SMART CARS | SMART CITIES

Connected Autonomous Vehicles

To realize the true potential of the upcoming Connected Autonomous Vehicle revolution, CAV's will need to communicate both with other vehicles and with smart city infrastructure.

Cohda's next generation of CAV application layer software is giving car manufacturers key solutions to push CAV projects forward such as; Improving driving environment monitoring through V2X radar, optimising traffic efficiency through cooperative cruise control, improving driving tasks through accurate positioning and developing better performance data collection.

Deploying tomorrow's CAV projects today.

COLLABORATION AND COOPERATION ON OUR ROADS

Connected Autonomous Vehicles

Connectivity is the key to safer, smarter and greener transportation infrastructure and Cohda is leading the way

CAV App Description

- Cohda's mature suite of CAV-specific applications have solved critical CAV issues including localization, sensor fidelity and system cost

- The next generation of CAV application layer software provides car manufacturers with advanced cooperative perception solutions:
  - Green Light Optimized Speed Advise (GLOSA)
  - Platooning
  - Collision Avoidance

- Cohda's applications include multiple world firsts for the CAV sector, such as vehicle localization that achieves sub-meter accuracy working on existing Wi-Fi, DSRC or C-V2X infrastructure and a passive radar system that uses Wi-Fi, DSRC or C-V2X signals to sense the environment
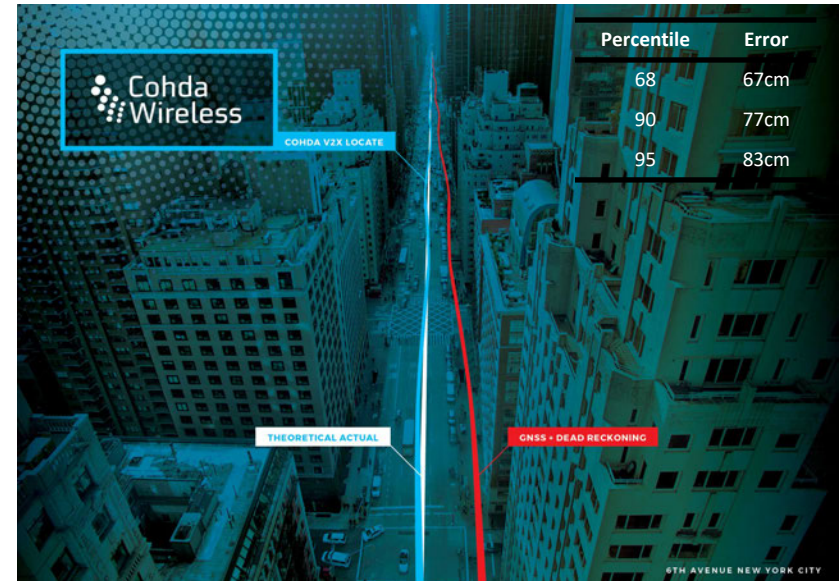
Connected Autonomous Vehicles

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V2X-Locate

- V2X-Locate is unique to Cohda. It allows the vehicles to position itself with sub-metre accuracy relative to RSU's, even in tunnels, underground car parks and urban canyons where GNSS along is not sufficient. V2X deployment , vehicles equipped with OBU's, while infrastructure is supported by installation of RSU's.
- V2X-Locate uses ranging measurements to these fixed RSUs to enable enhances positioning accuracy.
- The ranges from spatially separated RSUs are fed into Cohda enhanced V2X Locate positioning engine to accurately position the vehicle. Through the advanced processing capabilities of Cohda's software designed radio the V2X Locate solution is able to calculate a true line-of-sight path regardless of the existence of multipath signals.
- Cohda's V2X Locate positioning system with sub-meter accuracy, over 275% more accurate than comparable GNSS solution.
- Performance exceeds SAE J2945 requirements (68% < 1.5m)

V2X-Locate NYC 6th Ave Test Bed

| Percentile	Error
68	67cm
90	77cm
95	83cm

Connected Autonomous Vehicles

Cohda's V2X-Radar is a game-changing product that will deliver value for drivers of V2X-equipped vehicles, particularly in the early days when the penetration rate of V2X connected vehicles is low

V2X-Radar

- V2X-Radar uses standard V2X radio signals to sense the surrounding environment, transforming a standard V2X communications system into a 360 degree car radar

