

A map of Utah with numerous radio tower locations marked by green circular icons with antenna symbols. Several towers are connected by green lines, indicating signal paths or network connections. The map also shows geographical features like Salt Lake City and Provo.

# Utah's Fleet Map

Presented by:

David Edmunds, UCA Executive Director

James Baker, UCA Radio Programming Manager

Rajit Jhaver, Federal Engineering Director of Operations

Kevin Desmond, SSC Consulting

# Introduction

- Implementation of P25 System is opportunity to reconsider many aspects of Utah's radio system.
- There are things we do really well in Utah.
- And there are things we could improve upon.



The background of the slide is a map of the San Francisco Bay Area. It features numerous icons of radio towers, some with green circular bases and others with orange bases. Green lines connect several of these towers, indicating signal paths or network connections. The map shows geographical features like the bay, hills, and roads.

# Presenters' Introductions

- James Baker, UCA Radio Programming Manager
- Rajit Jhaver, Federal Engineering Director of Operations
- Kevin Desmond, SSC Consulting



# Today, we are giving you a CHOICE

- We will be presenting two options for a Fleet Map, specifically, the one that exists in Utah today, and the one that UCA, Federal Engineering, SSC Consulting, L3Harris, and Motorola recommend, which complies with best practices across the country.
- We will also be presenting two options for radio management, specifically, a “go everywhere” approach and a “coverage where you need” approach. Again, you will hear UCA’s, Federal Engineering’s, SSC Consulting’s, L3Harris’s, and Motorola’s recommendations.
- We will present to you the pros and the cons of the options, along with the potential consequences of choosing one over another.
- We will be ending this presentation with these options and will be providing a mechanism whereby agencies may vote on these options.
- These options, your comments, and the results of this vote will be presented to UCA’s Governing Board at its January Board Meeting to make a decision on both the Fleet Map to be implemented as well as the radio management policies to be implemented.
- I invite you to listen to this presentation with an open mind and an eye toward a statewide, cooperative, and future proof approach to these issues.

# History of the System / System Evolution



- Utah's System One of Largest in North America.
- Grew by both collaboration as well as UCAN/UCA growth.
- Radio user fee model encouraged a "sales" approach to the system.
- All of this means there are many different theories, ideas, requests, policies, etc.

# What is a Fleetmap?

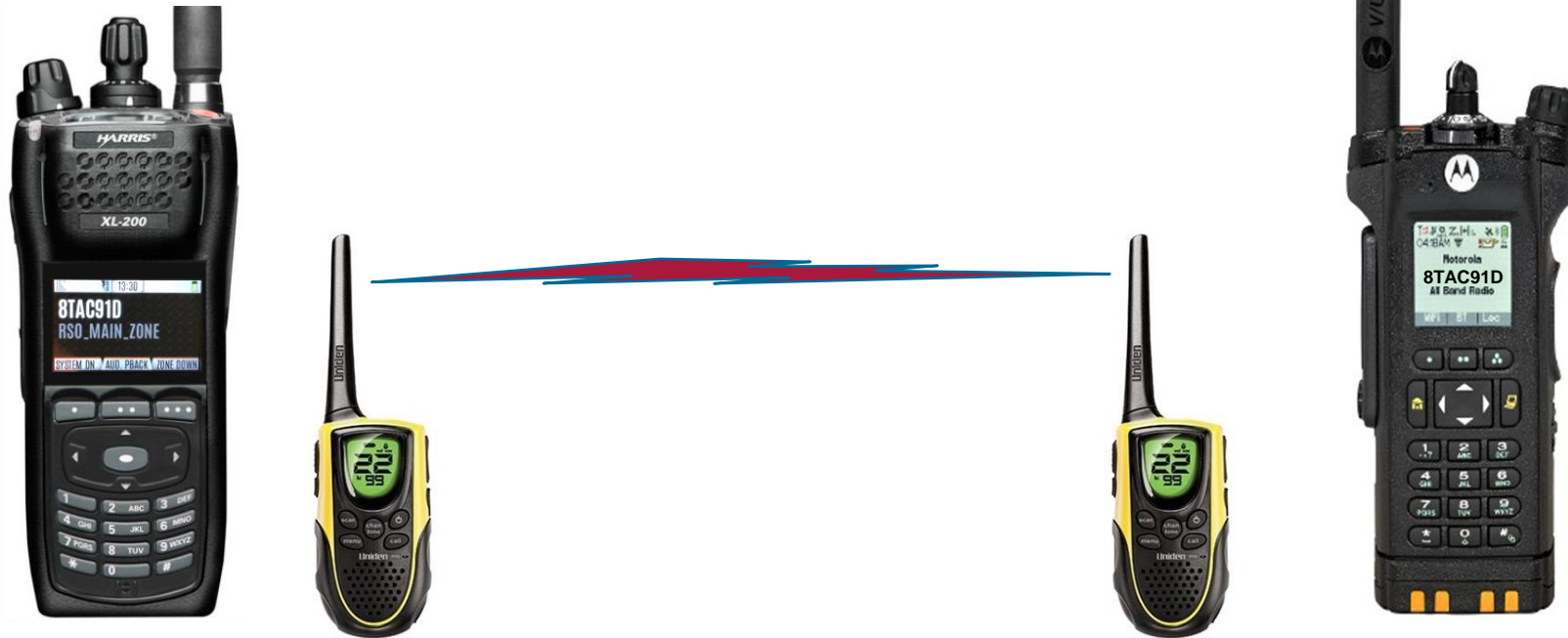
- An overview of all of the talkgroups within a radio system, their location, and the agencies that use them.
- Provides for the uniform programming of radios and establishes routes of interoperability.
- Components of Fleetmap:
  - Talkgroups / Announcement groups
  - User ID's / ID organization
  - RF Sites
  - PSAPs
  - Storm Plan
  - ISSI/ CSSI- communications with other systems
  - Talkgroup site permissions/ who can talk where



