

dtbird[®] dtbat[®]



Bird & Bat Monitoring

Collision Risk Reduction

Onshore & Offshore

JULY 2026



More than 15 years protecting birds and bats with presence in more than 17 countries

We develop, manufacture and install technologies to make wind energy compatible with wildlife conservation through automatic and real-time protection.

Liquen Consultoría Ambiental S.L. is committed to the protection and care of biodiversity in wind farms.

dtbird[®] dtbat[®]

DTBird® system is a combination of the following modules:

Scalable and
Tailor-Made Projects

01 _ **Detection Module**

02 _ **Acoustic Collision Avoidance Module**

03 _ **Stop Control Module**



01



Detection Module

Collision
Control



01 | **Detection Module**

Collision Control



**Cabinet on ground level in
the tower**

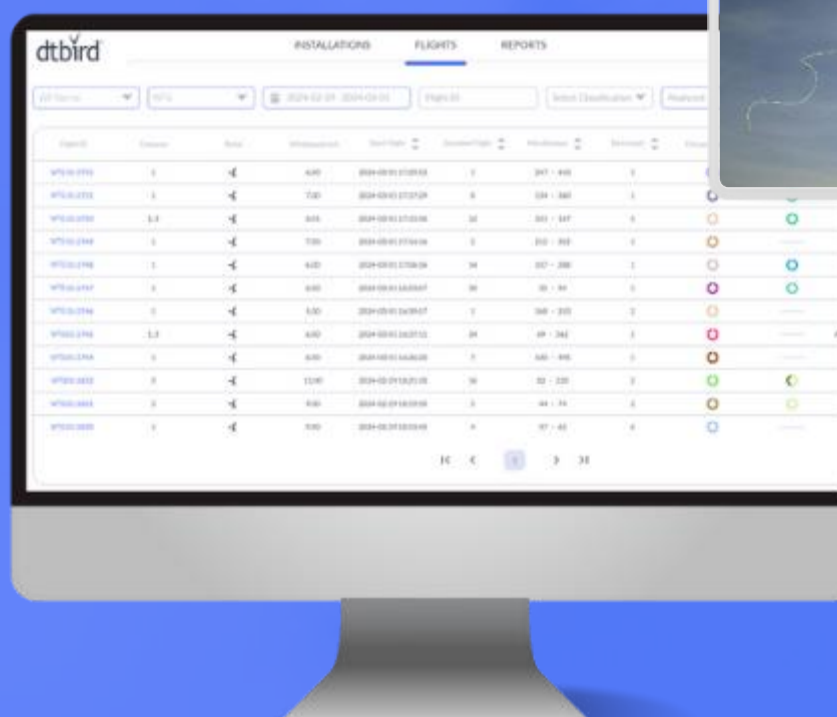


**One or two rings of cameras
fixed around the tower**



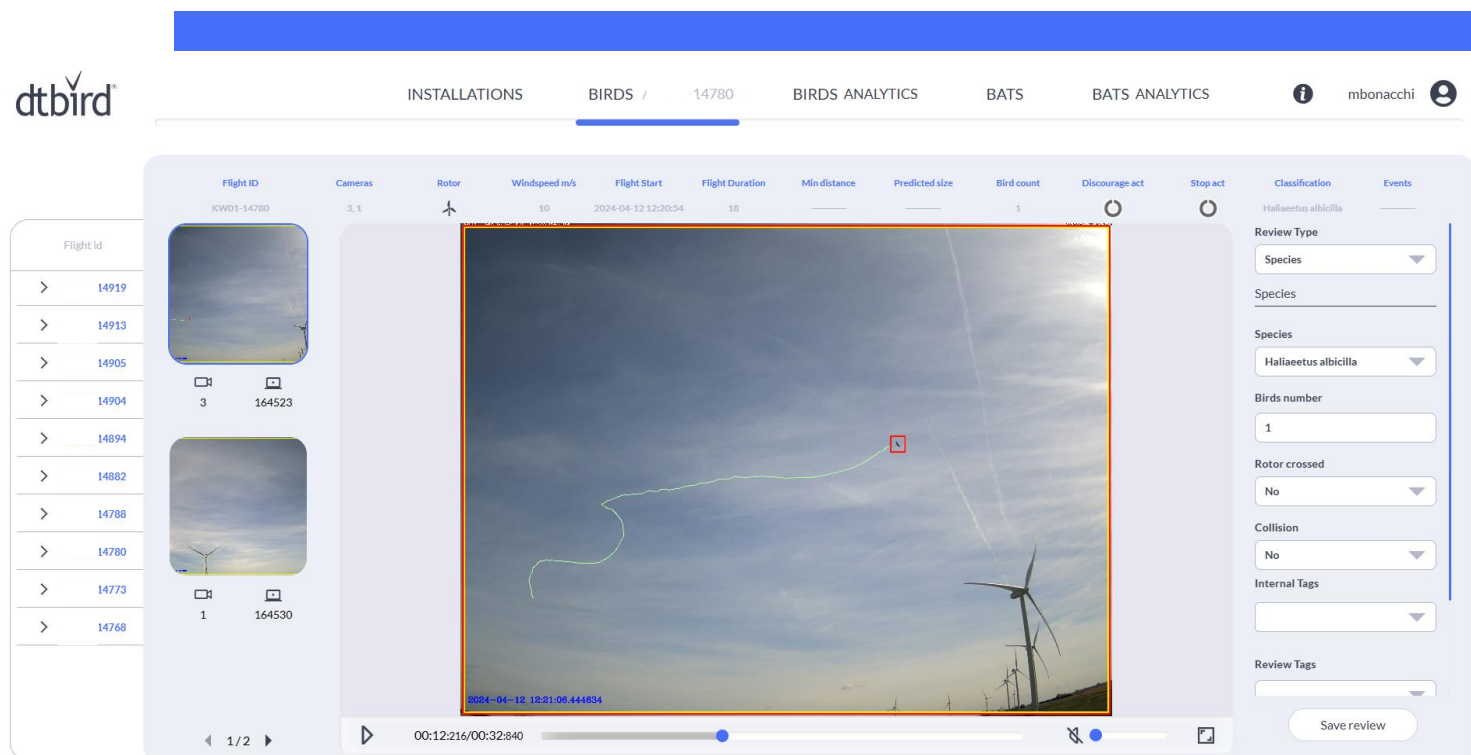
Cameras

Detects the presence of birds automatically and in real time using Larus software. Larus is based on tracking and neural networks.



Highlights

- Continuous process of improving detectability and reducing false positives.
- Detection between blades.
- Access to videos with integrated zoom, data and graphics through the NEST Platform.
- Automatic marking of flights with a higher probability of recording a collision.



