Protecting Railways from Wildlife-Vehicle-Accidents with a Virtual Fence

A Result of the WiConNET Project

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Largest Austrian Rail Infrastructure Owner and Operator

○ 4.862 km Rail-Network

Aims of OBB-INFRA within the project:

- Keep the railway a **low barrier infrastructure** for wildlife (without fences)
- **Avoidance of constructional measures** (wildlife bridges and ecoducts)
- **Reduction of costs** for carcass removal
- **Species protection**
- Implementation of the technical solution into **guidelines**
- Settle **hunters**

The WiConNET Project
Duration 2017 – 2022

- **A 4-years+ Wildlife-Vehicle Collision Avoidance** (WVC-A) **research and deployment project**

- **16 large testsites** across Austria, to evaluate the efficiency of advanced (WVC-A) systems.

The testsites have been carefully selected to reflect most of the typical wildlife and environmental challenges in Austria, and to cover the operator's requirements:

- 5 national road sites

- **5 railway sites**

- 6 highway sites

The efficiency of the WVC-A systems will be validated by **accident statistics**, by **observation of the wildlife behavior**, using video monitoring and **comparison of the results** before and after installation of the WVC mitigation system.

WiConNET Project Partners

Project Issuer

– FFG (Research Promotion Agency)

– Bmvit (Austrian Ministry for Traffic, Innovation and Technology)

Contracting Parties

– OBB INFRA (Austrian rail infrastructure)

– ASFINAG (Austrian highways)

– The 9 Austrian Federal States (National roads)

Contractors

– iPTE Traffic Solutions (Lead Contractor)

– AIT - Austrian Institute of Technology
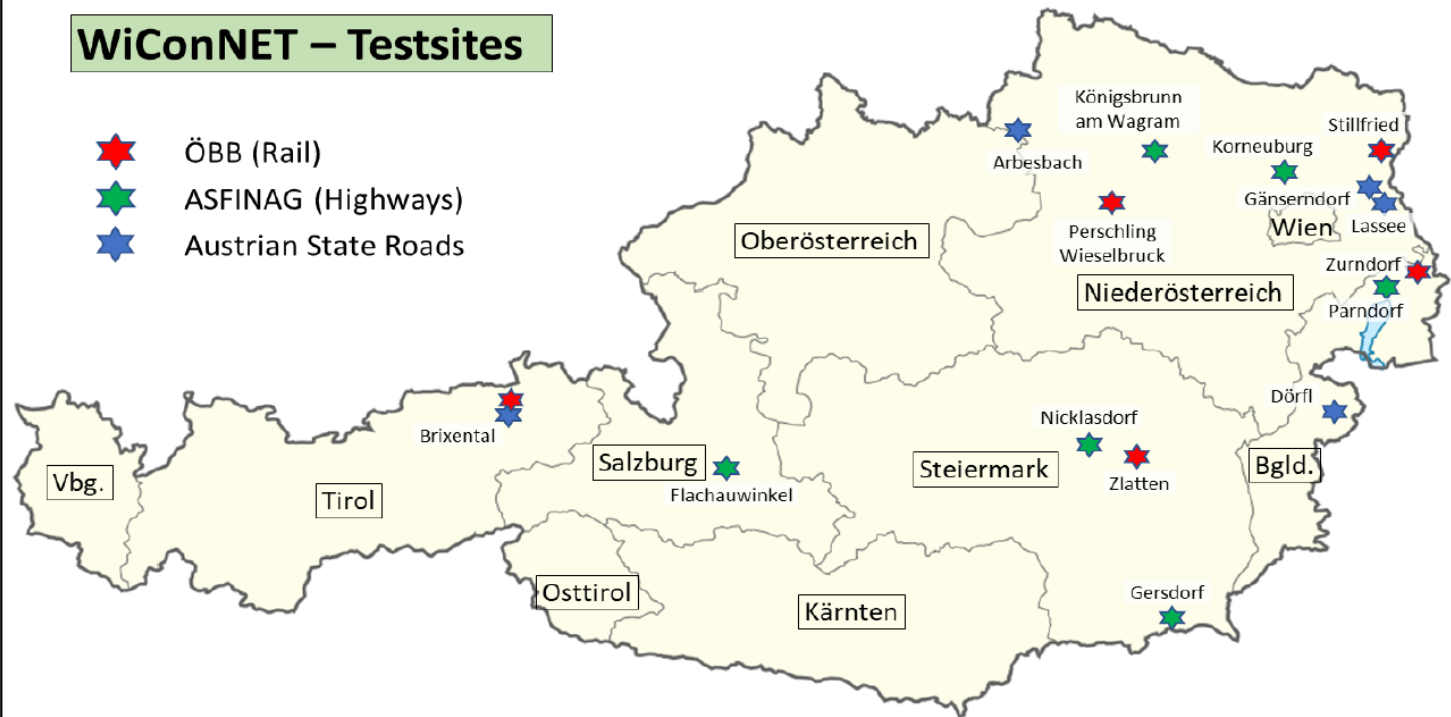
– WWN - Forstner

