# XSTAR
## X-Band Space Time Adaptive Radar

STAR DYNAMICS CORPORATION

**The ultimate test-range instrumentation radar system delivering warfighter confidence in weapon-system performance. The XSTAR is an advanced and proven, software-defined, precision CW range/Doppler radar.**

- Aperiodic, spatially-diverse phased-array receive aperture
- Covariance-matrix digital beamforming
- Over 1,000 real-time, simultaneous beams within IFOV
- Automated track functions
- Built-in test and diagnostics, both manual and automatic
- Convenient, real-time operator controls
- Modern, user-friendly HMI with multi-layer windows and interactive maps
- Real-time data-display products
- Mission planning and mission simulation
- On-board raw data storage for > 12 hours
- Optics available for calibration and tracking
- Available in 230, 246, 248, and 254 dB(m) (1-second RF loop gain)

### Revolutionary Precision

XSTAR is a revolutionary, yet proven, precision, continuous wave (CW), range-Doppler, time space position information (TSPI), instrumentation radar developed with private equity explicitly to address next-generation TSPI requirements across the needs of leading test ranges. XSTAR is an affordable, instrumentation radar that uses advanced CW Doppler techniques to address new requirements for simultaneous, precision tracking of multiple targets.

### Unprecedented Multi-object Tracking

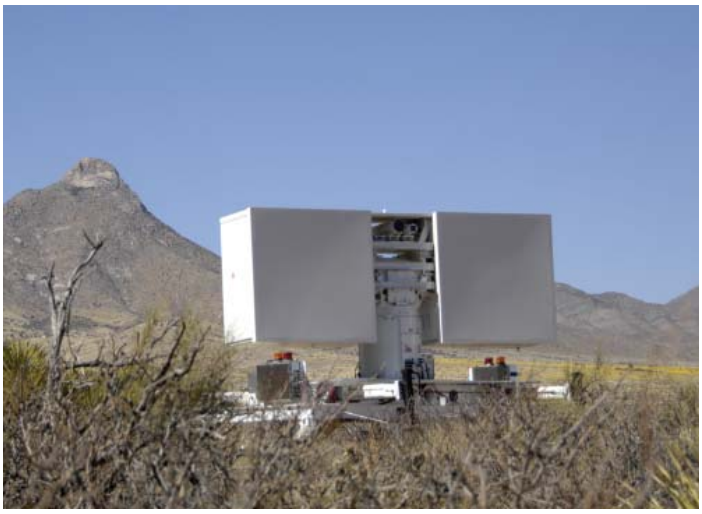
A multi-object tracking radar, XSTAR has unprecedented target-trajectory measurement capability that meets today's test-range measurement requirements while greatly reducing customer risk in developing and testing modern defense systems. The XSTAR solution brings exceptional technical features not available from any other supplier in the world and provides our customers with the highest precision range data measurement tool available.


### Revolutionary Digital-signal processing

The XSTAR family of radars are commercial off the shelf (COTS) radar systems, developed to satisfy US DOD major range test facility base (MRTFB) research, development, test and evaluation (RDT&E) requirements for advanced, open-air flight-test programs. The high-performance XSTAR is a software-defined system incorporating modern, novel, massively-parallel digital-signal processing technology that revolutionizes phased-array radar architecture providing unmatched operational performance for electronic trajectory measurement systems. The XSTAR includes a latest-generation phased-array antenna with digital-beamforming real-time processors, and is an advanced multi-object tracker providing state-of-the-art control, data-acquisition, recording, and processing subsystems.

## XSTAR Advantages

- ***Higher-speed data collections through proprietary implementation of modern, fast, digital control and real-time signal processing***—provides shorter test times and saves program money.



- ***Higher measurement accuracy and repeatability through proprietary control of the radar transmitted and received signals***—increases confidence in the performance of the systems under test when deployed to the operational environment.
- ***Industry-leading, comprehensive, flexible, user-control interface***—provides greater control of test set-up and data collection to improve the efficiency of the test scenarios.
- ***Unmatched, proprietary, massively-parallel, high-performance signal processing***—major private investment in real-time processing provides much lower risk to customers.
- ***Software-defined designs that are perpetually upgradable with advances in computer and software tools***—provides lower total cost-of-ownership through reduction of obsolescence and potential for ongoing performance upgrades.

## XSTAR Models and Maximum Range Performance

| Model | 1-second RFLG [dB(m)] | TX Power (W) | Range (km) O dBm² at 12-dB SNR | Range (km) 6-in Sphere at 12-dB SNR |
|---|---|---|---|---|
| M250 | 254 | 3,840 | 361 | 133 |
| M240 | 248 | 1,500 | 250 | 92 |
| M235 | 246 | 1,000 | 226 | 83 |
| M220 | 230 | 200 | 89 | 33 |

## Performance Capabilities

| | | | |
|---|---|---|---|
| Set-up & Cal Time | < 8 hours | Range Resolution | < 4 m |
| Range Measurement Accuracy | 0.1 m | Coherency | Fully Coherent |
| Angle Measurement Accuracy | 0.1 mrad RMS | Max CPI | 250 msec |
| Velocity Measurement Accuracy | < 0.5 m/s | Target Acquisition (4 detections) | 0.5 s |
| Velocity/Range Track Rate | ±12,500 m/s | Transportability | Unimproved Roads & C17 Air Transport |
| Range Rate Resolution | 5 m/s | Simulation & Training | HWIL |
| Doppler Sidelobe Levels – CW – 10-millisecond period | –42 dBc | MTBF | 2,000 hours |
| Doppler Sidelobe Levels – FM – 10-millisecond period | –32 dBc | Trailer Self-level | 5° Slope |
| Angle Track Rate | 50° $s^{-1}$ | Mission Reliability (45-min. mission) | 99% |
| Adjustable Angular Extent | 1° to 20° | Transmit Duration | > 8 hours |
| Angular Acceleration | 45° $s^{-2}$ | System Availability | 95% |
| Total Dynamic Range | 160 dB | Azimuth Mechanical FOV | 360° Continuous |
| Instantaneous Dynamic Range | 90 dB | Elevation Mechanical FOV | –5° to +95° |
| Operating Frequency Bands | 9 to 10 GHz | | |

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