- Available remotely
- 2 access levels
- WTG operational parameters
- Bird flight data + Reporting tools
- Videos recordings
- Potential collision indicator

01 —

Detection Module
Collision Control

Falco Model

Onshore Projects



We recommend combining rings
(F4+F6) or (F4+F8)
See details on the following pages

F4 Ring of 4 cameras

F6 Ring of 6 cameras

F8 Ring of 8 cameras

Falco Model

Onshore Projects

F4

Recommended for small turbine and medium and large target birds

- Bird monitoring, collision control and shutdown
- Ring with 4 cameras, with 360° horizontal and 58° vertical angles
- For turbine with rotor diameter < 90 m
- For birds with wingspan > 100 cm
- Bird detection distance at **400 m, 200 m***

F6

Recommended for turbine of any size, including medium and small target birds

- Bird monitoring and shutdown
- Ring of 6 cameras, with 360° horizontal and 33° vertical angles
- For turbine of any size
- For birds with wingspan > 60 cm
- Bird detection distance at **700 m, 300 m***

F8

Recommended for turbine of any size, including small target birds

- Bird monitoring and shutdown
- Ring of 8 cameras, with 360° horizontal and 26° vertical angles
- For turbine of any size
- For birds of any size
- Bird detection distance at **800 m, 320 m***

*Maximum detection distance for a bird with a 2,2 m wingspan. Maximum detection distance (absolute and average).

