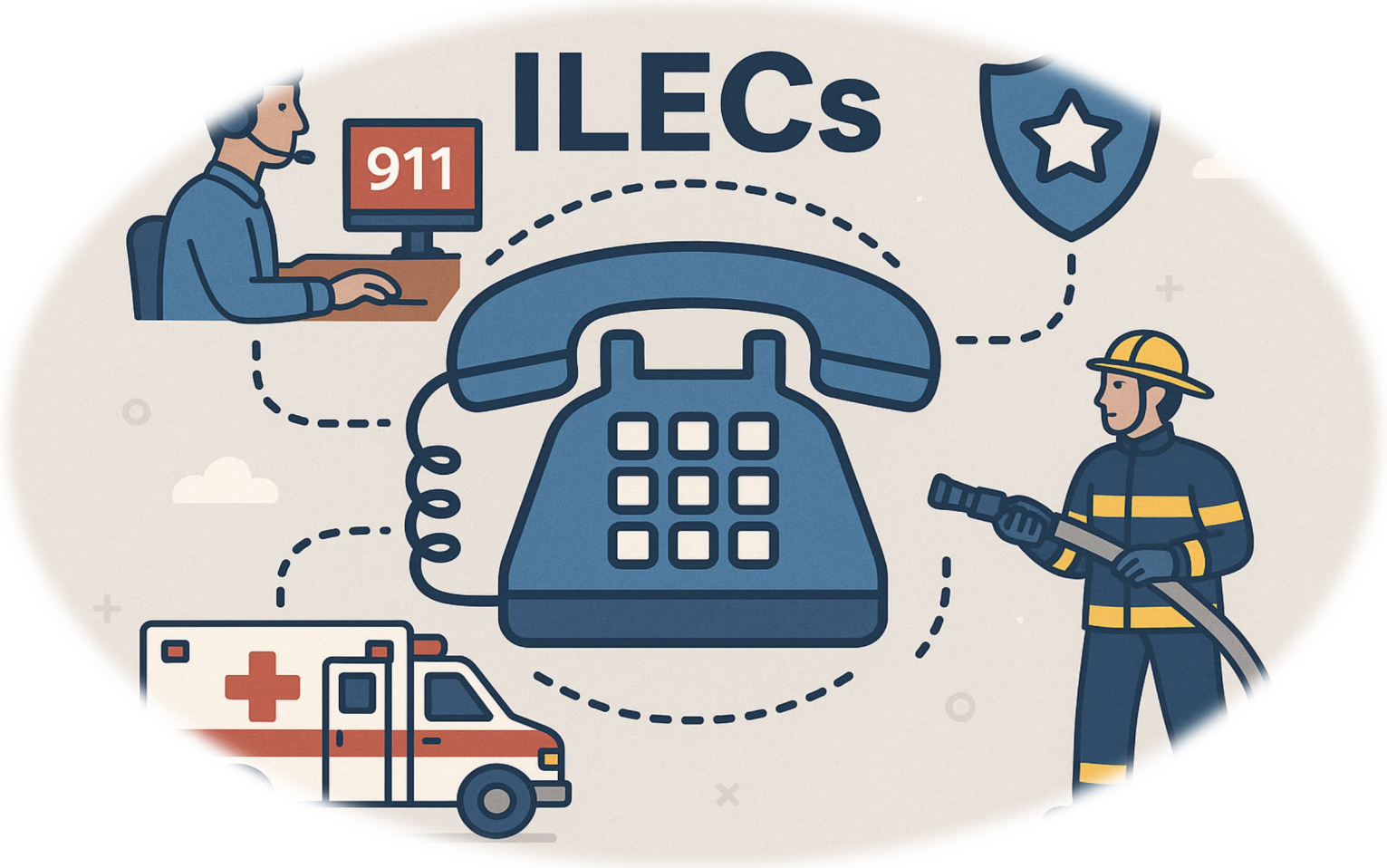
Rural Emergency Communications

Presented by:
Stela Stefanova
Senior Director – Demand Forcasting and Support Modeling
sstefanova@neca.org

Agenda

- Introduction and role of ILECs
- Rural emergency service challenges
- Funding support
- Infrastructure resilience
- Policy considerations
- High-capacity transport

Introduction and the role of ILECs



Source: Image generated by ChatGPT

Introduction and the role of ILECs
What are rural emergency communications?

