



## MetaSAR-X Airborne SAR

The MetaSAR-X is an advanced multi-channel high-resolution airborne Synthetic Aperture Radar (SAR) operating at X-band radio frequency. It provides high-resolution SAR imaging, useful for imaging, mapping and monitoring applications such as topography, land cover classification, change detection, ocean surface currents monitoring, automatic target recognition, geo-intelligence.

We provide a compact radar sensor that combines high-quality X-band radar performance with flexibility in swath size and resolution. The radar allows for all-weather observations of the scene to be monitored, and the system enclosure can be easily installed on multiple types of aircraft. It is the culmination of a decade of experience in creating and developing radar solutions that MetaSensing offers.

The collected airborne SAR data, synchronized with high-accuracy navigation data, are processed with the MetaSAR-PRO software, MetaSensing's proprietary airborne SAR processor based on Global Back Projection algorithm. The MetaSAR-X can provide Polarimetric Single-Pass Interferometric SAR (PolInSAR) images saved in georeferenced GeoTiff, the standard used by professionals worldwide. The Polarimetric SAR images can then be used for Automatic Feature Extraction, Land Cover Classification and Automatic Target Recognition.

The MetaSAR-X can acquire data in Single-Pass Interferometric mode, both in Cross-Track Interferometry (XTI) and Along-Track Interferometry (ATI) to retrieve Digital Surface Models (DSM) and the velocity of moving targets, respectively.

Moreover, the high-resolution X-band SAR images, can be used for Coherent Change Detection to resolve even the smallest variations in an area over time, providing information not clearly visible to the human eye. The MetaSAR-X system consists of a radar electronic box, characterized by its compact size and light weight as well as low power consumption, along with dual-polarimetric flat-panel antennas and mounting fixtures as required.

Details are provided in the technical specifications table.



The MetaSAR-X enclosure is compact and light-weight, allowing for quick and flexible mounting.

MetaSAR-X Technical Specifications	
Frequency	9.6 GHz
Bandwidth	600 MHz (1 GHz optional)
Slant range resolution	from 25 cm (from 15 cm optional)
Azimuth resolution	25 cm (20 cm)
Channels	2 alternating transmitters, 2 simultaneous receivers
IMU/GNSS	Embedded high-performance IMU/GNSS unit
Polarization	Full (Linear Vertical & Horizontal): HH, VV, HV/VH
Interferometry	Single-Pass, Cross-Track (XTI) & Along-Track (ATI)
Swath (from 10000 feet altitude AGL)	from 2 km to 10+ km (depending on configuration)
Output file format	GeoTiff, NetCDF (with all necessary metadata)
Weight	< 20 Kg
Power consumption	< 200 W @ 28 V DC
Dimensions	Enclosure: 320x320x370 mm



*Color-coded composition of fully polarimetric X-band intensity images acquired over a urban scenario. The SAR image has a ground range of 3.5 km and an azimuth range of 10 km. (Red: VV, Green: HH, Blue: VH).*



*MetaSAR-X image with a landing aircraft.*

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