Atlas and Viking Overview

April 12, 2016

Mission

EFJohnson focuses on innovating, developing and marketing the highest quality secure communications solutions to organizations whose mission is to protect and save lives.

Making Safe, Simple™

MY TRANSLATION:
- *We're building best in class P25 solutions - SAFE*
- *Simple to build, use, and maintain – SIMPLE*
- *Easiest working relationship in the industry - EASY*

Making Safe, Simple™

EFJohnson TECHNOLOGIES
JVC KENWOOD Group

EFJohnson History

92+ years in radio business

1923 | E.F. Johnson Company was founded

1939 | First public safety product was manufactured

1960 | Entered land mobile radio market

1980 | First company to introduce trunked systems for public safety

1995 | Founding member of Project 25 Standards Group

2004 | Moved headquarters to Texas

2005 | Introduced distributed architecture system

2011 | Hardware completely redesigned (ATLAS® and Viking®)

2014 | Acquired by JVCKENWOOD

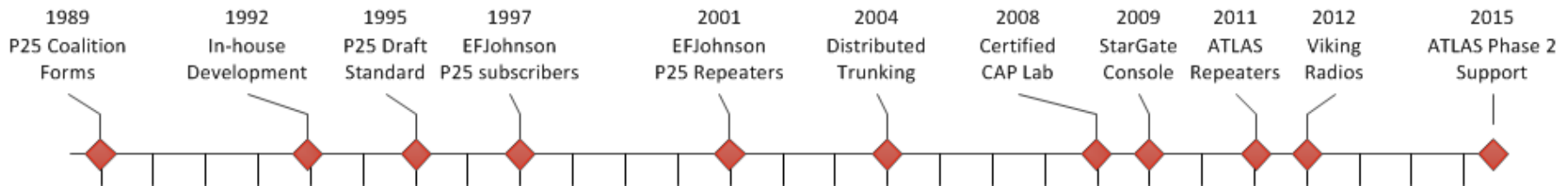*- Edgar F. Johnson*

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Interoperability

Dedicated to P25 interoperability

EFJ operates one of only eight (8) certified Compliance Assessment Program (P25 CAP) labs in the United States

- To get a radio P25 CAP certified, it must be tested in 3 labs and fully pass
- EFJ has tested products from all major P25 radio vendors

John Oblak, EFJ Vice President of Standards & Regulatory Affairs for EFJohnson, Chairs the TIA P25 Committee

EFJohnson has developed P25 products for over 20 years!

| 1989 P25 Coalition Forms | 1992 In-house Development | 1995 P25 Draft Standard | 1997 EFJohnson P25 subscribers | 2001 EFJohnson P25 Repeaters | 2004 Distributed Trunking | 2008 Certified CAP Lab | 2009 StarGate Console | 2011 ATLAS Repeaters | 2012 Viking Radios | 2015 ATLAS Phase 2 Support |

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EFJohnson TECHNOLOGIES

JVCKENWOOD Group

EFJohnson TECHNOLOGIES | **KENWOOD** | **JVC** | **ZETRON**

ATLAS®

VIKING

Turnkey Mission Critical Communications Solutions Provider

Solutions	**Products**	**Subscribers**	**Accessories**	**Services**
- Conventional	- Repeaters	- Portable Radios	- Audio	- Radio Network Design & Installation
- Trunked	- Interfaces	- Mobile Radios	- Antennas	- Training & Certification
- Hybrid	- Gateways	- LTE	- Batteries	- Extended warranty
- Simulcast	- NMS	- Radio Configuration Software	- Chargers	- Maintenance
	- Dispatch		- Cases	

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Representative Customers

U.S. Army

U.S. Dept. of Homeland Security

U.S. National Guard

U.S. Air Force

Fort Mojave Indian Tribe

State of Wisconsin
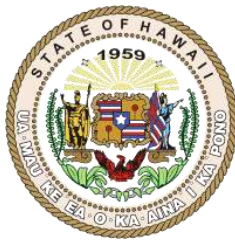
State of Hawaii

Washington DOT

Waterbury, CT

Will County, IL

Huron County, MI

Yukon Territory

Toronto Pearson International Airport

Dallas-Fort Worth International Airport

Puerto Rico State Police

Taipei City Police Department

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Land Mobile Radio Infrastructure

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ATLAS P25 Value Proposition

- **Simple system design, simple building blocks**

- **Industry leading reliability/redundancy**
  - No central controller

- **Low total cost of ownership (TCO)**
  - No system license fees
  - Perpetual feature licenses for subscribers

- **Simple, seamless interoperability**

- **Guaranteed solution**

- **No games**

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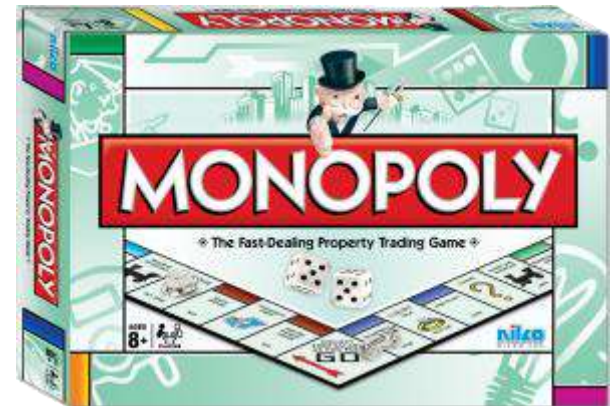
ATLAS P25 System Solution

It's Simple – Only 4 Basic Components

ATLAS® Repeater

ATLAS® NMS

ATLAS® StarGate Console

ATLAS® Controller

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Phase 1 to Phase 2

2010 ▸ 2011 ▸ 2012 ▸ 2013 ▸ 2014 ▸ 2015 ▸ 2016

80 Sites at WISCOM

20 Sites at WISCOM

4100

20 Sites at WISCOM

4200

ATLAS 4500

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ATLAS P25 System Solution
Industry Leading Redundancy and Reliability

ATLAS® Distributed Architecture

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ATLAS P25 System Solution
Simple and Seamless Interoperability

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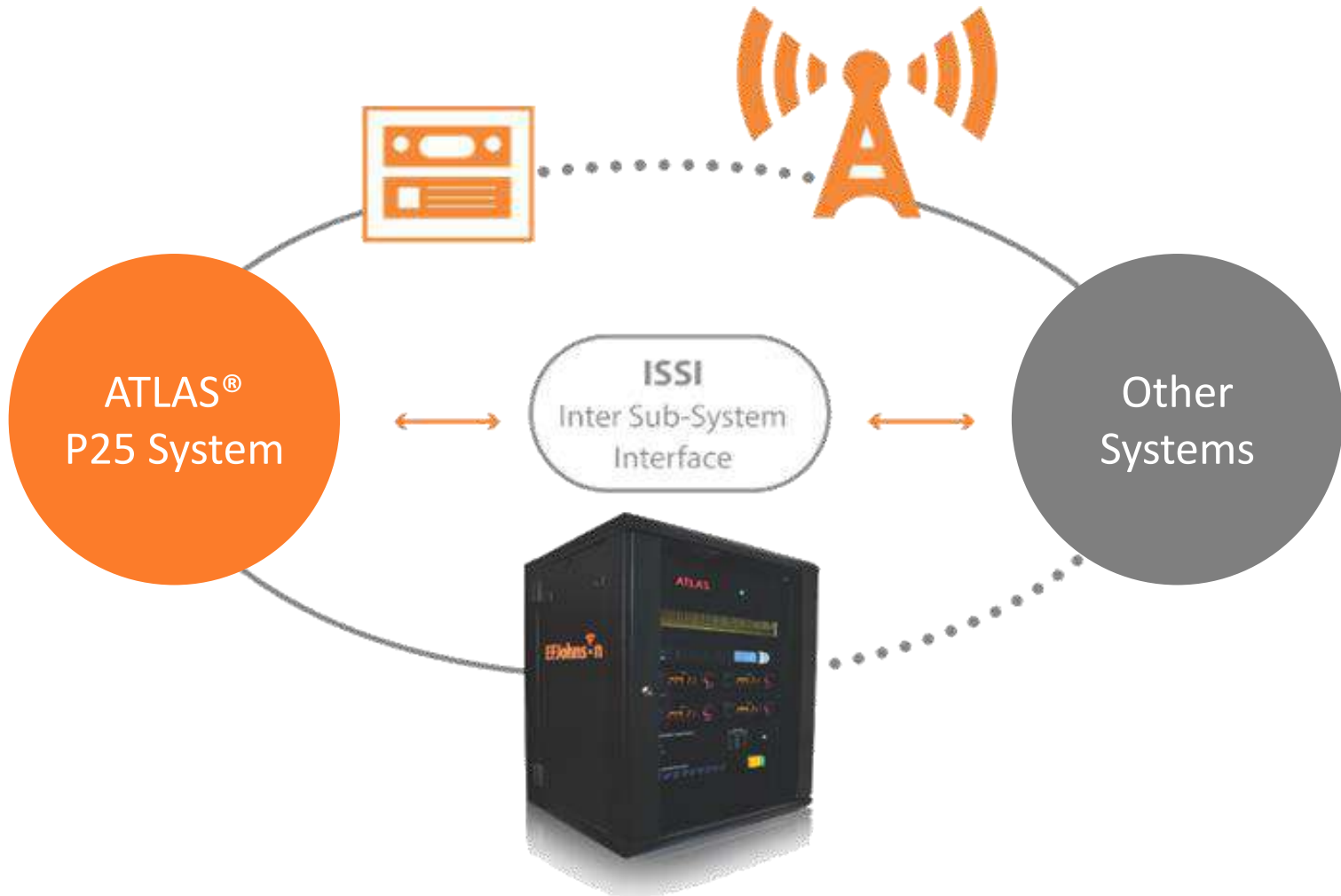
ATLAS P25 System Solution

Low Total Cost of Ownership

EFJohnson has a Turn-Key Solution with No License Fees

Everything is Included in Initial Price

Upgrade Fees & Services

Enable Capabilities

Add Users & Talkgroups

Initial Price

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OTHER VENDORS

- No new license fees as needs change
- No vendor originated change orders
- Software upgrades and all services included in optional maintenance

- Less training and fewer spares
- Save time and frustration due to outages
- Save electricity, thousands per repeater
- Less cooling and less floor space

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If for any reason we do not deliver what we have
promised, we will fix it at no charge.

ATLAS
Distributed Architecture

Robust, reliable, no single points of failure

Things never go wrong at the <u>best</u> possible time. Making sure your system has no single point of failure is the only way to ensure reliable communications.

