Combined Communications Network

Executive Board Orientation

CCN History

- **In 2006**, a partnership dialogue began between Pierce Transit and Pierce County to explore:
  - A radio system partnership
  - Create a sustainable modern communications network (voice and data) supporting the partners and other public safety stakeholders
  - Identify ways to more effectively and efficiently meet both organizations operational and future financial needs

CCN History

- **In 2008**, Pierce Transit built the Puget Sound Next Generation P-25 Phase 1 FDMA Voice and Data Network, investing over $35 million.
  - First in the Puget Sound Region

- **In 2010**, Pierce County entered into a MOU with Pierce Transit to:
  - Assure residents are provided public safety and/or public transportation services cost efficiently.
  - Create and maintain a high quality communication system that delivers next generation communications functionality for public safety and public transportation.
  - Improve effectiveness, efficiency, and overall service delivery by avoiding duplication of networks and supporting services.
    - Work together to support a single county wide communication system (SCWCS) in the Pierce County Region

CCN History

- **In 2011** Pierce Transit and Pierce County completed an Interlocal Agreement which established the Combined Communication Network (CCN) joint venture to:
  - Share a single county wide communication system's microwave, mobile radios, data radios, communication sites, towers, etc. to reduce costs and provide a lean approach toward an integrated public safety and public transportation communication network.
  - Work together concurrently to meet FCC Narrowband requirements, NIMS compliance, and certified design requirements including redundant and resilient capabilities with 99.999 system reliability.

CCN History

- **In 2013-2015** Pierce Transit funded over $8 million for TDMA subscribers which increased SCWCS capacity to allow access for SS-911 agencies and future customers to drive down costs for everyone.

CCN History – VHF Overlay Project

- **In 2014** the County funded the 4-channel 3-site VHF 410 corridor system
- **In 2015** SS-911 funded the 4-channel 11-site VHF Overlay network for station alerting, paging, and mutual aid
- **In 2018** the VHF Overlay Network became available for beneficial use

CCN History – Distributed Antennae System Project

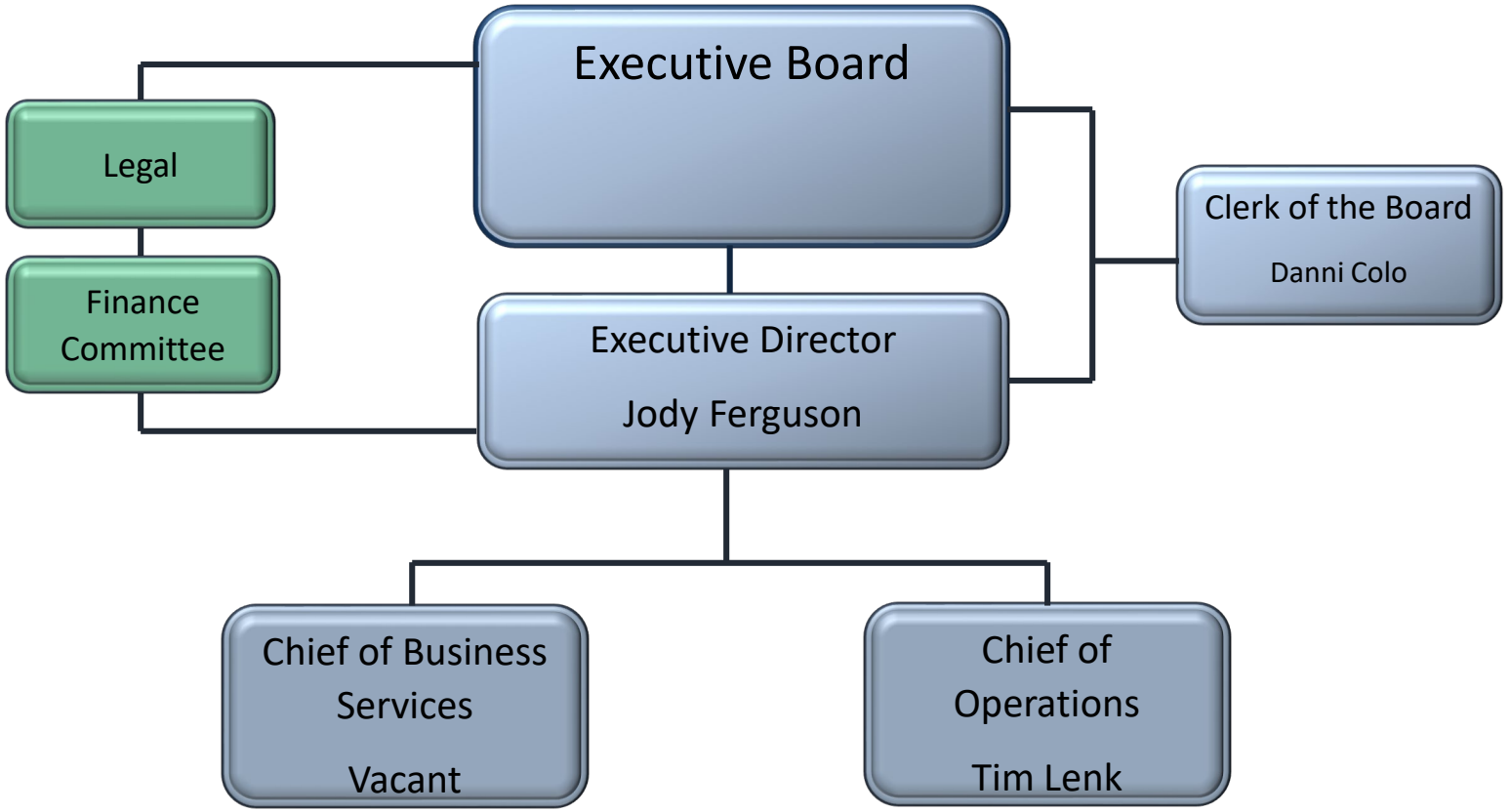
- **In 2018**, the CCN started the detailed design and review of the Pierce County Jail Distributed Antennae System (DAS) to increase critical voice and data coverage within the jail and provides capabilities to increase return-on-investment by leveraging without duplication the DAS back office network and SCWCS resources providing potentially other Pierce County and Pierce Transit facilities with in building voice and data coverage.
- **In 2019**, work on the DAS continues to move forward

CCN Governing Documents

Cooperative Governance Agreement

- Purpose of Agreement – pg. 1; section 1
- Shared access to FCC Licensing – pg. 3; section 6
- Staffing – pg. 4; section 7
- CCN Executive Board – pg. 5; section 8
  - Membership
  - Authorities
- System Access Agreements – pg. 6; section 9
- Support Services – pg. 7; section 11
- Duration and Termination of Agreement – pg. 8; section 14

