



## GeoSAR And PurVIEW: A new solution for efficient and accurate large-area topographic mapping

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## Fugro's Mission



Our mission is to be the **world's leading service-provider** in the collection and interpretation of data relating to the earth's surface and sub-surface, and in the support of infrastructure developments on land, at the coast and on the seabed.

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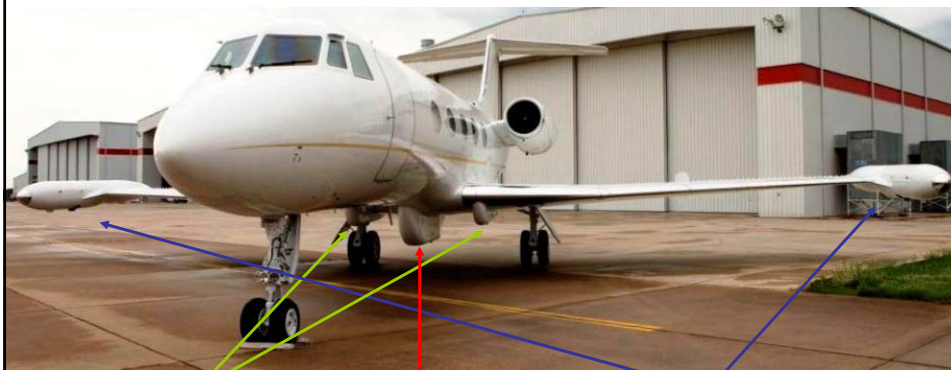
## Fugro Global Network



Fugro delivers these services from a **global network** of offices and facilities. Localized services are backed by an internationally acclaimed **knowledge base** and **resource provision**.

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## GeoSAR System



X-band antennas

Antenna positioning  
measurement unit

P-band antennas

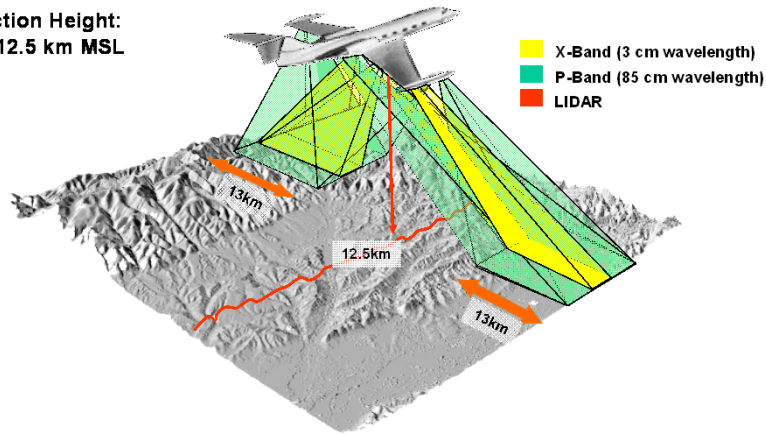
GeoSAR is an Interferometric Synthetic Aperture Radar System (IFSAR) that operates in **two frequency bands**.

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## GeoSAR's Collection Profile



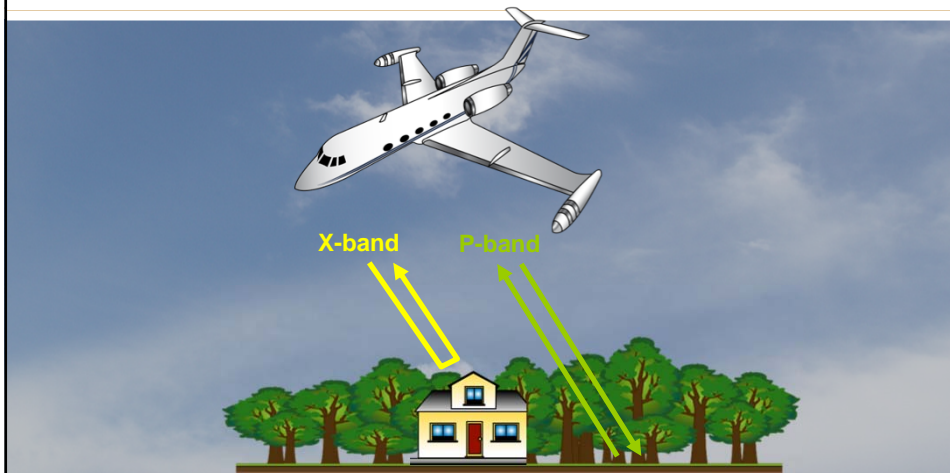
Collection Height:  
10 to 12.5 km MSL



GeoSAR operates day or night through most weather conditions **looking through cloud cover and dense vegetation.**

