

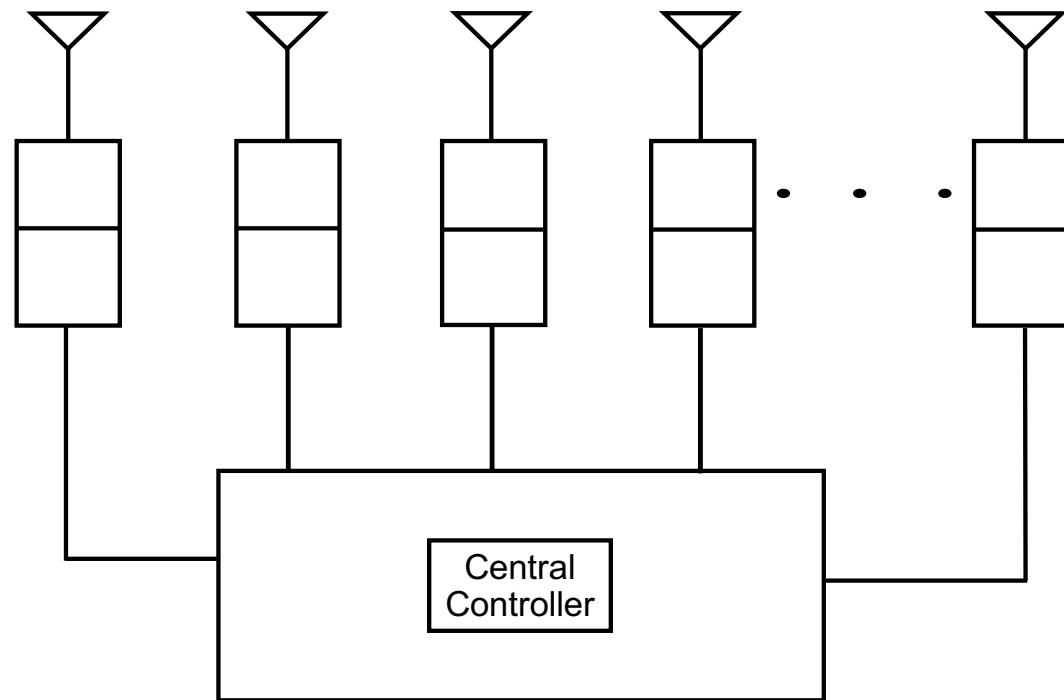


Radio Training and Trunked Radio System Overview

Agenda

- Trunked radio system overview
- Proper use of portable radios
- Proper antenna selection (portable and mobile)
- Proper mobile antenna installation location (Slides of Shame)
- Standard button configuration on portables and mobiles
- Scan operation and limitations
- Standard zone configuration
- Questions

