

Aerial surveillance radar - BirdScan MS1

Fact Sheet

The BirdScan MS1 is a compact electronic radar system based on latest solid state technology for the detection and identification of medium and large size birds.

The system continuously monitors the airspace for avian targets and tracks and classifies objects such as red kites, cranes and buzzards automatically and in real time. The information about the space utilization gained from the measurement can be used to take adequate measures for promotion and protection.

The surveillance angle can be chosen depending on the specific requirements between 90 and 360 degrees by adding additional sensors.

Like all our products, the system development and service offer is carried out in close cooperation with ornithological professionals.

Company: Swiss Birdradar Solution AG
Web: <http://www.swiss-birdradar.com>

Description:

The system recognizes, tracks and identifies objects in the monitored area based on the echo signature, including reflected object surface, wing beat pattern, flight speed and trajectory in the room. It allows the:

- simultaneous detection and tracking of >500 individual objects.
- echo evaluation also from microdoppler.
- continuous evaluation and classification of targets using proprietary algorithms.



Fig. 1: Sensor with processing unit

Comparison to traditional bird radars:

Monitoring systems based on rotating radar can detect echoes in space as well as their size and track depending on the speed of rotation of the radar. The rotating field of view allows the investigation of large areas of space.

In contrast, the BirdScan system uses fixed radar sensors, each of which scans in a defined direction and continuously examines the room for targets. This type of monitoring and evaluation provides accurate 3-D information about a target and allows to extract the unique characteristics necessary for classification. The flexible arrangement with several sensors allows reliable supervision of large areas without blind spots.

Coverage:

The field of view of each radar sensor is a three-dimensional cone with horizontal coverage of 90 and vertical coverage of 40 degrees (Fig. 2). It follows that a 360 degree surveillance can be achieved using a minimum of four sensors.

Using state-of-the-art electronic beam shaping and intelligent algorithms, the system permanently monitors the airspace and records flight movements. The user can select which objects are tracked, classified and recorded.

