# Radio Communications and Interoperability

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Statewide Interoperability Coordinator

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# Simplex

- Very Reliable
- Limited Range
- Radio Channel uses 1 frequency

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# Conventional Repeater

- Receives a signal on one frequency and retransmits (repeats) it on another frequency
- Placed at a high location
- Increases range of portable and mobile radio communications
- Allows communication around obstructions (hills, valleys, etc.)
- User radios receive on the repeaters transmit frequency and transmit on the repeater's receive frequency

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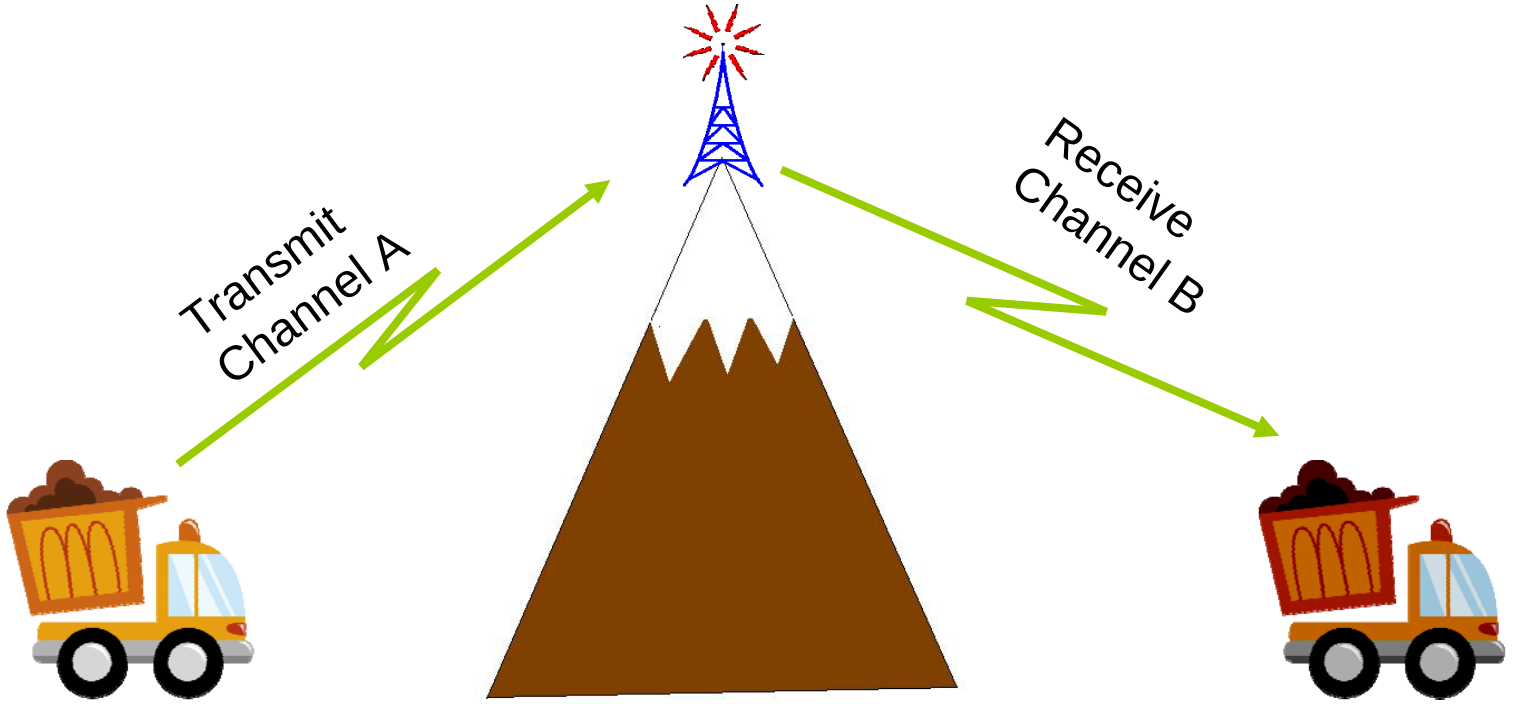
# Conventional Systems