Basic Trunked System

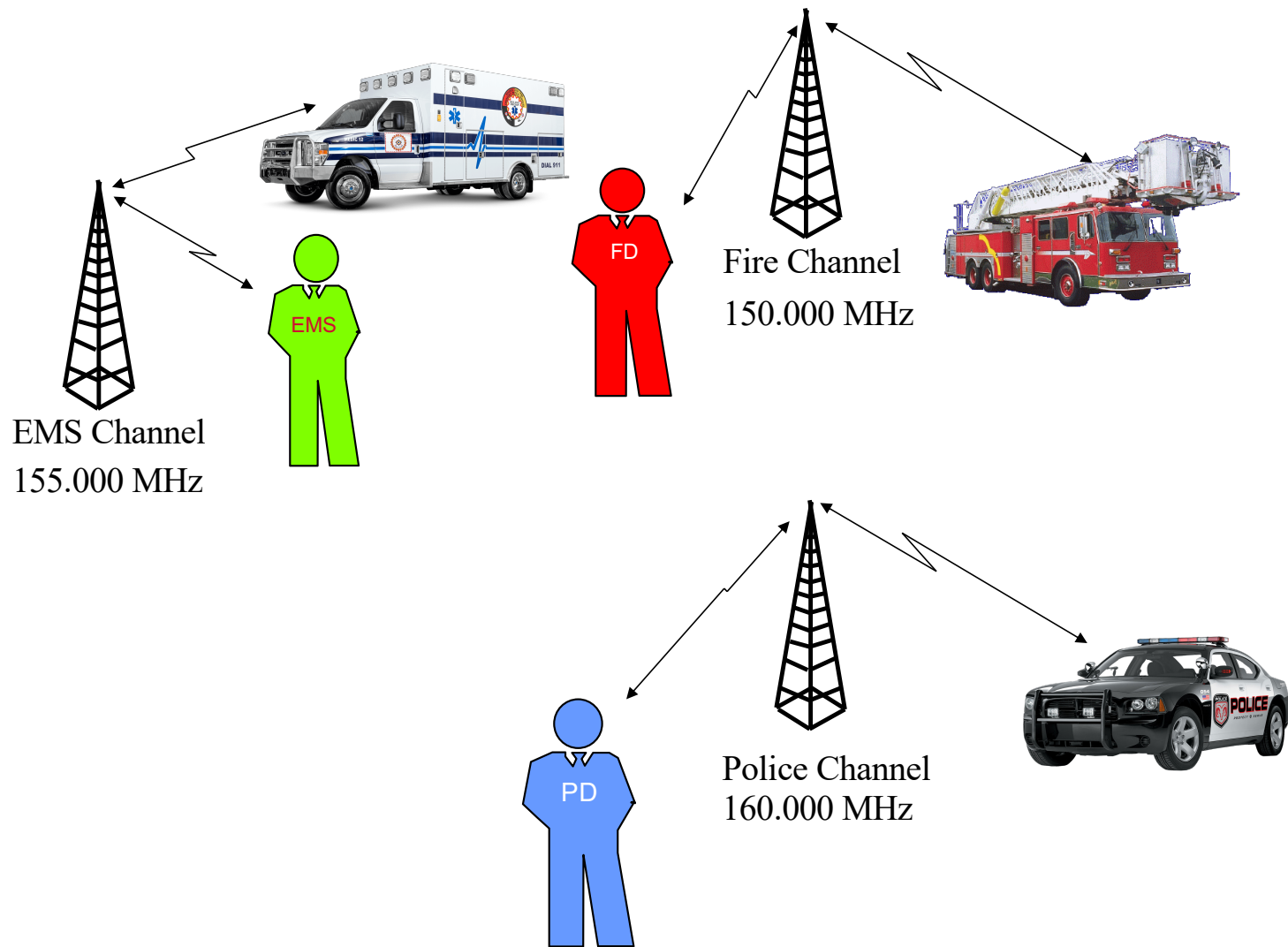


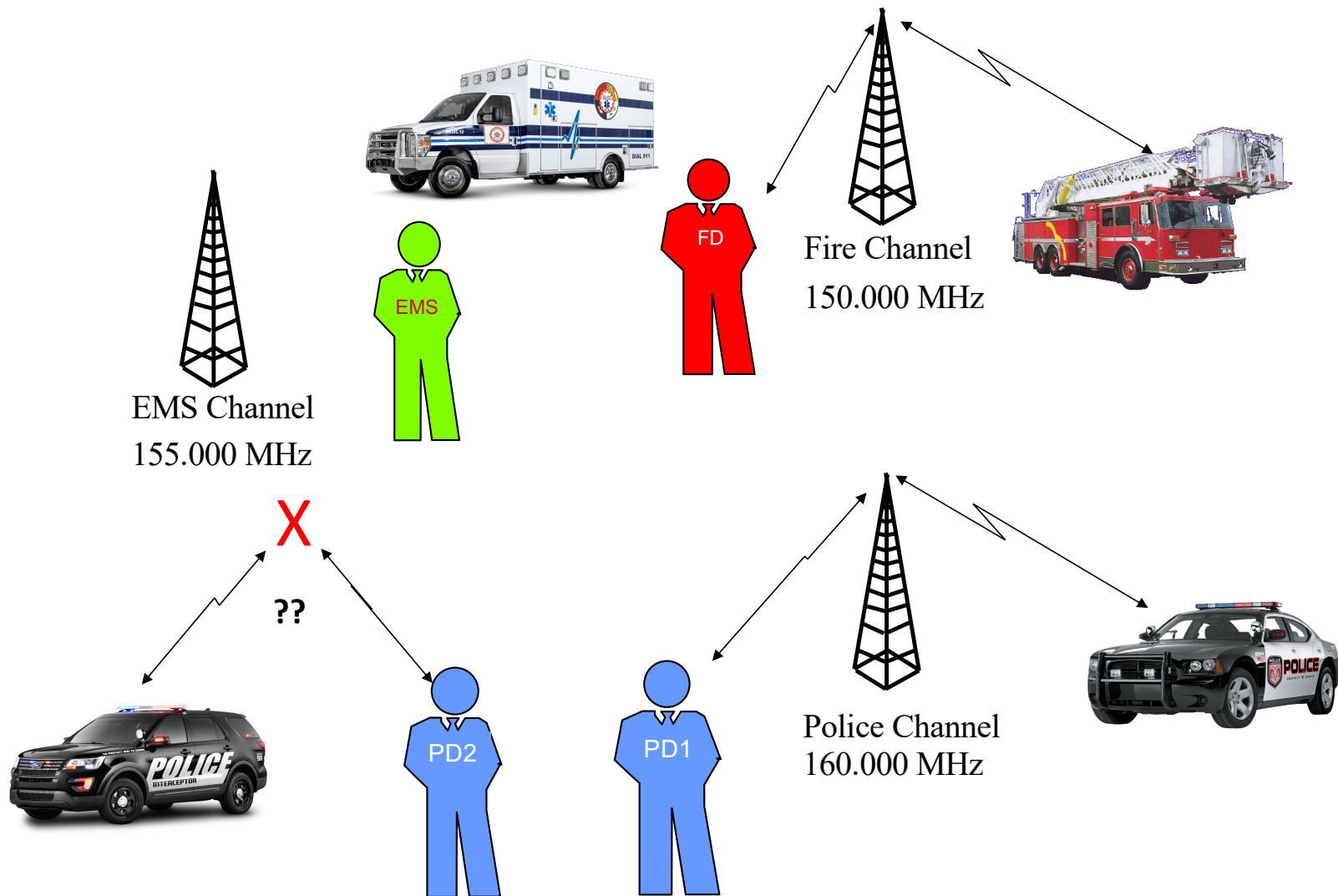
What is “Trunking”?

- It is **not** a term that “belongs” to Motorola, Kenwood, or any other manufacturer
- It is **not** a term exclusively used for radio systems
- It **is** a generic term used to describe:
“The sharing of a limited number of communications paths (or Trunks) among Many Users”

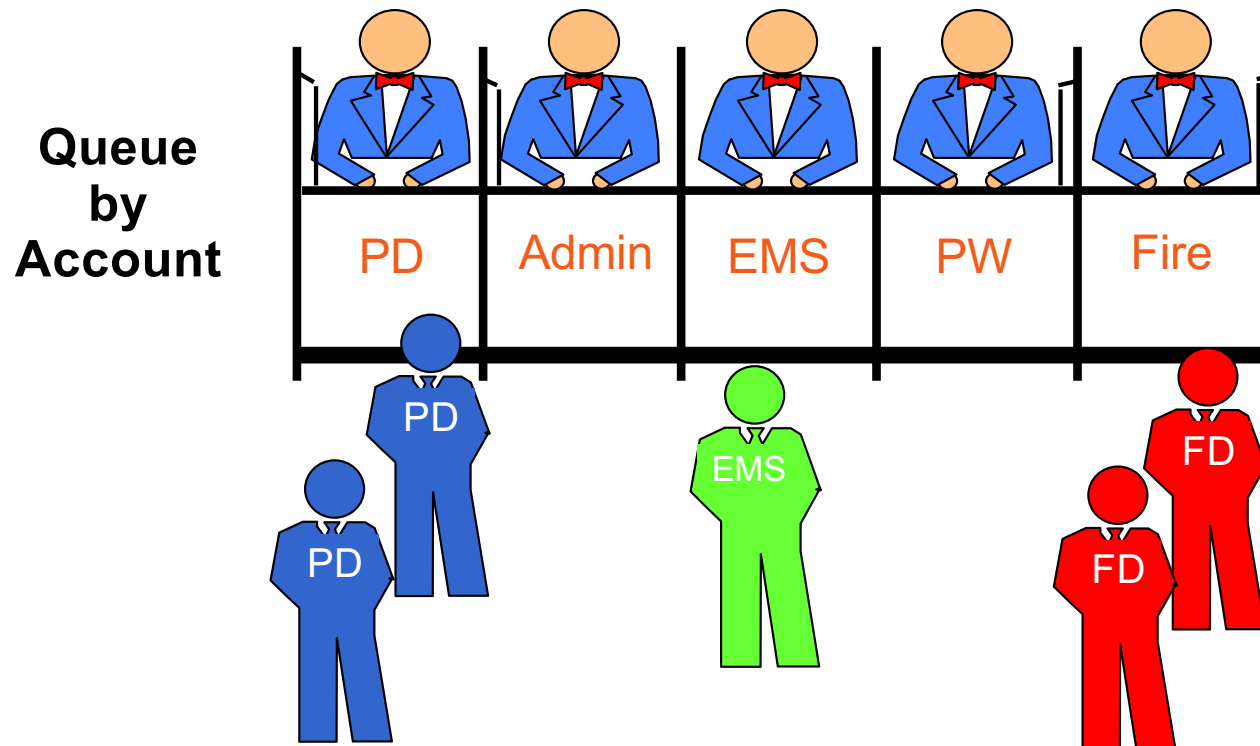
Conventional vs. *Trunked*

- Conventional Radio (base or repeater) system:
 - Uses a dedicated radio frequency for each radio channel in a system (unless sharing a channel)
 - A Channel = a Frequency (i.e. County Fire = 150.000MHz)
 - Each frequency is assigned to a group of users i.e. Fire, EMS, Police, etc.
 - If a channel is in use, radio users must wait in the “queue” before being able to transmit on the system.
 - A new frequency must be obtained each time a new channel is needed in the system
 - The system is limited by the number of frequencies





Your Bank Tellers – as “*Conventional*”