# Fleetmap Best Practices

- Develop talkgroups for local, regional and statewide communications
- Regional communications plans based on operational needs
- Minimize user intervention (reduce knob turn)
- Promote interoperable communications for local to regional to statewide to serve common needs
- Efficient configuration for channel loading (minimize busies)
  - Limit roaming to leave resources available for local or regional communications
- Radio management (who can talk to whom and where)
  - Simplify communication paths to create an understandable and quickly accessible template for users.

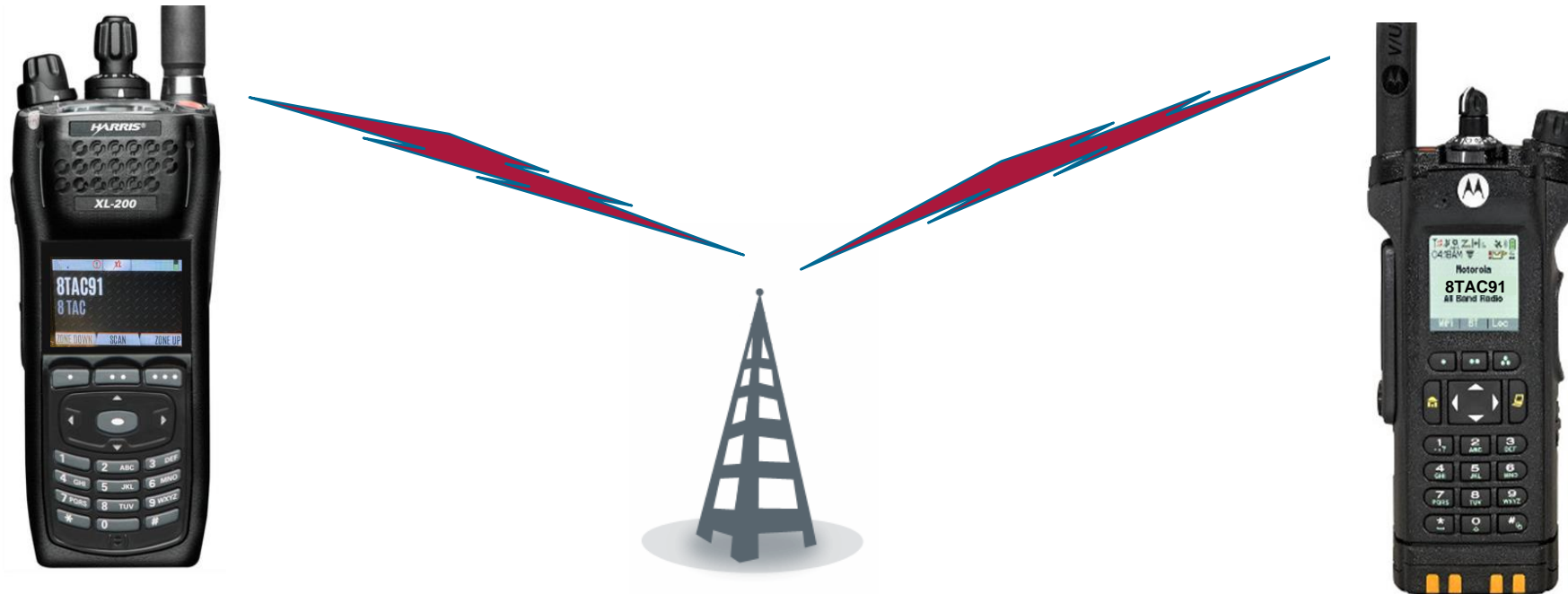
# Conventional Simplex Radio Communications



- Radios Transmit and Receive on the same frequency
- Whether it is your agency issued P25 Capable radio or an inexpensive Family talk-around radio, the operation is the same.
- Two or more radios with the same frequency programmed to a channel and the radios will communicate with each other on that common frequency.



