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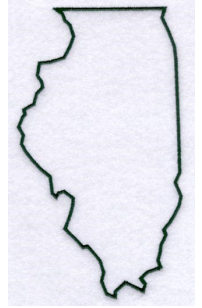
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ILLINOIS

Strategic Technology Reserve Newsletter



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Issue 3

Supporting Public Safety Communications Interoperability in Illinois

This newsletter is designed to share information & update STR members on technology, equipment, classes and much more. It is a team effort to keep everyone informed.

This is your newsletter. Have an idea for an article or want to share information? Maybe your Team's Activity? Send a note to the STR TEAM at STR@ileas.org.

MESSAGE FROM THE ILEAS COMMS TEAM

Happy Retirement!!

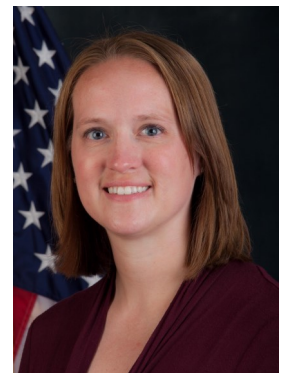
As many of our readers may have heard, our very own Lori Bell is riding off into the sunset at the end of June for her retirement. An epic retirement. A retirement that will be unique in the annals of retirementdom (no, that's not a real word, but it should be). She has been a very important part of our efforts here at ILEAS, with FirstNet and COMMS. This is truly the end of an era. We will miss Lori greatly.

On the other hand, some of you may have noticed a new voice on our calls... Kelsey Munsterman is joining our merry band of COMMS folks at ILEAS. Kelsey has been at ILEAS since 2019. She previously worked on the Narcan project, which distributed antidotes to numerous agencies for use when encountering life-threatening opioid overdoses.



Lori Bell

We're looking forward to working with Kelsey, and wish Lori all the best in her retirement!



Kelsey Munsterman

Adding Channels to ITTF Grant-Funded Radios

All radios issued by ILEAS to STR and ILEAS Special Teams are pre-programmed with all available licensed Interoperability talkgroups and channels. However, there is often a real operational need to add local agency talkgroups and frequencies to the radios assigned to STR and/or ILEAS Special Teams.

While this makes perfect sense from an operational perspective, there are some important administrative and contractual issues teams need to keep in mind when considering this. ILEAS fully supports adding channels and talkgroups to team radios, but it absolutely has to be done the right way.

Starcom21

The State of Illinois has an agreement with Motorola to have a maximum of 2,500 Starcom21 “ITTF Radios” on Starcom funded by the ITTF Grant Program under the “Specialty Use” classification. Specialty Use radios are restricted to only programming the Starcom21 talkgroups in Zones BA, BB, and BZ in the radios (or other Interoperability talkgroups as agreed to by the ITTF, per the State Master Contract).

In order to add agency-specific talkgroups to the ITTF-funded Starcom radios, the radios in question must be changed to a different rate plan as defined in the Master Contract, and the costs must be borne by the team/agency that is adding the talkgroups. Additionally, written permission is required when adding talkgroups from other agencies (from both ILEAS and the other agency).

If your team is interested in making changes to your ITTF-funded Starcom radios, contact Bill Springer or Russ Gentry at ILEAS for more information.

Conventional VHF/UHF/7-800

Although there are not normally any rate plans associated with adding local agency conventional channels, there are Federal Communications Commission (FCC) considerations.

While receive only frequencies can be added to any radio at any time, transmitting on any frequency requires a FCC license. A given agency should have a license for all frequencies they transmit on; this

defines how many radios they can have on the frequency, where they can operate the radios, and other parameters. However, an agency is allowed to give other agencies permission to operate off their FCC license, as long as they operate under all the requirements of that license.

Anytime a team adds an agency-specific transmit frequency to an ITTF-funded radio, they must have written permission from the licensed agency. The team must keep a copy of that document (permission letter, MOU, or other agreement) with their license package on the vehicle and send a copy to ILEAS. In the case of adding the Host Agency’s frequencies, keep a copy of the agency’s FCC license with the license package.