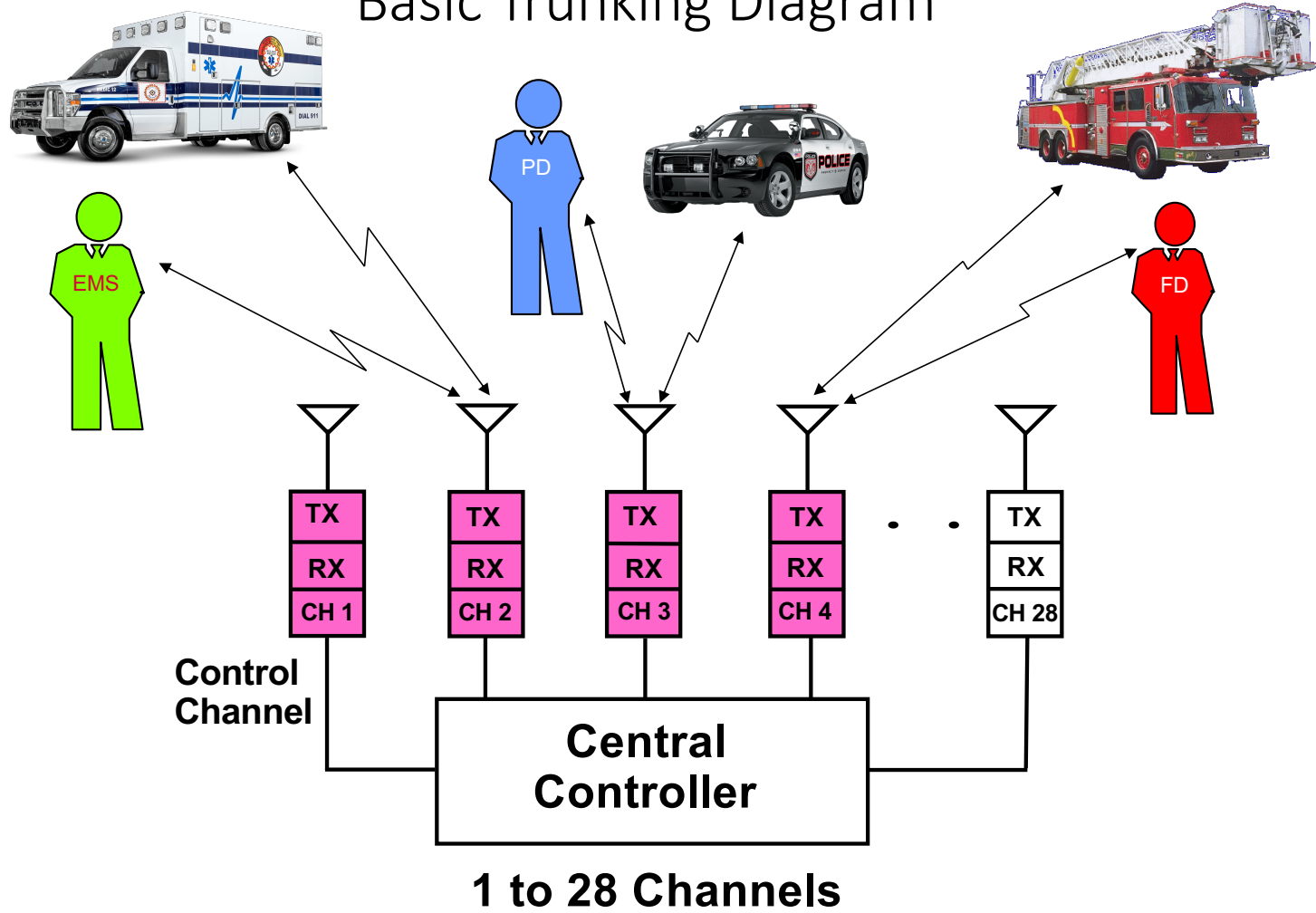
Conventional vs. Trunked

- Trunked Radio (repeater) system:
 - Uses a group of similar radio frequencies to create a “pool” for radio system users to access
 - Systems can be built using VHF, UHF, 700 & 800Mhz
 - A Channel is NOT a Frequency...(generally)
 - A Channel (on your radio) is now a computer-generated code...
 - ...and are now referred to as “Talk Groups”

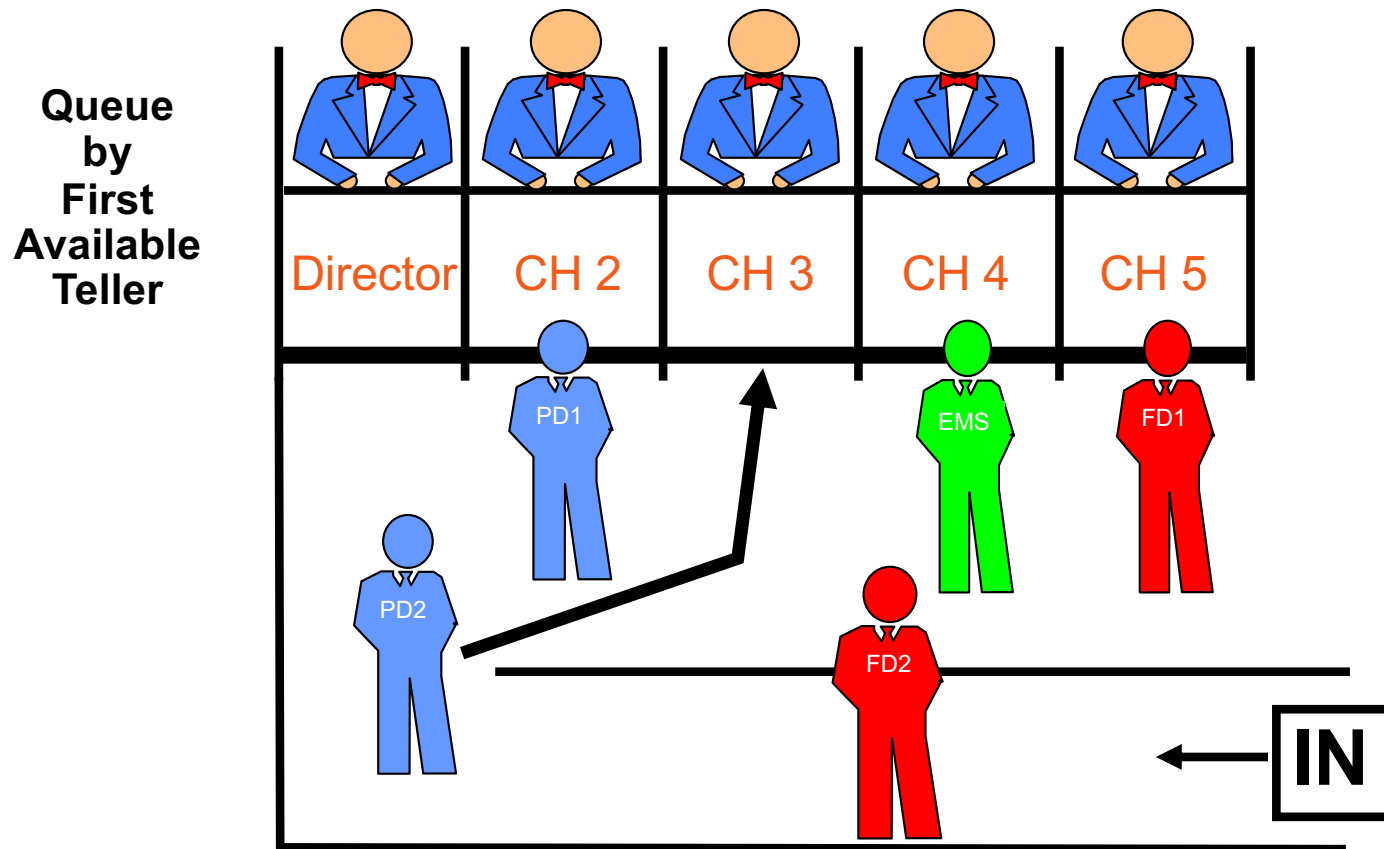
Conventional vs. Trunked

- Trunked Radio (repeater) system:
 - The entire system is managed by a computer, often referred to as the “Central Controller”
 - All radios in the system are computer-controlled and communicate to the central controller via one frequency known as the “Control Channel”

Basic Trunking Diagram



Your Bank Tellers – as “Trunked”