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ATLAS P25 System Solution

Distributed architecture - details

- Full network control capabilities everywhere

- Redundancy in-depth at reduced cost

Conventional Subsystem

Trunking Subsystem

IP Network Cloud

Master Core

Dispatch Console

Centralized Architecture

Simulcast Subsystem

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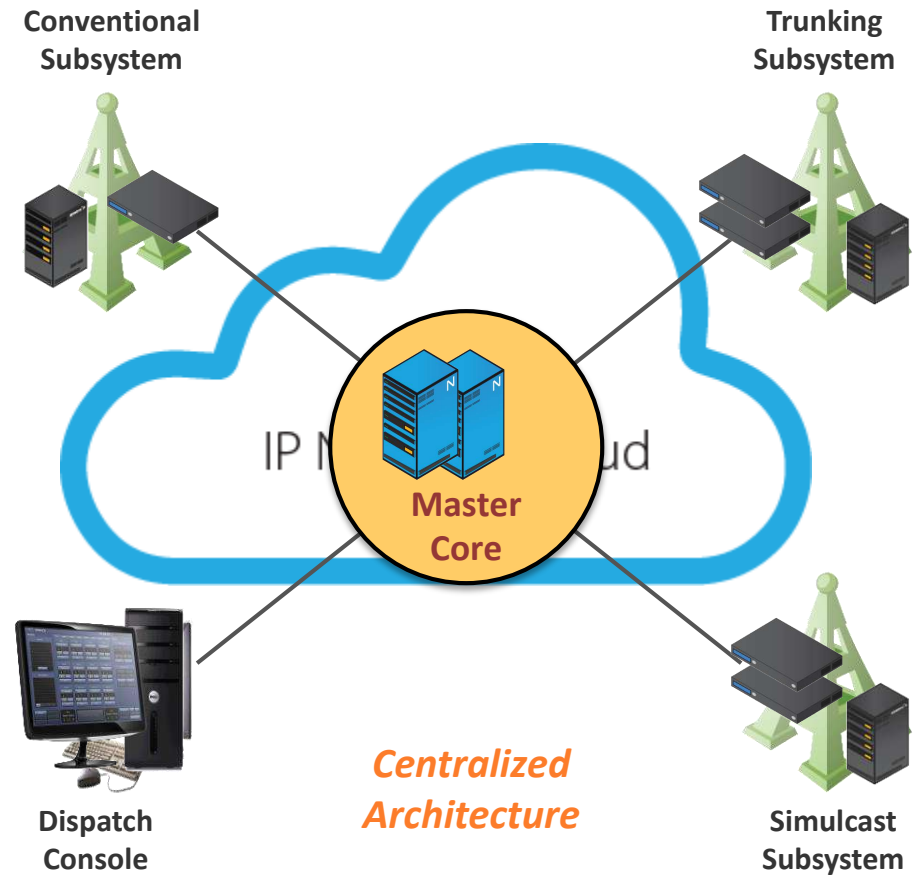
A central core has no place in a 21ˢᵗ century

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ATLAS P25 System Solution

What is a core - other than a single point of failure?

Simple is better

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Centralized Solution

What's wrong with a centralized network?
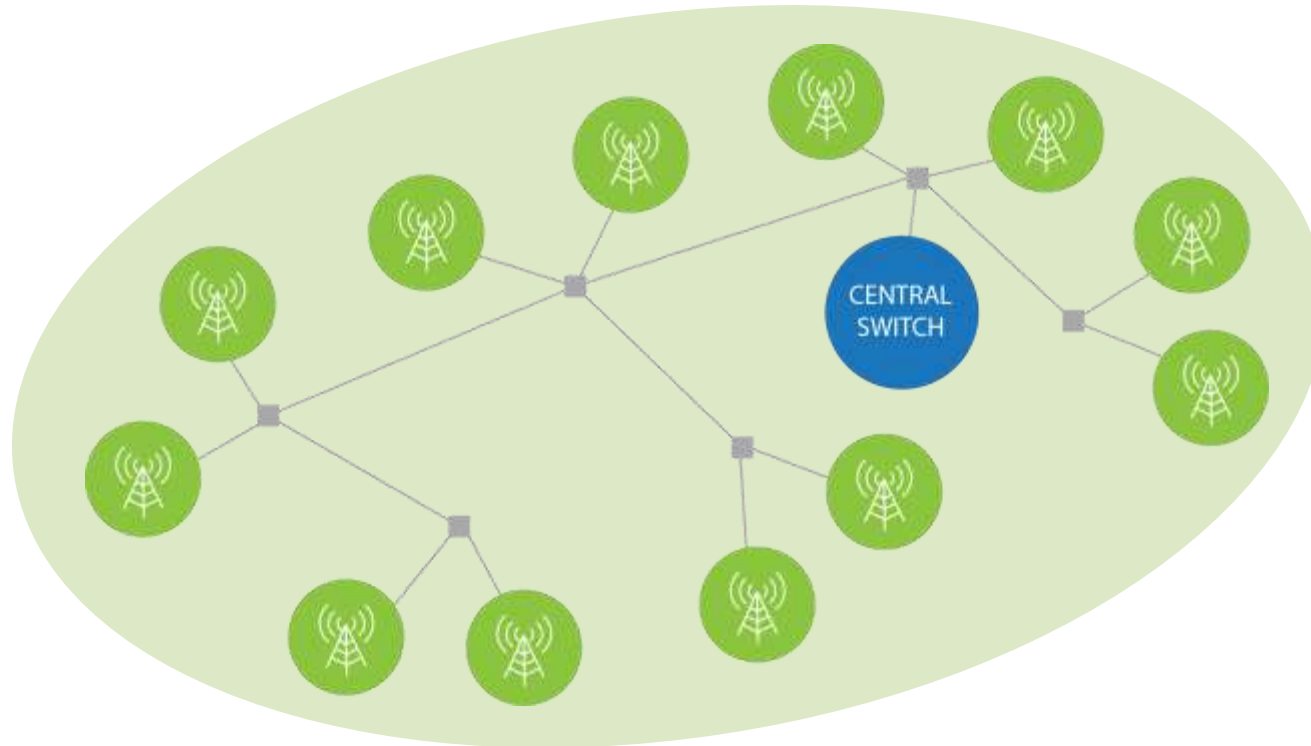
- Requires costly proprietary centralized audio switch
- All calls routed through single location
- Loss of core switch: single site trunking failure mode for everyone!
- Two centralized switches needed if operational redundancy is required

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Centralized Solution

Controller failure affects the *entire* system!
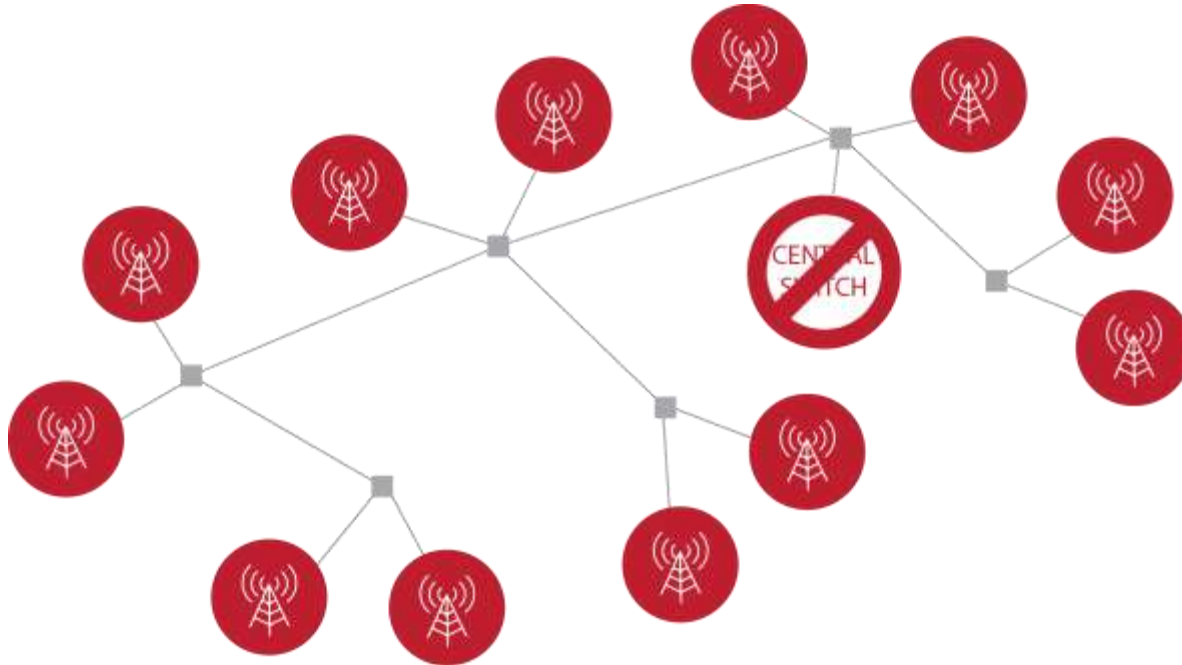
One failure... large impact to operation

All sites goes to site trunking

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Centralized Solution

Network failure means only *most* sites are affected!
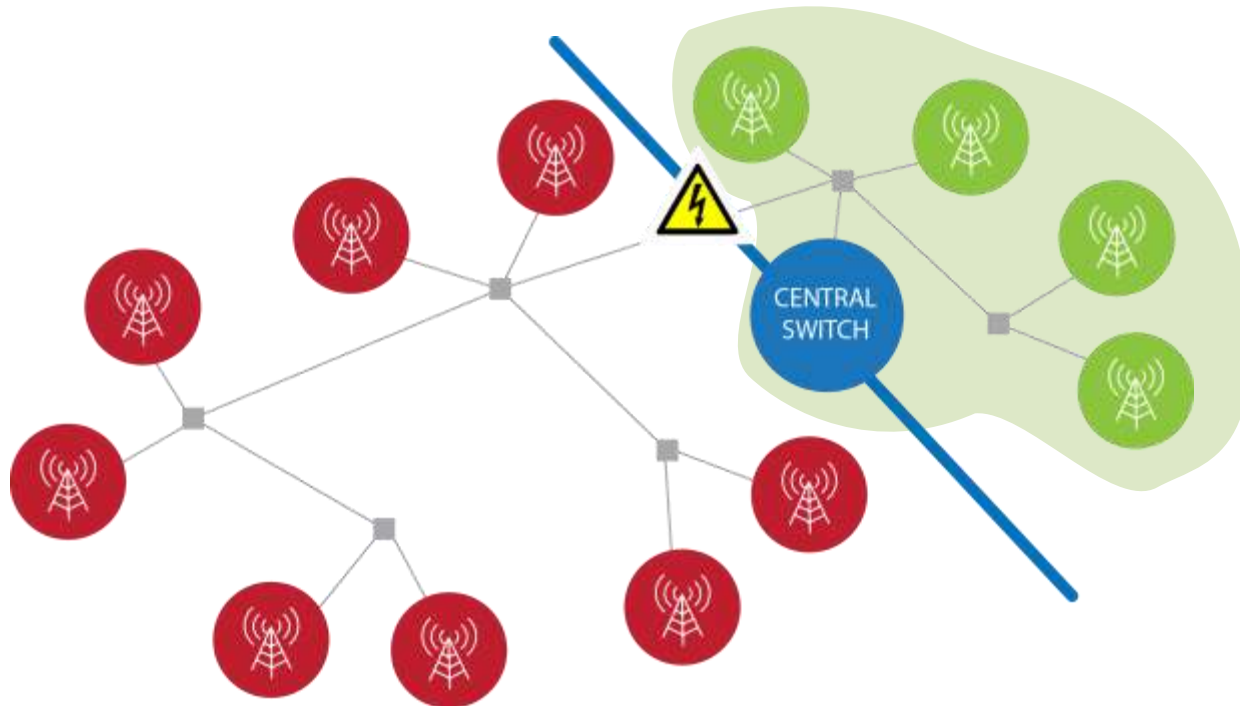
One failure... large impact to operation

