

# FLEXSAR

## Agile Adaptive Radar

The Space Dynamics Laboratory's (SDL) FlexSAR is a powerful, flight-proven intelligence, surveillance, and reconnaissance asset. Regardless of weather or time of day, this airborne radar system's outstanding geometric accuracy and precise scene measurements provide rapid, reliable imagery, including the following:

- Surveillance at high resolution or broad coverage at low resolution
- Geographically referenced imagery
- Moving target identification
- Highlighting of constructed objects

FlexSAR is a low-cost imaging system built on an extensible radio frequency (RF) architecture and supported by software-defined radio for waveform generation and sampling. This system emulates bat echolocation adaptivity in its ability to adjust to evolving conditions and modes. The FlexSAR system is easily modified to accommodate new capabilities and/or changing conditions, with modification timelines measured in weeks rather than years.



*FlexSAR in the VME chassis.*



*Quad-polarized Ku-band FlexSAR image.*

### FEATURES

- Agile RF & processing system
- Rapid & simple configurability
- High-quality connectorized RF for cost-effective modifications
- High-fidelity radar data with carefully designed data paths for signal integrity
- Quick, efficient validation & test of novel radar modalities
- Raw data open access in standard formats
- Fine-tuned processing & access to intermediate products
- Flight-proven, reliable performance

### SPECIFICATIONS

- 2 transmit (TX), 4 receive (RX), configurable multiple input, multiple output (MIMO) channels
  - Full pulse-to-pulse waveform agility
  - Capable of mutually coherent bands with simultaneous TX/RX
- Supports X-band & Ku-band
- Configurable sampling
  - Supports pulsed & continuous TX & RX modes
  - Supports up to 3.2 GB/sec RX & 4.8 GB/sec TX per channel
- 2.5 GB/sec raw data storage to 8 TB storage
- Centimeter-accurate navigation solutions
- Strip & spot modes
- VME & PCIe chassis compatible
- Paired with a two-axis gimbal for stabilized pointing

## FLIGHT TESTING SERVICES

SDL is uniquely positioned to support radar data collections and provide flight test support, with flight assets that include manned and unmanned aircraft, support facilities, and ready access to several test range sites. SDL also offers a full array of flight test resources and services, such as pilots, operators, sensor integration, and FAA certification, for reasonable hourly rates.

SDL's aircraft can be configured to support various power, processing, and communications requirements, including tactical data links.

**Dakota unmanned aircraft** can carry a payload of up to 65 lbs and 360 W. It features a large internal column, four wing mounts, a belly mount, and sky-looking antenna mounts. GPS/INS is available.

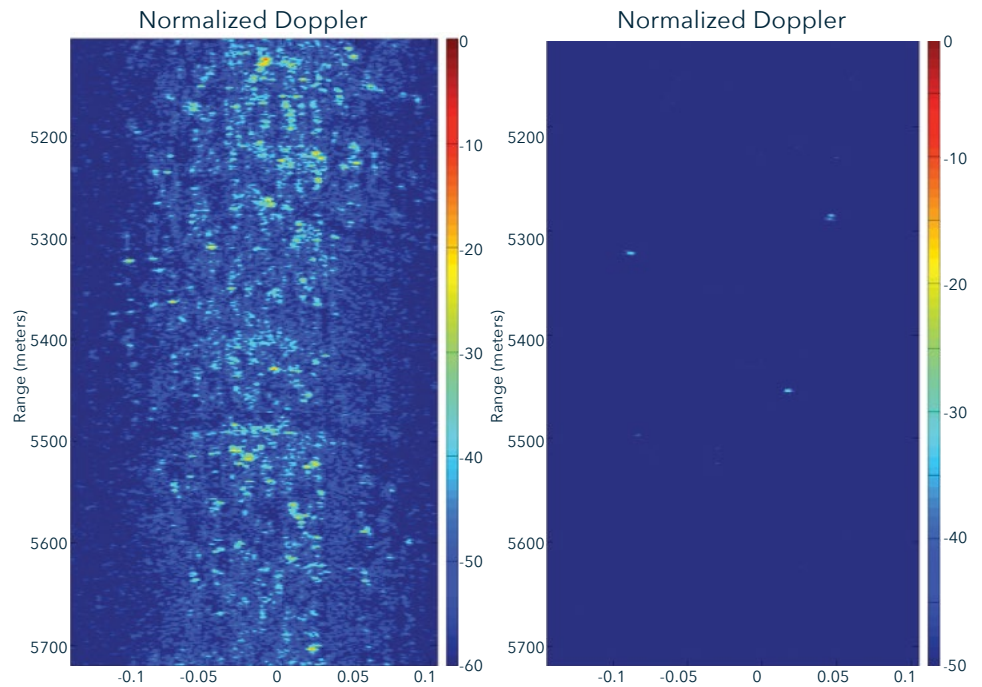
**(2) Cessna Skymaster O-2 manned aircraft** can carry a total payload of up to 450 lbs and 2 kW. It features 22 U of rack space, four wing hardpoints for sensor installation, and inline twin engines for very stable flight. GPS/INS is available.



SDL Skymaster aircraft with FlexSAR.

## APPLICATIONS

- Synthetic aperture radar (SAR)
- Ground moving target indicator (GMTI)
- MIMO for colorized polarization
- Monostatic or multistatic geometries
- Active or passive modalities
- Along-track interferometry (ATI)
- Dismount detection
- Video SAR
- Polarimetric imaging



FlexSAR Doppler image (left) and resultant ATI product showing hidden moving targets (right).