# Duplex Radio Communications



- Radios Transmit and Receive on different frequencies
- Uses a Repeater to Extend The Radio Coverage

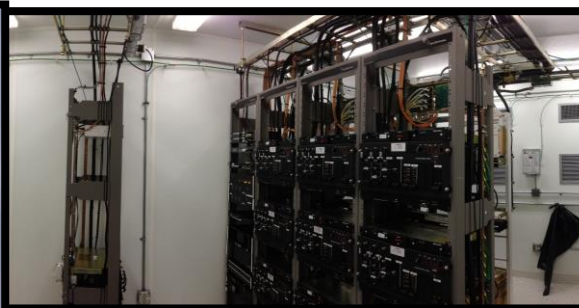
# Trunked Communication Systems



Units automatically communicate to the network.... :

- Each time the radio is turned on
- Each time a user changes from one talk group to another
- When the radio re-connects to the system:
  - Tells the system what TX messages the radios wants to hear by the talk group that is selected
  - Radios will automatically register to the nearest tower with the strongest signal

# Trunked Communications Systems





# Trunked Communication Systems



## TRUNKED COMMUNICATIONS SYSTEM

Chan  
1

Chan  
2

Chan  
3

Chan  
4

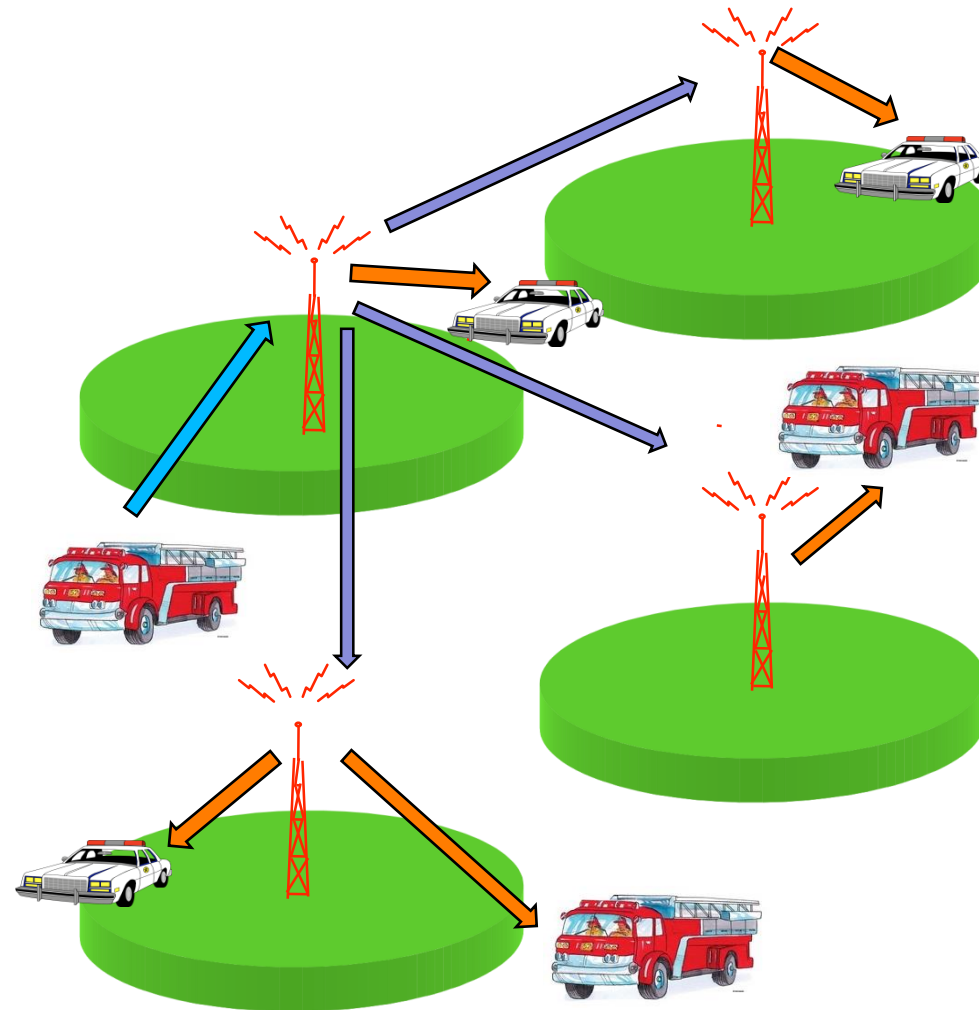
Chan  
5

Chan  
6



# Trunked Communication Systems

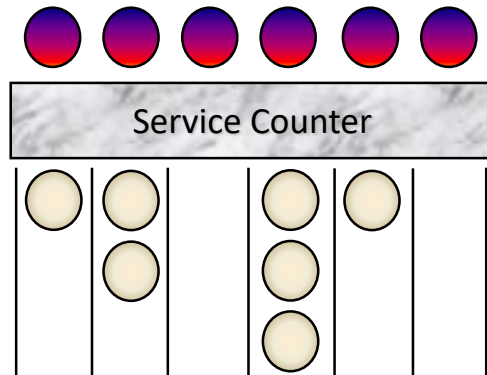
- All Tower Sites within a simulcast cell have the same number of shared frequencies
- Radios (like cell phones) select the tower with the strongest signal
- Transmissions are broadcast to any site where there is a radio selected to the talk-group in which the call is being transmitted