CCN Structure – Governance Model



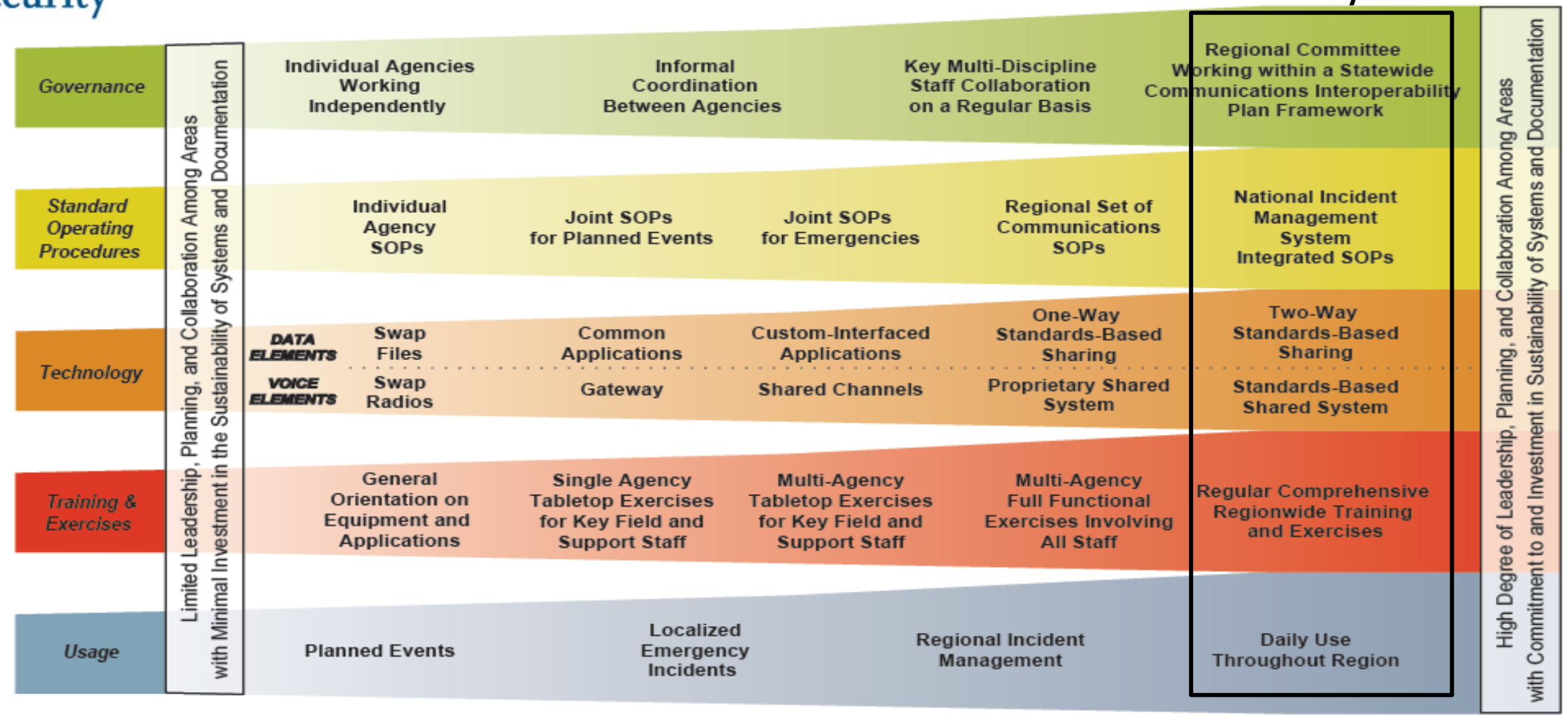
CCN Governing Documents

2018 - 2021 Strategic Plan

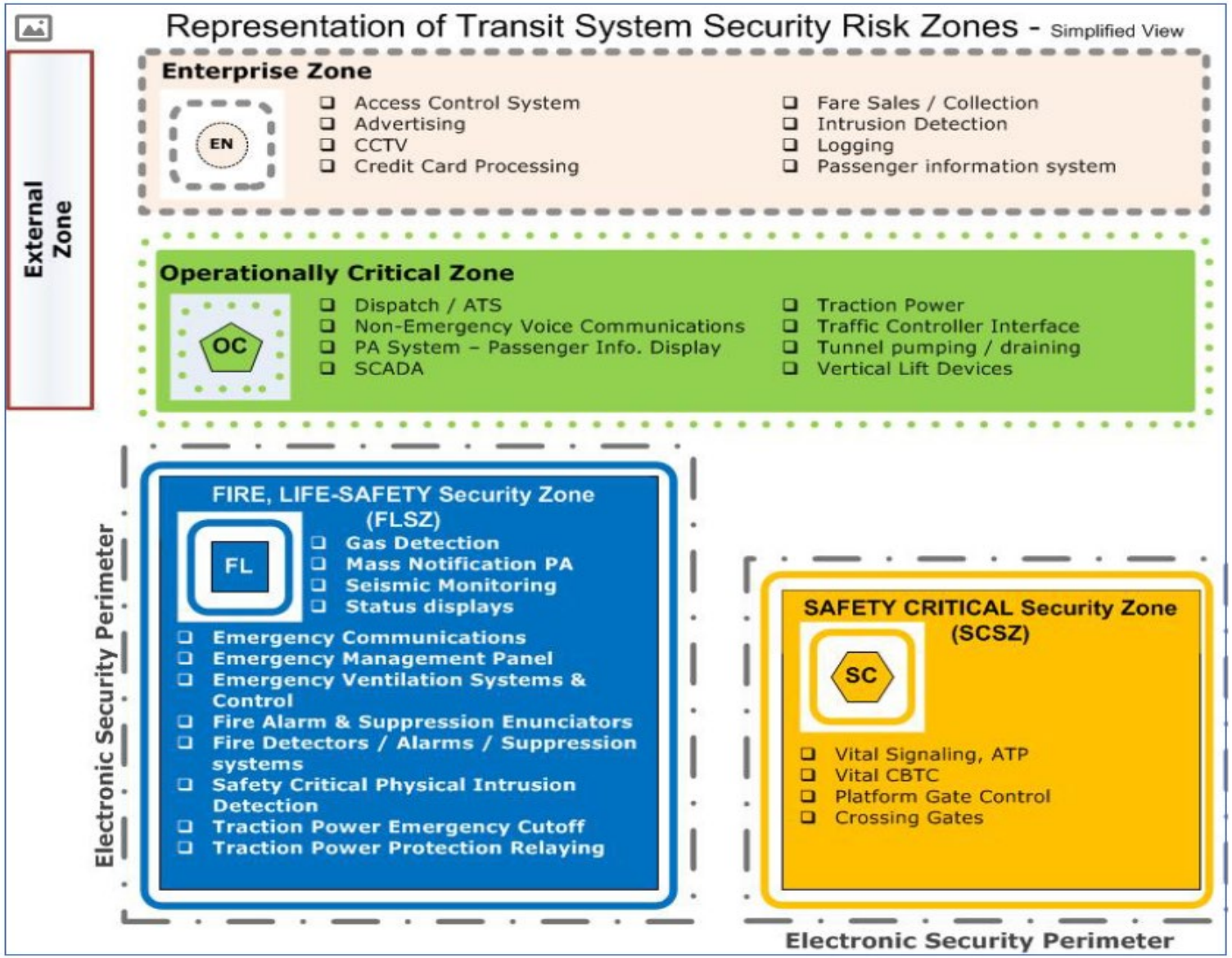
- Vision, Mission pg. 3
- Strategic Objectives – pg. 7
- Agencies benefitting from use the systems – pg. 10
- Planning Cycle – pg. 12
- Strategy Map – pg. 13

SAFECOM Interoperability Continuum

Homeland Security



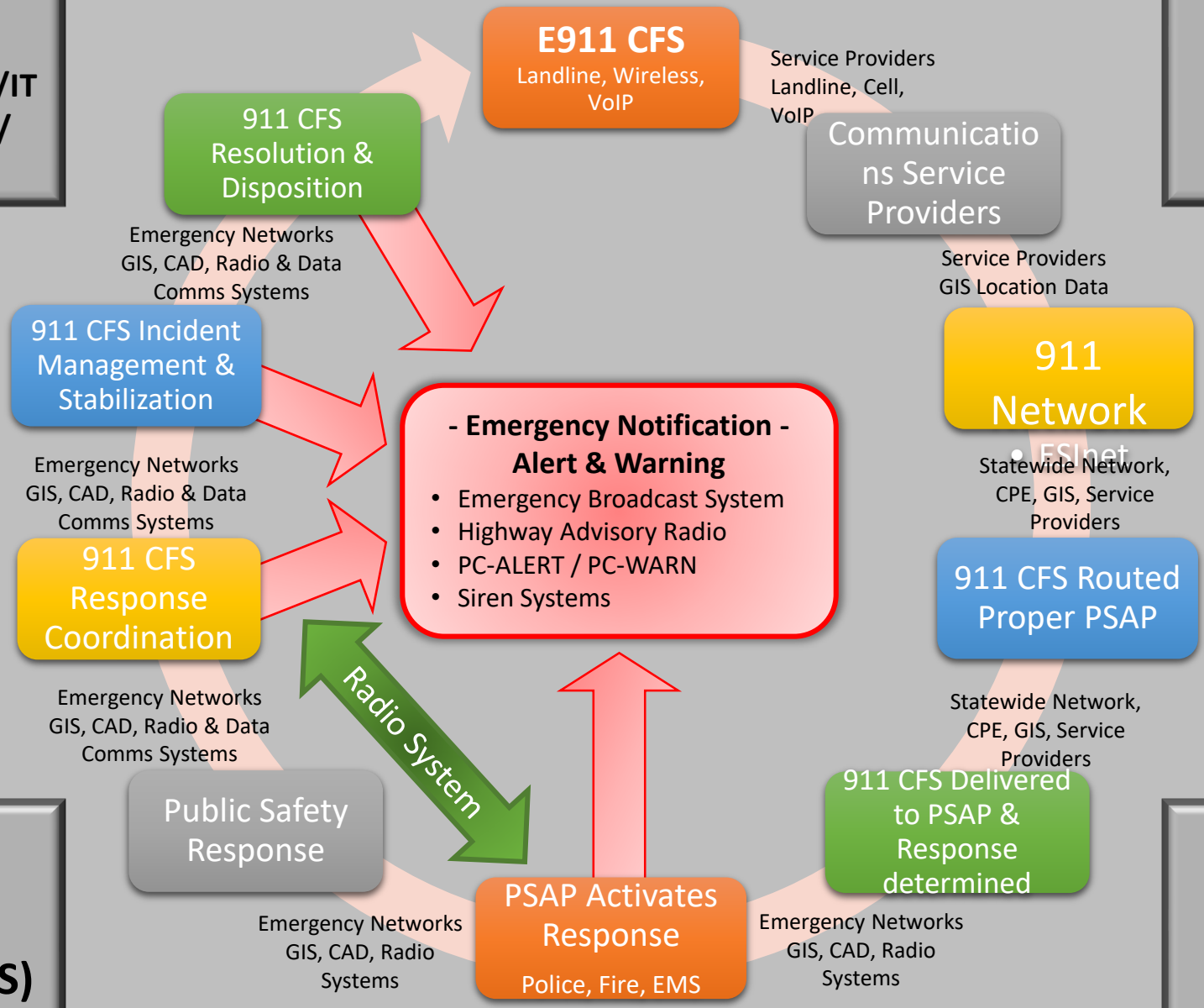
Public Transportation Standards



Emergency Communications Continuum

Building/ Facilities
(Power/HVAC/Security/IT & Comm. Back Office/ Radio Tower)

911 Telephone System (CPE – Voice & Data/GIS)



Radio System (Voice, Data & GIS)

Dispatching System (CAD/GIS)

700 MHz Network Users

Law Enforcement:
Buckley Police Department
Eatonville Police Department
Fircrest Police Department
Gig Harbor Police Department
Orting Police Department
Pierce County Corrections
Pierce County Sheriff Office
Pierce Transit Public Safety
Roy Police Department
South Sound Dispatch 35th Street
South Sound Records

