ECHODYNE

MESA® Radar Solutions for Critical Infrastructure

BETTER DATA. BROADER AWARENESS. MORE SECURE SPACES.
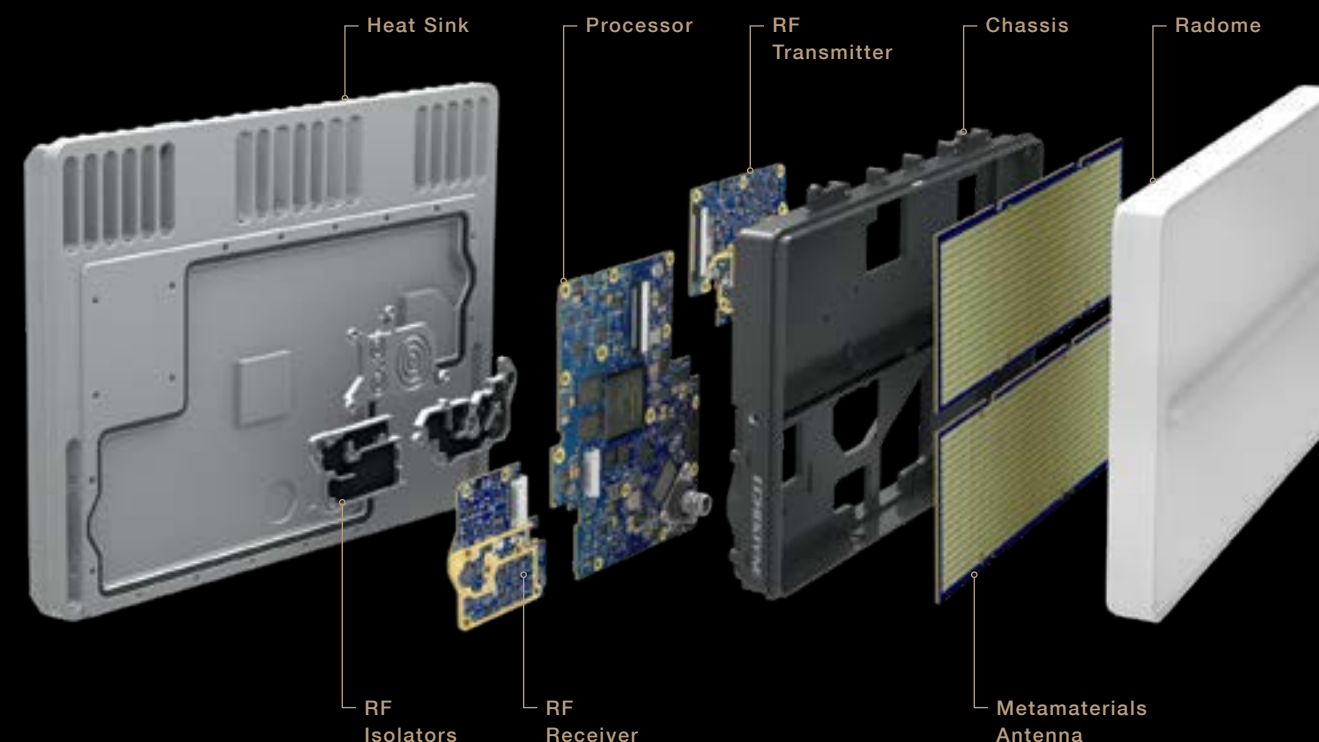
New Security Concerns Require Breakthrough Technology.

Security needs at high-risk sites are being stretched. As the number of clueless to nefarious actors increases, both on the ground and in the air, security teams require better situational awareness and more time to respond. To maintain present operational levels with a now 3-dimensional (3D) perimeter, technology must create the advantage, act as a force multiplier, and achieve greater situational awareness.

Echodyne metamaterials electronically scanned array (MESA) radar solutions deliver that advantage in an ultra-low SWaP format that is mission powerful and budget friendly.

Radar is the workhorse of modern perimeter intrusion and drone detection systems, streaming high-fidelity location data in real-time and amplifying the effectiveness of other sensors. Radar is the only sensor that detects and tracks all movement on the ground and in the air, regardless of lighting or weather conditions. And radar is required if "dark" or "silent" drones, ones that are not detectable by RF signature, are part of the risk assessment.

