Guide for Short Term Interoperability

Adopted: by the SIEC Technical Committee
May 8, 2007

The Oregon State Interoperability Executive Council (SIEC) and the State of Oregon encourage Oregon's public safety agencies to develop interoperable communications systems that encompass all of the elements of public safety. To most, this issue of "interoperability" is a confusing maze of trade journal articles, technical mumbo jumbo, and vendor hype. The SIEC has assembled this guide to assist non-technical, everyday public safety personnel in achieving simple, short term interoperability solutions that enhance day-to-day operations and that afford preparation for major multi-jurisdictional events. These short term efforts are leading to longer term and much more comprehensive solutions to wireless interoperability for public safety agencies throughout the entire state of Oregon.

Note: This guide was initially developed and endorsed by the SIEC in December 2004. Due to changes in the public safety wireless communications marketplace and regulatory environment since that time, the SIEC Technical Committee has worked to revise this guide in several key areas. It is assumed this 2007 version will also need to be revised on at least a two-three year cycle.

OWIN: The SIEC provides oversight and policy direction to the Oregon Wireless Interoperability Network (OWIN). At the state level, OWIN is implementing the SIEC's plans for statewide interoperability. In the near term, the SIEC/OWIN direction is to maximize use of nationwide interoperability channels in VHF, UHF, and 800 MHz (NPSPAC) frequency bands. The near term solution uses existing resources: nationwide interoperability frequencies and existing radios. In the longer term, the current OWIN conceptual design envisions implementation of a statewide Internet Protocol network on the state microwave system that addresses enhanced interoperability through the use of statewide programmed connection of systems to each other in a "system of systems" approach to interoperability. This guide sets recommendations for the near term development of statewide interoperability in Oregon while the longer term solutions are in development.

Radio Programming: (Agency specific frequencies) The simplest means to gaining a measure of interoperability is programming existing, operational channels from agencies that are adjacent to each other geographically and that operate in the same frequency band, into your radio. Each county, state agency, municipal and special district radio manager should agree to allow other responders, on the same frequency band, to use their radio system on designated interoperable channels when necessary. Formal, model-agreement can be obtained from the SIEC. As an aside, it is highly

recommended that adjacent agencies think about radio templates that follow some predictable rationale and that use common nomenclature for channel identification.

(Nationwide Interoperability frequencies) The second simplest means to another level of interoperability is found in the FCC's newly established nationwide interoperability channels. Every portable and mobile radio in Oregon should include all of these interoperable channels that are within the same band of operation as the basic radio. Interoperability Channels are available in all of the public safety bands and are designed to allow folks to communicate anywhere in the country, within each frequency band.

Make sure new radios you purchase have adequate channel capacity to accommodate all of the additional interoperability channels. It is the SIEC's recommendation for both interoperability and for the receipt of federal funds based upon interoperable communications that these nationwide interoperability channels shall be programmed into every Oregon public safety subscriber radio. In VHF subscriber radios, the other channels that should be in every radio are the **State Fire Net (154.280 MHz)** and the State Police Net – **OPEN, (155.475 MHz).** VHF Interoperability channels can be utilized on a secondary basis to interoperable communications for day to day tactical needs as well, so that personnel are accustomed to utilizing them.

OWIN is working in a partnership with the Federal Partnership for Interoperable Communications (FPIC) on improving nationwide interoperable frequency utility. The most notable enhancement is expected to involve adding federal radio frequencies to the FCC's VHF nationwide interoperability channels to make repeater operation possible in the VHF band. Repeater operation is already possible in the UHF, 700 MHz, and 800 MHz bands. At the present time only simplex (car-to-car) tactical use of the VHF frequencies is possible. In accordance with SEIC policy, the FPIC/OWIN partnership is aimed at extending unencumbered access to all levels of government to the type of interoperability network OWIN may install under the SIEC's guidance. As federal frequencies may be added in the Oregon system, this Short Term Guide will be revised.

800 MHZ (NPSPAC) frequencies are currently in a rebanding process in order to remove commercial system interference to public safety systems. This rebanding process will result in a need to reprogram in nationwide, 800 MHz interoperability channels in the near future. As the rebanding process is finalized, this Short Term Guide will be revised.

The following is the SIEC's guide for programming the FCC designated Interoperability (I/O) channels into existing radios and all new radios that are added to any system. Due to space limitations in some existing radios, it may not be possible to program all of the I/O channels into all radios. In that case, the calling channel and the first tactical channel should be programmed at a minimum. The frequencies listed are in each of the three bands and are listed by order of priority, with highest priority shown at the top of the list. They are to be programmed into the radios with the highest priority first, as space permits.

Note: As of January 1, 2005, existing systems on these channels and those existing systems on the adjacent channels become secondary to these interoperability channels. In the event of interference, existing systems must cease use when interference occurs to interoperability channels.