Falco Model

Onshore Projects

F4+F6

Recommended for turbine of any size, including medium and small target birds (2 rings of cameras)

- Bird monitoring, collision control and shutdown
- Ring with 4 cameras, with 360° horizontal and 58° vertical angles
- Ring of 6 cameras, with 360° horizontal and 33° vertical angles
- For turbine of any size
- For birds with wingspan > 60 cm
- Bird detection distance at **700 m, 300 m***

F4+F8

Recommended for turbine of any size, including medium and small target birds (2 rings of cameras)

- Bird monitoring, collision control and shutdown
- Ring with 4 cameras, with 360° horizontal and 58° vertical angles
- Ring of 8 cameras, with 360° horizontal and 26° vertical angles
- For turbine of any size
- For birds of any wingspan
- Bird detection distance at **800 m, 320 m***

*Maximum detection distance for a bird with a 2,2 m wingspan. Maximum detection distance (absolute and average).

01 —

Detection Module
Collision Control

Albatross Model

Offshore Projects
Onshore for Extreme Climates



A4 Ring of 4 cameras

A6 Ring of 6 cameras

A8 Ring of 8 cameras

A10 Ring of 10 cameras

A12 Ring of 12 cameras

Albatross Model

Offshore Projects
Onshore for Extreme Climates

A4

Recommended for small turbine and medium and large target birds

- Bird monitoring, collision control and shutdown
- Ring with 4 cameras, with angles of 360° horizontal and 50° vertical. Cameras (95°x50°)
- For turbine with rotor diameter < 90 m
- For birds with wingspan > 100 cm
- Bird detection distance at **400 m, 200 m***

A6

Recommended for turbine of any size, including medium and small target birds

- Bird monitoring, collision control and shutdown
- Ring with 6 cameras, with angles of 360° horizontal and 33° vertical. Cameras (60°x33°)
- For turbine of any size
- For birds with wingspan > 60 cm
- Bird detection distance at **550 m, 300 m***

A8

Recommended for turbine of any size and medium and large target birds

- Bird monitoring, collision control and shutdown
- Ring with 8 cameras, with angles of 360° horizontal y 90° vertical. Cameras (95°x50°)
- For turbine of any size
- For birds of any wingspan
- Bird detection distance at **400 m, 200 m***

*Maximum detection distance for a bird with a 2,2 m wingspan. Maximum detection distance (absolute and average).

Albatross Model

Offshore Projects
Onshore for Extreme Climates

A10

Recommended for turbine of any size, including medium and small target birds

- Bird monitoring, collision control and shutdown
- Ring with 10 cameras, with angles of 360° horizontal and 83° vertical. 6 cameras (60°x33°) and 4 cameras (95°x50°)
- For turbine of any size
- For birds with wingspan > 60 cm
- Bird detection distance at **700 m, 300 m***

A12

Recommended for turbine of any size, including small target birds

- Bird monitoring, collision control and shutdown
- Ring with 12 cameras, with angles of 360° horizontal and 76° vertical. 4 cameras (95°x50°) and 8 cameras (45°x26°)
- For turbine of any size
- For birds of any wingspan
- Bird detection distance at **800 m, 320 m***

*Maximum detection distance for a bird with a 2,2 m wingspan. Maximum detection distance (absolute and average).

Thermal

Thermal camera rings for night detection



- Bird monitoring, collision control and shutdown
- Number of cameras based on target species and areas to be monitored
- For turbines of any size
- Lens angles from (9.3°x7.1°) to (90°x69°)
- Detection distance based on bird wingspan, lens angle and image quality

02

Acoustic Collision Avoidance Module



02 | Acoustic Collision Avoidance Module

Optional

Nacelle Speakers



Tower Speakers



The system emits warning and discouraging artificial sounds in the presence of birds at potential risk of collision.

Approximately 120 dBA is emitted per speaker. Higher acoustic pressures may harm birds or people, and lower pressures will not produce a deterrent effect.

Reduction of number of collision risk flights and reduction of the fight time in collision risk.