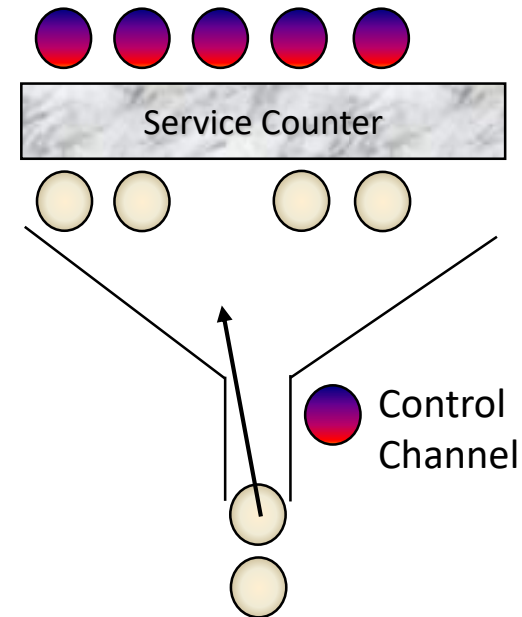
# Trunked Communication Systems

## Computerized Assignment of Channels

Conventional



Trunked



 Service Employee

 Customer



# Option A: Current Fleetmap

- The present fleetmap is a descendent of the legacy conventional VHF repeater model. A single agency per repeater, where your radio has all of your neighbor's single repeaters programmed in your radio.
- Each user within the community or region they service have access to all surrounding agencies talkgroups.
- This presents a self dispatch model, where the user can monitor communications traffic without the receiving dispatch center being aware

ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5
RIVERTN PD	UPD OQURH	OPS 1	EVENT 1	8CALL90
RIVERTN TAC	UPD WASTH	OPS 2	EVENT 2	8TAC91
RIVERTN C2C	UPD SPL S	OPS 3	EVENT 3	8TAC92
SERVICE	UPD MIDVL	OPS 4	EVENT 4	8TAC93
HERRIMAN PD	UPD TAC 1	OPS 5	EVENT 5	8TAC94
VECC C2C	SLCPD PN	OPS 6	EVENT 6	ST RPT 1
DRAPER PD	SLCPD LTY	OPS 7	EVENT 7	ST RPT 2
SJPD	UHP NO	OPS 8	EVENT 8	ST RPT 3
UC LAW 1	UHP SO	OPS 9	EVENT 9	ST RPT 4
W J P D 1	FIRE 1	OPS 10	EVENT 10	ST RPT 5
W J P D 2	FIRE 4	NO RGN	EVENT 11	ST T/A 1
SANDY PD	HERRIMN C2C	N E RGN	EVENT 12	ST T/A 2
WVC PD D1	SSL PD	S W RGN	EVENT 13	ST T/A 3
WVC PD D2	MURRAY PD	S C RGN	EVENT 14	ST T/A 4
COTTONWD	LZ-1	S E RGN	EVENT 15	ST T/A 5
SL RGN	LZ-2	SL RGN	EVENT 16	8CALL90D

# Pros and Cons of Option A

## Pros

- Users are familiar with layout of subscribers.

## Cons

- Too many talkgroups can cause busies
- More difficult to interoperate
- Difficult to locate support when roaming out of your primary jurisdiction
- Talkgroup additions and deletions makes programming more difficult (time consuming and costly)

# Potential Consequences of Option A: Current Fleetmap

- Lead to degradation of service
- Require agencies to buy new radios prematurely
- Increased programming costs
- Officer safety issue
- Overworked dispatchers monitoring too many talkgroups



# Option B: Proposed Fleetmap

- The purposed talkgroup layout would be designed by the agency's PSAP or Dispatch center. This would unify all disciplines to communicate on a path that is determined by the dispatch center they are dispatched by.
- The example below allows for agencies as they need to communicate with a neighboring jurisdiction to have the access and control locally, regionally, and statewide. This would also allow for the two PSAPs in Salt Lake County to leverage a large amount of paths to communicate as our communities grow and need more talkgroups.

ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 6
SL LAW 1	SL SERVICE 1	SL TALK 1	SL REGION 1	EVENT 1	8 CALL 90 (linked to region it is located)
SL LAW 2	SL SERVICE 2	SL TALK 2	SL REGION 2	EVENT 2	8 CALL 90 D
SL LAW 3	LAW C2C 1	SL TALK 3	SL REGION 3	EVENT 3	8 TAC 91
SL LAW 4		SL TALK 4	SL REGION 4	EVENT 4	8 TAC 91 D
SL LAW 5		SL TALK 5	SL REGION 5	EVENT 5	8 TAC 92
SL LAW 6		SL TALK 6	SL REGION 6	EVENT 6	8 TAC 92 D
SL LAW 7		SL TALK 7	SL REGION 7	EVENT 7	8 TAC 93
SL LAW 8		SL TALK 8	SL REGION 8	EVENT 8	8 TAC 93 D
SL LAW 9		SL TALK 9	SL REGION 9	EVENT 9	8 TAC 94
SL LAW 10		SL TALK 10	SL REGION 10	EVENT 10	8 TAC 94 D
SL LAW 11		SL TALK 11	SL REGION 11	EVENT 11	7 CALL 50 (linked to region it is located)
SL LAW 12		SL TALK 12	NORTH REGION CALL (BE,CA,RI,WE,DA,MO)	EVENT 12	7 CALL 50 D
SL LAW 13		SL TALK 13	NORTH EAST REGION CALL (SU,DA,WA,DU,UI)	EVENT 13	7 TAC 51
SL LAW 14		SL TALK 14	SOUTH WEST REGION CALL (JU,MI,BV,IR,WA)	EVENT 14	7 TAC 51 D
SL LAW 15		SL TALK 15	SOUTH CENTRAL REGION CALL (UT,SP,SV,PI,WY,GF,KN)	EVENT 15	7 TAC 52
SL RGN	SL RGN	SL RGN	SL REGION CALL (TO,SL)	SL RGN	SL RGN

# Pros and Cons of Option B: Proposed Fleetmap

## Pros

- Presents uniformity amongst all disciplines in the state.
- Consolidates ancillary talkgroups on the current system.
- Promotes interoperability by directing communication through the user's dispatch center for coordination.
- Reduces the likelihood of denial of service by keeping users in the area that their subscriber is designated.
- Keeps the operational cost for the user low by retaining use of FDMA Phase 1 subscribers.

## Cons

- Training of operational understanding for the user.
- Users will have to become familiar with the uniformity of the new fleetmap.

# Potential Consequences of Option B: Proposed Fleetmap

- Improves quality of service
- Agencies can retain use of current P25 Phase 1 radios
- Decreases programming costs
- Maximizes officer safety
- Reduces dispatcher load as they monitor fewer talkgroups
- Promotes intra-operability and inter-operability



# Recommendations

A map of Utah with numerous green circular markers representing proposed fleetmap locations. These markers are distributed across the state, with a higher concentration in the northern and central regions. Several markers are connected by green lines, forming a network. One specific connection is highlighted in orange, linking a marker near Salt Lake City to a marker near Provo. The map also shows geographical features like Salt Lake City, Provo, and various lakes and rivers.

UCA – Option B: Proposed Fleetmap

Federal Engineering – Option B: Proposed Fleetmap

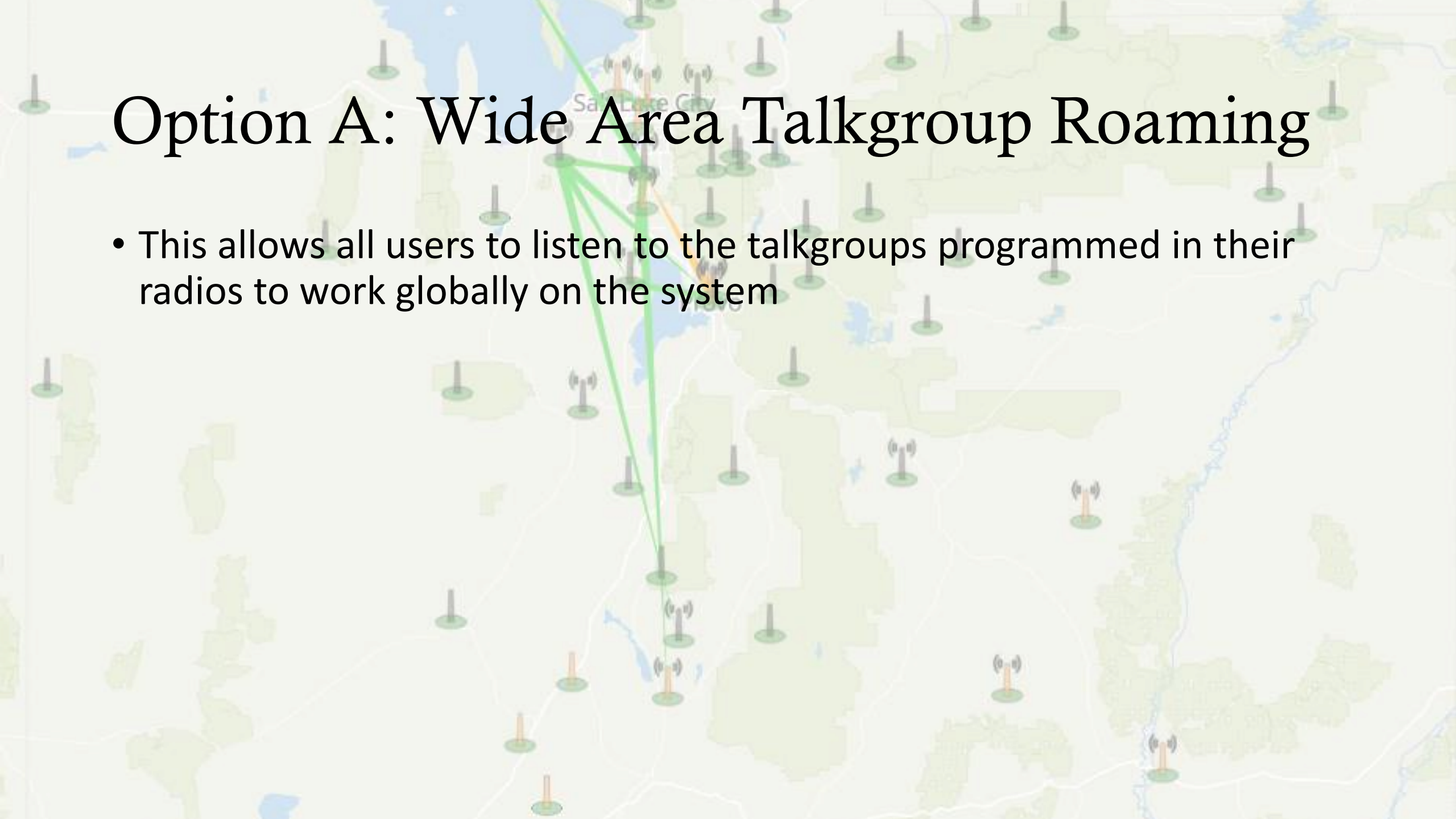
SSC Consulting – Option B: Proposed Fleetmap