After all is said and done, the short version is: Don’t just add channels to the STR radios. Make sure you’ve addressed all the administrative requirements for that particular talkgroup and/or channel.

Remember that ILEAS is ultimately responsible for the grant-funded radios, and when teams add unapproved channels and talkgroups to the radios, it puts ILEAS in an awkward position.

Finally, just a friendly thought, when Bill and Russ are out later this year to perform Inventory and Validation on the teams, we might just check what’s programmed in the various radios.

Any comments or questions? Contact STR@ileas.org, or the STR project office, 217-531-0499.



700 MHz Repeater Repurposing Project

STR Teams, as well as many others, are using Starcom radios more and more for both local and wide-area communications. Generally, talkgroups on the Starcom21 network in Zones BA, BB, and BZ are used for wide-area communications. The Direct Conventional Channels (all other Zones) should be used for short range, local communications, usually in and around a building or property, up to a ½ mile radius or so.

In those situations where Direct Channels don't work well, but the use of the Starcom network is not recommended (usually due to low signal strength or heavy loading on the tower sites in the area), there are 700 MHz and 800 MHz repeaters available to fill that coverage gap. But, there are not as many as we'd like to have, especially for the UCP's or other teams.

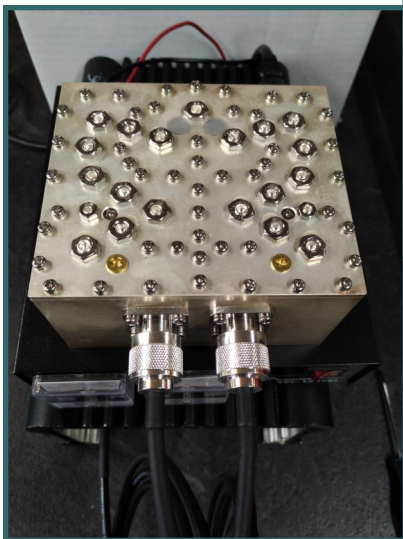
Purchasing 20-25 more repeaters that would be compatible with the approximately 60,000 Starcom21 portable and mobile radios out there is a good idea, except there isn't funding to do that. New portable repeaters on the 7/800 MHz bands are pricey to say the least, running in the \$10,000 to \$15,000 range per unit. That tends to add up quickly.

Coincidentally, a couple of years ago, rebanding and reconfiguration in the 700 MHz Public Safety band was required by FirstNet taking possession of what is now Band 14. Illinois State Police was faced with the situation where all their Vehicular Repeater Systems (VRS) and associated equipment were rendered useless for their original purpose due to the band reconfiguration. The VRS were not supported by the manufacturer and could not be retuned for the new band configuration. After ISP received a Federal Grant to replace their equipment, they had a large number of VRS units destined for the scrap heap.

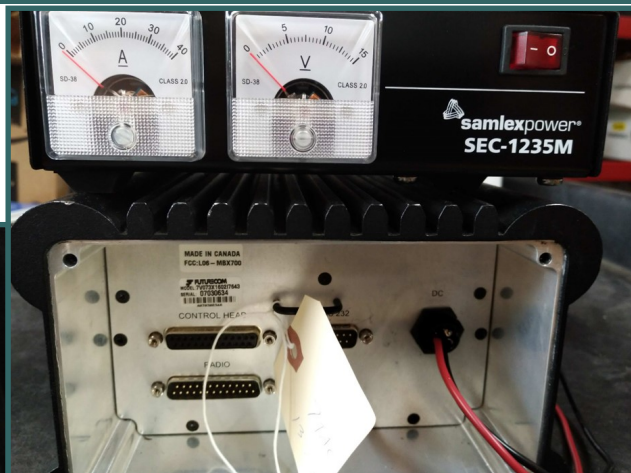
The Futurecom VRS units are pretty impressive pieces of technology. They are relatively small 12V powered repeaters that can operate on the current 700 MHz analog interoperability channels at 0.1W to 10W, analog only, with an internal duplexer, and can operate in a stand-alone repeater mode.