Transit:
Pierce Transit
Sound Transit
First Transit

Fire:
Fire Marshal
PCFD #16 (Key Penn)
PCFD #17 (South Pierce Fire and Rescue)
PCFD #18 (Orting)
PCFD #23 (Ashford/Elbe)
PCFD #43 (Eatonville)
PCFD #5 (Gig Harbor)
South Sound Dispatch
Puyallup

General Government:
Airport and Ferry Admin
Road Operations
Sewer Utility
Surface Water
Traffic Ops/Engineering

Public Safety Support
Auditor
Emergency Management
Medical Examiner

Partners:
WA. Dept. of Transportation
Washington State Patrol

Mutual Aid:
ATF
Boeing Frederickson
Bonney Lake Police Department
Buckley Fire Department
Central Pierce Fire & Rescue
DEA
PCFD # 22 East Pierce Fire and Rescue
Federal Bureau of Investigations
Fife Police Department
PCFD#21 (Graham)
Immigration and Customs Enforcement

Mutual Aid cont'd:
JBLM
King County Sheriff
Lakewood Police Department
Milton Police Department
National Parks
Port of Tacoma
Puyallup Police Department
Regional Aviation
Ruston Police Department
Seattle Police Department
Snohomish County Sheriff
Special Offenders Unit (WA DSHS)
Sumner Police Department
Tacoma Fire Department
Tacoma Police Department
WA State Dept. of Corrections
WA State Fish and Wildlife
WA State Gambling Commission
WADOC
West Pierce Fire & Rescue

410 VHF Network Users

Law Enforcement:
Pierce County Sheriff Office
South Sound Dispatch 35th Street
South Sound Records

Fire:
Fire Marshal
Greenwater Fire Department
Crystal Mountain Fire Department

Public Safety Support
Auditor
Emergency Management
Medical Examiner

Partners:
Washington State Patrol

Mutual Aid:
Bonney Lake Police Department
Buckley Police Department
Central Pierce Fire & Rescue
East Pierce Fire and Rescue
Eatonville Police Department
Federal Bureau of Investigations
King County Sheriff
National Parks
Orting Police Department
PCFD #18 (Orting)
PCFD #21 (Graham)
PCFD #43 (Eatonville)
Pierce Transit Public Safety
Puyallup Police Department
Regional Aviation
South Pierce Fire and Rescue
Sumner Police Department
WA State Fish and Wildlife

VHF Overlay Network Users

Law Enforcement:

Bonney Lake Police Department
Buckley Police Department
Eatonville Police Department
Fife Police Department
Fircrest Police Department
Gig Harbor Police Department
Lakewood Police Department
Milton Police Department
Orting Police Department
Pierce County Corrections
Pierce County Sheriff Office
Pierce Transit Public Safety
Port of Tacoma
Puyallup Police Department
Regional Aviation
Roy Police Department
Ruston Police Department
South Sound Dispatch 35th Street
South Sound Records
Sumner Police Department
Tacoma Police Department

Fire:

Buckley Fire Department
Fire Marshal
PCFD #13 (Browns Point)
PCFD #16 (Key Penn)
PCFD #17 (South Pierce Fire and Rescue)
PCFD #18 (Orting)
PCFD #21 (Graham)
PCFD #22 (East Pierce Fire and Rescue)
PCFD #23 (Ashford/Elbe)
PCFD #27 (Anderson Island)
PCFD #3 (West Pierce Fire & Rescue)
PCFD #43 (Eatonville)
PCFD #5 (Gig Harbor)
PCFD #6 (Central Pierce Fire & Rescue)
South Sound Dispatch Puyallup
Tacoma Fire Department

Public Safety Support:

Auditor
Emergency Management
Medical Examiner

Partners:

Washington State Patrol

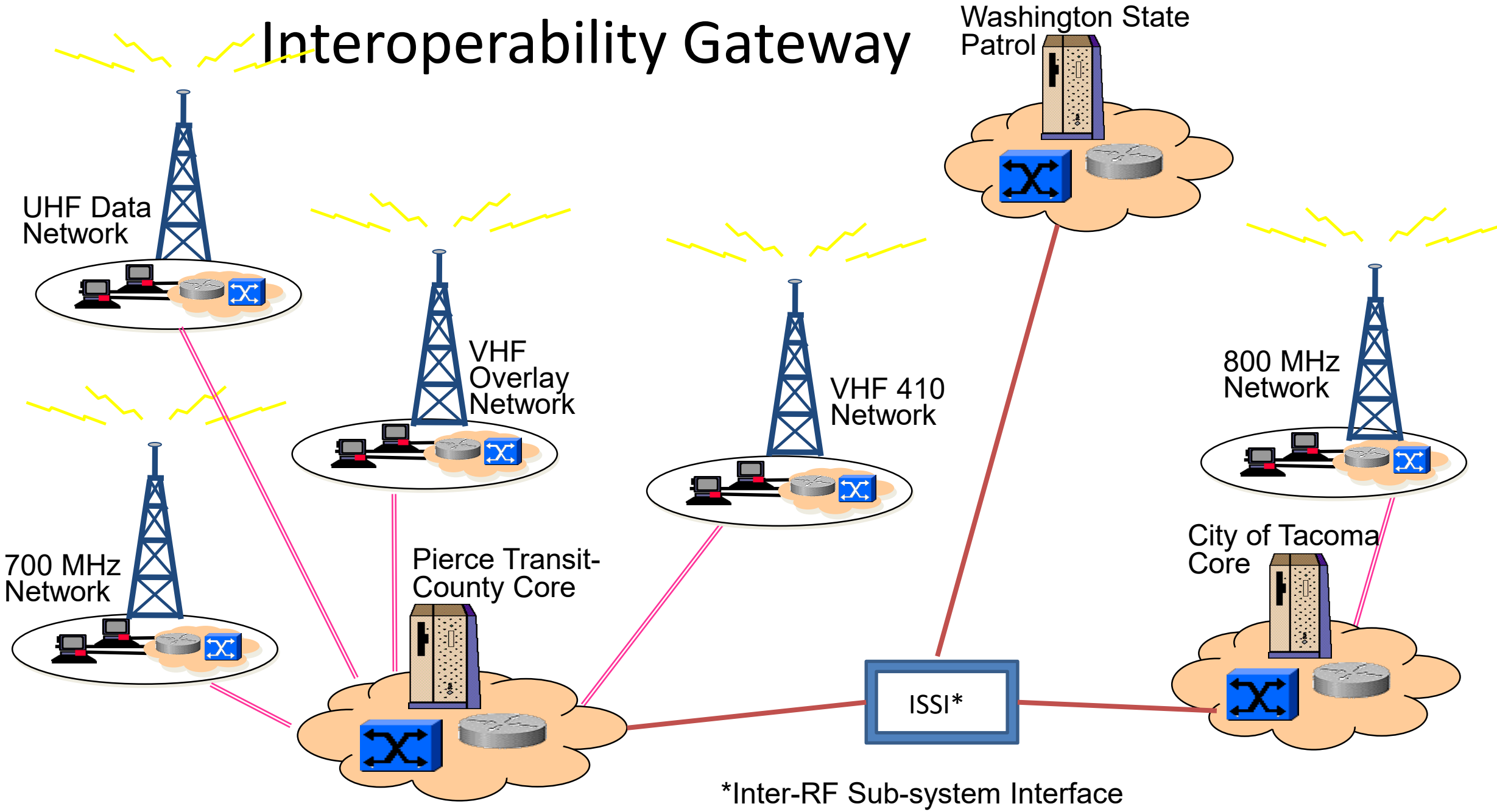
Mutual Aid:

All Public Schools in Pierce County
Boeing Frederickson
Federal Bureau of Investigations
JBLM
King County Sheriff
National Parks
Regional Aviation
Schools
Search and Rescue
Seattle Police Department
Snohomish County Sheriff
WA State Dept. of Corrections
WA State Fish and Wildlife
WA State Gambling Commission

Interoperability

- First responders in Pierce County have radios with 3 frequency bands, 150 MHz, 700 MHz, and 800 Mhz.
- A first responder needs to communicate with someone on a different frequency band, they can turn to the channel that has the correct frequency.
  - For example, a sheriff deputy normally communicates on the 700 MHz band, if that deputy needs to communicate with a park ranger, “who uses the VHF band”, the deputy can turn the channel on the radio to the park service channel and directly communicate with the park ranger.

