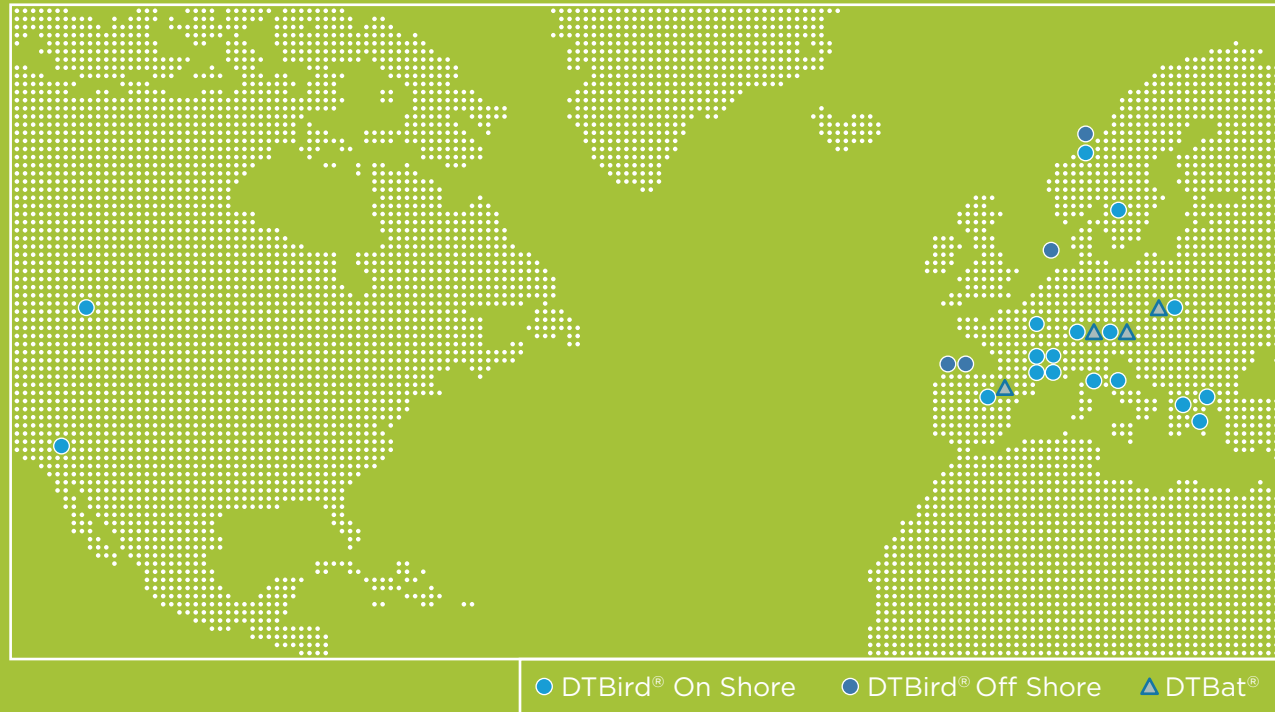


# DTBird® & DTBat®, world wide reference for bird & bat protection at wind farms

NOVEMBER 2016



95 DTBird® & DTBat® units are distributed in 21 existing / projected, onshore & offshore wind farms in 11 countries:

- ✦ Austria
- ✦ France
- ✦ Germany
- ✦ Greece
- ✦ Italy
- ✦ Norway
- ✦ Poland
- ✦ Spain
- ✦ Sweden
- ✦ Switzerland
- ✦ USA

2 additional units will be installed in Spain this year.

dtbat®

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# Bats Smart and Transparent Wind Power

AUTOMATIC & REAL-TIME PROTECTION

NOVEMBER 2016

dtbat®

# Bat Protection Automatic & Real-Time

DTBat® is a self-working System that detects bat passes in real-time, and takes automatic actions linked to bat detection. For the Wind Industry, DTBat® System automatically surveys the airspace around Wind Turbines (WTG) detecting bat passes in real-time; and optionally, reduces the collision risk triggering WTG Stops linked to bat activity thresholds and/or environmental variables measured in real-time.

DTBat® has 2 modules available: Detection and Stop Control.

## Bat Detection

Automatic and real-time detection of bats with ultrasound recognition.

### Features

- **Detection sensors:** Bat detectors installed at height (1 - 3 units).
- **Environmental sensors:** Temperature, Rain and Humidity (optional) and Wind Speed (from the WTG).
- **Surveillance area:** Rotor Swept Area.
- **Service period:** Continuous monitoring in bat activity periods.
- **Precision** of real-time detection > 0.97 (97% of detections are actual bats).

### Recorded Data

- Sonograms of every bat pass.
- Bat pass time.
- Environmental data and WTG operational parameters.
- Species/Group identification from sonograms review.

## Stop Control

Automatic WTG Shutdown linked to real-time bat detection.

### Features

- **Interface with WTG:** DTBat® hardware and software compatible with all WTG manufacturers.
- **Automatic Stop trigger:** linked to real-time bat activity thresholds and/or environmental variables.
- **Stop trigger:** < 2 s after bat pass detection.
- **Rotor Stop init time:** 2 - 10 s after DTBat® stop trigger, depending on WTG manufacturer.
- **Complete rotor Stop:** 10 - 25 s after WTG stop init, depending on WTG manufacturer.
- **Stop length** according to bat activity detected. Typical stop program covers > 90% of bat activity. Adjustable to Client/Environmental Authority requirements.
- **Automatic restart** of the WTG.
- Automatic **notification** of every Stop: Trigger (first notification), end time and duration (second notification).

### Recorded Data

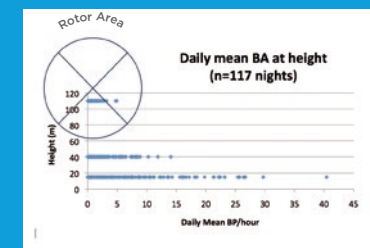
- Stop time data: Init time, end time and duration.
- Sonograms of all bat passes detected.



## Data Analysis Platform

DTBat® online Data Analysis Platform provides:

- Access to bat calls, environmental data, WTG operational parameters, and Shutdown actions.
- Data summarization in charts and graphics.
- Automatic Service Reports.



ID	Date & Hour	Species	Duration (s)	Height (m)	WTG Status	Stop Init	Stop End	Stop Duration (s)	Comments
1001	2014-10-01 01:15:01	Myotis	1.2	100	Running	01:15:03	01:15:05	2	
1002	2014-10-01 01:15:02	Myotis	1.5	100	Running	01:15:04	01:15:06	2	
1003	2014-10-01 01:15:03	Myotis	1.8	100	Running	01:15:05	01:15:07	2	
1004	2014-10-01 01:15:04	Myotis	2.1	100	Running	01:15:06	01:15:08	2	
1005	2014-10-01 01:15:05	Myotis	2.4	100	Running	01:15:07	01:15:09	2	