- Rural emergency communications refers to the systems and processes that support the exchange of critical information during emergencies in sparsely populated and geographically isolated areas
- Key components
  - Public safety communications – police, fire, EMS radio and dispatch systems
  - Warning systems broadcasts
  - Interagency networks – integration with regional and national systems

Introduction and the role of ILECs
Emergency communications services

- 911 – the standard public emergency number in the U.S. Primarily voice
- Enhance 911 – provides caller location and callback number to the PSAP
- Next Generation 911 – all IP protocol. Allows text, photos and videos, automatic crash data from vehicles and real-time location sharing
- Wireless emergency alerts – government-issued alerts sent to cell phones for imminent threats, Amber alerts and presidential alerts
- Emergency alert systems – alert broadcast over radio and TV
- First Responder Network Authority – nationwide dedicated broadband network for first responders. Operated in partnership with AT&T

Introduction and the role of ILECs
Emergency communications services

- Priority Telecommunications Services – provides prioritized call routing for government and critical infrastructure communications during network congestion
  - Government Emergency Telecommunications Service
  - Wireless Priority Service
- Emerging and future services
  - Drones for situational awareness
  - IOT and wearables
- Satellite backup – provides comms in remote areas or outages

Introduction and the role of ILECs
Why is rural emergency communications important?

- Crucial for evacuations, warnings and disaster management
  - Protects lives and property
    - Enables rapid response to wildfires, floods, accidents and health crises
    - Helps coordinate evacuations and rescue efforts
    - Delivers life-saving information to isolated populations
    - Provides critical care in areas far from hospitals
    - Ensures timely response to accidents, heart attacks, strokes and trauma

Introduction and the role of ILECs
Why is rural emergency communications important?

- Crucial for evacuations, warnings, and disaster management (cont.)
  - Supports first responders
    - Keeps law enforcement, EMS and fire crews connected over long distances
    - Allows communication across counties, states and agencies
    - Enhances situational awareness during complex incidents
  - Overcome infrastructure gaps
    - Compensates for lack of reliable cell service or internet
    - Provides alternative methods (radio, satellite) when networks fail
    - Ensures continuity during power outages or disasters

Introduction and the role of ILECs
Why is rural emergency communications important?

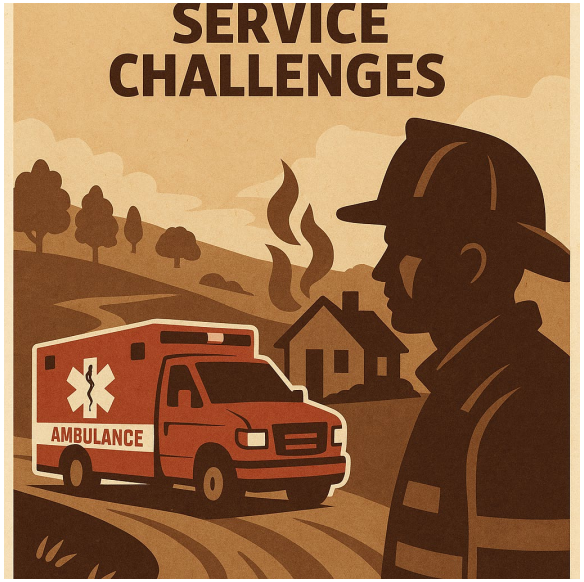
- Crucial for evacuations, warnings, and disaster management (cont.)
  - Protects critical infrastructure and build resilient communities
    - Helps rural areas prepare for and recover from emergencies
    - Enables local leaders to stay informed and make decisions quickly
    - Strengthens public trust through timely alerts and updates
    - Provides fast, secure communication to protect infrastructure (e.g., dams, power grids and pipelines) during emergencies
  - Integrates rural areas in national response systems
    - Connects rural agencies to national platforms like FirstNet, FEMA and NOAA

Introduction and the role of ILECs
What is the role of RLECs in emergency rural services?

- 911 network support
  - Maintain infrastructure for enhanced and next generation 911
  - Route emergency calls to public safety answering points
    - A PSAP is a call center responsible for answering 911 emergency calls and dispatching emergency services
  - Ensure redundancy and routing diversity in emergency networks
- Ensure location data is transmitted to the PSAP
- Distribute emergency alert messages through phone and internet systems
- Work with other providers ensure reliable 911 access

Rural emergency service challenges

- Geographic challenges
  - Sparse population density: Fewer customers are spread over large areas, making it difficult to justify the cost of infrastructure investment
  - Challenging terrain: Mountains, forests, or remote locations can complicate the deployment and maintenance of fiber or wireless networks
  - Long Distances: Extending connectivity to distant or isolated locations increases installation and maintenance costs
- Aging infrastructure and the cost of upgrades



Source: Image generated by ChatGPT

Rural emergency service challenges (cont.)

