

Radar networks, innovation against occupational hazard

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Radar camion interior

Researchers at UPM have developed an alarm system for construction vehicles with a low-cost radar network that can prevent collisions and improve safety in work environments.

The Radar and Microwave Group (GMR) at the Universidad Politécnic

de Madrid (UPM) has developed an innovative system based on the usage of multiple radars that is installed in the vehicles creating a sensor network. This system will provide workers with a general view at the blind spots facilitating making decisions and preventing collisions.

The usage of large vehicles such as dump trucks is one of the main causes of accidents in [construction sites](#), some of them with fatal consequences. This [vehicle](#) has numerous [blind spots](#) due to its size and design making difficult the driving and increasing the zone of [collision](#) risk.

Nowadays, there are diverse safety systems for these types of vehicles such as cameras or sirens. However, these systems do not have many advantages due to adverse conditions in construction sites. The suspended particles obstruct the camera lens and loud noises disturb the sirens. To summarize, an innovative solution was needed to solve this safety issue.

Radars are high reliability sensors hardly affected by the suspended particles, rain or fog. These radars do not need light to work and can be used in any work environment at any time. This way, GMR has developed a system based on a low-cost radar networks installed in the vehicle that detects obstacles around the vehicle and can be seen through a screen. Besides, the latest advances in electronics and processing speed allow researchers to miniaturize and to develop the proposed system.

The biggest challenge was to develop a high performance and reliability system in order to prevent collisions and to reduce the false alarms rate. A worker can be suspicious of a system that generates several false alarms during a work day and this could have severe consequences if a real detection is ignored. The false alarms rate can be drastically reduced thanks to the usage of multiple sensors placed around the car and a chain processing and data fusion.

The field tests conducted with the first prototype have proved the viability of the developed solution. Thanks to its easy installation and reduced cost, this new solutions can be extensively deployed in large vehicles used in construction improving the work area safety. Besides, these types of vehicles need certain time to start and stop the motor due to their size and weight. In this regard, the usage of this system can optimize the constructive processes reducing the duration and construction cost.

This technology opens the door to a new safety work environment providing the drivers of these vehicles with a better view.

More information: González Partida, JT; León Infante, F; Blázquez García, R; Burgos García, M. "On the Use of Low-Cost Radar Networks for Collision Warning Systems Aboard Dumpers". *Sensors* 14 (3): 3921-3938. [DOI: 10.3390/s140303921](https://doi.org/10.3390/s140303921). March 2014

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