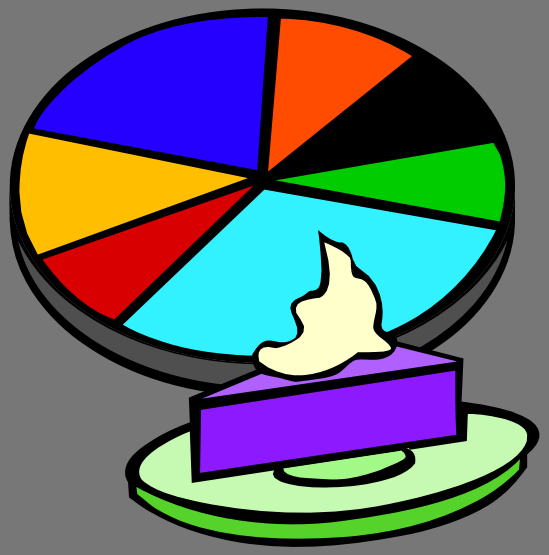
TEXAS FOREST SERVICE
The Texas A&M University System

Narrowband, Interoperability, and the Texas Statewide Interoperability Channel Plan

Overview and Considerations

Narrowband Mandate

To create more pieces of a pie, it's cut into smaller slices. Currently, many radio frequencies are "wideband." The demand for additional radio frequencies is ever-growing. To create additional channels, the wideband frequencies are being "cut" into smaller slices, which is called "narrowbanding." The Federal Communications Commission (FCC) has mandated that ALL wideband frequencies below 512 MHz be replaced with narrowband frequencies by January 1, 2013. This includes day-to-day internal operable frequencies and interoperable frequencies.



Narrowband Migration Date

- All Texas state agencies have agreed to collectively migrate their “operable” and “interoperable” channels from wideband to narrowband on June 1, 2012. This is to get ahead of the end-of-the-year deadline to ensure that all radios are programmed correctly.
- All state agencies will still maintain the current *wideband* interoperable channels until December 31, 2012, at which time the *narrowband* interoperable channels will be used exclusively.
- The narrowband interoperable channels are national frequencies and adopted by Texas. They are available for use now.

Narrowband Migration Assistance

The Texas Department of Public Safety's Law Enforcement Support Division has offered to assist public safety entities with narrowband issues.

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Interoperable Channels

Interoperable channels are common radio frequencies used to communicate with various disciplines (fire, LE, EMS, etc.) and with other agencies. Without these, many agencies could not communicate with each other. These are shared channels with common frequencies, tones, and names.

Interoperable Communications

The state of Texas has interoperable channels licensed in various public safety frequency bands. The state has an interoperable *communications plan* which follows guidelines established by the National Emergency Communications Plan. It requires the use of interoperable frequencies when working an incident/event with multiple agencies and/or disciplines. *Due to the interagency involvement with wildfires, such as those of the precedent-setting 2011 fire season, interoperable channels were used successfully across Texas multiple times daily for months.*

In many situations, without question, interoperable communications were absolutely essential to the success of the unified efforts.

Interoperable Communications

And yet, with all of the literally millions of tax dollars that have been spent across the State of Texas for interoperability, many agencies could not communicate on interoperable channels, sometimes even with brand new radios.

Why?

Among the reasons were:

- Simply not having any interoperable channels programmed into the radio. *If someone had merely dialed through the channel / group lists, this would have been detected prior to them being put into service. Some of these were new radios purchased with funding which specifically targeted interoperability.*
- The wrong name for even the most common interoperable channels were programmed into the radio. *Most of these names, frequencies and tones have been available in Texas statewide communications plans and on the internet for eight years prior to the 2011 fire season.*
- The number one issue was that the user didn't know how to change the channel or group selector on the radio to access the interoperable channels because they had never been shown or received any training on it. *This must become a LOCAL training and usage priority before the next incident happens.*

STATE OF TEXAS

TEXAS STATEWIDE INTEROPERABILITY CHANNEL PLAN

A statewide interoperability *channel plan* was developed to provide common communications between agencies at the local, state, and federal level.