Interoperability Gateway



*Inter-RF Sub-system Interface

SCWCS Design - Business and Mission Critical Capabilities

- High level of security, mobility, resilience, and availability to its customers
- Network designed to 99.999% reliability
- Emergency Alert features
- Master Site Core has the following features:
  - M3 redundant core ***"largest expansion capacity available"***
  - Located in a 1.5 seismic rated facility
  - 4 layers of redundant power:
    - Shore power
    - Generator power
    - Facility UPS
    - Dedicated DC battery power system

SCWCS Design - Coverage and Capacity Capabilities

- Designed at 97% 3.4 Digital Audio Quality (DAQ) for on street portable-on-hip coverage "***the highest guaranteed standard available***"
- Designed to not exceed 80 percent loading with a 20 percent buffer to mitigate busies or system overloading
- Consists of 3 subsystems and 2 Independent Repeater (IR) sites that overlap coverage for redundancy
- Provides 3 layers of redundant power at all subsystem and IR site
  - Shore power
  - Generator power
  - DC power plant
- Features a large on-site spare inventory for key systems with OEM Priority Advanced Replacement for parts
- Network Operations Center (NOC) 24/7/365 monitoring and on-demand response

SCWCS Design - Security

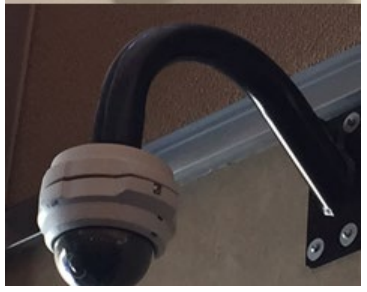
- Strong P-25 Phase 2 digital authentication method
  - Unique authentication key for programming subscribers
  - Utilizes Advanced Encryption Standard (AES) with keys of 128 or 256 bits
  - Advanced System Keys (ASK) access follow strict federal and state sensitive security requirements and are kept in a fire proof secure safe at all times when not in use
- Certified network that meets or exceeds Federal security requirements
  - Criminal Justice Information Systems (CJIS)
- Security Update Service (SUS) provides pre-testing and validation procedures

System Categories

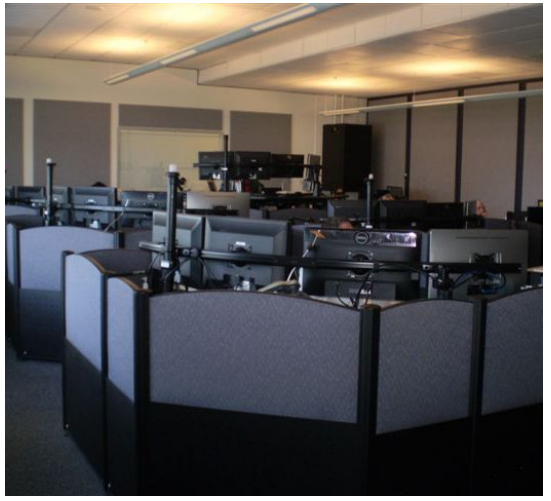
Data

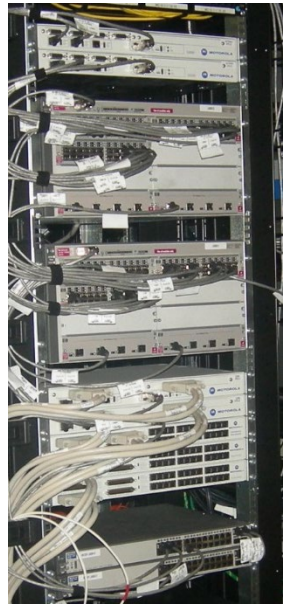
Subscriber Units

Layers of security



Dispatch Consoles





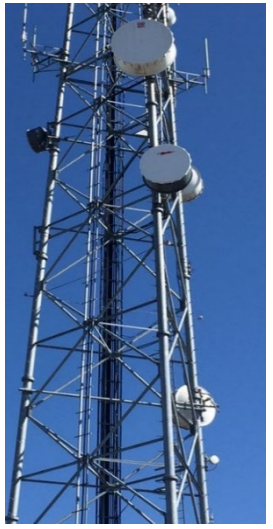
Radio Frequency Equipment

Microwaves

Master Site

Battery System

Tower - sites



Financial Structure

Financial Philosophy

- Meet the need of our customers at the lowest long-term cost
- Provide reserves to cover sustainment costs
- Lean processes to maintain and sustain a minimum cost for services

Accounting Structure

- CCN uses a business model where revenues and reserves cover all expenses as they occur
- This business model is based on full cost accounting for all expenses associated with providing the products and services
- Complies with standards including Government Accounting Standards Board (GASB) and Generally Acceptable Accounting Principles (GAAP)

Financial Structure

Full Cost of Services

- Overhead costs of the program and department
- Taxes and transfers
- Labor and benefits
- Supplies, materials and parts
- Fuel
- Fuel equipment maintenance, operation, preservation and improvement
- Service equipment used to perform work
- Equipment capital purchases
- Licenses to operate facilities and equipment

Subscriber Rate Methodology

The subscriber rate is the monthly charge to a radio customer who utilizes the system to communicate.

Both the 700 MHz and 800 MHz system owners used a finance methodology to determine the cost per unit spread equally across all system customers.

- 2016 South Sound 911 established the $30.00 base rate, determining a rate independent of system owner costs.
- 2017 South Sound 911 established the $31.50 base rate, determining a rate independent of system owner costs.

The annual payment made by SS911 to the radio system owners although supplementing the system costs, does not make whole the subscriber unit cost.

Financial Structure – Rate Model

SYSTEM BY LAYER WEIGHTED VALUE				$3,584,290
REPLACEMENT	SYSTEM	VALUE	%	O/M
	700	$26,715,258	89%	$3,176,287
	UHF DATA	$1,400,000	5%	$166,452
	VHF 410	$2,031,646	7%	$241,551
$0				
	Grand Total	$30,146,905	100%	$3,584,290

VHF 410	$241,550	700 SYSTEM	$3,176,290
SUBS ON 410	782	SUBS on 700	2257
Cost Per Unit	$26	Cost Per Unit	$117

UHF DATA	$166,450		
SUBS ON UHF	556		
Cost Per Unit	$25		

O&M	$3,584,290		Replacement	-
	-		LESS	-
NET	$3,584,290		NET	-
			BUDGET	$3,584,290

	Pierce Transit	General Gov't	Pubic Safety (PS) Total Cost	PS Customer Net Cost
700	$750,094	$281,461	$2,144,735	$ 428,274
UHF DATA	166,450	-	-	-
VHF 410	-	-	241,550.00	147,798
2019	916,544	281,461	2,386,285	576,072
	$916,544	$281,461	$2,386,280	$576,072

Revenue Sources	O&M	Total Cost
General Government	281,461	281,461
Transportation Authorities	916,544	916,544
Other Public Safety	576,072	576,072
Additional Funding	1,810,213	1,810,213
Grand Total	3,584,290	3,584,290
Additional Funding Detail		
Use of Fund Balance	100,000	100,000
1/10th of 1% Payment	560,000	560,000
E-911 Excise Tax	1,150,220	1,150,220

Agency	Total Cost	Jurisdiction	Difference
Transit	916,544	-	-
P.S. Agencies	2,386,285	576,072	1,810,213
PC Gen. Gov't	250,500	-	-
City of U.P.	30,961	-	-
	3,584,290	576,072	1,810,213

Rate Breakdown by User Group

User Group	2019 Total Cost	Amount Paid by User Group	South Sound 911 Public Safety Payment	Remaining Balance Due	Additional Funding – Use of CCN Fund Balance	Additional Funding – E911 Excise Tax
Transit	$916,544	916,544	- 0 -	- 0 -	- 0 -	- 0 -
Pierce County General Government	$250,500	250,500	- 0 -	- 0 -	- 0 -	- 0 -
City of University Place	$30,961	30,961	- 0 -	- 0 -	- 0 -	- 0 -
Public Safety	$2,386,285	576,072	560,000	-1,250,213	100,000	1,150,213

