



MiniSAR Radar

FACT SHEET

Miniature Synthetic Aperture Radar

At any size/weight, the image quality and resolution demonstrated by Sandia's Synthetic Aperture Radars remains unequaled. MiniSAR fills a void in current remote sensing technology by providing unprecedented image quality and resolution while achieving a 4 to 5x reduction in size, weight, and cost. MiniSAR gives small UAVs the



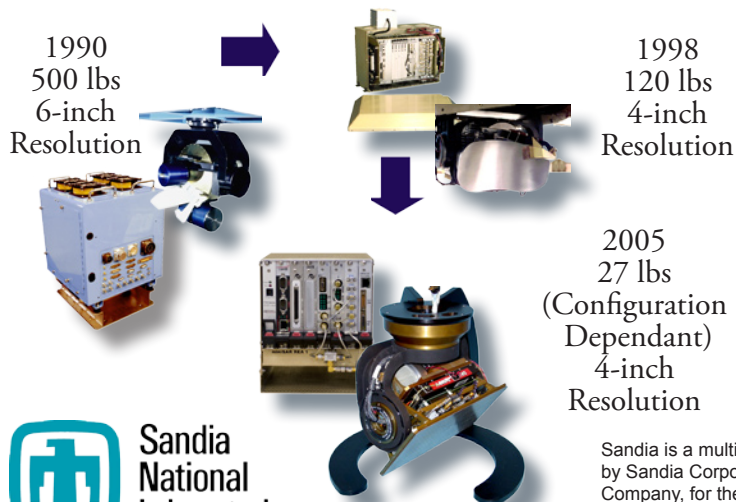
ability to see through smoke, dust, clouds, heavy rain and darkness. Similarly, the MiniSAR sensor has broad application to all-weather, precision guided weapons. MiniSAR is an in-development program; the initial prototype version has been extensively flight tested, with image products being generated in real-time, examples of which are shown here.



Mission

Sandia's MiniSAR program emphasizes the following applications and program goals:

- Reconnaissance from small UAVs
- Affordability
- Potential for use as an all weather precision guidance sensor
- Basic Modes: Spotlight SAR, Stripmap SAR, and CCD (Fine-resolution stripmap and CCD imagery is ground processed)
- Future Modes: GMTI, stereo SAR, videoSAR
- MiniSAR prototype basic modes were flight tested on Lockheed Martin's Sky Spirit FCS Class 3 UAV in 2006



Experience

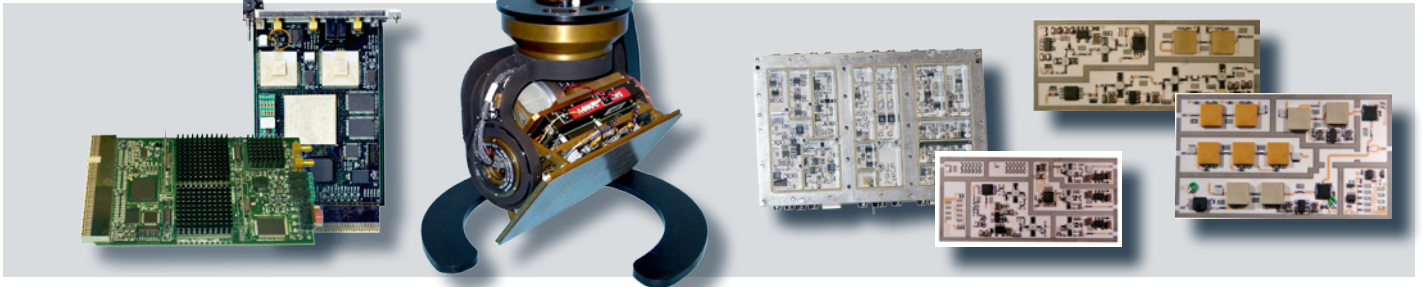
For two decades Sandia has been shrinking SAR size and increasing performance. Sandia systems are best known for their fine resolution (4-inch), high quality imagery (<-20dB multiplicative noise ratio), and real-time image formation. MiniSAR is a revolutionary step forward in this long tradition.



Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy under contract DE-AC04-94AL85000.

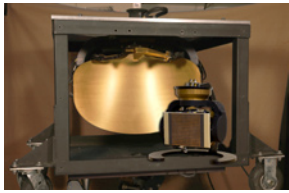


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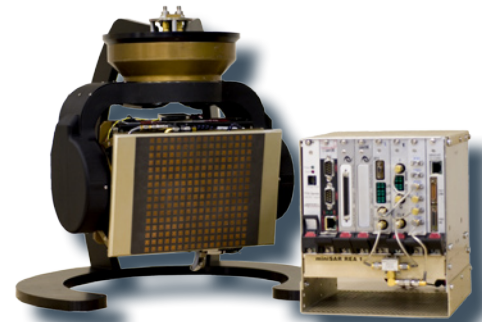


Development Capability

Sandia designs and develops all major component assemblies of each SAR system. We have significant design capabilities in antennas, gimbals, RF front ends, embedded processing, miniaturization, transmitters, microwave modules, high-speed digital circuitry, digital waveform synthesis, digital receivers, motion measurement, motion compensation, and multi-node flight computer software. We integrate, laboratory-test, and flight-test each system to assure that it meets performance requirements.



- **Antenna/Gimbal Miniaturization**
- **Image Quality and Resolution**
- **Radar Electronics Miniaturization**



Specification	Value	Notes/Comments
Weight	27 - ~ 60 lbs (configuration dependent)	Factors influencing weight include number of processors, data storage setup and installation configuration.
Frequency	16.7 GHz (center frequency)	Have demonstrated X-band version. Also extensible to Ka-band.
Resolution	0.1 - 10m (adjustable)	
Maximum Range	5 - 23 km	Range is variable, depending upon several factors which include frequency band of operation, antenna aperture size, resolution, etc.
Tx Power	60 W	
Antenna Type	Wideband patch arrays (patented)	
Modes	Spotlight, Stripmap	GMTI and real-time fine-resolution stripmap and CCD modes are in development. Future modes include videoSAR and stereoSAR.
SAR Image Formation	PFA with PGA; OSAPF	

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Sandia SAR Web Site:
www.sandia.gov/RADAR.html