The WiConNET Rail-Testsites

Nr.	Operator	Section	km/h	Length
1	ÖBB-INFRA	Perschling - Wieselbruck	230-250	0,7 km
2		Stillfried towards Bernhardsthal	120-140	3,2 km
3		Zurndorf – Parndorf	140	3,2 km
4		Zlatten bei Bruck/Mur	100	0,5 km
5		Brixental Bahn	80-100	2,0 km
		Overall length		**9,5 km**

WiConNET Application
Wildlife Safety at Railway Sections

Preventing wildlife collisions with trains and highspeed trains

Wildlife killed by trains is a problem worldwide, associated with high costs in damage repair and compensation payments for delays and cancelled trains. OBB-INFRA and WiConNET are trying to mitigate.

WiConNET Testsite Wieselbruck with train speeds up to **250** km/h.

How does DD461 Rail compare to the DD430 Road?

WiConNET

The **DD461 Virtual Rail-Fence** was developed in a cooperation within the WiConNET by iPTE Traffic Solutions and OBB-INFRA.

It has a much improved wildlife alert system

- 10 times stronger audio alert (93dB vs. 82dB)
- Intense LED flashes (8 vs. 2 LEDs)
- it may be equipped with an audio system that emulates human voices, dog-barking etc.

In addition the DD461

- Is working on 2 sides, so the deployment can be on just one side of the rail-track. This makes the deployment safe and possible without closing the traffic
- has 2 solar panel instead of 1
- may contain 2 LiPo batteries instead of 1
- Is directly fitting on the mounting pole so the full rollout/setup can be done in 5 minutes per device.
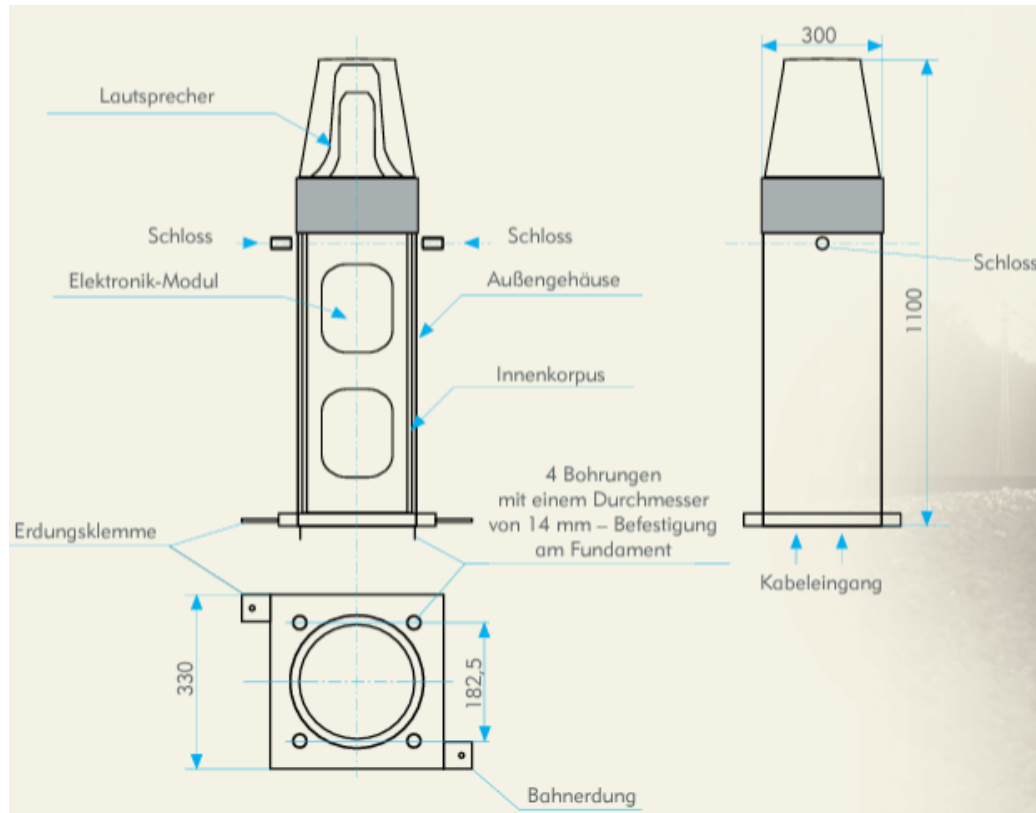
WiConNET
Other Systems on the Market