- V2X-Radar takes advantage of current V2X systems to detect radio signals as they bounce off objects (walls, road signs and other vehicles) while travelling from transmitter to receiver

- By knowing the position of the transmitter, the receiver and the environment, V2X-Radar can use the radio waves to identify objects within that environment, including non-V2X equipped vehicles

- Cohda's V2X-Radar delivers a new 360 degree sensor that can detect buildings, road signs and older vehicles while being unaffected by rain, snow or fog

- V2X-Radar is a passive radar system that can use DSRC, Wi-Fi, C-V2X, or LTE signals as illuminators
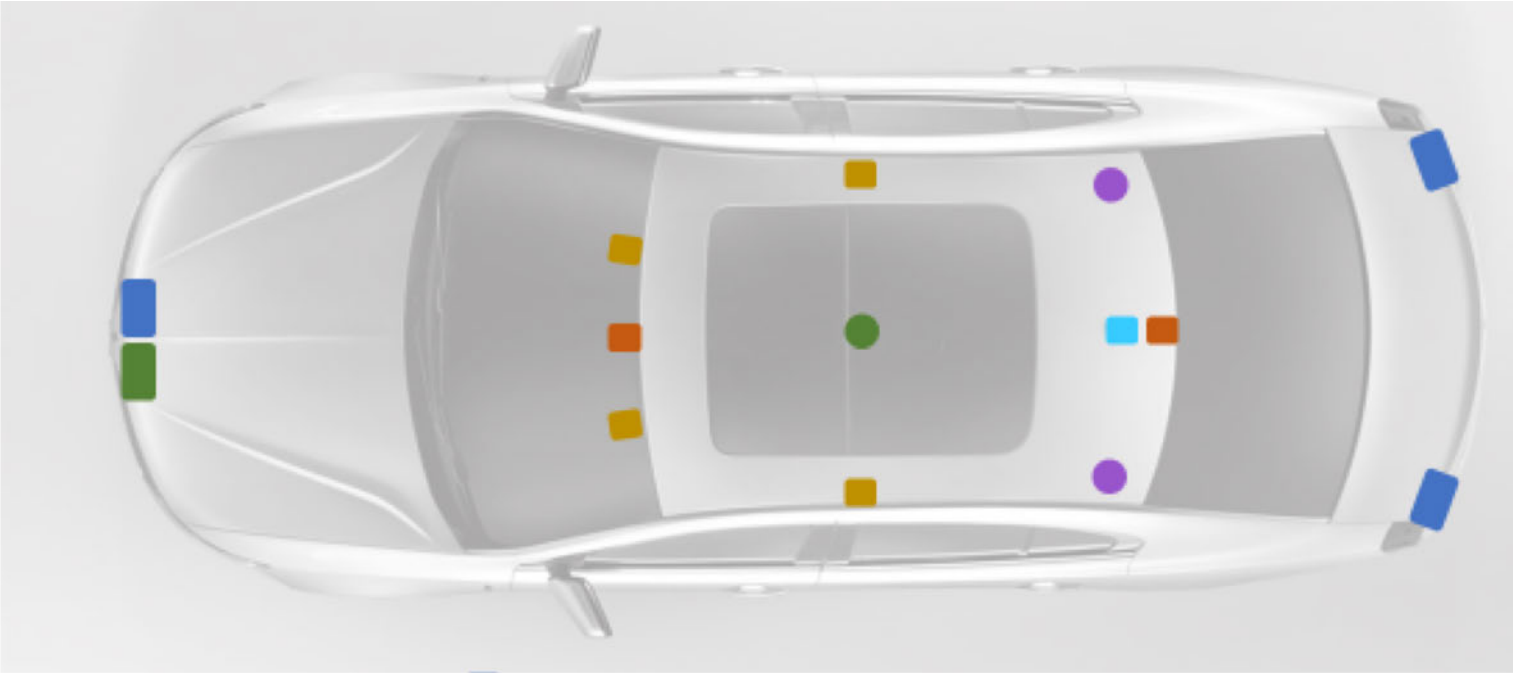
V2X-Radar example
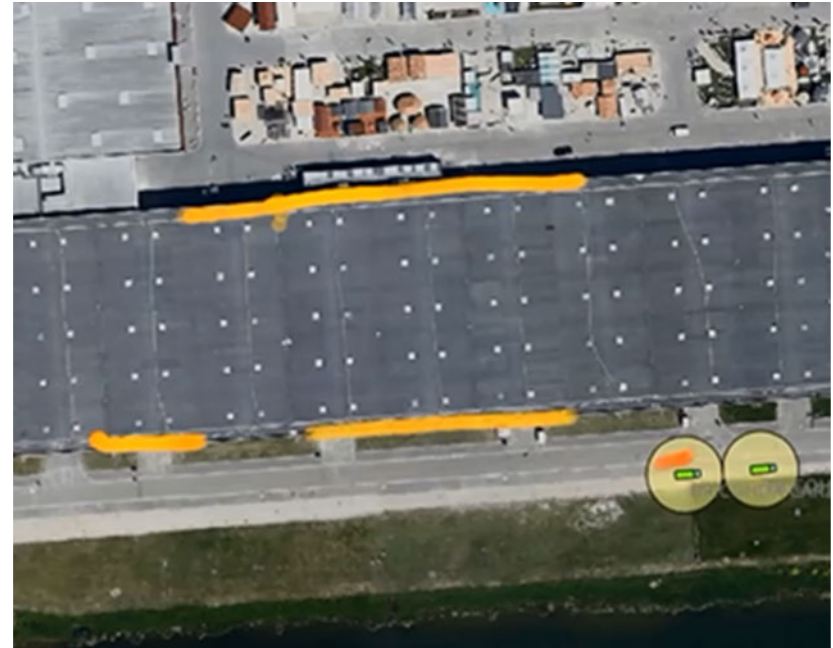
Connected Autonomous Vehicles
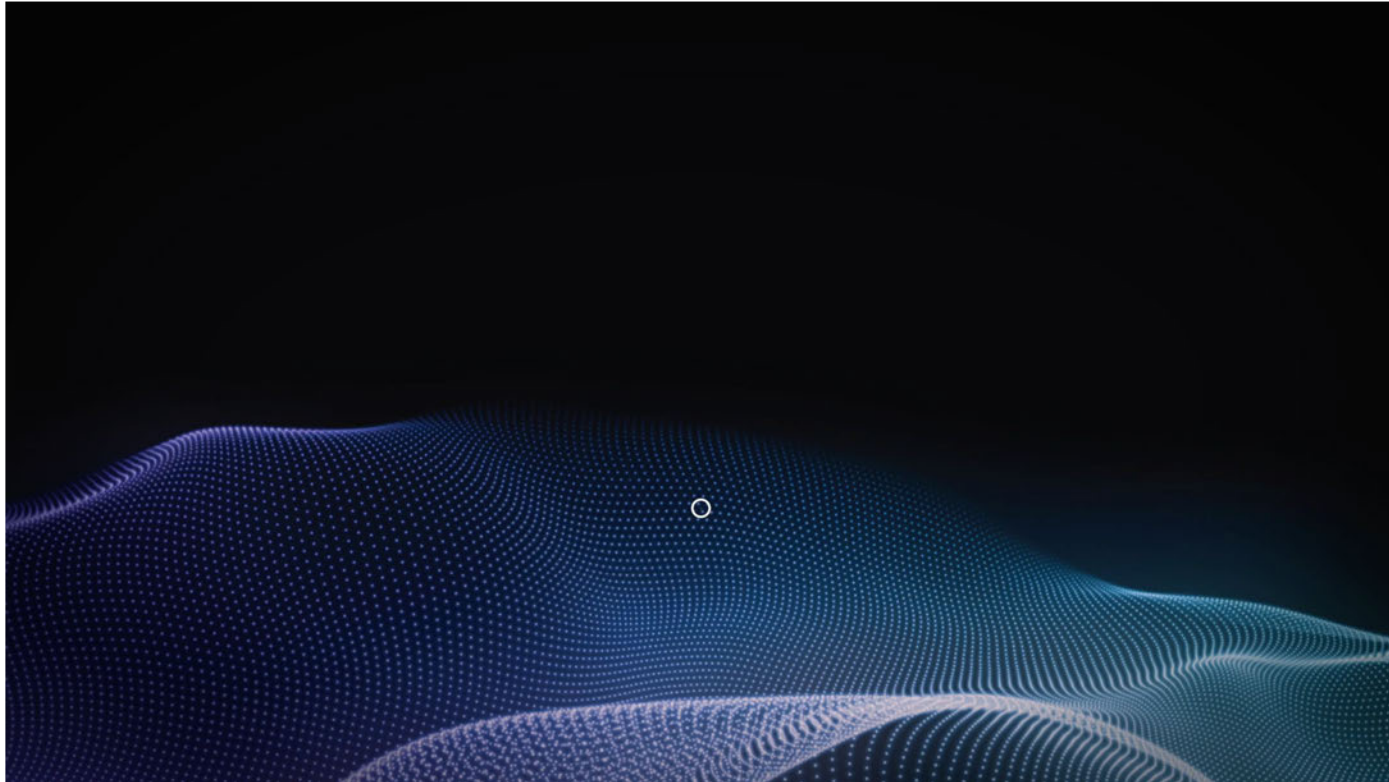
Connected Autonomous Vehicles