Forward-looking security teams are making MESA radar the cornerstone sensor in their detection stack, ingesting the high-fidelity radar data into their C2 and VMS to boost situational awareness in all domains:

- Detect, track and classify multiple threats at the same time
- Slew optical sensors for eyes-on-object
- Inform and direct mitigation responses

Heat Sink   Processor   RF Transmitter   Chassis   Radome

RF Isolators   RF Receiver   Metamaterials Antenna

Different by Design, MESA Radar Delivers Enhanced Multi-Domain Situational Awareness.

Until Echodyne's breakthrough in radar design, commercial security was priced out of using powerful electronic scanned array (ESA) radar for perimeter intrusion and drone detection. The long-standing military gold-standard for multi-domain threat detection, today's fielded ESA radars offer extraordinary performance at an equally extraordinary cost. The primary obstacle to broader use of ESA is directly related to the system architecture, which is built using complex Tx/Rx modules with high lifecycle costs. Simply, ESA has historically required significant investment in equipment, staffing, and maintenance.

Echodyne has taken a different approach to radar design, employing a physics design concept called metamaterials which creates counter-intuitive results when conventional materials are assembled in a very specific way. Echodyne's patented MESA design allows electromagnetic energy to be shaped and steered without moving parts. This approach unlocks other elements in radar design that produce a compact, solid-state radar with the range and, importantly, the accuracy to detect and track objects of interest across a large field of view. And the object metadata from MESA radar is richer, faster, more accurate, and more reliable, with the precision and data rates required for robust situational awareness.

Combined with powerful on-radar and off-radar software, Echodyne's MESA design creates a commercially priced radar with ultra-low SWaP and unrivaled performance, tested and trusted by defense, government, and commercial customers as the foundation for more effective threat detection and safer outcomes.

Radar reinvented.

Why are Echodyne Radars Preferred for Critical Infrastructure Protection?

Engineering Breakthrough. MESA design delivers military-grade ESA beamforming performance with no moving parts. The result is an ultra-low SWaP powerhouse that is affordable, simple to launch, durable, and easy to maintain. Plus, Echodyne radars are all designed and built in the USA.

Multi-Domain Detection. Designed to meet the needs of a changing threat landscape, Echodyne radars are tested and proven accurate and reliable for detecting and tracking multiple ground and air threats at the same time.

Systems Integration. Built for data fusion and systems integration, Echodyne radars utilize open architecture, produce multiple rich data options, and connect via TCP/ IP over Gigabit Ethernet.

Software Defined. A powerful suite of off-radar software tools tunes the radar for site and mission requirements, helps reduce false positives, visualizes radar performance, and intelligently networks radars.

Data Fidelity. Echodyne radars generate the most accurate and dependable location and track data in their respective classes.

Key Applications

Correctional Facilities

Electric

Hydroelectric

Oil & Gas

Airports


Nuclear

Water & Wastewater

Custom Security Applications

DRONE DETECTION

Fast, nimble, easy to build, and simple to operate, the drone threat is now a core element of risk assessments for critical infrastructure sites nationwide. And as more drones fly and pilots become familiar, modifications of retail equipment can quickly make a drone much less detectable. Radar detects everything that moves, making it the key to attaining and maintaining comprehensive situational awareness. Echodyne's precision radar data can be ingested directly and integrates easily with other sensors and systems, acting as a technology force-multiplier in a layered sensor stack.

RADAR SOLUTIONS

EchoGuard	EchoGuard CR	EchoShield	EchoFlight
Short-range radar with industry-best drone detection, tracking, and classification capabilities. Ultra-low SWaP for mobile and fixed requirements.	Lower power requirement. Tuned for highly accurate intrusion detection in urban environments and at close range.	Medium-range, best-in-class accuracy for wide open spaces with high threat risk including large campus environments and takeoff/landing corridors.	Ultra-low SWaP for short-range monitoring from tethered drones.

3D SECURITY

Critical infrastructure faces a battery of threats. As the modern threat landscape evolves, new tools are needed to enhance perimeter intrusion detection systems and improve situational awareness - primarily on the ground and increasingly in multiple domains. High-performance MESA radar provides multi-threat ground detection, optional air coverage and integrates with optics for eyes-on trespass confirmation. Actionable, high-fidelity radar data provides insight when time is on your side and threats are at a distance.

RADAR SOLUTIONS

EchoGuard	EchoGuard CR	EchoShield	EchoFlight
Unrivaled performance. Short-range trespass detection, tracking, and targeting. Ultra-low SWaP for mobile and fixed requirements.	Lower power requirement. Tuned for highly accurate intrusion detection in urban environments and at close range.	Medium-range, best-in-class accuracy for wide open spaces with high threat risk.	Ultra-low SWaP for short-range monitoring from tethered drones.