- Financial constraints
  - High costs with low return: Capital investments in network upgrades (e.g., for NG911) are expensive, but the revenue base is small
  - Limited funding: Many rural LECs depend on federal or state subsidies (e.g., USF or RUS loans), which may be inadequate or inconsistent
- Regulatory and compliance hurdles
  - Evolving Requirements: Keeping up with new FCC rules, cybersecurity standards and NG911 mandates can strain resources
  - Reporting and Coordination: Rural LECs often lack the staff to manage compliance paperwork and coordinate with state and federal emergency systems

Rural emergency service funding support
High-cost programs

- The High-cost program provides financial support to rural LECs to build, operate and maintain telecommunications networks in high-cost areas
  - These funds directly and indirectly support rural emergency communications
- Directly support voice and broadband capable network infrastructure
  - 911 can only function if wireline end users have a working landline or broadband connection
    - Fiber and IP infrastructure is a prerequisite for NG-911

Rural emergency service funding support
High-cost programs

- Directly support voice and broadband capable network infrastructure (cont.)
  - CAF ICC supports switching equipment needed to route 911 calls to public safety answering points
  - PSAPs funding is provided by state and local sources
    - Most states collect a monthly fee on landline, wireless, and VoIP service bills. These fees typically range from $0.25 to $1.50 per line per month. Collected by telecom providers and remitted to the state or local 911 board
    - Counties, municipalities or regional 911 authorities often supplement PSAP funding through general tax revenues (property or sales tax) for public safety or emergency services budgets

Rural emergency service funding support
Grants and loan programs – direct support

- 911 Grant Program – helps states, territories, and tribal governments upgrade their 911 infrastructure
- State Homeland Security Program – helps state and local governments prevent, prepare for, respond to, and recover from acts of terrorism and other catastrophic events
- Emergency Management Performance Grant – provides federal funding to help state, local and tribal governments sustain emergency management capabilities
- Community Facilities Direct Loan and Grant Program – supports construction or modernization of essential rural facilities

Rural emergency service funding support
Grant and loan programs - indirect

- Reconnect Program – grants and loans provide support for rural broadband infrastructure, essential for NG911 and PSAP connectivity
- Bead Program – eligible uses include infrastructure that supports public safety, telehealth, and emergency services
- Distance Learning and Telemedicine Program – grants up to $1 million for technology linking ambulances and facilities
- Tribal Broadband Connectivity Program – can be used for infrastructure and facility projects that support emergency communication
- Community Development Block Grants – can be used for infrastructure and facility projects that support emergency communication in rural areas

Infrastructure resilience

- To ensure continuity of service, RLECs must take proactive steps to strengthen infrastructure resilience
  - Network hardening
    - Replace aging copper lines
    - Use hardened shelters and weatherproof cabinets for equipment
    - Elevate critical infrastructure above flood risk areas
    - Install backup power systems at key sites
  - Redundancy and failover
    - Create diverse routing paths to avoid single points of failure
    - Partner with nearby LECs for mutual aid routing in emergencies

Infrastructure resilience

- To ensure continuity of service, RLECs must take proactive steps to strengthen infrastructure resilience (cont'd)
  - Cybersecurity Enhancements
    - Implement firewalls, intrusion detection and endpoint protection
    - Regularly patch systems and conduct vulnerability assessments
  - Workforce training
    - Train technicians in emergency restoration procedures
    - Train staff to handle outages, cyber incidents, and field deployment
  - Community partnerships – collaborate with local utilities, fire/rescue and municipalities for shared response planning

Policy consideration

- RLECs are vital emergency communications in rural America, yet they face persistent regulatory, financial and operational challenges
- Sustain and expand funding mechanisms for Rural ILECs
- Participate in public/private partnerships
  - Promote collaboration between ILECs and local public safety agencies to share infrastructure and coordinate deployments
- Encourage inclusion of emergency services in broadband planning
- Support training and workforce development

Policy consideration
FCC's Report and Order

- Facilitating Implementation of Next Generation 911 Services (NG911); Location-Based Routing for Wireless 911 Calls
  - FCC 24-78, WC Dockets 21-479 and 18-64, adopted on July 18, 2024, released on July 19, 2024
  - Effective date: November 25, 2024
- The Order seeks to accelerate and standardize the transition from legacy 911 infrastructure to Next Generation 911 (NG911) IP-based emergency call infrastructure that can support voice, texting, video and data, improved location information, and greater resilience

Policy consideration
FCC's Report and Order

- The Order establishes default federal rules around definitions, obligations of originating service providers (OSPs), cost allocation, and transition timing
- Definitions:
  - OSPs include wireline providers, commercial mobile radio service (CMRS) providers, covered text providers, interconnected VoIP providers, and Internet-based TRS providers
  - NG911 Delivery Point is defined as the location within a 911 Authority's NG911 system where an Originating Service Provider (OSP) is required to deliver 911 calls in IP format
  - ESInet is a managed IP network used to transport NG911 calls and data between PSAPs, functional elements, and other parts of the NG911 system