VHF Radios

Channel (MHz)		Label	Description
155.7525	base/mobile	VCALL	National Calling
151 .1375	base/mobile	VTAC 1 *	National Tactical
154.4525	base/mobile	VTAC 2 *	National Tactical
158.7375	base/mobile	VTAC 3 *	National Tactical
159.4725	base/mobile	VTAC 4 *	National Tactical

UHF Radios

Channel (MHz)		Label	Description
458.2125	mobile	UCALL	National Calling
453.4625	base/mobile	UTAC 1 a	National Tactical
458.4625	mobile	UTAC 1	National Tactical
453.7125	base/mobile	UTAC 2a	National Tactical
458.7125	mobile	UTAC 2	National Tactical
453.8625	base/mobile	UTAC 3a	National Tactical
458.8625	mobile	UTAC 3	National Tactical

800 MHz Radios

Channel (MHz)	Label	Description
821/866.0125	ICALL	National Calling
821/866.5125	ITAC-1	National Tactical
822/867.0125	ITAC-2	National Tactical
822/867.5125	ITAC-3	National Tactical
823/868.0125	ITAC-4	National Tactical
821/866.3250	OROPS1	Oregon Tactical
821/866.3875	OROPS2	Oregon Tactical
821/866.7500	OROPS3	Oregon Tactical
821/866.7750	OROPS4	Oregon Tactical
821/866.8000	OROPS5	Oregon Tactical
867.5375	WAOPS-1**	Washington Tactical
867.5625	WAOPS-2 **	Washington Tactical
867.5875	WAOPS-3 **	Washington Tactical
867.6125	WAOPS-4 **	Washington Tactical
867.6375	WAOPS-5 **	Washington Tactical

* Note: In the future, these channels will change from simplex analog to repeater analog and digital channels

** Note: The WAOPS 1-5 Labels used to be labeled "STATEOPS".

Use of interoperability channels

General SIEC statement. The SIEC has adopted a policy that is aimed at allowing both operability and interoperability of nationwide interoperability channels. Through allowing a controlled and monitored level of operability on these channels, the SIEC expects to assure that the channels are implemented, are normally tested through day-to-day use, are maintained, and are available when needed for interoperability purposes. The SIEC has also endorsed, unencumbered access by federal, state, local, and tribal entities to the use of these channels. This policy foresees that these channels can have controlled and monitored use between agencies and jurisdictions and solely by those agencies and jurisdictions as well.

Calling channel: The calling channel shall be used to contact other users in the Region for the purpose of requesting incident related information and assistance and for setting up tactical communications for specific events. In most cases, the calling party will be asked to move from the Calling Channel to one of the TAC channels for continuing incident operations or other interoperability communication needs. This channel can be implemented in full repeat mode in 450 MHz or 800 MHz systems. In the 150 MHz, 450 MHz, and 800 MHz bands, direct, or a talk around/simplex mode can be used.

Note: WAOPS is simplex only as per the Region 43 Regional Plan for 800 MHz.

Tactical channel: By FCC rules, the tactical channels are to be used for coordination activity between different agencies in a mutual aid situation, but in non-interference instances, they may be used on a case-by-case basis for emergency activities of a single agency. Incidents requiring multi-agency participation will be coordinated over these channels by the agency controlling the incident. These channels can be implemented in full repeat mode in 450 MHz or 800 MHz or they may be used on a direct (talk-around/simplex) mode in 150 MHz, 450 MHz or 800.

Dispatch Centers and Interoperability: The SIEC endorsed a SIEC Policy Action 09-2007 on March 13, 2007.   That policy action concerned a Memorandum of Understanding calling for potential licensees of the VHF, UHF and 700/800 MHz nationwide interoperability channels to voluntarily refrain from installing or requesting Fixed Base Station licenses until a coordinated effort to limit interference and monitor those channels is put in place by the SIEC.   The SIEC is working on longer term methods of coordination of interoperability channels on a statewide basis. Gateways, Interoperability Switches, or console patching, are strongly encouraged at 9-1-1 dispatch centers in the short term to allow connection of interoperable VHF, UHF, and NPSPAC channels to the operating channels within the center's range.

Purchasing New Radios and Systems: If you are in the market to purchase new subscriber radios or a new radio system, you may choose to utilize the SIEC technical committee as a sounding board to help clear the confusion and provide guidance and suggestions to assure maximum interoperability in the most effective manner. By FCC rules all new, VHF and/or UHF systems (meaning below 512 MHz) shall be implemented using narrowband (12.5 kHz bandwidth) technology.

Note: As of January 1, 2011, FCC Rules will no longer allow manufacture or importation of any radio that has a mode in it that works on existing wide band systems.

If your agency intends to remain on VHF and/or UHF public safety radio frequencies, it is important to start the migration to meet FCC timelines for conversion to narrowband operation. The mandate for a complete conversion to narrowband operation is January 1, 2013

When purchasing new VHF and/or UHF portable or mobile radios make sure they are narrowband compatible. This is consistent with FCC requirements. All VHF radios must be capable of adhering to FCC channel bandwidth, efficiency and frequency channelization rules.

Note: The I/O frequencies will operate in the analog narrowband mode. If a CTCSS (Continuous Tone Coded Squelch System) tone is needed, it will be 156.7 Hz. Normally it would be recommended that all receivers and all transmitters use CTCSS.

The SIEC's recommendation for priority in receipt of federal funding for interoperable communications is to strongly encourage conversion to digital technologies.

The primary reason is that digital technologies operate in only 72% of the band occupied by narrowband analog technologies, and they suffer no reduction in voice quality or in system range with this added efficiency. The SIEC recommends that all radios procured under interoperability shall be, at a minimum, capable of programmable conversion from analog to digital operation. The only acceptable digital operation is in compliance with the Project 25 standards. The applicable standards are within the ANSI/TIA/EIA 102 series. All portions of that standard that define the common air interface and the vocoder are to be complied with. Whenever encryption is also used, the Project 25 encryption documents must be complied with as well.

It is suggested that you consider the use of multimode (digital and analog) technologies, and multi-band operation as these features might become available. You may choose to not implement Project 25 technologies while you are continuing to operate or are building an analog system. All Homeland Security grant funding promotes interoperable communications and recommends adherence to open architecture technologies and Project 25 standards.

Note: If you build a new system or convert an existing one to narrowband it is likely that some of your older mobile and portable radios will not work on the narrowband frequencies, however, you'll need to verify with your vendor. The newer radios will work in both modes.