

Rajant and Framr Below the Fjords – Wireless Communications for World’s Longest Subsea Tunnel

Norway’s topography is characterized by its dramatic and challenging terrain, featuring fjords, mountains, and rugged coastlines. This unique geographical landscape necessitates the construction of extensive road tunnels to facilitate transportation across the country. Norway’s commitment to maintaining accessibility in these challenging conditions has led to the development of an impressive network of tunnels, many of which are engineering marvels, allowing residents and travelers to navigate the country’s breathtaking but often treacherous landscapes. In line with this commitment, the Rogfast tunnel construction project in Norway is poised to set a world record as the longest and deepest undersea road tunnel upon completion.

The Challenge

Stretching over 25 kilometers and reaching depths of more than 390 meters below sea level of Boknafjord, this ambitious undertaking not only addresses the challenging topography but also promises to significantly reduce travel times. Moreover, the Rogfast tunnel will enhance connectivity between the Stavanger region and the rest of Norway, marking a groundbreaking achievement in infrastructure development amid Norway’s unique and demanding geographical features.

In line with contemporary large-scale projects, the success of the Rogfast endeavor hinges on resilient wireless communications. The tunnel construction teams operate on a



Customer

- Norway’s Rogfast Undersea Tunnel

Partners

- **Framr Technology AS** – The exclusive Rajant Kinetic Mesh Partner (KMP) in the Norwegian market offering advanced and reliable wireless network solutions that are essential for modern industrial applications.
- **Rajant** - Pioneers of peer-to-peer radio communications enabling real-time voice, video, and data to connect machines, robots, and people together everywhere as part of a secure private fully mobile network.

Kinetic Mesh® Components

- Peregrine FE1-2255 BreadCrumb®
- LX5-2455D BreadCrumb
- ME4-2450R BreadCrumb
- Rajant RCP tunnel antennas

Outcome/Income Statistics

- Industrial strength, high quality, Wi-Fi access providing push-to-talk voice, video, and Internet supporting Rogfast’s tunnel construction project.

24-hour schedule, conducting continuous drilling and blasting to keep to the project's schedule. Essential for maintaining a safe and productive work environment, the imperative for robust push-to-talk voice and Wi-Fi solutions underscores their pivotal role in supporting the construction efforts.

The Solution

Implementing high-quality wireless communication infrastructure for an expansive subterranean tunnel construction environment spanning multiple kilometers presents a formidable undertaking. Framr Technology, a reputable Norwegian Kinetic Mesh Partner (KMP), boasts a proven track record in deploying exactly these types of solutions, providing critical support to numerous tunnel maintenance and construction projects across Norway.

Rajant BreadCrumb wireless nodes have been extensively utilized to support underground and tunnel environments. Furthermore, the Framr Technology team has innovatively engineered a rapidly deployable, preconfigured system using Rajant BreadCrumb wireless nodes in conjunction with Rajant RCP tunnel antennas.

Framr Technology deploys the BreadCrumb nodes in strategic locations and then relies on the linear meshing capability of Rajant Kinetic Mesh networking to rapidly extend connectivity down the tunnels. This strategy substantially reduces the need for fiber, minimizing delays related to fiber deployment and maintenance to an unparalleled minimum.

According to Karel Venter, Rajant Sales Engineering Director EMEA, "The magnitude of this project is truly remarkable. Interestingly, what also left a profound impression on me was the exceptional performance of push-to-talk radio system over Rajant Wi-Fi, particularly during the journey from the tunnel development zones deep underground all the way to the surface."

The Results

Currently in its fifth year of operation, the Rogfast tunnel construction benefits from pervasive Wi-

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Our customers depend on the Framr Technology team to create an environment where they can work virtually free from distractions or delays. The rapid deployability of Rajant's Kinetic Mesh empowers us to fully support our customers, enabling them to focus on their tasks without concerns about communication infrastructure.

— **Thomas Berger von Tscharnier**

CEO – Framr Technology AS

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Fi coverage throughout tunnel complex and construction site, a technological achievement brought about by Framr Technology in collaboration with Rajant Kinetic Mesh. Wi-Fi connectivity and push-to-talk voice communications seamlessly spans from the construction offices on the surface to drilling operations several kilometers below ground. This allows the project team to enjoy access to video calls and internet no matter where they find themselves in the tunnels. Furthermore, Framr has initiated the deployment of Rajant BreadCrumb nodes on refuge bays, strategically located safety bunkers, scattered throughout the tunnels.

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On multiple occasions, Rogfast project workers have told me that this is the best Wi-Fi access they have ever experienced on a project.

— **Bjornar Simonsen**

IT Manager – Framr Technology AS

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