



NovelGeo Technologies — Capability Statement

NovelGeo Technologies, LLC · Knoxville metropolitan area, Tennessee

Nicholas J. Sokol, PhD Geospatial Data Science · GIS Automation · GeoAI

Founder-led GIS consulting practice based in the Knoxville metropolitan area, Tennessee. NovelGeo Technologies delivers Python-driven geospatial automation, remote sensing analysis, and spatial data products for government and industry clients.

Contact Nicholas J. Sokol, PhD — Knoxville, Tennessee Email: nickjsokol@gmail.com · LinkedIn: [linkedin.com/in/nicksokol](https://www.linkedin.com/in/nicksokol) · GitHub: github.com/Nsokol44

NAICS: 541370 (Surveying & Mapping, except Geophysical) · 541512 (Computer Systems Design) · 541511 (Custom Computer Programming) · 541611 (Administrative & General Management Consulting — analytics/decision support) · 541690 (Other Scientific & Technical Consulting) · 518210 (Data Processing/ Hosting) · 611430 (Professional & Management Development Training) **PSC:** D302/D307/D311 (IT & data services) · B506/R405 (special studies, operations research) · U008/U012 (curriculum development, IT training)

Core Competencies

- **GIS Automation & Python Development** — GeoPandas, GDAL/OGR, Shapely, ArcPy, and rasterio workflows that replace manual GIS processing with repeatable, auditable pipelines; batch geoprocessing, data conversion, and automated QA/QC.
- **NG9-1-1 GIS Readiness** — Address point and road centerline QA against NG9-1-1 data models, GIS data gap analysis, and remediation roadmapping for PSAPs and emergency communications districts.
- **Asset Extraction & Imagery Processing** — Feature extraction from right-of-way and aerial imagery, videolog processing support, traffic-sign and asset inventories, and image-processing pipelines for pavement/asset-management programs.
- **Remote Sensing & Earth Observation** — Multispectral and satellite imagery analysis, vegetation indices, land-cover classification, change detection, and image processing pipelines using rasterio, xarray, and open-source geospatial toolchains. FAA Part 107 Remote Pilot — photogrammetry and LiDAR processing on a consulting basis.
- **Spatial Statistics & GeoAI** — Geographically weighted regression, spatial clustering, machine-learning models on geospatial features, spatial econometrics, and predictive modeling for location-based decision-making.
- **Parcel Data QA & Modernization** — Parcel fabric QA/QC, conflation support, attribute standardization, data-quality reporting for county assessors and GIS departments.

- **Web Applications & Data Pipelines** — Full-stack geospatial web applications (TypeScript, React, Python backends), ETL pipelines, cloud data workflows, and interactive mapping dashboards that put analysis in decision-makers' hands.
 - **Database Management** — Relational database design and administration (PostgreSQL/PostGIS, SQLite): schema design and revision, data migration, integrity constraints, performance tuning, and documented data dictionaries for operational and research databases.
 - **Statistical Modeling** — Regression and panel models, spatial econometrics, time-series and event-catalogue methods, sensitivity and uncertainty analysis — models built to be audited, with construction choices documented and stress-tested.
 - **Forecasting** — Production forecasting systems for operational decisions: load and renewable-generation forecasting at grid scale, demand and revenue forecasting, forecast-performance evaluation sliced by conditions to isolate failure modes.
 - **Analytics & Decision Support** — End-to-end analytics: data pipelines, exploratory and confirmatory analysis, dashboards and reporting, and translation of results into decisions for operators, managers, and public agencies.
-

Past Performance

NG9-1-1 Spatial QA — County Emergency Communications Data (2026) Built an automated spatial quality-assurance pipeline for county Next Generation 911 data: five validation checks over 26,792 address points and 5,365 road segments, covering street-name agreement, spatial outliers, address-range parity, duplicates, and county-seam continuity. The audit methodology — including an honest accounting of which remediation steps can and cannot certify their own results — was accepted for presentation at a state GIS conference (October 2026).

Geospatial Platform Company — Founder & CEO Designed and built an end-to-end geospatial analytics platform for agriculture: remote-sensing data ingestion, spatial data processing, and machine-learning models delivered through a production web application sold to 300+ customers — full-system responsibility across data pipelines, APIs, and product. Funded by a \$500,000 U.S. Department of Energy Innovation Crossroads award (via Oak Ridge National Laboratory) and NSF I-Corps.

State Grid Operator — Power Systems Forecaster / Data Scientist Production machine-learning forecasting in a mission-critical grid operations environment: day-ahead and real-time load and renewable-generation forecasting models on live operational data, with the reliability standards of a balancing authority.

Multi-Institution Research Platform — Research Fellow Database management for energy research data, including schema design and revisions — the operational side of analytics: keeping research databases structured, documented, and queryable as requirements evolved.

National Consulting Firm — Senior Consultant (2023) Energy forecasting and analytical development within a large consulting practice — client-facing modeling work delivered to commercial standards and deadlines.

University Teaching (2017–present) — Seven years of university instruction in GIS, data science, and spatial analysis — technical depth paired with proven ability to train staff and explain complex geospatial methods to non-technical audiences.

Differentiators

- **PhD in Geography/Atmospheric Science** (2020); research-grade expertise in remote sensing, spatial statistics, and geocomputation.
- **FAA Part 107 Remote Pilot Certificate** — photogrammetry and LiDAR work performed on a consulting basis.
- **Production ML pedigree** — forecasting systems run in live grid operations for a state grid operator; founder-built geospatial platform serving 300+ customers.
- **Full-stack delivery** — Python data pipelines through TypeScript web applications; one accountable expert from raw data to deployed product.
- **Educator's communication** — seven years of teaching translates into clear documentation, effective staff training, and findings that leadership can act on.

Rates available on request. W-9 and certificates of insurance available on request once registrations complete.

NovelGeo does not perform licensed land surveying or professional-engineering-stamped work; where a project requires them, we team with licensed firms.