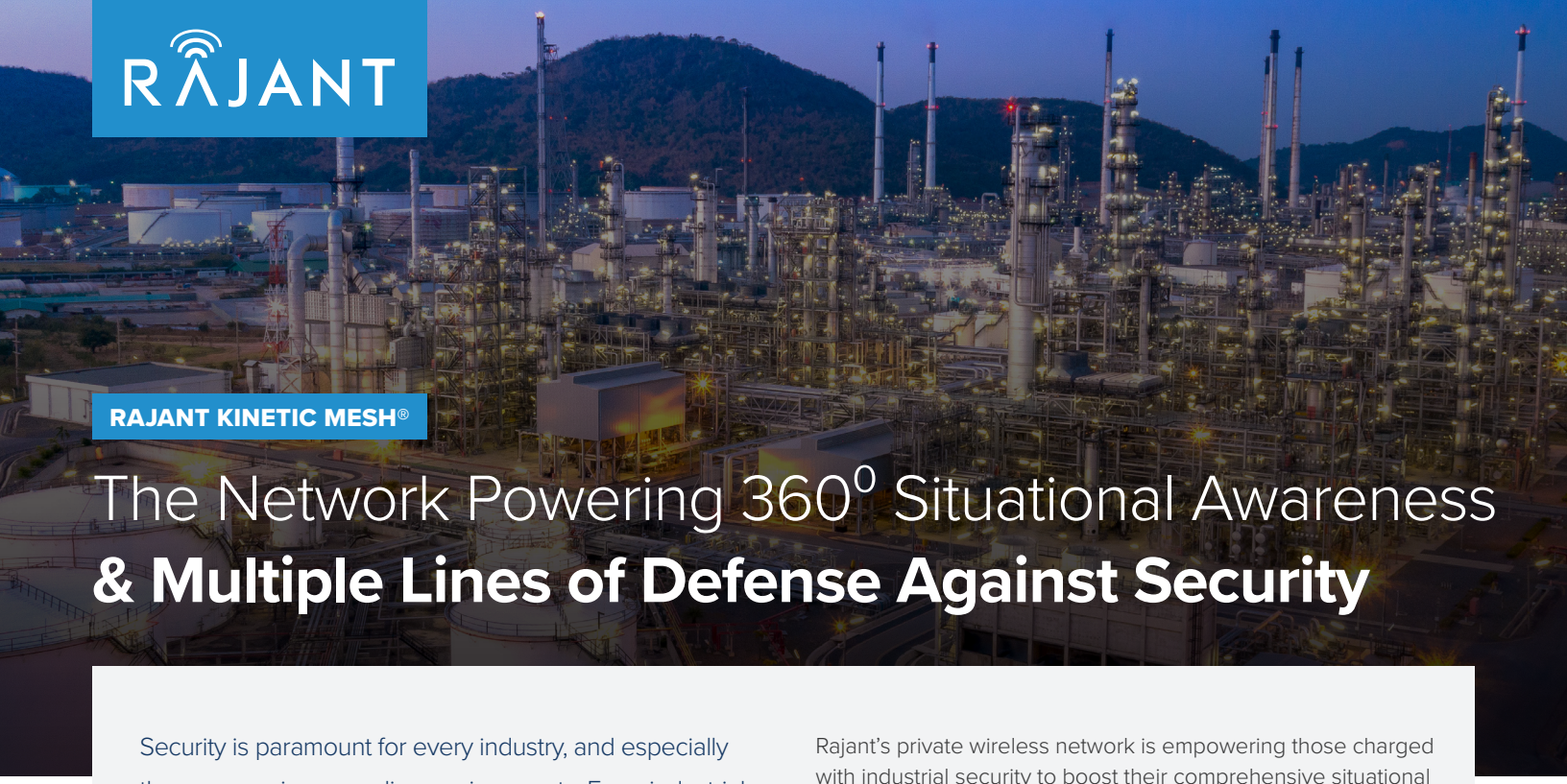


RAJANT KINETIC MESH®

The Network Powering 360° Situational Awareness & Multiple Lines of Defense Against Security

Security is paramount for every industry, and especially those managing sprawling environments. From industrial work zones to college campuses, both physical and data security are key to ensuring safety of people, the safeguarding of equipment, and the protection of valued information. With operations rapidly digitalizing, and the potential for hacks and breaches rising, proactive 24/7 security monitoring across operations is necessary. **Enter Rajant Kinetic Mesh®.**

Rajant's private wireless network is empowering those charged with industrial security to boost their comprehensive situational awareness to ensure their entire environment is safe for every person, and that all their systems and machines are secured.