Speaker Rings

Optional

D4

- Ring of 4 speakers on the wind turbine tower < 30m from the lowest tip of the blade
- For turbine with rotor diameter < 60 m

D4 Nacelle

- 4 speakers in the Nacelle of the wind turbine
- Used in combination with D4 or D6

D6

- Ring of 6 speakers on the wind turbine tower at < 20m from the lowest tip of the blade
- For turbine with rotor diameter between 60 - 90 m

D4 + D4 Nacelle

- Ring of 4 speakers on the wind turbine tower < 30m from the lowest height of the blade
- Ring of 4 speakers in the Nacelle
- For turbine with rotor diameter between 90 - 130 m

D6 + D4 Nacelle

- Ring of 6 speakers on the wind turbine tower at < 20m from the lowest height of the blade
- 4 speakers in the Nacelle
- For turbine with rotor diameter > 130 m

We recommend combining the rings [D4+D4Nacelle](#) or [D6+D4Nacelle](#).

Parameters

Detection Parameters	
F4 – A4 – A8 Models	F6 - F8 – A6 – A10 – A12 Models
Maximum detection distance : 400 - 280 m (Golden Eagle - Red Kite)	Maximum detection distance: 800 - 550 m (Golden Eagle - Red Kite)
Neural Network	
Tracking	

Deterrence Parameters	
F4 –A4 – A8 Models	F6 - F8 – A6 – A10 – A12 Models
WTG in motion	
Minimum 3 consecutive detections at distance less than: 200 -150 m (Golden Eagle - Red Kite)	

03



Stop Control Module

The Stop Control module is a software that is installed in all DTBird models.

The customer decides whether to activate the software or not and the level of sensibility of the Stop Control module.

The shutdown procedure is shown in the following table.

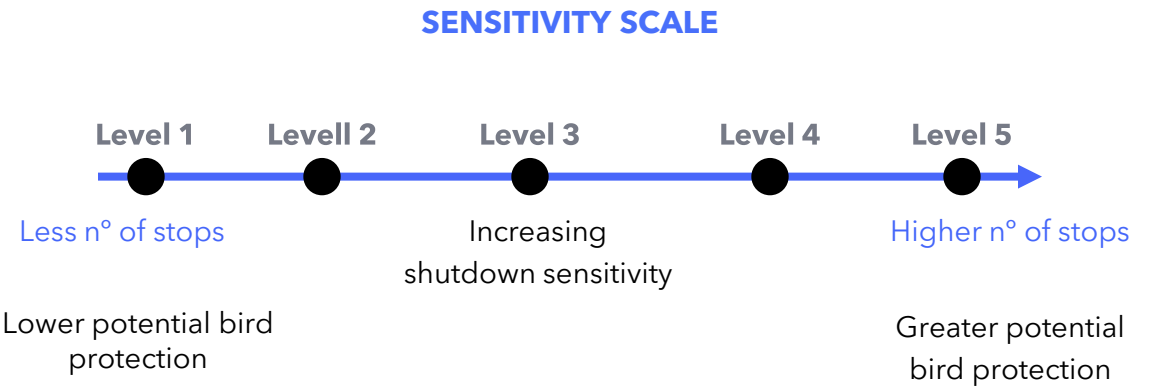
How it works

Detection Parameters	
F4 –A4 – A8 Models	F6 - F8 – A6 – A10 – A12 Models
Maximum detection distance: 400 - 280 m (Golden Eagle - Red Kite)	Maximum detection distance: 800 - 550 m (Golden Eagle - Red Kite)
Neural Network	
Tracking	

Shutdown Procedure for All Models
1) Rotor state check
2) Automatic detection and classification of an object/s (such as a bird/s)
3) Evaluation of the position and trajectory of each detected bird
4) Analysis of changes in the detection size

How it works

Sensitivity Level
1
2
3
4
5



DTBird® Autonomous PTZ

(for monitoring at High Voltage
Lines, Meteorological Towers, etc.)