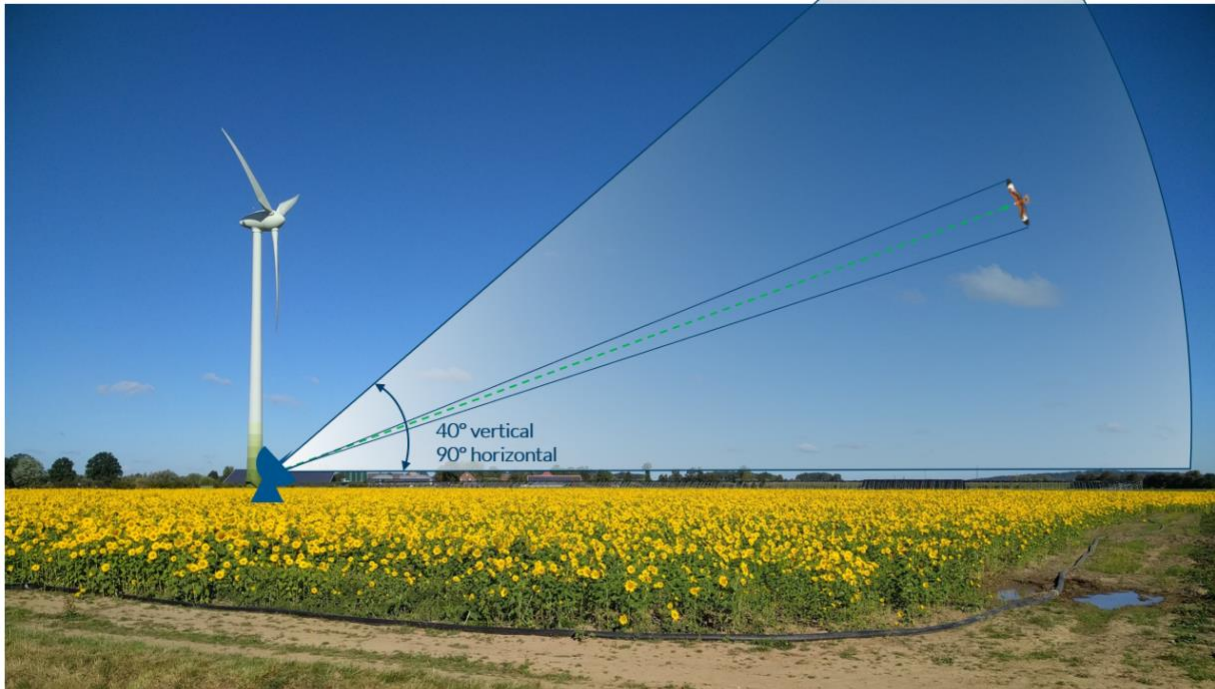


Fig. 2: Detection range of a single radar sensor

Objects and their movement within the detection range are tracked in 3-D. Handover of an echo moving from the field of view of one radar to the field of view of the next radar takes place automatically.













	cs	id	asmr_id	observation	tstart	tend
1		32367	30959	1	2018-11-28 11:03:54,645	2018-11-28 11:04:05,146
2		32366	30957	1	2018-11-28 11:03:54,645	2018-11-28 11:03:59,645
3		32365	30956	1	2018-11-28 11:03:50,645	2018-11-28 11:04:05,146
4		32364	30955	1	2018-11-28 11:03:49,146	2018-11-28 11:04:05,146
5		32363	30954	1	2018-11-28 11:03:48,645	2018-11-28 11:04:05,146
6		32362	30951	1	2018-11-28 11:03:46,645	2018-11-28 11:03:50,146
7		32361	30953	1	2018-11-28 11:03:44,145	2018-11-28 11:03:57,645
8		32360	30952	1	2018-11-28 11:03:43,145	2018-11-28 11:04:05,146
9		32359	30949	1	2018-11-28 11:03:40,145	2018-11-28 11:03:52,146
10		32358	30948	1	2018-11-28 11:03:40,145	2018-11-28 11:04:03,645
11		32357	30946	1	2018-11-28 11:03:39,145	2018-11-28 11:04:05,146
12		32356	30947	1	2018-11-28 11:03:37,146	2018-11-28 11:03:47,645



Fig. 3: Evaluation of echoes in 3D

Radar signature analysis:

Classification of the data into reliable information is done by machine learning algorithm (Fig. 4). Thus the quality increases with correctly recognized echoes. While a base knowledge is included by default, the system can be continuously trained to specific interests to achieve a best possible statement about the local situation. Efficient daytime offline labelling can be achieved with the video kit, optionally available.

All data is also stored and available for offline analyses and reporting.

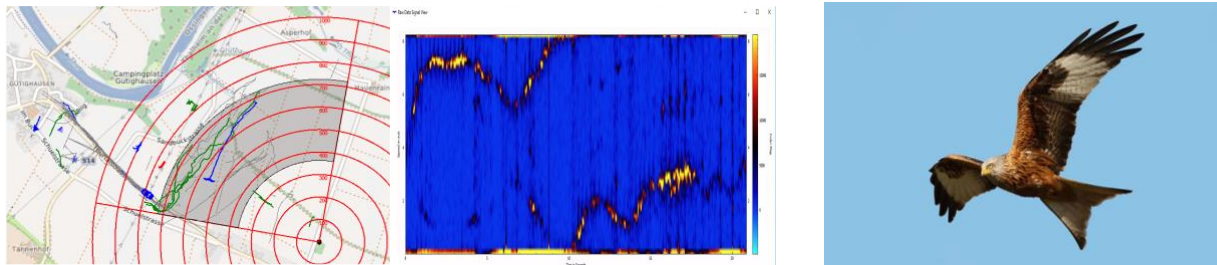


Fig. 4: Track and microdoppler signature of a red kite

Configuration:

A BirdScan MS1 system consists of one or more radar sensors and a central processing unit (Fig. 5). The processing unit evaluates all echoes from all sensors in real time, records them and can transmit information and evaluation data via interfaces. Raw data as well as analyzing results are stored on separate Network Attached Storage.

