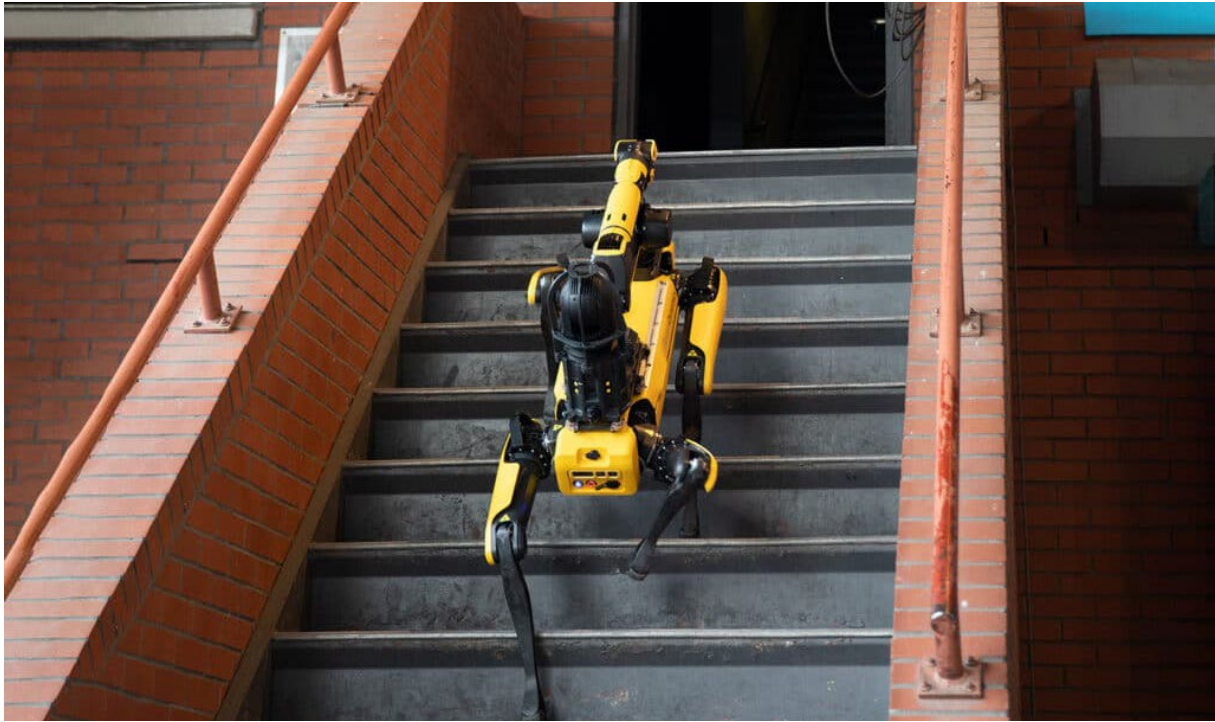


Giving First Responders an Advantage with Autowalk

This article was authored by Keith Lovendale, President & CEO of [RADēCO Inc.](#), a Boston Dynamics partner and a manufacturer and distributor in the energy, security, research, and military markets.



Every day, I work with law enforcement agencies across the country who use Boston Dynamics' [Spot® robot](#) in ways that are ready-made for an agile robot—such as investigating suspicious packages or providing live footage during a police raid.

While it isn't uncommon to use robots for these applications, Spot is in a league of its own. Easy to use and quick to deploy, Spot can climb steps and navigate around obstacles, providing SWAT teams, bomb squads, and emergency responders crucial [situational awareness](#) in very dangerous, time sensitive situations. However, what really sets Spot apart from other public safety robots is its ability to operate autonomously through what are called Autowalk missions.