Multiple single site systems

ATLAS P25 Distributed System

Central controller failures are impossible!
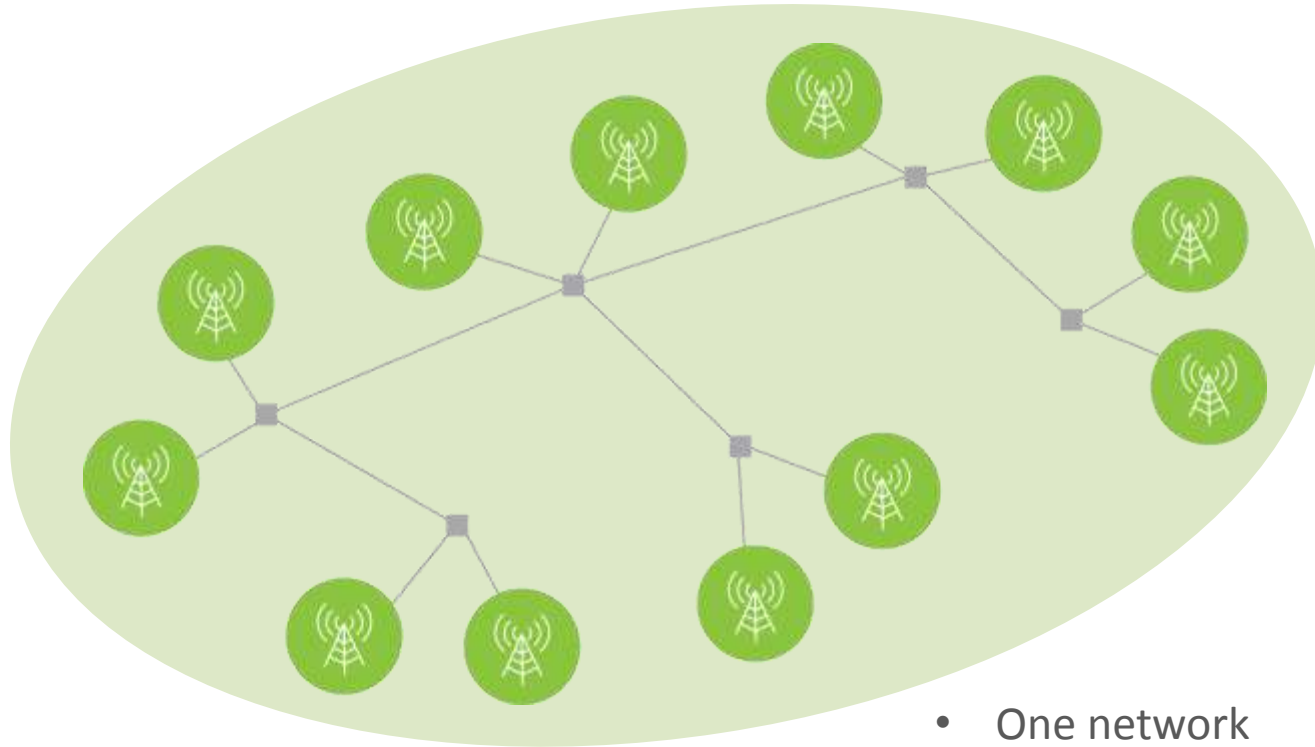
- One network
- No central controller

No central controller means no central controller failure

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ATLAS P25 Distributed System

Network failure effects are minimized
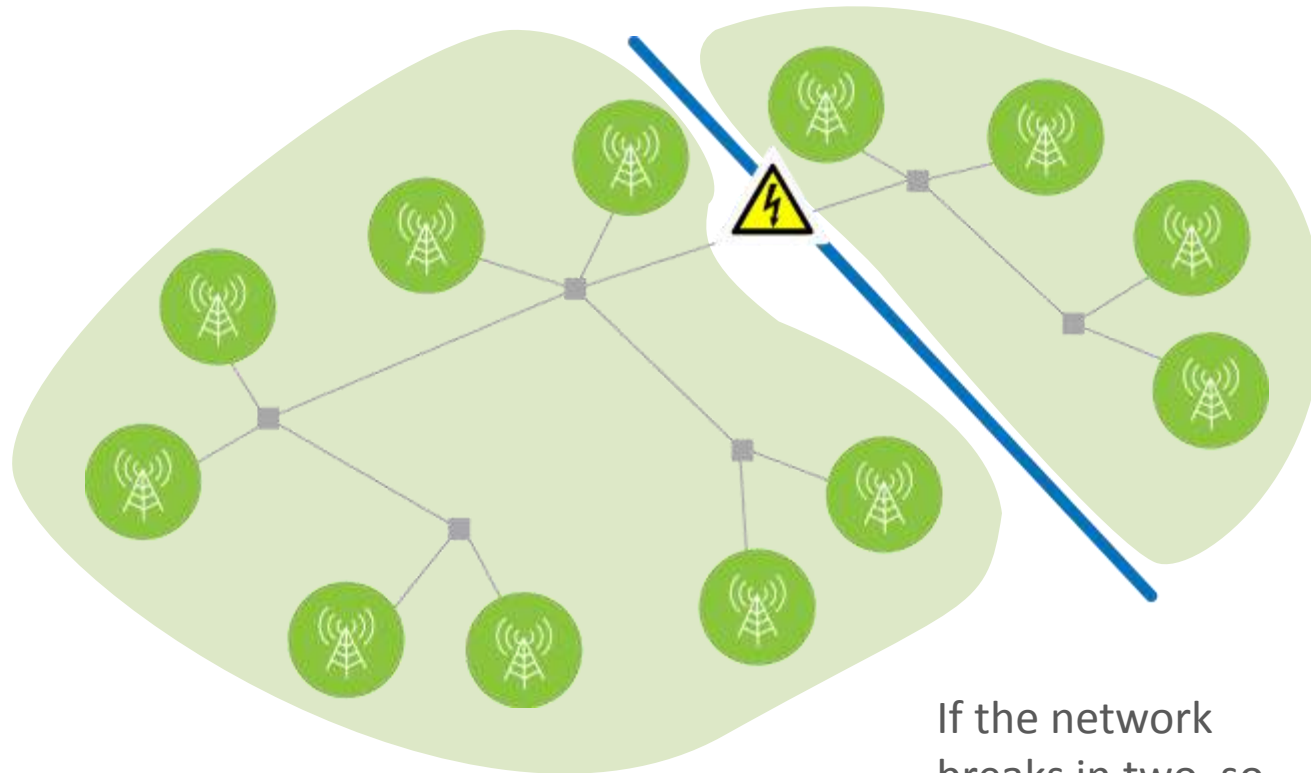
If the network breaks in two, so does your system

Each segment retains full multi-site capability for their coverage footprints

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ATLAS P25 Distributed System

Handles multiple network failures gracefully
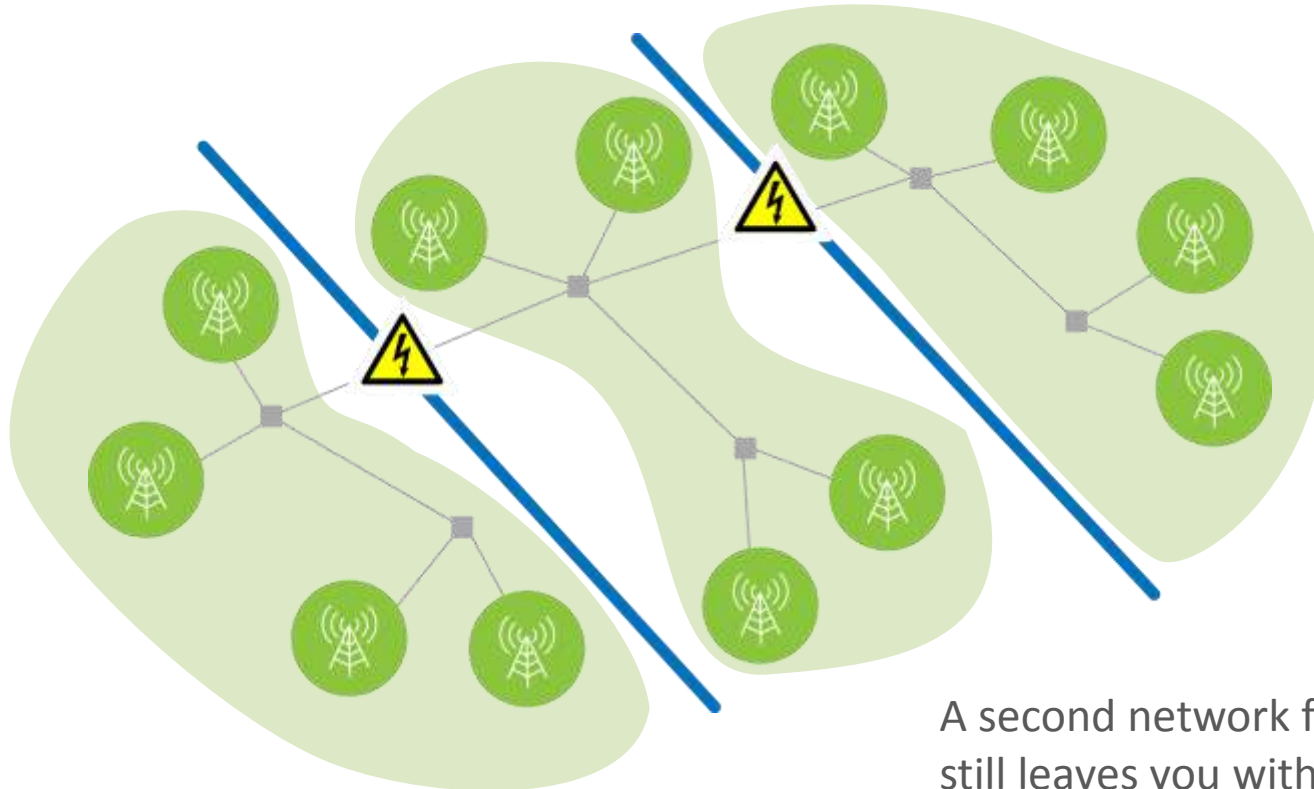
A second network failure still leaves you with fully functioning subsystems

Each segment retains full multi-site capability for their coverage footprints

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ATLAS P25 Distributed System

Automatic recovery
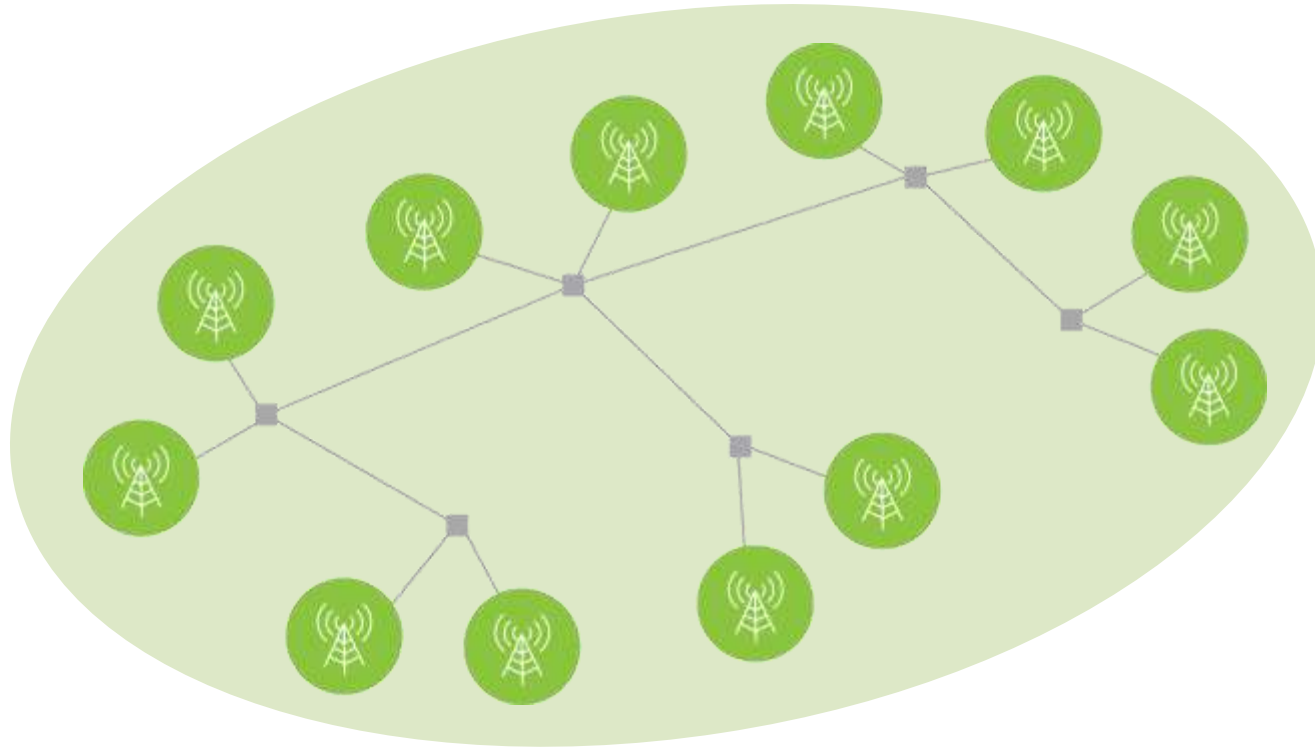
When network connectivity is re-established ATLAS detects it and repairs the system with no human intervention

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ATLAS P25 Simulcast Solutions

What is it?

