



DeTect specializes in advanced 2D and True3D™ radar and remote sensing technologies.

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TLY Energy is Promedi LTD's authorized sales agent.

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For 20 years since 2003, DeTect has specialized in delivery, integration and support of advanced, proven Bird Monitoring and Mitigation systems (BMMS) for wind energy project developers, owners, operators and environmental consultants for bird and bat survey, mortality risk assessment, and operational monitoring, with over 500 systems delivered worldwide.

DeTect also developed the HARRIER™ Aircraft Detection Lighting Systems (ADLS) for automatic obstruction lighting activation for aviation obstructions such as wind farm turbines and communication towers.

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Products:

✦✦✦ AIRCRAFT BIRDSTRIKE AVOIDANCE RADAR

The most widely-used bird radar for bird-aircraft strike hazard management

✦✦✦ AVIAN AND BAT RADAR SYSTEMS

Advanced avian monitoring systems for conducting bird and bat research

✦✦✦ SECURITY & SURVEILLANCE RADARS

Cost-effective air and marine security for homeland and industrial applications

✦✦✦ DRONE DETECTION & DEFENSE SYSTEMS

Advanced, multi-layer UAS surveillance and interdiction technologies

✦✦✦ WIND ENERGY BIRD MONITORING SYSTEMS (BMS) | BIRD MONITORING & MITIGATION SYSTEMS (BMMS)

Survey, monitoring and mortality mitigation for terrestrial and offshore sites

✦✦✦ BIRD CONTROL RADAR SYSTEMS

Automatic radar-activated bird deterrence for waste ponds, landfill and facilities

✦✦✦ AIRCRAFT DETECTION LIGHTING SYSTEMS (ADLS)

Radar-activated obstruction lighting system for wind farms and communications towers

✦✦✦ BEYOND VISUAL LINE OF SIGHT (BVLOS)

Extends safe UAS operations Beyond Visual Line of Sight (BVLOS)

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MERLIN 7360p True3D™ BDR

Bird Detection Radar (portable)

Highly portable, True3D, full 360 degree bird detection radar system for environmental survey, monitoring and research.

Engineered & manufactured in the USA for dependable 24-7 operation with high reliability & low maintenance with hardware and operating software developed specifically for bird detection and tracking.

The Right Radar for the Job™



DeTect

Proven bird radar technology tested, validated & used operationally by commercial airports, the US Fish & Wildlife Service, Air Force, Navy & NASA

Developed by the world leader in avian radar technologies
Incorporates technologies proven at over 600 installations worldwide since 2003
Full parts & labor warranty & performance guarantee
Designed & manufactured in the USA; meets Buy American Act (2018 & 2021 amendment)
Supported by global network of offices and technicians.

The Right Radar for the Job™



Model: MERLIN True3D BDR for bird & bat survey & monitoring

Technology Features

Classification intelligence (target-of-Interest & false positive minimization)
Fast update rates (1-5 Hz) for improved target tracking
Bird/small drone detection up to 5+km (2.7+nm)
All weather situational awareness
Low wattage power for low interference risk
US FCC, USDOD & foreign frequency licensed/registered.

Application: Real-time bird & bat survey and monitoring; highly portable for tower, vehicle and stabilized offshore use

Configuration: Fixed & mobile designs, self-contained with all system hardware, software & integration included

Sensors:

Solid-state S-band Pulsed Doppler 3D radar, full 360 degree surveillance with high update rates (4x per second)
Sealed radome enclosure for all environmental conditions
Optional EOIR integration (visible & night camera) for real-time target classification & identification with advanced AI.

Operating Range: 1-3km (0.5-1.6nm) range for bird & bat detection, 360-degree True3D

Power: Single phase 110/240VAC, with UPS back-up, power conditioning (foreign power configurations available)

Network: TCP/IP supports multi-user web remote real-time system display, control & data access via fiber optic, wireless or mobile broadband



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Celebrating 20 years of excellence 2003-2023



MERLIN 7360p True3D™ BDR Specifications

Unlike traditional 3D & quasi-3D radars that scan only one sector at a time and leads to under-sampling, fewer tracks & low accuracy altitude estimates, DeTect's dynamic multibeam True3D radar scans & updates target data across the entire 3D volume continually, providing precise (x-y-z) data and no target or track error.

TECHNICAL SPECIFICATIONS

Architecture: Simultaneous multiple beams

Processing Type: Pulsed Doppler

Frequency Band: S

Range Resolution: 10 or 20 m (adjustable)

Selectable Frequency Bands: 6 calibrated

Instrumented Range: 8km (4.3nm)

Detection Ranges:

Medium-sized Bird/Drone (DJI Phantom): 2.25 km (1.2nm) 360°

Large Aircraft: 7 km (3.8nm)

Azimuth FOV: 360°

Elevation FOV: 45°

Software Defined Update Rate: 1-5 Hz

Minimum Detectable Velocity: 0.25 - 1mph (0.4 - 4.5km)

Weight: 22.7 kg / 100 lbs.

Dimensions: 62.2 cm x 62.2 cm x 52.7 cm (24.5" x 24.5" x 20.75")

Power Draw: 80W

Operating Temperature: -20°C to +50°C (-4°F to +122°F)

Component Temperature: -40°C to +85°C (-40°F to +185°F)

Heating/Cooling: Passive

Notes:

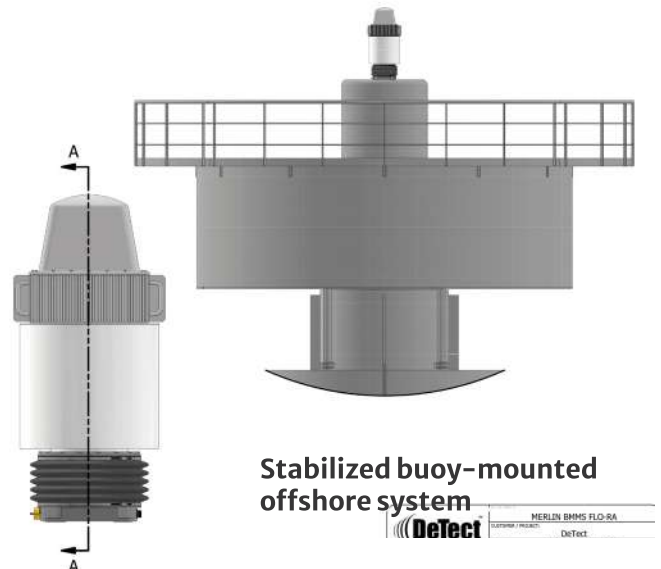
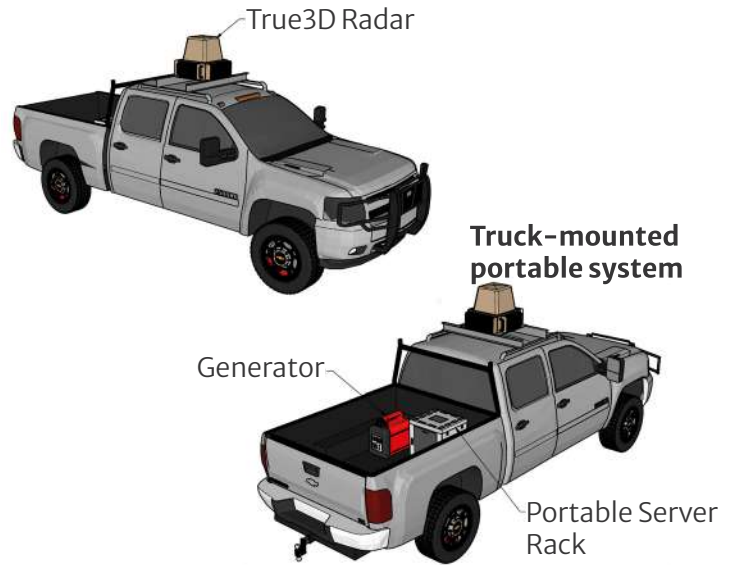
Achieving maximum detection ranges requires sufficient mounting height and line of sight Specifications subject to change as design is completed.



Model: MERLIN True3D BDR for bird & bat survey & monitoring

DETECT TRUE3D™ RADAR ADVANTAGES

Full 3D Radar
S-Band, Pulsed Doppler
3D digital multibeam dynamic (scans full 3D volume in single scan)
High update rates (4x per second)
Available in fixed, mobile & stabilized offshore configurations.



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MERLIN

Bird Monitoring and Mitigation Systems (BMMS)

DeTect specializes in delivery, integration and support of advanced, proven avian radar technologies for wind energy project developers, owners, operators and environmental consultants for bird and bat survey, mortality risk assessment, operational monitoring and realtime risk mitigation with over 500 systems delivered worldwide.

DeTect™



DeTect™

DeTect provides advanced radar technologies and expert support to wind energy developers, owners and consultants for bird and bat survey, mortality risk assessment, monitoring and risk mitigation for projects worldwide that includes:

- Data processing, analysis & reporting
- Risk mitigation radar systems
- Public meeting support & technology consulting



DeTect™

Model: E-Series (Environmental)

Application: Real-time bird and bat detection and tracking for quantitative wind farm preconstruction surveys, mortality risk assessment mitigation system & monitoring of on & offshore windfarms and other projects

Configuration: Mobile, trailered, fully self-contained or fixed system designs

Sensors: Solid state Doppler Horizontal Surveillance Radar (HSR) & Vertical Scanning Radar (VSR); Frequency Diversity processing option with True 3D

Operation: Simultaneous horizontal and vertical bird detection with real-time analysis of flight paths, altitude, characteristics, passage rates and environmental conditions with full data recording to SQL data server system

Operating Range: HSR 2–6 mile (3.2 – 9.65km) range, 360-degree airspace surveillance. VSR 2–3 mile (3.2 – 4.8km) range and detection from surface to at least 18,000 ft. True 3D tracking to 4+ NM (7.4km)

Power: Single Phase 120–240 VAC with UPS back-up & power conditioning & optional auto-start diesel generator

Network: TCP/IP supports multi-user web remote realtime system display, control & data access via fiber optic, wireless or mobile broadband



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Staff specialists include highly experienced radar ornithologists, avian biologists and statisticians that comprise the most experienced team of experts in remote sensing of birds and bats in the world with specific expertise in design, construction and operation of bird/wildlife detection systems for real-time risk management.



Bird Monitoring and Mitigation System (BMMS)

DeTect is the developer and manufacturer of the most advanced and proven Bird Monitoring and Mitigation System available for wind energy project bird and bat survey, risk assessment, monitoring and real-time risk mitigation with over 500 systems delivered worldwide. The MERLIN technology, originally developed for the US Air Force and NASA, can be used to develop detailed preconstruction risk projections, and mitigate risk at operating wind farms. DeTect provides full operational and technical support to wind farm owners and consultants that includes system deployment, operation, user training, data processing, analysis, reporting and QA/QC.

