TCARTA

Trident Tools ArcGIS Pro Toolbox

TCarta's multispectral bathymetry tool allows rapid creation of bathymetric surfaces from multispectral UAV, aerial or satellite imagery.

Shifting geopolitical landscapes, climate change, and emerging economic opportunities require modern geospatial solutions across the global marine environment. To aid in the creation of this high value data, TCarta has created a user-friendly bathymetry processing tool for utilization in commercial, environmental and GEOINT applications.

Securing accurate and up-to-date bathymetric data is essential to ensure the national security of the United States and its allies. Collection of bathymetry data using in situ collection methods is often not feasible for both remote and contested areas, necessitating alternate approaches without compromising coverage and accuracy.

Within The Trident Toolbox:

- BAG Creator
- In Situ Sample Tool
- Band Ratio Satellite Derived Bathymetry (SDB) Algorithm
- Random Forest SDB Algorithm
- QAQC Statistics Tool

2 Meter Bathymetry Surface from Maxar's WorldView-2 | Bimini Island, Bahamas

WHY TCARTA?

TCarta is the foremost commercial provider of global marine geospatial data. Our dedicated team provides a suite of geospatial products and services for use across a variety of industries and applications.

NSF Small Business Innovation Research Grant Phase II - Trident Bathymetry Mapping System: A Multi-Pronged Automated Solution to Satellite Derived Shallow Seafloor Surveying. Award No: 1927058
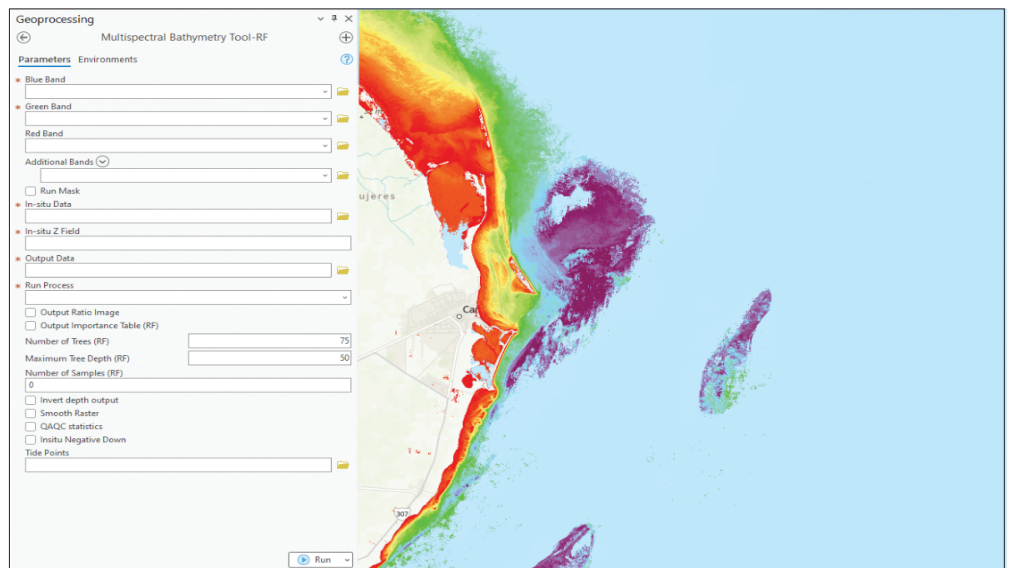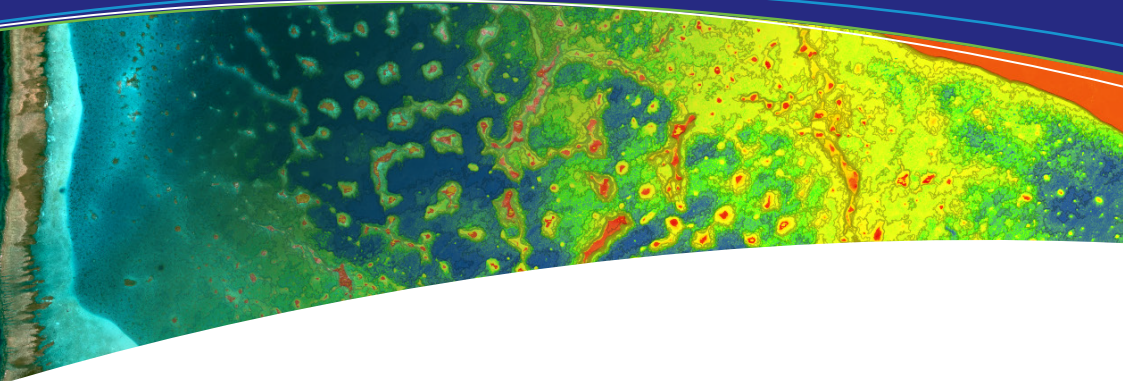
TRIDENT TOOLS ARCGIS PRO TOOLBOX

