# Vehicle antennas are evolving

yokowo

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I belong to a company called Yokowo Co., Ltd., which recently joined the ITU Association of Japan as a supporting member. Let me take this opportunity to tell you about what we do.

Yokowo is an OEM manufacturer of electrical and electronic components. Over many years, we have built up a range of core technologies that we have used to develop products such as antennas, microwave equipment and micro-precision processing equipment. Our main strengths lie in products such as vehicle antennas, semiconductor testing connectors and probes, spring connectors for electronic equipment, and medical catheter units. Regarding vehicle antennas, we are working on antennas that cover a broad spectrum of frequencies including digital TV, GPS, satellite radio broadcasting and ETC/DSRC. In particular, we produce roof-mounted shark fin antennas (Photo 1) and micro antennas (Photo 2).

■ **Photo1: Shark fin antenna**
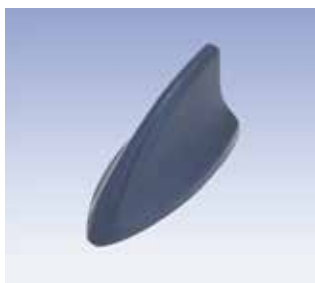
■ **Photo2: Micro antenna**

Our company was founded in 1921 by Chutaro Yokoo, who laid the foundations for worldwide growth by inventing a "spring bar" (Photo 3) using skills he had acquired in the field of precision engineering, especially the stretching and cutting of metal tubes. The structure of this spring bar has been passed down to modern-day spring connectors and semiconductor testing contact probes. Our interest in vehicle antennas dates back to 1957, when we started making car radio antennas using the same metal tube processing techniques that we had been using in rod antennas for audio and visual appliances. In 1996, we developed a micro antenna (pole type) that incorporates electronic circuitry to achieve a much shorter length than an ordinary antenna, and we transitioned from vehicle antennas based on mechanical components to anten-

■ **Photo3: Spring bar**

nas based on electrical components. Since then, by designing antennas based on techniques such as electromagnetic field simulations (Photo 4) and establishing mechanisms for avoiding interference between radio wave media, we developed and entered into the market for multi-frequency integrated antennas and shark fin antennas, which we are still involved with to this day.

■ **Photo4: Designing antennas based on electromagnetic field simulation**
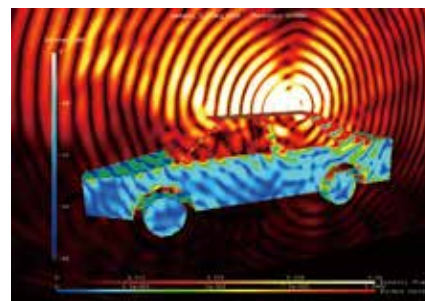
Today, vehicle antennas are about to change dramatically in order to keep up with new trends such as driverless cars, IoT, and connected cars. Cars will soon be able to drive while gathering traffic information from their surroundings by sensing, and using communication to exchange information by themselves. Vehicle antennas are no longer just passive receiving devices, but are evolving at an accelerating rate into adaptive active components while harmonizing with developments in radio communication, such as performing control adapted to the surrounding electromagnetic environment by working in conjunction with radio sensors, radars and communication equipment.

Practical applications of new media such as V2X[*1] and 4G/5G[*2] are also starting to find their way into automobiles. Yokowo is more involved than ever with these media standards and specifications, and is developing and providing antennas that meet all the required specifications by cooperating with car manufacturers, electronic equipment manufacturers and communication equipment manufacturers while creating optimal designs that take account of trends in the mounting positions and performance of communication equipment, and communication standards.

We recently joined the ITU Association of Japan, and, through exchanging information with other members, we will contribute to the standardization and spread of radio usage and communication standards from the viewpoint of an antenna manufacturer. I look forward to working with you in the future.

[*1] V2X: Vehicle to X (X=vehicle, infrastructure, pedestrian, etc.)
[*2] 4G/5G: 4th/5th-generation communication systems