



● ● Sharp INTELLOS Automated Unmanned Ground vehicle (A-UGV)

Identifying early the need for wireless network infrastructure that could effectively support ever-growing mobility demands, Rajant Corporation developed its patented Kinetic Mesh® technology—and in turn became the pioneer provider of the most adaptable, scalable, and readily deployed private mobile broadband networks on the market today.

Rajant was established in October 2001, after founders Robert Schena and Paul Hellhake recognized the significant shortcomings in traditional wireless mesh technology, particularly when it came to mobile voice and data networks used by first responders. The Rajant team envisioned a new, more robust mesh technology that would allow these networks to be fully mobile and mobility-enabled, and operate reliably in even the most demanding environments. Enter the Rajant Kinetic Mesh® network.

Kinetic Mesh technology and market expectations ● ●

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GMC: What can you tell us about Rajant's development and key milestones since its inception?

Chris Mason: When Rajant's founders saw the weaknesses with mobile voice and data networks during the events of 9/11, they envisioned a mobile network that would provide anywhere-anytime voice, video, and data communications. It was in 2002 that the company rolled out its Kinetic Mesh technology. Consisting of industrial-strength Rajant BreadCrumb® wireless nodes and patented Rajant InstaMesh® routing software, the deployed networks deliver highly reliable, secure connectivity in tough environmental and extreme weather conditions, are readily scalable, and support mobility across the entire network site at all times.

The following represent some of the company's notable milestones since its inception:

- 2002-2003: Acquired early DoD R&D funding specifically earmarked for battlefield communication development;
- Rajant's technology is a critical component of the overall communications solution for several prominent DoD programs to include C-RAM, SoldierLINK, and Wolfhound projects;
- Obtained advanced security and cryptography certifications including Suite A, AES Suite B and FIPS 140-2 Level 2;
- Awarded Top Supplier Northrop Grumman 2011-2013;
- 2014: Frost & Sullivan Best Practices Award for Enabling Technology Award for Industrial Mesh;
- BT and Rajant forged partnership to bring Kinetic Mesh wireless to industrial networks;
- Mitsui USA and Rajant Joint to Deliver Wireless Solutions to IIoT and autonomous applications;



● ● Photo courtesy of Rajant

GMC Q&A



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- Sharp Electronics selects Rajant as network communications platform for perimeter security based INTELLOS™ A-UGV; and
- Rajant delivers InstaMesh-enabled drone for UAV surveillance applications.

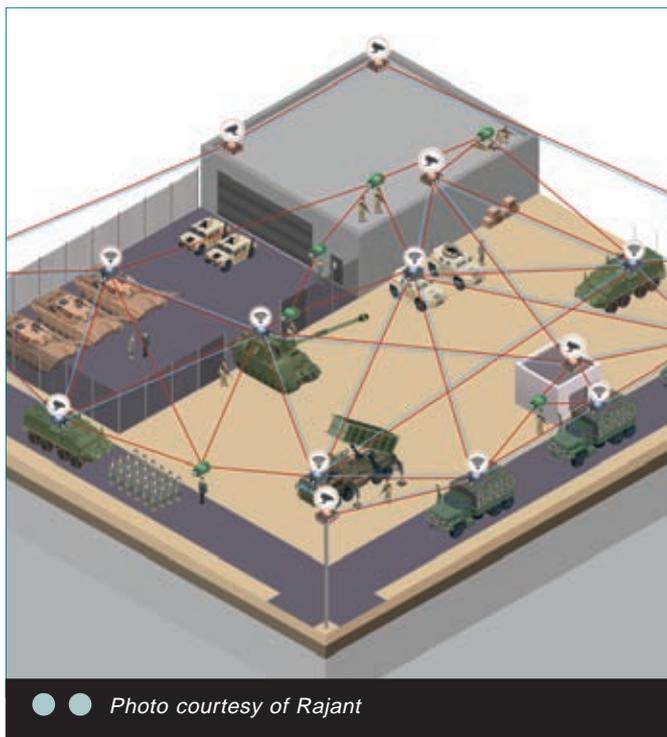
GMC: Can you provide an overview of your product offering?

Chris Mason: Rajant manufactures mobile, scalable and highly reliable kinetic wireless mesh network technology, which provides an always connected communications network so critical applications can be accessed in real time.