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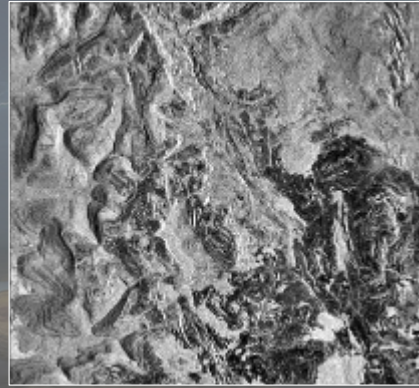
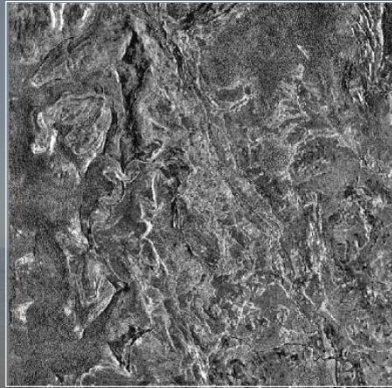
## GeoSAR's X and P-band RADAR Technology



**X-band reflects off the surface** (i.e. vegetation, houses, roadways), producing a DEM and image. **P-band penetrates vegetation** and produces a 3D terrain map and image that reveals underlying features.

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## Geology Revealed by GeoSAR's X- and P-bands



GeoSAR's data **facilitates the mapping of geologic structures** in areas where forest canopy obscures the underlying terrain.

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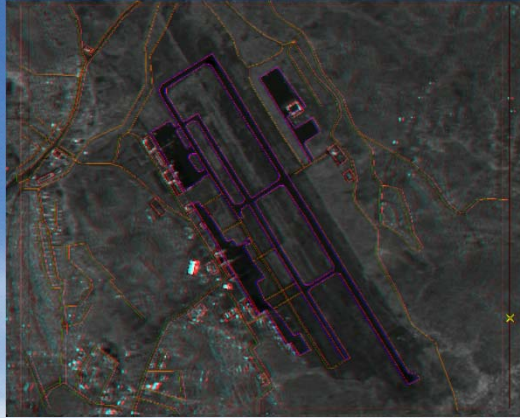
## GeoSAR's P-band Foliage Penetration



P-band shows objects below canopy and surface foliage, and **completes planimetric feature capture** and maps. It detects objects and features **hidden beneath foliage** (i.e. cultural features, trails, roads, fences, wires).

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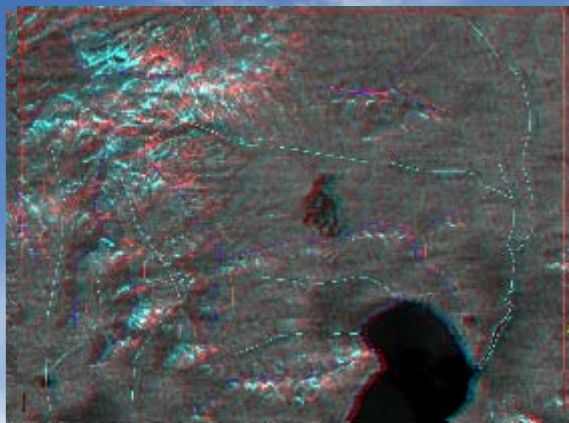
## ESRI PurVIEW



PurVIEW is a **GIS-integrated 3D stereoscopic mapping tool** that can be used for image interpretation and feature extraction.