Spot is commonly deployed as an industrial robot autonomously navigating factory floors, looking for air leaks and other mechanical anomalies. Can this same Autowalk capability be used to proactively map out critical routes at so-called soft targets—K-12 schools, universities, and houses of worship? Agencies could use Spot to map the layout in these facilities in advance of an emergency, giving responding teams an advantage if they are called to assist with a crisis at that location.

In the last few months, I have been working with local law enforcement in a number of states to put this trial idea to the test. Here's how it works.

Putting Payloads into Place

At its core, Spot is a mobile IoT (Internet of Things) platform. We can mount a [range of payloads](#) on the robot, including thermal and visual cameras, CBRNE sensors, radios, and lidar. In both industrial applications and public safety use cases, Spot's role is to use those payloads to capture relevant data efficiently so people can make informed decisions.

In most situations today, public safety professionals control Spot manually using a tablet that displays live footage from the robot's cameras or other sensors. However, if the officers aren't familiar with the layout of a specific school or synagogue, it can slow their response as they guess the best route to inspect the space for bad actors, hazards, or people needing assistance. In the case of an active shooter or other emergency, time is of the essence.



Now imagine a scenario where police have already walked Spot through a specific building beforehand and recorded an Autowalk mission. As part of that process, they can get more familiar with the layout, identifying key locations, potential hazards, and specific high risk areas. Then, in a crisis, emergency response teams can deploy Spot to execute the Autowalk mission in one section of the property, gathering valuable information while officers respond to an active threat or other priorities in another.

How to Set an Autowalk Route

My team has tested this Autowalk concept in a couple of different schools now. We come in after-hours and plan out a route for Spot. Autowalk is a teach-and-repeat autonomy system—as we drive Spot around, the robot builds a map of the environment and records the actions it should take—so it's important to think through an optimal route in advance.

We then place fiducials throughout the planned route. These fiducials act to anchor Spot in the world, a bit like breadcrumbs. Each one is unique so when operating autonomously, Spot can

still localize its position even in similar looking places like long hallways or if things have changed in the environment since the mission was recorded.

Once we've positioned the fiducials, we bring Spot through the building and program the robot to collect data. For example, we may want it to capture a panoramic photograph, then take five steps to the left and take a new picture. In a school setting, Spot may be mainly recording visual data to help officers find victims or suspects, but this process can include any of Spot's sensor payloads. For example, in houses of worship, public safety professionals in cooperation with religious leaders might focus on bomb threats, using the same method to make a methodical sweep with payloads that can help determine whether explosives are present.

Protecting our Communities

With this preparation in place, Spot can hit the ground running in a crisis. Operators set the robot on its autonomous mission while they focus on other priorities. To be clear, in an active shooter scenario, the top priority is to neutralize the threat as quickly as possible. Police are not going to wait for Spot to complete its mission before entering the building.

Nonetheless, there is tremendous value in having Spot in the building at the same time as police. Mission control teams have visibility inside the building, following along with Spot's mission, and can keep the ground team informed. They may want to use Spot to conduct a sweep of the building in search of victims, maybe even carrying First Aid kits that victims can grab while waiting for paramedics to arrive. Imagery captured by Spot could help with subsequent criminal investigations. Spot can also potentially provide visual confirmation that a threat has been neutralized and the building is secure.

Autowalk locations aren't limited to schools or religious facilities, either. Any place that is an area of concern for potential violence can benefit. This could be train stations, subways, or even stadiums, looking for things that are out of place or suspicious.

Training is all about anticipating future scenarios. Should police respond to a threat in the future, they can deploy Spot on its pre-programmed route. We can rely on Spot to accomplish its mission and give law enforcement greater advantage when lives lie in the balance.

About RADeCO

RADeCO has a diverse product offering that includes, robotics, air samplers, environmental monitoring, ventilation systems, drones, and consumable sample media. The RADeCO brand is now sixty years old and has been separated from SAIC and privately owned since February of 2000. Their headquarters is located in Plainfield, Connecticut and their drone and robotics division is located outside Charlotte, North Carolina.