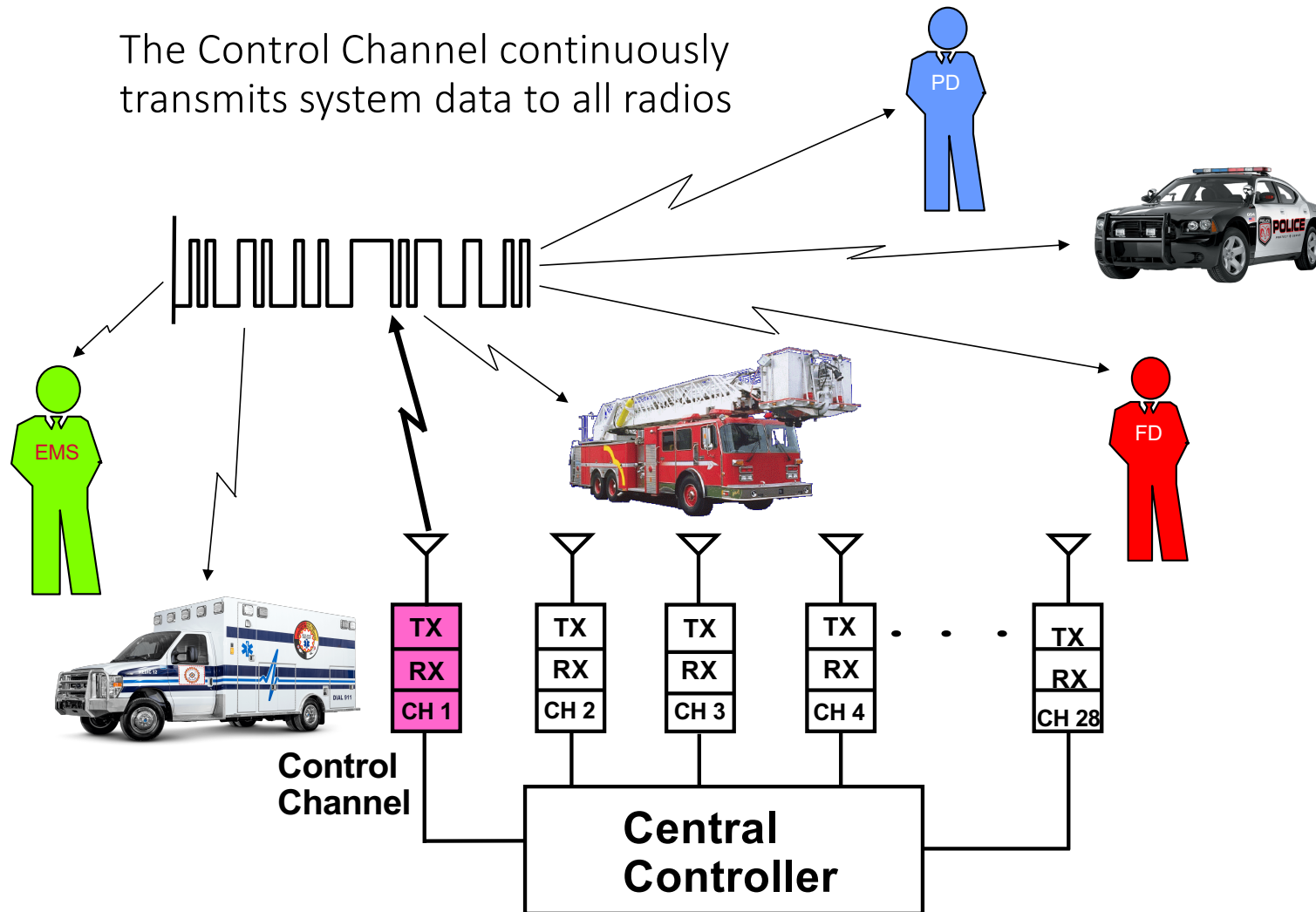


Conventional vs. Trunked

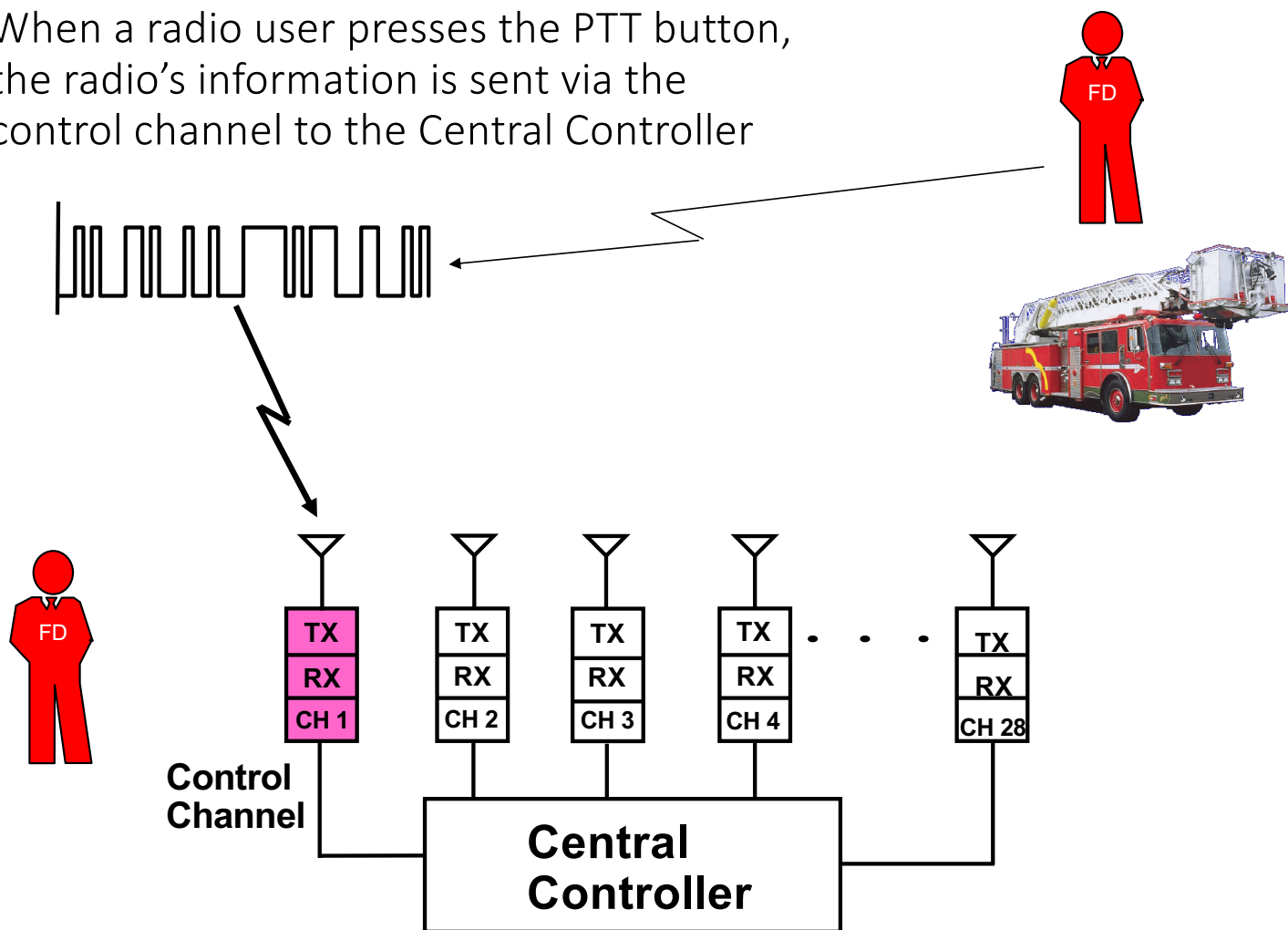
- Trunked Radio Benefits:
 - Greatly improved usage of scarce radio frequencies
 - Greater overall radio system flexibility, including:
 - ✓ Channel (Talk Group) capabilities
 - ✓ Various user features, including Emergency Alarm, PTT ID, Channel Regrouping, Call Alert, and Radio Inhibit
 - Brings radio users together on a common radio system
 - Consistency in radio coverage

So How Does It Work?