The website for this plan is at the end of this presentation.

y means an essential communications link within nd public service wireless communications systems nits from two or more different entities to interact er and to exchange information according to a

Authorization is very simple and included in the radio plan.

Unified Command

Many local incidents involve more than one agency or jurisdiction. Each agency or jurisdiction, with significant responsibility for the incident, should be represented in the command organization.

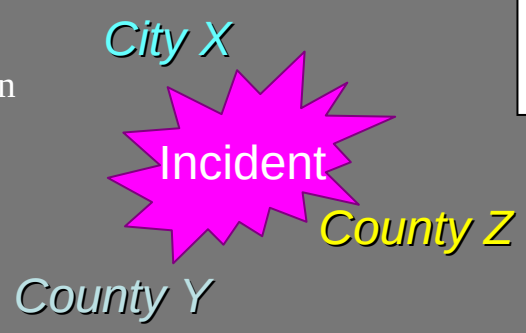
Representatives could become co-incident commanders (IC) or deputy ICs to a single IC.

One set of objectives for the management of the incident is collectively created.

One Operations Chief is selected to carry out the tactical objectives.

EMS
Law Enforcement
Fire/Rescue

Same Jurisdiction or Separate



IC Agency X	IC Agency Y	IC Agency Z

OPERATIONS

Communications Networks

Utilize multiple channels when needed. Don't try to manage a large incident using a single channel for everything.

- Tactical
  - Communications among tactical resources and with immediate supervisor; May have multiple tactical channels on the incident or event;
- Command
  - Communications among supervisors on an incident;
- Dispatch
  - Communications between the dispatch point and field units;
- Air-to-Ground
  - Communications between the aircraft and ground resources;

