



ESF 2: Communication

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ESF 2 Tasked Agencies

Primary County Agency	Technology Services (TS)
Supporting Agencies	Clackamas County Communications (C-COM)
Community Partners	Clackamas 800 Radio Group (C800) Clackamas County Amateur Radio Emergency Service (CARES) Lake Oswego Communications (LOCOM) Washington County Consolidated Communications Agency (WCCCA)
State Agency	State Interoperability Executive Council (SIEC) Statewide Interoperability Coordinator (SWIC) Oregon Department of Emergency Management (OEM)
Federal Agency	Department of Homeland Security (DHS) Cybersecurity and Infrastructure Security Agency (CISA)

1 Introduction



1.1 Purpose

Emergency Support Function (ESF) 2 coordinates governmental and non-governmental organizations that provide the communications and information technology capabilities necessary to support response efforts, facilitate the delivery of information to emergency management decision makers, and stabilize communications systems following natural and human-caused incidents.

Communication systems utilized by Clackamas County include, but are not limited to:

- Land mobile radio
- Cellular / LTE (Long Term Evolution) networks
- TDM (time-division multiplexing) telephony
- Fiber network
- WLAN (wireless local area network) and Wi-Fi networks
- Data and industrial telemetry
- National Warning System (NAWAS)
- Satellite voice and data
- Mobile vehicle-based broadband

1.2 Scope

Activities encompassed within the scope of ESF 2 include:

- Communications Systems
 - Establish and maintain an effective communications system, including County-owned and commercially leased systems, for use in a disaster.
 - Coordinate the provision of redundant and temporary communications as required.
 - Monitor and report on the overall status of the County's communications infrastructure during a disaster.
 - Maintain the County's critical information technology infrastructure.
 - Maintain the County's emergency notification system software and authorities, including system proficiency testing to maintain the County's Integrated Public Alert and Warning System (IPAWS) certificate.

- Coordinate County support to local, tribal, and special district communications systems as requested.
- Design and develop resilient and fault-tolerant systems to maintain communications in the event of an incident.

2 Situation and Assumptions



2.1 Situation

The County faces numerous hazards that require effective communications to manage and could pose threats to the stability and efficiency of communications networks. Key considerations for planning and managing ESF-2 during disasters, emergency response, and both short- and long-term recovery include:

- Impacts to cellular services, external internet connectivity, local phone services, etc., are dependent upon the vendor services the County utilizes.
- “Communication” is defined as the transfer of information, and may involve the representation, transfer, interpretation, and processing of data among persons, places, and machines. The term may also refer to the transmission, emission, or reception of signs, signals, writing, images, and sounds or intelligence of any nature by wire, radio, optical, or other electromagnetic system.
- “Interoperability” is the ability of emergency response agencies and relevant government officials to talk to one another via communication systems—to exchange voice and/or data with one another on demand, in real time, when needed, and as authorized.
- An emergency can disrupt or even destroy communications systems by damaging antennas, repeaters, power supplies, or other components. During hazardous conditions, both access to and the functionality of communications infrastructure may be limited and prevent the timely restoration of services.
- The distribution of accurate and timely information is a critical component of any effective emergency response.
- A large-scale incident may result in a surge of user requests for utilization access to the local communications infrastructure. Heavy demand for communication services can quickly exceed the capacity of existing systems, limiting user access or shutting them down entirely.
- Response agencies, from state and federal agencies or mutual aid jurisdictions, often maintain and operate their own radio systems and may use different frequencies, potentially hindering timely and effective response/coordination unless interoperable communication systems are in place.

- Protection/restoration of emergency communications is one of the highest priorities in an emergency. Priority communications include emergency 9-1-1 calls and dispatch; interoperable communications among responders and supporting agencies; Emergency Operations Center (EOC) contact with field units, cities, and special districts; local, regional, and state EOC nets; and communications with the public and media.
- C-COM, in conjunction with Clackamas County Disaster Management (CCDM), provides emergency communications for Clackamas County 24/7/365 and may initiate alerts and warnings in Clackamas County.
- Technology Services (TS) monitors the status and availability of business communication systems and assists in supporting and resolving communications issues. Depending upon the incident, TS identifies the impact of communications issues, determines resource allocations, and determines prioritization strategies in coordination with CCDM and Command Staff in the Emergency Operations Center.