In Poland a system for rail application was presented in 2007 by NEEL Ltd.
The system is called UOZ-1 and the deployment distance is every 70m.
It was tested and confirmed as working.
But there are several drawback aside of the costs. It is quite heavy (the UOZ-1 weights 27kg and the required socket 180kg) and it needs a 230V powerline.
Therefore, it was not considered within the WiConNET project
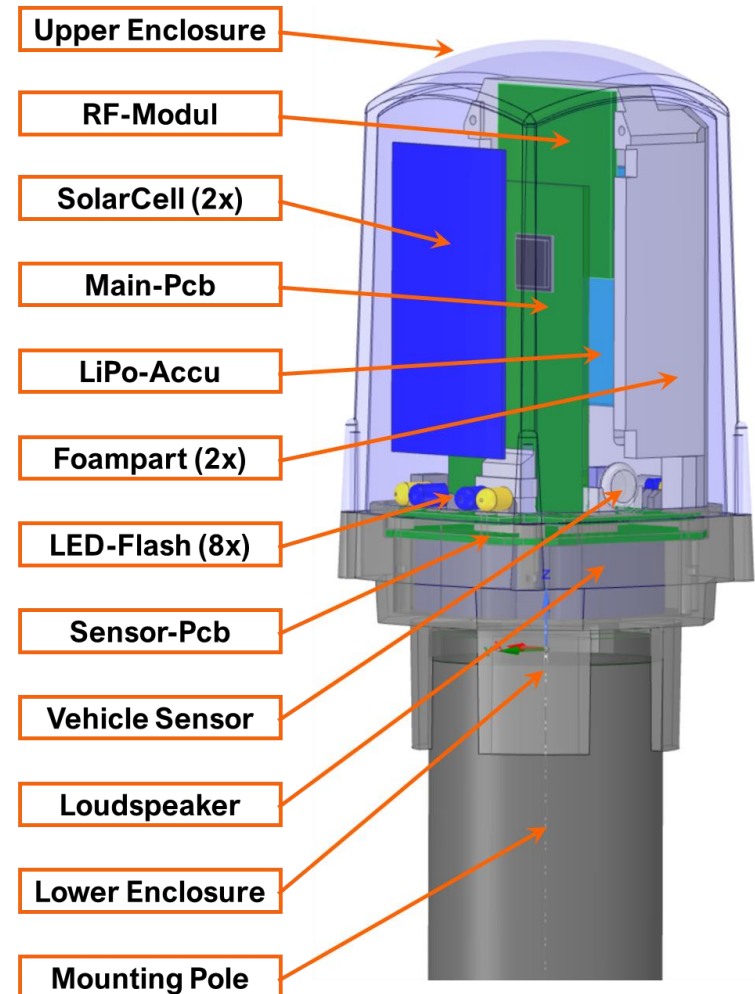
The DD461 Rail - How does it Work?

The DD461 Virtual Rail-Fence is the first sales product out of the *WiConNET* Project.

The system is lightweight (about 5kg including pole and base), cost efficient (12-20k€ per km) and easy to deploy, as it does not need power supply digging.

It is energy autonomous by its solar panels and high performance LiPo buffer batteries.

Up to 40 devices are wirelessly interconnected in groups and its wildlife alerts are activated by optical or thermal or radar remote trigger device.

The DD460/461 may be connected to the Internet by a DD601 Gateway for remote control and service.