EchoGuard®

4D Surveillance Radar

Superior Drone Detection
Enhanced Perimeter Security
Market-Leading Performance

EchoGuard CR®

4D Surveillance Radar for Close Range

Guard Every Perimeter
Ground and Air
Accurate and Reliable

Multi-Domain Vigilance

Echodyne's patented MESA technology combines with powerful software to deliver ESA performance in a compact solid-state format that detects, tracks, and classifies objects of interest on the ground or in the air, regardless of weather or lighting conditions. Exclusive to Echodyne, concentrated Tx/Rx cell modules direct thousands of pencil-thin beams across the 120° azimuth x 80° elevation field of view (FoV) in milliseconds. EchoGuard rapidly detects and precisely tracks up to 20 objects of interest, delivering high-fidelity data in a proprietary format over a standard TCP/IP Gigabit Ethernet connection. With multiple data-rich output options available by API, including raw data, EchoGuard's superior spatial accuracy creates a robust data foundation for critical infrastructure protection including drone detection, enhanced perimeter intrusion detection, and mobile deployment for surveillance and hot zone coverage.
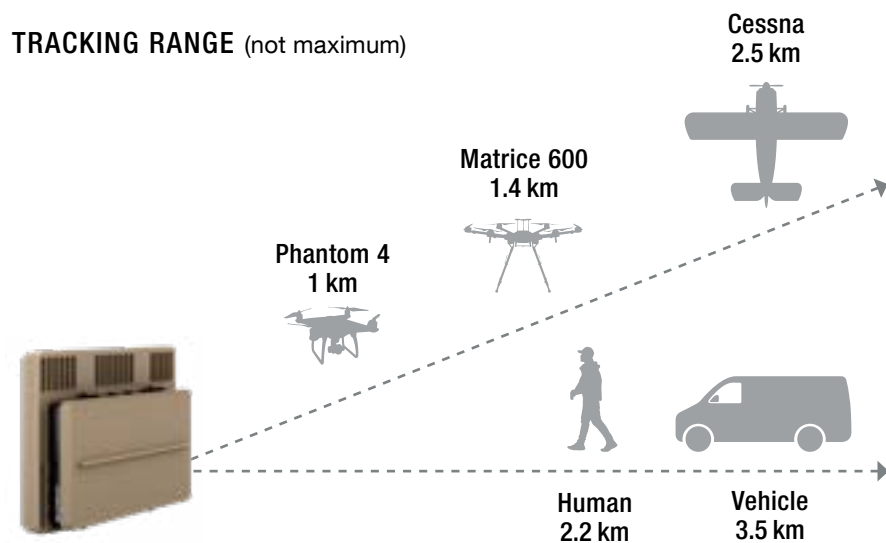
RADAR SPECS

Frequency
K-band 24.45 – 24.65 GHz (USA)
K-band 24.05 – 24.25 GHz (INTL)