L3Harris - Option B: Proposed Fleetmap

Motorola – Option B: Proposed Fleetmap

# Option A: Wide Area Talkgroup Roaming

- This allows all users to listen to the talkgroups programmed in their radios to work globally on the system



# Pros and Cons of Option A: Wide Area Talkgroup Roaming

## Pros

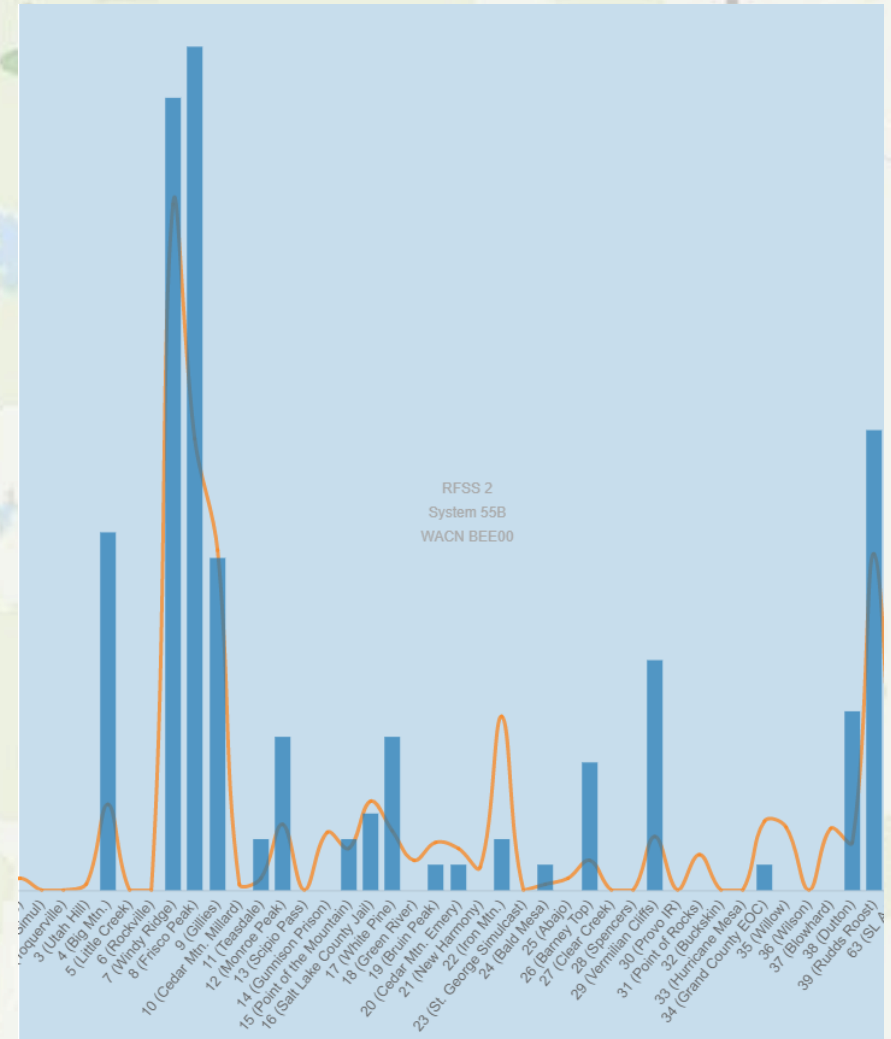
- Users gets full global access to the entirety of the state

## Cons

- Negatively impact other agencies while roaming outside your jurisdiction and communicating with your home agency

# Potential Consequences of Option A: Wide Area Talkgroup Roaming

- Lead to degradation of service
- Require agencies to buy new P25 Phase 2 radios prematurely
- Officer safety issue