Simulcast is the simultaneous transmission
of the same radio signal from multiple sites

Only two reasons to use

- Efficient use of frequencies
- Provides better penetration of radio signals
  into and around buildings

Key technical challenge

- Make sure identical signals reach the
  places you care about at the same time.
- An old problem with a new answer

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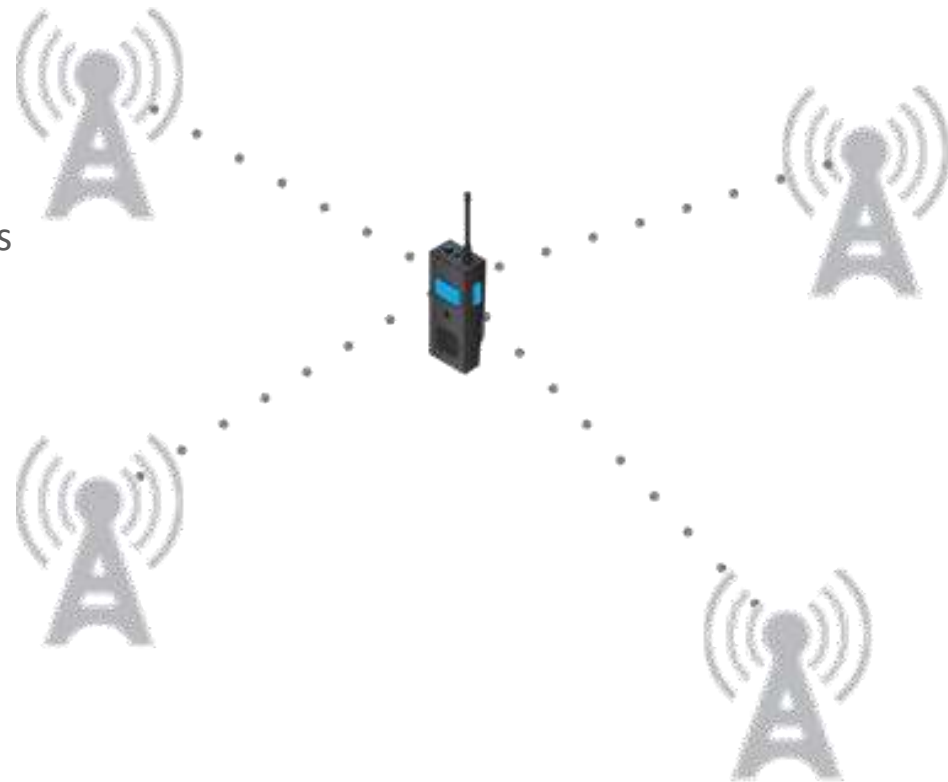
ATLAS P25 System Solution

Simulcast

Prime Sites have outlived their usefulness

- Digital tuning and ultra-reliable time references eliminate the need

EFJ uses a "Master Channel" instead of a "Prime Site" to control the launch

- The "Master Channel" site is different for each channel, distributing the functionality
- Enables failover without interference

Proven simulcast technology

- EFJ solution utilizes a simulcast technology that has been successfully used in hundreds of systems

Prime Site Based Simulcast

ATLAS® Master Channel Based Simulcast

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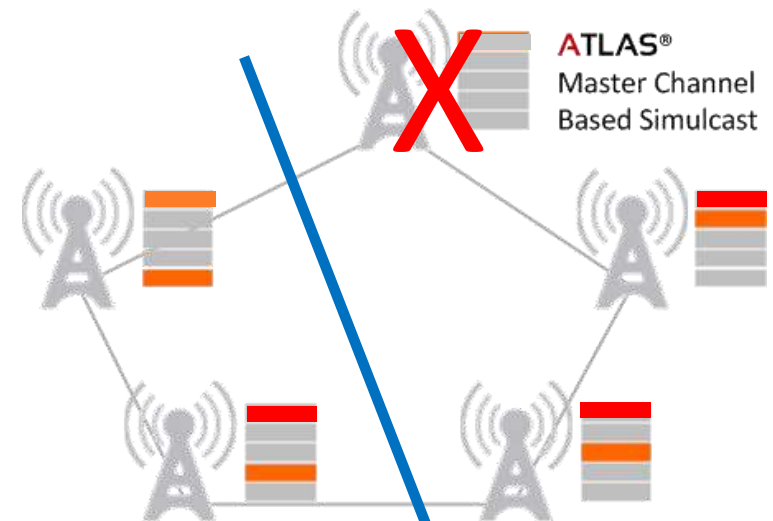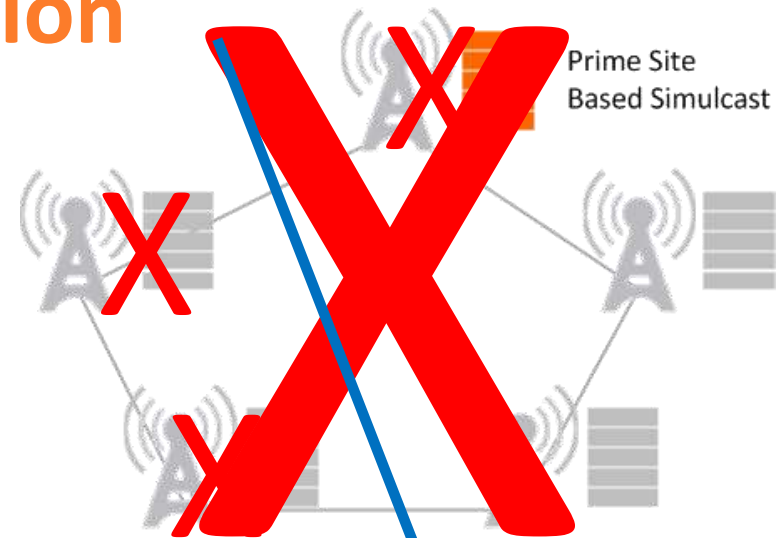
ATLAS Simulcast System

Centralized Architecture

Prime Site

Wide Area Controller

IP Network Cloud

- Six level of Prime Site Redundancy

- Wide area controller at every site

- Higher redundancy at reduced cost

Prime Site

Wide Area Controller

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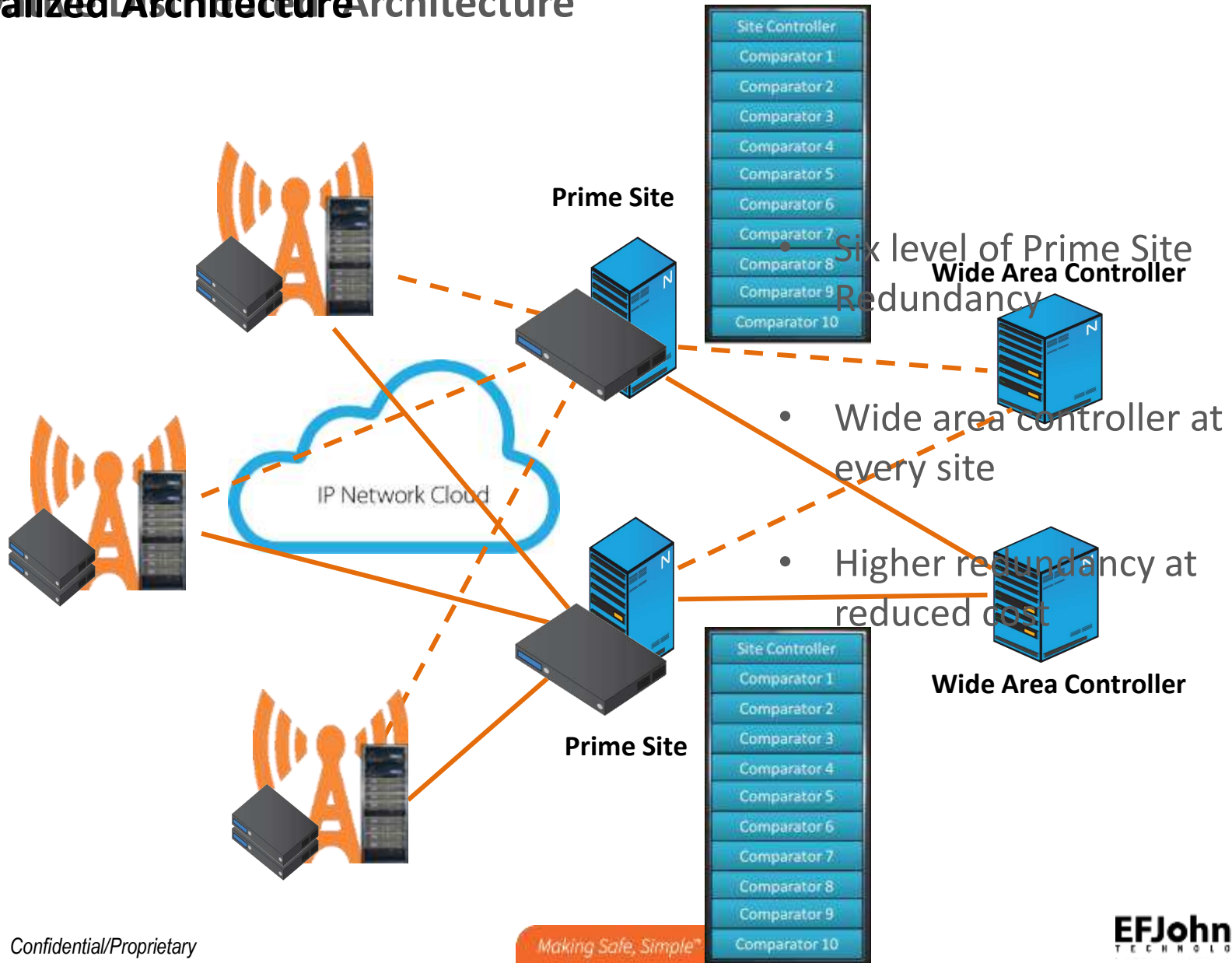
Real World Comparison

When everything is
working, coverage is
the same.

Loss of a site makes all
the difference...
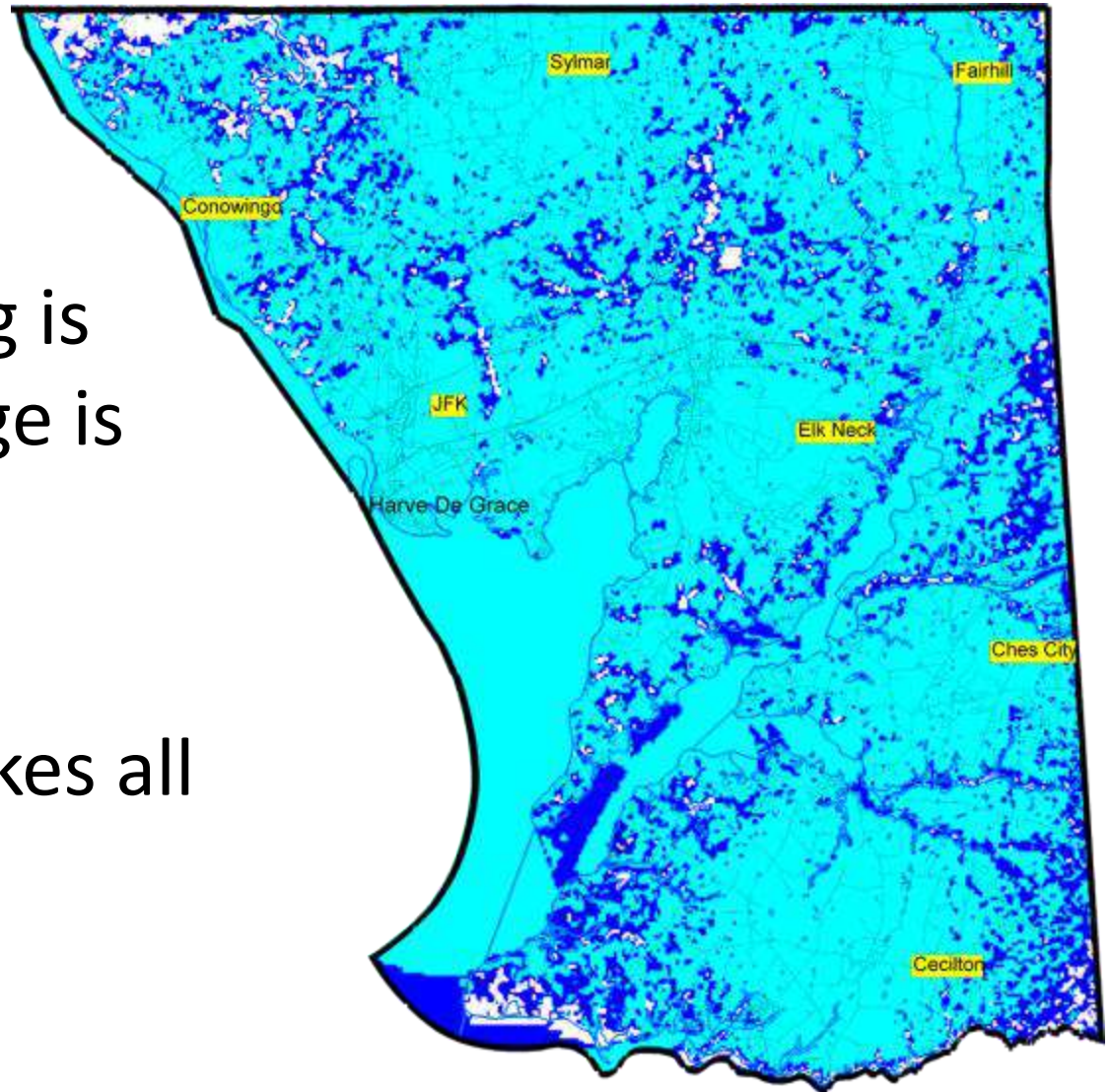
Real World Comparison

