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AVES

an automatic bird identification system to reduce mortality risks by collision and down time of the WTG

Conference in Estonia: „Mutual Impacts of Land-Based Wind Farms and Wildlife”
arendud linnutuvastuskaamerate ja peatamissüsteemide vallas; March 17, 2026



AGENDA

- INTRODUCTION
- FUNCTIONALITY & TECHNOLOGIE
- PROOF OF EFFECTIVENESS
- AI-TRAINING
- DISCUSSION



INTRODUCTION



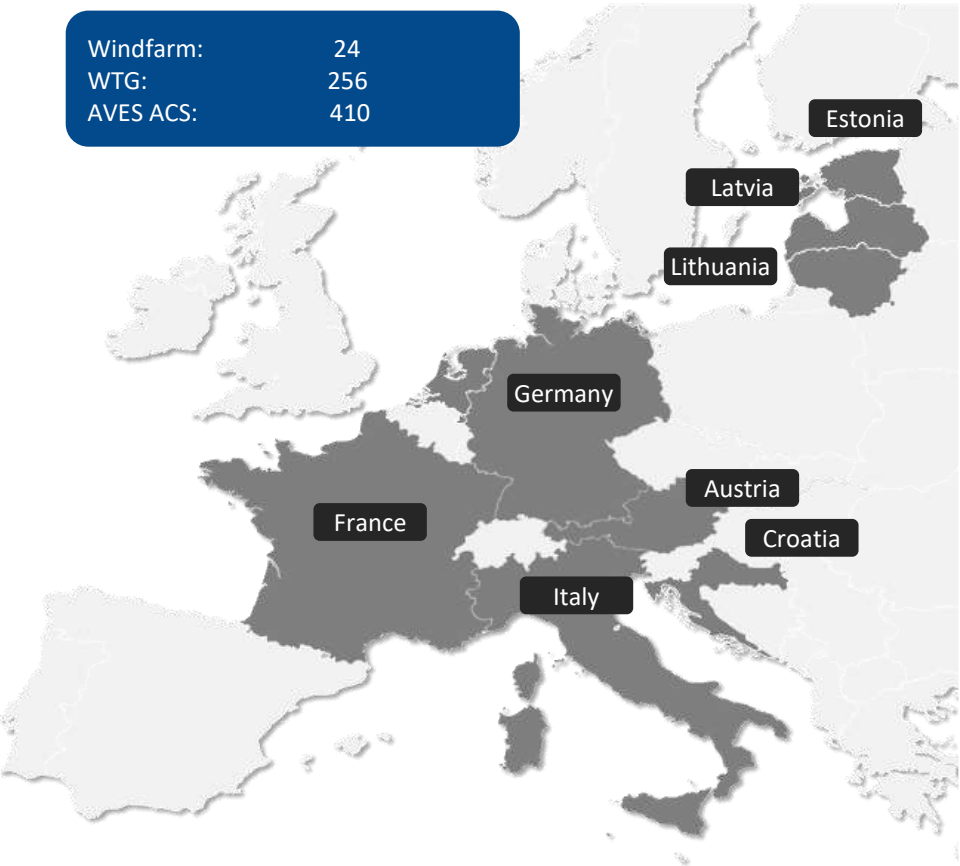


Who is PROTECBIRD?

- German AI Scale-up with ornithological and industrial expertise
- Largest German ecological consultant - BioConsult SH as shareholder
- >400 contracted systems , >200 systems installed in 2025
- Industrial, serial tested hardware partners:
 -  - BTS tracking software)
 -  - PTZ-camera)
 -  - switch cabinet and electronic)
- Capacity to produce > 600 systems per year
- Certified in Germany for 4 bird species (Red Kite, White-tailed Eagle, White Stork and Marsh Harrier)

REFERENCES

Windfarm: 24
 WTG: 256
 AVES ACS: 410



CLIENTS

Germany									
Baltics									
Balkans									
Other EU									
Offshore									

LARGEST WINDFARMS

Project	Country	# systems	# turbines	Commissioning	WTG type
Kelme Ignitis	LT	84	44	Apr 2025	N163
Smiltene Taaleri	LV	33	16	Q1 2027	N163
Senj Projekt Energija	HR	28	21	Feb 2026	SEC-136

WTGs TYPE

Nordex	N117	N163							
Vestas	V90	V100	V112	V136	V150	V162			
Enercon	E82	E115	E138	E160	E175				
GE	GE-158								
other	LTW77	SG132	SG155						



FUNCTUNALITY & TECHNOLOGY

AVES WIND ACS SYSTEM DESIGN

PLUG AND PLAY INSTALLATION

- Cameras mounted externally on the WTG tower using magnets (ca. 10 m)
- Switch cabinets installed inside the WTG tower and substation using magnets

SYSTEM INTERCONNECTION

- All systems are interconnected via fibre optic network
- One master system in the substation
- Curtailment control via PLC-SCADA connection



Technical data	
Dimensions	1.000 x 600 x 400 mm (height, width, depth)
Weight	60 - 80 kg
Temperature	-25 °C to +55 °C
Protection class	IP54
Power supply	230V AC (50Hz) by max. 10 A
Installation site	WTG tower

AVES WIND ACS

FUNCTIONALITY & TECHNOLOGY

- AI-driven bird detection at day and night
- Wing beat frequency measurement for bird pre-selection
- AI-driven species identification
- Real-time zoom, tracking and target handover
- Precise measurement of 3D position, speed, altitude, distance
- Curtailment control
 - SDOD control via SCADA (supervisory control and data acquisition)
- Dashboard and reporting







White-tailed Eagle
Detection 1.000 m





AI-working
Lesser Spotted Eagle



White Stork



AVES WIND® ANTI-COLLISION SYSTEM

Validation in Germany – Proof of effectiveness



RED KITE (Aug 24)

