CASE STUDY

MILLIBEAM

Australian semiconductor company at the frontline of defence

Rakurai - handheld counter-UAS
Image courtesy of MILLIBEAM

New semiconductor technology, designed and built in Australia, could help soldiers defend against hostile drones with smaller, lighter counter-drone systems.

Military technologies are rapidly evolving, transforming the nature of modern warfare. With over 80% of casualties in the Ukraine-Russia war attributed to drone operations, finding ways to stop hostile drones is becoming increasingly important for defence.

One way to do this is through vertically-integrated counter-drone technology. This often works by jamming the radio frequencies that drones rely on to navigate and communicate with their remote pilots.

However, current counter-drone technologies are often heavy, have narrow coverage, and require two hands to operate. As a result, they cannot be deployed to every soldier, and instead require a dedicated, trained specialist who must be in the right place to see the drone when it appears.

Australian semiconductor company, MILLIBEAM, is developing new technologies to address this challenge. Their counter-drone platform, RAKURAI (Japanese for thunderbolt), relies on proprietary semiconductor technologies and is designed to be small, lightweight and inexpensive enough to be deployed to every soldier, without diminishing performance.

"Drone technology is changing rapidly. Counter-drone technology needs to keep up just as fast," Dr Venkata Gutta, CEO and Founder of MILLIBEAM said.

While many counter-drone technologies exist, what makes MILLIBEAM unique is its bottom-up engineering approach.

Dr Venkata Gutta explained that the company is building vertically integrated platforms that are engineered from the ground up, from the semiconductor device to the entire system. This results in a device that weighs only 1kg, much less than comparable systems that weigh up to 8kg.

"The industry has traditionally worked by buying off-the-shelf semiconductor and electronic components and putting them together. But if you want low power consumption and low weight, you need to innovate at the semiconductor device level," Dr Venkata Gutta said.

"Commercial-off-the-shelf components limit flexibility and the system architectural improvements needed to bring about significant reduction in size, weight and cost. "

MILLIBEAM also currently sells semiconductor products (RF/mmWave chips and packaged antennas) beyond a field-deployable platform like RAKURAI to the global civilian market with customers worldwide. The components are used in a variety of applications, from space satellites to communications, helping it remain resilient to market changes.

As a company that designs and manufactures its products in Australia, MILLIBEAM believes one of the biggest opportunities is to create a local foundry to bolster national resilience.

"There could be a pathway for a small, local foundry that keeps operating even if the global foundry supply chains are disrupted, and that can support defence and sovereign needs," Dr Venkata Gutta said.

"Semiconductors are critical to national resilience. So, if resilience is a key priority, building this capability has to be part of the equation."

Image courtesy of Millibeam