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SUMMIT 2023

Grow Your Business Through Wireless



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Panelists

Eric Toenjes – Graybar, National Market Manager, Wireless Solutions

Marc Knapp – Centerline, Executive VP, Business Development

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Market Opportunity

- Wireless market is \$4.5B TAM + 18% CAGR
- 5.6 million commercial buildings in US with only 10% penetration
- Wireless data doubles every 2.5 years
- Wi-Fi is everywhere but can't keep up by itself
- 5G makes the coverage problem worse

4th Utility



- 80% of use is indoors
- Major factor in customer experience
- New advancements and code requirements:
 - 5G, Public Safety Codes, Private cellular networks
- And – EV Charging support is a new opportunity



Keep Your Electric Vehicle Chargers Connected.

Why do EV chargers need a cellular signal? Most EV charging stations include an LTE modem. Without a signal, they cannot set schedules, track data, or charge the user for electricity. This isn't usually a problem streetside, but cellular repeater solutions strengthen and amplify signals, so EV chargers stay connected, even in the depths of a parking garage.

How do you amplify cellular signals?

Cellular signal booster solutions bring a clear, reliable signal to any EV chargers in a facility. They take an existing signal, amplify it, and broadcast the strengthened signal within the structure. You can cover an entire garage or a single parking spot.



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3 Core Wireless Applications

5G Cellular

Enable wireless voice and data services to operate in the building to improve customer and employee satisfaction. Need to solve for more devices, more applications and the fact 5G doesn't penetrate buildings well.

Public Safety

Help make the builder safer by ensuring mobile 911 calls get out with location accuracy, mobile mass notifications reach building occupants, and first responders can communicate with each other. *NFPA and IFC codes also require this application in most construction projects*

Private Networks

Control the building's most business-critical functions and satisfy the growing demand for bandwidth on the newly available CBRS spectrum. Wi-Fi and Private LTE/5G are key private networks. + Bluetooth, Zigbee, LoraWAN and others



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The Problem: Poor in-building cellular signal



Why would I need an amplifier?

- Frequent dropped calls
- Poor call quality
- Low cellular data speeds
- Multi-Factor Authentication
- Safety and Security



What causes a weak signal?

- Building materials like *Low-E glass*
- Surrounding landscape
- Distance from cell tower

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Solutions for Improving Cell Coverage



Femtocells

- Mostly private enterprise – normally connected via internet, usually single-carrier; mostly privately-funded

Wi-Fi Calling

- Phones connected to network via internet connection.

Active DAS (Distributed Antenna System)

- Large public venues; typically, privately-funded

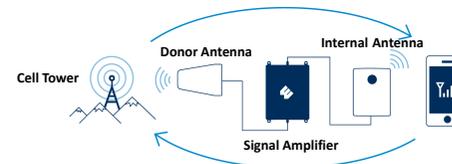
Passive DAS

- Capture an existing outside signal, then bring it inside
 - Industrial: High-power (each site requires approval) and expensive
 - **FCC Part 20: Pre-Approved, Carrier-Agnostic, No Internet Connection Needed, Quick Deployment Time, and Cost-Effective**

* WilsonPro designs and manufactures FCC 'Part 20' passive DAS solutions.

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Easy Solution: Passive DAS



Passive DAS systems are:

- Preapproved by the FCC and all Carriers
- Cost effective
- Quick to install, no approvals needed
- Multicarrier

- ⚡ Brings outside signal into the building
- 📶 Powers all cellular in-building solutions
- 📶 Amplifies to FCC standards for optimal uplink and downlink performance
- 🖱 Remote managed monitoring solutions available

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WILSONPRO™

DAS (distributed antenna system)

Myth: "DAS is difficult, and we can't do it"

Don't miss out on this revenue by passing these opportunities to someone else.

Passive DAS systems do NOT require:

- Extremely Technical Engineering Staff
- Relationships with Cellular Carriers
- Carrier Coordination and Approvals
- Expensive Test Equipment & Software
- 1-3 years of install time

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Becoming an Integrator in Wireless Contractor Skills Needed

<p>Installation</p> <ul style="list-style-type: none"> • Pulling cable (Coax, Category, Fiber, Composite fiber/copper) • Termination & Connectorization • Cable Sweep Testing • Hanging antennas • Rack & Stack equipment • Rooftop antenna installation 	<p>Technical</p> <ul style="list-style-type: none"> • General Radio Operators License (GROL) • NICET Certification • RF Engineer with iBwave certification • DAS/Small Cell OEM Certifications • Use of test equipment & post processing data for reports • Commissioning expertise
<p>Handshake</p> <ul style="list-style-type: none"> • Benchmark signal testing • Acceptance and annual tests • Carrier & AHJ relationships • Coordination & requirements • Selling to your customer base 	<p>Direct Costs</p> <ul style="list-style-type: none"> • iBwave license \$60K • RF Engineer - \$120K annual salary • Test Equipment \$60K +

CENTERLINE

GraybaR.