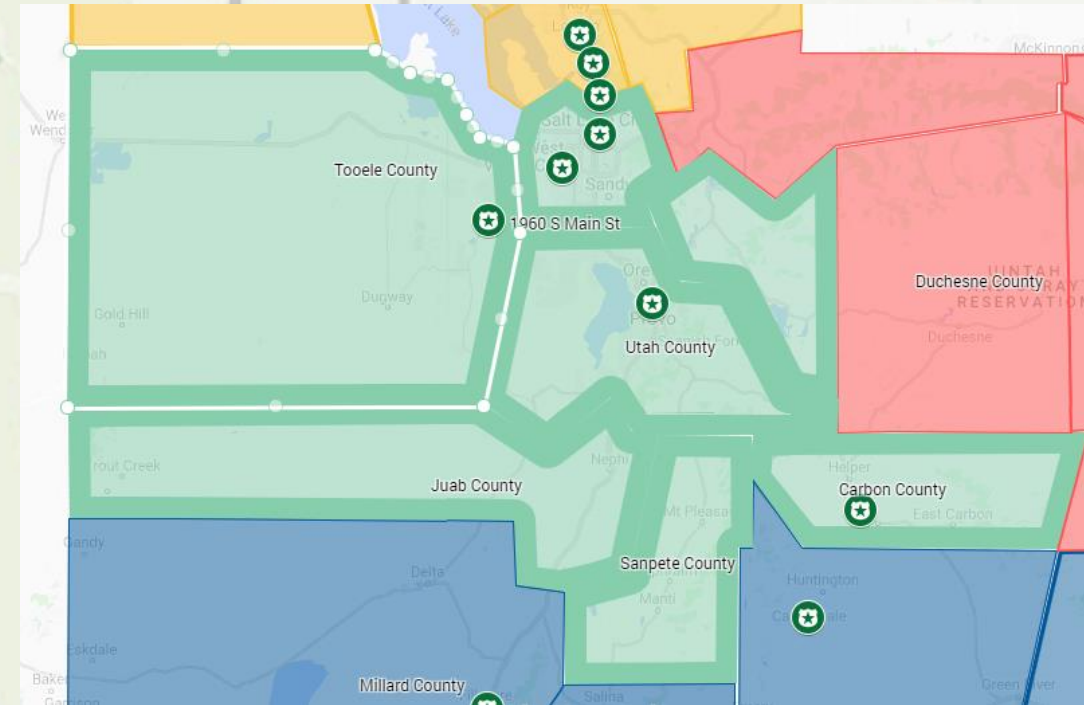
# Option B: Introduction to Radio Management and Interoperability Talkgroups

Industry best practice to reduce the over all cost of operation is to segment primary traffic to sites that provide service to the user's geographic location.

This allows for a site that provides an agency that serves a municipality with hundreds of thousands of residences to have maximum channel capacity locally. Limiting capacity at sites that are only used for secondary users to be accessing while passing through or providing mutual aid.

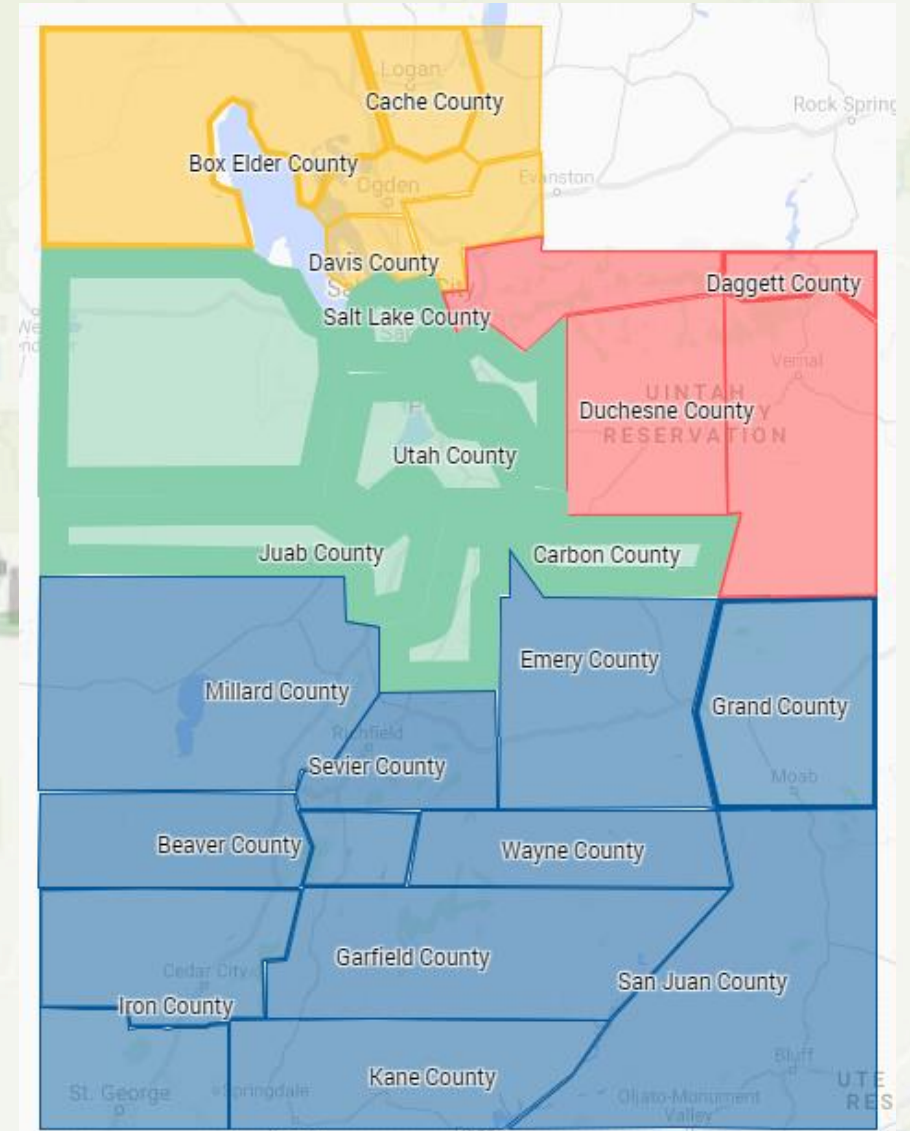
An example would be the population centers of Provo, Ogden, Salt Lake have the largest cells of capacity ranging from 20 to 12 talk paths for the users to conduct daily communications where a rural site has only 5 talk paths. If a user from the population center were to tie up a rural site for the convenience of listening to there traffic this will not allow the rural user to conduct their mission.

