# IMPIANTO EOLICO COSTITUITO DA N. 10 AEROGENERATORI,
# NEL COMUNE DI SAN SEVERO (FG),
# IN LOCALITÀ *CAMERA- LI CALICI*
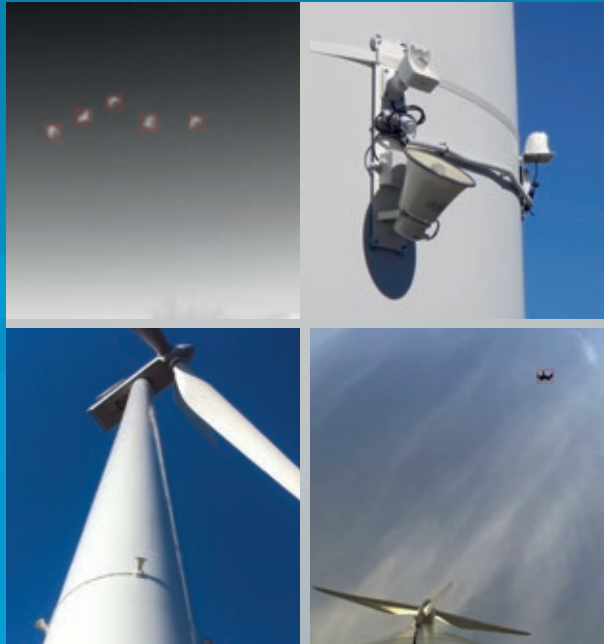


## *Allegato -*
## *Sistema automatico di rilevamento e blocco DTBird*[®]

**Committente**
ENERWING SRL

PROFESSIONISTA INCARICATO
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# Bird Monitoring & Reduction of Collision Risk with Wind Turbines

## DTBIRD® SYSTEM

**MARCH 2019**

dtbird®

# Bird Monitoring & Reduction of Collision Risk with Wind Turbines

DTBird® is a self-working system that monitors bird activity in real-time, and detects any bird flying during the day or night all year round.

DTBird® System can be installed in Wind Turbines (WTGs), Meteorological Towers and other facilities on & offshore.

In operating Wind Farms, DTBird® System includes specific modules that take automatic actions to reduce the collision risk of birds with the WTGs: DTBird® Collision Avoidance Module and DTBird® Stop Control Module. In addition, DTBird® Collision Control registers bird collisions.

DTBird® **efficiency** in detectability and collision risk reduction has been tested by independent environmental consultancies, research institutions and bird protection organizations.

DTBird® features and operational specifications are available to the public in the download section of DTBird® website.

dtbird®

DTBird® has 4 modules available:

### Detection

Automatic and real-time detection of flying birds by high resolution image analysis during the day or night.

### Collision Control

Video and audio recording of high collision risk flights, including bird collisions (with the blades, tower and nacelle) and injured birds that fly away.

### Collision Avoidance

Emission of Warning and Discouraging Sounds adjusted to bird collision risk and legal requirements.

### Stop Control

Automatic triggering of signals to stop and restart the WTG based on real-time collision risk.

Videos of every bird flight, environmental data, WTG operational parameters and DTBird® actions are recorded and uploaded daily to an online Data Analysis Platform (DAP), available through the Internet. The DAP also provides Automatic Service reports that summarize service profiles, bird flights, DTBird® actions, and bird collisions detected.

DTBird® Systems are customized for every wind farm depending on WTG characteristics (dimensions and tower construction materials), target species, local weather and collision risk mitigation actions selected.

The first installation of DTBird® in a WTG was completed in March 2009 in Spain. DTBird® has been installed in Austria, France, Germany, Greece, Italy, Poland, Spain, Sweden, Switzerland, Norway, The Netherlands, the United Kingdom and the USA, in on & offshore projects.

# Detection Module

## Features

- **Installation sites**: WTGs (with steel and/or concrete tower), meteorological towers and other facilities (on & offshore).

- **Detection sensors**: 4 to 8 daylight HD cameras, and/or 2 to 8 night vision thermal cameras per WTG.

- **Surveillance area**: 360° around the installation site.

