White Paper

Stopped Vehicle Detection (SVD) Comparison with Automotive Radar

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Vehicle-fitted automotive radar does not prevent collisions in many situations because it intentionally ignores stopped vehicles. Roadside stopped vehicle detection (SVD) radars such as SVR-500 actively detect all stopped vehicles to prevent minor breakdowns turning into major incidents.

Some modern cars are fitted with forward-looking radar sensors for two reasons:

1. **Adaptive cruise control: At high speeds it measures the distance to the car in front on a motorway to maintain the appropriate stopping distance.**

2. **Automatic emergency breaking: At very low speeds the radar can help to avoid "rear-end" shunting accidents. A typical example is moving off from a stopped position at a roundabout and colliding with the car in front if it unexpectedly stops. At higher speeds the crash may not be avoided but the consequences can be reduced.[1]**

Automotive radar is clearly able to prevent some types of collision and is a useful driving aid, but it is not suitable for all situations. It cannot be used for effective SVD on motorways and highways, as it will not avoid collisions. A well-known example of this is when a car with sophisticated sensors drove straight into a fire engine on a California highway [2]. The forward-looking radar was perfectly able to detect the large object but it simply ignored the fire engine because it was parked.

The root cause is because automotive radar is always on the move it is unable to have prior knowledge of the fixed objects within the field of view. To account for road curvature, automotive radar has a reasonably wide field of view. This means it readily detects roadside features adjacent to the road, many of which do not move. It must ignore these stationary objects otherwise it would have numerous false detections and would try to brake every time it detected the undulations in the road surface, potholes, manhole covers, signs, lampposts, overhead gantries or crash barriers, effectively making the system unusable and unsafe.

Vehicle manufacturers are open about the issue with automotive adaptive cruise control radar, for example Volvo's manual states: "Pilot Assist will ignore the stationary vehicle and instead accelerate to the stored speed". Tesla state: "Traffic-Aware Cruise Control cannot detect all objects and may not brake/decelerate for stationary vehicles, especially in situations when you are driving over 50 mph (80 km/h) and a vehicle you are following moves out of your driving path and a stationary vehicle or object is in front of you instead." [3]

Automotive radars are usually mounted low down on the front of the vehicle to maintain the view of the car in front without obscuring the driver's view. This mounting position is acceptable for cruise control purposes but unsuitable for wide area situational awareness. Distant objects will be obscured easily by surrounding vehicles compared to a radar that is mounted high up that has unobstructed view over the top of large trucks and lorries.

T: +44 (0) 1727 853 521
E: enquiries@ogierelectronics.com
W: www.ogierelectronics.com

Unit 13 Sandridge Park,
Porters Wood, St Albans,
Herts, AL1 6PH, UK

The Ogier Electronics SVR-500 SVD radar system is mounted high at the side of the road in a fixed position. It monitors all traffic lanes, slip roads, hard shoulders and refuge areas to detect if a vehicle has stopped in a way that could cause a collision. Existing stationary objects such as lampposts, signs and crash barriers are mapped by the radar when first configured so it can easily distinguish stopped vehicles from the environment. The system automatically adapts as changes occur over time.

Unlike automotive radar, SVR-500 is mounted high to give an excellent view over obstructions to eliminate blind spots, allowing full coverage of up to 500m for a single radar sensor over the entire 360 degrees. Unlike equipment fitted to vehicles, SVR-500 is fixed firm so does not experience frequent shocks and vibration. Furthermore, SVR-500 is used for the benefit of all road users, so drivers of older and classic cars are also forewarned of danger, which may be more important due to the less effective brakes compared to modern vehicles and absence of modern safety features.

SVR-500 may be linked directly to traffic management systems and electronic signage so all road users are pre-warned of the location and nature of the upcoming hazard. SVR-500 can automatically slew nearby cameras to zoom in on the incident so operators can make rapid assessments about the best course of action to take.

Conclusion

Ogier Electronics SVR-500 Stopped Vehicle Detection (SVD) radar is ideally suited to detect stationary and stopped vehicles to improve road safety for all vehicles and drivers. Vehicle-fitted automotive radars do not compete with roadside SVD radar as the vehicle radar actively rejects stopped vehicles, the total opposite of how SVD has to work.

References

[1] COLLISION WARNING WITH AUTO BRAKE - A REAL-LIFE SAFETY PERSPECTIVE, p3.
https://www-esv.nhtsa.dot.gov/Proceedings/20/07-0450-O.pdf

[2] Tesla and GM self-drive cars involved in road collisions
https://www.bbc.co.uk/news/technology-42801772

[3] Why Tesla's Autopilot Can't See a Stopped Firetruck
https://www.wired.com/story/tesla-autopilot-why-crash-radar/