To address and allow the system to police the users a surrounding site approach would allow for all the local traffic to be accessed beyond the user's home area but limited to just the neighboring county. If a Utah county user lives in Juab they would be able to drag traffic but not outside a neighboring county to Utah county.



# Option B: Regionally Accessible Talkgroups

- Within every region of the state every discipline will have access to mutual aid talkgroups that would facilitate a common talk path to complete daily missions as they are presented
- This would present an opportunity of dispatch centers to access and be able to retain communications with resources that have been reallocated to another agency during a mutual aid event
- Provides for a high level of system availability when an asset or user leaves the community they serve



# Pros and Cons of Option B: Regionally Accessible Talkgroups

## Pros

- Uniformity during a natural disaster for a coordinated response
- Fewer talkgroups in a radio so easier to locate and access
- Increased system availability enhancing officer safety as users cannot drag traffic

## Cons

- User training
- User loses statewide access to home talkgroup without purchasing LTE licensing



# Potential Consequences of Option B: Regionally Accessible Talkgroups

- Improves quality of service
- Agencies can retain use of current P25 Phase 1 radios
- Maximizes officer safety
- Promotes intra-operability and inter-operability



# Recommendations



UCA – Option B: Regionally Accessible Talkgroups

Federal Engineering – Option B: Regionally Accessible Talkgroups

SSC Consulting – Option B: Regionally Accessible Talkgroups

L3Harris - Option B: Regionally Accessible Talkgroups

Motorola – Option B: Regionally Accessible Talkgroups

# Voting and Comments

- An email has been created, [fleetmapcomments@uca911.org](mailto:fleetmapcomments@uca911.org), and we would request that all comments and questions be provided to this address. These will be compiled and, depending on the quantity, summarized for UCA's Governing Board.
- An email has also been created, [fleetmapvote@uca911.org](mailto:fleetmapvote@uca911.org), where we will be collecting votes for these proposals. The following are eligible to vote:
  - Sheriffs
  - Police Chiefs
  - Fire Chiefs
  - The Commissioner of Public Safety
  - The Executive Director of the Department of Corrections
  - The Executive Director of the Utah Department of Transportation
  - The Executive Director of a PSAP
  - The Chairpersons of UCA's Advisory Committees
  - Emergency Management Region Committee Chairpersons
  - Executive Director of the Utah Department of Health
- Voting will remain open until December 31, 2020 at midnight.

# Voting and Comments

What am I voting for again?

## FLEETMAP OPTION A:

- Status quo
- Large number of individualized talkgroups
- Individualized with no uniformity
- Higher chance of “busies”
- Less Interoperability
- Higher programming costs
- Potential need to buy new radios sooner
- Focus on individual at expense of the whole

## RADIO MANAGEMENT OPTION A:

- Wide area access to home talkgroups
- Dragging traffic cannibalizes channels
- Greater chance of “busies”
- Focus on individual at the expense of the whole

## FLEETMAP OPTION B:

- Recommended by experts
- Manageable number of talkgroups
- Standardized format without sacrificing needs
- More interoperability and availability
- Decreases strain on PSAPs
- Lower programming costs
- Potential to use current P25 Phase I radios longer
- Focus on whole at the expense of the individual

## RADIO MANAGEMENT OPTION B:

- Regional area access to home talkgroups
- Reserve Capacity for emergency communications
- Lower chance of “busies”
- Focus on whole at the expense of the individual

**We want voters to choose either Option A or Option B for Fleetmap and either Option A or Option B for Radio Management.**