2.2 Assumptions

ESF 2 is based on the following planning assumptions:

- To the extent possible, operational local communication capabilities will be utilized to support response operations even in a diminished capacity.
- Local emergency responders have identified frequencies to be utilized for operational coordination, direction, and control communications.
- The loss of one or more communications network/business communications system may reduce the effectiveness of the EOC and/or other County offices (including Department Operations Centers).
- Emergencies may require extensive coordination of inter- and intra-community communications.
- If crisis information management systems (CIMS) are not available, redundant incident management documentation protocols may be required (e.g., paper logs may be used to record events, communications and messages, damage assessments, situation reports, resources utilized, staff hours expended, etc.)
- Resilient and redundant communications systems are vital for effective and efficient warning, response, and recovery operations.

3 Concept of Operations

3.1 General

The County uses a variety of technology solutions to facilitate emergency and disaster communications, including:

- Cellular phones, land-line telephones, pagers, voicemail, and facsimile machines.
- Private and public wired and wireless computer networks with controlled access to the public Internet. Various technologies, including email, file transfer, videoconferencing, document sharing, and public-facing communications are carried out by these networks.
- Priority Telecommunications Services (PTS) through the Federal Emergency Management Agency to enable access through congested wired and wireless phone networks.
- Radio voice and data networks, including high frequency (HF), very high frequency [VHF], ultra-high frequency [UHF], 800/700 megahertz frequencies, and, in limited cases, super-high frequency (SHF) devices supporting mesh networks and microwave backhaul systems.
- Satellite telephones, including dedicated in-building and portable devices.
- Amateur radio networks (VHF, UHF, HF, and data using packet over radio frequencies) provide field and EOC to EOC communications capabilities.
 - Amateur radio networks are also increasingly using newer communications technology such as Amateur Radio Emergency Data Network (AREDN), which connects these agencies into the Willamette Valley MESH.
- Emergency notification software system (Everbridge).
- Building announcement and notification systems (AlertUs).
- Data and industrial telemetry using various private and public networking.
- Web and social media.

Clackamas County Technology Services (TS) monitors the status and availability of Clackamas County's communications infrastructure. TS assists in supporting and resolving issues, providing resources as available and determining resource allocations in coordination with the EOC and Clackamas Disaster Management, based on incident specifics, impacts and priorities.

3.2 Warning Systems

3.2.1 National Warning System (NAWAS)

The National Warning System (NAWAS) is the primary method of communicating alert and warning messages from national authorities to state authorities and between state authorities and local authorities or warning points. NAWAS messages are received through Clackamas County Communications (C-COM).

3.2.2 Disaster Management Notification

As a general protocol, C-COM notifies CCDM when:

- Emergencies affect multiple jurisdictions and may require CCDM resources or coordination.
- A three-alarm or greater fire occurs; C-COM pages the Fire Operations Center, which includes CCDM pagers.
- A major weather event impacts the county (routine warnings are not paged but approaching or in-process events with potentially severe impact are).
- A large hazardous material incident occurs.
- A terrorist incident is suspected or confirmed.
- On-Scene Command requests such notification.
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3.2.3 Employee Notification

The County can notify employees using:

- Phone-based systems
- Department-based notification technologies and procedures (each department is responsible for establishing and maintaining internal emergency communications)
- Instant messaging/texting
- Websites
- Social media

- Everbridge emergency notification software
- AlertUs – TS manages the AlertUs alert system for County employee use only. CCDM utilizes the system to alert County staff through networked equipment and cell phones that have been set up to use AlertUs.

3.3 Public Notification

3.3.1 Emergency Alert Systems

- **Everbridge:** An emergency notification software system, managed on a day-to-day basis by Clackamas County Disaster Management, which enables alerts and warnings to be sent to the public. The system can issue alerts and warnings via the following technologies:
 - **Emergency Alert System (EAS):** This is a method for communicating alert and warning messages to the public via radio and television broadcast. These alerts are issued in coordination with broadcasters. When issued, these alerts go out to the entire broadcast region. EAS is a component of the federal IPAWS alerting system.
 - **Wireless Emergency Alerts (WEA):** This is a method for communicating alert and warning messages to the public via cell towers to any WEA-enabled mobile device in a locally targeted area. WEA is a component of the federal IPAWS alerting system.
 - **Resident Connect and Opt-in Data Public Alerts:** This is a method for communicating alert and warning messages to the public via the phone (landline, cell, and/or Voice Over Internet Protocol (VOIP)), text message, email, fax, and teletypewriter (TTY)/time division duplex (TDD) devices. Community members in the county must opt in to the system (called PublicAlerts) to receive these messages.