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Becoming an Integrator in Wireless – Filling Gaps

<p>Hire or Train needed technical skills</p> <ul style="list-style-type: none"> • Develop carrier/AHJ relationships • Acquire test equipment & design software • Gain reputation & sales knowledge <ul style="list-style-type: none"> High Cost High Risk Long-term Higher Revenue/Margin Higher Control 	<p>Acquire an existing DAS integrator</p> <ul style="list-style-type: none"> • Established Business • Established Relationships • Established Revenue <ul style="list-style-type: none"> High Cost Low Risk Short-term Higher Revenue/Margin Higher Control 	<p>Partner with a turn-key integrator</p> <ul style="list-style-type: none"> • Quick and reliable solution • Lack of project control • Deal runs through integrator • Margin stacking <ul style="list-style-type: none"> Low Cost Low Risk Short-term Lower Revenue/Margin Lower Control 	<p>Subcontract technical services</p> <ul style="list-style-type: none"> • Engineering services firm • OEM design services • Instant, Project Control, Deal runs through EC, Cost specific to project <ul style="list-style-type: none"> Low Cost Low Risk Short-term Higher Revenue/Margin Higher Control
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COMMON SERVICES

CENTERLINE

Commercial Cellular/Private LTE/Wi-Fi	Public Safety ERRCs
<ul style="list-style-type: none"> • Benchmark Testing (Scanner and UE) • Continuous Wave Testing (Indoor and Outdoor) • iBwave, Atoll (Outdoor) and Ekahau RF Design • DAS Commissioning • RF Optimization • Acceptance Testing • PIM and Sweep Testing • Consulting (RFPs, Project Management, Construction Management etc.) 	<ul style="list-style-type: none"> • Initial Coverage Assessment – Grid Test • RF Design with Propagation Analysis • Formal AHJ Submittal Packages • DAS Commissioning & Optimization • Grid and Digital Audio Quality (DAQ) Testing • Interference Mitigation • Consulting • Codes and Standards Training

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RF ENGINEERING SERVICES



COMMERCIAL CELLULAR



EMERGENCY RESPONDER



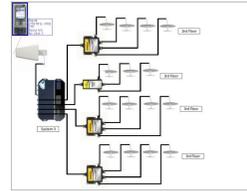
Performed by preferred cabling or Centerline DAS Construction*.

Shades of red performed by in-house Centerline talent as needed.

DAS Construction only available in select markets*

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Resources, Tools, and Training Available



Many options for online and in-person training classes to get you and your team trained on DAS Solutions.

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Grow Your Business Through Wireless Questions?



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Key Markets



Education



Office



Hospitality



Healthcare



Venues



Retail





RF DESIGN

Centerline is the wireless industry's most trusted name in DAS, Small Cell & Private Wireless design.

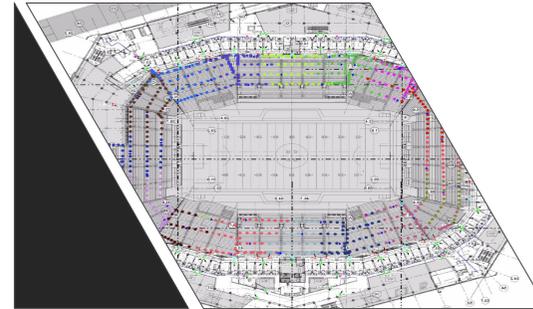
- iBwave, Ekahau and Atoll Expertise
- Proficient in All Venue Types
- Indoor and Outdoor Applications
- OEM Agnostic



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DATA COLLECTION



- ✓ Benchmark Testing
 - ✓ Walk and Drive Testing
 - ✓ RF Scanner and User Equipment (UE)
- ✓ Continuous Wave (CW) Testing
 - ✓ iBwave Model Tuning
 - ✓ Outdoor Small Cell Modeling
 - ✓ Uplink/Downlink Testing
- ✓ Optimization and Acceptance Testing
 - ✓ Throughput Testing
 - ✓ Near-Real Time Post-Processing

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COMMISSIONING + OPTIMIZATION

Commissioning is more than just "green-lighting". It's delivering a network that performs.

OEM CERTIFIED

Not only are we certified, but in many cases, we are the team OEMs use to commission their systems.

BATTLE TESTED

Centerline has commissioned and optimized the most complex systems out there for every carrier and neutral host

BOOKEND APPROACH

Hiring Centerline to commission the systems we design is a proven recipe for success.



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Where do I start?



Signal Booster

- Up to 25,000 sf per system
- Cover multiple cellular carriers
- Fill coverage holes or whole smaller buildings – up to 100K sf
- Installed as a kit from OEM
 - Pre-terminated cable
- Online carrier registration
- Easy to install, quick training, short sales cycle, **high margins**



Public Safety ERRCS/ERCES

- Code required in many municipalities – new construction & renovation
- Must install to gain Certificate of Occupancy
- Most solutions are simpler passive DAS
- EC is higher in the stack (Division 27 Specs)
- EC or Fire Alarm Contractor

must pull permit



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