As the exclusive provider of private wireless networks powered by the patented Kinetic Mesh® network, BreadCrumb® network nodes, and InstaMesh® networking software, Rajant enables its customers to rapidly deploy a carrier grade adaptable network that leverages the power of real-time data to deliver on-demand, critical business intelligence. Rajant BreadCrumbs can seamlessly integrate with any Wi-Fi or Ethernet-connected device to deliver low-latency, high-throughput data, voice and video applications across the meshed, self-healing network. Rajant's Kinetic Mesh® networks are made up of intelligent nodes called BreadCrumbs, which are powered by its proprietary InstaMesh® protocol. These mission critical networks have been successfully deployed across the globe and offer customers sustainable investments that change the way they deliver voice, video and data while bringing real-time data to its users to streamline operations and positively impact decision making.

GMC: Which vertical and geographical markets are key to Rajant's business, and where do you see the most opportunity going forwards?

Chris Mason: While Rajant's initial start and subsequent success was built on military and mining, the company has expanded its reach into a number of other verticals, all of which have the common requirements of mobility and mission critical reliability. It is also not uncommon that the markets where our technology is optimised tend to be rugged outdoor environments where extending fibre or wired infrastructures are difficult or cost prohibitive, or both. To date, in addition to mines, you can find Kinetic Mesh networks deployed in O&G, ports, construction, railyards, and municipalities. Within these industry sectors, our technology supports a wide array of data, voice and video applications to include surveillance and monitoring, perimeter security and fleet management.



● ● Photo courtesy of Rajant

Looking forward, Rajant is seeing opportunities to deploy its Kinetic Mesh technology into indoor manufacturing facilities where traditional Wi-Fi falls short in establishing reliable connectivity. Agriculture also represents a significant new market space for us as the demand for autonomous tractors and precision farming lend themselves to wireless technology that can be placed directly on heavy equipment and machinery that already includes many sensors monitoring the equipment. We are continuing to advance our capabilities around UAVs and UGVs and see the defence space as a prime target for the innovation we are driving in that area.

GMC: What can you tell us about the development of mesh technology, and where does Rajant's Kinetic Mesh fit in?

Chris Mason: As previously mentioned, Rajant's Kinetic Mesh technology was created shortly after the weaknesses of pre-existing networks were amplified during the devastating events surrounding 9/11. Today, Rajant Kinetic Mesh technology is successfully deployed across the globe, providing industrial customers with a highly reliable and secure network infrastructure that has addressed many of the deficiencies that have plagued other network offerings including interference conflicts, high latency and lack of adequate and comprehensive security. As the only solution proven to establish and sustain any-node to any-node communication across hundreds of high-bandwidth nodes, the Rajant Kinetic Mesh network continually operates and 'self-heals' with no single point of failure.

Developed with critical communication in mind, the company's wireless nodes are proven to deliver unparalleled reliability, performance, scalability, security and flexibility in an easy-to-deploy and portable product. Rajant BreadCrumbs can be added to any pre-existing Wi-Fi or Ethernet-connected device to deliver low-latency, high-throughput data, voice and video applications across the network.

Sometimes people have a tendency to assume the company's Kinetic Mesh technology is the same as Wi-Fi or traditional mesh, this however is not the case. Rajant Kinetic Mesh is significantly different from traditional Wi-Fi or mesh technologies in a number of important ways:

- Kinetic Mesh does not do 'hand-off,' rather it establishes multiple connections with multiple nodes – something the company refers to as the Make, Make, Make, Never Break paradigm;
- Kinetic Mesh networks have no controller node and as a result have lower network management overhead on the network performance;
- Rajant networks have no single point of failure;
- Rajant networks employ multi-band frequencies to mitigate interference and provide network wide redundancy; and
- Most importantly, Rajant Kinetic Mesh networks support mobility, unlike that of fixed or management-intensive Wi-Fi technologies.

So, this is how Rajant differs from others. Using a combination of our BreadCrumb® wireless network nodes and InstaMesh® networking software, Rajant Kinetic Mesh® networks employ any-node to any-node capabilities to continuously and instantaneously route data via the best available traffic path and frequency for any number of nodes, all with extremely low overhead.