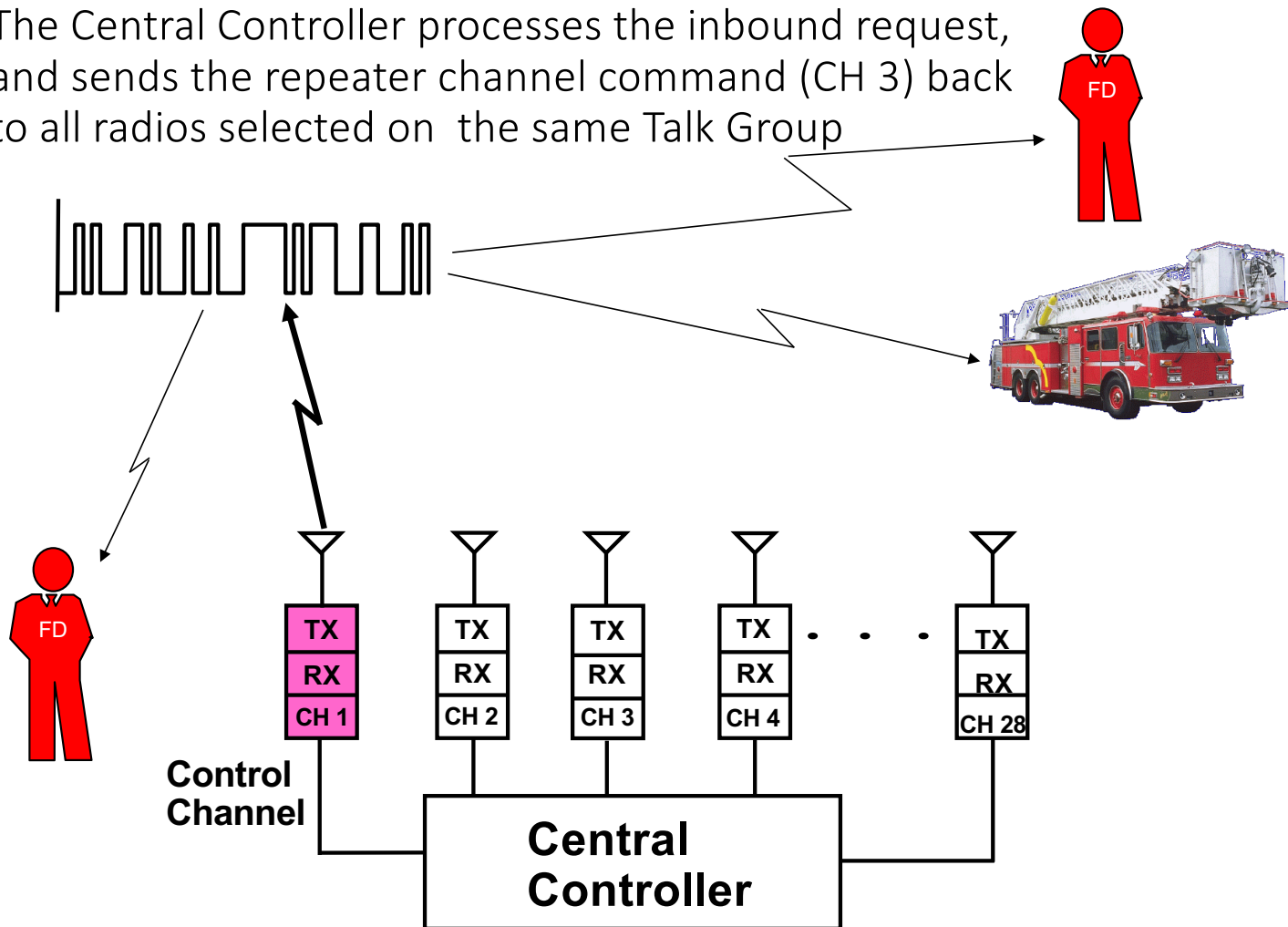
The Control Channel continuously transmits system data to all radios



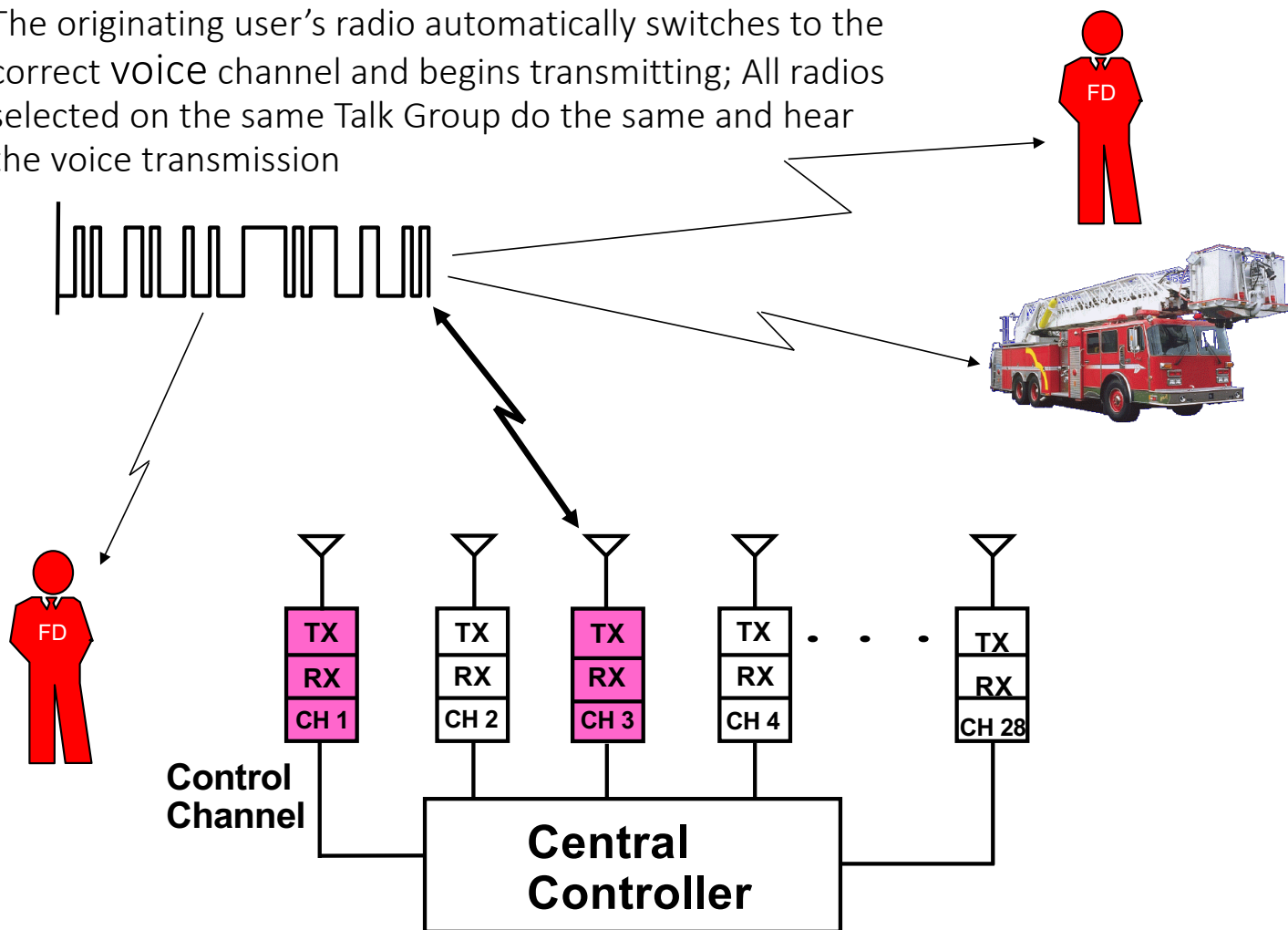
When a radio user presses the PTT button, the radio's information is sent via the control channel to the Central Controller



