

Feature Extraction Capabilities IARPA SMART Presentation

Brian Rabek, Senior Programmer (Presenter)

- Bachelor of Science Degree – Computer Engineering – University of Cincinnati
- 15 years, application development experience – SDI

Rae Helton, Owner & CEO

- Masters Degree – North Carolina Central University (NCCU)
- Bachelor of Arts Degree – NCCU

Audwin Helton, Owner & President

- Certificate of Completion, Joint & Combined Staff Officers' Course – Armed Forces Staff College
- Masters Degree – College of Notre Dame
- Bachelor of Science Degree – NCCU



Company Profile

- Since 1994, SDI is proud to be one of the only African American and woman owned geospatial services firms in the US.
- 30 dedicated employees; several are former National Geospatial-Intelligence Agency (NGA) and military personnel, with geospatial expertise and experience
- Office locations: Louisville, KY and St. Louis, MO
- Owners serve on HBCU Advisory Boards – NCCU
- Memberships – National Security Executives and Professionals Association (NSEPA), U.S. Geospatial Intelligence Foundation (USGIF)
- Owners funded the creation of the Audwin & Rae Helton Center for Geographic Information Sciences Lab in the Department of Geography and Geosciences at the University of Louisville – December 2012.

Research Area of Interest: Feature Collection

Upgrading existing datasets is an area of expertise. Using the latest available high resolution commercial monoscopic imagery, our team validates/invalidates the existence of features in the original, outdated dataset. We further enrich the existing data using custom, in-house tools to provide up-to-date measurements as well as collect new anthropogenic features to add to the dataset.

Research Area of Interest: Data Conflation

Conflating and upgrading existing transportation datasets created at different times is another area of expertise. Transportation routes are continually changing and datasets vary in accuracy and completeness. We use a variety of extensions in conjunction with ArcGIS to evaluate and conflate these datasets based on the newest available high resolution imagery. The image to the right illustrates the result of conflating the top two images.



Research Area of Interest: Application Development

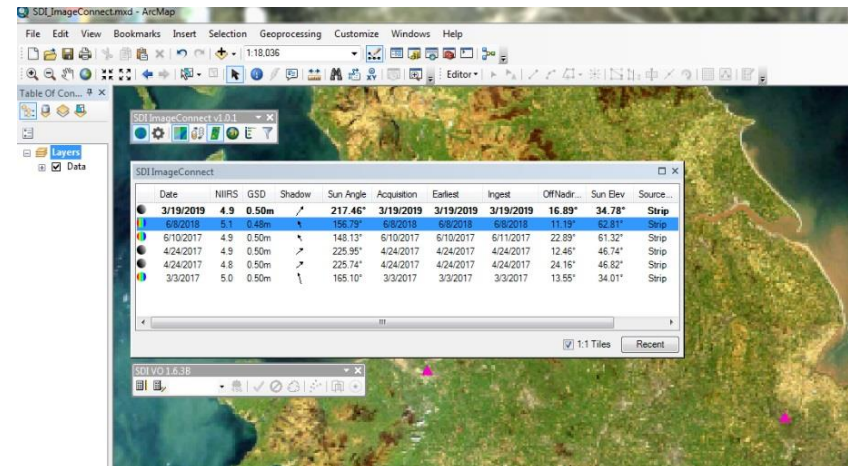
Vertical Obstruction (VO) Requirements

- Digital Vertical Obstruction data includes a worldwide collection of man-made point, line, and area features on the earth's surface that are sufficiently tall so as to pose a potential hazard to flight.
- Technical concepts of Focused Vertical Obstruction Dataset collection entails validating existing vertical obstruction data if it meets certain height and spatial criteria, changing attributes or geographic location if they fall outside of these parameters, and adding new VO data that meets specifications. This requires a targeted feature extraction approach, scanning imagery for vertical obstructions in all airfields that were identified. Mono imagery from DigitalGlobe's Enhanced GEOINT Delivery service (EGD) is used to identify and measure vertical obstructions.
- The desired image currency for this requirement is within one year of the date of contract. These projects utilize current DVOF holdings, other government provided data, and open source information to target feature extraction using mono imagery.