Distributed control

With an ATLAS system, If you lose a site you lose only the footprint of that site.

The other sites continue providing coverage.

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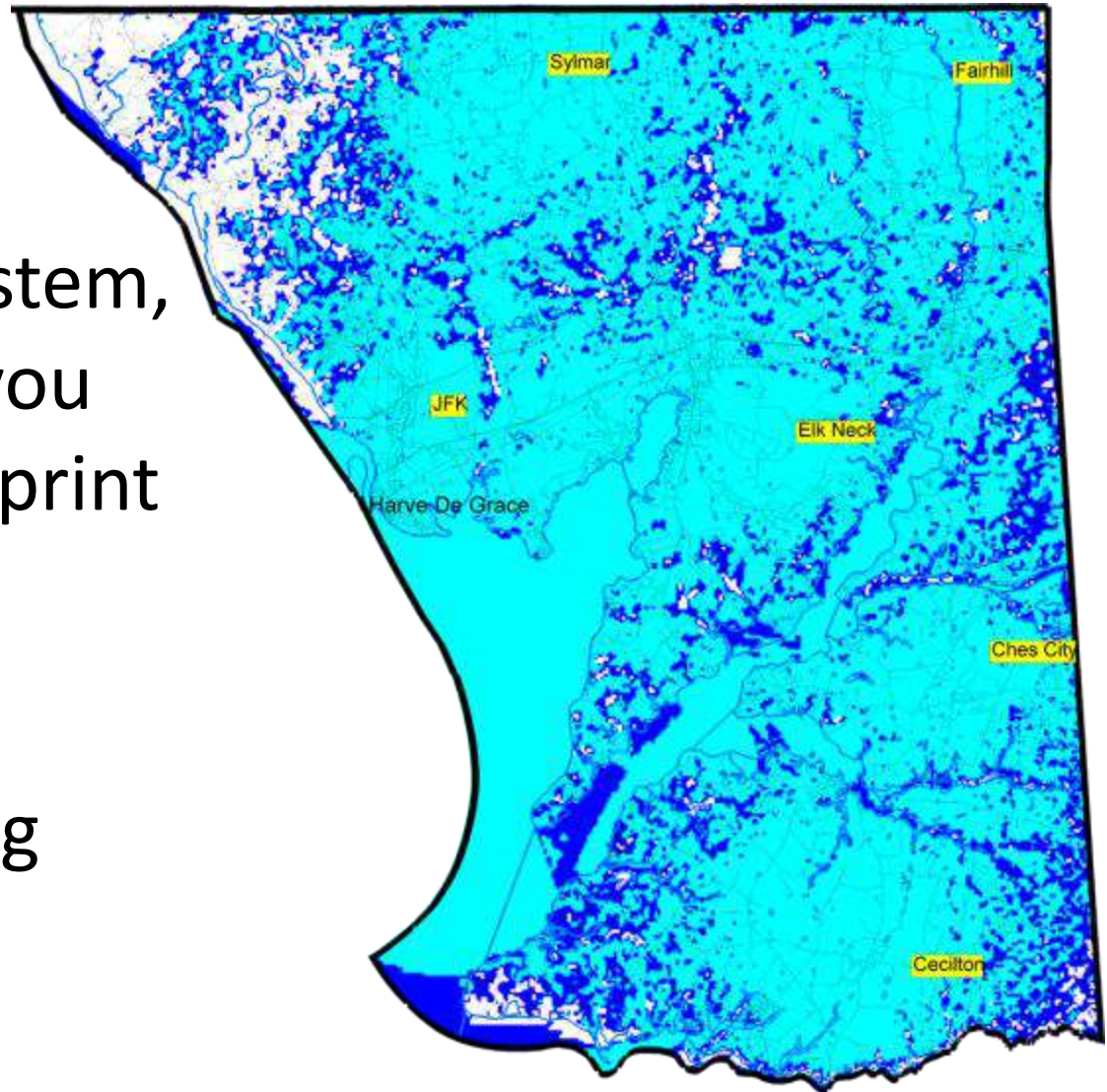
Real World Comparison

Prime Site

Without distributed simulcast, loss of the prime site leaves you without communications.

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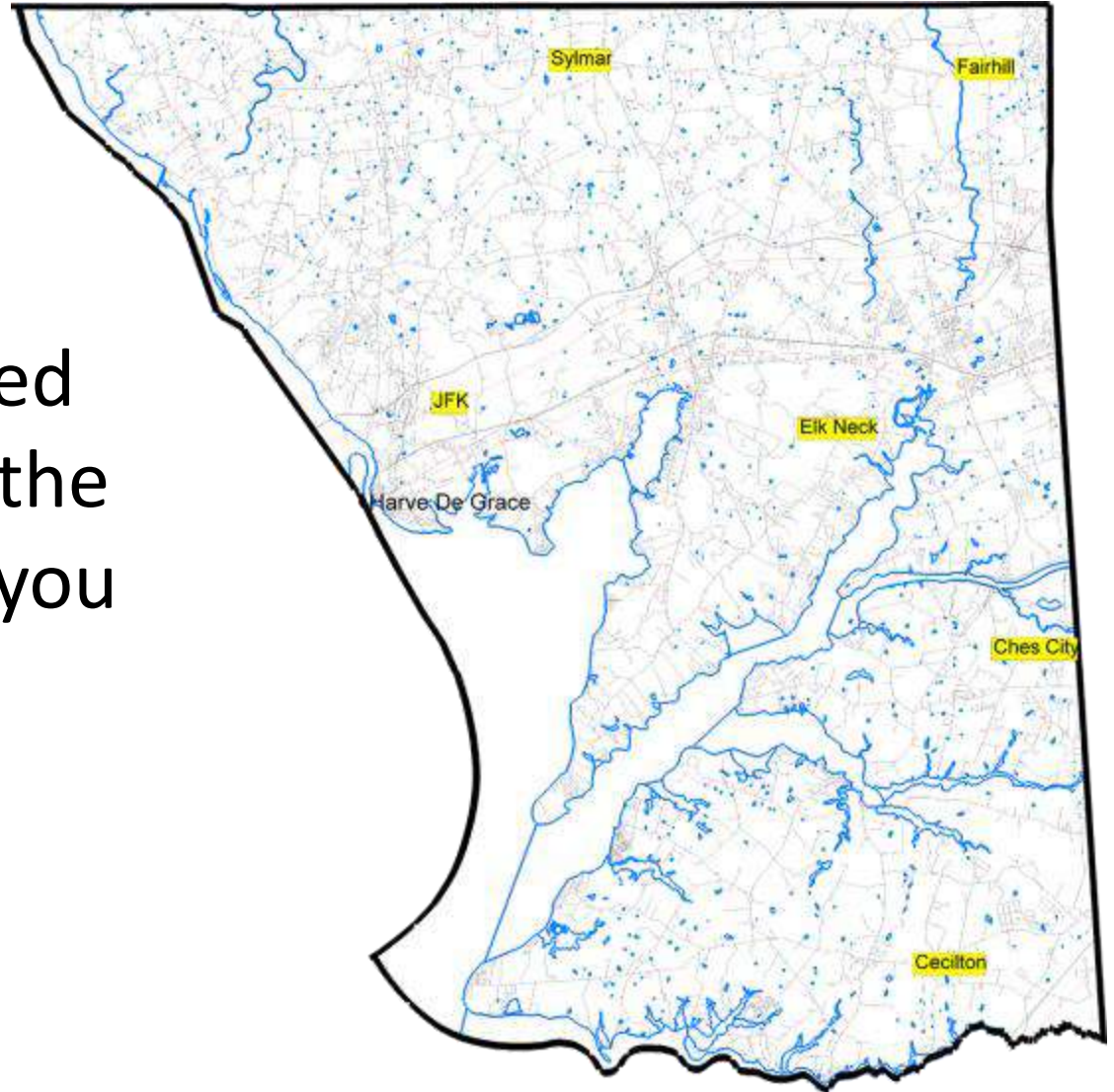
ATLAS P25 System Solution

StarGate® Dispatch Console

ATLAS® 7000 StarGate®

- IP based, **fully distributed**, no central banks of equipment
- Next generation graphical user interface
- Custom sound card
- 10 speaker support
- P25, Control Station, Analog, Multi-Net – pick your flavor
- Multiple monitor capability

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ATLAS P25 System Solution

Network Management System – Basic and Advanced

- Web based client
- Remote configuration
- Remote software upgrade
- Real time fault monitoring
- Fully redundant
- Backup/restore
- Fleet map
- Radio control
- Security/agency management
- Channel/activity monitoring
- Upstream alarm notification
- Statistics reporting
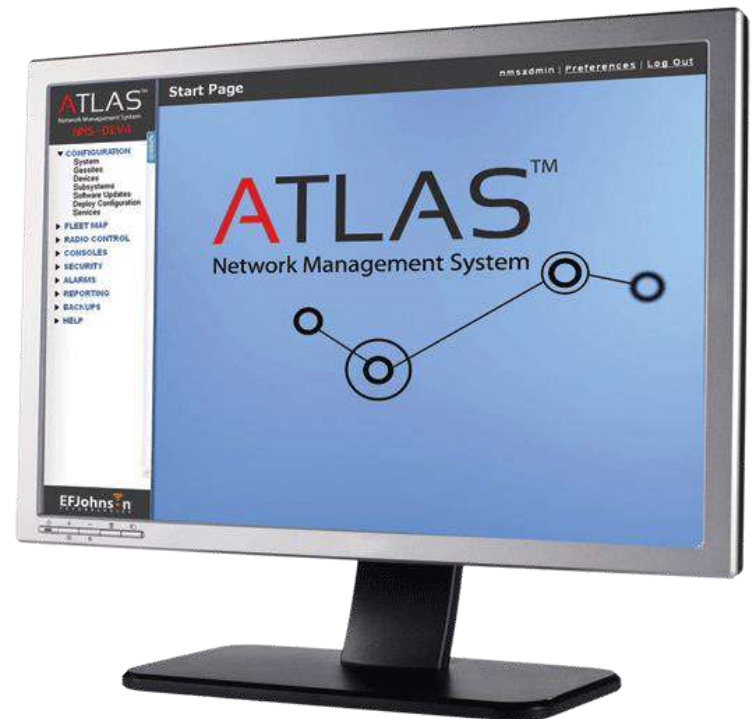
No Licensing – Flat Pricing