Networks

Tactical – External

Tactical – Internal

Command

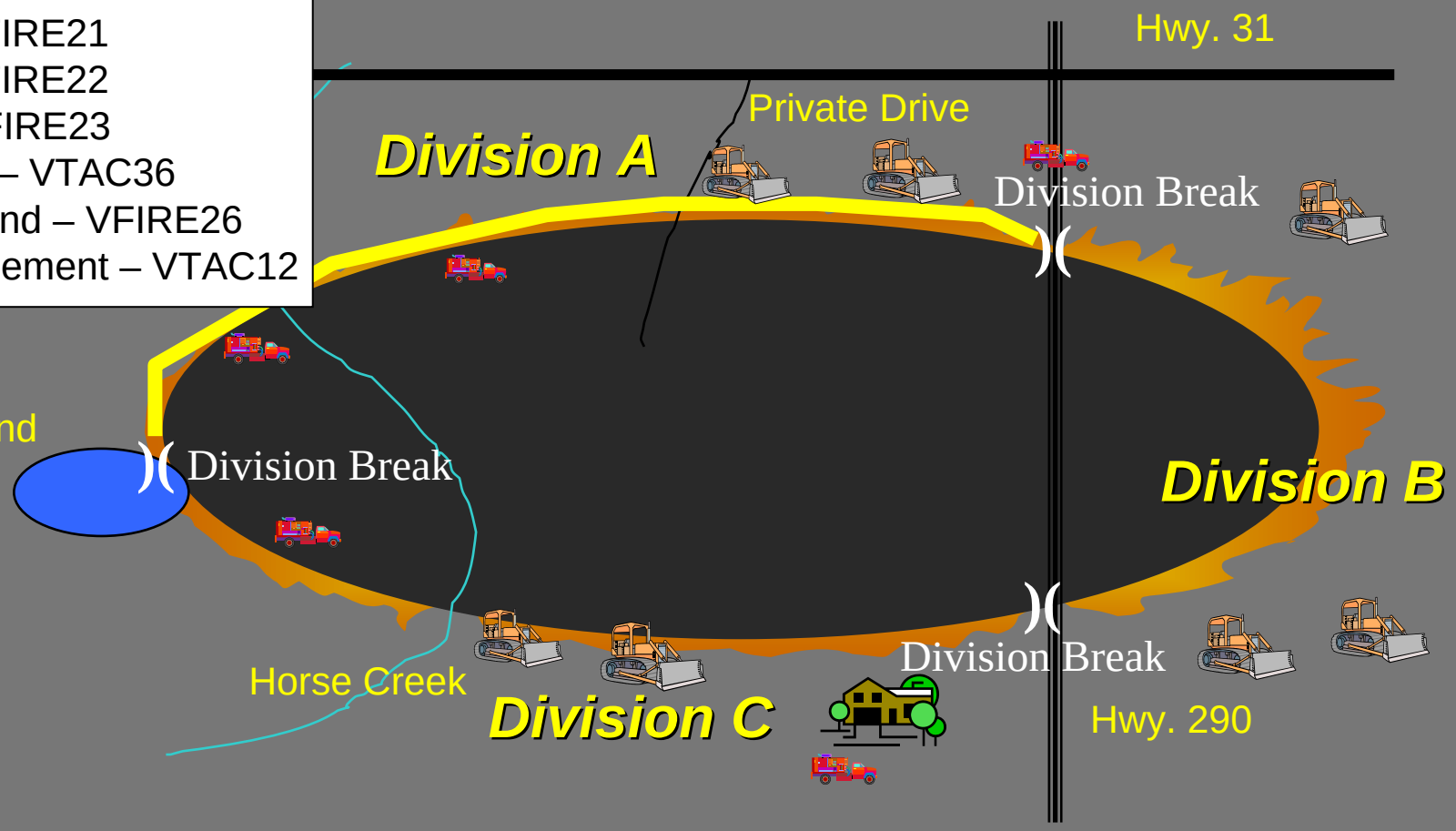
Dispatch

Air-to-Ground

Divisions may have their own Tactical Frequency assigned.

Sample Communications Plan

DIV A – VFIRE21
DIV B – VFIRE22
DIV C – VFIRE23
Command – VTAC36
Air-to-Ground – VFIRE26
Law Enforcement – VTAC12



Texas Forest Service and Interoperability

- Currently the TFS uses six *internal* tactical frequencies in the VHF Band:
  - Tac 7, Tac 8, Tac 9, Tac 10, Tac 11 and Tac 12
  - These are all "wideband" frequencies.

- This will change prior to January 1, 2013 when the TFS will move from six to three internal tactical narrowband frequencies:
  - "Alpha," "Bravo" and "Charlie"
  - These are for TFS internal use ONLY.
  - The TFS will utilize interoperable channels to communicate with local agencies. This will help with Unified Command situations and can be utilized for Command, Tactical and Air-to-Ground applications.

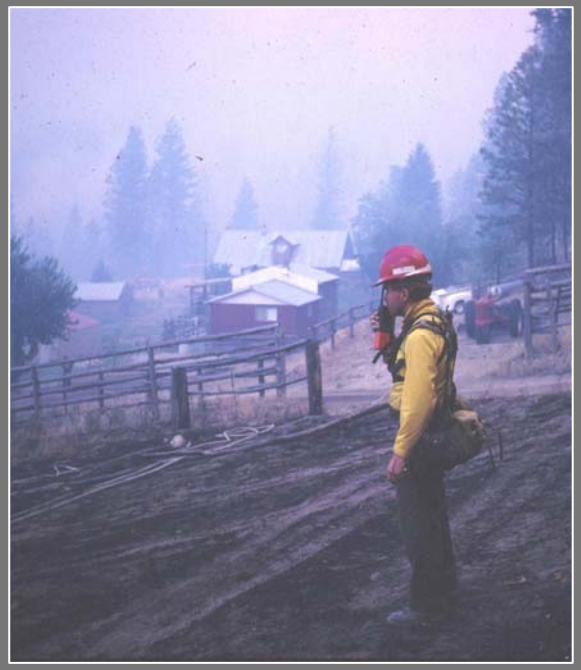
Consider Radio Features

- Determine the operation and capability of your existing radios and what capability is needed for future purchases.
- How easy is the radio to use?
- Do you have enough radios to be "operable" in your own locale? Will you meet the narrowband mandate with your equipment? Do you need to meet both of these needs before you can spend money on P-25 equipment (analog/digital)?
- How many channels does the radio need to accommodate day-to-day and interoperable channels?
- Other features to consider include: field-programming, cloning-capable, user-selectable output power, priority scanning, alpha-numeric display, various battery sources (including AA).