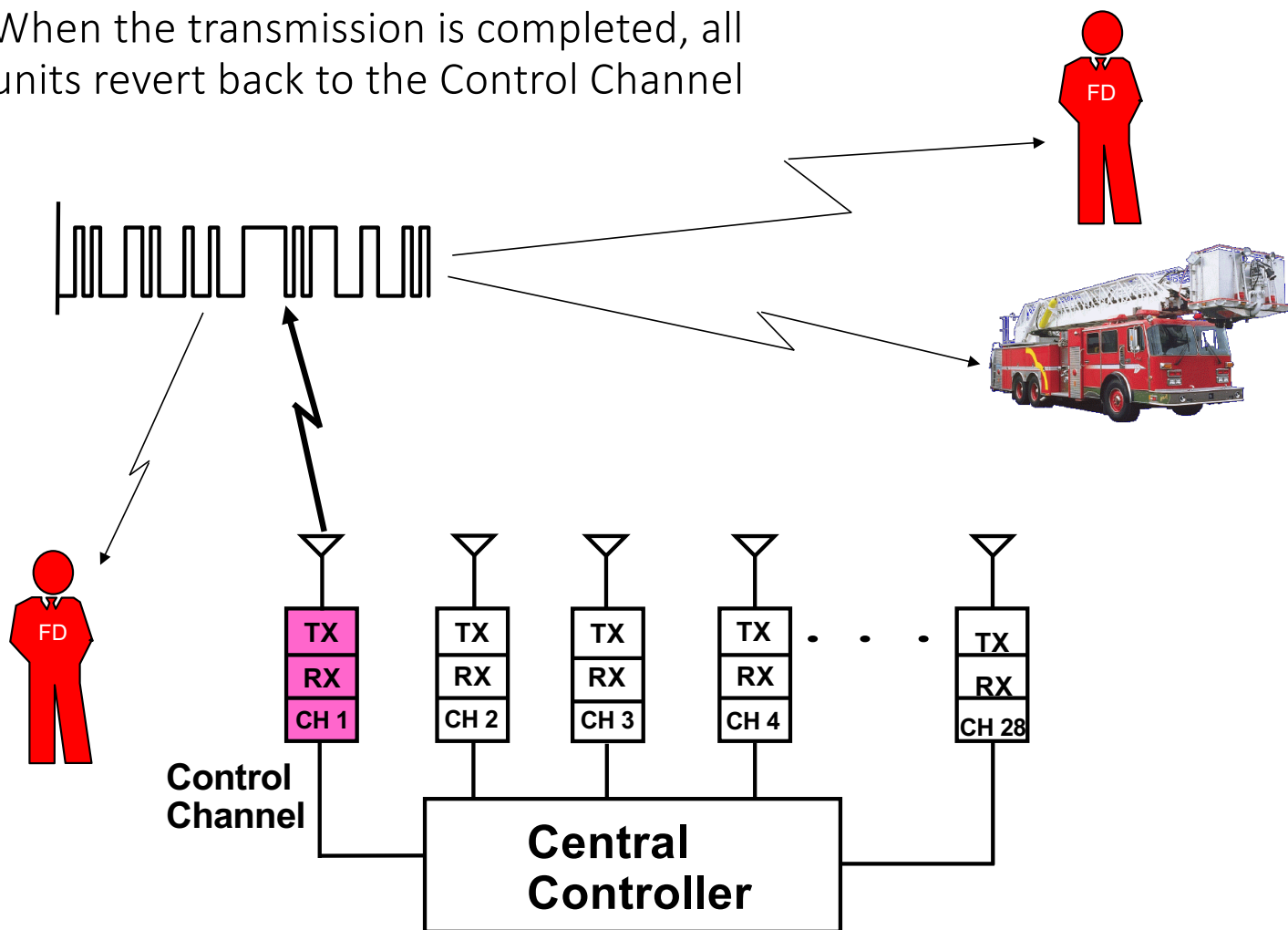
The Central Controller processes the inbound request, and sends the repeater channel command (CH 3) back to all radios selected on the same Talk Group



The originating user's radio automatically switches to the correct VOICE channel and begins transmitting; All radios selected on the same Talk Group do the same and hear the voice transmission



When the transmission is completed, all units revert back to the Control Channel



How to properly utilize your portable radio

- Best practice is to bring the radio to face level and press the PTT.

- Talking in a normal voice, several inches away from the radio will produce the best audio – This will be important with the upcoming P25 system.

- Best in an area free of obstructions. This includes your own body when worn on your hip. The body absorbs RF energy and will degrade transmissions.

- Not in a moving vehicle.

- Use a proper antenna

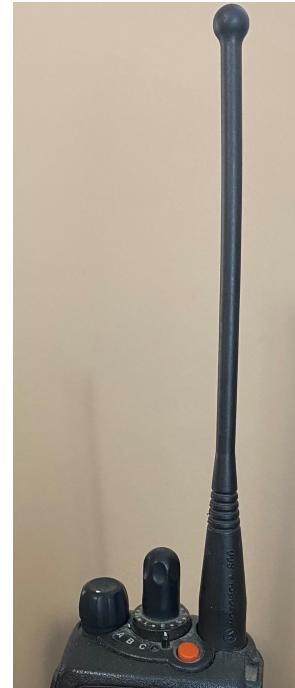


Portable antenna — size *does* matter!

A stubby antenna is a compromise between form and function and *will* result in poor performance.



NO



YES

Mobile antenna type



¼ wave stinger



Low profile



Low profile blade

NO



3-5db whip



3-5db elevated feed

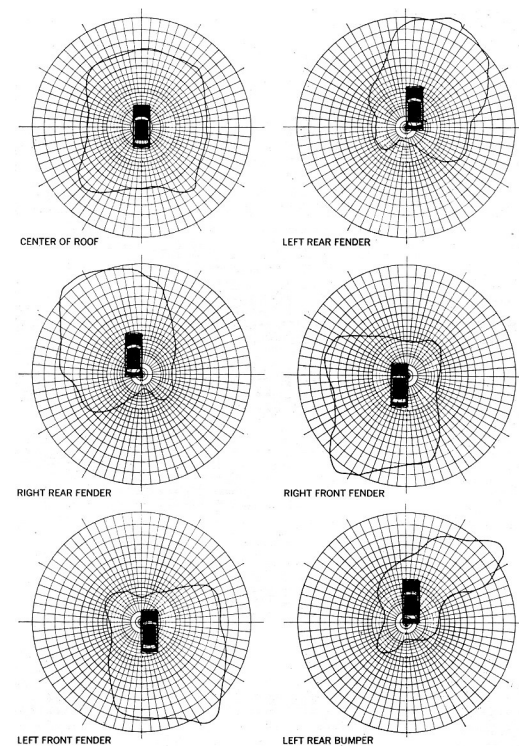
YES

Proper mobile antenna location

Antenna placement is paramount.