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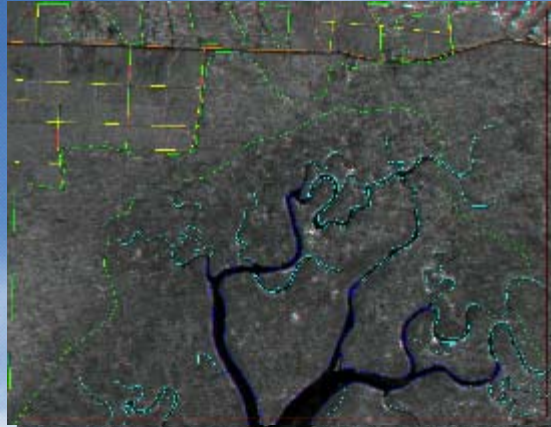
## ESRI PurVIEW



Using PurVIEW, GeoSAR analysts compile **large-area TLMs using precise orthorectified radar image mosaics and DEMs**. The feature data are extracted directly into the geodatabase and incorporated into GIS applications.

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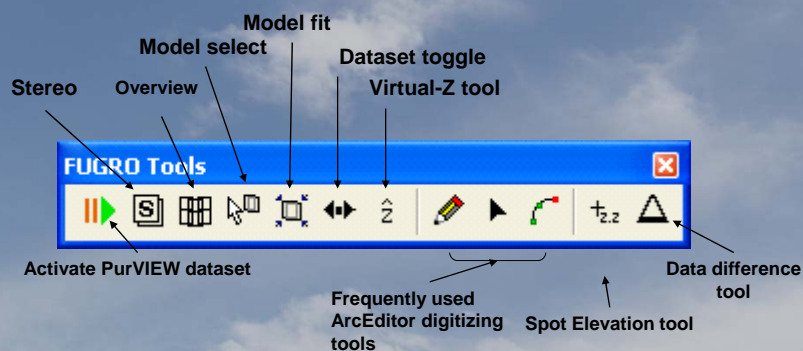
## PurVIEW's 3D Display



PurVIEW **simultaneously displays from the geodatabase** – in 3D -- dual-band GeoSAR and vector feature data. ESRI's ArcGIS database provides storage and dissemination of the image, elevation and feature data.

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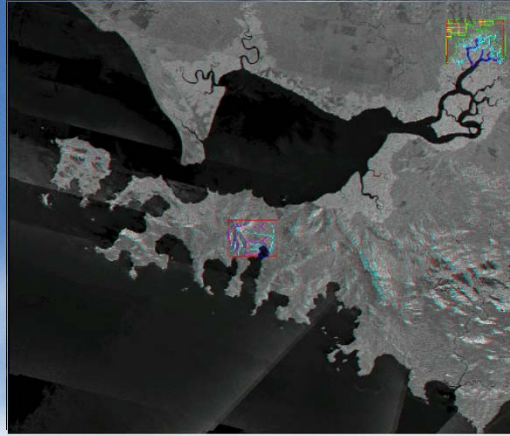
## PurVIEW's Fugro Toolbar



The Fugro Toolbar supports **digitizing and query directly from GeoSAR data**, and it **provides access to important tools**, including on-the-fly synthetic stereo display, 2D feature draping, a stereo cursor, and a data difference display.

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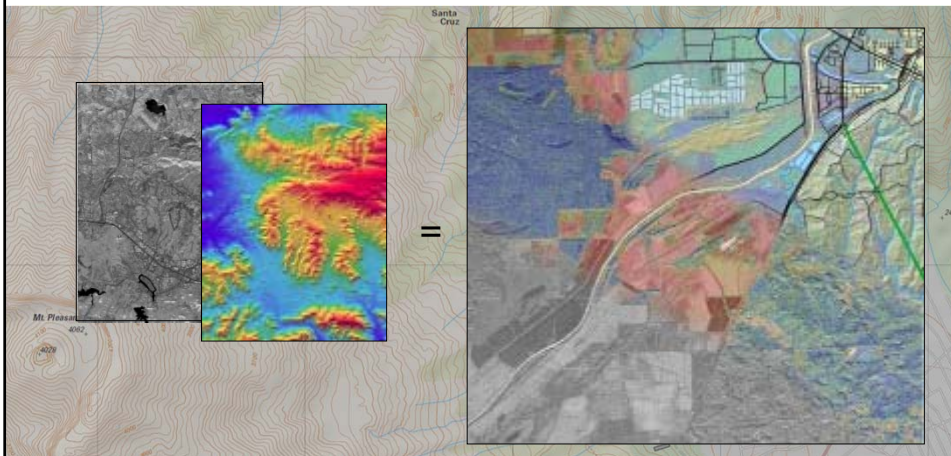
## PurVIEW/GeoSAR Geodatabase



PurVIEW can serve as a **viewer, query, and analysis** engine for GeoSAR data.