- **Detection distance**:

| BIRD SPECIES (WINGSPAN) | MAXIMUM DETECTION DISTANCE | | |
|---|---|---|---|
| | DAYLIGHT | | NIGHT |
| | DTBirdV4 | DTBirdV8 | |
| Golden Eagle (1,9 – 2,25 m) | 320 – 380 m | 550 – 650 m | 180 – 210 m |
| Red Kite (1,4 – 1,65 m) | 230 – 280 m | 400 – 480 m | 130 – 150 m |
| Atlantic Puffin (0,47 – 0,63 m) | 80 – 100 m | 130 – 180 m | 40 – 60 m |

- **Daily service period**: Continuous monitoring during the day (light > 50 lux) and night.

- **Bird Detectability**: > 80 %.*

### Observations:

* H.T. Harvey & Consultants for the *American Wind Wildlife Institute* (AWWI) in 2018 reported a 63% mean detection rate per distance band of 30 m (7 distance from > 230 m to the RSA). The cumulative detectability in 2 bands > 80%.

The *Norwegian Institute for Nature Research* (NINA) in 2012 reported a 86 - 96% detectability for all birds in a 150 m radius to the WTG and 76 - 92% in a 300 m radius.

## Recorded Data

- Video and sound recordings of every flight.

- Flight time data: Init time and total length.

- Environmental data, and WTG operational parameters.

Species group and bird behaviour can be noted from video recordings review.



Latest DTBird®V8 model installation on a concrete WTG. 2 to 8 HD cameras can be installed per tower.

# Collision Avoidance Module

## Features

- **Installation sites**: WTGs (with steel and/or concrete tower).

- **Dissuasion units**: 4 to 10 speakers per WTG installed at several heights, covering the whole Rotor Swept Area.

- **Sound features**:
  - Warning sounds to birds with Potential Collision Risk.
  - Discouraging sounds to birds flights in High Collision Risk/Rotor Swept Area.
  - Trigger in real time: milliseconds after detection of flight collision risk.
  - Power adjusted to legal requirements and bird sensitivity.
  - Sound emission covering the whole Rotor Swept Area.

- **Collision risk reduction:** Already reported.*

### Observations:

\* H.T. Harvey & Consultants for the _American Wind Wildlife Institute_ (AWWI) in 2018 reported the deterrence response rate for Golden Eagles is 52-83%, for Buteos is 36-76%, and for all Raptors is 39-78%.

_ECOCOM_ in 2016 reported a reduction in flight time in the risk area of the rotor between 61-87%. It triggers avoidance behaviour in 88% of cases where the bird is on a collision course with the WTG.

## Recorded Data

- Warning/Discouraging Sounds time data: Init time and total length.

- Video and sound recordings of bird flights and Warning/Discouraging Sounds.



DTBird® Collision Avoidance Module Speakers installed on the WTG tower. 4 to 10 Speakers can be installed per WTG.

# Stop Control Module

## Features

- **Interface with WTG**: DTBird® system hardware and software compatible with all WTG manufacturers.

- **Automatic Stop trigger**: Linked to real-time flight detection at the collision risk distance.

- **Collision risk distance**: Configured according to WTG complete rotor Stop time and Target Species flight features in the installation site.

- **Rotor Stop init time**: Depending on WTG manufacturer, 2 - 18 s after DTBird® stop trigger.

- **Complete rotor Stop**: Depending on WTG manufacturer, 15 - 35 s after WTG stop init.

- **Stop duration:** Linked to real-time flight detection in collision risk.

- **Automatic restart** of the WTG when the collision risk disappears.

- Automatic **email notification** of every Stop: Trigger time (first email), end time and duration (second email).

- Stop adjusted to legal requirements.

## Recorded Data

- Stop time data: Init time, end time and total time transpired.

- Video recordings of bird flights and the whole Stop.



DTBird® Stop Control Module stops and restarts the WTG.

**Observations:**

Depending on bird activity, DTBird® model and the stop protocol applied, the total stop duration produced by DTBird® is estimated to be in the range of 10 - 130 hours/year (with wind speed above 3 m/second).

# Collision Control Module

## Features

- **Installation sites**: WTGs (with steel and/or concrete tower) and Meteorological Towers.

- **Detection sensors**: 2 to 8 daylight HD cameras and/or 2 to 8 night vision thermal cameras per WTG.

- **Daily service period**: Continuous monitoring during the day (light > 50 lux) and night.

- **Surveillance area**: The whole rotor swept area.

- **Register of potential collisions in > 96% of flights detected** (360° bird monitoring around the rotor swept area).

