

Technical Data Sheet

MERLIN

Avian Radar Systems Wind Energy Preconstruction Survey & Risk Assessment



Avian Radar System

SUMMARY SPECIFICATIONS

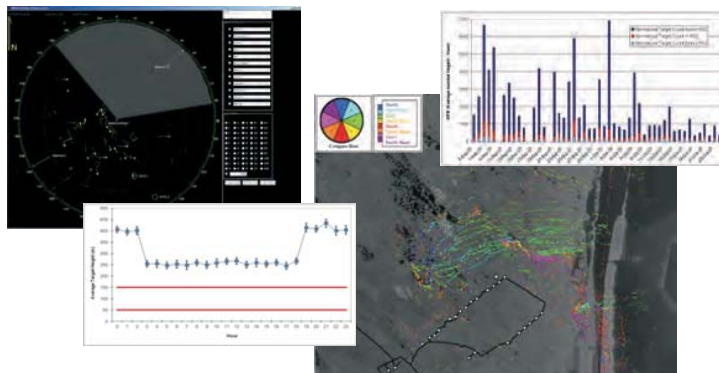
subject to change without notice

- Model:** E-Series (Environmental)
- Application:** Real-time bird and bat detection and tracking for quantitative wind farm preconstruction survey, mortality risk assessment & monitoring of terrestrial and offshore sites
- Configuration:** Mobile, trailered, fully self-contained or fixed system designs for terrestrial & offshore wind farms
- Sensors:** 200 watt solid state Doppler Horizontal Surveillance Radar (HSR) & 25 kW Vertical Scanning Radar (VSR); Frequency Diversity processing option
- Operation:** Simultaneous horizontal and vertical bird detection & tracking with full data recording to SQL dataserer system
- Operating Range:** HSR 2-4 miles, 360 degrees around the site with 24 degree AGL detection from ground level & above; 0.75-2 miles 22 degree beam width & detection from ground level to 15,000 ft AGL
- Power:** 110/220 vAC, 60/30 amps service with UPS back-up & power conditioning (30 minutes) & optional auto-start single or dual 6 kW diesel 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 cellular



ABOVE: MERLIN systems are available in a variety of standard models & custom, fixed installation configurations

BELOW: Examples of real-time radar display of bird tracks with Groundtruth bar enabled & example data products from system SQL database & analysis software



•The most widely used & tested bird radar system with over 140 units operating worldwide in bird control & aviation safety.

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MERLIN Avian Radar System - Wind Energy



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:

- NEXRAD pre-screening site assessment
- Bird & bat radar systems - terrestrial and offshore
- Data processing, analysis & reporting
- Bird & bat mortality risk analysis
- Risk mitigation radar systems
- Public meeting support & technology consulting

Bird & Bat Radar Technologies from DeTect

DeTect is the developer and manufacturer of the most advanced and proven radar systems available for wind energy project bird and bat survey, risk assessment, monitoring and realtime risk mitigation with over 90 systems operating worldwide. The technology was originally developed for the US Air Force and NASA and is highly automated providing unattended 24-7 collection of high quality data on bird and bat activity at proposed windfarm sites that 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. 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 realtime risk management.

BirdMap™ NEXRAD Pre-screening Risk Assessment

BirdMap™ is a GIS-based system that uses processed radar data from the US NEXRAD weather radar network to provide current and historical avian population density and seasonality data for the continental US, Alaska and Hawaii, including most coastal and offshore resource areas. BirdMap incorporates public and proprietary databases on habitat, threatened and endangered species, roost sites, hibernacula, bird and bat distribution, and refuges along with relevant correlation issues such as wetlands, weather and visibility to provide preliminary evaluation of a proposed windfarm site. DeTect maintains the largest database in the world on bird and bat activity that includes over ten years of bird density and migratory data for the US. BirdMap™ provides a unique



resource for conducting a low cost “screening” assessment of proposed wind energy development sites to assist in site selection prior to investment in long term planning studies, radar and field studies, and design.

MERLIN Avian Radar System

MERLIN surveys provide the most cost effective, scientifically sound, and conclusive method for collection of high quality, statistically superior data on bird and bat movements at proposed wind turbine project locations for both onshore and offshore wind turbine installations. DeTect has extensive expertise and experience that includes the only staff with experience on conducting major multiyear, continuous avian radar studies for landbased and offshore windfarms. 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



continuously and automatically generate highly accurate, detailed datasets for quantitative analysis. MERLIN is fully remotely viewable and controllable and operates 24-7 unattended. Data is also archived providing a permanent record for each project. 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.

MERLIN SCADA Mortality Risk Mitigation System

For operating windfarms, MERLIN SCADA™ functionality allows the MERLIN system to provide advance “early” warning to windfarm operators of approaching migratory or resident birds and bats under mortality risk conditions. MERLIN SCADA™ can operate autonomously, automatically sending requests to idle turbines when risk conditions are detected by the system, and sending requests to restart the turbines when the risk has abated. The MERLIN SCADA™ system can also be configured to mitigate mortality risk for raptors by monitoring the airspace above turbines, evaluating the risk of collision for each target and automatically stopping the turbines when raptor activity consistent with mortality risk is detected. The MERLIN SCADA™ operating software is fully compatible with most wind farm SCADA (Supervisory Control and Data Acquisition) systems.