MERLIN uses state-of-the-art radar and computer techniques developed specifically for detecting and tracking the unique behavioral characteristics of birds and bats to collect data unattended, 24-7 and automatically generate highly accurate, detailed datasets for quantitative analysis. MERLIN's options for real time display and the automatic reporting feature generate detailed data in both tabular and graphical formats quantifying the numbers of birds passing through the rotor swept area allowing precise calculation and determination of bird and bat mortality risk.



Mitigation On Demand

DeTect's MERLIN Bird Monitoring and Mitigation System (BMMS) integrates the advanced, fully automatic MERLIN Avian Radar System (ARS) with a wind farm's SCADA network to create a realtime risk mitigation system for bird or bat mortality.

MERLIN BMMS consists of additional software, hardware, and/or other data sensors that monitor the wind farm, assess realtime mortality risk using mitigation rule sets, and alert for or automatically initiate risk mitigation measures when pre-defined risk thresholds are detected by the system. The MERLIN BMMS ultimately reduces both turbine downtime and bird or bat mortality risk by implementing mitigation measures in real time, and only during time periods of high mortality risk. Configurations are available for mitigating mortality risk for migrating songbirds, raptors, and bats.

Staff specialists include highly experienced radar ornithologists, avian biologists and statisticians that comprise the most experienced team of experts in remote sensing of birds and bats in the world with specific expertise in design, construction, and operation of bird/wildlife detection systems for real-time risk management.



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MERLIN 9090 True3D™ BDR

Bird Detection Radar

True3D bird detection radar system for environmental survey, monitoring and research.

Engineered & manufactured in the USA for dependable 24-7 operation with high reliability & low maintenance with hardware and operating software developed specifically for bird detection and tracking.

The Right Radar for the Job™



Proven bird radar technology tested, validated & used operationally by commercial airports, the US Fish & Wildlife Service, Air Force, Navy & NASA

Developed by the world leader in avian radar technologies
Incorporates technologies proven at over 600 installations worldwide since 2003
Full parts & labor warranty & performance guarantee
Designed & manufactured in the USA; meets Buy American Act (2018 & 2021 amendment)
Supported by global network of offices and technicians.

The Right Radar for the Job™



Model: MERLIN 9090 True3D BDR™ for bird & bat survey & monitoring

Technology Features

- Classification intelligence (target-of-Interest & false positive minimization)
- Fast update rates (1-5 Hz) for improved target tracking
- Small bird/drone detection up to 6km (3 nm)
- All weather situational awareness
- Low wattage power for low interference risk
- US FCC, US DOD & foreign frequency licensed/registered.

Application: Real-time bird & bat survey and monitoring; highly portable for tower, vehicle and stabilized offshore use

Configuration: Fixed & mobile designs, self-contained with all system hardware, software & integration included

Sensors:

- Solid-state S-band Pulsed Doppler 3D radar, 90 degree panel (4 panels provide full 360 degree surveillance) with high update rates (4x per second)
- Sealed radome enclosure for all environmental conditions, no moving parts for high reliability and durability
- Optional EOIR integration (visible & night camera) for real-time target classification & identification with advanced AI.

Operating Range: 15km (8 nm) 360-degree True3D

Power: Single phase 110/240VAC, with UPS back-up, power conditioning (foreign power configurations available)

Network: TCP/IP supports multi-user web remote real-time system display, control & data access via fiber optic, wireless or mobile broadband.



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MERLIN 9090 True3D™ BDR

Specifications

Unlike traditional 3D & quasi-3D radars that scan only one sector at a time and leads to under-sampling, fewer tracks & low accuracy altitude estimates, DeTect's dynamic multibeam True3D radar scans & updates target data across the entire 3D volume continually, providing precise (x-y-z) data and no target or track error.



Model: MERLIN 9090 True3D BDR

TECHNICAL SPECIFICATIONS

Architecture: Simultaneous multiple beams

Processing Type: Pulsed Doppler

Frequency Band: S (3.0-3.3 GHz)

Range Resolution: 10 or 20 m (adjustable)

Selectable Frequency Bands: 6 calibrated

Instrumented Range: 15km (9.3 nm)

Azimuth FOV: 90° (4 panels, 360°)

Elevation FOV: 12.5°

Software Defined Update Rate: 1-5 Hz

Minimum Detectable Velocity: 0.4-1.6 km (0.25 - 1mph)

Weight: 40.8 kg / 90 lbs

Dimensions: 91.4 cm x 53.3 cm x 22.9 cm (36" x 21" x 9")

Power Draw: 200W

Operating Temperature: -40°C to +65°C (-40°F to +149°F)

Component Temperature: -40°C to +85°C (-40°F to +185°F)

Heating/Cooling: Passive

Notes:

Achieving maximum detection ranges requires sufficient mounting height and line of sight

Specifications subject to change as design is completed.

DETECT TRUE3D™ RADAR ADVANTAGES

Full 3D Radar

S-Band, Pulsed Doppler

3D digital multibeam dynamic (scans full 3D volume in single scan)

High update rates (4x per second)

Available in fixed, mobile & stabilized offshore configurations.



DroneWatcher™

200 C-UAS System

DeTect's radar processing technology developed specifically for detection and tracking of small, low radar-cross section, non-linearly moving, low altitude targets in high clutter environments make it one of the most sensitive, affordable Counter Unmanned Aerial System (C-UAS) technologies on the market.

DroneWatcher™ provides full surveillance coverage from ground level with UAS detection ranges out to 10+ miles



Above:

X200 C-UAS radar with integrated TacFLIR EOIR and third-party Electronic Attack-Counter Measures system at US Army MFX 2018

Below:

DroneWatcher C-UAS remote command-and-control workstation



Model: DSR-200d

Application:

C-UAS cooperative and non-cooperative drone and small unmanned aerial vehicle/system (UAV/UAS) detection, tracking, identification and intrusion alerting for military installations, airports, power plants, industrial facilities, stadiums, public events and other sites that require airspace intrusion control for security and public safety.

Configuration:

Fully self-contained mobile, portable and fixed systems with DeTect's Intelligent Radar™ technology and full system remote control and information display Sensors: solid state S- or X-band Doppler open array radar sensors with optional integrated, radar-directed EOIR (Electro-optic, Infrared) and RF (radio-frequency) scanner

Options:

Integrates and controls DeTect proprietary and third party UAS interdiction and cyber systems

Architecture:

Open software SQL for real-time target analysis, data storage and queries and using AMRDEC MAFIA Tactical Counter-UAS Technologies (TCUT), XML, BC3 and US Army Composite Tracker and Classifier Sensor Report messages (CTC)

Configuration Options:

Fully self-contained and self supporting standard and custom mobile tactical, trailered and fixed designs with optional hardened design.

Operating Characteristics:

360-degree coverage with range dependent drone/UAS TOI detection:

- Large (Global Hawk class) to 10 nm (18 km)
- Medium (Raven class) to 6 nm (11 km)
- Micro UAVs (DJI Phantom class) to 2 nm (4 km)

Includes user programmable alert perimeters and zones and automatic target type classification (requires calibration)

Power:

110/220 VAC, 60/30 amps service with UPS back-up & power conditioning (30 minutes) and optional auto-start single or dual 4 kW diesel generator and double-walled fuel tank to support 10-20 days 24-7 operation

Comms & Interfaces:

Web-based remote real-time system display, control & data access via fiber optic, wireless or cellular; SQL architecture for data storage and exchange supporting TCPIP, AMRDEC MAFIA Tactical Counter-UAS Technologies (TCUT), XML and US Army Composite Tracker and Classifier Sensor Report messages (CTC).

Available in a variety of fixed and mobile configurations.



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HARRIER

Airspace Surveillance Radar (ASR)
Marine Surveillance Radar (MSR)

DeTect's radar processing technology developed specifically for detection and tracking of small, low radar cross-section, non-linearly moving targets make it one of the most advanced radar systems on the market today for locating and monitoring a wide range of targets including aircraft, UAVs, ships and boats.

HARRIER is an ideal, cost-effective solution for many force protection and homeland security applications.



The HARRIER security and surveillance radar provides full surveillance coverage ground level to altitudes up to 20,000 feet with ranges out to 30+ miles and allows the system to function as a multi-purpose sensor for simultaneous detection, alerting and tracking of aircraft and vessels.

HARRIER functions include:

- Airspace monitoring & surveillance
- Aircraft detection & tracking
- Marine and coastal surveillance
- Airspace see-and-avoid
- Intrusion detection
- Collision & obstruction avoidance
- Perimeter & shoreline security



Model: SS200 ASR / MSR

Functionality:

Supports single or dual-function real-time airspace *and/or* marine surveillance with user-definable perimeter risk alerting.

Configuration: Available in fixed or mobile (trailer, truck, vehicle) configurations in standard and custom designs.

Sensors: Solid-state doppler S-band radar sensor with 50,000 hour MTBF and all weather detection
**X-band and dual X-S band systems available.*

Features: Target-of-interest options include size class, speed and heading with target trails and actual or predictive heading integrates with AIS and ADS-B data for consolidated displays:

- Multi-function capable for simultaneous airspace & marine surveillance from a single radar sensor
- Ancillary equipment integration with FLIR, video, and other sensors
- Units are fully networkable and support multiple remote display, alerting and control via fiber and wireless networks.

Applications: Space launch facilities, civil airports, military airfields & ranges, UAV operations support, ship detection/tracking, perimeter control (air and sea).

Network: TCPIP supports multi-user remote system display and control via fiber optic (recommended) wireless or cellular.



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Technical Data Sheet

Model: Harrier SS200 ASR / MSR

Applications:

HARRIER applications include a wide range of sites, types, sizes and configurations from single facilities to large-area or linear radar networks for force protection and facility security, including:

- Commercial airports, civil aviation airports & military airfields & ranges
- Unmanned aerial vehicle (UAV) operations support
- Government installations
- Industrial plants, refineries & power plants
- Ports, waterways & coastlines
- Border control areas
- High security facilities
- Gap filler radars

Interoperability:

HARRIER systems can operate as a standalone security / force protection radar system detecting and alerting perimeter intrusions on land, by air and on water. The system can be programmed to detect intruders crossing a user-defined site perimeter, providing automated notifications to security events via text or cellular phone or direct to remote monitoring stations.

HARRIER ASR systems can also be used as coverage gap filler radars to provide data for large-scale navigation and military surveillance radars in areas blocked by terrain or structures including wind turbine farms.



Integrated Technology:

HARRIER systems use electronically variable high speed scanning for enhanced small target detection in high clutter environments such as developed areas, terrain and high sea states.

Systems are optimized for detection of small targets that includes low-profile manually propelled watercraft, small motorized high-speed watercraft, low flying aircraft and ultralights. Automatic detection and tracking includes user-defined monitoring and alarm zones. Systems are offered in fixed and mobile configurations and can be linearly networked to cover large areas such as border crossings, coastlines and large facilities. DeTect's HARRIER technology is highly customizable providing radar, video, and thermal detection and acoustic deterrent through a single user interface display with advanced alerting and response features all controllable remotely.