That is because Kinetic Mesh includes the military-grade cryptographic solutions for end-to-end information assurance across the network, while at the same time enables next-gen security applications themselves – including surveillance drones, inspection bots, guarding robots, and more – by providing resilient, continuous communications links over which to output real-time data.

Continuous Connectivity Anywhere: Secure, Nonstop Data Flow to Protect Today's Mobile, Information-Based Corporate Assets

Connected devices and people all generate data, which, if carried through a secure and reliable communication network can fortify monitoring, situational awareness, security management, and rapid response. As the use of air, land, and sea robots to supplement security workforces increases, secure data-sharing and device cross-communication becomes even more critical. These assets are highly mobile and demand continuous high-capacity links over which to transmit audio, video, and sensor data. If there are drops in connectivity or systems cannot talk to each other, important information can be missed and security or safety breaches can happen.

Rajant's technology uniquely supports all aspects of the industrial security equation, from powering physical security assets to protecting the sensitive data they hold.

Here's how.

Multi-radio, multi-frequency redundancy for high capacity and mission-critical performance.

Kinetic Mesh employs any-node-to-any-node communications to ensure no single point of failure and extreme reliability, as BreadCrumb® nodes can hold multiple connections over multiple frequencies simultaneously. The network is infused with the intelligence of Rajant's InstaMesh® networking protocol which seamlessly links fixed, wireless, and mobile nodes together. It continually works to select the fastest path for delivery among the meshed connections, and will dynamically redirect traffic to the next-best available path(s) if any one peer is compromised or obstructed. Multi-radio, multi-frequency redundancy creates 'never-break' coverage even in hard-to-network settings, providing for continuous data flow to, from, and between the infrastructure and assets performing security-related operations.

Plug-and-play solution to safely establish a resilient network in hazardous environments.

Our ES1 BreadCrumb nodes come pre-integrated with a Class I, Division 1 and Class II, Division I ready explosion-proof enclosure. This enables you to rapidly deploy Rajant's powerful, commercial-grade meshing capabilities in hazardous locations throughout your refinery. These BreadCrumbs are also available with UL, IECEx and ATEX certifications to ensure they can be deployed globally.

Military-grade security for mission-critical downstream processes and operations.

Network security is a major concern for downstream oil & gas operations. Hackers... pose major risk not only to loss of data and IP, but also lives if safety functions are compromised. Initially created for military applications, Rajant's network is the only wireless network to offer multiple cryptographic options inclusive of NSA Suite B algorithms and down to per-hop, per-packet authentication.

Long-term scalability managed with minimal technical resources.

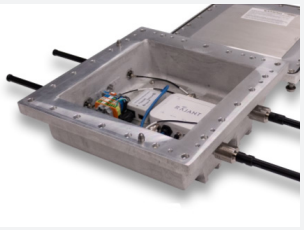
Kinetic Mesh networks are readily scalable to hundreds of high-bandwidth nodes; in fact, the network only grows stronger as more nodes are added because more paths become available. After initial configuration, when new BreadCrumbs are turned on, they automatically begin communicating with other nodes in the area. This makes it fast and easy to scale the network, increasing capacity or extending coverage where needed throughout the plant without the need for a team of network engineers.

Rajant also uniquely offers cross-generational forward and backward compatibility so you always remain future-ready for upgrades.

Powering Industry 4.0 Efficiencies:
What's Enabled with Kinetic Mesh

With Rajant's intelligent network, downstream operations can optimally support smart devices and IIoT applications for real-time monitoring, analytics, and control of processes across their plants – optimizing their ability to maximize efficiencies and yield.