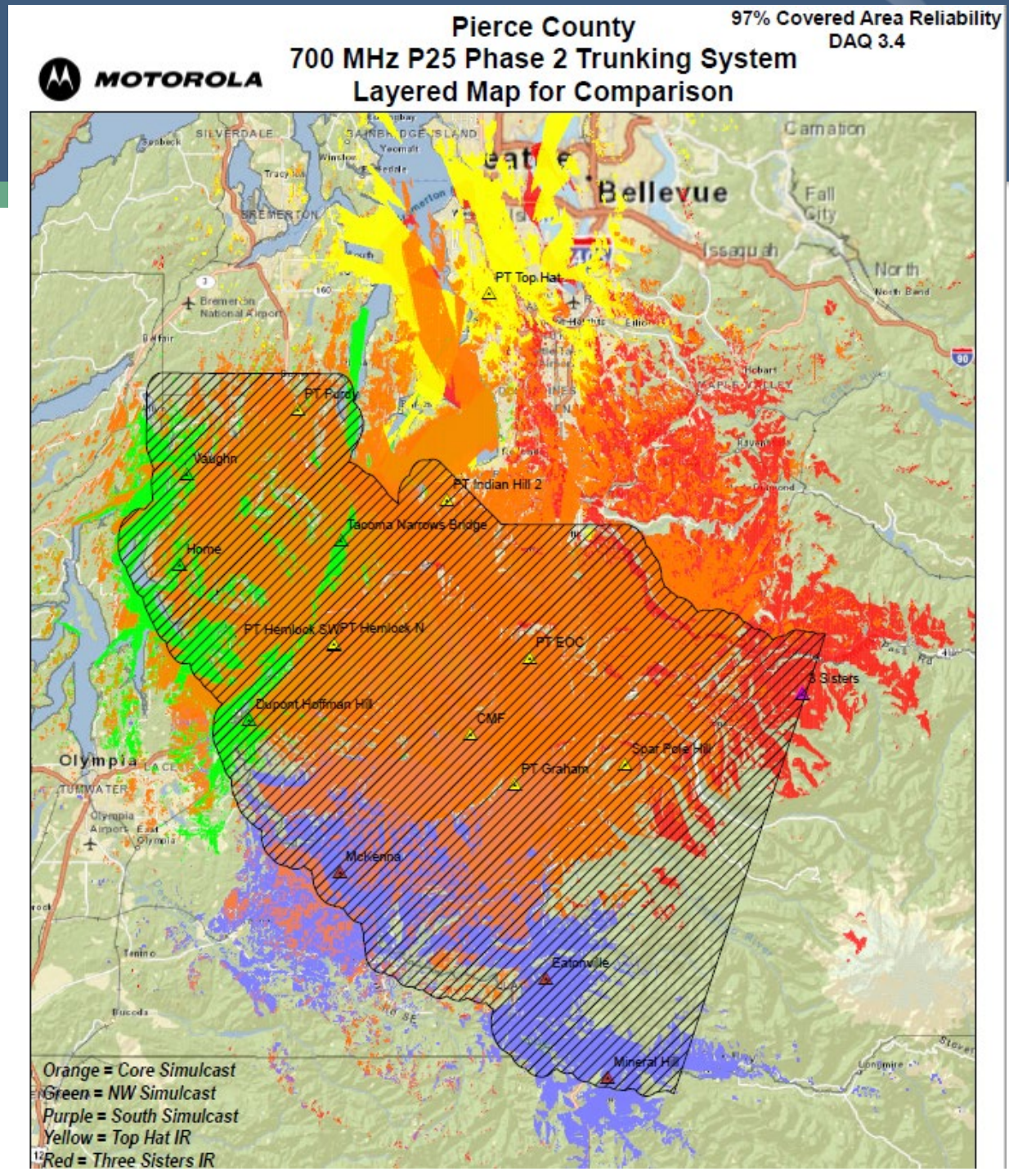
Layered Coverage Map

- **Main Simulcast (Orange)** The main sub-system consists of 6 remote sites throughout the metropolitan areas of Pierce County providing coverage within the high population areas of Pierce County, the I-5 corridor into King and Thurston Counties.

- **West Simulcast (Green)** The west sub-system consists of 4 remote sites throughout the northwest areas of Pierce County providing coverage within the rural population areas of west Pierce County along the Key Peninsula, City of Gig Harbor, and Kitsap and Mason Counties.

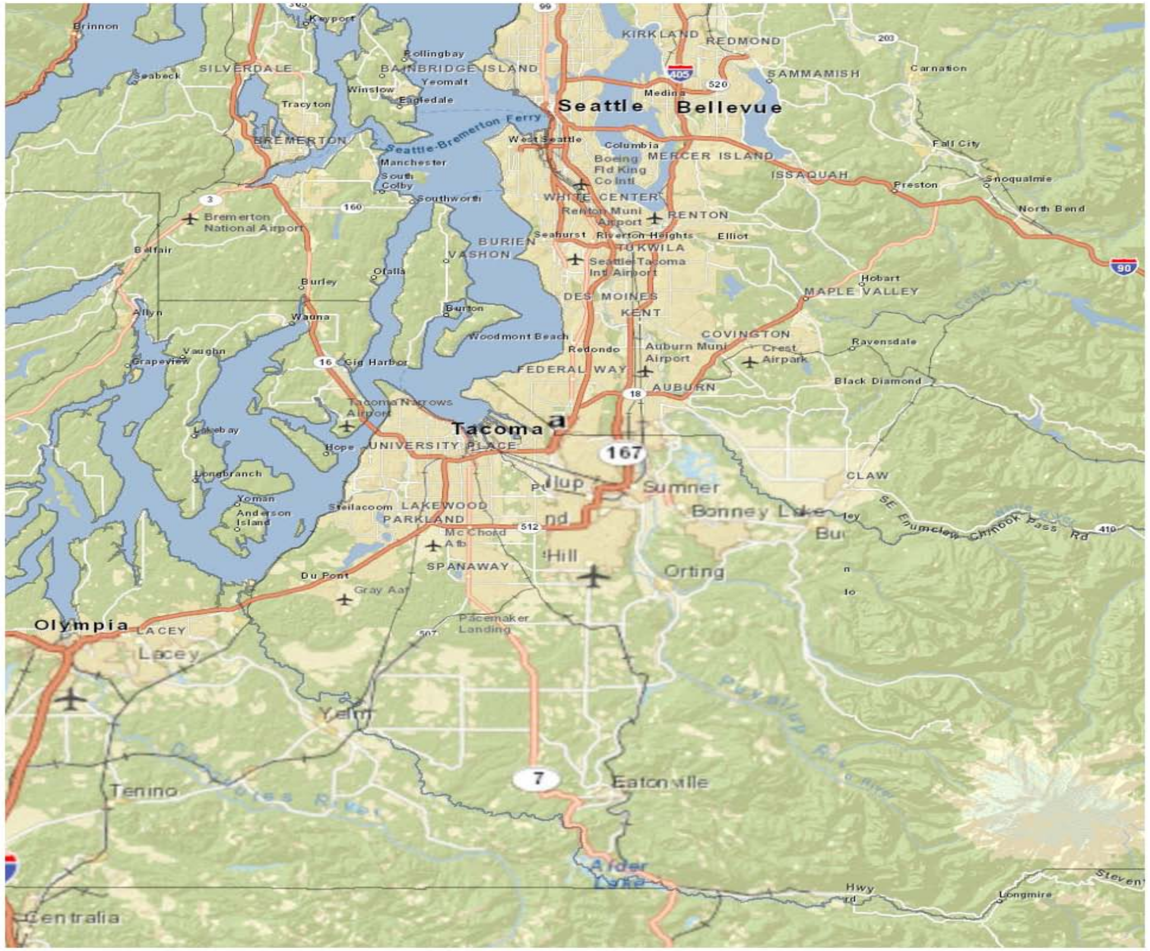
- **South Simulcast (Purple)** The south sub-system consists of 3 remote sites throughout southeast Pierce County providing coverage within the southeast areas within the rural population of south Pierce County, the National Park Service, and into Lewis County.

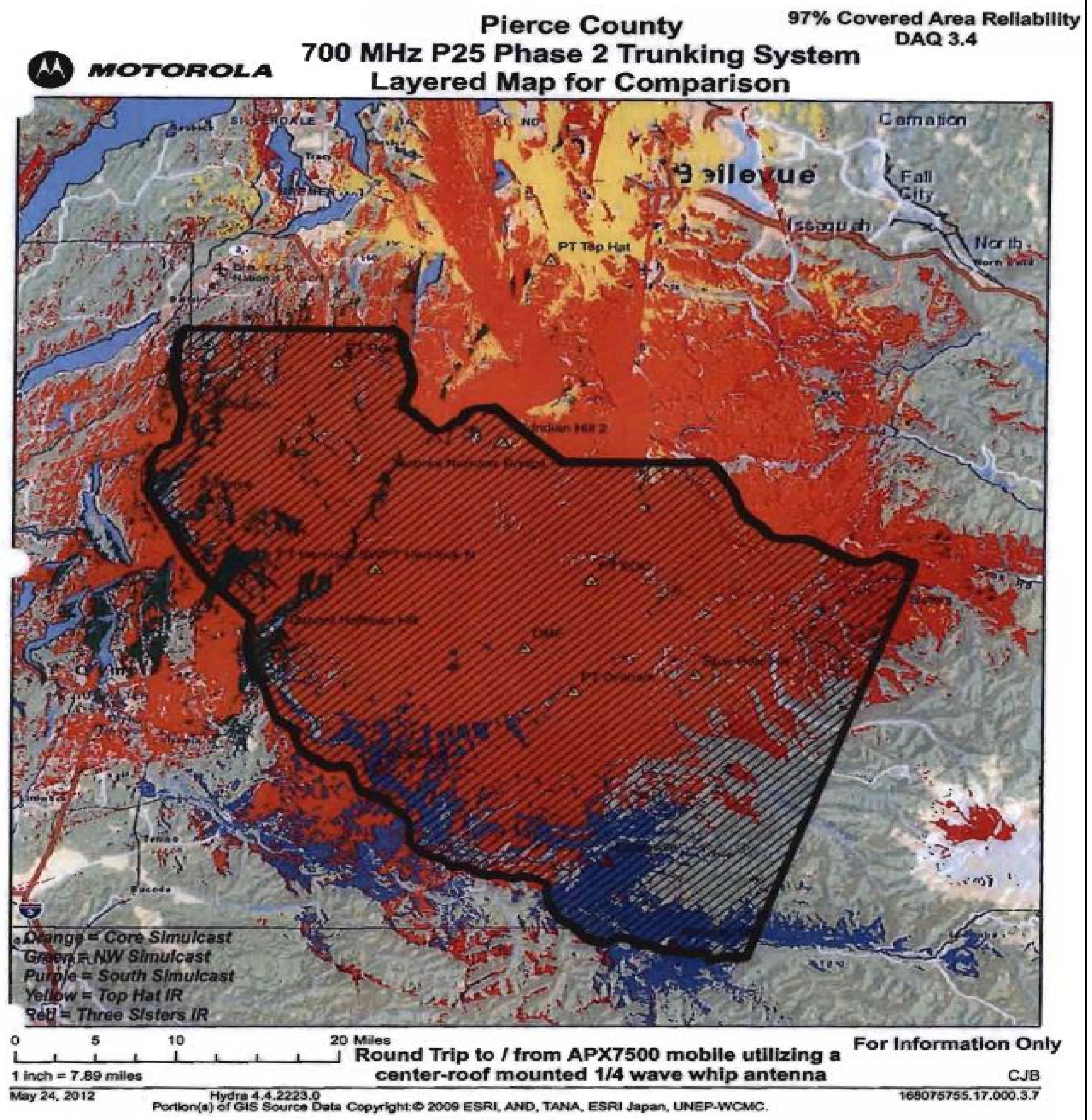
- **Two Multicast Sites** (Red and Yellow) In addition to the main, south, and west simulcast systems, there are two independent sites located in the Cascade Mountain range and in King County that further enhance coverage throughout the region. These enhanced coverage areas include Pierce County, King County, Snohomish County, Lewis County, Thurston County, and most of the major transportation corridors within those counties.