It's okay to express YOUR radio needs. A "compelling reason exception" can be requested to purchase less expensive non-P-25 radios which will allow for more radios to be acquired. "Operability" and "Narrowband" are Priorities.

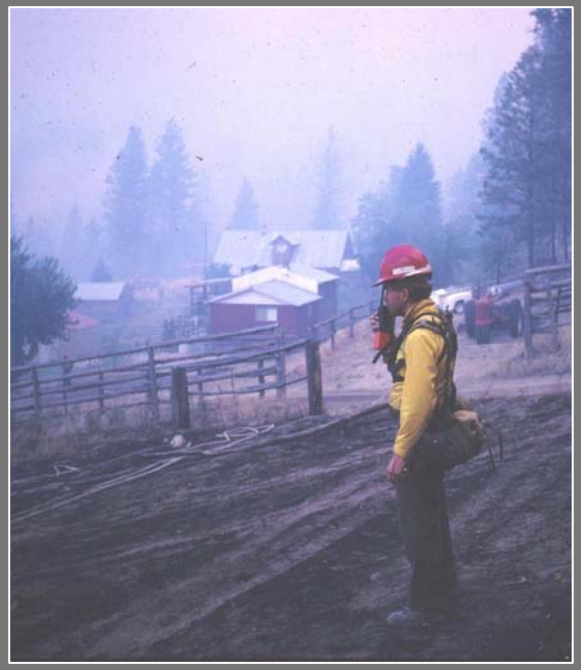
General Rules

- Keep transmissions as short as possible. Transmit official messages only. Think before transmitting.
- Use proper names or unit identification;
- Don't tolerate the use of profane language. Not only does this reflect badly on you and your agency, it is illegal and many people are monitoring these frequencies, including the media.
- Check often to determine that your microphone is not accidentally "keyed" which could tie up the channel.



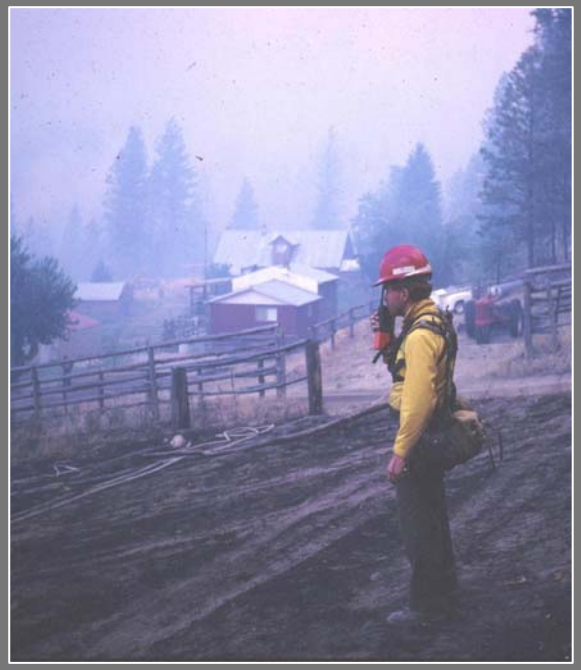
General Rules

- Monitor the channel for a few seconds before transmitting. Someone may be in the middle of a conversation.
- Avoid any “codes” or acronyms that others may not be familiar with.
- Avoid sounding excited on the radio. This anxiety often spreads among other users when they are talking.
- Avoid high noise areas, especially when transmitting.
- Make sure the radio is on the correct channel.



General Rules

- With portable radios, ensure the battery is charged or that you have an extra fresh battery or set of batteries or way of charging the battery.
- If multiple channels are being used on the incident, say the channel you are on when calling.



Extended Operations

- Extra Rechargeable Batteries
- AA Battery Packs
- 12VDC Mobile Charger
- AC Charger with 12VDC-110VAC inverter

Monitoring Networks (Channels)

- At a minimum, on a multiple discipline or interagency incident, designate a “command” channel which can be used to contact the IC or Unified Command.
- Utilize a portable and a mobile radio on different channels.
- Utilize two or more portable radios on different channels.
- If only one radio is available to monitor, scan the pertinent incident channels and remove non-essential channels from the scan list.