IDEAL BREADCRUMBS FOR DOWNSTREAM NETWORKS



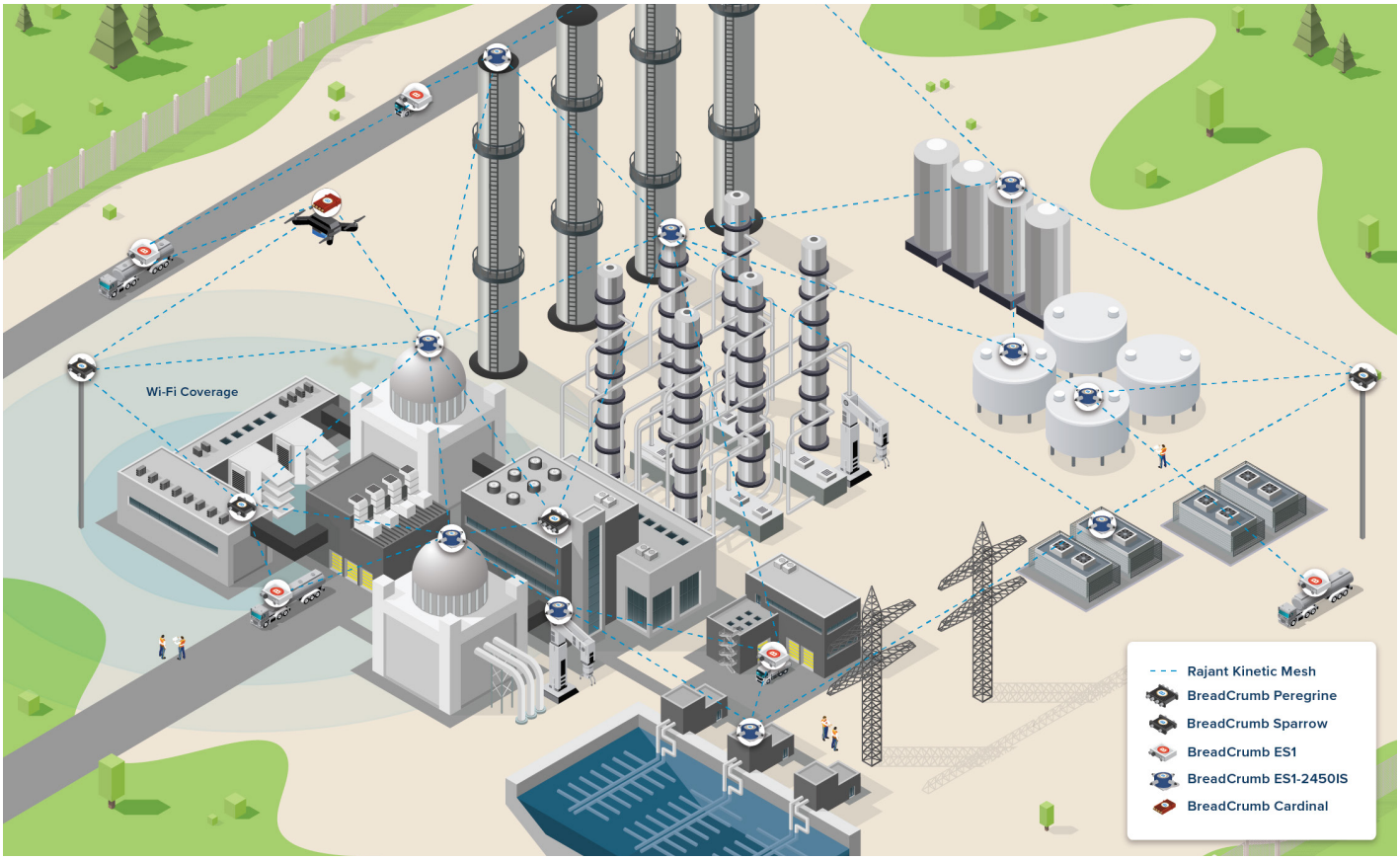
The ES1-IS02450 Hazardous Environment Enclosure is a C1D1/C1D2-ready enclosure with the ES1 BreadCrumb inside. It is a plug-and-play solution for establishing a Kinetic Mesh network in refineries and chemical plants.

The Sparrow is an IP67 radio ideal for non-autonomous tele-remote IIoT heavy-duty machinery and light-duty vehicle applications with dual 2X2 MIMO transceivers and four antennas having multiple mounting options.