Features Include:

- Microsoft Windows-based operating system
- Integrated radar, thermal, video, acoustic, sonar & deterrents
- Display activated "point-and-click" video zoom & deterrent activation
- Compatible with other security & display systems
- Site-specific underlay maps includes mobile mapping technology
- Identifies & tracks each target by size, position, speed & heading
- Audible & visual intrusion alarms with optional notification by email & text
- Automated data recording & archiving.

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Drone Detection & Defense Solutions

DeTect's DroneWatcher™ system

DeTect's DroneWatcher™ system provides the most comprehensive, multi-layered solutions available for detection, locating, alerting and interdiction of drones and small UAVs (sUAV).

Advanced military-grade technology combines signals intelligence (SIGINT) and radar to provide a scalable solution to meet each user's specific security profile objectives. The systems are also software upgradable to meet continually evolving drone capabilities and components can be added at any time to expand the security envelope.

DeTect's surveillance systems use DeTect's Intelligent Radar™ data system to provide real-time target classification, false positive rejection (*bird targets*), automated perimeter and zone intrusion alerts and remote display and control. DeTect's technologies also integrate and control both DeTect and third-party surveillance and interdiction devices including video, acoustic and cyber systems.



DroneWatcher DSR

DroneWatcher RF



DroneWatcher RF Box installation on college campus

- **Low-cost Radio Frequency (RF)** sensor network
- Includes DeTect's **global drone activity** DroneWatcher Web data system and web cloud service with real-time custom user situational awareness displays and intrusion alerting service
- RF Provides **security for 98% of consumer remote controlled drone risk**
- Applications – public event security, NASCAR, sports, airports, hospitals, schools, government buildings and prisons
- DeTect also provides a **tactical deployable system** providing a versatile unit for drone surveillance in remote areas. Used in urban environments and remote locations for border patrol, law enforcement and the military operations.

- **Long range, military grade Drone Surveillance Radar (DSR)** designed specifically for detection and tracking of small, low radar cross section targets in complex, high clutter environments

- **2+ mile detection range** for sUAS and drones

- **Detection of commercial, military and programmed flight** (non-RF controlled) uncooperative drones



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Technical Data

DeDetect's radio frequency signal and radar detection and processing technologies make it one of the leading technologies on the market today. Developed specifically for detecting and tracking small, low-radar cross section, non-linear moving targets in complex high clutter environments.

The Drone Surveillance System is used for locating and monitoring a wide range of targets including aircraft, UAVs, drones and ultralights.

- Airspace monitoring & surveillance
- Aircraft detection & tracking
- Drone and small UAV intrusion alerting
- Ultralight (ULAD) detection
- Ground based sense-and-avoid
- Collision and obstruction avoidance
- Gap coverage & filler

The DroneWatcher Web fuses data from all sensors into a consolidated, real-time coverage and alerting display system

Applications

Applications include a wide range of sites, types, sizes and configurations from single facilities to large-area or linear radar networks for force protection and facility security, including:

- Commercial airports, civil aviation airports & military airfields & ranges
- Unmanned aerial vehicle (UAV) operations support
- Government buildings and installations
- Prisons & institutions
- Telecommunications facilities & complexes
- Industrial plants, refineries & power plants
- Ports, waterways & coastlines
- Border control areas
- High security facilities
- Stadiums, racetracks & other public venues

Features Include

- Microsoft Windows-based operating software
- Automated target classification & false positives rejection
- DeDetect's global drone activity web database service, integrated radar, thermal, video, acoustic, RF & interdiction systems
- Display activated "point-and-click" video zoom & deterrent activation
- Compatible with other security & display system
- Site-specific underlay maps includes mobile mapping technology
- Identifies & tracks each target by size, position, speed & heading
- Audible & visual intrusion alarms with optional notification by email or text.



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DroneWatcher™

200 C-UAS System

DeTect's radar processing technology developed specifically for detection and tracking of small, low radar-cross section, non-linearly moving, low altitude targets in high clutter environments make it one of the most sensitive, affordable Counter Unmanned Aerial System (C-UAS) technologies on the market.

DroneWatcher™ provides full surveillance coverage from ground level with UAS detection ranges out to 10+ miles



Above:

X200 C-UAS radar with integrated TacFLIR EOIR and third-party Electronic Attack-Counter Measures system at US Army MFX 2018

Below:

DroneWatcher C-UAS remote command-and-control workstation



Model: DSR-200d

Application:

C-UAS cooperative and non-cooperative drone and small unmanned aerial vehicle/system (UAV/UAS) detection, tracking, identification and intrusion alerting for military installations, airports, power plants, industrial facilities, stadiums, public events and other sites that require airspace intrusion control for security and public safety.

Configuration:

Fully self-contained mobile, portable and fixed systems with DeTect's Intelligent Radar™ technology and full system remote control and information display Sensors: solid state S- or X-band Doppler open array radar sensors with optional integrated, radar-directed EOIR (Electro-optic, Infrared) and RF (radio-frequency) scanner

Options:

Integrates and controls DeTect proprietary and third party UAS interdiction and cyber systems

Architecture:

Open software SQL for real-time target analysis, data storage and queries and using AMRDEC MAFIA Tactical Counter-UAS Technologies (TCUT), XML, BC3 and US Army Composite Tracker and Classifier Sensor Report messages (CTC)

Configuration Options:

Fully self-contained and self supporting standard and custom mobile tactical, trailered and fixed designs with optional hardened design.

Operating Characteristics:

360-degree coverage with range dependent drone/UAS TOI detection:

- Large (Global Hawk class) to 10 nm (18 km)
- Medium (Raven class) to 6 nm (11 km)
- Micro UAVs (DJI Phantom class) to 2 nm (4 km)

Includes user programmable alert perimeters and zones and automatic target type classification (requires calibration)

Power:

110/220 VAC, 60/30 amps service with UPS back-up & power conditioning (30 minutes) and optional auto-start single or dual 4 kW diesel generator and double-walled fuel tank to support 10-20 days 24-7 operation

Comms & Interfaces:

Web-based remote real-time system display, control & data access via fiber optic, wireless or cellular; SQL architecture for data storage and exchange supporting TCPIP, AMRDEC MAFIA Tactical Counter-UAS Technologies (TCUT), XML and US Army Composite Tracker and Classifier Sensor Report messages (CTC).

Available in a variety of fixed and mobile configurations.



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DocRef: TDS_DRONEWATCHER_200C_08_23

DroneWatcher RF DR

RF Drone detector

DroneWatcher RF DR is a Standard Frequency (DR) Radiofrequency (RF) scanner-detector with a directional antenna that is able to detect over 98% of the commercially-available, consumer and prosumer drones on the market out to 2+ miles providing detailed information including drone type, ID, bearing (8 directions), range and other data.

The DroneWatcher RF DR is a compact, unit that is available in both fixed, mobile, marine and avionics-grade designs with industrial and military (MILSPEC) configurations that can be installed in multiple configurations with only nominal power and network requirements (self-contained solar and cellular versions are available).



DeTect

Operation:

DroneWatcher RF DR uses advanced signals intelligence (high speed processors and software defined radio scanners) to continually scan covered frequency ranges to identify signals and SSIDs consistent with drone control systems. Once a signal is detected, it is compared to the database of known drone IDs and known non-drone RF sources (a *Whitelist*) in the DroneWatcher C2 SQL database and if a 'match' occurs, the system returns the drone type (manufacturer and model), unique ID number, signal strength, location and other information to the user.



DeTect™

Model: DroneWatcher RF DR

Once a drone is detected by a RF DR sensor, the system will provide a bearing and range (*based on signal strength*). New drone signatures are continually being added to DeTect's DroneWatcher RF DR identification database.

DroneWatcher RF DR also includes DeTect's proprietary drone interdiction and inception functionality (*usage varies limited by country and jurisdiction*).

- DroneWatcher uses advanced signals intelligence technology to detect non-encrypted and encrypted RF and WiFi controlled drones and/or controllers
- Applications include personal privacy and industrial/business/facility security and military security
- The unit detects, tracks and alerts (audible and visual) presence of most commercially-available, nonencrypted consumer and prosumer drones and records related data including the drone type and ID which can be used to document incursions and support apprehension and prosecution
- The unit will not detect non-signal emitting drones (*e.g. GPS waypoint flight programmed*) and some military frequencies



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Technical

Covered Frequency Ranges*:

- 900 – 990 MHz
- 2400 – 2480 MHz
- 5500 – 6000 MHz

Drone Protocols Included*:

- DJI Lightbridge
- DJI Lightbridge 2
- DJI OcuSync
- Graupner
- Futaba
- High-Tech
- Spectrum
- WiFi Drone Network and MavLink

Power: 110/220 vAC, 20/10 amps, 60 and 50 Mhz options, standard US outlet with international plug or direct-wire options

Network: TCP/IP with high speed internet access and fiber recommended for access to the DroneWatcher C2 cloud-based datasystem and current drone signature database. Secure on-site DroneWatcher C2 data system option is available.

• Ethernet:

- Fiber or copper
- Fast Ethernet, 1000 Mbps recommended
- P2P (Point-to-Point)

• Wireless:

- 50 MBps, 2.4 GHz or 5 GHz
- Radwin, Ubiquiti Picostation, or equivalent

• Cellular:

- LTE recommended, 4G minimum
- Provided by customer: LTE/4G service or local WWAN
- Provided by DeTect (with each radar unit): Network or Digi Cellular Router; provides data uplink to local WWAN or cellular network

• **Environmental:** NEMA 4/IP65, -30 to +50 degrees C

Specifications

Detection range: 2-3 miles / 3 to 5 kilometers

OS: Microsoft Windows

Interfaces: Gigabit Ethernet, wireless and HDMI

Display: Visual display to third party monitors and DeTect or 3rd party C2 systems via secure web display.

Construction:

- Plug-and-Play ready requiring only limited remote configuration support (*included in web service subscription*)
- Self-contained unit with integrated NEMA 4/IP 65 waterproof power and ethernet inputs
- Air transportable, meets most airline shipping and carry-on size requirements
- Unobtrusive, urban camouflage exterior option (*no brand labeling*)
- Suitable for ground, rooftop, tower/monopole or structure mount operation
- Available with optional cyber interdiction module (*subject to country-of-use regulatory & US ITARs restrictions*)

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MERLIN

Bird Control Radar System (BCRS)

The most widely used & tested bird radar system with over 250 units operating worldwide in bird control & aviation safety.

Fully self contained, networked units with the capability to custom define multiple, zoned control perimeters.

Engineered & manufactured for dependable 24-7 operation with high reliability & low maintenance.

Software controlled allowing for custom, user-defined control zones



Multi-unit networks can be provided to cover numerous control zones over large areas

DeTect's MERLIN BCRS is an advanced radar system designed to monitor user-defined bird control zones, automatically activating bird deterrent devices to deter and harass birds entering restricted areas.