Mobile antennas are best utilized on the top center of a vehicle.

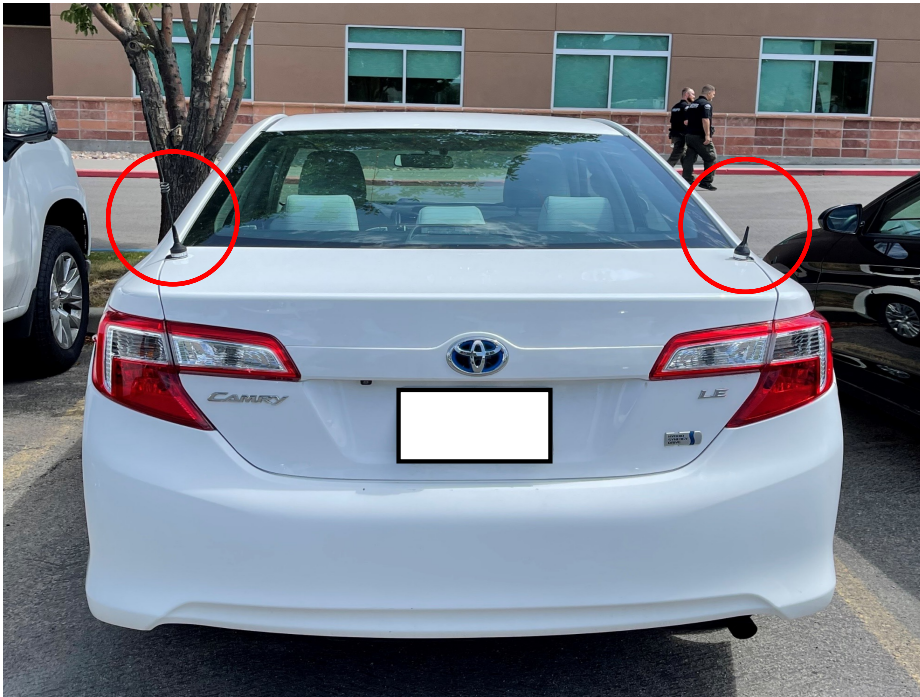
A stubby antenna on a mobile install will result in poor performance.



Examples of incorrect mobile installations



Examples of incorrect mobile installations



Examples of incorrect mobile installations



Improper antenna



Proper antenna – poor installation

Example of a correct mobile installation



XTS Button/Switch Configuration



Buttons and Controls

Index	Description	Conventional	Trunking
1		Power/Volume	Power/Volume
2	Three Position Concentric		
	Position A	Zone Select	Zone Select
	Position B	Zone Select	Zone Select
	Position C	Zone Select	Zone Select
3	Rotary Control	Channel Select	Channel Select
4	Top Button	Unprogrammed	Emergency
5	Side Button - Top	Light	Light
6	Side Button - Middle	Monitor	Site Displ/Srch
7	Side Button - Bottom	TalkAround/Direct	Private Call
8	Data Button	Unprogrammed	Unprogrammed

APX Button/Switch Configuration



Buttons and Controls

Index	Description	Conventional	Trunking
1		Power/Volume	Power/Volume
2	Two Position Concentric		
	Position A	Blank	Blank
	Position B	Scan	Scan
3	Three Position Toggle		
	Position A	Zone Select	Zone Select
	Position B	Zone Select	Zone Select
	Position C	Zone Select	Zone Select
4	Rotary Control	Channel/Sub Select	Channel/Sub Select
5	Top Button	Unprogrammed	Emergency
6	Side Top Button	Light/Flip	Light/Flip
7	Side Middle Button	Volume Set Tone	Site Displ/Srch
8	Side Bottom Button	TalkAround/Direct	Private Call
9	Data Button	Blank	Blank

XTL/APX Softkey Configuration



Scan Use and Configuration

Typically, every radio has scan enabled. Access to the scan functionality varies depending on the type of radio and previous programming configuration.

Priority monitor is the main scan type and the selected channel/talkgroup is priority.

Scan lists are user programmable. Users can add any of the available talkgroups programmed in their radio to the scan list.

A nuisance delete feature, **NUIS**, is available in the menu and is used to temporarily remove a busy channel from the scan list. This channel will automatically be reenabled when scan is turned off/on

Scan Use and Configuration

XTS2500 scan activation varies. Depending upon programming, scan can be activated/deactivated using either:

1. Via the menu and soft keys. (UCA standard)
2. Bottom left button on the side of the radio
3. To program scan, use the **PROG** option in the menu
4. Use the **SEL** option to add a channel to the scan list. A scan indicator resembling the letter **Z** will appear.
5. Use the **DEL** to delete channels from the list
6. Use the **HOME** button to exit the scan list edit



Scan Use and Configuration

APX6000/7000/8000 series radio. Scan is activated/deactivated using the 2-position concentric switch underneath the channel selector switch

1. To program, use the **SCNL** option in the menu
2. Use the **SEL** option to add a channel to the scan list. A scan indicator resembling the letter **Z** will appear.
3. Use the **DEL** to delete channels from the list
4. Use the **HOME** button to exit the scan list edit

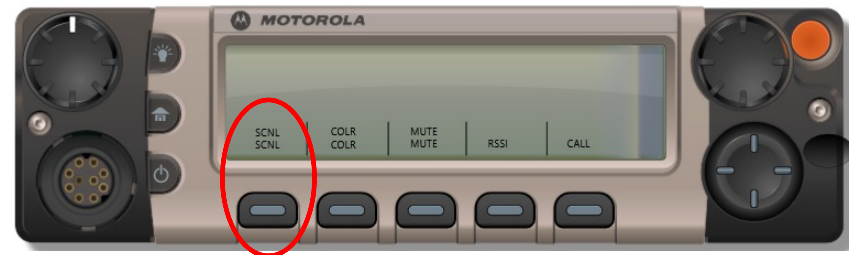
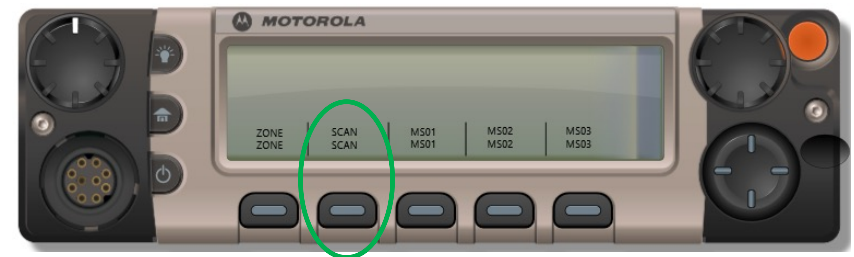
APX900 and APX4000 series radios DO NOT have the 2-position switch under the channel so scan is activated/deactivated using the **SCAN** option via the softkeys