3.4 Emergency Response Systems

3.4.1 Public Safety Answering Points

Public Safety Answering Points (PSAPs) are also known as emergency communication or 9-1-1 centers. Clackamas County has two PSAPs that dispatch emergency responders and partners with Washington County for some additional dispatch services as outlined below:

C-COM

- Receives all 9-1-1 calls in the county except for calls made from within the city limits of Lake Oswego, Milwaukie, and West Linn.
- Dispatches fire and law for all of Clackamas County except for the agencies and areas noted below that are serviced by Lake Oswego Communications (LOCOM) and the Washington County Consolidated Communications Agency (WCCCA).
- C-COM dispatches fire/EMS for the city of Aurora.
- C-COM can, under certain circumstances, dispatch responders from the U.S. Forest Service and Bureau of Land Management as well as staff from several county departments and divisions including community corrections, juvenile, medical examiner, district attorney,

dog services, code enforcement, and weighmaster.

Lake Oswego Communications (LOCOM)

- Receives 9-1-1 calls from Lake Oswego, Milwaukie, and West Linn.
- Dispatches law and fire for Lake Oswego.
- Dispatches law for the cities of Milwaukie and West Linn.

Washington County Consolidated Communications Agency (WCCCA)

- Dispatches Tualatin Police and Tualatin Valley Fire & Rescue (TVF&R). TVF&R provides fire and emergency medical services to the cities of West Linn and Wilsonville.

LOCOM and C-COM can transfer call-taking responsibility to each other through a “make busy switch” which is a programmable feature to allow for seamless call-taking during emergencies, if one center evacuates or becomes overloaded. They also serve as back-up centers for each other, as needs arise.

LOCOM, C-COM and WCCCA share a connected 7/800 MHz digital trunked public-safety radio system (the WCN / C800 system), which means that any dispatch center on the system can communicate to first responders anywhere in the Washington County, Clackamas County, and city of Newberg areas. This also allows WCCCA in Washington County to serve as a backup dispatch site for either LOCOM or C-COM if necessary.

3.4.2 Amateur Radio Emergency Service

Amateur radio (also known as “ham radio”) is a critical component of emergency communications, particularly since other communications systems may be unavailable or overloaded in an emergency. Clackamas Amateur Radio Emergency Service (CARES) volunteers are federally licensed and registered as Clackamas County emergency service workers and provide emergency voice and data communications.

CARES is led by an Emergency Coordinator working directly with CCDM to identify requirements, capabilities, and protocols for emergency operations. CARES provides a robust, reliable communication network throughout the county until primary and alternate communications services can be restored. The CARES incident-specific emergency communications plan becomes an integral part of the EOC Action Plan (EAP).

CARES operations are conducted in accordance with the Amateur Radio Emergency Service District 1 Emergency Communications Plan and Title 47 of the Code of Federal Regulations (Parts 2, 15 and 97). Additional information on CARES can be found at <http://www.clackamasares.org/>.

3.4.3 WCN Radio System (C800)

The mission of the Clackamas 800 Radio Group (C800) is to own and operate an effective and cost-efficient public safety voice and data communications system to benefit the public safety providers that protect the citizens of Clackamas County. C800 was formed as an Oregon Revised Statutes (ORS) 190 cooperative intergovernmental agency in 2000.

The Washington County Consolidated Communications Agency (WCCCA), an ORS 190 agency in Washington County, manages and maintains the C800 radio system under an intergovernmental agreement. C800 is funded by user fees from the participating jurisdictions.