The system is based on DeTect's proven MERLIN Avian Radar System technology that is used by the USAF, NASA and airports worldwide to detect and monitor hazardous bird activity on and around airfields for bird-aircraft strike hazard management.

MERLIN BCRS detect & deter applications include control of birds at industrial waste impoundments, oil & gas drilling frac ponds, landfills, stormwater retention basins, crop fields and sites of various size that require automated bird control.



Model: MERLIN Bird Control Radar Systems (BCRS)

Application: Real-time, automatic bird control for industrial impoundments, oil & gas waste ponds, landfills & other large exclusion areas

Configuration: Single or multi-unit networked fixed, skid-mounted or mobile radar packages

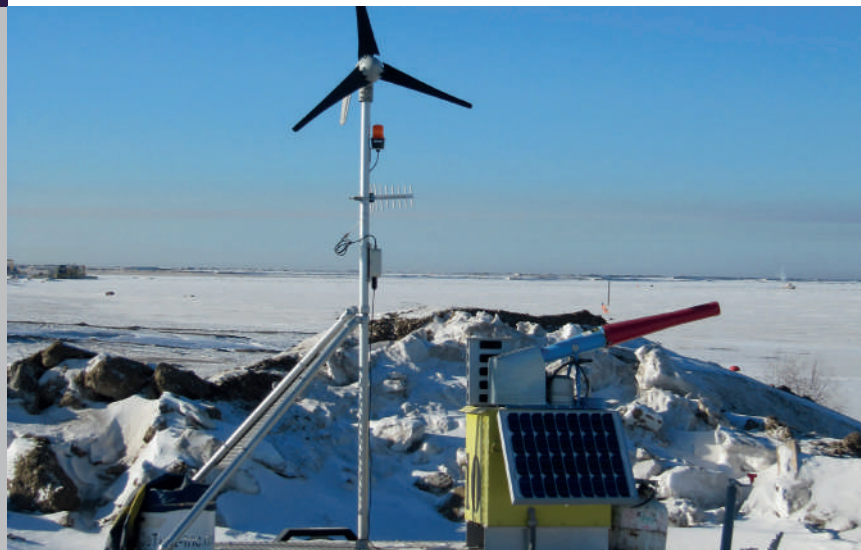
Sensors: 200w Horizontal Surveillance Radar (HSR) Solid-state sensors (50,000 hour MTBF) All weather bird detection

Operation: Automated detection & non-lethal hazing of birds. Deterrent device options include Acoustic Hazing Devices (AHD's), lasers, robotic falcons, propane cannons, bioacoustics & effigies

Operating Range: 360-degree continuous monitoring with unlimited programmable control zones for areas in size from under 1 acre (0.4 ha) to over 10 square miles (25 square km)

Power: Single Phase 110/220 VAC, 60/30 amps service with UPS back-up & power conditioning (30 minutes) & optional auto-start single or dual 5 kW diesel generator & fuel tank to support 10-20 days 24-7 operation

Network: TCP/IP supports multi-user web-based remote real-time system display, control & data access via fiber optic, or wireless WAN



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Doc Ref: TDS_BCRS_Merlin Wind Energy_08_23



Model: MERLIN BCRC Floating Deterrent Unit (FDU)

DeTect's MERLIN BCRC is software controlled and allows for custom, user-defined control zones.

Birds detected entering the control area trigger activation of the deterrent devices. Systems are available as fully self-contained and powered fixed, skid-mounted, or mobile units.

Multi-unit networks can be provided to cover numerous control zones over large areas. The system interfaces with a wide variety of non-lethal bird deterrent devices including bioacoustics and propane cannons, Long Range Acoustic Devices (LRAD), and DeTect's Programmable Bird Control Laser system.

MERLIN BCRC uses automated, randomized deterrent selection to vary the deterrent selection and volume applied with each response to reduce habituation. The system includes a library of standard recorded acoustic deterrent files or can use client-provided sound files.

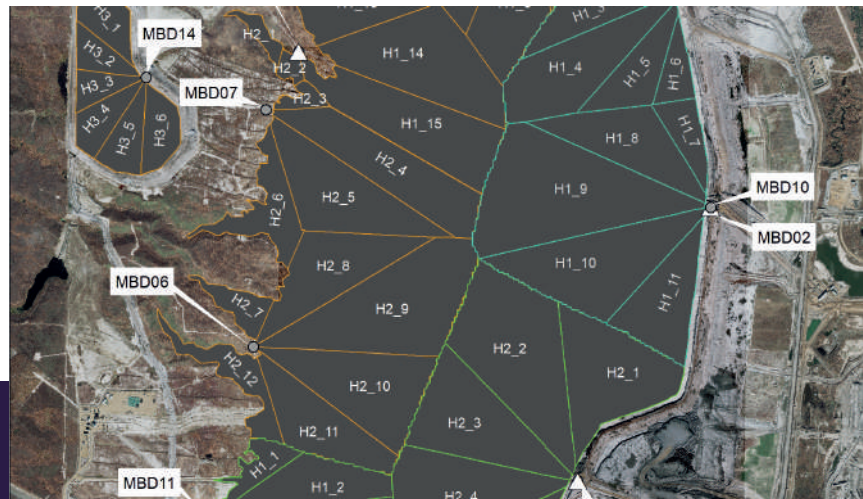


MERLIN BCRC is a complete turnkey system that includes the bird control radar master unit (radar sensor, tower (if required), processor equipment, software and equipment enclosure), deterrent devices, installation, start-up and support, or can be integrated with existing deterrent systems.

Systems provide reliable bird detection and deterrent hazing in virtually any terrain, over water and weather conditions, including in fog, rain and snow.

MERLIN systems are fully remote controllable and networkable through TCP/IP, wireless wide area network (WAN) and other protocols. All equipment is industrial-grade and designed for use in outdoor and extreme environments with exceptionally high reliability.

The MERLIN radar and processor equipment are housed in a NEMA outdoor rated, environmentally controlled enclosure mounted on the trailer, tower, or a separate foundation.



Each system includes an available 1-year parts and labor warranty and 24-7 technical support provided by DeTect's technical support team, which includes biologists, radar ornithologists, technicians, and hardware & software engineers.

MERLIN technology has been tested and proven at installations throughout North America, Europe, Africa, the Middle East, and Far East, and represents the most advanced avian radar and bird control technology on the market.

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Doc Ref: TDS_BCRC_Merlin Wind Energy_08_23

HARRIER

Beyond Visual Line of Sight (BVLOS)

DeTect's radar processing technology developed specifically for detection and tracking of small, low radar-cross section, non-linearly moving targets make it one of the most sensitive, affordable security and surveillance radar technologies on the market today for locating and monitoring a wide range of targets including aircraft, UAVs, drones, ultralights, ships, and boats.

HARRIER is an ideal, cost-effective solution for many force protection and homeland security applications.



The HARRIER security and surveillance radar provides full surveillance coverage ground level to altitudes up to 20,000 feet with ranges out to 20+ miles and allows the system to function as a multi-purpose sensor for simultaneous detection, alerting and tracking of aircraft and vessels.

HARRIER functions include:

- Airspace monitoring & surveillance
- Aircraft detection & tracking
- Drone & small UAV detection & defense
- Ultralight (ULAD) detection & interdiction
- Marine, coastal & shoreline security
- Ground-based sense-and-avoid
- Collision & obstruction avoidance
- Gap coverage and filler



Model: S200 - GBDA

Application: UAS ground-based detect and avoid and situational awareness

Functionality: Real-time airspace and surveillance with user-definable risk alerting

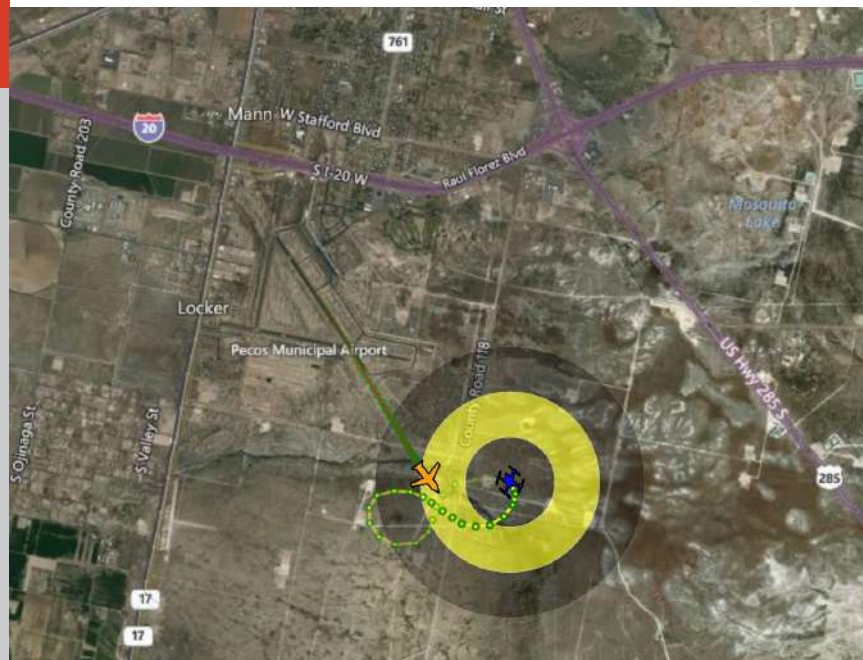
Configuration: Available in fixed or mobile (trailer, truck, vehicle) configurations in standard and custom designs

Sensors: Solid-state Doppler S-band radar sensor with 50,000 hour MTBF and all weather detection *X-band systems also available

Operating Range: Full 360 degree coverage with detection to 18nm

Power: 110/220 VAC, 60/30 amps service with UPS back-up & power conditioning (30 minutes) & optional auto-start single or dual 6 kW propane or diesel generator & fuel tank to support 10-20 days **24-7 operation**

Network: TCP/IP connection supports multi-user web remote real-time system display, control & data access via fiber optic.



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Doc Ref: TDS_HARRIER_BVLOS_08_23



Model: Harrier S200 – GBDA

Applications:

HARRIER applications include a wide range of sites, types, sizes and configurations from single facilities to large-area or linear radar networks for force protection and facility security, including:

- Commercial airports & military airfields & ranges
- Unmanned aerial vehicle (UAV) operations support
- Government installations
- Industrial plants, refineries & power plants
- Ports, waterways & coastlines
- Prisons & Jails
- Border control areas
- High security facilities
- Stadiums, racetracks & other public venues
- Cities, campuses & shorelines
- Gap filler radars

Interoperability:

HARRIER systems can operate as a standalone security/force protection radar system detecting and alerting perimeter or zone incursions by air and on events via pager or cellular phone or direct to remote monitoring stations. **HARRIER ASR** systems can also be used as coverage gap filler radars to provide data or large-scale navigation and military surveillance radars in areas blocked by terrain or structures including wind turbine farms.