Policy consideration
FCC's Report and Order

- Obligations of OSPs defined:
  - Deliver calls to the NG911 Delivery Point when a 911 Authority (i.e., a state/tribal/local jurisdiction) issues a valid request indicating readiness for IP delivery.
- Two-phase implementation:
  - **Phase 1:** Deliver traffic in IP format (without location embedding if the Authority isn't ready)
  - **Phase 2:** Deliver traffic in IP format **with location information embedded** (e.g., PIDF-LO) to the designated delivery points

Policy consideration
FCC's Report and Order

- Cost Allocation / Default Financial Responsibilities
  - In the absence of an alternative agreement, OSPs will be responsible for the cost of delivering 911 traffic to the NG911 Delivery Point(s) designated by the 911 Authority, and for the cost of translating legacy traffic into the required IP format
  - Importantly, OSPs are *not* automatically responsible for the cost of constructing the NG911 infrastructure (ESInets, NG911 Core Services, PSAP equipment) — those remain with the 911 Authorities unless agreed otherwise

Policy consideration
FCC's Report and Order

- Preservation of State/Local Flexibility to adopt alternative approaches for configuration, timing and cost allocation for NG911 implementation in their jurisdictions, so long as they meet minimum federal requirements
- Timelines: for nationwide CMRS providers, covered text providers, interconnected VoIP providers and non-RLEC wireline carriers: six months after a valid request for each phase. For non-nationwide CMRS, RLECs and Internet-based TRS providers: one year after a valid request
- NG911 is still evolving, so standards, interoperability, and full implementation (especially location embedding, video/data, richer call content) remain work in progress

High-capacity support
The role of ETS and OWS

- Ethernet transport service and optical wavelength services play a crucial backbone and transport role in the provisioning of rural emergency services
  - These services form the backbone of rural emergency infrastructure, enabling PSAPs, hospitals, first responders and command centers to share real-time data
  - Emergency response in today's digital landscape is data-intensive
    - NG911 relies on IP-based broadband to handle multimedia emergency calls (voice, text, video, pictures, medical records)
  - Support secure, high-speed IP transport between NG911 elements
  - Allow for redundant network paths in case of fiber cuts, storms or equipment failures

High-capacity support
What is OWS?

- Optical wavelength service – a dedicated, high-speed communication service using fiber optic networks to transmit data over long distances with minimal signal loss
  - OWS offers high-speed transmission, strong reliability and low latency
- OWS provides the underlying physical transport which supports various types of services, including those with extremely high bandwidth requirements
  - OWS is protocol flexible and can support SONET, ethernet transport service, internet protocol, time division multiplexing and asynchronous transfer mode
    - Transmits voice, video and data

High-capacity support
ETS versus OWS

Feature	ETS	OWS
Technology	Uses ethernet protocol over various mediums (fiber, copper, wireless)	Uses fiber optic networks
Speed	Typically ranges from 10 Mbps to 400 Gbps	Capable of extremely high speeds (up to terabits per second)
Latency	Low	Very low
Reliability	Reliable, but can be affected by network congestion	Highly reliable
Scalability	Easily scalable for businesses and small enterprises	Scales well for large enterprises and ISPs
Security	Can be secure, but depends on encryption and network configuration	High security due to dedicated optical links

High-capacity support
Uses of OWS

- ISP middle mile facilities
- Data centers
- Cloud computing connectivity
- State rings
- Large corporations and financial institutions
- Government and defense networks
- Smart cities
- Hospitals and telemedicine

Summary

- There are many things to consider for ILECs in rural emergency communications, including a myriad of challenges
- Funding support exists, both directly and indirectly, to help in making your network resilient in the midst of emergencies
- There are various policies to consider, including the FCC's new rules and open dockets, in improving emergency services
- ETS and OWS are high-capacity transport services to help bolster your network to add further resiliency and quality of service
- We are here to help you

thank you!

Please fill out the class evaluation on the EXPO app; your feedback is important to us!

Acronyms

- **CAF ICC** – Connect America Fund Intercarrier Compensation
- **EMS** – Emergency Medical Services
- **ESInet** – Emergency Services IP Network
- **ETS** – Ethernet Transport Service
- **FCC** – Federal Communications Commission
- **FEMA** – Federal Emergency Management Agency
- **FNPRM** – Further Notice of Proposed Rulemaking
- **ILEC** – Incumbent Local Exchange Carrier
- **IOT** – Internet of Things
- **IP** – Internet Protocol
- **LEC** – Local Exchange Carrier

Acronyms

- **NG911** – Next Generation 911
- **NOAA** – National Oceanic and Atmospheric Administration
- **OWS** – Optical Wavelength Service
- **PSAP** – Public Safety Answering Point
- **RLEC** – Rural Local Exchange Carrier
- **RUS** – Rural Utilities Service
- **SONET** – Synchronous Optical Networking
- **USF** – Universal Service Fund