Field of View
120° Azimuth x 80° Elevation

Track Accuracy
< 1° Azimuth x < 1.5° Elevation

Track Update Rate
10 Hz

Size
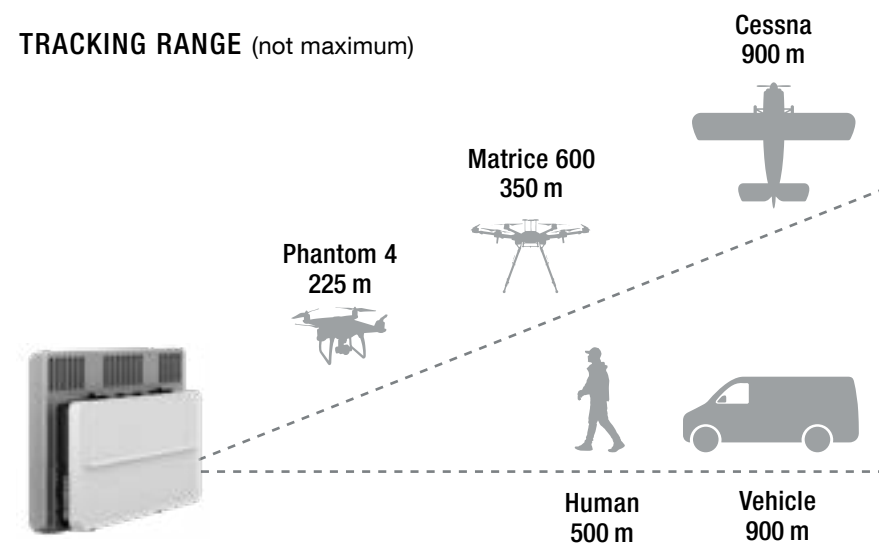20.3 cm x 16.3 cm x 4 cm

Weight
1.25 kg

Power
+ 15 to + 28 VDC

Close-Range Precision

Part of the EchoGuard family of 4D beamforming radars, EchoGuard CR is specifically built for performance in semi-urban, urban, and other close-range environments. EchoGuard CR's low-power signature maintains high performance by managing energy output to reduce signal clutter and reflection. EchoGuard CR rapidly and accurately detects and assesses multiple ground and air targets within the 120° azimuth and 80° elevation field of view. High-fidelity data for up to 20 simultaneous tracks includes latitude, longitude, range, velocity, bearing, closing time, and more. Standard TCP/IP Gigabit Ethernet connections and multiple data-rich output options available by API ease integration with other sensors and systems.

RADAR SPECS

Frequency
K-band 24.45 – 24.65 GHz

Field of View
120° Azimuth x 80° Elevation

Track Accuracy
< 1° Azimuth x < 1.5° Elevation

Track Update Rate
10 Hz

Size
20.3 cm x 16.3 cm x 4 cm

Weight
1.25 kg

Power
+ 12 to + 30 VDC

TRACKING RANGE (not maximum)

Cessna
2.5 km

Matrice 600
1.4 km

Phantom 4
1 km

Human
2.2 km

Vehicle
3.5 km

TRACKING RANGE (not maximum)

Cessna
900 m

Matrice 600
350 m

Phantom 4
225 m

Human
500 m

Vehicle
900 m

EchoShield®

Multi-Mission 4D Radar

Next-Gen ESA

Intelligent Search

Multi-Domain, Multi-Mode

Extended-Range Protection

Ideal for sites desiring comprehensive situational awareness at greater range, EchoShield is a next-generation, software-defined, medium range, pulse-Doppler, cognitive 4D radar. Concentrated Tx/Rx modules direct thousands of pencil-thin beams across the wide field of view (FoV) in milliseconds. EchoShield detects and precisely tracks up to 1,000 objects of interest while continuing to interrogate the remaining field of view. High-fidelity data is delivered in a proprietary format over a standard TCP/IP Gigabit Ethernet connection. Multiple data-rich output options are available by API, easing integration with other sensors and systems. EchoShield's unparalleled accuracy and multi-mission capabilities are a value for high-risk critical infrastructure sites seeking 360° protection.
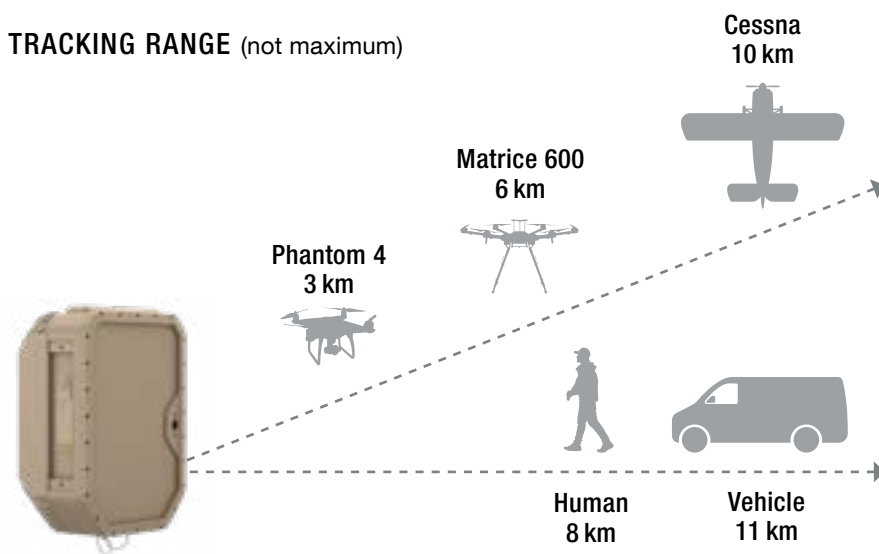
RADAR SPECS

Frequency
Ku-band 15.4 – 16.6 GHz

Field of View
130° Azimuth x 90° Elevation

Track Accuracy
< 0.5° Azimuth x < 0.5° Elevation

Track Update Rate
10 Hz

Size
42.5 cm x 33 cm x 18 cm

Weight
17.8 kg

Power
+ 21.5 to + 33 VDC

TRACKING RANGE (not maximum)

Cessna
10 km

Matrice 600
6 km

Phantom 4
3 km

Human
8 km

Vehicle
11 km

EchoFlight®

Airborne Security

Ultra-Light

BVLOS Enabled

Airspace, Site, and Asset Surveillance

When security requires semi-permanent, temporary or movable threat detection, a tethered drone equipped with EchoFlight delivers wide-view, stable surveillance. Unparalleled performance in an ultra-low size, weight, and power (SWaP) package, EchoFlight delivers high-fidelity location data and offers rich-data output choices to complement other sensors and systems. EchoFlight detects threats on the ground and in the air and prioritizes up to 20 tracks at once.

