



## Product Engineering Bulletin

V3 Integrators is committed to bringing the highest quality solutions and products to the Nuclear Sector.

With the shrinking UHF footprint, it is critical to determine what the best performing and feature rich wireless solutions are for the nuclear sector. While many systems may appear good on paper, they struggle to perform in these demanding environments. Some systems require large, expensive antenna distribution systems that are complicated and time consuming to deploy.

At V3i, we are working closely with Bosch and other Manufacturers to thoroughly vet, test and bring to market the best performing wireless solutions for the nuclear sector.

In this bulletin we will share our testing results and let you see why the ROAMEO system is now a top performer for the Nuclear Industry.

The Bosch ROAMEO system by V3 Integrators has many advantages to the nuclear market.

- The ROAMEO System Operates in a globally accepted license free RF band
- Lower cost when compared to currently available UHF or Split Band UHF/VHF systems on a per Beltpack basis
- ROAMEO Beltpacks can operate up to 17 hours per charge and are about half the weight of current UHF and split band Beltpacks on the market
- ROAMEO Beltpacks can communicate with up to 4 separate audio channels at a time with studio quality audio
- V3i Beltpack holster incorporates a button shield, FME friendly belt loop, and a locking headset connector
- Single Access Point RF coverage as compared to a traditional Telex UHF base station is roughly 25% greater in real world testing
- Broaden RF coverage throughout your facility and eliminate dead zones by placing additional Access Points
- The V3i POE powered Access Point with modular mounting system is light, compact and easy to deploy on your existing network with just a CAT5 cable required
- Extremely low latency audio compared to previous generation RVON systems
- Significantly reduce the volume of equipment in your audio system
  - An expensive RF over fiber optic system is not required.
  - No more large, and bulky coaxial antenna cables to route through a facility
  - No separate Analog to Digital conversion devices needed



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V3 Integrators has recently completed testing the ROAMEO wireless system with updated Beta firmware (v8.3.3-ds beta) provided by Bosch.

The system was tested during a refueling outage at a pressurized water reactor.

The system had previously had some performance issues on the refueling elevation of the containment building.

Based on current firmware test results, the performance and multipath issues have been resolved for ROAMEO.

ROAMEO is now suitable for use in all areas of your facility.

Please contact V3 Integrators for further ROAMEO information, or how to obtain and load the firmware to your system.

### Summary

- The FCC channel repack and sale created a gap in viable wireless communications solutions
- The ROAMEO wireless communications system with enhancements from V3i is a viable communications solution for all areas of a nuclear power station
- The ROAMEO system is easy to deploy
- The ROAMEO system increases the capability of wireless communications
- The ROAMEO system is cost effective
- The ROAMEO system is backed by the experience, testing and knowledge of V3 Integrators and Bosch

Contact V3i today to discuss a solution for communications at your nuclear power plant or facility

Email: [Sales@v3is.com](mailto:Sales@v3is.com)

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### Current Beta Firmware Test Results

Testing included the following areas:

- All Refuel elevation areas
- Directly over the cavity (on active refueling machine)
- lower containment

In all test areas and cases, the audio quality Beltpack to Beltpack, and Beltpacks to Keypanel was excellent.

No audio dropouts occurred within signal range of the Access Point.

Quality Factor Indicators showed a significant improvement and stayed within the 6/10-10/10 range and audio was solid throughout the testing.

Further testing with additional antenna type indicated QF numbers slightly higher at 7/10-10/10 but with slightly reduced RF range. These additional antenna types could be suitable in some situations.

Currently this Beta firmware allows 5 Beltpacks per access point in the updated G.722ex codec.

Updates to the firmware also include: new roaming algorithms, Access Point RF power adjustments and greater performance in challenging RF environments.

A production release of this firmware targeted for December 2019 will incorporate the updates to the G.726 protocol (10 Beltpacks per access point) with the additional RF performance enhancements.

### Background Testing and Results

V3 Integrators has tested the ROAMEO system at multiple nuclear facilities and conditions. The issues previously encountered at some nuclear facilities with ROAMEO and similar technologies were brief losses of audio or audio dropouts to/from Beltpacks.

These issues were observed primarily on the refuel floor of PWR containments, Turbine Decks and BWR Refuel Floors.

In areas such as PWR Ice Condensers, BWR Drywells and PWR Lower Containments the ROAMEO System exhibits excellent performance benefits and several systems are presently in use at PWR ice condenser plants and BWR Drywells.

Performance issues were determined to be RF multipath related, and when occurring, the Beltpack survey mode showed simultaneous High RSSI and Low Quality Factor indicators. Previous results showed QF numbers dropping to levels of 0/10 when audio dropouts were occurring. Testing was performed with supplied Bosch antennas and alternate types.

Several antenna types are available that improve the multipath performance with the previous Bosch firmware and are available to purchase from V3 Integrators.