After checking the manuals, it appeared that with a few modifications these could be used as stand-alone repeaters for many of our teams. We just simply couldn't let these get away.

So, in the best traditions of Radar O'Reilly and Maxwell Klinger, we jumped into scrounger mode, talked to ISP, and ISP very generously donated 39 units to ILEAS to be repurposed.



Top View of the external Duplexer



Front View w/ Power Supply. Note the high tech DC connection.



Rear View w/ Power Supply and Duplexer. Note that the RF cables are cut very long for the prototype. Final version will be cut to length. Also note that the internal Duplexer is not connected.

700 MHz Repeater Repurposing Project (cont.)

The repeaters can be programmed to either the 769 MHz or 774 MHz low power analog repeater interoperability channels, as found in Zones BH and BI in the Statewide Interoperability Template. The FCC limits those channels to 2W maximum ERP, which fits these repeaters to a Tee. Before we could put this plan into operation, we had a few issues to resolve.

1. The VRS units were originally wired to operate in conjunction with a mobile radio that tells the VRS to turn on. One can also force the repeater on by powering two additional pins on the power connector. But, the power cables we got with the units are permanently molded with only a + and – pin in the connector. And, the units are out of support by the manufacturer so we couldn’t get a connector with the additional pins available. So, our high-tech solution is to just solder power wiring directly to the pins on the repeater. Crude, but effective.
2. Once all the pins on the power connector were connected, the unit required programming to tell it to be in local repeat mode at all times, as well as to program the correct repeater channel.
3. The units originally operated on frequencies at 764-765 MHz. Once the prototypes were programmed, we found that the duplexer wasn’t tuned to work in the 769-774 range. When we disassembled the units, we found that there was no way to retune the internal duplexers. Luckily, we found a vendor that sells a compatible external duplexer that covers all the way from 769 to 775 MHz, and for only about \$600 per unit.

We purchased a couple of duplexers, and built up some prototypes.



Fun fact for the ITECS Crews:

The VRS repeaters can be programmed to operate on channel 7GTAC5, which matches one of the Sinclair duplexers that all the ITECS have onboard to work with the orange Tait repeater.

And, by a happy coincidence, the 7GTAC5 channel is programmed in all the XTS-1500 radios on the UCP’s (as well as every other Starcom radio out there).

So, after all this, we have a few prototypes that are being evaluated by some of the teams. We’ll plan the final build using feedback from everyone who tries one of these out. One of the biggest questions we still have to determine is: Do we want to permanently mount the repeaters in the vehicles (they don’t take up much room at all), or do we want to put them in a transit case so they can be deployed anywhere? If you have any ideas about which way to go, we’d love to hear them.

Additionally, we have several repeaters that are, or will be, available to any units that want to evaluate them. However, we do not have enough duplexers to go around at this point. For the ITECS teams, you can connect them through the Sinclair 7GTAC5 duplexer to try them out. For everyone else, you’d need to try them out with separate receive and transmit antennas (with appropriate separation) for now.

These units aren’t going to provide coverage over a very long distance, but they might just be the ticket for coverage around a UCP or other command post. Examples include, when your COMMS unit is deployed, local communications from inside to outside a building, or other such short range applications. One of the things the teams are testing is what kind of range we can get when the antenna is on the 30’ mast on the UCP, or the 50’ tower on the ITECS. And, we are looking into trying one on a 5 to 7 story building to see what kind of range we can get in that application.

So there you have it. It looks like we can get repeaters that will work with any properly programmed 700/800 MHz radios for less than \$1000 per repeater. Basically, if we can get this to work, we could outfit all 22 STR vehicles for less than the cost of two brand-new repeaters.

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