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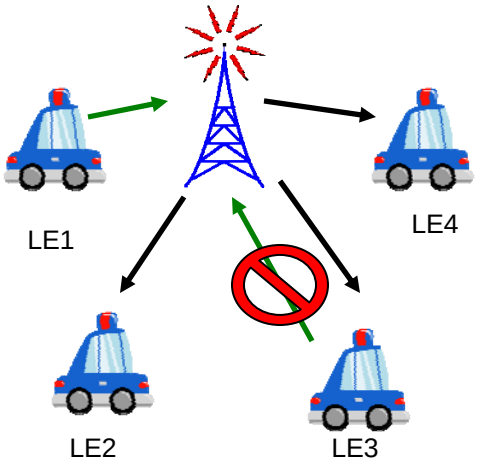
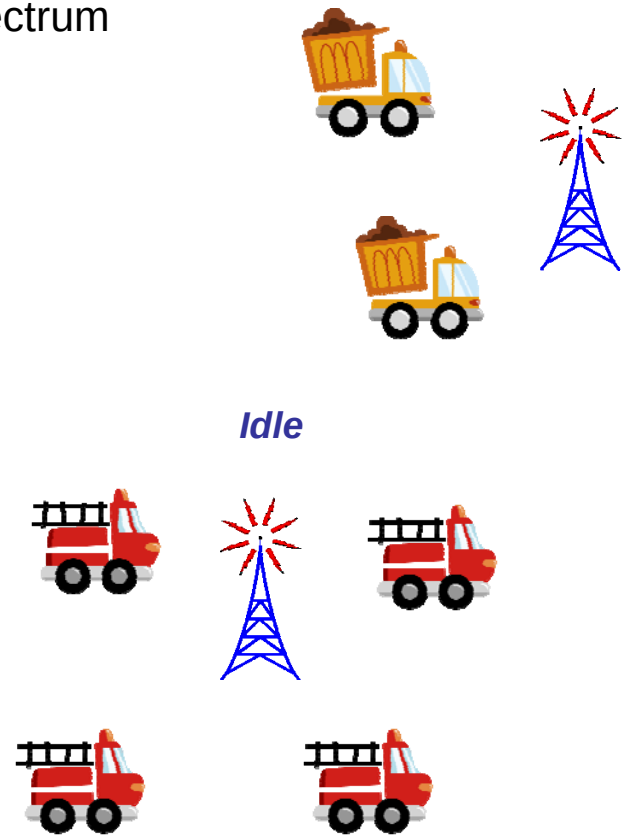
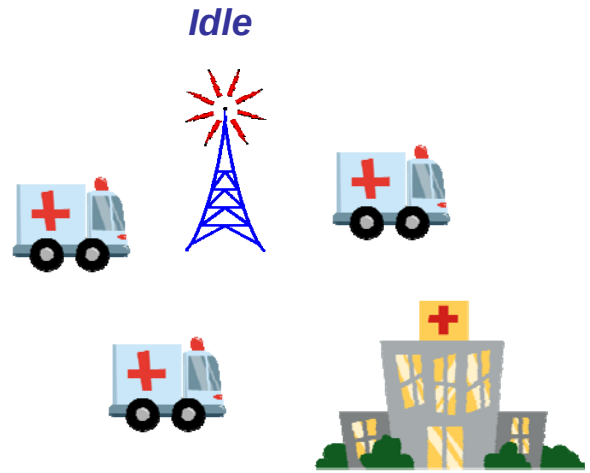
# Conventional Systems

- Only one user can transmit on a given frequency at a time
  - LE1 needs to talk to LE2 prohibiting LE3 from talking to LE4
  - Inefficient use of spectrum




Public Works may be idle 90% of the time which means that frequency is mostly wasted