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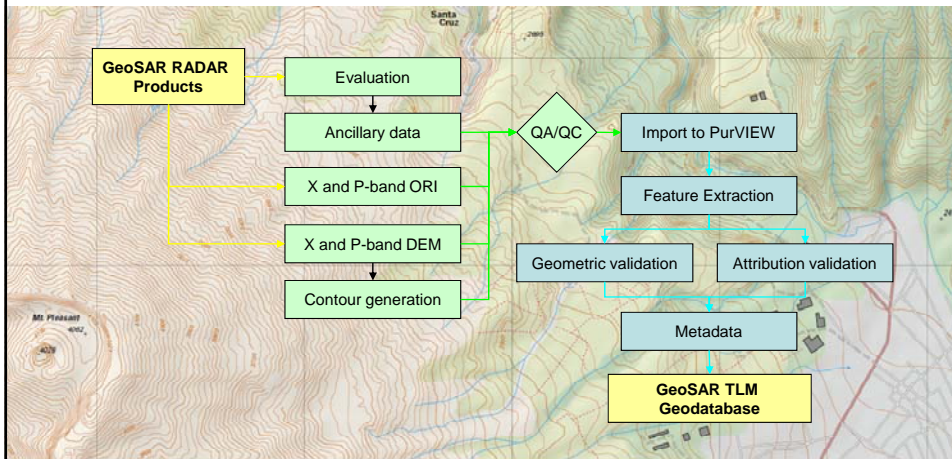
## Topographic Line Mapping (TLM)



PurVIEW **contributes to all phases of TLM development** – including fieldwork, cartography and post-production management.

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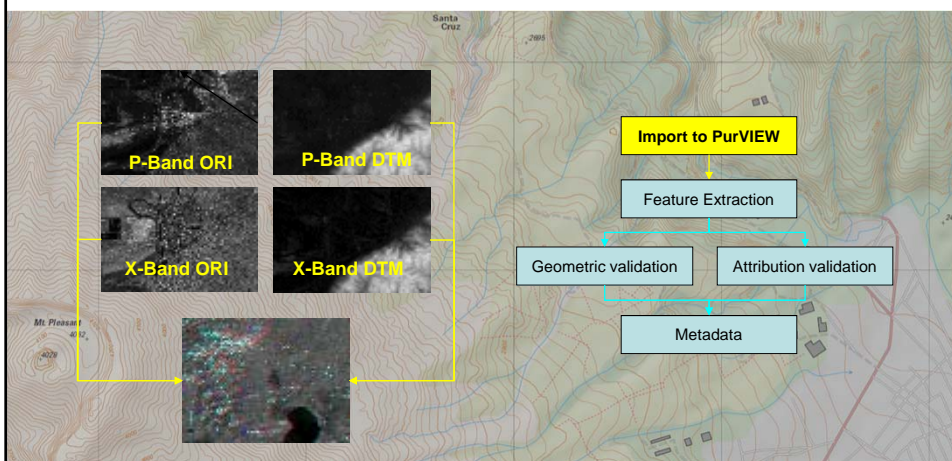
## GeoSAR/PurVIEW's TLM Method



Fugro employs ISO9001:2008 standards for quality control, process improvement, and for assuring codes of practice.