GMC: In April 2017, Rajant's Kinetic Mesh technology was used by Sharp Electronics Corporation as the wireless communications infrastructure for the Sharp INTELLOS Automated Unmanned Ground vehicle (A-UGV). What can you tell us about this application and the feedback received?

Chris Mason: As a mobile platform capable of traversing various terrains, the Sharp INTELLOS A-UGV provides outdoor surveillance, security, safety, and maintenance inspection patrols. The INTELLOSE A-UGV extends the impact of traditional

security forces, so it stands to reason that it would require a network infrastructure capable of supporting continuous connectivity and real-time communications of sensor and monitoring data. Capturing video, audio and environmental data, and communicating that information to a command and control centre, requires an advanced network, and a Kinetic Mesh network offers a best-in-class mission critical network infrastructure.

The mobility, reliability and scalability of Rajant's network were key reasons for the company's selection. The majority of customers who deploy Rajant networks do so because they need robust, secure network infrastructures that can deliver data from devices, cameras and sensors to be used to make intelligent decisions in real-time. Additionally, because the A-UVG is always on the move, traditional Wi-Fi technology would not provide enough reliable connectivity to support the mission critical nature of the INTELLOS' A-UVG minute-to-minute functions.

GMC: How might your Kinetic Mesh technology be used in other applications in the government and military sectors, and what benefits will it provide compared with competitor systems?

Chris Mason: Our technology is ideal for public safety, security, first responders and municipalities, including CCTV operators. Rajant Kinetic Mesh® networks allow communities to improve surveillance and situational awareness with high-bandwidth transmission of security and surveillance data. The any-node to any-node communications enabled with Rajant's BreadCrumbs® ensures that there is no single point of failure throughout the network.

Data encryption is a key feature of our network, as information flows through the mesh, it stays encrypted all the way through and is not decrypted until it is delivered to its final destination.

With the imminent threat of cyber-attacks, this encryption helps protect vital communication, as well as the location of nodes and other active devices in the network. The authentication process also provides protection from packet injection or replay attacks.

GMC: In May 2017, Rajant announced advances in its Kinetic Mesh Wireless Network technology that will power in-air networks, enabling drone manufacturers to strengthen drone-to-drone and drone-to-ground communications. Can you elaborate on this, and explain what benefits it will deliver for military applications?

Chris Mason: The fast-moving drone industry definitely caught the eye of one of Rajant's engineering teams located in Morehead, Kentucky. This team quickly recognised the many challenges drone manufacturers were facing in trying to deploy drones for longer durations, across further distances and with more intelligence capabilities.

Despite many advancements in the physical and components aspects of drones, drone communications were still legacy-based simple remote control operated, despite growing interest to support an array of other applications. With a focus on new ways to utilise both its industry leading InstaMesh routing protocol and its ruggedized wireless BreadCrumb nodes, Rajant has now advanced both persistent tethered drones as well as established aerial broadband with swarms. Airborne swarms of drones are equipped with lightweight Rajant BreadCrumbs to help solve many of the challenges they contend with, so Rajant began working on establishing aerial broadband with all of the attributes and capabilities of a ground-based network.

Creating a mobile mesh network in the air, tethered drones enabled with Rajant technology are rapidly deployable and can be easily integrated into pre-existing networks, working instantly to provide high-capacity, far-reaching aerial broadband coverage.

By using the drone as an instant tower to create 'temporary fixed' communications, law enforcement and other officials can add another dimension of awareness, with aerial on-the-spot connectivity, no matter where they are, and access real-time mission-critical data.

Employing a Kinetic Mesh network to operate aerial drones provides the security, scalability and mobility that standard networks cannot deliver. The technology can be easily redeployed and expanded in multiple ways, while still operating with the same level of reliability. While traditional mesh networks degrade as more nodes are added, Kinetic Mesh grows stronger with each additional node. The nodes self-configure, making it simple to expand the network.

GMC: What do you expect Rajant to achieve in 2018 and beyond?

Chris Mason: We expect to see continued growth in military and mining sectors, but are particularly excited as we have several significant port and railyard deployments that will be deployed by end of calendar year. I also believe that we will be identifying new channels to engage our technology to include more OEM opportunities and involve more eco-system partners who are also seeking better network communications solutions to advance their customers IIoT demands.

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