

Summary of SIP-ADUS project (FY2015)

Name of the project	Development of Infrastructure Radar System Technology
Responsible Organization	Panasonic System Networks, Co., Ltd.

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Object of the Project

The goal of the R&D initiative is to develop a practical 79GHz band high resolution radar system deployed as roadside sensors that are capable of detecting pedestrians, cyclists, and other smaller objects in or near roadways. This involves the development of *infrastructure radar technology* providing reliable detection, and robustness against interference and environment; and development of a cooperative safety drive support system that mainly contributes to automated and connected vehicles driving in the future.

Project Summary

The *infrastructure radar technology* requires a number of key capabilities: "radar detection reliability enhancement" to improve the reliability of the radar for detecting pedestrians, "radar mutual interference attenuation" permitting multiple radar systems (such as vehicle-mounted radar and infrastructure radar) to coexist and properly work in the same intersection, and "environmental performance compensation" enabling the infrastructure radar to function properly even under adverse environmental conditions. The *cooperative safety support system* features a "connection between infrastructure and vehicle" that feeds data gathered by the infrastructure radar to vehicles in the vicinity. These initiatives are critically important for clarifying the extent that the system will function under actual conditions; mainly, worsening detection performance and longer data processing time due to adverse weather.

R&D progress to date:

- Verification on pedestrian discrimination function of infrastructure-based 79GHz code pulse radar in an emulated street scene environment
- Simulation analysis of millimeter wave band propagation and study on detection methods for interference occurrence due to vehicle surface reflection and other paths
- Performance evaluation on 79GHz band radar target detection in bad weather conditions such as in heavy rain or snow
- Introduction of a compact and wide Field-Of-View 79GHz band radar unit and beginning of prior verification toward public road field trial

Future plan

An experimental 79GHz-band coded pulse radar prototype had been developed that proved effective for collecting data regarding pedestrian discrimination, occlusion modeling, etc. in an emulated street scene environment. While continuing efforts to devise vehicle type discrimination algorithm and multiple-radar integration scheme, we are also working on more propagation data measurement and background clutter attenuation technique that will work reliably even in heavy rain and snow conditions. We are also committed to the idea of field trials on public roads, since testing new technology under actual conditions is the best way to demonstrate practicality.