Customer Success Story: Autotalks | ZooZ

"Collaborating with Taoglas was a great experience. Their team includes RF and wireless engineering experts, coupled with highly knowledgeable sales and customer service teams. Communication remained smooth and consistent throughout the entire process, starting from our initial conversations through to the implementation phase Taoglas dedicated the effort required to gain an in-depth comprehension of our challenges, enabling them to furnish us with top-tier antenna solutions and comprehensive documentation for our ZooZ device."

Chen Tamir, Product Manager, Autotalks

About Autotalks | ZooZ

Road crashes kill more than 1.3 million people yearly - more than two every minute.[1] A large portion of this number is Vulnerable Road Users (VRUs), including pedestrians, motorcycle riders, cyclists, children seven years and under, older adults and users of mobility devices. Although there have been significant advancements in vehicle safety, the increasing number of fatalities among bicycle riders worldwide remains a considerable concern.

75% of all bicycle and scooter accidents are due to drivers failing to notice cyclists. Addressing this issue has led to integrating the bicycle market into the V2X (Vehicle to Everything) safety network. This technology not only alerts nearby vehicles to the presence of cyclists but also proactively notifies riders of potential collisions with vehicles.

Autotalks developed its micro-mobility V2X ZooZ device to address these vehicle safety concerns. The V2X ZooZ device enables bicycles to exchange data with other V2X vehicles and smart devices. To achieve this the V2X ZooZ device uses DSRC and C-V2X direct communication protocols.

ZooZ aims to get drivers and cyclists to notice each other sooner rather than later. It makes nearby vehicles aware of a cyclist's presence, even if there is no line of sight between them, and proactively alerts the rider if a collision with a car seems imminent.

The Challenge

The ZooZ device is small and compact enough to be installed on the handlebar of a bicycle or e-scooter. Measuring 105mm (L) x 60mm (W) x 35mm (D) with a light weight of 190 grams, it's roughly the size of a smartphone. So, the V2X antenna integration space inside the ZooZ device was limited, and the antenna solution had to strike a careful balance of size, performance and weight.

1. https://www.who.int/news/item/25-06-2023-seize-the-moment-to-tackle-road-crash-deaths-and-build-a-safe-and-sustainable-future

Continue Reading >>

Figure 1. Image of Autotalks' ZooZ device mounted on bicycle handlebar

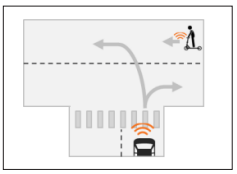


Figure 2. Intersection crossing illustration

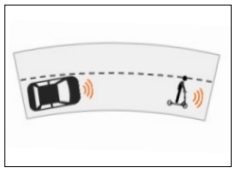


Figure 3. Rural curved road illustration

ZooZ required an on-board V2X antenna to operate within an urban multi-path environment with eBike speeds of up to 45 km/h and any vehicle speed, as illustrated in the graphics on the left.

Therefore, the V2X antenna had to meet a communication range of at least 200 meters and good omnidirectional characteristics to allow for 360˚ coverage around the bicycle or e-scooter. Adding to the complexity, both the V2X and GNSS antennas had to be selected to withstand the demanding rigours of an extreme environment, being robust enough to endure the long periods of vibrations and shocks that come with being mounted on a bicycle or e-scooter.

The Solution

The ZooZ device stands as a complete, self-contained V2X solution. Leveraging Autotalk's advanced second-generation CRATON2 V2X chipset, it encompasses all essential components required to seamlessly integrate into the V2X safety network. This includes a high-precision GNSS receiver for accurate self-positioning and a suite of pre-installed V2X software from Commsignia, ensuring immediate functionality and connectivity.

Autotalks turned to Taoglas as their trusted antenna supplier of choice. Working alongside the Taoglas Engineering team, they chose the SDCP.5900.12.4.A.40, an embedded ceramic C-V2X, DSRC patch antenna for their V2X ZooZ device.

The SDCP.5900 is a high-performance directional antenna designed to operate at 5.9GHz for C-V2X and DSRC radio devices. Due to its small size, at just 4 mm height, with a 12 mm^2 footprint, and weighing just 2 grams, the SDCP.5900 is perfect for placement on crowded device PCBs where space is at a premium. It's also a circularly polarized antenna that enables a more stable system signal strength, typically required on moving vehicles and to reduce atmospheric signal errors. Circular polarization limits any potential drop in signal from orientation change to 3dB compared to a potential reduction of 40dB or more for linear solutions - resulting in a system that will maintain the communication link much more reliably.

In addition, Autotalks chose Taoglas' GPDF357B, a GPS-stacked passive patch antenna supporting both GPS L1/ Galileo E1 and GPS L2 bands. The GPDF357B is manufactured and tested in our TS16949 first-tier automotive-approved facility, making it the safe choice for devices such as UAVs, robotics and autonomous vehicles that require the assurance of high-accuracy positioning, safety and durability. Tuned for a 35*35mm ground plane, the GPDF357B operates at 1575.42MHz and 1227.6MHz, with a 2.8 dBi gain.

Taoglas follows rigorous quality standards and policies and recognizes that safety and durability are essential components of the micro-mobility / automotive sector. That's why, to meet challenging environmental requirements, Taoglas antennas are put through extensive vibration and shock, temperature and humidity tests to conform with the TS16949 standards.

Featured Taoglas Product

SDCP.5900

5.9GHz DSRC Ceramic Patch Antenna

Peak Gain: 4.64dBi

Efficiency: 60%

Dimensions: 12*12*4mm

Datasheet

GPDF357B

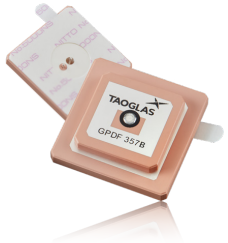
Dual-Pin, Stacked Patch

Dual Feed Design for Low Axial Ratio

Covering GPS L1 | GPS L2 | Galileo E1

Dimensions: 35*35*7.15 mm

Datasheet



The Outcome

"Collaborating with Taoglas was a great experience. Their team includes RF and wireless engineering experts, coupled with highly knowledgeable sales and customer service teams. Communication remained smooth and consistent throughout the entire process, starting from our initial conversations through to the implementation phase Taoglas dedicated the effort required to gain an in-depth comprehension of our challenges, enabling them to furnish us with top-tier antenna solutions and comprehensive documentation for our ZooZ device.

ZooZ, equipped with Taoglas' antennas, has streamlined our field-testing process. The ZooZ field test kit, designed for easy plug-and-play functionality, facilitates rapid testing without the need for intricate integration on the bicycle itself. Mounting the device onto the handlebar allows to quickly and efficiently assess V2X performance in various bicycle use cases. Taoglas' antenna solutions have been instrumental in ensuring the effectiveness of our device"

- Chen Tamir, Product Manager, Autotalks

"Taoglas Engineering Team was happy to work with Autotalks and to advise them on the best solution for their product. We always learn new techniques or new innovative concepts when working with new customer projects during development and Autotalks was no different. Working with Autotalks was a pleasure for our Taoglas team, specially knowing that the technology will create a safer environment for all road users of the future."

- Vincent Hodnett, Antenna Design Engineer, Taoglas.

Furthermore, Taoglas provided a detailed 'Antenna Integration Guide for Autotalks' ZooZ' as a reference for possible bicycle and e-scooter manufacturers planning to use an Autotalks ZooZ device or its embedded system.

ZooZ
By Autotalks

TAOGLAS | Autotalks | ZooZ By Autotalks

www.taoglas.com

www.auto-talks.com