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Integrated Alarm Management

SNMPc from Castle Rock
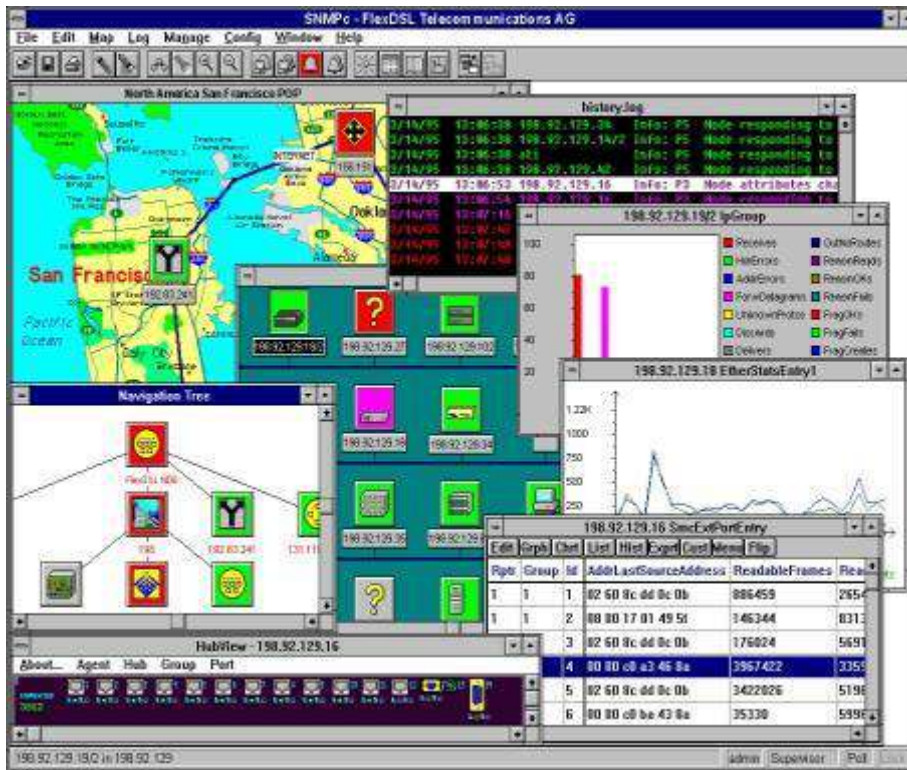
Tabular, Graph, or Map based interface including trends and trend alerts
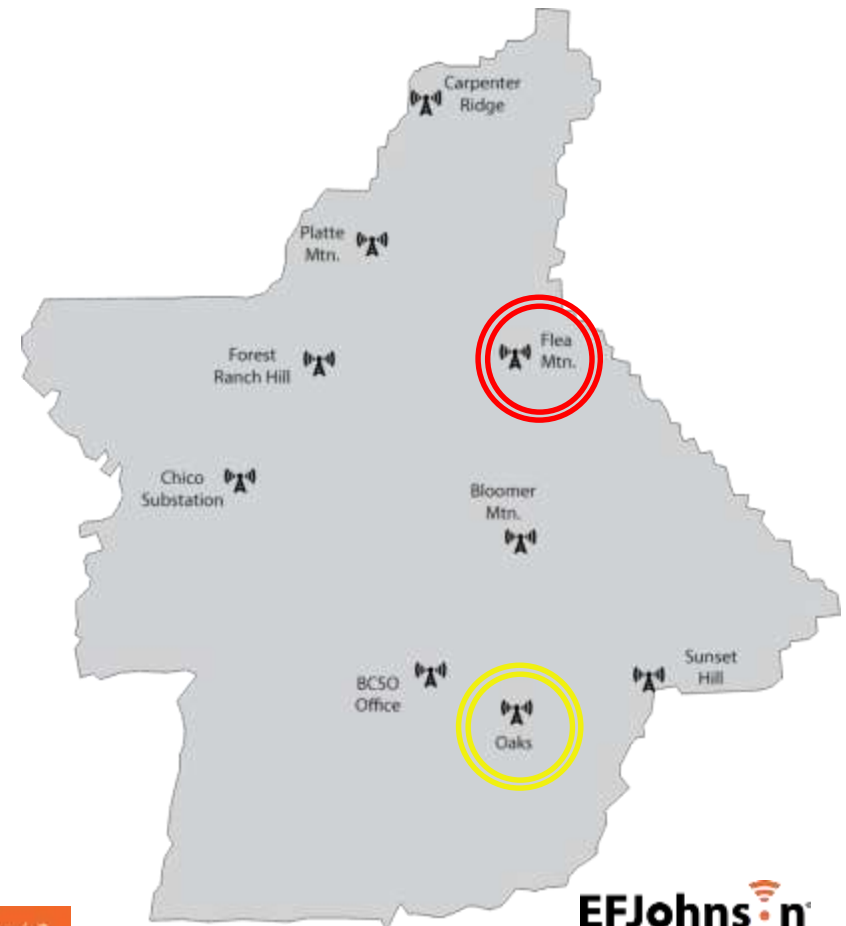
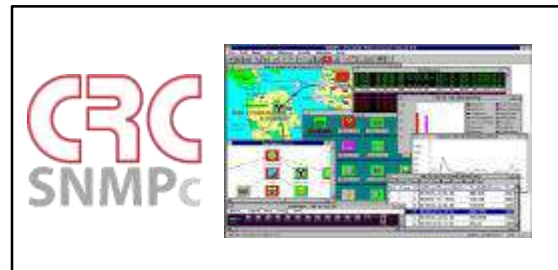Simple unified LMR, Network, Microwave, and Environmental status and reporting

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Integrated Alarm Management

SNMPc from Castle Rock

Network Equipment

ATLAS NMS
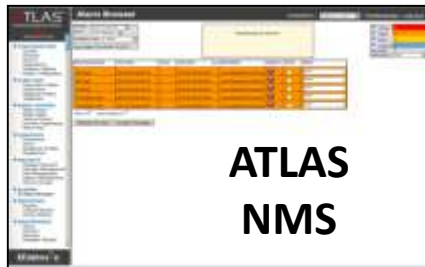
ATLAS Equipment

Microwave Equipment

Physical and Environmental

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Push-to-talk over Cellular

Secure Push to Talk Voice
High Definition Voice Encrypted with AES-256.

Secure Group Messaging
Encrypted Group Text & Image Messaging.

Live Location Tracking
Real-Time Live Location of PTT Call Members.

Bread Crumb Tracking
View Location History via Bread Crumb Maps.

RoIP: LMR Radio Integration
Extend LMR Coverage and add radio capacity.

PC Dispatch
Full Featured PC Based Dispatch Client.

Cloud or Customer Hosted
ESChat Servers deployed as you want them.

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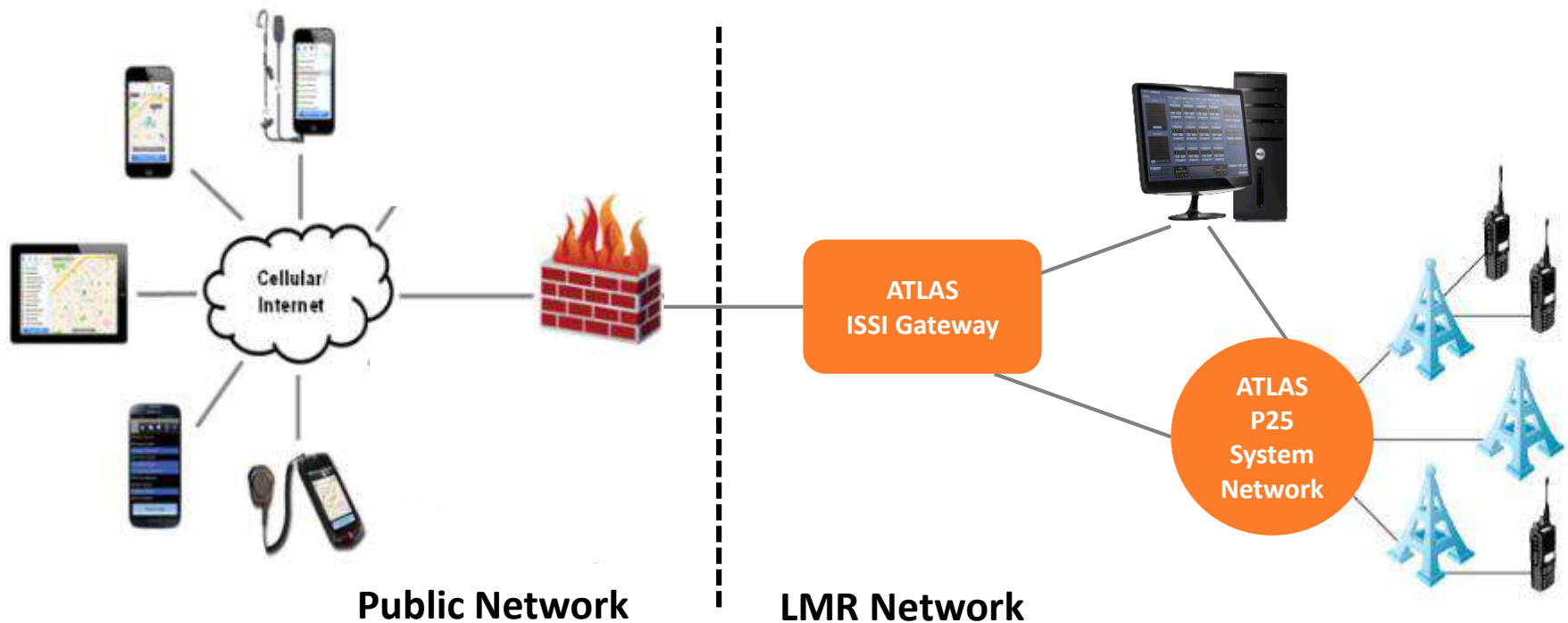TECHNOLOGIES
JVC KENWOOD Group
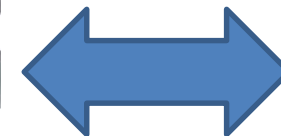
Cellular Integration via Open Standards

ISSI interface eliminates vendor lock-in

ESChat from SLA Corp

LTE25 from Etherstack

ePTT from Kodiak Networks

Public Network

LMR Network

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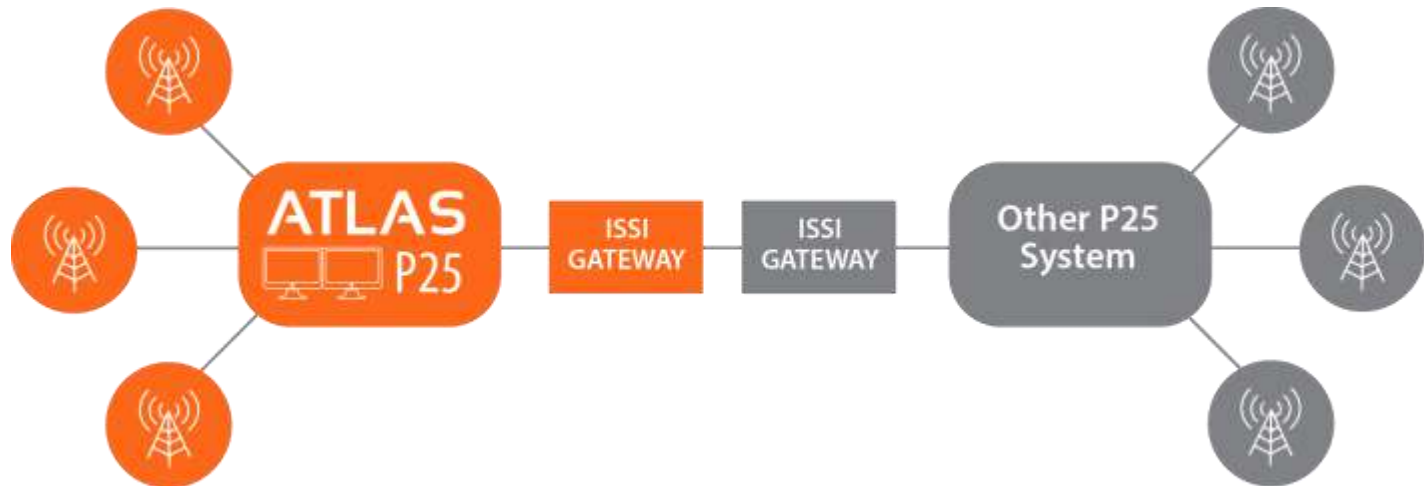
ATLAS P25 System Solution

Interoperability

### Inter RF Subsystem Interface (ISSI)

An ATLAS ISSI gateway supports, and is licensed for four connections, usable for connection to any other P25 systems or for console connectivity via CSSI. EFJohnson ISSI gateways are an extremely affordable access point for ISSI/CSSI.