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## GeoSAR/PurVIEW's TLM Method

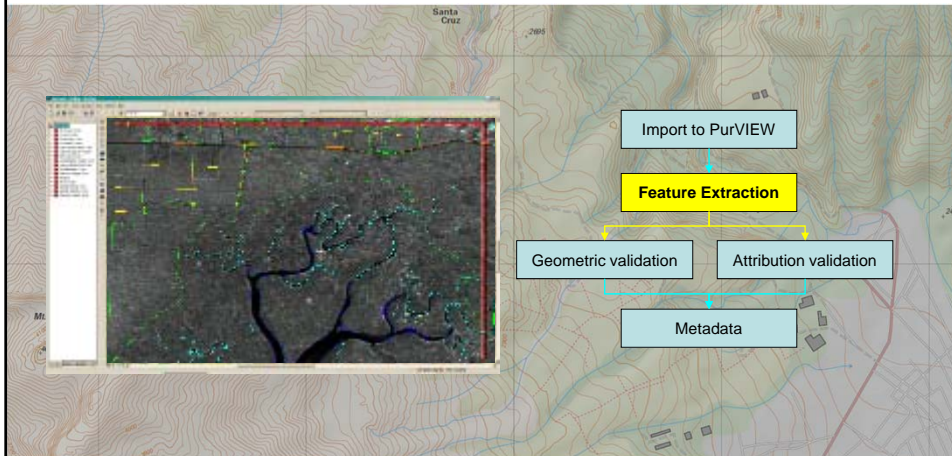


The GeoSAR orthorectified images and surface and terrain models are imported into ESRI's ArcGIS program. Using PurVIEW, a **3-D stereoscopic image is created** that combines image and elevation raster files into one environment.

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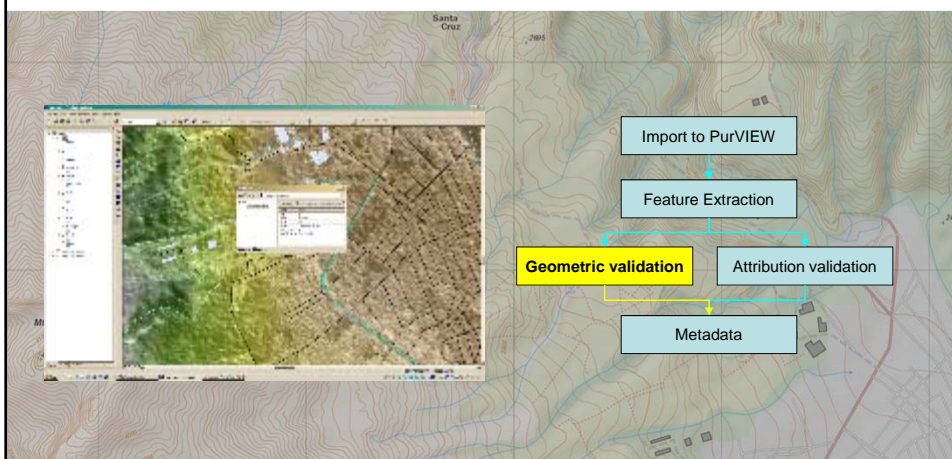
## GeoSAR/PurVIEW's TLM Method



Feature extraction builds a **positional list of the cultural and physical features and objects of interest in a given area.**

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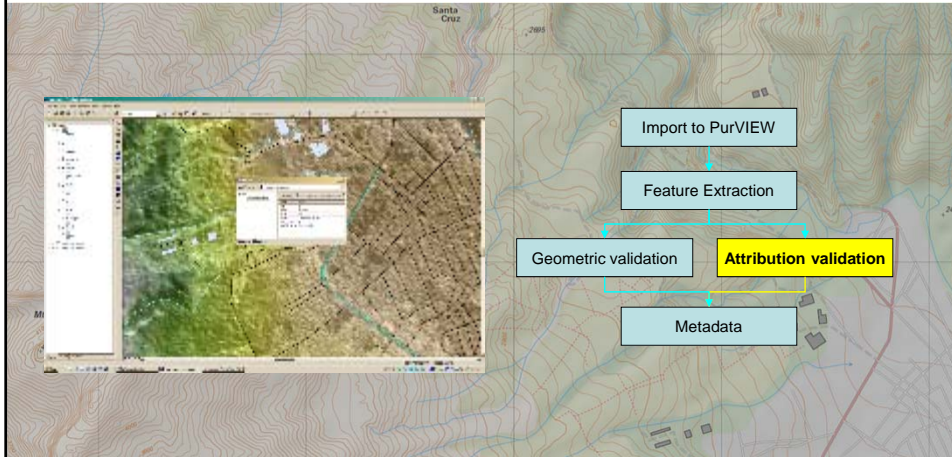
## GeoSAR/PurVIEW's TLM Method



When complete, **all of the features and objects appear in the proper physical relationship** to each other.