Tool Development

SDI's outstanding applications development team created these tools to enhance data quality, improve workflow, and maximize production:

- Metadata Tool – Automated methods of extracting metadata from imagery services to populate extracted feature attributes.
- Data Integrity Tool – A series of automated processes to review data integrity at multiple stages of collection and identify errors and inconsistencies, while quickly allowing corrections by analysts.
- Imagery Tool – Processes to enhance the viewing of web streaming imagery that utilizes many metadata.
- Imagery Tool II – Methods of downloading and hosting imagery in-house for faster performance and analysis.
- Workflow Tool – A suite of tools to simplify workflows.



Date	NIRFS	GSD	Shadow	Sun Angle	Acquisition	Earliest	Ingest	OffNadir...	Sun Elev	Source...
3/19/2019	4.9	0.50m	↗	217.46°	3/19/2019	3/19/2019	3/19/2019	16.89°	34.78°	Strip
6/8/2018	5.1	0.48m	↖	198.79°	6/8/2018	6/8/2018	6/8/2018	11.19°	52.81°	Strip
6/10/2017	4.9	0.50m	↖	148.13°	6/10/2017	6/10/2017	6/11/2017	22.89°	61.32°	Strip
4/24/2017	4.9	0.50m	↗	226.36°	4/24/2017	4/24/2017	4/24/2017	12.46°	46.74°	Strip
4/24/2017	4.8	0.50m	↗	225.74°	4/24/2017	4/24/2017	4/24/2017	24.16°	46.82°	Strip
3/3/2017	5.0	0.50m	↖	165.10°	3/3/2017	3/3/2017	3/3/2017	13.55°	34.01°	Strip

Qualifications & Capabilities

Certifications

- Woman Owned Small Business (WOSB)
- Women's Business Enterprise (WBE)
- Minority Business Enterprise (MBE)
- ITAR Registration
- SAM Registration
- ISO:2008 Compliant



NAICS Codes

- 541370 – Surveying & Mapping (Except Geophysical) Services
- 541511 – Custom Computer Programming Services
- 541519 – Other Computer Related Services
- 541990 – All Other Professional, Scientific, Technical Services
- 518210 – Data Processing, Hosting, Related Services

DUNS

- 878189836

CAGE

- 02JU3



Small Business Designations

- 8(a) Business Development Program – 1995 through 2004.
- DoD Mentor-Protégé Program with ESRI/NGA – 2003 through 2004.
- DoD Mentor-Protégé Program with Harris/NGA – 2011 through 2012
- DoD Mentor-Protégé Program with Harris/NGA – 2014 through Present.

Key Projects

Map of the World – Content Management and Enrichment

Enrich electrical power networks, transportation networks, and water resources data to resolve gaps in existing baseline datasets to enhance Map of the World content.

Focused Vertical Obstruction Datasets

Compose comprehensive VO datasets that include power-related and cultural data layers using targeted feature extraction over focused Areas of Interest (AOI). Verify VO and/or collect features due to construction of new anthropogenic features.

Multinational Geospatial Co-Production (MGCP) 1:50,000 and 1:100,000 Scale

Utilizing imagery analysis and open source data items, provide updates to existing Topographic Data Store (TDS) feature data, and/or new collection of MGCP feature data.

Ready to Support the SMART Mission

SDI seeks opportunities to align our expertise in geospatial feature extraction, quality control, and applications development with the SMART mission and partners. SDI is experienced in providing quality, low-cost data for integration. We believe our unique expertise will be an asset. Since 1994, SDI has supported the NGA mission to provide timely, relevant, and accurate imagery, geospatial information and products to support national security requirements and challenges.

- **Collaboration:** Geospatial technology alone cannot answer questions that call for reasoning and analysis. SDI's experienced team of analysts and applications developers are ready to support new challenges and requirements.
- **Close Intelligence Gaps and Support Global Mission:** SDI can provide quality, real-time geospatial data to support information decision advantages.
- **Diversity Efforts:** SDI's longevity and experience as one of the only African American and woman owned geospatial firms in the U.S. with HBCU affiliations makes the firm a unique partner. Our award-winning Mentor-Protégé experiences can be leveraged to support small business outreach.



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