RAJANT

CASE STUDY

Rajant BreadCrumbs® Debut in Extreme Sports — Supporting the Aspen Snowmass Freeskiing Open

This slopestyle event is one of the last and longest-running independent open competitions in the U.S., sanctioned by the Association of Freeskiing Professionals and the International Ski Federation.

Typically attracting over 200 competitors from six nations, the Aspen Snowmass Freeskiing Open held annually on the Winter X Games course gives high-caliber amateur-level athletes the opportunity to experience competing on a professional tier racecourse.

But the resort lacks a network, leaving wireless communications and streaming impossible. In 2020, Rajant's Kinetic Mesh® wireless network, with IP video cameras from Think Vertical Now!, was installed to demonstrate the ability to record and live-stream the event in high-definition video to a remote judging panel for scoring.

The Challenge

Designing a wireless network in the heart of Pitkin County, Colorado came with many strings attached and multiple challenges. First, the vertical drop of the combination ski course, which included rails and big air jumps, required an innovative network design to ensure connectivity between each of the Rajant BreadCrumb® nodes. Most networks only have a single plane of elevation. Also, none of the infrastructure nodes on the course had Ethernet or PTP backhaul.

Second, like most ski resorts, the Aspen Snowmass Ski Resort is in an inhospitable location for wireless networking gear. Heavy snow, wind, and subzero temperatures are seasonal environmental challenges. An additional complication is the proximity of the Aspen/Pitkin County Airport, adjacent to the resort. Airports are known to show little regard for containing their use of wireless frequencies within their physical boundaries.

Next, due to the course's vertical drop and length, the competition has always run a split judging panel, because there is nowhere on the course, a single panel could observe all competitive elements. This means there is one panel of judges for the rail portion of the course and another panel for the jumps. A competitor's score is a combination of the results from

Aspen Snowmass Ski Resort

- Often named the best ski resort in the West, Aspen Snowmass is a popular resort known for hosting the Winter X Games and Aspen Snowmass Freeskiing Open
- Comprising over 3,100 acres, it is approximately 8,000 feet in elevation and home to 10,191 year round residents

The Partners

- **Rajant:** provides peer-to-peer radio communications enabling data, voice, video, and autonomous applications
- **Think Vertical Now!:** a wireless integrator specializing in both industrial communications infrastructure and outdoor action sports

Solution Components

- Rajant Kinetic Mesh® private wireless network consisting of the six ME4-5050S BreadCrumbs
- Four IP cameras from Think Vertical Now!

Outcome and Impact

- Network installed within two days
- BreadCrumb's ruggedness survived five days of wind, snow, and subzero temperatures at a high altitude
- Judges were able to utilize streaming video to score the rails portion of the event
- Judges had access to instant replay of the high-quality video feed
- Livestreaming was successfully demonstrated

both panels. In a perfect situation, one would want the judges for each of the two disciplines to be located together, so they could confer immediately after each competitor takes his or her run. In the world of competitive skiing, it is understood and accepted, an event requiring a split judging panel has a greater possibility of variability within the combined score.

The Solution

The perfect solution is to deploy broadcast-quality systems for each competitive event. However, the cost to deploy such is so prohibitive, only the largest professional events can justify this expense. Amateur events, such as the Aspen Open, despite being just one notch below World Cup, will never have funding sufficient for television

The goal for this proof of concept was to demonstrate the viability of a pop-up event that could support IP video cameras along the course and stream a high definition image to a judging location located some distance from the course. The judging panel was excited to try the proposed solution in the hopes of finding a way to eliminate the split panel for future events. The head judge gave his blessing and authorized the rail judges to use the video solution. A secondary goal of the POC was to demonstrate the live-streaming of the event. This has the potential to dramatically improve visibility and sponsorship revenue for the participants and the venue.

Rajant and Think Vertical Now! teamed up for the challenge and deployed the network and cameras two days before the event started. The Kinetic Mesh® network consisted of six ME4 BreadCrumbs with four of the BreadCrumbs connected to IP video cameras and the remaining acting as a relay to transport the video to the remote judging panel.

Over the five day event, the Kinetic Mesh network's flexibility overcame terrain challenges, local radio frequency interference as well as physical obstructions. Unlike traditional Wi-Fi, which is required to break a connection before forming a new one, InstaMesh® has the capability to forms multiple connections independent of breaking connections. These connections are formed by each radio transceiver in a BreadCrumb to provide both frequency and radio redundancy. In addition, BreadCrumbs can determine which connection will perform the best, at any given moment, and can redirect a transmission on a packet-by-packet basis if another connection is faster. This not only ensures optimum continuous performance but also ensures the delivery of critical data. Collectively, these features enabled the Kinetic Mesh Network to provide the adaptability needed to succeed in this hostile and unpredictable environment.

> "I see this as being scalable over the whole site: for security, for the efficiency of operation, [...] for safety, dispatch, [...] and knowing where your capital goods are on the mountain."
>
> **— Tom Dietz,** Technical Director of Think Vertical Now! and Owner of RF-MOON

The Results

By introducing the Rajant technology, Aspen Snowmass was able to demonstrate the ability to significantly enhance their digital capabilities and revenue opportunities for future events. Setup was prompt and the BreadCrumbs provided a full-duplex network with both frequency and radio redundancy. The ruggedness and the IP67 environmental rating of Rajant's ME4-5050S were up to the task at hand as the nodes overcame all sorts of challenges—including significant elevation changes, limited infrastructure height, the proximity to a municipal airport, inclement weather, the interference from obstructions, and more.

Think Vertical Now! was able to successfully demonstrate live-streaming of the video feed. Having this capability to stream the competition to a digital audience demonstrated the potential to be invaluable and can create future sponsorships while strengthening current ones. It can attract larger audiences and more tourism.

In the end, this eye-opening experience has since opened the doors to streaming future sporting events in the mountains. In addition to the Freeskiing Open and the X Games, Aspen also plays host to outdoor concerts and other sports functions, such as the Bud Light Spring Jam and the Audi Power of Four Race Series, where the Rajant network could be utilized.

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