Maximize Process Yields

Improving efficiency and increasing throughput are vital requirements to maximizing yield and profitability in downstream operations. With the right insights, refineries and plants can identify under-performing assets or areas to enhance processing effectiveness, predict maintenance needs to reduce downtime, and more. The ability of facilities to use data in these efforts however has been hampered by aging instrumentation and network infrastructure. These legacy technologies cannot singularly support high-volume, real-time voice, video, and data applications needed to modernize operational processes.

Rajant's unique network architecture ensures the throughput and real-time performance to meet demanding data access requirements, providing ultra-reliable real-time communications that enable up-to-the-second insights into your operations. Now you have the links you need to collect, analyze, and act on the troves of information generated throughout the plant and drive rapid, effective optimization.



Ensure Accurate Daily Production Reporting (DPR)

Because operations are taxed according to production, high accuracy in daily production reporting is a critical component to cost savings. Measurements from hundreds of thousands of sensors must be continually collected with spot-on precision. As more sensing technologies are added, the demands on the network increase even further with more bandwidth needed to transport all the data. Rajant Kinetic Mesh's resilient multi-radio, multi-band network ensures real-time communications with mission-critical reliability, so that no data is dropped or missed even in the face of interference or a node outage. It also has numerous paths to leverage, providing the high capacity required to collect all the data that will provide an accurate view of production yield.

Secure Downstream Data in Transit

As a critical piece of the energy supply chain, refineries are also a prime target for security hacks. Data breaches can have devastating consequences to your operations and the network you choose must employ multiple layers of security to mitigate those risks. With military-grade security features, Rajant Kinetic Mesh provides end-to-end information assurance across the network, offering many levels of encryption to protect packets from devices and people accessing them directly.

Enhance Worker Safety Facility-Wide

In addition to being compatible for use in hazardous locations throughout refineries or plants, BreadCrumb nodes operate on standards-based frequencies and include integrated Wi-Fi Access Point service for compatibility with a multitude of smartphones, laptops, and other IP devices. Kinetic Mesh can enhance or expand coverage for personnel to easily connect their devices anywhere throughout the facility, and access real-time information on sensor readings, equipment health, and process performance wherever they are. This connectivity also ensures real-time communications and location tracking of workers in critical emergency situations.

Optimize Costs and Plant Performance with IIoT

The differentiated multi-radio architecture of a Kinetic Mesh network means that Rajant is the only industrial wireless solution that can offer high availability for any number of real-time downstream oil & gas applications. This level of reliability and capacity is required to run new IIoT-enabled devices powering smart plant operations, from automation to real-time process analytics, robotics, and more. With Rajant, you can rapidly modernize for Industry 4.0 efficiencies without overhauling your entire network infrastructure.

APPLICATIONS ENABLED

Kinetic Mesh supports all the intelligent devices and applications used in downstream oil & gas processes to **maximize output, operational efficiency, reliability, and security, including:**

Asset Tracking & Optimization

- Equipment Health Monitoring
- Telemetry from Sensor Networks
- Real-Time Asset Tracking
- Predictive Maintenance
- Daily Production Reporting

Automation & Remote Control

- Remote Process Control
- Remote Machine Guidance
- Machine-to-Machine (M2M) Communications
- Process Monitoring & Automation

Safety & Security

- Video Surveillance
- Theft Monitoring
- RFID Tracking
- Real-Time Voice, Video, and Data Communications
- Emergency Response Communications

Next-Gen Applications

- Augmented Reality (AR)
- Autonomous Systems
- Robotics

Rajant Private Wireless Networks: **An Evolved Network for Modern Downstream Operations**

Digitizing downstream oil & gas processes can have a significant impact on cost savings and productivity, but requires network performance and capacity that cannot be effectively met by traditional infrastructures used in plant settings today. Kinetic Mesh's highly differentiated multi-radio, multi-frequency technology, infused with the intelligence to continuously self-optimize, provides the low-latency, high-throughput, resilient performance required to ensure the uptime of bandwidth-intensive Industry 4.0 applications. Expand and enhance IIoT-enabling coverage in every corner of your refinery or plant, and easily deploy the next-gen applications needed to modernize your operations, fast.

We'll show you the opportunities that a smart network can bring to your refinery.
Visit **rajant.com/markets/** to get started.

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RAJANT

*MAKING THE COMPLICATED **SIMPLE***

Continuous, Connectivity, Anywhere