The WCN (Washington-Clackamas-Newberg) radio system consists of 23 radio sites in Clackamas County, 20 radio sites in Washington County, and one radio site in the city of Newberg. All sites are equipped with commercial power, emergency generators, propane, and 18 hours minimum of back-up batteries. A power management system allows the sites to continuously operate for up to four weeks on emergency power. The sites are interconnected by a looped digital microwave system. All of these measures create a reliable and resilient radio system.

All fire and law enforcement agencies in Clackamas County, along with American Medical Response, operate on the WCN system. The WCN system is interoperable with the Clark County, Washington, system, city of Portland – Multnomah County system, city of Salem system, and the state of Oregon OSP/ODOT 700/800 MHz system.

3.5 Interoperability

The Oregon State Interoperability Executive Council (SIEC) defines communications interoperability as:

The ability of emergency response agencies and relevant government officials to talk to one another via communication systems—to exchange voice and/or data with one another on demand, in real time, when needed, and as authorized.

From an ESF-2 perspective, interoperable communications are redundant, reliable, resilient, and based on common public standards. Interoperability is required for regional disasters and emergency situations where the response requires far more resources than any local jurisdiction by itself can bring to bear. Traditionally, discussions about interoperable communications have been focused on land-mobile radio (LMR). With growth in the use of electronic data and communications in incident management, interoperability across data networks is rapidly becoming just as important.

The WCN and Portland 800 radio networks share a common radio template format, where the first several zones on the radio are reserved for agency operations, and the rest of the radio is pre-programmed with the same channels for commonality in regional operations. The radio systems are networked together such that common talk groups / channels are available for mutual aid during incidents and emergencies. In addition, both WCN and Portland 800 maintain several conventional (i.e. traditional analog radio sites, not digital trunked) interoperability assets across the VHF and UHF spectrum in case of something happening to the main trunked systems. The WCN network is also able to communicate via a network link with the state of Oregon's State Radio Project, which allows interoperability with Oregon State Police, Oregon Department of Transportation, and other state agencies involved in response and recovery. Several agencies in Clackamas County maintain their own VHF radio systems, with usage by first responders permitted via intergovernmental agreements or memorandums of understanding. This allows for communications between federal entities (such as the BLM or the U.S. Forest Service), state entities (Oregon Department of Forestry) and the County.

Both C800 and WCCCA maintain small caches of pre-configured mobile and portable radios that can be deployed to incidents to provide spare radios for incoming out-of-area resources. Also, most fire agencies in the county maintain caches of VHF radios for use during wildfires that can also be leveraged during emergencies and disasters. WCCCA maintains a portable tower and deployable trunking radio site that can be used as a fill-in during emergencies. Several agencies, including some fire departments, the Oregon State Fire Marshal, and ODOT maintain portable radio repeaters that can also be deployed to provide emergency voice communications.

Interoperability across data networks remains somewhat of a challenge. Most agencies in the Portland metropolitan region, including Clackamas County, use digital tools like Microsoft products for file sharing, content collaboration, videoconferencing, and document production. However, despite most of these functions existing in the cloud, security considerations and costs remain a barrier to true data interoperability. In addition, some agencies (Multnomah County in particular) have adopted different software ecosystem (Google Cloud) that does not interoperate with Microsoft. Information security and legal considerations with respect to on-premises and cloud software also exist, bringing about an environment where some software used by County partners cannot be used by the County, leading to an interoperability gap.

Cellular communications are another area where interoperability challenges exist. At the system core level (the backbone that runs the data networks behind the cell towers), none of the major carriers interoperate. All three (Verizon, T-Mobile, and AT&T/FirstNet) advertise priority and pre-emption (the ability to interrupt less important calls and data when the lines are congested) on their networks, but traffic going between their networks may not have the same priority. Priority telecommunications services from the Department of Homeland Security (DHS) such as the Government Emergency Telecommunications System (GETS) and Wireless Priority Service (WPS) programs do assist with prioritizing voice phone calls between the cellular carriers and with conventional wired telecommunications systems but lack any mechanism for applying the same priority to data streams.

