INS: Intelligent Network Synchronizer

Augmenting the investment in your legacy FreeWave™ 900MHz license-free SCADA communications infrastructure while providing a proven migration path into higher performance license-free communications technology.

258 S Taylor Ave, Louisville, CO 80027 | Ph: 303.447.2745 | info@xetawave.com

You have invested heavily in your FreeWave™ 900 MHz license-free SCADA communications infrastructure and want to get the most out of that investment as technology, equipment and SCADA requirements evolve.

- You want to **add Ethernet connectivity** to sites / equipment on a Serial system.
- You want to **migrate away from Serial technology** and into **Ethernet technology** to provide **greater flexibility**, **scalability** and **compatibility** with modern SCADA polling systems.
- You want to **add speed** and more effective **bandwidth** to a legacy Ethernet system.
- You want to migrate into a **faster, more throughput intensive** Ethernet technology.
- You want **negligible communications downtime** during any of the above activities.
- You don't want to add extra antennas or hardware at any infrastructure sites; i.e. Access Point and Repeater towers during any of the above activities.

As 900 MHz license-free SCADA communications technology evolves, there comes a time when an existing network may require augmenting or replacing with a complete system upgrade.

How you approach these activities can make a big difference when it comes to disruption from communications downtime affecting operations.

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Rip and replace you say?

When it comes to updating, upgrading or replacing a legacy system, one method is a complete "rip and replace" of all communications hardware. This approach can introduce significant downtime with no data collection occurring until the new communications hardware - *and ultimately system* - is operational.

More manpower may also be required to speed up the installation process, but how many personnel can you devote to such an operation?

Then there's cost of such an exercise: material cost, personnel, subcontractors, system downtime and lost revenue. **Not with INS**.

A better, more cost-effective way

Through XetaWave's advanced INS technology, existing antennas, coaxial cable and towers can be shared at ANY Access Point / Master site where INS is to be installed.

XetaWave EP's can be installed "plug and play" to co-exist alongside legacy FreeWave™ DGR/FGR/FGR2/FGR2-PE/HTPlus radios on the *same* network.

Only INS allows you to retain legacy radios where legacy radios are adequate; overlay XetaWave radios where additional features, performance or throughput are needed; and install advanced technology radios for less than replacing low speed legacy radios.

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Synchronize to Augment

The heart of any augmentation - or migration for that matter - is the ability to synchronize radio timing with the legacy license-free system. 900 MHz license-free technology uses the 902 – 928 MHz ISM Band with radios hopping between channels in either a Frequency Hopping Spread Spectrum (FHSS) or Digital Transmission System (DTS) configuration – *also hopping*.

The *hopping* is what makes it possible to match the legacy system timing yet transmit on a different channel so that both systems coexist with negligible interference.

INS monitors the legacy system for key-up and matches the legacy system transmission timing so that both systems are synchronized. Since the synchronization is based off RF timing, it makes it possible to augment a legacy Serial network by synchronizing and "overlaying" an Ethernet network on top. This introduces Ethernet connectivity to select sites in a Serial system where Ethernet PLC's, gas meters, or RTU's are to be installed. Sites can remain in either state, Serial or Ethernet, indefinitely or be migrated over time.

Synchronize to Migrate

On top of providing the previously mentioned system augmentation, INS has been designed to use the overlaid nature of both networks to migrate from the legacy system - be it Serial or Ethernet technology - into faster license-free Ethernet technology, which incidentally outperforms the legacy system even when constrained by the legacy system timing during synchronization.

Once fully migrated, the timing restrictions from being synchronized to the legacy system are removed so that even more performance can be realized.