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ATLAS P25 System Solution

ISSI

- ISSI: Inter RF Subsystem Interface
  - The P25 standard to connect two or more systems together
  - ATLAS supports ISSI

- To make it work:
  - Requires the two different manufacturers to integrate their systems together – required for <u>EVERY</u> implementation
  - Requires the two system owners to coordinate configuration Whenever there is a change it has to be done on both systems to make it work
  - Operationally, some functions (console patching) may need to be done twice
  - How to handle the situation where one or both systems have user fees???

- P25 functionality that hasn't yet lived up to its promise
  - Very few instances fielded & actively working

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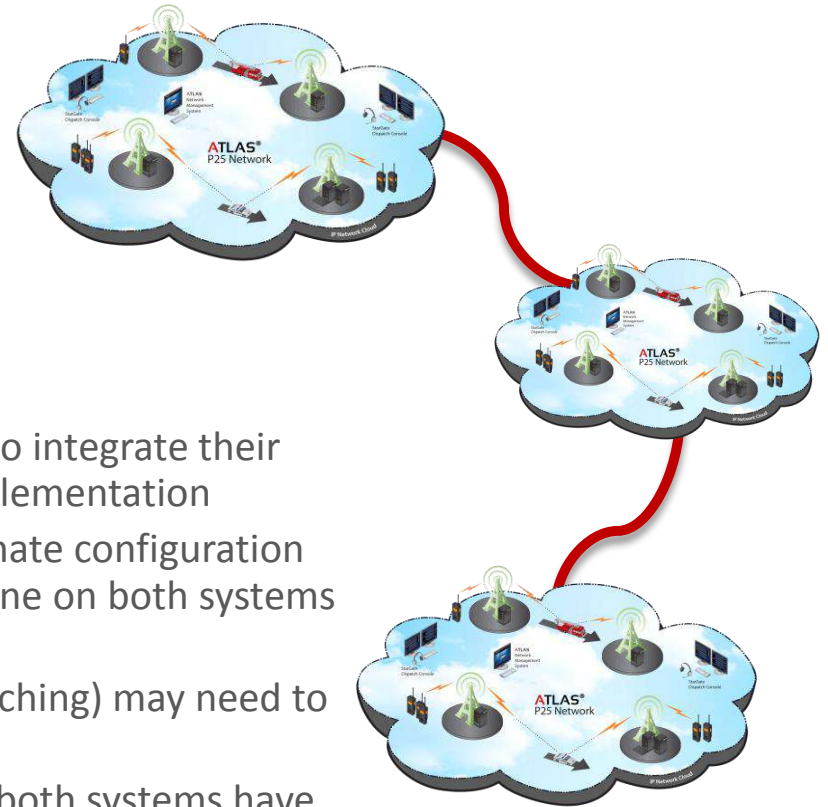
ATLAS P25 System Solution

Interoperability

OPTION 2 | Mobile Radio Gateway
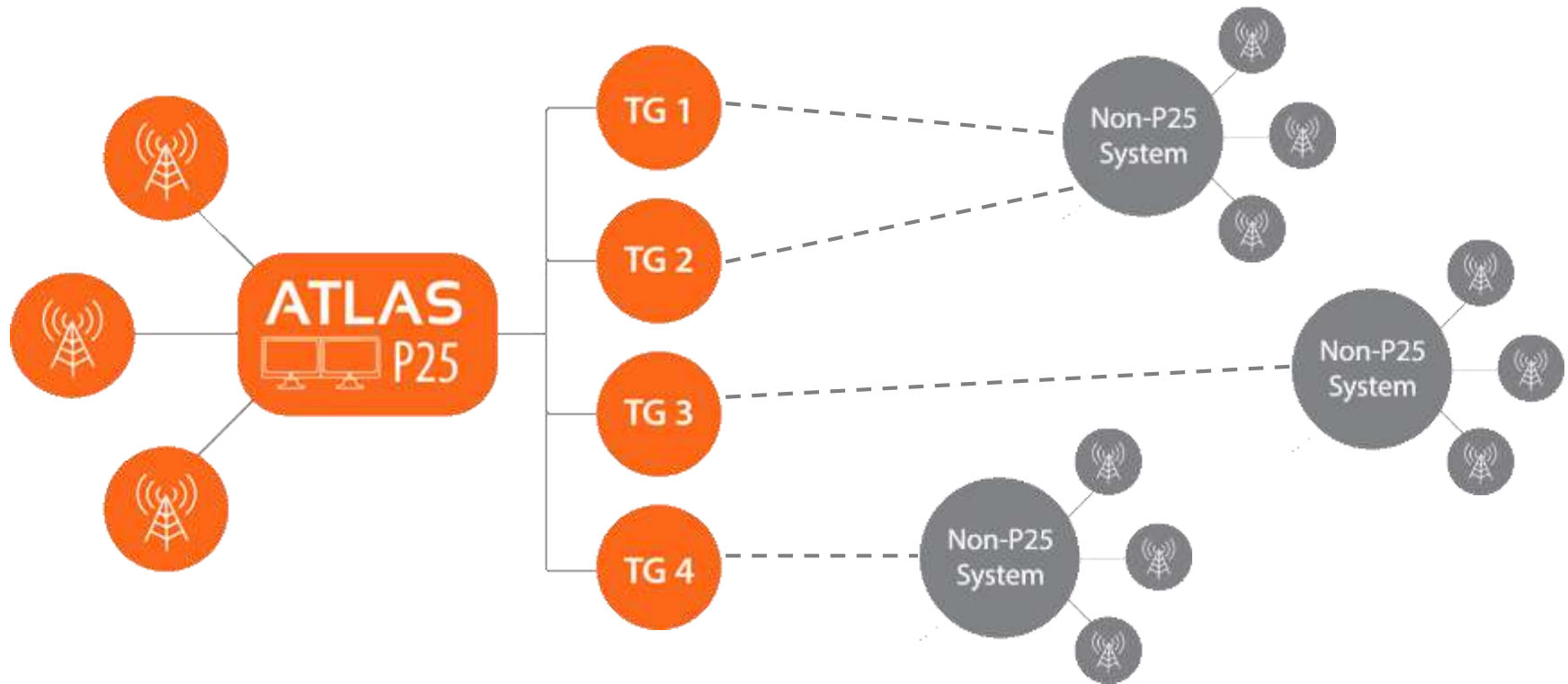
ATLAS P25 System Solution

Mobile Radio Gateway

Excellent in specific situations

- Small number of talkgroups – e.g. area interoperability or off base EMT
- Backup control stations already purchased for use
- Does not require cooperation from other vendors

To make it work:

- Requires a Mobile Radio Gateway for each <u>talkgroup</u>
- Space intensive for large number of talkgroups
- Individual gateways are inexpensive, but large numbers of gateways add up

ATLAS P25 System Solution

Interoperability

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ATLAS P25 System Solution

RConnect™

- Wirelessly connects ATLAS P25 system to another P25 system or to a Motorola SmartNet®/ SmartZone® system

- Provides seamless integration
  - Easy to configure which talk groups to share between the systems
  - StarGate dispatch integration/failover
  - End-to-end encryption
  - Voice quality protection
  - User ID protection
  - Rapid implementation

- Provides dispatch backup, integration, and failover

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Any Questions?

- Reliability – 99.999% or better

- Lowest total cost of ownership
  - No license fees, or sell up/change orders
  - Lower up front and operational costs

- Implement or expand with ease
  - Quickest implementations in our industry
  - No changes to the core to expand

- Flexible, interoperable solutions and personal treatment
  - Use the radios of your choice

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Viking Radios

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Viking Portables and Mobiles

Feature Rich and Interoperable

- P25 Phase 1 and 2
- SN/SZ
- ADP compatible encryption
- P25 Trunked/Conventional and Analog
- Single or Multi-band

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Viking Radios

The industry's best

- Noise Cancellation
- Ruggedized
- Immersion
- Multi-Protocol (system types)
- Multi-Band Options
- Top Display
- Voice Annunciation

Viking

MIL Standard 81OG
IP67

High Capacity Li-Ion battery

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Viking Radios

12 character top display & customizable voice annunciation

Viking

Customizable
Display Information

Customizable
Display Orientation

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Case Study: St. Cloud MN

Customer evaluation of radios for ARMER system - *October 2014*

🐂 **Viking**

The EFJohnson Viking radio was the only one to receive <u>and</u> transmit after being run over, on asphalt, by a pumper truck

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Case Study: Buncombe County, NC

Customer defined destructive mechanical tests - *4Q 2013*

Far beyond the spec sheets

- **Ergonomics** – non-gloved, gloved & blindfolded

- **Vibration** – in paper collator for 5 minutes

- **Noise Cancelling** – fan, chainsaw, pump panel, SCBA

- **Immersion** – 3' in a barrel for 30 minutes

- **Humidity** – Dishwasher steam cycle for 1.5 hours

- **Temperature Extremes** – Oven drawer to freezer & back
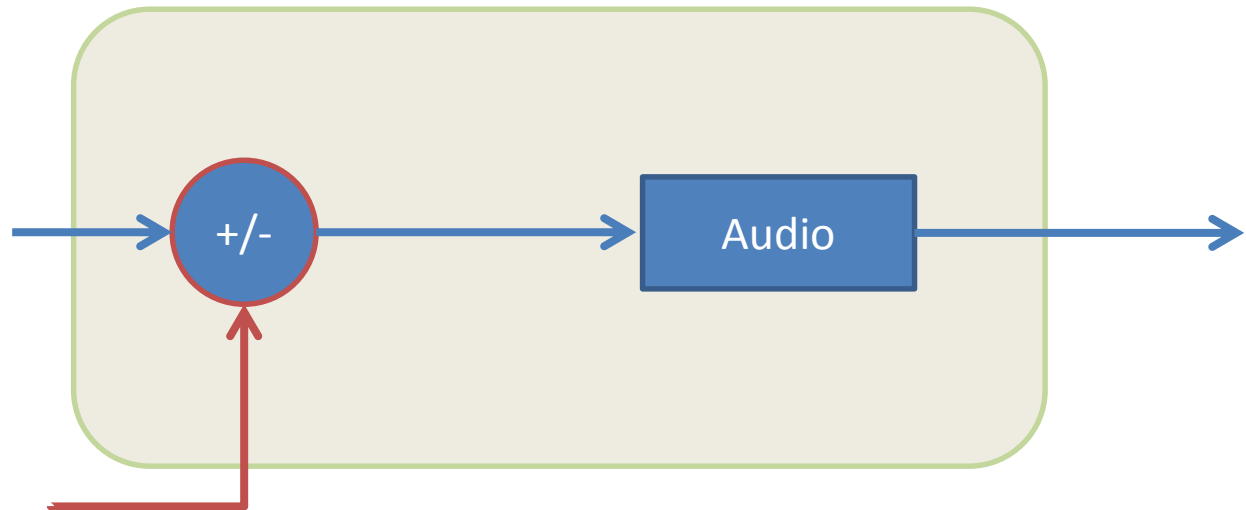
- **Drop** – 10' vertical onto concrete floor

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The Results

Buncombe County bought Johnson radios

Viking

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Noise Cancellation

Dual Mic (Hardware)

Dual Mic – Theory is simple . . .