The system can be programmed to detect intruders crossing a user-defined site perimeter, providing automated notifications to security forces. Alarm functionality can provide notification of security by text messaging or email. **Integrated Technology:** **HARRIER** systems use electronically variable high-speed scanning for enhanced small target detection in high clutter environments such as developed areas, terrain and high sea states.



Technical Data Sheet

Systems are optimized for detection of small targets that includes low-profile manually propelled watercraft, small motorized high-speed watercraft, low flying aircraft, ultralights and drones. Systems are offered in fixed and mobile configurations and can be linearly networked to cover large areas such as border crossings, coastlines and large facilities. DeTect's **HARRIER technology is highly customizable** providing radar, video, and thermal detection and acoustic deterrent through a single user.

Advantages of the **HARRIER BVLOS**

- Solid-state Doppler S or X-band radar with 50,000 hour MTBF
- Detection of cooperative (transponder equipped) and non-cooperative aircraft to 20+ miles
- Secondary Traffic Advisory System (TAS) and Automatic Dependent Surveillance-Broadcast (ADS-B) interrogators for cooperative aircraft detection and data acquisition
- Automatic target type classification using **DeTect's Intelligent Radar™ technology**
- Multi-functional for simultaneous detection of UAVs, drones and conventional aircraft (ultralights, helicopters, small-to-large aircraft)
- Optional slew-to-cue camera integration
- Automatic operation with user-definable risk alert zones and intrusion perimeters
- Full remote control and real-time information display (radar and video) to multiple users through secure network and web displays
- Includes real-time display to wireless and cellular devices (smart phones, tablets) alerts.

Features Include:

- Microsoft Windows-based operating software
- Integrated radar, thermal, video, acoustic, sonar & deterrents
- Display activated "point-and-click" video zoom & deterrent activation
- Compatible with other security & display systems
- Site-specific underlay maps with mobile mapping technology
- Identifies & tracks each target by size, position, speed & heading
- Audible & visual intrusion alarms with optional notification by email & text.

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MERLIN 7360p True3D™ BDR

Bird Detection Radar (portable)

Highly portable, True3D, full 360 degree bird detection radar system for environmental survey, monitoring and research.

Engineered & manufactured in the USA for dependable 24-7 operation with high reliability & low maintenance with hardware and operating software developed specifically for bird detection and tracking.

The Right Radar for the Job™



DeTect

Proven bird radar technology tested, validated & used operationally by commercial airports, the US Fish & Wildlife Service, Air Force, Navy & NASA

Developed by the world leader in avian radar technologies
Incorporates technologies proven at over 600 installations worldwide since 2003
Full parts & labor warranty & performance guarantee
Designed & manufactured in the USA; meets Buy American Act (2018 & 2021 amendment)
Supported by global network of offices and technicians.

The Right Radar for the Job™



Model: MERLIN True3D BDR for bird & bat survey & monitoring

Technology Features

Classification intelligence (target-of-Interest & false positive minimization)
Fast update rates (1-5 Hz) for improved target tracking
Bird/small drone detection up to 5+km (2.7+nm)
All weather situational awareness
Low wattage power for low interference risk
US FCC, USDOD & foreign frequency licensed/registered.

Application: Real-time bird & bat survey and monitoring; highly portable for tower, vehicle and stabilized offshore use

Configuration: Fixed & mobile designs, self-contained with all system hardware, software & integration included

Sensors:

Solid-state S-band Pulsed Doppler 3D radar, full 360 degree surveillance with high update rates (4x per second)
Sealed radome enclosure for all environmental conditions
Optional EOIR integration (visible & night camera) for real-time target classification & identification with advanced AI.

Operating Range: 1-3km (0.5-1.6nm) range for bird & bat detection, 360-degree True3D

Power: Single phase 110/240VAC, with UPS back-up, power conditioning (foreign power configurations available)

Network: TCP/IP supports multi-user web remote real-time system display, control & data access via fiber optic, wireless or mobile broadband



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Doc Ref: TDS_Merlin 7360p_08.23

20 YEARS

DeTect



Celebrating 20 years of excellence 2003-2023

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MERLIN 7360p True3D™ BDR Specifications

Unlike traditional 3D & quasi-3D radars that scan only one sector at a time and leads to under-sampling, fewer tracks & low accuracy altitude estimates, DeTect's dynamic multibeam True3D radar scans & updates target data across the entire 3D volume continually, providing precise (x-y-z) data and no target or track error.

TECHNICAL SPECIFICATIONS

Architecture: Simultaneous multiple beams

Processing Type: Pulsed Doppler

Frequency Band: S

Range Resolution: 10 or 20 m (adjustable)

Selectable Frequency Bands: 6 calibrated

Instrumented Range: 8km (4.3nm)

Detection Ranges:

Medium-sized Bird/Drone (DJI Phantom): 2.25 km (1.2nm) 360°

Large Aircraft: 7 km (3.8nm)

Azimuth FOV: 360°

Elevation FOV: 45°

Software Defined Update Rate: 1-5 Hz

Minimum Detectable Velocity: 0.25 - 1mph (0.4 - 4.5km)

Weight: 22.7 kg / 100 lbs.

Dimensions: 62.2 cm x 62.2 cm x 52.7 cm (24.5" x 24.5" x 20.75")

Power Draw: 80W

Operating Temperature: -20°C to +50°C (-4°F to +122°F)

Component Temperature: -40°C to +85°C (-40°F to +185°F)

Heating/Cooling: Passive

Notes:

Achieving maximum detection ranges requires sufficient mounting height and line of sight Specifications subject to change as design is completed.



Model: MERLIN True3D BDR for bird & bat survey & monitoring

DETECT TRUE3D™ RADAR ADVANTAGES

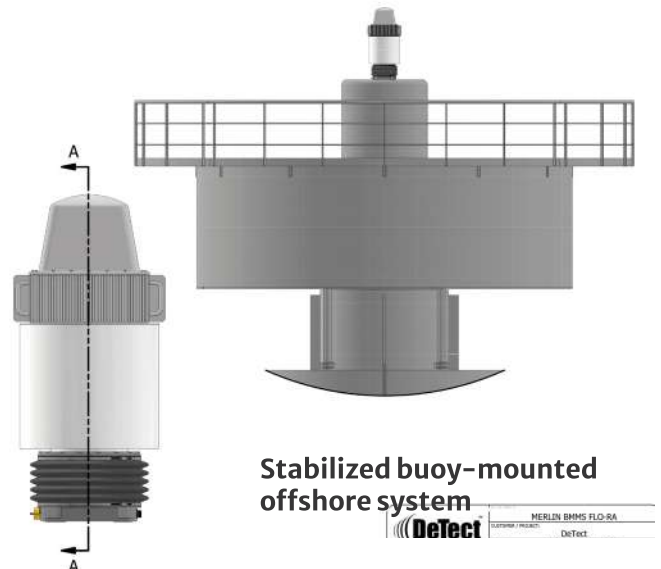
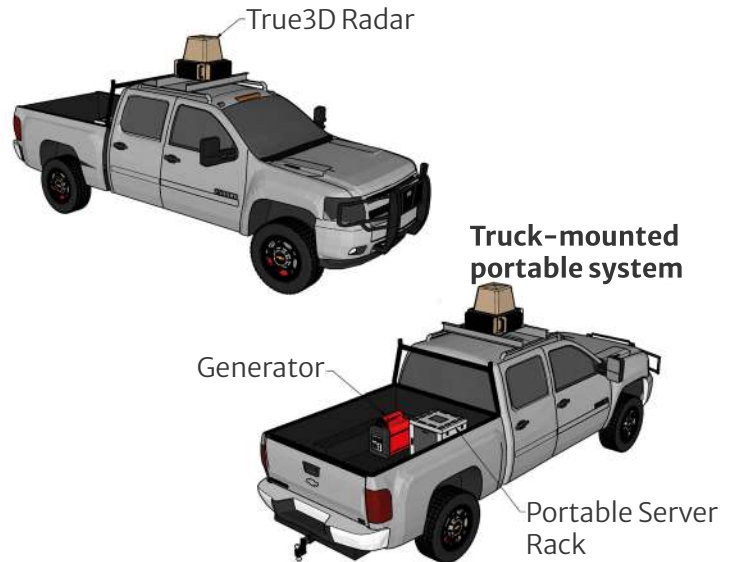
Full 3D Radar

S-Band, Pulsed Doppler

3D digital multibeam dynamic (scans full 3D volume in single scan)

High update rates (4x per second)

Available in fixed, mobile & stabilized offshore configurations.



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MERLIN

Avian Radar Systems for Wind Energy
Preconstruction Survey and Risk Assessment

DeDetect specializes in delivery, integration and support of advanced, proven avian radar technologies for wind energy project developers, owners, operators and environmental consultants for bird and bat survey, mortality risk assessment, operational monitoring and realtime risk mitigation with over 500 systems delivered worldwide.



DeDetect provides advanced radar technologies and expert support to wind energy developers, owners and consultants for bird and bat survey, mortality risk assessment, monitoring and risk mitigation for projects worldwide that includes:

- Bird & bat radar systems – offshore and onshore
- Data Processing, analysis & reporting
- Bird and bat mortality risk analysis
- Risk mitigation radar systems
- Public meeting support & technology consulting.



Model: E-Series (Environmental)

Application: Real-time bird and bat detection and tracking for quantitative wind farm preconstruction surveys, mortality risk assessment mitigation system & monitoring of on & offshore windfarms and other projects

Configuration: Mobile, trailered, fully self-contained or fixed system designs

Sensors: Solid state Doppler Horizontal Surveillance Radar (HSR) & Vertical Scanning Radar (VSR); Frequency Diversity processing option with True 3D

Operation: Simultaneous horizontal and vertical bird detection with real-time analysis of flight paths, altitude, characteristics, passage rates and environmental conditions with full data recording to SQL data server system

Operating Range: HSR 2–6 mile (3.2 – 9.65km) range, 360-degree airspace surveillance. VSR 2–3 mile (3.2 – 4.8km) range and detection from surface to at least 18,000 ft. True 3D tracking to 4+ NM (7.4km)

Power: Single Phase 120–240 VAC with UPS back-up & power conditioning & optional auto-start diesel generator

Network: TCP/IP supports multi-user web remote realtime system display, control & data access via fiber optic, wireless or mobile broadband



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Staff specialists include highly experienced radar ornithologists, avian biologists and statisticians that comprise the most experienced team of experts in remote sensing of birds and bats in the world with specific expertise in design, construction and operation of bird/wildlife detection systems for real-time risk management.



Bird Monitoring and Mitigation System (BMMS)

DeDetect is the developer and manufacturer of the most advanced and proven Bird Monitoring and Mitigation System available for wind energy project bird and bat survey, risk assessment, monitoring and real-time risk mitigation with over 500 systems delivered worldwide. The MERLIN technology, originally developed for the US Air Force and NASA, can be used to develop detailed preconstruction risk projections, and mitigate risk at operating wind farms. DeDetect provides full operational and technical support to wind farm owners and consultants that includes system deployment, operation, user training, data processing, analysis, reporting and QA/QC.