RADAR SPECS

Frequency
K-band 24.45 – 24.65 GHz

Field of View
120° Azimuth x 80° Elevation

Track Accuracy
< 1° Azimuth x < 1.5° Elevation
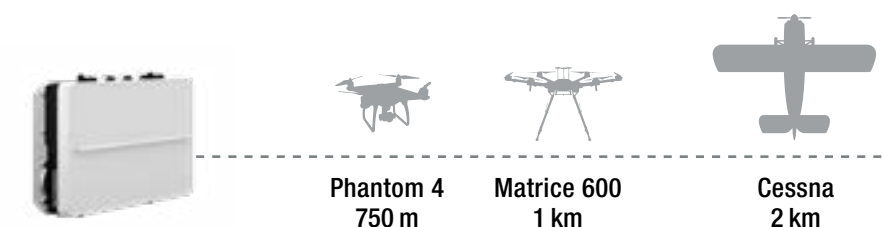
Track Update Rate
10 Hz

Size
18.7 cm x 12 cm x 4 cm

Weight
817 g (Natural Convection)

Power
+ 12 to + 28 VDC

TRACKING RANGE (not maximum)

Phantom 4
750 m

Matrice 600
1 km

Cessna
2 km

Software & Support

**MAXIMIZE RADAR PERFORMANCE**

SOFTWARE UPDATES
Continuous Improvement from Software-Defined Radar

- Includes All Major and Minor Releases
- Improve Radar Operations
- Enhanced Classification
- Radar Data Visualization Tools
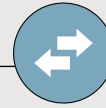- Radar Support Tools

TECHNICAL SUPPORT
Priority Access to Radar Support

- Review and Training Sessions
- Systems Integration
- Troubleshooting
- Performance Review
- Planning
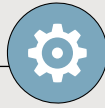
| PRIORITY TECHNICAL SUPPORT	CUSTOMER PORTAL	PERFORMANCE ENHANCEMENT	USER COMMUNITY
Priority queuing via company match when using support@echodyne.com.	24/7 access to all tools, manuals, and materials.	Continuous improvements through software development.	Submit requests for features and functionality.

Kits & Accessories

QUICK START KIT (QSK)

A ruggedized transport case with all the cables and accessories needed for typical integration and testing activities.
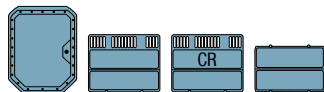
TOWER MOUNTING KIT

Radar mounting kit includes arms, brackets, and tools to configure and operate hemispherical ground and/or airspace surveillance for one to four radars.
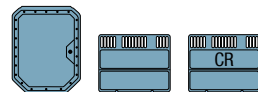
RADAR HUB

Pre-engineered C2 solution for deployment, networking, and operations of multi-radar installations. Standardize every install and simplify support and maintenance.

Featured Applications

Improving situational awareness with single pop-up radars for drone detection and tracking at high-profile event.

EchoGuard integrated with optical sensor for slew-to-cue, eyes-on confirmation of drone threats.

EchoGuard deployed on mobile security solution. Here, scanning for incoming coastal and air threats in trespass hot zone.

EchoFlight delivers wide capture of incoming drone threats from tethered surveillance tower.

Extended perimeter intrusion detection at high security site using EchoShield.

Echodyne Corp.

Echodyne, the radar platform company, is a U.S. designer and manufacturer of advanced radar solutions for defense, government, and commercial market applications. The company's proprietary metamaterials electronically scanned array (MESA®) architecture is a rare breakthrough in advanced radar engineering, leveraging an innovative physics-design approach, Echodyne's MESA radars use standard materials and manufacturing processes to shatter unit cost barriers for high performance radar. The result is a solid-state, low-SWaP, exportable, commercial radar with advanced software capabilities that delivers superior performance, unparalleled data integrity, and exceptional situational awareness.

For more information, please visit: Echodyne.com.

U.S. Designed & Manufactured

AS9100D CERTIFIED ISO 9001