



# Autonomous Vehicles in Private Communities

## NXGVenues adds another layer of safety with CommScope's RUCKUS® CBRS APs

### The right place and time for autonomous vehicles

Fully autonomous vehicles (AVs)—cars or trucks without a driver—are not a common sight on the roads. Yet.

But automobile manufacturers all over the world have been investing in AV programs for years. As consumers, we're already seeing the fruits of these projects with autonomous features. Drivers are still, well, in the driver's seat, but they may be assisted by backup cameras, proximity alerts, automatic braking, adaptive cruise control, and even self-parking.

The momentum for AV investments is accelerating. Why? Because it's time to cut the carbon footprint of cars and trucks, and because the shift to work-from-home has seen a decline in commuting traffic and a big uptick in contactless home deliveries. By some estimates, AVs could well be a multitrillion-dollar market worldwide within the next 10 years.

Typically, AVs are designed to operate in predictable, controlled environments, which is why one of the first areas we'll likely see AVs in commercial use is in private or gated communities.

With contained boundaries and lighter road traffic, these communities are a great use case for:

- 1. Transportation:** Ride sharing and shuttle services within the community, which can be set up in different models, such as:
  - a. Residents ordering a ride sharing AV to come and pick them up
  - b. An AV shuttle running continuously around the community, stopping at pre-determined locations so residents can get on and off
- 2. Logistics:** Contactless delivery services, from packages to groceries

NXGVenues has partnered with RUCKUS® to use LTE CBRS APs to achieve a new level of safety for AVs. The solution is based on continuous collection and transmission of video and telemetry data as the AVs travel through the community.

## A private LTE network protects traffic in the air and on the ground

Private LTE is the ideal technology for using AVs in private communities. It costs less than cellular with longer range and mobility than Wi-Fi. Private LTE networks reduce deployment time and costs, making it faster and easier to bring new smart transportation offerings to market.

Another important advantage is that a private LTE network in a gated community doesn't draw on—or conflict with—other wireless transmissions in the neighborhood. Embedded security in the RUCKUS CBRS APs also prevents anyone from intercepting or disrupting traffic between the AV and the RUCKUS AP.

### Highlights of the NXGVenues/RUCKUS CBRS solution for AVs

- Extensive coverage tracks AVs throughout the community
- Continuous monitoring of AVs provides "second set of eyes" for safety
- Extremely low-latency performance for near-real-time response to incidents
- Seamless, uninterrupted handoff from one AP to the next for continuous monitoring
- Built-in security and QoS
- Low-profile, lightweight APs for easy, unobtrusive placement within the community

## On the road with CommScope's RUCKUS CBRS solutions

Safety is perhaps the most important priority with AVs. Confidence in autonomous vehicles depends on meeting the public's safety and security expectations and various agencies' (evolving) regulations.

The closer that vehicles get to fully autonomous, the more vital it is that the vehicle can "see" and react to anything. That includes people, objects, weather conditions, road conditions, posted speed limits, time of day...basically any situation a good (human) driver is expected to handle.

But this raises one of the toughest safety problems for car manufacturers: ensuring an AV's ability to sense, distinguish and appropriately maneuver around objects. Part of what confounds developers is how an AV's sensors can be affected by sun, rain, fog, shadows, glare and other changing conditions.

The NXGVenues partnership with RUCKUS creates a continuous, reliable connection between RUCKUS CBRS APs to the AV's video and telemetry systems. If there is a problem, the external monitoring provided by the RUCKUS APs can be used to alert a human driver to take action. Or prompt the vehicle to take corrective action.



In other words, if the sensors and systems inside the car don't respond appropriately, the external tracking provided by RUCKUS can activate a second level of intervention. For example, if the AV system is monitored by a third party, someone can take control of the car or shuttle remotely for safety.

As a "second set of eyes," the RUCKUS CBRS/NXGVenues solution can be used as an external check on the:

- Route, progress and location of the AV
- Response of the AV to objects and environmental conditions

**NXGVenues, a leading wireless solution integrator, was recently selected to design, build and maintain a private network solution to support autonomous vehicles. NXGVenues has extensive experience with both licensed wireless and Wi-Fi deployments. The company is one of the first RUCKUS CBRS specialists.**

## Getting a better view of AV safety with RUCKUS CBRS APs

<b>Placement flexibility and ease of integration</b>	<ul style="list-style-type: none"><li>• Full range of indoor and outdoor 3.5 GHz LTE APs</li><li>• Ease of placement with unobtrusive (no antennas), low-profile, lightweight APs</li><li>• Energy-efficient clean power and connectivity</li><li>• Interoperation with any band 48 LTE modem</li></ul>
<b>Coverage and connectivity</b>	<ul style="list-style-type: none"><li>• 4x the range of 5 GHz Wi-Fi</li><li>• Exceeds 1,800 ft with crystal-clear, continuous video streams*</li><li>• Mobility/handoff: uses "make before break" connections (unlike Wi-Fi roaming)</li></ul>
<b>Advanced CBRS LTE features</b>	<ul style="list-style-type: none"><li>• Embedded non-negotiable zero-trust security</li><li>• Self-organizing networks (SON)</li><li>• Zero touch provisioning</li><li>• LTE-Advanced carrier aggregation</li><li>• Self-organizing timing</li></ul>
<b>Performance to support mission-critical applications</b>	<ul style="list-style-type: none"><li>• Extremely low latency</li><li>• Capacity to handle 300 MB of video streaming and telemetry data, including up to 36 MB uplink</li><li>• Adjustable QoS parameters to prioritize traffic</li></ul>

\*Based on NXGVenues AV project data

### Need More Information?

[www.commscope.com/solutions/enterprise-networks/privatenetworks](http://www.commscope.com/solutions/enterprise-networks/privatenetworks)

### RUCKUS commitment and leadership in CBRS

- RUCKUS is a co-founder of the CBRS Alliance, and is at the forefront of advocating for CBRS
- First vendor to ship an FCC-approved AP/base station
- First FCC-certified CBRS-ready AP available

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