- Detection rate: 97 % (400 – 600 m)
- Identification rate: 98 % (400 – 600 m)



WHITE-TAILED EAGLE (Apr 25)

- Detection rate: 95 % (300 – 1.000 m)
- Identification rate: 94 % (300 – 1.000 m)

WHITE STORK (Dec 2025)

- Detection rate: 92 % (300 – 1.000 m)
- Identification rate: 91 % (300 – 1.000 m)

- Identification rate White/Black Stork: average 96 % (300 – 1.000 m)



AVES WIND® ANTI-COLLISION SYSTEM

Validation in Germany – Proof of effectiveness



MARSH HARRIER (March 26)

- Detection rate: 91 % (400 – 650 m)
- Identification rate: 94 % (400 – 650 m)



All images shown here were taken with the AVES PTZ-camera



North Sea (Helgoland)



North Sea (Beltringharder Koog)



Lithuania



Baltic Sea



France

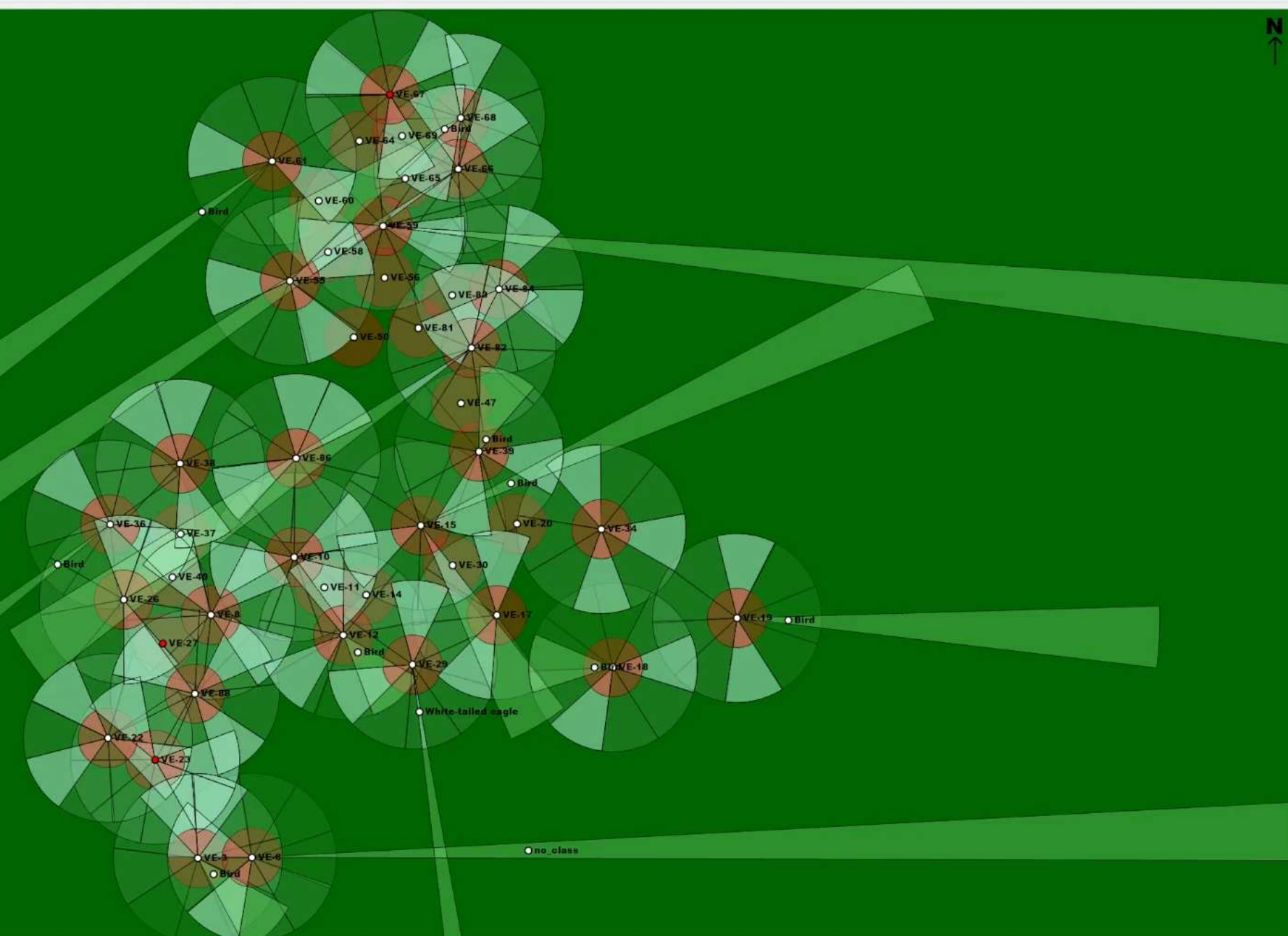


Bulgaria

Geographical map

Geographical range: 43 | 1000

- Show sound radius
- Show assumed range
- Show intersection between
- Show sound radius
- Show intersection between
- Show all WTG's info
- Show no WTG's info
- Show WTG's
- Show WTG's name
- Show WTG's description



SUMMARY

- AI-based species identification ACS
- Database includes the majority of relevant bird species
- Proof of effectiveness in Germany for 4 birds
- Real-time object tracking software from Rheinmetall Defence
- Detection ranges: up to 1,000 m (day) and 400 m (night)
- Real-time dashboard with shutdown events, videos, and statistics
- Bat detection module planned for testing in 2026
- Dynamic curtailment module under development in 2026



THANKS FOR YOUR ATTENTION!

DISCUSSION - FAQ