Scan Use and Configuration

For XTL and APX series mobiles

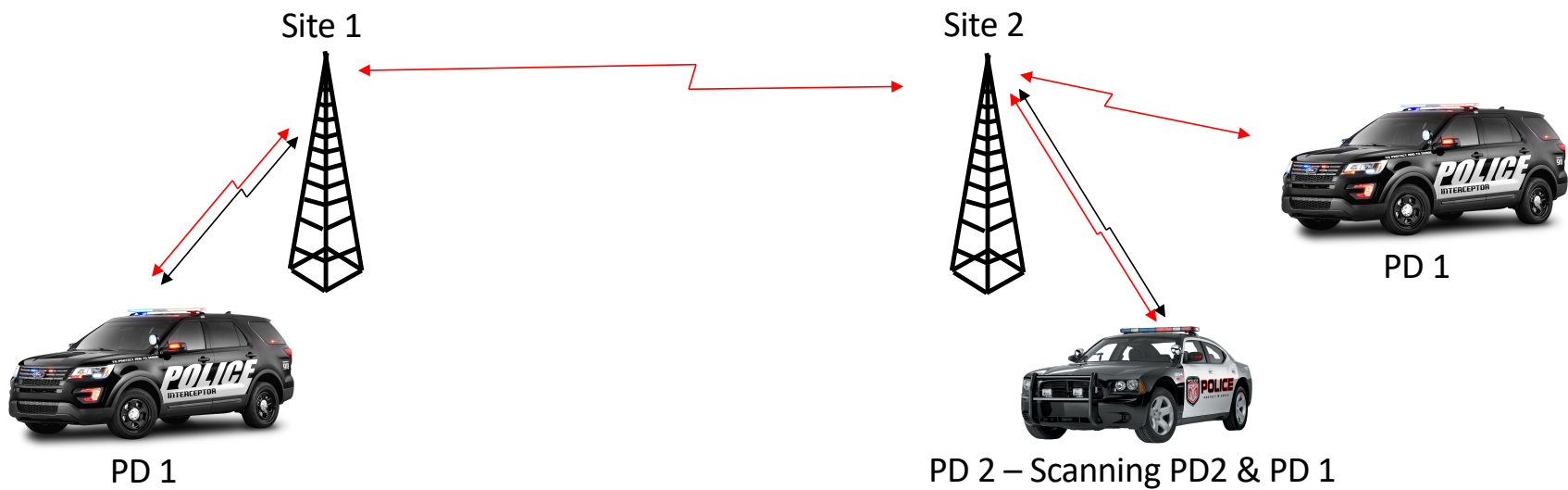
1. Use the **SCAN** softkey to activate/deactivate scan
2. To program the scan list, use the **PROG(XTL)** or **SCNL(APX)** option in the menu
3. Use the **SEL** option to add a channel to the scan list.
A scan indicator resembling the letter **Z** will appear.
4. Use the **DEL** to delete channels from the list
5. Use the **HOME** button to exit the scan list edit



Limitations of Scan

Scan does have some limitations.

1. The more talkgroups in the scan list, the slower the scan, so keep the list small. 3-4 talkgroups is the maximum recommended
2. Talkgroups not affiliated at the same location as the scan user, will not be received.



Standard Zone Configuration

	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 6
1	CH1	CH1	OPS 1	EVENT 1	8CALL90	LOCKDOWN
2	CH2	CH2	OPS 2	EVENT 2	8TAC91	
3	CH3	CH3	OPS 3	EVENT 3	8TAC92	
4	CH4	CH4	OPS 4	EVENT 4	8TAC93	
5	CH5	CH5	OPS 5	EVENT 5	8TAC94	
6	CH6	CH6	OPS 6	EVENT 6	ST RPT 1	
7	CH7	CH7	OPS 7	EVENT 7	ST RPT 2	
8	CH8	CH8	OPS 8	EVENT 8	ST RPT 3	
9	CH9	CH9	OPS 9	EVENT 9	ST RPT 4	
10	CH10	CH10	OPS 10	EVENT 10	ST RPT 5	
11	CH11	CH11	NE RGN	EVENT 11	ST TA1	
12	CH12	CH12	NO RGN	EVENT 12	ST TA2	
13	CH13	CH13	SE RGN	EVENT 13	ST TA3	
14	CH14	CH14	SL RGN	EVENT 14	ST TA4	
15	CH15	CH15	SW RGN	EVENT 15	ST TA5	
16	RGN	RGN	RGN	RGN	RGN	RGN

Standard Zone Configuration

Zone 3 – Regional Ops Talkgroups

These are localized talkgroups designated for agencies to interoperate with each other on a temporary basis.

An example of this would be if an EMS in one county needs to talk to a PD from a different county and they don't have each other's talkgroup programmed in their radios.

Another example would be a local event that doesn't need to be handled on a main dispatch talkgroup.

This should be coordinated via dispatch.

Standard Zone Configuration

Zone 4 – Event Talkgroups

These are Statewide talkgroups designated for agencies to interoperate with each other on a temporary, Statewide basis. Event talkgroups are reserved for major events and when multiple agencies from around the State need to interoperate.

Examples of proper use would be interoperability exercises, natural disasters, Executive events, funerals for fallen officers/fire fighters, etc.

This should be coordinated via VECC.

Standard Zone Configuration

Zone 5 – Conventional 800 Channels

These are Statewide channels designated for agencies to interoperate with agencies from out of the area, such as Federal agencies or surrounding State agencies.

They can also be used for local communications when the Trunked system is either unavailable or not needed.

Standard Zone Configuration

Zone 6 – Lockdown Talkgroups

These Talkgroups mimic your main Talkgroups in Zone 1 but are local only. No audio traffic will be passed to any other site in the area. This is designed to prevent users from being separated onto different “islands” during a network outage on the system.

This zone should **only** be used during an outage.

Standard Zone Configuration

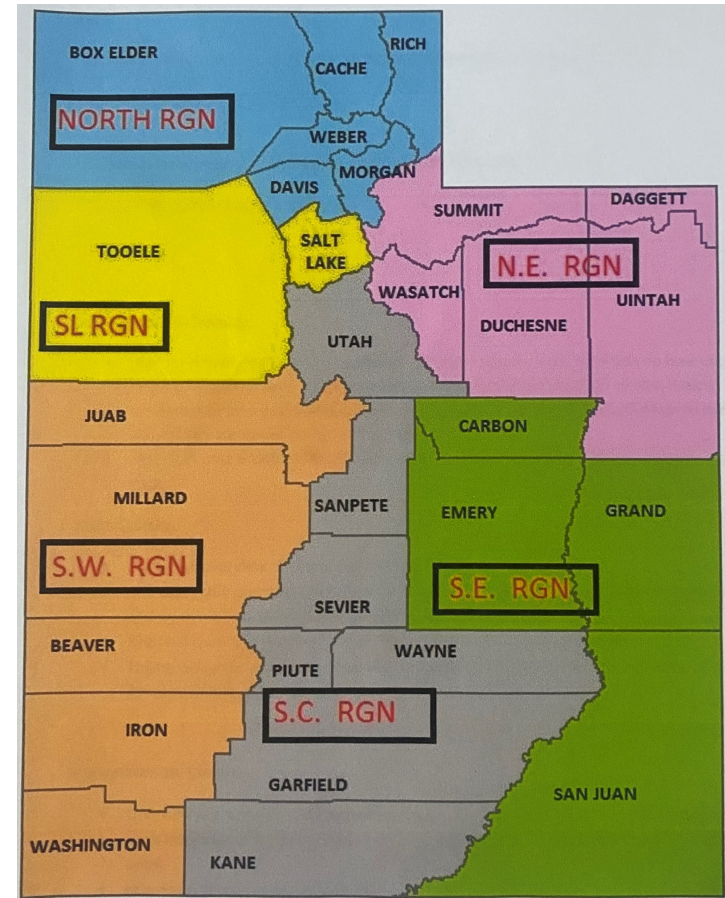
Regional Talkgroups

NO RGN – North Region
SL RGN – Salt Lake Region
NE RGN – North East Region
SC RGN – South Central Region
SE RGN – South East Region
SW RGN – South West Region

If programmed correctly, your local regional Talkgroup will be in CH16 on every zone.

Any radio, anywhere in the State can call for help and reach a dispatcher on these Talkgroups.

Can be used for interoperability between agencies in different geographical areas.



We've reached the end
of presentation, yes!

Any questions?

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