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# Trunked Systems

- Trunking is a method of combining repeaters at the same site to “share” frequencies among users
  - Spectrally efficient
  - Allows many more “virtual” channels (called talkgroups) than there actually are frequencies
  - Computer controlled
  - All sites are linked together and controlled by a computer (wide area coverage)

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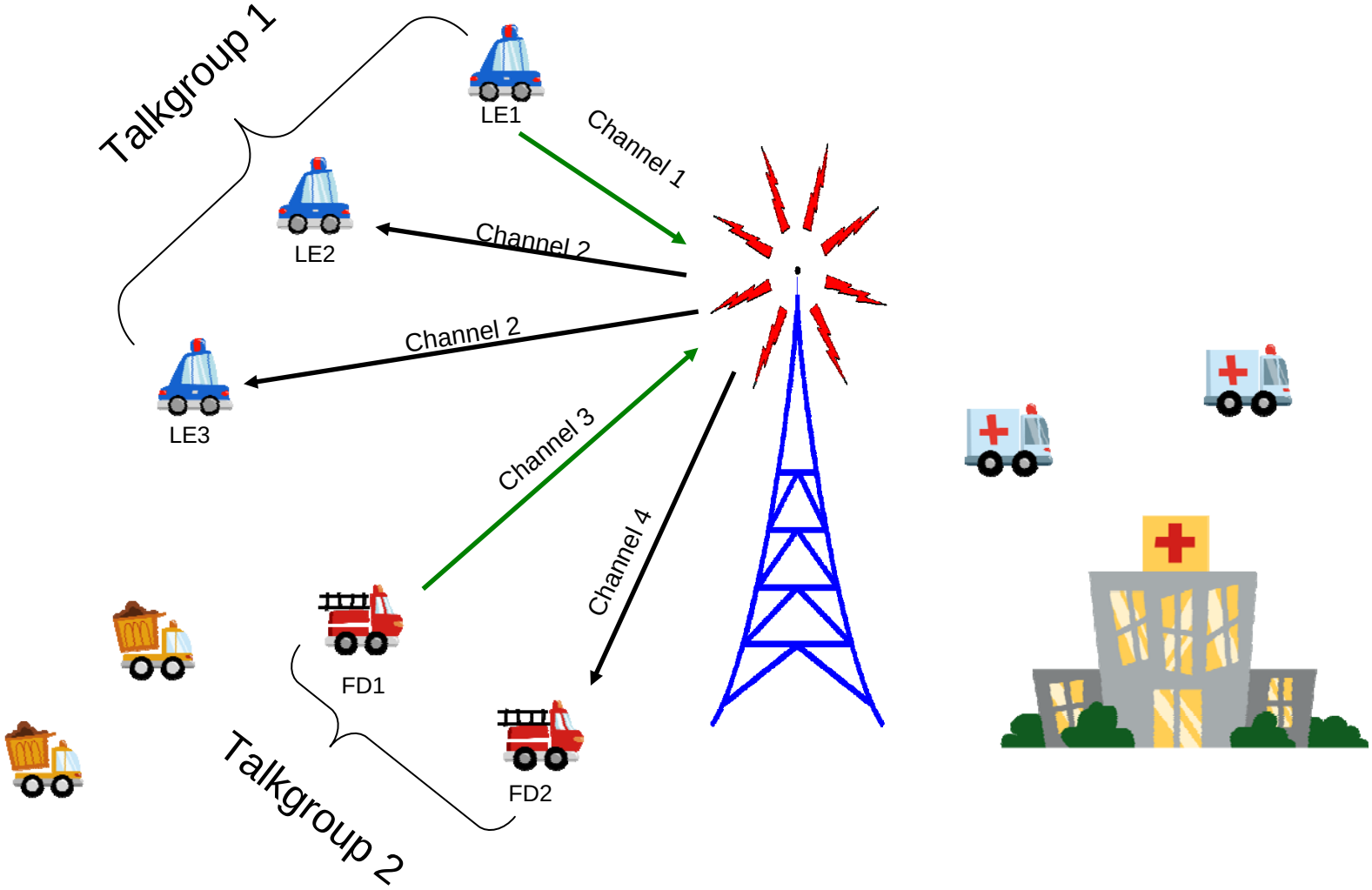
# Trunked Systems