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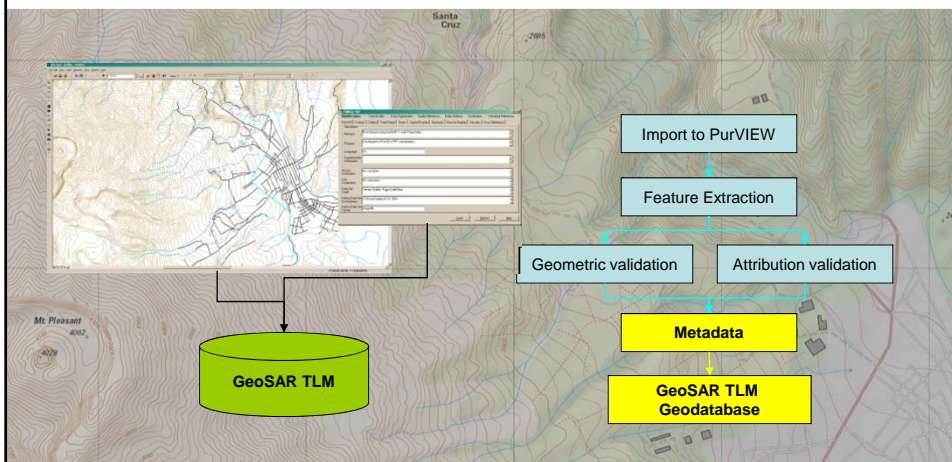
## GeoSAR/PurVIEW's TLM Method



Many features have **attributes which characterize information associated with the feature**. A roadway might be depicted as line and could have attributes which describe its location, size, and the composition of its surface materials.

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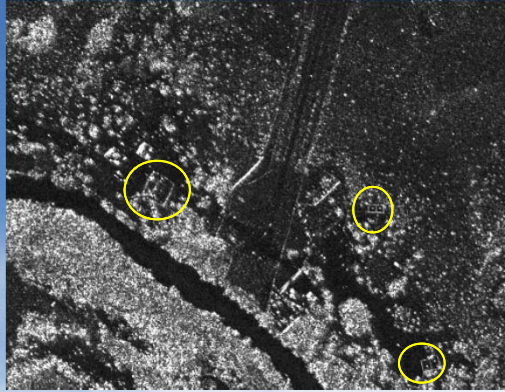
## GeoSAR/PurVIEW's TLM Method



Metadata from the extracted vector features are created and the **features and metadata are both written out to an enterprise-scale geodatabase**.

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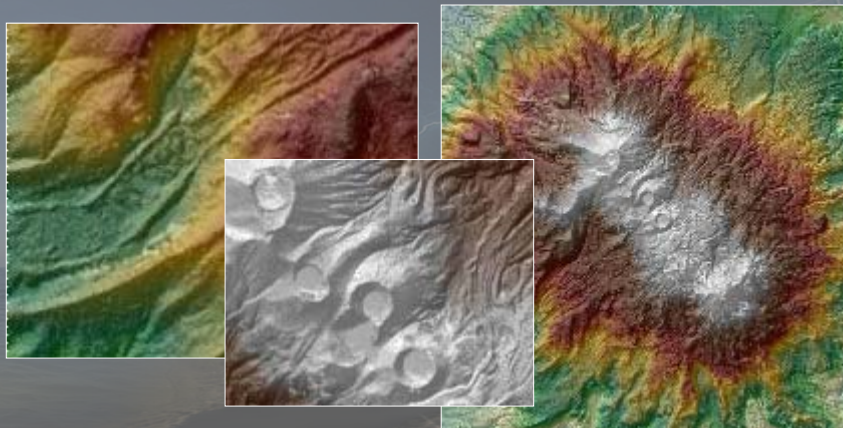
## Defense and Intelligence Applications



GeoSAR and PurVIEW are an excellent platform for the **collection, interpretation and display of natural environments and infrastructure.**