Upper Enclosure

RF-Modul

SolarCell (2x)

Main-Pcb

LiPo-Accu

Foampart (2x)

LED-Flash (8x)

Sensor-Pcb

Vehicle Sensor

Loudspeaker

Lower Enclosure

Mounting Pole

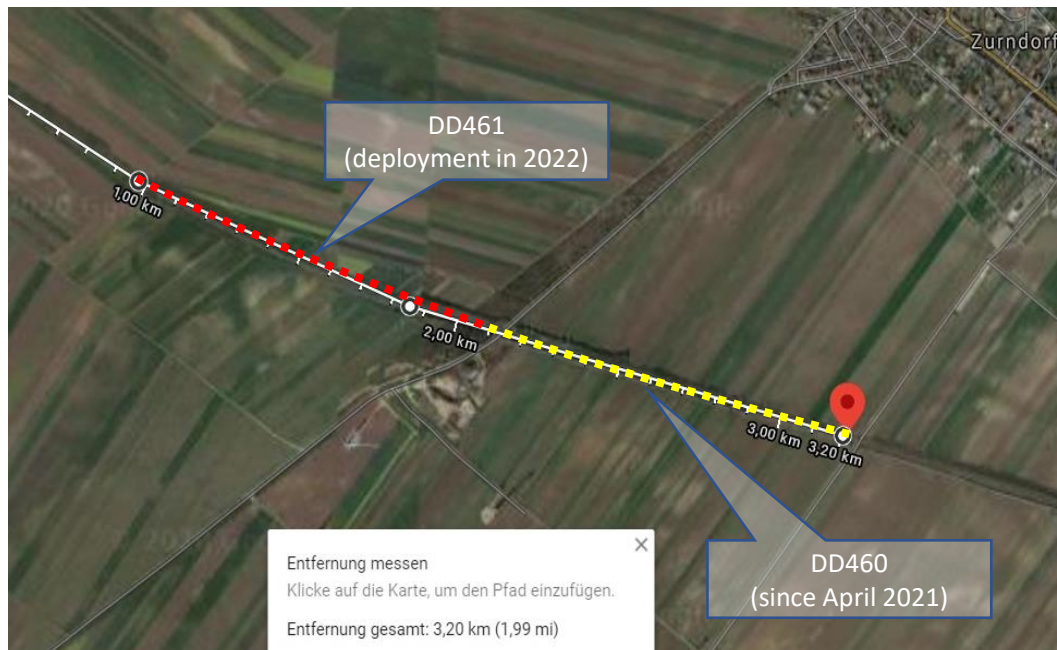WiConNET

Testsite Stillfried - Setup

The Testsite Stillfried is located on the northeast border of Austria, at the March National Park. The rail line runs along the river March with train-speeds up to 140 km/h and it will likely be upgraded to higher train-speed soon.

There are 3 1.2km sections be equipped, each with 40 DD460 Virtual Fence at a spacing of about 30m.

Results @ Parndorf-Zurndorf Testsite

DD461 (deployment in 2022)

DD460 (since April 2021)

Entfernung messen
Klicke auf die Karte, um den Pfad einzufügen.
Entfernung gesamt: 3,20 km (1,99 mi)

Results of the physical inspection of the site in March 2021 just before setting up the DD460:

23 killed animals were found just on the left side of the track on the first 1.2km section (5 roe deer, 9 rabbits, 2-3 foxes, 4 birds of prey and some unknown.

Results of the physical inspection in March 2022 after the DD460 installation:

Still 5 remains of killed animals were found on the same location: 1 roe deer, 3 rabbits, 1 birds of prey.

This is anyway an impressive reduction by 78%

Monitoring the Virtual Fence Sites

The status of each of the connected DD460/461 can be monitored via the internet gateway and the remote service center.

Information like service status (battery charge, solar intensity, temperature, upright position) but also the connectivity, number of activations/alert cycles, firmware release number etc. can be read from the devices.

Active Devices Overview

Net-Adress	Gateway	Site	Voltage	Temperature	Ambient Light	Connectivity
10:00:11:01	20:00:10:06	Zlatten	4133	33	7308	🟢
10:00:11:02	20:00:10:06	Zlatten	4128	34	7317	🟢
10:00:11:03	20:00:10:06	Zlatten	4118	33	7326	🟢
10:00:11:04	20:00:10:06	Zlatten	4139	38	5778	🟢
10:00:11:05	20:00:10:06	Zlatten	4139	37	6786	🟢
10:00:11:06	20:00:10:06	Zlatten	4128	34	6984	🟢
10:00:11:07	20:00:10:06	Zlatten	4118	33	5571	🟢
10:00:11:08	20:00:10:06	Zlatten	4071	32	7029	🟢
10:00:11:09	20:00:10:06	Zlatten	4110	33	4617	🟢
10:00:11:0A	20:00:10:06	Zlatten	4133	32	6327	🟢

Thank you for watching!

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