

GeoSAR

Mapping

*A new perspective
on the Earth*



WHAT IS GEOSAR?

GeoSAR is an airborne mapping system that produces 3D data and radar imagery for generation of topographic maps and other derived products. The system uses a technology known as interferometric synthetic aperture radar, widely referred to as IFSAR or InSAR, which is the radar equivalent of stereo vision. It is the world's only radar mapping system that simultaneously maps above and beneath foliage.

WHAT PRODUCTS ARE PRODUCED FROM GEOSAR DATA?

GeoSAR provides solutions for areas with persistent cloud cover, dense vegetation, or desert-like conditions:

- Terrain elevation data (top surface and penetrating band combinations)
- Orthorectified images showing natural and man-made structures including those typically hidden below dense canopy (such as power lines, roads, water-bodies, and buildings)
- Sub-surface feature detection in sand (and some soils)
- Near surface moisture

GeoSAR provides multiple products from dual-band radar and lidar data, all from the same flight:

- Orthorectified radar images with up to 1.25 m resolution
- Digital elevation models at 1.25 m to 5 m posting, with up to 1 m vertical accuracy
- Lidar-derived multiple-return terrain profiles and ground control with a vertical accuracy of 35 cm

What are the differences between X-band and P-band data?

- GeoSAR's X-band (3 cm wavelength) scatters off the first surfaces of vegetation, buildings, and bare earth, delivering images that are rich in first-surface details
- GeoSAR's P-band (85 cm wavelength) penetrates foliage and scatters off substructure, showing details otherwise hidden beneath foliage

COMPARED TO OTHER MAPPING SYSTEMS, WHAT ADVANTAGES DOES GEOSAR OFFER?

Satellite systems - both optical and radar - are limited in their ability to efficiently provide high-resolution datasets over large-coverage areas. The systems that provide high-resolution data typically do so for small areas and are limited by cloud cover; the systems that provide large-area coverage typically result in coarser resolution data. Most IFSAR solutions are single band, multiple pass systems introducing interferometric decorrelation in data, decreasing product quality and stability.

With GeoSAR, customers are offered:

- Accurate and high-resolution data for large coverage areas, acquired in a short timeframe
- Ability to map above and below foliage, no matter the foliage density
- Multi-band, single pass collections with up to eight looks of every 3D point on the ground
- Collection of lidar terrain profile for improved data quality control
- Performs circular collects over targeted areas (very high resolution tomography)
- Customer-owned data

WHAT ARE THE APPLICATIONS OF GEOSAR DATA?

GeoSAR data products support numerous applications in GIS, infrastructure development, transportation, geospatial intelligence (military mapping), environmental assessment, natural resources management, and other disciplines.

Examples include:

- **Economic development and large area engineering studies:** land-use management, planning, infrastructure development, transportation, and pipeline routing
- **Natural hazards and hydrologic mapping:** flood modeling, emergency planning and response
- **Defense and intelligence:** terrain mapping, reconnaissance, mission planning, and illicit activity detection
- **Natural resource management and environmental protection:** deforestation prevention, timber management, monitoring of agricultural yields, water conservation, wetland monitoring, and coastal preservation
- **Oil, gas and mineral exploration:** surface geology, terrain data, and seismic planning
- **Cultural heritage management:** detection and mapping of archeological features

CAN YOU ACQUIRE GEOSAR DATA ANYWHERE IN THE WORLD?

Subject to overflight permission, yes. GeoSAR is capable of mapping thousands of square kilometers during each collection, day or night, and in almost any weather condition to deliver topographic mapping data of a scale, accuracy, and completeness never before possible. GeoSAR is especially well-suited for equatorial regions where dense vegetation and year-round cloud cover make conventional mapping techniques impossible or cost-prohibitive.