Interoperable Channel Usage

- The Texas Forest Service (TFS), like many local, state and federal agencies, needs to maintain and use internal tactical channels for special applications. The TFS will not be sharing these frequencies with local agencies.
- However, as most TFS responses are in a “Unified Command” with local and/or federal agencies, the TFS will monitor and use an interoperable channel for “command” communications on those unified command incidents.
- The TFS also encourages its personnel to utilize interoperable frequencies as fireline tactical channels for either communicating directly with adjoining interagency resources, or so those interagency resources will have situational awareness of TFS activities.

Programming Interoperable Channels

- There are 21 national VHF narrowband interoperable channels, plus 2 that will be added 01/01/2013 that will be unique to Texas.
- There are 8 VHF wideband interoperable channels.
- *What if your portable will only hold 32 channels or less and you must also maintain local channels?*

Making them fit…

- First, determine the channel capacity of the radio, including talk-groups or zones.
- If the radio has multiple talk-groups or zones, determine the channel capacity of those groups.
- Next, determine how many “operable” (day-to-day) local channels will be needed.
- Next, determine what disciplines you need to talk to (fire, law enforcement, EMS, public works, etc).
- Then, determine how long you will need to maintain wideband channels.
- Finally, establish a priority list of interoperable channels to keep.

Making them fit…

- Let's say that after "operable channels", there are only 16 open channel slots for interoperable channels and the radio belongs to a fire department.
- Until 12/31/2012, the wideband interoperable channels ("Texas" channels) will continue to be used. So, eight slots could be used for them. This will provide the ability to talk to multiple disciplines plus air-to-ground.

Interoperable Channels – VHF *Wideband*

- Group/Zone: Varies by Radio Brand and Agency Program
- System: Statewide
- Alpha-numeric Display: Varies by Radio

In this example are ALL of the VHF ***wideband*** Interoperability frequencies that are used in Texas. These will be replaced with the national ***narrowband*** interoperable frequencies on January 1, 2013.

Display Label

1. **TEX LAW1**
2. **TEX LAW2**
3. **TEX LAW3**
4. **TEXFIRE1**
5. **TEXFIRE2**
6. **TEXFIRE3**
7. **TEXMED1**
8. **TEX AIR2**

Interoperable Channels – VHF *Narrowband*

1. VCALL10
2. VTAC11
3. VTAC12
4. VTAC13
5. VTAC14
6. VFIRE21
7. VFIRE22
8. VFIRE23
9. VFIRE24
10. VFIRE25
11. VFIRE26 – Also used for air-to-ground communications with STATE and FEDERAL Aircraft; *This replaces "Texas Air 2" on 01/01/2013*
12. VMED28
13. VMED29
14. VLAW31
15. VLAW32
16. VTAC33 (Tactical Repeater)
17. VTAC34 (Tactical Repeater)
18. VTAC35 (Tactical Repeater)
19. VTAC36 (Tactical Repeater)
20. VTAC37 (Tactical Repeater)
21. VTAC38 (Tactical Repeater)

Preferred
Repeater Channel

Making them fit…

There are eight more channel slots available. If all six of the narrowband VFIRE channels were added, that would leave two slots. If VCALL10 was added, it could be used in many MCP situations. And of the six VHF narrowband interoperable repeater pairs, VTAC36 has the widest spacing and is preferred by the National Interoperability Field Operations Guide (NIFOG). Therefore, it will be the most common VHF interoperable repeater channel. That makes our 16 channels. After 12/31/2012, the 8 wideband channels can be replaced with narrowband. The VTAC11-14 could be the next priority, followed by the other disciplines which would round out the 16 channels.

Interoperable Channels – VHF *Narrowband Additional Channels for Texas Agencies*

22. **TXCALL1D (formerly "Texas Law 1" which will be narrowbanded and have new tones added)**

    This will be used as a mobile-to-mobile calling channel.

22. **TXCALL2D (formerly "Texas Law 2" which will be narrowbanded and have new tones added)**

    This will be used as a statewide "flight-following" channel to communicate between STATE and FEDERAL Aircraft ONLY and a BASE station. It will also serve as a backup to VCALL10.