Amateur radio provides a very capable contingency and emergency backup for local and regional voice and data communications in a disaster situation. Most Portland region volunteer groups utilize a radio-based data service known as Winlink for emergency communications. Winlink provides the ability to send email and file sharing traffic over radio frequencies, microwave frequencies (using the Amateur Radio Emergency Data Network or AREDN network), and the internet. It is a common open standard that all the Portland region counties and many of the region's cities support and embrace. Selected and trained amateur radio personnel also support the High Frequency Shared Resources (HF SHARES) radio system, which utilizes federally owned radio frequencies to support state, regional, and national voice and data interoperability. Amateur radio and HF SHARES are the primary tools for communication with the state of Oregon's Emergency Coordination Center (ECC) during disasters.

C-COM is a participating member of the PDCC (Portland Dispatch Center Consortium), which is comprised of regional 9-1-1 centers that collaborate to ensure interjurisdictional, interoperable communication and disaster preparedness capabilities. CAD2CAD is an electronic system administrated within PDCC that enables multiple 911 centers and emergency dispatch centers within the state of Oregon and Clark County, Washington, to electronically share and exchange

dispatch data in real time. CAD2CAD provides seamless connectivity between the participating member agencies and their dissimilar Computer-Aided Dispatch (CAD) system platforms to facilitate faster, more accurate, and coordinated emergency responses across jurisdictions and between police, fire, and EMS services. This real-time data sharing enhances situational awareness, reduces human error, and supports cross-jurisdictional collaboration and resource sharing.

3.6 Coordination with Other ESFs

The following ESFs support communication-related activities:

- **All ESFs:** Support interoperable and redundant communications systems to ensure responding agencies can communicate with each other and the EOC.

4 Communications Infrastructure Coordination



4.1 Cities

If the incident occurs in an incorporated area, the city in which it occurs has jurisdictional authority and primary incident management responsibility. If two or more cities are impacted, the cities share responsibility for incident management and the safety and well-being of their citizens.

City and County officials work to ensure communications capability by collaborating on equipment and systems, authorizing the shared use of emergency frequencies, and providing current emergency contact information for officials in all jurisdictions within the county. CARES includes sub-units that have primary responsibility for serving designated cities in the county.

4.2 County

The County has jurisdictional authority and primary incident management responsibility for incidents that occur in the unincorporated area, and for health emergencies countywide. If the incident impacts both the unincorporated and an incorporated area, the County and impacted cities share responsibility. The County will respond to city requests for assistance, manage critical resources, and coordinate with outside agencies, adjoining counties, and OEM.

All jurisdictions with incident management responsibility are likely to activate their EOCs and implement their emergency operations plans in a major incident. EOC staff, including the TS coordinator, will coordinate emergency communications and resources in support of field activities, share incident information, conduct multi-agency planning, and operate the Joint Information System (JIS).

Public information representatives from all impacted locations and organizations will collaborate to ensure that a common operating picture is established and maintained throughout the impacted area. The Communications Unit Leader in the EOC Logistics Section, in conjunction with the TS coordinator, develops a communications plan to meet incident-specific needs.

4.3 Special Districts

The service areas of special districts may overlap several city and County boundaries. County officials collaborate with special districts in coordinating emergency preparedness, response and recovery operations, and will work with special districts to maintain communications during emergencies.

4.4 Regional

Clackamas County participates in the Inter-County Omnibus Mutual Aid Agreement that provides a framework for counties to request mutual aid from each other in emergencies. Emergency assistance may include communications equipment, supplies, and personnel, or the direct provision of services. A copy of the agreement and current participants is available in the EOC library.

The Oregon Resource Coordination Assistance Agreement (ORCAA) provides for non-reimbursable assistance among local governments. To receive reimbursement for resource assistance provided under this statute, participants must agree to a reimbursement request in writing before resources are dispatched.

4.5 State and Federal Assistance

OEM coordinates state support for local incident response and recovery operations. During a major emergency or disaster, one of the first priorities for the County is to establish emergency communications with the State Emergency Coordination Center. The National Guard, Federal Emergency Management Agency, and other state and federal agencies have deployable emergency communications capabilities that may be available in a major emergency.

5 ESF Annex Development and Maintenance



The Director of the Department of Technology Services and the Director of C-COM are responsible for coordinating regular review and maintenance of this annex. Each primary and supporting agency is responsible for developing plans and procedures that address assigned tasks as well as testing equipment, backup EOC sites, and overall coordination of technical and communication requirements with the EOC and C-COM.