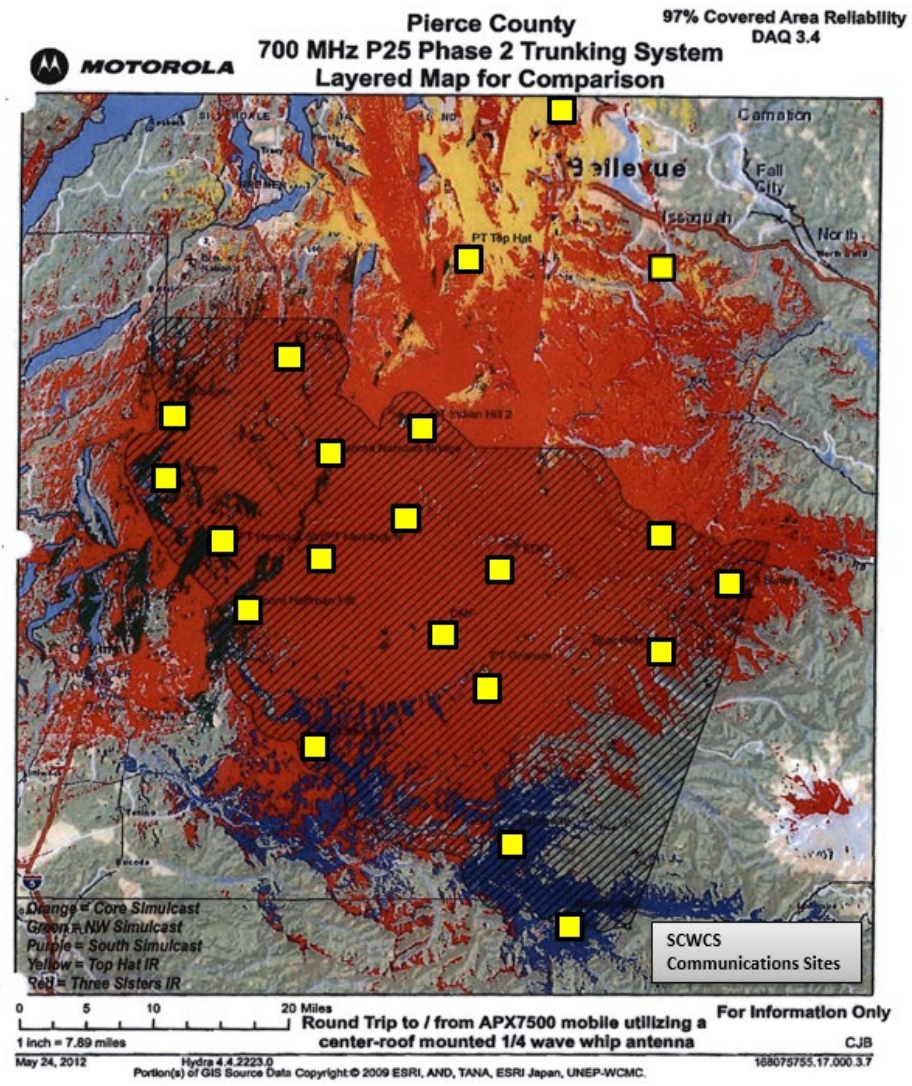
Combined Communications Network (CCN) – Single County Wide Communications System (SCWCS) Overview

Puget Sound Regional Map





CCN – SCWCS Site Locations



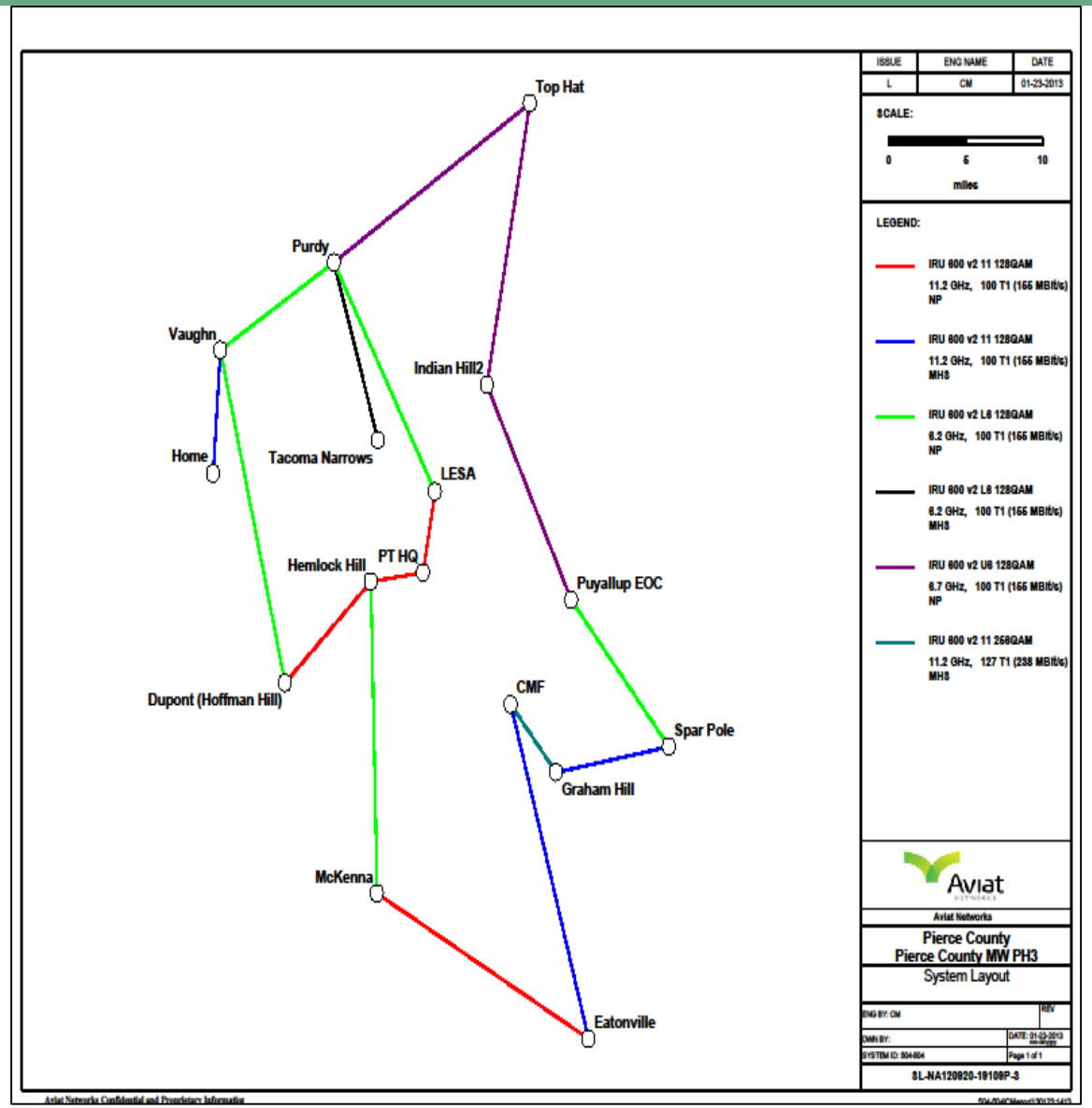
The SCWCS is a regional, multi-layered, Public Safety and Public Transportation voice and data communications network which covers a significant amount of the Puget Sound region.