These can't be used until 01/01/2013 but could be programmed at any time, as long as there is a MOU between your agency and the Texas DPS.

Multiple Talk Groups

What if the maximum number of channels for each group/zone is limited to 16 channels and you want to maximize the use of interoperable channels?

- One group, until 12/31/2012 could hold all 8 VHF wideband channels (Texas channels)
- Another group/zone could hold the first 15 narrowband channels (VCALL10-VLAW32) plus VTAC36.
- Another group/zone could have the channels listed in the bullet-point immediately above but swap VFIRE25 with TXCALL1D. This would still provide multiple fire-specific channels but allow for a statewide mobile-to-mobile calling channel.

VHF 150 MHz Narrowband Interoperability Channels (12.5 kHz)

Channel Name	Receive	Transmit	Station Class	CTCSS RX/TX	Use
VCALL10	155.7525	155.7525	FBT / MO	CSQ/156.7	Calling Channel
VTAC11	151.1375	151.1375	FBT / MO	CSQ/156.7	Tactical Channel
VTAC12	154.4525	154.4525	FBT / MO	CSQ/156.7	Tactical Channel
VTAC13	158.7375	158.7375	FBT / MO	CSQ/156.7	Tactical Channel
VTAC14	159.4725	159.4725	FBT / MO	CSQ/156.7	Tactical Channel
VFIRE21	154.2800	154.2800	FBT / MO	CSQ/156.7	Tactical Channel
VFIRE22	154.2650	154.2650	FBT / MO	CSQ/156.7	Tactical Channel
VFIRE23	154.2950	154.2950	FBT / MO	CSQ/156.7	Tactical Channel
VFIRE24	154.2725	154.2725	FBT / MO	CSQ/156.7	Tactical Channel
VFIRE25	154.2875	154.2875	FBT / MO	CSQ/156.7	Tactical Channel
VFIRE26	154.3025	154.3025	FBT / MO	CSQ/156.7	Tactical and Air-to-Ground *State-Federal*
VMED28	155.3400	155.3400	FBT / MO	CSQ/156.7	Tactical and Air-to-Ground *Medical Aircraft*
VMED29	155.3475	155.3475	FBT / MO	CSQ/156.7	Tactical Channel
VLAW31	155.4750	155.4750	FBT / MO	CSQ/156.7	Tactical Channel
VLAW32	155.4825	155.4825	FBT / MO	CSQ/156.7	Tactical Channel

Non-Federal VHF National Interoperability Channels					
VHF High Band Repeaters					
Mobile and Portable Configuration					
Channel Name	Mobile Receive Freq.	Mobile Transmit Freq.	Station Class	CTCSS Tone RX/TX	Description
VTAC33	159.4725	151.1375	FBT / MO	CSQ/136.5	Tactical Rpt
VTAC34	158.7375	154.4525	FBT / MO	CSQ/136.5	Tactical Rpt
VTAC35	159.4725	158.7375	FBT / MO	CSQ/136.5	Tactical Rpt
VTAC36	151.1375	159.4725	FBT / MO	CSQ/136.5	Tactical Rpt
VTAC37	154.4525	158.7375	FBT / MO	CSQ/136.5	Tactical Rpt
VTAC38	158.7375	159.4725	FBT / MO	CSQ/136.5	Tactical Rpt

NOTE: The sub-audible tones for these repeater pairs are different from the VHF narrowband interoperable simplex channels.

VTAC36 and VTAC37 will be the most commonly used repeater pairs due to the wider frequency spacing and have been recommended as priorities by US Department of Homeland Security's Office of Emergency Communications.

The Army National Guard has also made available some of their frequencies for temporary VHF repeaters. Request procedures are in the TSICP.