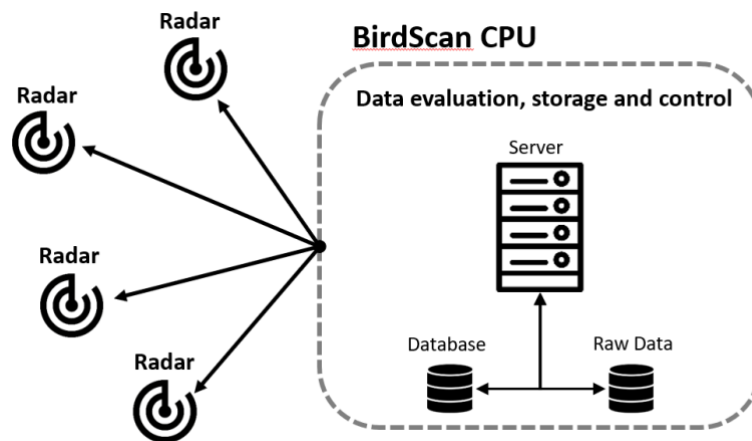


Fig. 5: Central evaluation with radar sensors

Applications:

Space utilization analysis:

The system is designed to accurately measure and record the movement of medium to large size birds, fully automatic, long-term, day and night.

The data collected gives information to researchers and authorities about the actual situation at a specific site and allows the assessment of the effects of planned infrastructure development to birds.

Wind park developers with the requirement of an active collision management can profit by having reliable data about the space utilization of protected species already during the project planning phase.

Active collision risk management:

The collision risk for birds in a wind park can be reduced by stopping of the plants. To monitor and identify birds in real time thus opens the possibility for active collision risk management in wind parks. 3-D tracking information combined with the classification and a flight forecasting module is used to continuously calculate the potential risk of a collision for selected species.

Timely shutdown of the wind turbines can be achieved by direct communication between the BirdScan system and the wind farm controls.

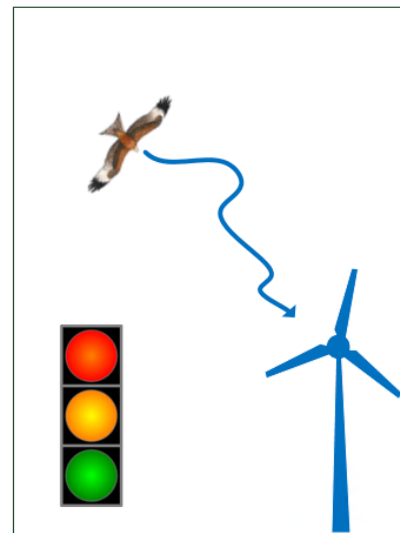


Fig. 6: Active collision management

Product Specification

Radar technology	3D radar with fixed beam
Frequency	X- Band, adjustable
Detection Range	1500m, depending target size
Distance resolution	2 m
Scan sector horizontal	90° per radar
Scan sector vertical	40°
Max. simultaneous targets	>500
Operation	7x24h, detection even in light rain and at night
Power consumption	230VAC, (approx. 1kW depending on configuration)
Raw data (radar, Doppler)	Stored locally, available for later evaluation
Communication	LAN/ WAN/ LTE
Weight	Evaluation unit approx. 50 kg (19" rack), on request suitable for outdoor use (IP55) Radar sensor approx. 7kg
Communication	LAN / WAN / LTE
Environmental conditions	MIL-STD-461F, IP67, MIL-STD-810G, FCC/CE
Offshore Kit (optional)	On demand/ on request