

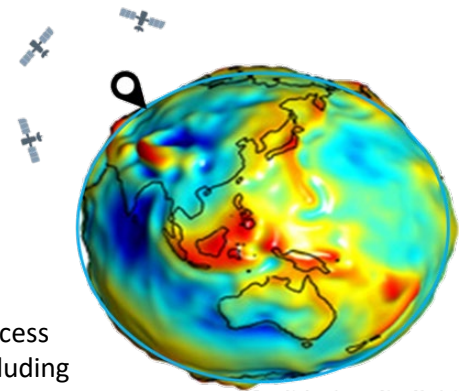
Geoid Modelling

Airborne Gravity Data Capture and Precision Geoid Modelling

Service Overview

We offer airborne gravity surveys and geoid modelling services, delivering solutions to meet the demanding needs of governments and industries. Using proprietary technology (iCORUS-iX) for data capture and modelling workflows, our geoid models achieve typical height accuracies of 2-3 cm - setting a benchmark for precision in surveying, infrastructure development, and environmental management.

Our services utilize the latest airborne technology to capture and process gravity data, enabling seamless modelling across diverse terrains, including densely populated areas and challenging nearshore environments.



Business and Target Market Notes

Target Clients and Business Relevance:

Our airborne gravity and geoid modeling service is ideal for government agencies, infrastructure developers, environmental assessment firms, and geospatial data providers who require high-accuracy, reliable elevation data across large areas. Key market segments include:

- **National Geospatial Agencies:** Developing nationwide geoid models to enable consistent mapping, national infrastructure planning, and environmental monitoring.
- **Engineering and Construction Firms:** Providing precise elevation data to support major infrastructure and construction projects, ensuring accurate and stable project foundations.
- **Environmental Risk and Natural Resource Management:** Delivering critical data for flood risk assessments, land-use planning, and natural resource management.
- **Transportation and Navigation:** Enabling GNSS-supported networks for accurate navigation, essential for air traffic control, maritime navigation, and road mapping.

Value Proposition:

Our geoid models support data consistency for cm level accurate national infrastructure projects, GNSS-based positioning, and contribute to flood risk mitigation efforts and large-scale engineering projects.

- **Comprehensive Coverage and Adaptability:** Our airborne solution allows coverage of difficult-to-access areas (urban, nearshore, rugged terrains) with flexibility unmatched by terrestrial methods.
- **Time and Cost Efficiency:** Airborne gravity surveys streamline data collection, delivering high-quality data in less time than traditional ground-based methods, saving time and cost on large projects.
- **High Precision:** Our geoid models reach 2-3 cm accuracy, surpassing standard global models (typically ~10 cm), adding unparalleled value for high-stakes projects.

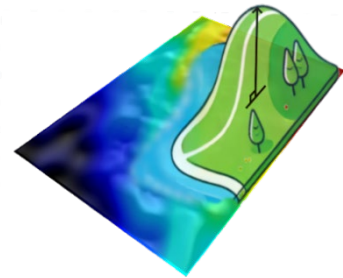
- **Proprietary Technology:** Our iCORUS-iX gravimeter and custom data processing pipeline deliver unique value, allowing clients to leverage precision geoid models for national and regional applications.

Competitive Advantage: With expertise in airborne geophysics and precision modeling, we offer unmatched data quality, adaptable service options, and rapid deployment to meet client requirements efficiently.

Background

What is a Geoid Model?

The geoid is a model of the Earth's "level" surface, closely aligned with mean sea level. It serves as a stable physical reference for measuring elevations across various applications. Coupled with GNSS (Global Navigation Satellite Systems), the geoid model enables precise height determinations, making it a critical component of infrastructure, flood risk assessments, and positioning networks.



Applications for Geoid Models

Our geoid modeling service has diverse applications across critical sectors:

- **Surveying and Infrastructure Development:** Provides precise GNSS-based height measurements, aiding in the planning and execution of construction projects.
- **Flood Risk Management:** Assists in mapping water flow patterns and coastal flooding projections.
- **National Height Datums:** Establishes a unified, national-scale height reference for consistent elevation data, supporting infrastructure and geographic data harmonization.
- **Positioning and Navigation:** Enhances geodetic networks vital for transportation, land management, and national security.

Service Offering

We provide comprehensive airborne gravity surveys and geoid model development, utilizing our proprietary iCORUS-iX gravimeter to capture high-fidelity gravity data.

Data Capture

- **Scalar Absolute Gravimetry:** The iCORUS-iX gravimeter records gravity measurements across survey grids (typically spaced 1-2 km), achieving gravity anomaly accuracy within 1-2 mGal.
- **Customizable Survey Design:** Flight parameters are adjusted according to terrain and project requirements to ensure optimal data coverage.

Data Processing and Geoid Model Generation

- **Gravity Anomaly Reduction:** Line-by-line processing with time domain filters to remove dynamic artifacts, to give in high-accuracy gravity anomalies.

- **Least Squares Collocation (LSC):** This technique is used to interpolate the gravity anomaly data onto a regular grid at the Earth's surface (i.e. in three dimensions) and transform them into gridded geoid model values.
- **Reference Surface Transformation:** Customizable output options include the quasi-geoid or geoid, accommodating specific project needs through methods like Bruns' equation or the Poincaré-Prey approach.
- **Uncertainty Quantification:** Propagating uncertainty estimates throughout the process ensures robust accuracy metrics for each model.

Enhanced Data Fusion for Accuracy

- **Multisource Data Integration:** Our processing can incorporate additional high-fidelity datasets (e.g. If the client has existing terrestrial gravity data or GNSS-leveled heights) to supplement airborne data, using data fusion methods for more robust geoid models.

Why Choose Our Service?

Global geoid models offer limited 10 cm accuracy at best. By utilizing our airborne gravity technology, we achieve local geoid models with superior accuracy (2-3 cm), suitable for applications requiring highly precise elevation data over vast and hard-to-access regions, including urban centers and nearshore areas.