Sample the audio "environment"

Subtract "environment" from voice

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Noise Cancellation

Dual Mic (Hardware)
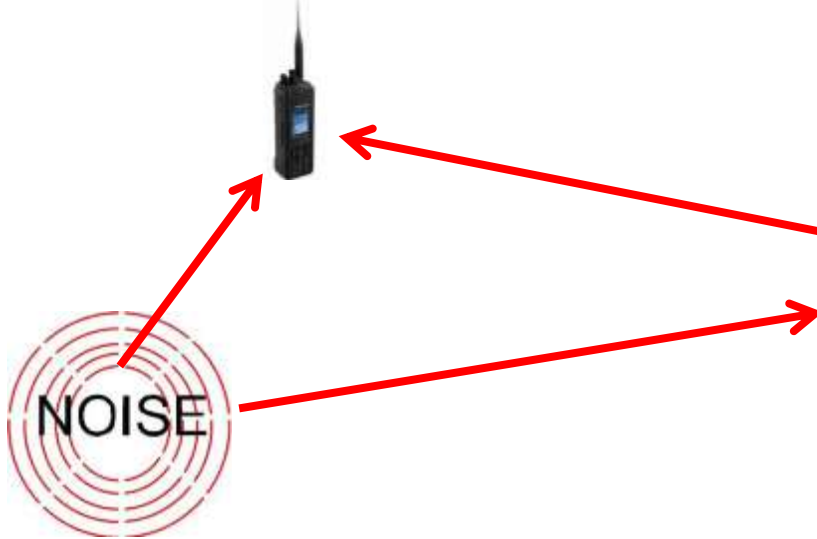
Dual Mic – Limitations . . .

- Multi-path noise is problematic
- Extremely high noise is problematic
- Noise direction is problematic (mic adjustment needed)
- 2nd mic can be blocked (holster, pouch, etc)
- Different noise environments are a challenge

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EFJ Noise Cancellation

Frequency Based (Software)
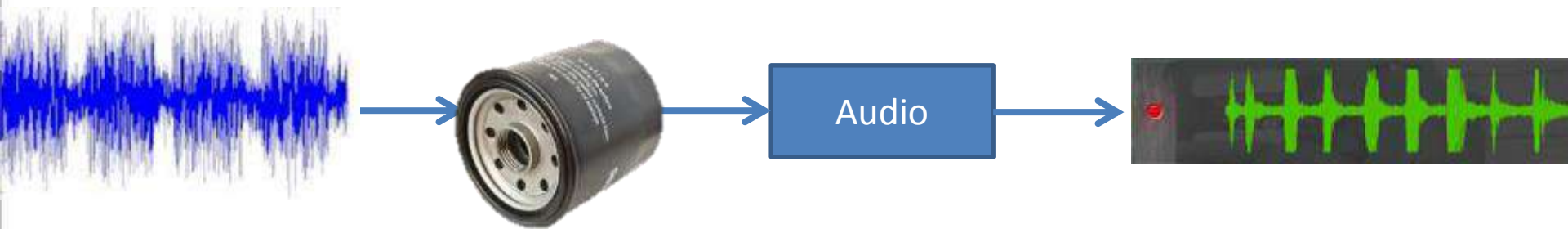
Strip out noise frequencies. . .

- Handles multi-path noise – no problem
- No custom settings for different environments
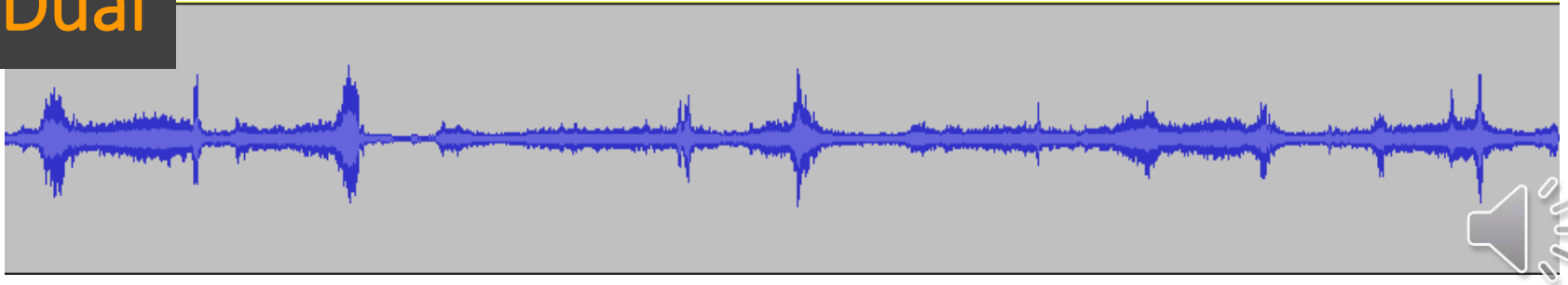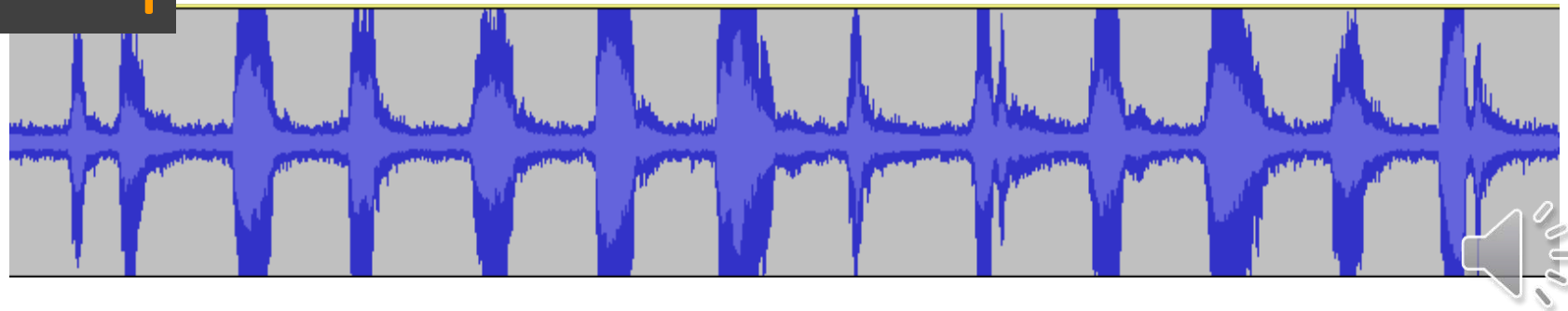- No special speaker microphones

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Results

Can be independently measured…

Noise Environment >110dB

noise environment includes noise reflection

Dual

Freq

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Viking Fire

Viking

Options and Features for the Fire Industry (and everyone else)

- Loudest Radio in the industry

- SN/SZ, P25 Phase 1&2, FM Analog at the same time

- FM3640

- FireSafe™ Features

- Hi Vis Shoulder Mic

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FireSafe™

Establish commander & responder radios

- Enable Role with Single Button

- Set & Forget

- Out of Range

- Audible/Visual Range Indication

- P25 Auto Switch

- Responder Comm Check

- Commander Evacuation Alert

🐏 **Viking**

P25 Digital Messaging

Command radio   Responder radio

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# Armada = Fleet Management

Radio Programming Application

- Templates – 1 template for mobiles and portables

- Fleet Management – all radios in fleet can be managed

- Copy & Paste – quick creation of multiple agency templates

- USB or OTAP programming – program many radios at the same time

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Armada

Proactive battery management – track and manage your fleet
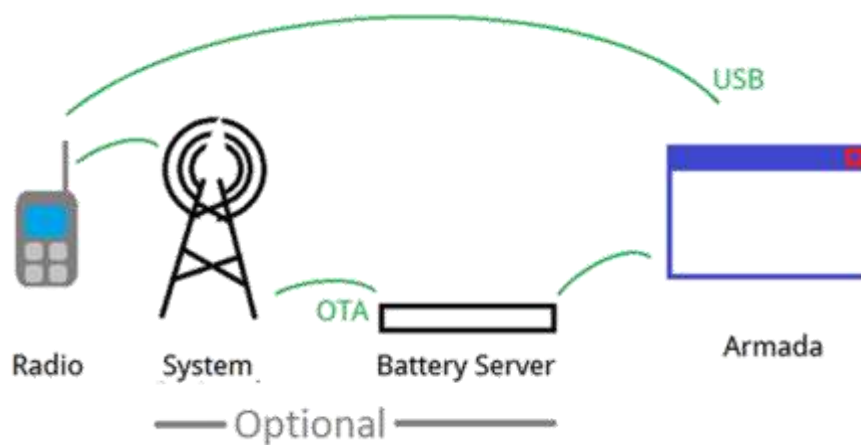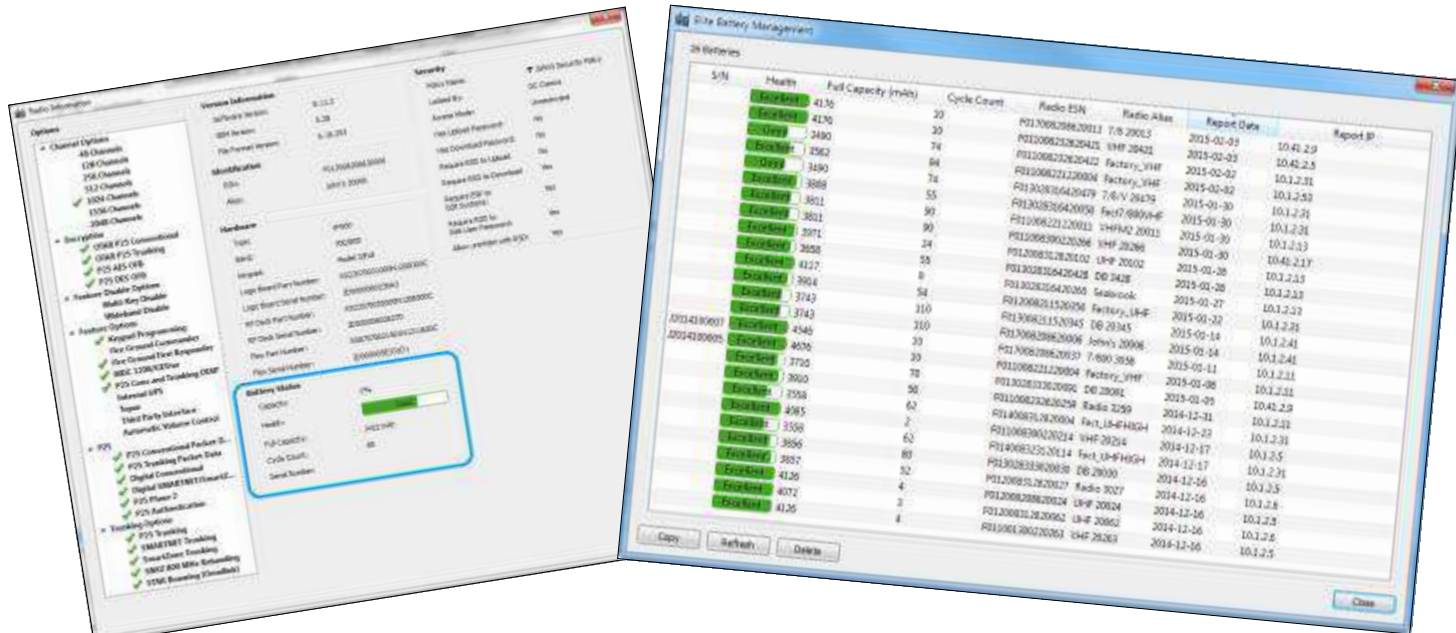
Armada

OTiP

Over the Intranet Protocol (OTIP) allows programming of Viking radios remotely via IP-based network services. It works with both wired (Ethernet) and wireless (Wi-Fi) networks

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TK-5x30

- Phase 1 and 2
- Nexedge support
- Bluetooth
- Color screen
- Class 1/Div 1 Certified
- Up to 18 Hour Battery

Viking Software

- Software Noise Cancellation
- SN/SZ compatibility
- ADP compatible encryption
- Programmable with Armada