MERLIN uses state-of-the-art radar and computer techniques developed specifically for detecting and tracking the unique behavioral characteristics of birds and bats to collect data unattended, 24-7 and automatically generate highly accurate, detailed datasets for quantitative analysis. MERLIN's options for real time display and the automatic reporting feature generate detailed data in both tabular and graphical formats quantifying the numbers of birds passing through the rotor swept area allowing precise calculation and determination of bird and bat mortality risk.



Mitigation On Demand

DeDetect's MERLIN Bird Monitoring and Mitigation System (BMMS) integrates the advanced, fully automatic MERLIN Avian Radar System (ARS) with a wind farm's SCADA network to create a realtime risk mitigation system for bird or bat mortality.

MERLIN BMMS consists of additional software, hardware, and/or other data sensors that monitor the wind farm, assess realtime mortality risk using mitigation rule sets, and alert for or automatically initiate risk mitigation measures when pre-defined risk thresholds are detected by the system. The MERLIN BMMS ultimately reduces both turbine downtime and bird or bat mortality risk by implementing mitigation measures in real time, and only during time periods of high mortality risk. Configurations are available for mitigating mortality risk for migrating songbirds, raptors, and bats.

Staff specialists include highly experienced radar ornithologists, avian biologists and statisticians that comprise the most experienced team of experts in remote sensing of birds and bats in the world with specific expertise in design, construction, and operation of bird/wildlife detection systems for real-time risk management.



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MERLIN 9090 True3D™ BDR

Bird Detection Radar

True3D bird detection radar system for environmental survey, monitoring and research.

Engineered & manufactured in the USA for dependable 24-7 operation with high reliability & low maintenance with hardware and operating software developed specifically for bird detection and tracking.

The Right Radar for the Job™



Proven bird radar technology tested, validated & used operationally by commercial airports, the US Fish & Wildlife Service, Air Force, Navy & NASA

- Developed by the world leader in avian radar technologies
- Incorporates technologies proven at over 600 installations worldwide since 2003
- Full parts & labor warranty & performance guarantee
- Designed & manufactured in the USA; meets Buy American Act (2018 & 2021 amendment)
- Supported by global network of offices and technicians.

The Right Radar for the Job™



Model: MERLIN 9090 True3D BDR™ for bird & bat survey & monitoring

Technology Features

- Classification intelligence (target-of-Interest & false positive minimization)
- Fast update rates (1-5 Hz) for improved target tracking
- Small bird/drone detection up to 6km (3 nm)
- All weather situational awareness
- Low wattage power for low interference risk
- US FCC, US DOD & foreign frequency licensed/registered.

Application: Real-time bird & bat survey and monitoring; highly portable for tower, vehicle and stabilized offshore use

Configuration: Fixed & mobile designs, self-contained with all system hardware, software & integration included

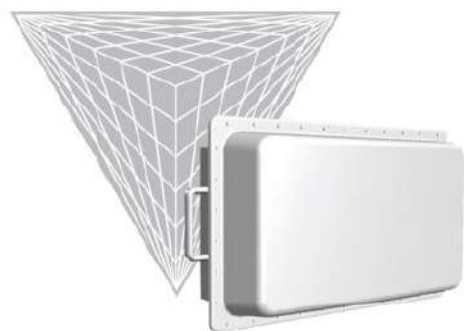
Sensors:

- Solid-state S-band Pulsed Doppler 3D radar, 90 degree panel (4 panels provide full 360 degree surveillance) with high update rates (4x per second)
- Sealed radome enclosure for all environmental conditions, no moving parts for high reliability and durability
- Optional EOIR integration (visible & night camera) for real-time target classification & identification with advanced AI.

Operating Range: 15km (8 nm) 360-degree True3D

Power: Single phase 110/240VAC, with UPS back-up, power conditioning (foreign power configurations available)

Network: TCP/IP supports multi-user web remote real-time system display, control & data access via fiber optic, wireless or mobile broadband.



Celebrating 20 years of excellence 2003-2023



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MERLIN 9090 True3D™ BDR

Specifications

Unlike traditional 3D & quasi-3D radars that scan only one sector at a time and leads to under-sampling, fewer tracks & low accuracy altitude estimates, DeTect's dynamic multibeam True3D radar scans & updates target data across the entire 3D volume continually, providing precise (x-y-z) data and no target or track error.

TECHNICAL SPECIFICATIONS

Architecture: Simultaneous multiple beams

Processing Type: Pulsed Doppler

Frequency Band: S (3.0–3.3 GHz)

Range Resolution: 10 or 20 m (adjustable)

Selectable Frequency Bands: 6 calibrated

Instrumented Range: 15km (9.3 nm)

Azimuth FOV: 90° (4 panels, 360°)

Elevation FOV: 12.5°

Software Defined Update Rate: 1–5 Hz

Minimum Detectable Velocity: 0.4–1.6 km (0.25 – 1mph)

Weight: 40.8 kg / 90 lbs

Dimensions: 91.4 cm x 53.3 cm x 22.9 cm (36" x 21" x 9")

Power Draw: 200W

Operating Temperature: –40°C to +65°C (–40°F to +149°F)

Component Temperature: –40°C to +85°C (–40°F to +185°F)

Heating/Cooling: Passive

Notes:

- Achieving maximum detection ranges requires sufficient mounting height and line of sight
- Specifications subject to change as design is completed.



Model: MERLIN 9090 True3D BDR

DETECT TRUE3D™ RADAR ADVANTAGES

- Full 3D Radar
- S-Band, Pulsed Doppler
- 3D digital multibeam dynamic (scans full 3D volume in single scan)
- High update rates (4x per second)
- Available in fixed, mobile & stabilized offshore configurations.



HARRIER

Aircraft Detection Lighting System (ADLS)

Many stakeholders recognize the environmental and social impacts of aviation obstruction lights at wind farms and similar project sites and are exploring strategies to mitigate the impacts on surrounding communities.

In response, DeTect developed the HARRIER™ Aircraft Detection Lighting System (ADLS), an advanced radar-based ADLS using high-resolution ground-based airspace surveillance with automated activation of wind farm's aviation obstruction lights when aircraft are detected within a defined perimeter. DeTect HARRIER ADLS systems are currently operating in the US, Canada, and Europe.



The HARRIER ADLS provides extended-range detection of cooperative and noncooperative aircraft, with a coverage range of up to 18 nautical miles. Aircraft entering a custom configured exclusion zone will trigger the activation of the obstruction lights.

The HARRIER ADLS is multi-function capable and can provide site security for aircraft, drones, and bird detection for environmental monitoring and collision risk mitigation.

The system is fully networkable and remotely controllable with real-time data display, data transmission, diagnostics, and Health and Status Monitoring (HSM).



Model: HARRIER ADLS 200d

Application: Aircraft Detection Lighting System. High resolution, airspace surveillance system for aviation obstruction light activation onshore and offshore

Configuration: Fully self-contained fixed system for obstruction light activation for wind farm, power transmission, communication tower, and other projects that require automated aviation obstruction lights.

Sensors: Solid state S- or X-band radar sensors with Doppler processing; and Automatic Dependent Surveillance - Broadcast (ADS-B) secondary surveillance for cooperative aircraft

Operation: Extended range detection of cooperative (transponder equipped) & non-cooperative aircraft with automatic activation of obstruction warning lights at user-defined perimeters.

Operating Range: Full 360 degree range up to 18 nm (33km).

Power: Single phase 120-240 VAC, with UPS back-up & power conditioning & optional auto-start propane or diesel generator.

Network: TCP/IP connection supports multi-user web remote real-time system display, control & data access via fiber optic, wireless or mobile broadband.



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DeTect



DeTect™

Advantages of the HARRIER ADLS

Longer range detection provides greater safety margin

Fewer sensors required for complete coverage

ADS-B integration minimizes obstruction light activation from high altitude aircraft and provides secondary sensor for redundant detection

Ground-based sensors with lower installation and O&M costs

Based on FAA tested, commercially available technology

Advanced solid-state Doppler radar processor

Meets or exceeds US FAA, Transport Canada, European, and Australian requirements

Multi-function capable for ADLS, site security & bird detection from a single sensor

Integrated with all ADLS compatible obstruction lights.

DeTect's ADLS uses Operational Risk Management (ORM) algorithms and operates in a failsafe manner where the lights are held in an 'ON' state by the system unless no aircraft are detected within the defined risk zone. When the sensors detect an aircraft, the obstruction lights are activated. A "heartbeat" indicator provides constant system status reading of the ADLS and its network. Should the ADLS go offline, or heartbeat indicator lost, the lights will automatically activate and remain illuminated until the system returns online and confirms no aircraft in the risk zone.

HARRIER uses an advanced solid-state S- or X-Band Doppler surveillance radar that has the ability to penetrate into moderate rain. The HARRIER ADLS logic is designed to err on the side of caution. If precipitation is detected, which may mask aircraft, the system will automatically activate the lights. The HARRIER ADLS also incorporates secondary surveillance using an Automatic Dependent Surveillance – Broadcast (ADS-B) receiver. The radar sensors, and ADS-B antennas are ground-based resulting in lower installation and O&M cost over the life of the project. The system electronics can be collocated with the radars at the project site or can be remotely located at a central facility, such as a substation or O&M building up to 50 miles (80 km) away for ease of O&M and for security (requires dedicated fiber network).

DeTect's HARRIER radar processing software is user customizable and software definable to 'tune' the system to detect, track, and display only targets within the user desired target class based on a variety of parameters that include size, speed, and track characteristics. Additionally, the HARRIER ADLS has user selectable channels to operate with both the X and S band variants. This allows several radars to work in conjunction with one another without interfering with each other and/or other nearby radar systems such as air traffic control, weather, and communications networks.



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HARRIER ADLS COMMS

Aircraft Detection Lighting System for Communication and Cellular Towers

Many stakeholders recognize the environmental and social impacts of aviation obstruction lights at communications and cellular tower sites.

In response, DeTect developed the HARRIER Aircraft Detection Lighting System (ADLS), an advanced FAA-tested, radar-based ADLS using high-resolution solid-state radar with automated activation of obstruction lights when aircraft are detected within the defined regulatory perimeter.



The HARRIER ADLS is the most widely used ADLS in the world with over 150 installations since 2008 in the US, Canada and Europe. HARRIER provides reliable detection of cooperative and non-cooperative aircraft out to 18+ miles (long range version). Aircraft entering the pre-set regulatory buffer zone around the tower will trigger activation of the obstruction light(s).

DeTect's ADLS has been evaluated by the US FAA and meets or exceeds the requirements of Advisory Circular 70/7460-1M as Chapter 14, "Aircraft Detection Lighting Systems".