Developed as an ESRI ArcGIS Pro Geoprocessing Toolbox by TCarta, Trident Tools utilizes satellite imagery and in-situ bathymetric point data to derive per-pixel depth measurements. Using multispectral imagery and in situ point depth data inputs, the tool produces bathymetric grids using a band ratio or machine learning random forest algorithm. Users can integrate multispectral imagery from virtually any platform including satellite or unmanned aerial vehicle (UAV)s.

End users can leverage the European Space Agency's freely available Sentinel-2 A/B archive to produce 10 meter depths over broad geographic regions, with near global imagery availability. For more targeted, site-specific projects, Maxar's WorldView platforms and user-collected imagery from UAV's can be processed providing higher resolution outputs.

Repeat processing of archive and newly collected imagery allows end users to perform meaningful change detection over extended temporal windows to quantify local morphological variations or closely monitor coastal conditions.

EVALUATING SDB INPUTS AND OUTPUTS

Satellite imagery, UAV imagery, and ICESat-2 or other ground control sources serve as the primary inputs to the SDB process. Using the QAQC Statistics Tool to analyze bathymetry outputs, end users can evaluate outliers and iterate to improve the quality of outputs.
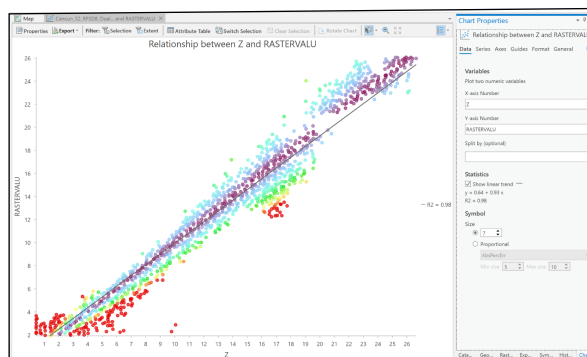
Training topics include evaluation of bathymetry using Trident Tools QAQC Outputs.
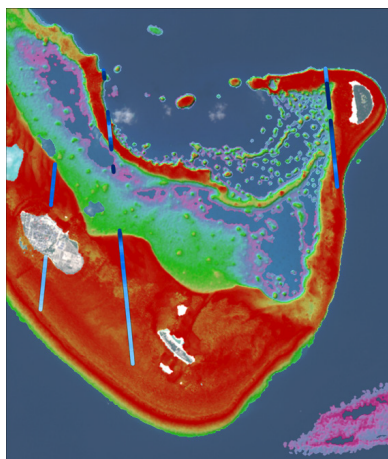
ICESat-2 CALIBRATION

Under NASA's ICESat-2 Applied User Program and funded through the NSF SBIR grant program, TCarta has developed a data access, processing and extraction software to efficiently extract near-shore bathymetry data from ICESat-2. Trident Tools Users can aquire ICES-2 data to calibrate their projects.

10m Satellite Derived Bathymetry Maldives

Trident Tools StoryMap

Trident Tools

A Rapid And Reliable Bathymetric Derivation Solution

- Sensor agnostic
- Creation of continuous, per pixel depth derivation
- Surface calibration using any user-provided point measurements
- Global ICESat-2 bathymetry in situ measurements

Minimum System Requirements

- OS Windows 7 or above, 64-bit
- Software: Esri ArcGIS Pro 2.8 or above
- CPU: Intel Core Duo 2.0 GHz or similar
- For MBT - Band Ratio | Standard Extensions required, 3D Analyst is optional
- For MBT - Random Forest | Standard Extensions, Image Analyst and Spatial Analyst Required
  Recommended: Esri ArcGIS Pro 3.0, Windows 10