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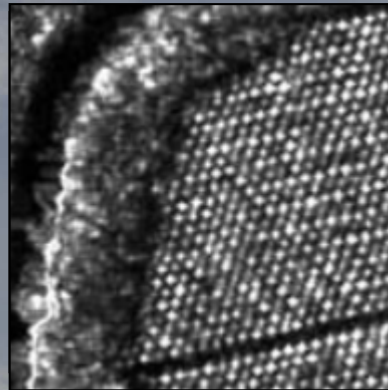
## Geologic and Hydrologic Applications



PurVIEW and GeoSAR support geologic applications with features from **crisp shaded relief models.**

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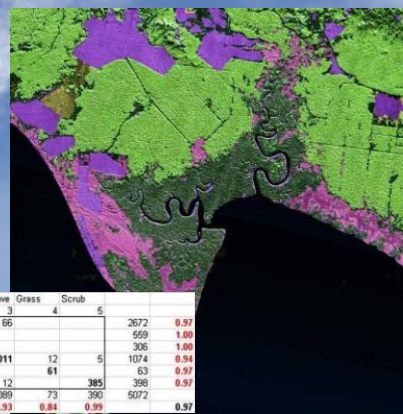
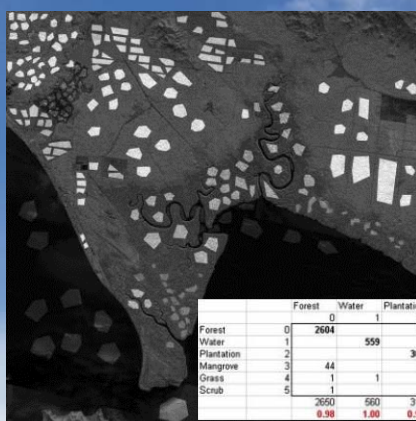
## Land Management Applications



PurVIEW and GeoSAR are **excellent tools for land management, forestry and agricultural applications**. Tree height and crop volumes can be easily estimated and individual tree stems are visible in the 1.25m P-band image.

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## Land Use / Land Cover Classification Overlays

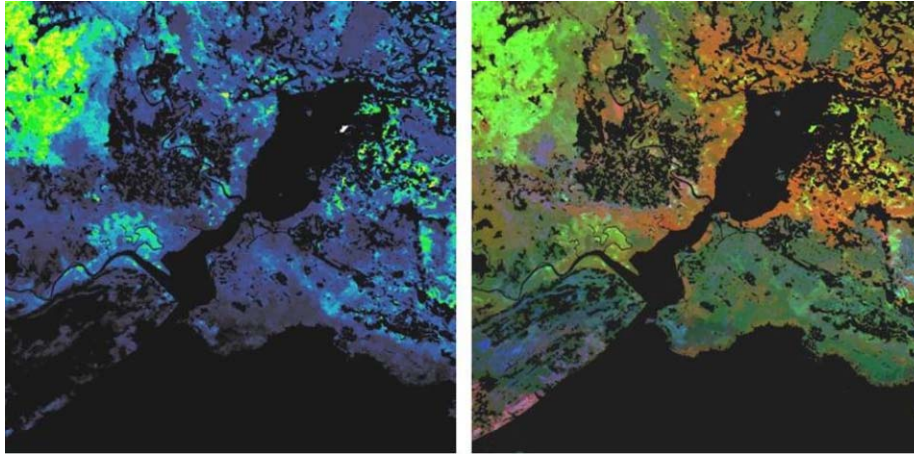


	Forest	Water	Plantation	Mangrove	Grass	Scrub		
	0	1	2	3	4	5		
Forest	0	2604					2672	0.97
Water	1		559		66		659	1.00
Plantation	2			306			306	1.00
Mangrove	3	44			1011	12	1074	0.94
Grass	4	1	1			61	63	0.97
Scrub	5				12		385	0.97
		2650	560	310	1089	73	390	5072
		0.98	1.00	0.99	0.93	0.84	0.95	0.97

GeoSAR data can also be used to derive **reliable land-use and land-cover classification products**.

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## Carbon and Biomass Applications



This GeoSAR image shows a **quantitative biomass estimate at high resolution** for forest carbon calculation or forestry applications. The RGB image on the right shows an X- and P-band multichannel image (R:X, G: $h_{int}$ , B:P).

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## Thank You

For more information on  
GeoSAR or PurVIEW

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