DTBird® Autonomous PTZ



Daylight camera

(Horizontal lens angle 56° → 2°)

Solar panel with integrated lithium battery

Most frequent maximum detection distance

For Red Kite (1.5m wingspan)
depending on lens angle

55° - 500 m

45° - 545 m

30° - 600 m

15° - 660 m

DTBat[®] System Bats



The DTBat[®] system detects bats with microphones

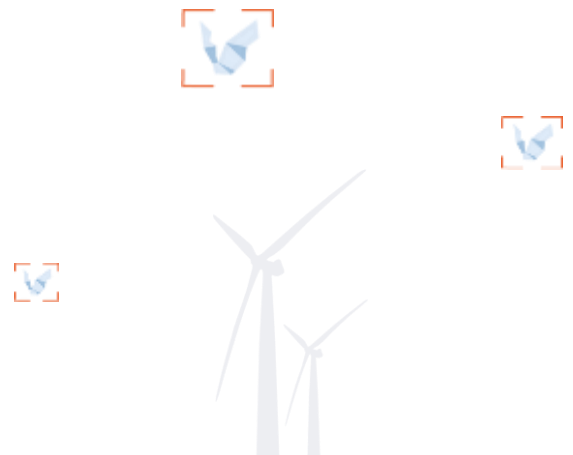
It is used for:

- **Bat monitoring**
- **Mortality mitigation**

Available Modules

01 — **Detection Module**

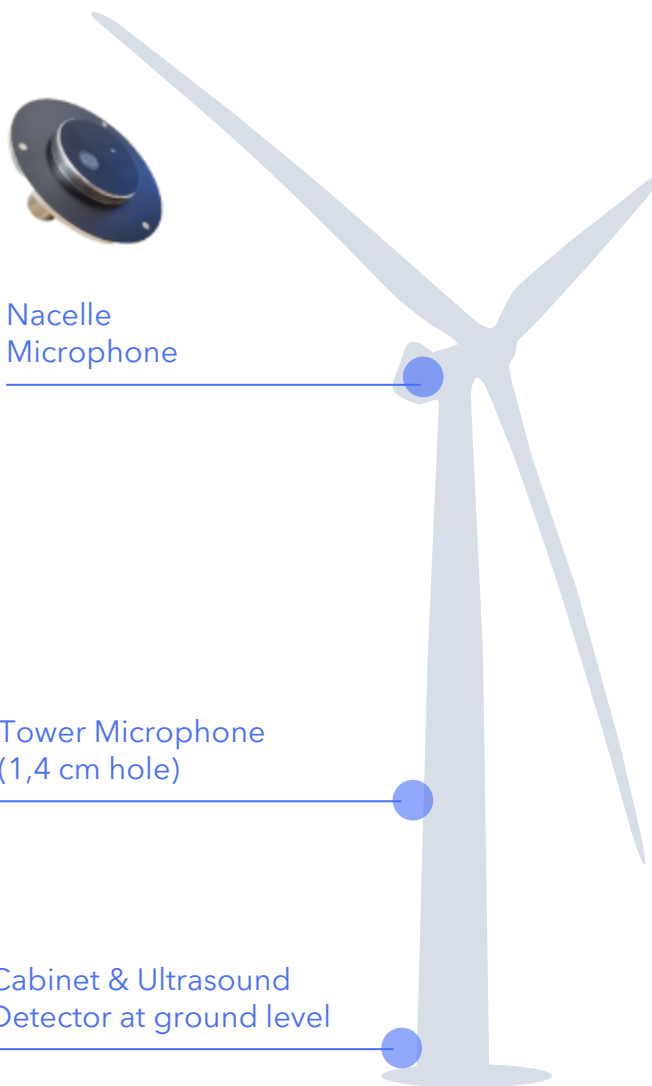
02 — **Stop Control Module**



DTBat[®] System Diagram



Tower Microphone



Tower Microphones



DTBat[®] models are chosen and installed according to:

- Target Species
- WTG Dimensions

DTBatQ2

- Bat monitoring and shutdown
- System with two microphones installed on the tower
- Standard model

DTBatQ3

- Bat monitoring and shutdown
- System with two microphones installed on the tower and one microphone in the Nacelle
- It is recommended for projects that include high-flying resident or migratory species



Scalable and tailor-made projects

Automatic species identification available



dtbird[®] dtbat[®]

AUTOMATIC COLLISION RISK REDUCTION

Your scalable solution for bird and bat protection



Thank you for
your attention

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