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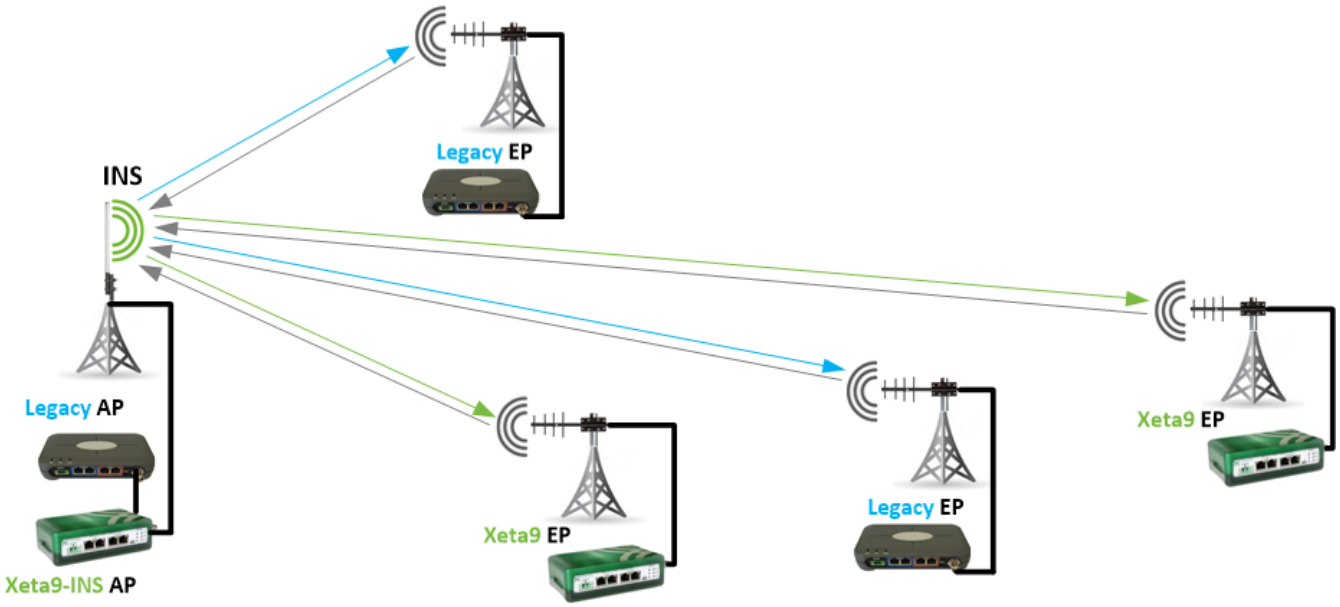
Performance Results



When synchronized with a FreeWave™ FGR2-PE the following performance was measured on both systems in relation to the timing constraints of the legacy system packet size combinations. Fping used for latency and Fbench used for TCP throughput.

Legacy Ethernet System		**Synchronized XetaWave Ethernet System**
Packet Size	Latency (ms) / TCP throughput (kbps)	Latency (ms) / TCP throughput (kbps)
9/1	48 / 75	41 / 71
5/9	110 / 55	41 / 148
3/9	118 / 33	30 / 181

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Testimonials of Success

XETAWAVE
CUSTOM RF SOLUTIONS

INS has been utilized in the Bakken, Permian, Colorado's Front Range and Mexico since 2013.

I am impressed with Xetawave's commitment to providing products that fit traditional radio networks along with niche markets like the Intelligent Network Synchronizer (INS).

The INS radio line fills a void in the marketplace that well known radio manufacturers have not been able to do even within their own product lines.

We can now upgrade a master radio and begin taking advantage of higher bandwidth XetaWave radios without the expense of replacing existing field radio networks.

Technical support has been excellent and the INS installation manual is spot on with recommended settings that work right out of the box.

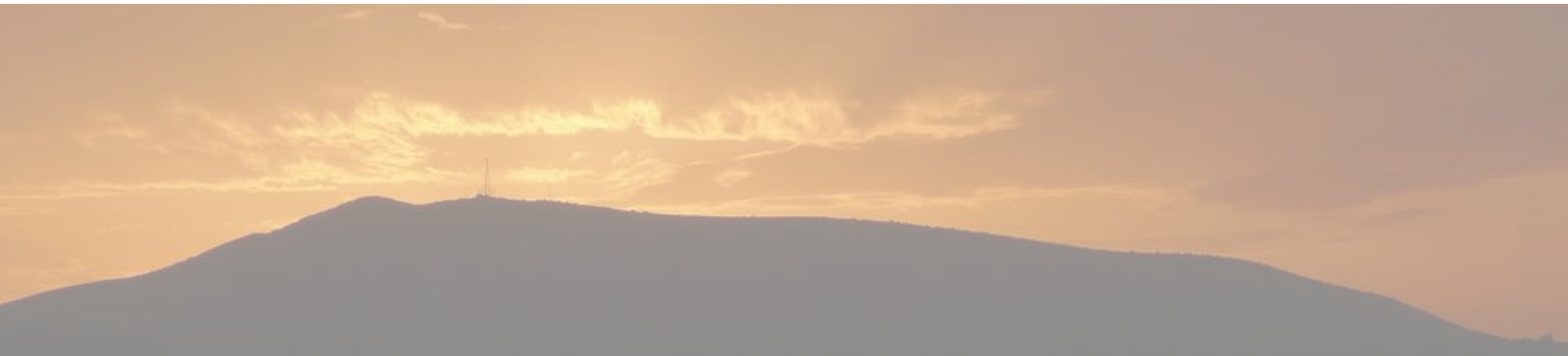
Energy Company in West Texas

Things went very well today with the INS install. We put 1x INS Access Point on the master tower which has 3 x FreeWave™ FGR2-PE Access Point radios installed. From there we installed 3 x end point sites.

One of the sites had a pretty bad signal and forced us to drop the modulation to 1061 QPSK. Other than this issue, everything came up and was working great.

We were able to access a site where we had experienced consistent prior issues. At another EP site we were able to pull a TotalFlow™ daily log which we had been unable to do with the legacy network.

Energy Company in West Texas



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