



# TECHNICAL DATA SHEET

## MERLIN SCADA

### Avian Radar Mortality Risk Mitigation System

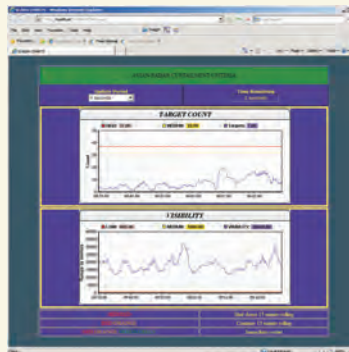


- Application:** Real-time, radar-activated bird & bat mortality risk mitigation
- Configuration:** Fixed or mobile radar installation with MERLIN SCADA wind farm control system interface
- Operation:** Simultaneous horizontal & vertical bird detection of migratory birds, raptors & bats with real-time analysis of flight paths, altitude, characteristics, passage rates and environmental conditions against mitigation rule sets
- Operating Range:** HSR 2-6 miles, 360 degrees around the site with 24 degree AGL detection from ground level and above; VSR 0.75-3 miles with 24 degree beam width and detection from ground level to 15,000 ft
- Power:** 110/220 vAC, 60/30 amps service with UPS back-up and power conditioning (30 minutes); optional 6 kW auto-start generator power back-up
- Network:** TCP/IP with MODBUS & OPC protocols via fiber optic network for windfarm system control via Supervisory Control and Data Acquisition (SCADA) system



TOP: MERLIN SCADA installation at the Iberdrola Penãscal wind farm in Texas, USA (operating since 2009).

MERLIN SCADA provides real-time mortality risk mitigation for migratory birds, resident birds, raptors and bats with customizable rule sets and responses.



MERLIN SCADA-M for coastal migratory bird risk mitigation (bottom); Operator user interface with current risk status (left)



*MERLIN SCADA is the world's only radar-based wind farm risk mitigation system and provides continuous monitoring and automatic activation of mitigation measures to reduce mortality risk for migratory birds, resident birds, raptors and bats. The system applies rule sets programmed to respond to a variety of risk conditions in real-time activating mitigation measures that include operator alerts, turbine idling and activation of deterrent devices (long range bioacoustic and laser based).*



MERLIN SCADA-R interface for raptor mitigation using turbine centric model that idles individual turbines when proximate risk is detected; each turbine is assigned a color-coded risk value (El Pino wind farm, Spain)



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 real-time 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 pre-construction 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, and data processing, analysis, reporting and QA/QC. Staff specialists include highly experienced radar ornithologists, avian biologists and statisticians that comprises 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.

### **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 five 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 on-shore and off-shore wind turbine installations. DeTect has extensive expertise and experience that includes the only staff with experience in conducting major multi-year, continuous avian radar studies for land-based 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 generating 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 Analyzer program generates 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, the MERLIN SCADA functionality allows the MERLIN system to operate as a monitoring and risk mitigation system providing advance "early" warning to windfarm operators of approaching migratory or resident birds and bats under mortality risk conditions. MERLIN SCADA can operate autonomously, automatically idling turbines when risk conditions are detected by the system, restarting the turbines when the risk has abated. The MERLIN SCADA operating software is fully compatible with most wind farm SCADA (Supervisory Control and Data Acquisition) systems and can be configured to mitigate raptor mortality risk providing continuous monitoring of the airspace above turbines, automatically stopping the rotors when raptor activity consistent with mortality risk is detected.

*For detailed information on the systems,  
email DeTect at [info@detect-inc.com](mailto:info@detect-inc.com)*