The system is fully networkable and remotely controllable with real-time data display, diagnostics, Health & Status Monitoring.



Model: X80 COMMS ADLS

Application: Aircraft Detection Lighting System. High resolution, airspace surveillance radar system for aviation obstruction light activation onshore and offshore.

Configuration: Fully self-contained compact, lightweight system for obstruction light activation for small wind farms, power transmission lines, communication tower and other projects that require automated aviation obstruction lights.

Sensors: Solid state X-band radar with Doppler processing; and Automatic Dependent Surveillance - Broadcast (ADS-B) secondary surveillance receiver for cooperative aircraft detection.

Operation: Medium-range detection of cooperative (transponder equipped) and non-cooperative aircraft with automatic activation of obstruction warning lights at user-defined perimeters.

Operating Range: Full 360 degree range up to 4 nm (7.4 km).

Power: 120/220 VAC, 60/50 Hz (DC option available) with UPS back-up and power conditioning with optional autostart propane or diesel generator.

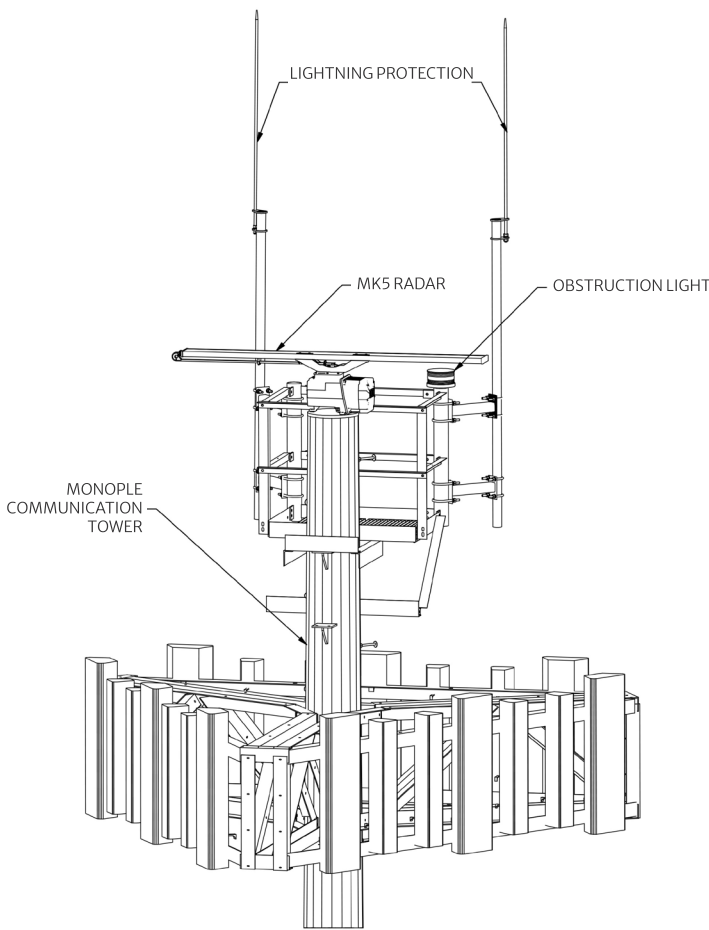
Network: TCP/IP connection supports multi-user web remote real-time system display, control & data access via fiber optic, wireless or mobile broadband.



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Advantages of the X80 COMMS ADLS

Lightweight (80 lbs/36 kg), compact solid-state radar with 50,000 hour MTBF

'Down-tower' processing electronics (can be remotely located up to 50 miles away)

ADS-B integration minimizes obstruction light activation from high altitude aircraft and provides secondary aircraft detection

FAA tested, commercially available technology

Meets or exceeds US FAA, Transport Canada, European and Australian requirements

Integrates with all ADLS compatible obstruction lights.

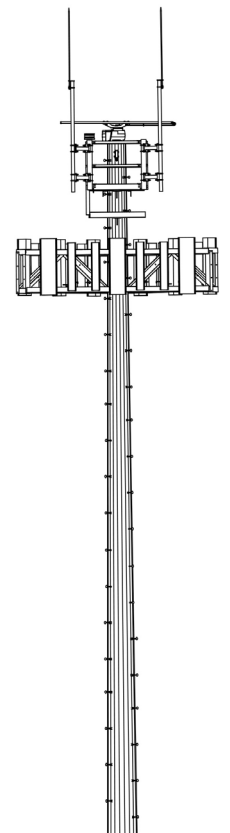


DeTect's ADLS uses Operational Risk Management (ORM) algorithms and operates in a failsafe manner where the lights are held in an 'ON' state by the system unless no aircraft are detected within the defined risk zone. When the sensors detect an aircraft, the obstruction lights are activated. A "heartbeat" indicator provides constant system status reading of the ADLS and its network. Should the ADLS go offline, or heartbeat indicator lost, the lights will automatically activate and remain illuminated until the system returns online and confirms no aircraft in the risk zone.

HARRIER uses an advanced solid-state X-Band Doppler surveillance radar that has the ability to operate in moderate rain events. The HARRIER ADLS logic is designed to err on the side of caution. If precipitation is detected, which may mask aircraft, the system will automatically activate the lights. The HARRIER ADLS also incorporates secondary surveillance using an ADS-B receiver. The system electronics can be co-located with the radars at the base of the tower or can be remotely located at a central facility up to 50 miles (80 km) away for ease of O&M and for security (requires dedicated fiber network).

DeTect's HARRIER radar processing software is user customizable and software definable to 'tune' the system to detect, track, and display only targets within the user desired target class based on a variety of parameters that include size, speed, and track characteristics.

Additionally, the HARRIER ADLS has user selectable channels to operate that allows multiple radars to work in conjunction with one another as a wide area network without interfering with each other and/or other nearby radar systems such as air traffic control, weather, and communications networks.



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MERLIN 7360p True3D™ BDR

Bird Detection Radar (portable)

Highly portable, True3D, full 360 degree bird detection radar system for environmental survey, monitoring and research.

Engineered & manufactured in the USA for dependable 24-7 operation with high reliability & low maintenance with hardware and operating software developed specifically for bird detection and tracking.

The Right Radar for the Job™



DeTect

Proven bird radar technology tested, validated & used operationally by commercial airports, the US Fish & Wildlife Service, Air Force, Navy & NASA

Developed by the world leader in avian radar technologies
Incorporates technologies proven at over 600 installations worldwide since 2003
Full parts & labor warranty & performance guarantee
Designed & manufactured in the USA; meets Buy American Act (2018 & 2021 amendment)
Supported by global network of offices and technicians.

The Right Radar for the Job™



Model: MERLIN True3D BDR for bird & bat survey & monitoring

Technology Features

Classification intelligence (target-of-Interest & false positive minimization)
Fast update rates (1-5 Hz) for improved target tracking
Bird/small drone detection up to 5+km (2.7+nm)
All weather situational awareness
Low wattage power for low interference risk
US FCC, USDOD & foreign frequency licensed/registered.

Application: Real-time bird & bat survey and monitoring; highly portable for tower, vehicle and stabilized offshore use

Configuration: Fixed & mobile designs, self-contained with all system hardware, software & integration included

Sensors:

Solid-state S-band Pulsed Doppler 3D radar, full 360 degree surveillance with high update rates (4x per second)
Sealed radome enclosure for all environmental conditions
Optional EOIR integration (visible & night camera) for real-time target classification & identification with advanced AI.

Operating Range: 1-3km (0.5-1.6nm) range for bird & bat detection, 360-degree True3D

Power: Single phase 110/240VAC, with UPS back-up, power conditioning (foreign power configurations available)

Network: TCP/IP supports multi-user web remote real-time system display, control & data access via fiber optic, wireless or mobile broadband



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20 YEARS

DeTect

Celebrating 20 years of excellence 2003-2023



MERLIN 7360p True3D™ BDR Specifications

Unlike traditional 3D & quasi-3D radars that scan only one sector at a time and leads to under-sampling, fewer tracks & low accuracy altitude estimates, DeTect's dynamic multibeam True3D radar scans & updates target data across the entire 3D volume continually, providing precise (x-y-z) data and no target or track error.

TECHNICAL SPECIFICATIONS

Architecture: Simultaneous multiple beams

Processing Type: Pulsed Doppler

Frequency Band: S

Range Resolution: 10 or 20 m (adjustable)

Selectable Frequency Bands: 6 calibrated

Instrumented Range: 8km (4.3nm)

Detection Ranges:

Medium-sized Bird/Drone (DJI Phantom): 2.25 km (1.2nm) 360°

Large Aircraft: 7 km (3.8nm)

Azimuth FOV: 360°

Elevation FOV: 45°

Software Defined Update Rate: 1-5 Hz

Minimum Detectable Velocity: 0.25 - 1mph (0.4 - 4.5km)

Weight: 22.7 kg / 100 lbs.

Dimensions: 62.2 cm x 62.2 cm x 52.7 cm (24.5" x 24.5" x 20.75")

Power Draw: 80W

Operating Temperature: -20°C to +50°C (-4°F to +122°F)

Component Temperature: -40°C to +85°C (-40°F to +185°F)

Heating/Cooling: Passive

Notes:

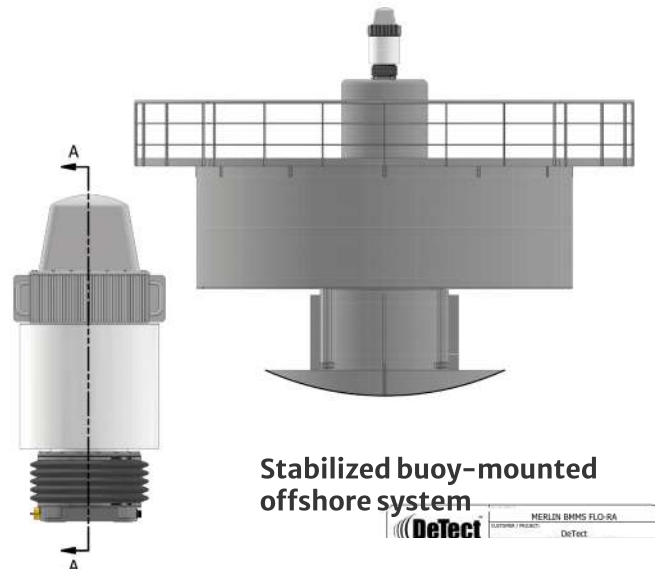
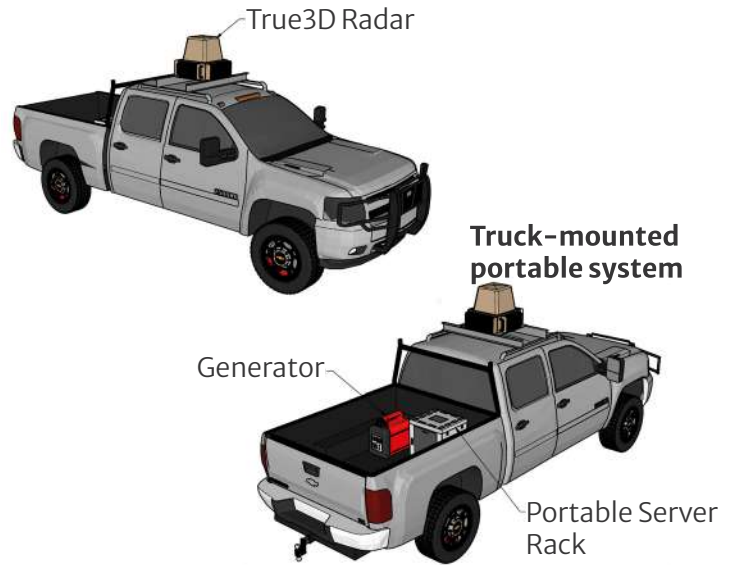
Achieving maximum detection ranges requires sufficient mounting height and line of sight Specifications subject to change as design is completed.



