive Species Map**

Multispectral Sensor and High-Resolution Digital Camera

Field Data

Data Outputs:
- Aerial Photograph
- 3D Point Cloud
- Digital Elevation Model
- Canopy Height Model
- Multispectral Orthophotograph
- Fractional Vegetation Coverage
- Normalized Difference Vegetation Index

Radiometric Calibration Panel

Ground Control Point

Ground Truthing Field Plot

10-Band Multispectral Invasive Species Mapping

Detecting New Buildings for Post-Disaster Response

Nationwide, United States

- **Challenge:** As part of post-disaster response, field teams must document damage to buildings to assess the success of new building codes. Traditional methods of identifying structures that incorporate new building codes are tedious, costly, and time consuming.

- **Solution:** The Sky Wave™ team built a system that uses publicly available satellite data, machine learning, and cloud computing to identify new buildings across the entire United State in a matter of minutes. The identified new buildings are then added to a web mapping application that field teams can access from their smartphones and tablets. **This means people heading to post-disaster zones no longer need to spend days or weeks compiling data on new buildings.** Instead, they can focus on documenting impacts and providing recommendations for improving building safety in the future.

2017   **2022**   **New Buildings**
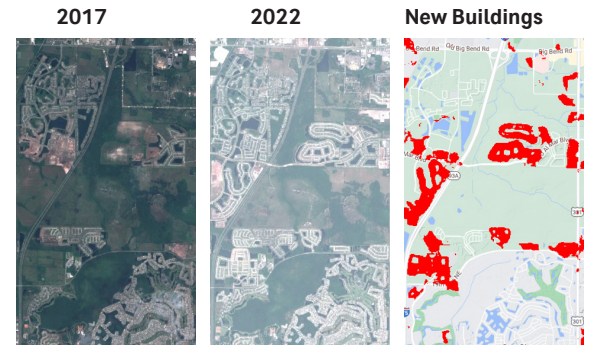
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