Wide Camera | Narrow Camera | Directional RADAR | Directional LIDAR | 360° LIDAR | V2X | GNSS
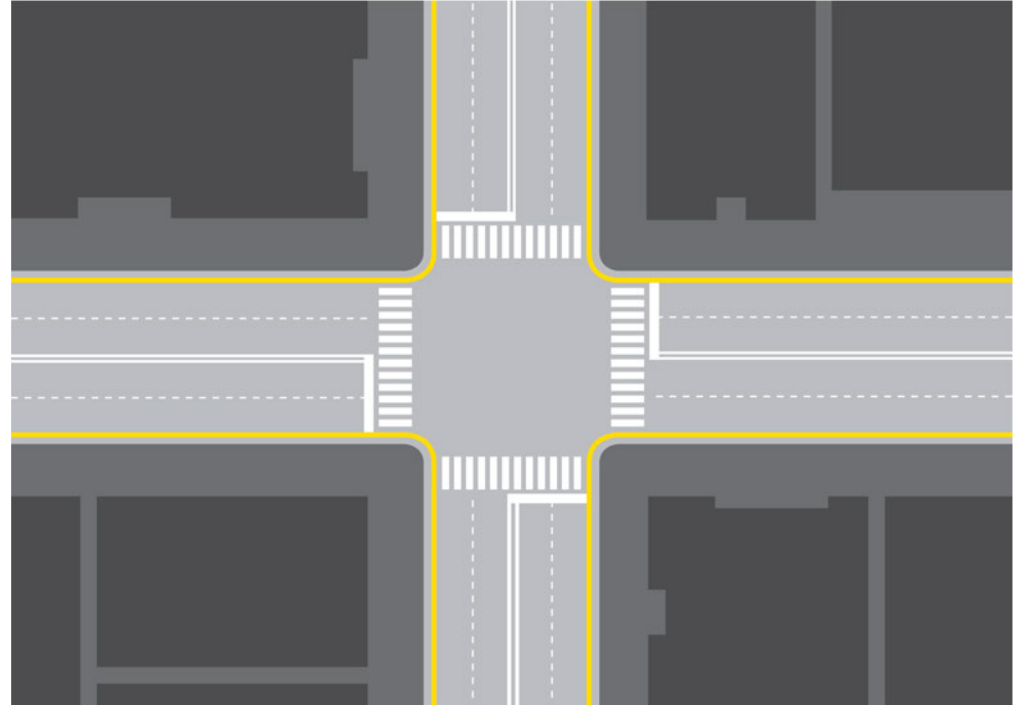
Connected Autonomous Vehicles

- AV suite of sensors perceive it's environment as aligned with its line of sight

- Vehicles and buildings in sight create occlusions impeding line of sight

- Because of these occlusions other vehicles travelling on the road are then made invisible

⇨ +V2X

- V2X fuses sensor data between nearby vehicles extending the perception horizon beyond line of sight

- V2X enables cooperative perception

Smart Cars I Smart City

- October 2018: Demonstrating collision avoidance and positioning enhancements for <u>Connected</u> Autonomous Vehicles in Adelaide CBD.

- Collision avoidance and improved CAV positioning will be enabled through the use of V2X.

- V2X-Locate enable positioning will allow the demonstration to occur in a urban canyon where GNSS fails.

- The CAV will respond to a threat caused by a second V2X enabled vehicle by slowing to a stop autonomously. Once threat is no longer present the CAV will start to accelerate and continue journey.