New Texas VHF Narrowband Interoperability Calling Channels					
Mobile-to-Mobile and Flight-Following with Base Stations					
Mobile and Portable Configuration					
Channel Name	Mobile Receive Freq.	Mobile Transmit Freq.	Station Class	CTCSS Tone RX/TX	Description
TXCALL1D	154.950	154.950	FBT / MO	156.7/156.7	Mobile-to-Mobile Calling
TXCALL2D	155.370	155.370	FBT / MO	156.7/156.7	Calling Channel Between State/Federal Aircraft and a Base Radio

These interoperable channels will be unique to Texas. These are the wideband channels currently known as Texas Law 1 and 2. Several organizations had recommended that the state keep these after the narrowband migration date as they were already established statewide. On January 1, 2013 these will be converted to narrowband, new sub-audible tones will be assigned, they will be re-named and assigned to their new roles. Implementation date 01/01/2013;

Texas Statewide Interoperability Channel Plan (TSICP) Update 2012

- A sub-committee of state/regional/local agency representatives was asked to review the TSICP and update it in preparation of the reprogramming of radios with the narrowband mandate.
- There were minor tweaks to obsolete dates, formatting of tables, radio emissions, etc.
- There were also a few significant recommendations which were voted on, approved, and implemented. Details on these items follows on the next slide.

TSICP Update 2012

- Added the VHF Narrowband Interoperable Repeater Pairs;
- Removed the NAC and 2014 deadline from the VHF Narrowband Interoperability Channels;
- Cleaned up grammatical and formatting errors and some technical issues with the various frequency bands;
- Designated VFIRE26 as an Air-to-Ground Channel when communicating with State and Federal Aircraft (this replaces Texas Air 2 which was on loan from the Texas Forest Service;)
- Created a VHF mobile-to-mobile calling channel using the narrowband version of Texas Law 1; New channel: TXCALL1D
- Created a statewide Flight-Following Channel between State and Federal Aircraft and a Base Radio using the narrowband version of Texas Law 2. This will also be a backup to VCALL10; New Channel: TXCALL2D

Texas Statewide Interoperability Channel Plan

The latest version is maintained on the

Texas DPS website: http://www.txdps.state.tx.us/

Click on ***"Communications/SWIC"***

On the next page, click on ***"Communications/SWIC"***

On the next page, click on

"Texas Statewide Interoperability Channel Plan (TSICP) and MOU (PDF)"

There were many instances with the 2011 wildfires where responders didn't have interoperable channels in their radios, or they were labeled incorrectly or the individual didn't know how to access them. Program-Train-Practice…

Exposure and Training

- Following the precedent-setting 2011 Wildfire Season, it became clear that more was needed in the way of managing and developing strategies for large and complex wildfires. The TFS developed a presentation called *"Large Fire Strategies and Management,"* and a large portion of it is devoted to interoperability because communications is so critical.
- Make interoperable channel use a part of your routine training.

TIPS

- Though most of the interoperable channels are listed as “tactical,” they can be used for “command,” “staging,” or other applications as determined by the IC.
- If interference is received on an incident, sub-audible tones, matching the transmit tones of the VHF channels, can be added to the receive side.
- When interagency/inter-discipline resources check in at your incident, determine what their interoperable capabilities are. From this, a communications plan can be developed.
- When calling for mutual aid resources, have them travel on an interoperable channel that both of you can access. This will be essential if they need to be guided to the ICP, reassigned, etc.
- Practice using interoperable channels on routine incidents/events, and include interagency and inter-discipline resources.

SUMMARY

- Migration to narrowband must take place on, or prior to, the mandated timeline of 01/01/2013. The Texas state agencies are promoting a June 1, 2012 target date (wideband interoperable channels will be co-maintained until 12/31/2012 to ensure communications with all agencies).
- It is absolutely critical that interoperable channels are programmed with the NAMES, FREQUENCIES and TONES as they appear in the Texas Interoperability Channel Plan (TSICP). Make sure your radio shop has the *latest version* of the TSICP. It can be found via the Texas DPS website.
- Determine the minimum capability requirements for radio upgrades. Review those slides in this presentation. Count the required "day-to-day" (operable) and "interoperable" channels carefully when selecting channel/group capacity. And remember, the state has listed the following in order of priorities for funding: PRIMARY: Achieving "Operability" and complying with the FCC mandate to migrate to narrowband; SECONDARY: Acquiring P-25 capable equipment (analog/digital).
- The most dynamic radio and accurate radio programming are worthless if the operator isn't trained in the use of interoperable channels. Consider this in the same light as you would "routine maintenance" for a vehicle.

Questions / Comments

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