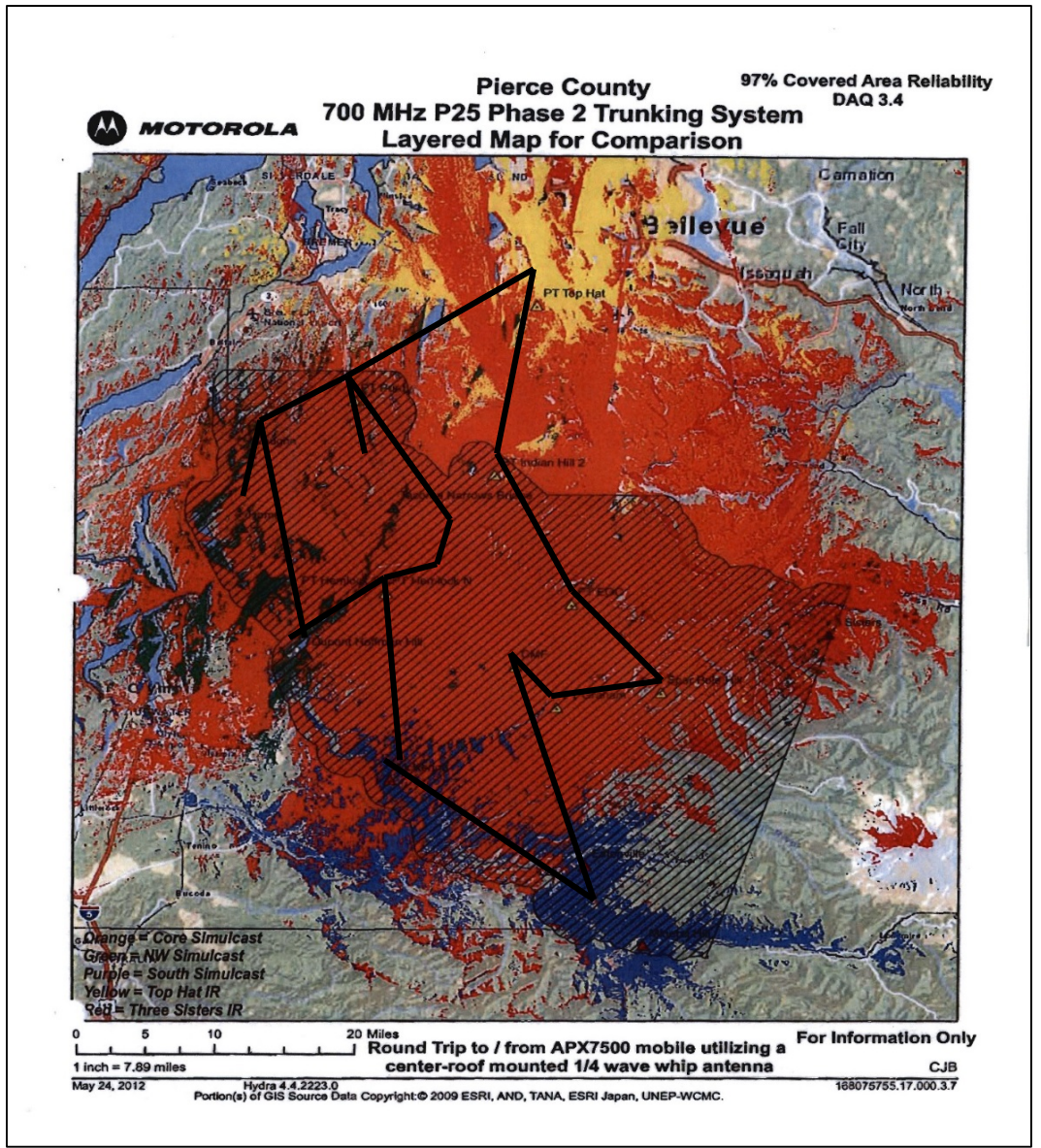
SCWCS Infrastructure Categories Summary:

- Next Gen. P-25 Master Site (M3 Core)
- 21 Comm. Sites
  - Three Simulcasts
  - Two Independent Repeaters
- 96 Microwaves
- Seismic hardened towers and facilities.
- 24/7/365 network and security monitoring
- Tier 3/4 back-up power systems
  - Generators
  - DC Power