Model: MERLIN True3D BDR for bird & bat survey & monitoring

DETECT TRUE3D™ RADAR ADVANTAGES

Full 3D Radar
 S-Band, Pulsed Doppler
 3D digital multibeam dynamic (scans full 3D volume in single scan)
 High update rates (4x per second)
 Available in fixed, mobile & stabilized offshore configurations.



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MERLIN

Aircraft Birdstrike Avoidance Radar (ABAR)

The most widely used & tested bird radar system with over 250 units delivered worldwide for aviation safety & bird control. The only system in use for real time, tactical operational birdstrike avoidance by air traffic controllers. Engineered & manufactured for dependable 24-7 operation with high reliability & low maintenance.

MERLIN™ systems are available in fixed and mobile installation configurations.



Proven technology tested, validated & used operationally by commercial airports, the US Air Force, Navy & NASA

Can be combined with DroneWatcher RF and/or **HARRIER™** Drone Surveillance radar for simultaneous bird and drone detection.

MERLIN™ systems are available in fixed and mobile installation configurations. For large, multi-runway airports and airfields, multiple fixed-mount sensor packages can be installed around the airfield and networked to provide optimal coverage.



Model:

Industrial series for **commercial airports** and **military airfields**

Application:

Real-time aircraft-bird strike avoidance.

Configuration: Fixed and mobile designs, fully self-contained with all system hardware, software and integration included.

Sensors: MERLIN SS200: dual solid-state S-band Doppler radars provide 2-1/2 D coverage of airspace around airfield to 4+ nm (3D in runway approach and departure corridors).

MERLIN True 3D: solid-state S-band, full 360 degree true 3D, digital beam forming radar with real-time x-y-z target location and tracking to 4+ nm.

Operating Range: 2-6 mile range, 360-degree airspace surveillance around the airport, including runway, approach and departure corridors and detection from surface to at least 18,000 ft.

Power: Single phase 110/240 VAC, with UPS back-up, power conditioning & optional auto-start electric generator & fuel tank to support 10-20 days 24-7 operation.

Network: TCP/IP supports multi-user web remote real-time system display, control & data access via fiber optic, wireless or mobile broadband.



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Technical Data Sheet

With MERLIN™ users get more than just a radar:

Each **MERLIN™** system is supported by DeTect's experts in military and commercial aviation safety, air traffic control, airfield management, airfield bird control and radar remote sensing to provide a cost-effective system that integrates seamlessly and effectively into airfield / airport operations.

The **MERLIN™** bird radar uses custom software specifically developed to detect and track bird targets: not modified ship or aircraft tracking software, which are not designed to identify and track the unique flight signature and variable characteristics of birds in flight.

The **MERLIN™** system also processes and displays the bird targets and tracks the current bird strike risk in real-time.

A key feature of **MERLIN™** is its wide-beam coverage that detects and provides real-time alerts of hazardous bird activity from ground level to 18,000 feet for real-time tactical & strategic aircraft bird strike risk avoidance.

With its clutter suppression and Doppler processing, the system provides continuous bird detection near the ground level where 85% of damaging and hazardous birdstrikes occur.

The **MERLIN™** system includes a wide range of unique technology features and benefits not available with any other bird radar system:

- Operational, production-model technology
- Real-time, web-based display of high-risk bird activity with high update rates with accurate target position & altitude data
- Automatic, continuous risk assessment & warnings for tactical aircraft bird strike risk alerts to air traffic controllers & pilots
- Mobile display capabilities to support wildlife control managers
- Advanced clutter suppression & Doppler processing detects birds from near ground level to 18,000 feet
- Real-time bird mass & size filtering eliminates false positive alerts
- State-of-the-art solid state, S-band radar technology
- Proven bird detection tracking algorithms, clutter suppression & insect filtering
- Bird radar software developed specifically for detection & tracking of bird targets
- Simultaneous multi-range operation to support both bird control & aircraft surveillance
- Automatic SQL data system with daily BASH report generation
- Complete design, installation, commissioning & long-term support
- Full parts & labor warranty & performance guarantee.



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MERLIN True3D™ BDR-DDR

Aircraft Birdstrike Avoidance Radar

The world's first dual-function bird and drone detection radar system for aviation safety & bird control. In use since 2003 for real-time, tactical operational birdstrike avoidance, now with True3D & drone detection and alerting.

Engineered & manufactured in the USA for dependable 24-7 operation with high reliability & low maintenance.



DeTect™

Proven technology tested, validated & used operationally by commercial airports, the US Air Force, Navy & NASA.

Available in dual function BDR-DDR configuration for simultaneous bird & drone detection with integrated radar-directed electro-optic, infrared (EOIR) camera system and DroneWatcher RF-DR radiofrequency drone detection & interdiction; includes real-time target classification using advanced AI technology.

Available in fixed and mobile installation configurations.



Model:

True3D BDR-DDR for commercial airports & military airfields

Application:

Real-time aircraft-bird strike avoidance & drone detection (Counter-UAS).

Configuration:

Fixed and mobile designs, fully self-contained with all system hardware, software and integration included.

Sensors:

- S200 solid-state S-band Doppler horizontal surveillance radar (long-range bird & small drone detection, 4-6 nm)
- S9000 solid-state True3D panel radars; 2-panel model for full 3D in critical runway approach and departure corridors (where 85% of birdstrike occur), or 4-panel model for full 360 True3D surveillance, 3-4 nm range
- Optional radar-controlled EOIR visible & night camera for real-time target classification & identification
- Optional DroneWatcher RF-DR radiofrequency sensors for detection, tracking & identification of RF & video signal emitting drones (80%+ of consumer & prosumer).

Operating range:

2-6 mile range, 360-degree airspace surveillance around the airport, including runway, approach & departure corridors & detection from near surface to above 18,000 ft AGL.

Power:

Single phase 110/240VAC, with UPS back-up, power conditioning & optional auto-start electric generator & fuel tank to support 10-20 days 24-7 operation (foreign power configurations available).

Network:

TCP/IP supports multi-user web remote realtime system display, control & data access via fiber optic, wireless or mobile broadband.

General Specifications:

- Frequency range: 2.9 to 3.3 Ghz (electronically variable)
- Emitted Power: 200-300 watts
- Operational Wind Speed: 185 km/h (51 m/s)
- Operational temperature range: -25 to +60°C
- Operational relative humidity: up to 100%.

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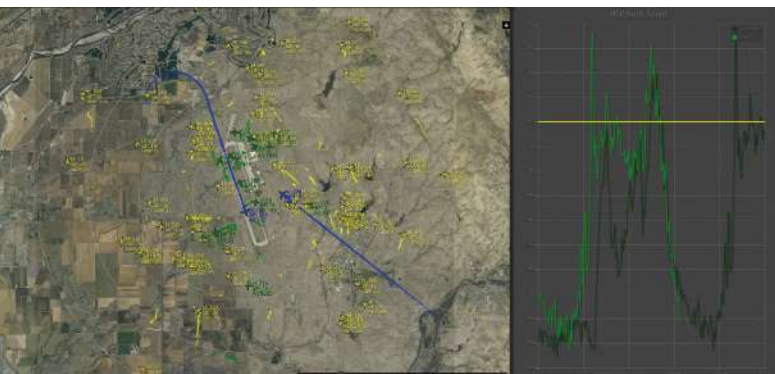
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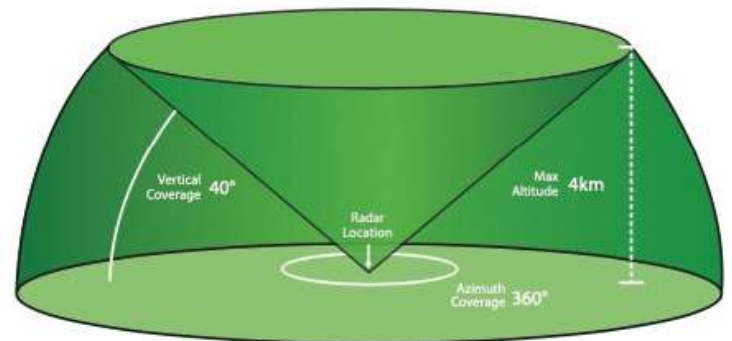
- Operational, production-model technology
- Real-time, web-based display of high-risk bird & drone activity with accurate target position & altitude data (x-y-z)
- Automatic, continuous risk assessment & warnings for tactical aircraft bird strike risk & drone incursion alerts
- Mobile display capabilities to support wildlife control managers & security teams
- State-of-the-art solid state, S-band radar technology
- Proven bird & drone detection tracking algorithms, clutter suppression & insect filtering
- Radar software developed specifically for detection & tracking of small RCS targets (birds & drones)
- Simultaneous multi-range operation to support both bird control, drone detection & aircraft surveillance
- Automatic SQL data system with daily report generation
- Complete design, installation, commissioning & long-term support
- Full parts & labor warranty & performance guarantee
- Designed & manufactured in the USA meets Buy American Act (2018 & 2021 amendment)



Model:
True3D BDR-DDR for commercial airports & military airfields

DeTect True3D™ Radar Advantages

- Full 3D Radar
- S-Band, Pulsed Doppler
- 3D digital multibeam dynamic (scans full 3D volume in single scan)
- Available in several power & range levels
- Available in all DeTect radar products in various power & range levels.



Unlike traditional 3D & quasi-3D radars that scan only one sector at a time and leads to under-sampling, fewer tracks & low accuracy altitude estimates, DeTect's dynamic multibeam True3D radar scans & updates target data across the entire 3D volume continually, providing precise (x-y-z) data and no target or track error.

Technology Features

- Classification intelligence (target-of-interest & false positive minimization)
- Fast update rates (1-5 Hz) for improved target tracking
- Drone/bird detection up to 5+ km (4+ nm)
- All weather situational awareness
- Low watt power for low interference risk
- FCC & US DOD frequency licensed/registered

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