# Trunked Systems

- User radios continuously monitor a dedicated “control channel”
- When a user wants to transmit, the user’s radio makes a request to the system controller
- If a repeater is available, the system controller temporarily assigns that repeater channel to the talkgroup making the request
- Transmitting user’s radio will give a “talk beep”, indicating that a repeater has successfully been assigned…user can talk
- All user radios monitoring that talkgroup automatically switch to the frequency of the assigned repeater and hear the transmission
- When the transmission is complete, all radios return to monitoring the control channel

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# Trunked Systems

- The system is still limited by the number of frequencies allotted
  - During high-traffic events users should eliminate unnecessary traffic
  - Ensure that necessary traffic is concise
    - Law of the firefighters
      - “Why say something in four words when you could say the same thing in thirty-six words.”

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# Systems in Utah

- Utah utilizes both Conventional and Trunked radio systems
  - Most rural areas utilize conventional radio networks
  - Most urbanized areas participate in a statewide trunked radio system (UCAN)

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# Conventional Systems

- Most rural counties and cities operate their own conventional radio network
- The state operates a statewide conventional radio network
- All disparate radio networks in the state are linked together via Omni-Link
  - Allows for “patching” channels together
  - Provides interoperability

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# Utah Communications Agency Network (UCAN)

- Independent government agency formed prior to the 2002 Olympic Games
  - Governed by an Executive Board with representation from all member counties
- Created a regional trunked radio network
  - Salt Lake, Davis, Utah, Weber, Morgan, Tooele, Summit, Wasatch Counties

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# Utah Communications Agency Network (UCAN)

- Over the past 10 years the system has utilized grant money to expand the system
- Additional counties joined UCAN
  - Cache, Box Elder, Rich, Washington
- Network expanded to cover 75% of the State
- System is connected to Omni-Link

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# Hospital Communications

- Conventional systems
  - "HEAR" Channel
  - Other  designated Hospital channels
- UCAN
  - Each hospital has a dedicated talkgroup
    - EMS communications only
  - Some have local and state EOC talkgroups
  - All have the "Hospital Common" talkgroup

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# General Radio Guidelines

- Decide what you are going to say before you push the button
- Listen briefly to make sure no one is using the channel
- Transmit the call sign of the person or station you are calling following by your call sign
  - Ambulance 6 from McKay Dee ER
- Keep transmissions short and simple
- Speak clearly, concisely, and in a normal voice
- Do not use profanity or jargon (it is an FCC offense subject to fines even in training)
- Don’t break into a conversation unless your interruption needs priority

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# General Radio Guidelines

- When receiving important instructions it may be appropriate to repeat them back to the sender
- When transmitting a long radio transmission, break it up using the radio term “break”
  - This allows the receiver an opportunity to interject an emergency transmission if needed or ask for clarification
- If spelling an uncommon name or work, use the phonetic alphabet
- If transmitting a long number, break it up into 3 number section with a pause in between

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# Radio Care and Maintenance

- Most Public Safety grade radios are designed to be rugged and durable
- Regular radio test should be performed
- Batteries will lose their life over time
  - Frequently drain the battery before charging
  - Don’t leave battery on charger
  - Keep cache radio batteries charged

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# Radio Usage

- Incorporate radio usage into as many exercises as possible
  - Practice makes perfect
- A lot of people have radiophobia
  - Exposure to radio usage will overcome this
- Most EMS-Hospital communications now happens over cell phones
  - Designate one day a month as radio only day

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# What is in Store for the Future?

- National Public Safety Broadband Network
  - What is it?
  - What does this mean for EMS and Hospitals?
- Next Generation 911

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# Disaster Communications

- Will current communication systems function during a disaster?
  - Radio Network?
  - Cell Phones?
  - Internet?
- How will hospitals communication and coordinate during a disaster?

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# Questions?

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