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UNITED STATES DEPARTMENT OF THE INTERIOR AVIATION MANAGEMENT

Safety Alert

No. 05-04

August 12, 2005

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Subject: Narrowband and Wideband Operation

Area of Concern: Fire and Aviation Operations

Distribution: Fire and Aviation Personnel, Contract Pilots

Discussion: Due to a Congressionally mandated restructuring of the Federal radio frequency spectrum, Federal Agencies were mandated to transition to narrowband FM frequencies by January 1, 2005. However, it is critical that radios being used in wildland firefighting operations must still be able to function in both wideband mode and narrowband mode.

Findings from a recent Aviation Safety Technical Assistance Team (ASTAT) indicate that there are problems resulting from narrowband-wideband conflicts. Operating radios that are not programmed to the proper FM mode will cause you to experience (or create) radio problems.

The ASTAT noted indicators of mixing narrowband and wideband frequencies, which include:

If one aircraft is in the wideband mode and all other radios, including dispatch, are in narrowband mode then the volume transmitted from the aircraft wideband frequency will be loud and the receiving station(s) will probably need to decrease the volume on their radio. After turning down the volume for the aircraft in wideband mode they may not be able to hear radio calls from a radio(s) operating in the narrowband mode.

When an aircraft transmitting in the wideband mode is far from a receiving station that is set in the narrowband mode, the transmission may seem normal. However, as the aircraft gets closer to the receiving station the wideband transmission will often become “chopped”, inaudible, or distorted.

Some new repeater equipment is very sensitive and if a radio that is in the wideband mode transmits to a “narrowband repeater” it may result in an inaudible or distorted message. In some cases the repeater may “lock-up” allowing no transmissions until the preset “time-out” period for the repeater expires (1-3 minutes).

The ASTAT also observed aircrews and firefighters using portable radios that could not be programmed in the field by the operator to the narrowband mode or wideband mode as required by the mission or frequency plan.

Other problems involve newer radios that have had their software set by their radio shop to “lock-out” any operator manipulation of the wideband or narrowband mode. Additionally, because newer P25 digital portable radios are more complex to program some crews have switched back to their older, more familiar King radios. This poses a problem because older King hand-held radios (LPH model) cannot function in the narrowband mode.

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Programming Tips:

In the past, FM frequencies had 3 digits to the right of the decimal point (i.e. 166.675). However, current FM frequencies are carried out to 4 digits past the decimal point (i.e. 165.4125). An FM frequency with 4 digits past the decimal point does not indicate that the frequency is programmed in the narrowband mode!

After a frequency is programmed into a radio, the mode for the given frequency must also be set. It can either be in 25.0 Khz (wideband) or 12.5 Khz (narrowband). The proper mode must be programmed into the radio by manipulating a dial, switches or buttons on the radio, or by cloning with a master radio or laptop computer that has been properly programmed.

Mitigation Measures:

- Before an aircraft is put in service the manager should thoroughly brief the pilot on mode of operation and ensure that the radio is programmed properly with Rx (receive) and Tx (transmit) frequencies and tones.
- Frequency guides must be published in a more user-friendly format and include tones and mode of operation. Dispatchers must provide, and pilot briefings must include, frequencies in the following format to ensure accurate and positive communications:

Function	Rx Frequency	Rx Tone	Tx Frequency	Tx Tone	Mode
Air-Ground	170.0000	None	170.0000	No tone	Narrow
Big Repeater	169.8750	None	170.4750	114.8	Narrow
State Tac One	151.4750	None	151.4750	None	Wide

- Remove radios from the system that cannot be programmed to operate in the narrowband mode.
- Update aviation vendors with bulletins that describe wide / narrowband issues, proper and intended use of the Guard frequency and Guard tone, and flight-following procedures.
- If interagency cooperators are operating a radio system that is not narrowband compatible, add an Air-Ground FM frequency that operates in the wideband.

Remember, any frequency can be programmed to operate in a wideband or narrowband mode. Mission aircraft must be on the same mode (wideband or narrowband) as the firefighter and the dispatch center. Mixing modes creates communication chaos and compromises safety.

If you have been experiencing radio problems similar to those described above, or other unusual FM communication difficulties, investigate the problem immediately. Check all radios to ensure that they are programmed in the narrowband mode. If differences are identified, it's a relatively simple matter to correct. Normally, all that is required is to reprogram the radios from the wideband mode to the narrowband mode.

If you should discover a wideband/narrowband discrepancy, advise the operator and request them to reprogram their radio(s). Operators should know how to program their FM radio. However, if questions arise you should contact your communications or avionics technician. Issues that can not be resolved locally can be addressed to the Avionics Branch of the National Interagency Radio Supply Cache at (208) 387-5648.

Finally, if a radio problem adversely affects aviation operations or causes an unsafe situation please remember to document the event by submitting a SAFECOM (www.safecom.gov)

/s/ Robert Galloway
Aviation Safety Manager