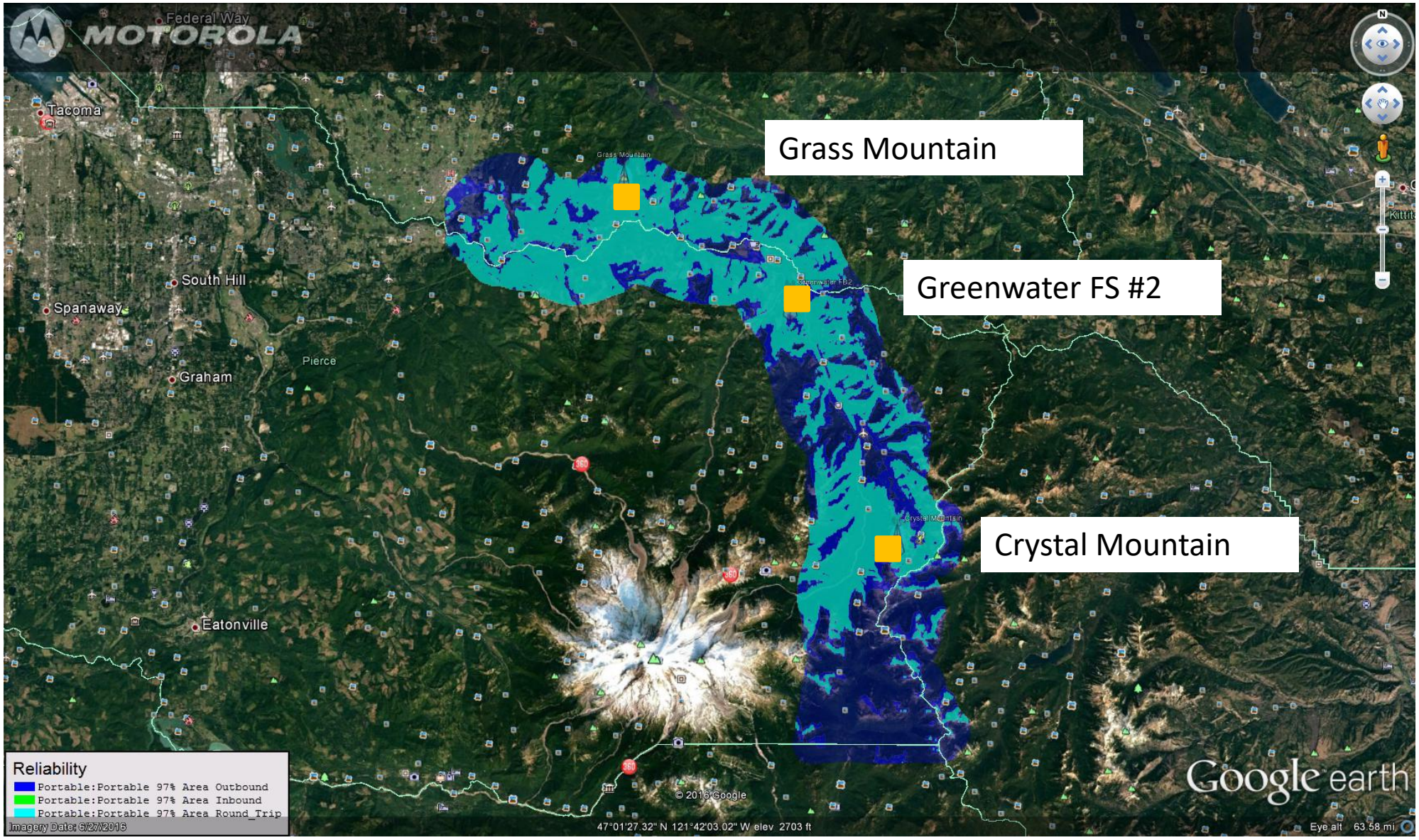
Single County Wide Communication System

Microwave Network and Coverage Maps

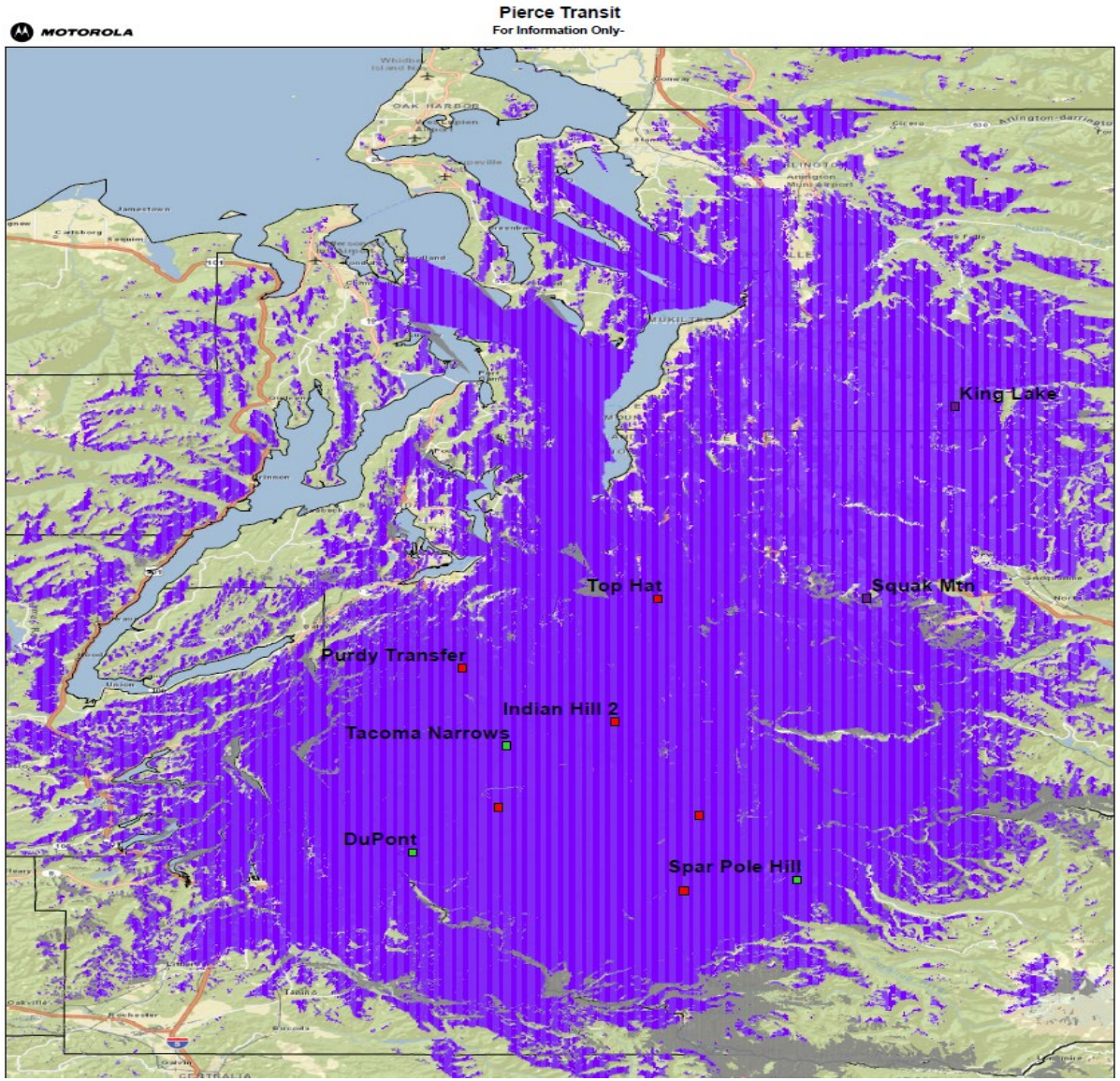




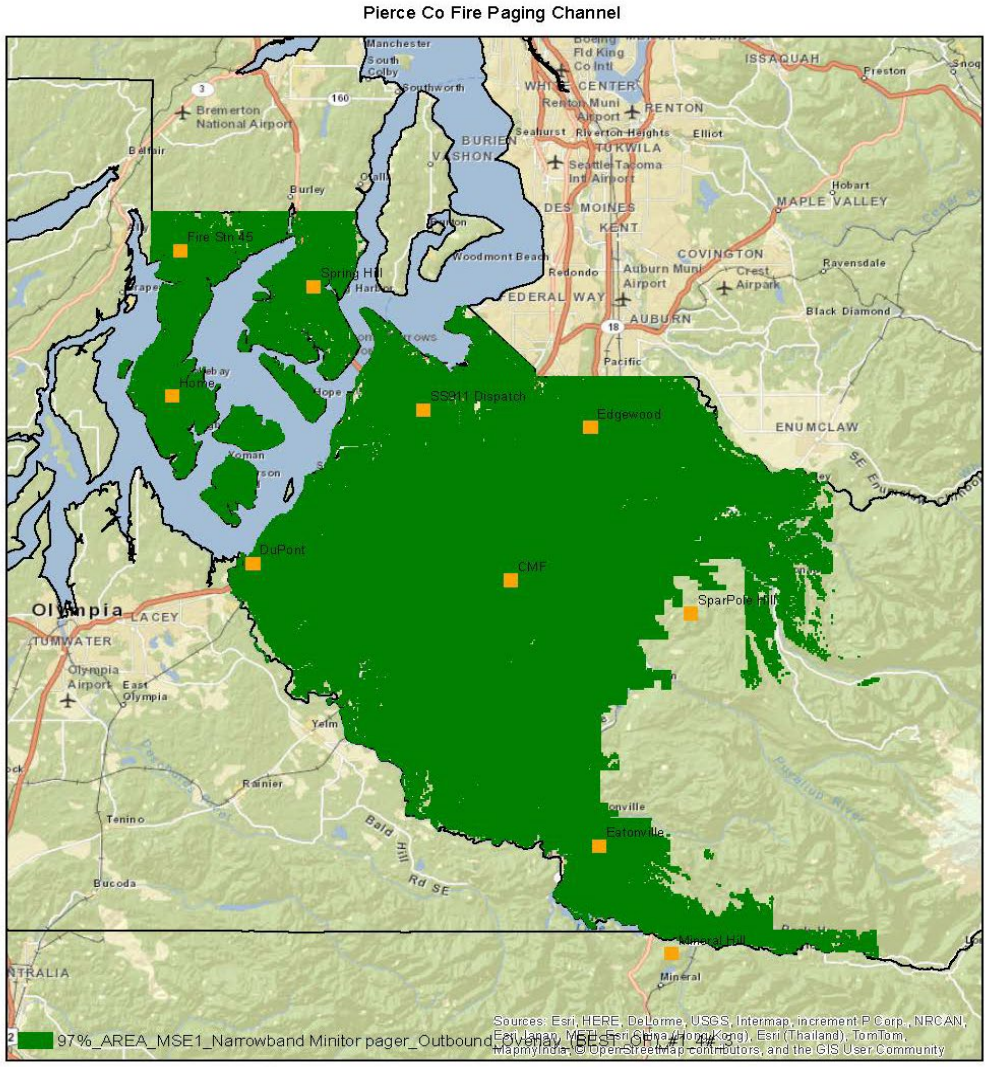
VHF – 410 Coverage Map



CCN – SCWCS UHF Data Network Coverage Map



CCN – SCWCS VHF Overlay Coverage Map



Station Alerting and Paging

Mutual Aid

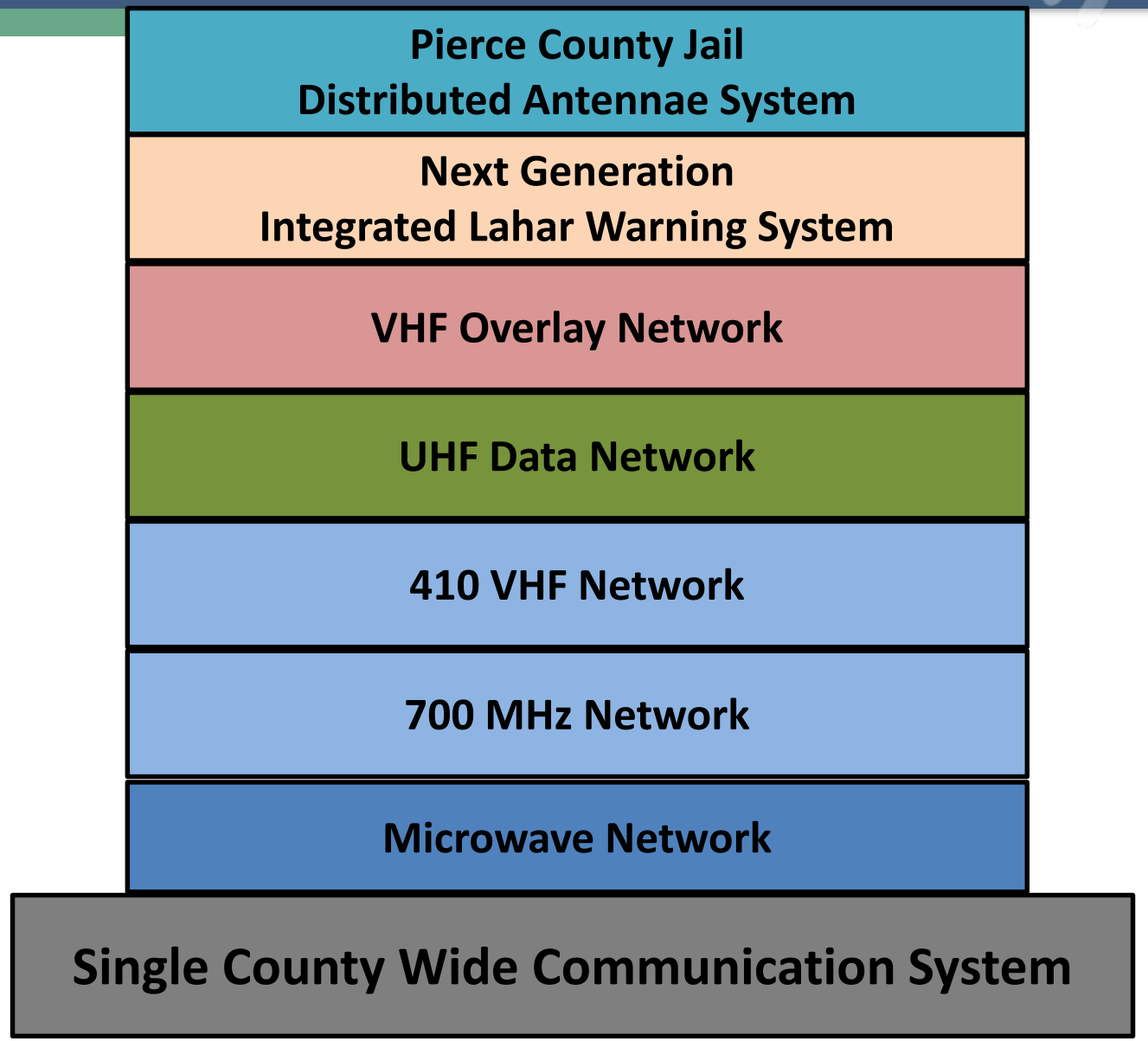
Search and Rescue

CCN – SCWCS Distributed Antennae System

The SCWCS Networks and Systems:

- Microwave Network;
- 700 MHz Network;
- 410 VHF Network;
- UHF Data Network;
- VHF Overlay Network;
- Next Generation Integrated Lahar Warning System
- Distributed Antennae System

These projects represent an overall funding level over $70 million.



System Access Agreement (SAA)

An agreement between the CCN and Subscriber Agencies including the terms and conditions for its share of access to and use of the ‘system’

- The purpose of this agreement is to:
  - Define the roles and responsibilities of the ‘Parties’
  - Formalize an invoice and fee structure

System Owners Collaboration

Coordinated work we are doing together

- Alias changes
- ISSI Coordination
- Coordinated radio ID model
- Coordinated programming templates
- Coordinate in-building coverage approval processes with Fire Marshall
- Tech Talk – technical coordination
- Joint training
- Back Haul sharing
- Coordinated dispatch console encryption
- Site sharing

System Owners Collaboration

Processes we are analyzing for potential improved efficiency and effectiveness

- Vetting non-Motorola P25 subscriber equipment
- Radio network support
- Contracting – Preferred vendor list
- Talk Group efficiencies
- System and physical security
- Asset management – common platform
- Data driven decision making
- Coordinated product line platforms
- Unified subscriber support

Questions ?

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CCN Chief of Operations
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