### Observations:

Currently, the capability to register potential collisions in flights detected during daylight, for all bird species and in all DTBird® Systems operating worldwide, vary from 96 to 100%.
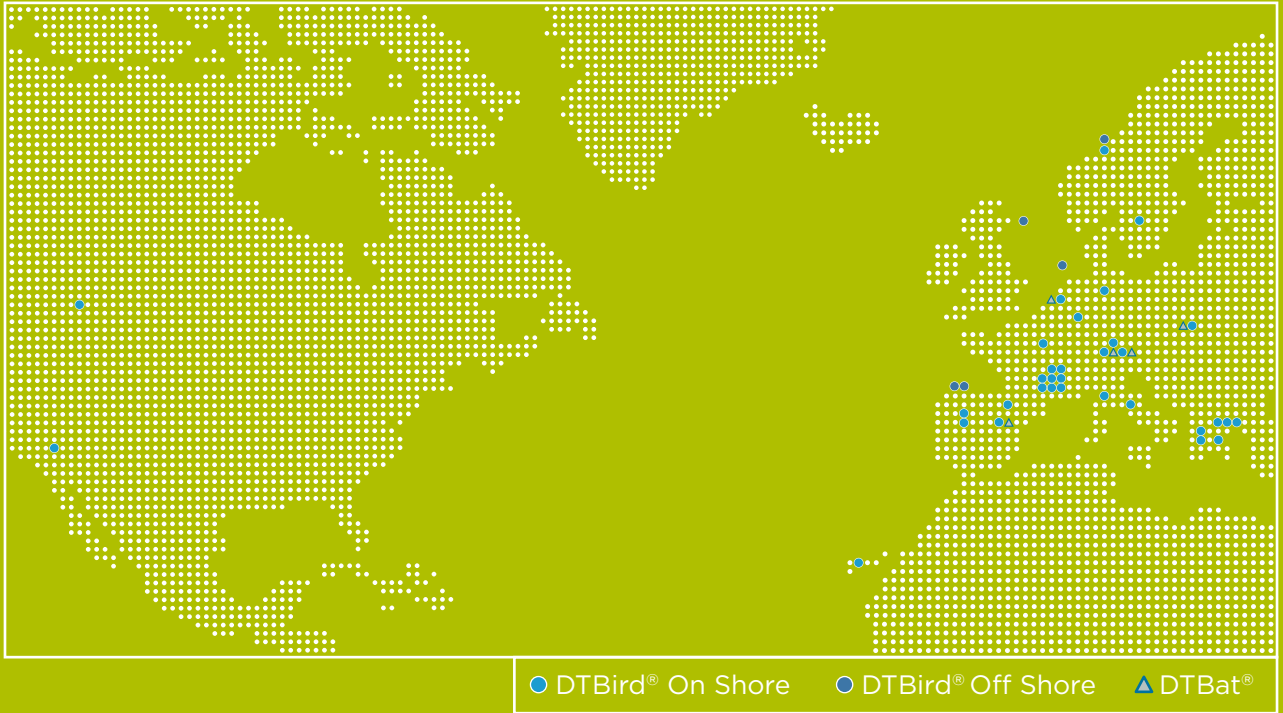
## Recorded Data

- Collision review from video and sound recordings, including potentially injured birds that fly away.

- Video and sound recordings of bird collisions.

- Continuous video recording of the previous 10 days.

DTBird® video image with a White-Tailed Eagle in collision risk.
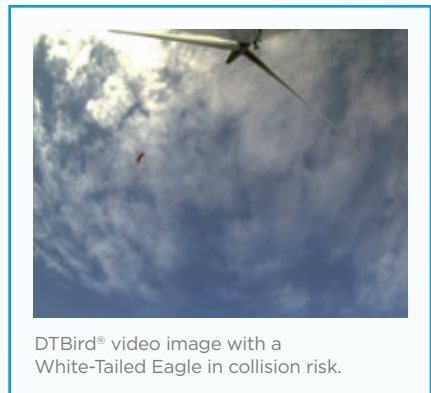
# DTBird® System:
# a Worldwide Reference for
# Bird Protection at Wind Farms

○ DTBird® On Shore  ● DTBird® Off Shore  △ DTBat®

DTBird® & DTBat® features are demanded by environmental administrations of an increasing number of countries.

153 DTBird® & DTBat® units have been installed at 50 existing / projected, onshore / offshore wind farms in **13 countries** (Austria, France, Germany, Greece, Italy, Norway, Poland, Spain, Sweden, Switzerland, The Netherlands, the United Kingdom and the United States).

DTBird® is operating at WTG since 2009 and DTBat® since 2012.

dtbird®

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