Hybrid SCADA Communication Networks

xetawave.com

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Discussion Points:

- Corporate Office to Network Access Point (NAP)
- NAP to Well Pad
- Well Pad Network
- Dangers / RF Security
- Design Considerations
- SD Radio
- Legacy Networks
- Q&A

Corporate Office to Network Access Point (NAP)

Cloud to Private NAP

High Speed Communication technologies

- Private fiber
- Private broadband
- Private microwave
- Big data pipe
- Part 101 900 MHz an option

Network Access Point To Well Pad

Broadband Microwave

- High speed
- Line of Sight (LOS) only
- Unlicensed – Competing with wireless ISP's

900 MHz

- Approx. 1 Mbps, moderate range
- Frequency synchronization
- Forgiving of line of sight
- Interference so bad it can only get better!

Licensed Channel

- Very reliable
- Long range
- Low speed

Well Pad Network

Broadband
- Line of sight only
- Many non C1D2 options

900 MHz
- Near line of sight
- Possible self-interference NAP to pad networks

2.4 GHz
- Eliminates near self-interference
- Near line of sight due to higher system gain

Wireless IO
- Best if integrated within existing wireless networks
- End to end network management
- Local intelligence – data concentrator

DANGERS – RF Security

RF data must be encrypted – AES

Unlicensed means no control – protocol must deal with jamming

Licensed channels should hop

Parallel RF links with different frequencies

- 900 MHz x 400 MHz (9x4)
- 900 MHz x 2.4 GHz (9x2.4)
- 200 MHz x 900 MHz (2x9)
- Licensed and Unlicensed 900 MHz MAS/ISM

Design Considerations

Path Studies and understanding bandwidth requirements are essential!

You need to manage your data!

- In a narrow pipe -> limited bandwidth, only allow SCADA data
- Filter/block “office” traffic

Protocol Optimization – know what you are trying to do!

- SCADA data – small packets, lots of them

  Packets per second more important than throughput

- VIDEO wherever – big data, big packets
  - Largely inbound traffic, high bandwidth

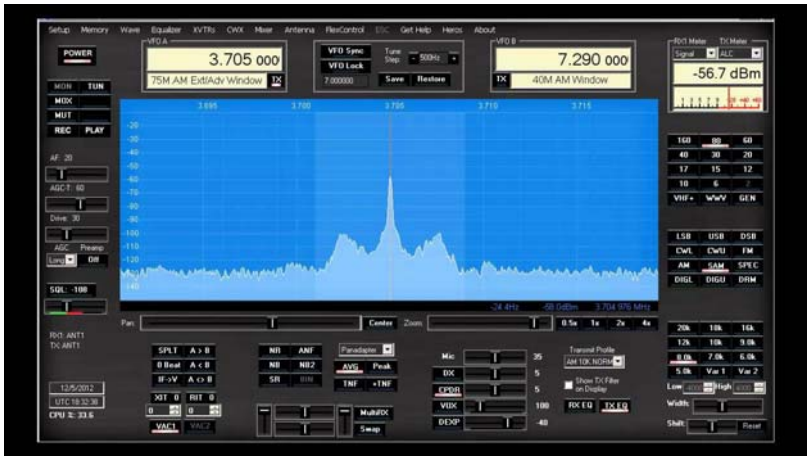
Software Defined Radio (SDR)

- SD Radios don't need to be multiband
- SD Radio – all characteristics controlled by software
  Makes it obsolete proof!
- One radio can operate in multiple FCC modes
- Drop in new code over the air, same hardware, and it works
- Not the same as using a chipset that has no control and will end of life
- Narrow banding – instead of replacing hardware to meet new FCC channelization, SD radios can just be reprogrammed.

SD Radios Emulate Legacy Radios

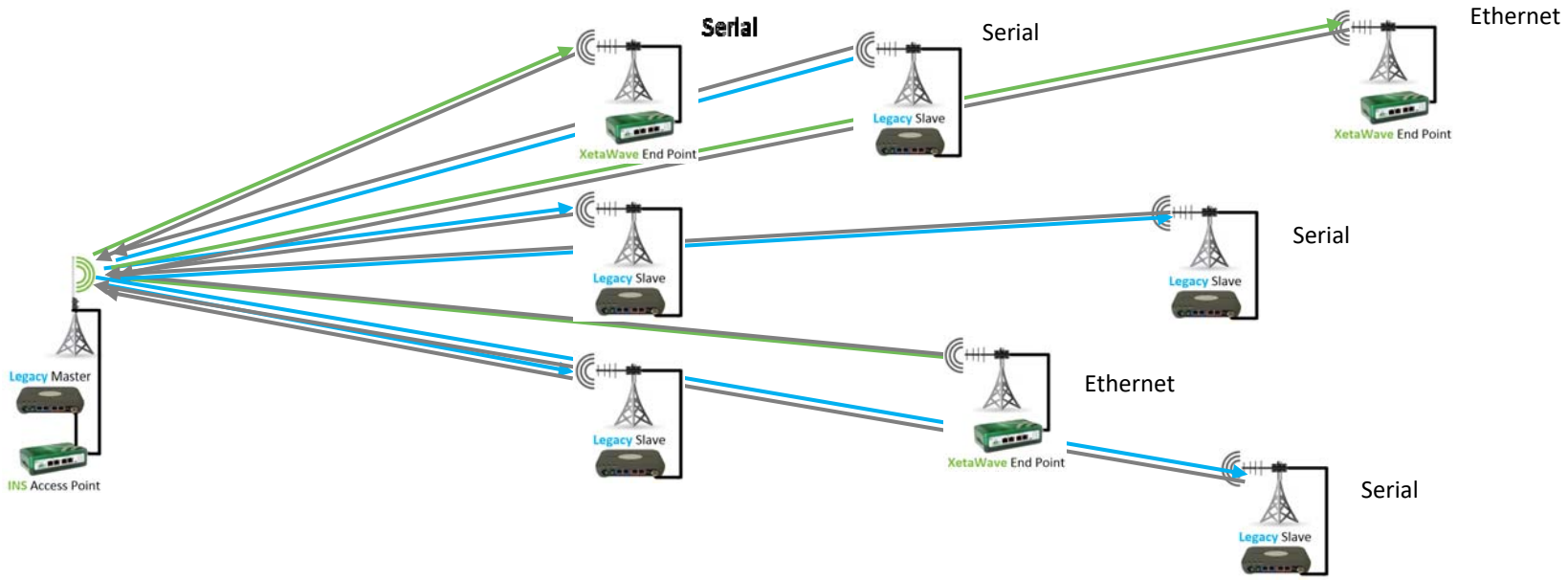
SD radio can mimic legacy waveform and protocol

Why continue to invest in a legacy radio? Drop in SD radio in emulation mode as replacement radio, when field hits critical mass turn on new features, speeds and capabilities.



How SDR Works in Legacy Networks Using INS

XetaWave's Intelligent Network Synchronizer (INS) enables Ethernet and Serial radios to be added into a legacy network, enhancing the performance of the existing radio system, providing a higher performance, parallel XetaWave network.



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Presentation available for download from
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