MOTOBRIDGE

INTEROPERABLE COMMUNICATIONS SYSTEM

SYSTEM DESCRIPTION AND STANDARD OPERATING PROCEDURES

V. 1.0

February, 2009

This document is a product of the Kansas Office of Emergency Communications through a partnership with:

The Kansas Statewide Interoperability Executive Committee
The Kansas Department of Transportation
And
The Kansas Highway Patrol

KANSAS SIEC
Statewide Interoperability Executive Committee

ADJUTANT GENERAL STATE OF KANSAS

KANSAS
Adjutant General's Department
Office of Emergency Communications

KANSAS
DEPARTMENT OF TRANSPORTATION
Responsible & Responsive

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1. Introduction

For many years, Kansas emergency responders have identified the lack of readily available interoperable communications as a shortfall during a multi-disciplinary or multi-jurisdictional response. One step toward improvement of interoperable communications was the creation of a statewide fixed-site (stationary transmitters located on permanent tower sites) communications interoperability gateway that would be available upon demand, when needed, and as authorized. This system is known as MOTOBRIDGE.

These MOTOBRIDGE Standard Operating Procedures were developed to provide a description and common reference of operational protocols for the system. The contents were developed using multi-jurisdictional and multi-disciplinary input from emergency responders throughout Kansas.

2. Background

In May of 2008 a joint planning session including the Statewide Interoperability Executive Committee (SIEC) and the Communications Advisory Committee was held in Salina, Kansas to develop the Standard Operating Procedures for the MOTOBRIDGE System. 59 multi-jurisdictional and multi-disciplinary public servants attended the planning session. Core participation included representatives from the following disciplines:

- **Law Enforcement (State and Local)**
- **Fire**
- **EMS**
- **Emergency Management (State and Local)**
- **Communications (State and Local)**
- **Transportation**
- **Medical**
- **Military**

After reviewing the technical operation of the MOTOBRIDGE System, participants engaged in a question and answer process to determine the desired operational protocol. After the planning session, the SOP's were developed by the Kansas Office of Emergency Communications (KS-OEC) and approved by the SIEC

3. System Overview

MOTOBRIDGE is a fixed-site interoperability gateway that is located on 76 tower sites owned by the Kansas Department of Transportation (KDOT). Figure 1 is a map of the State of Kansas with red dots indicating each of the 76 tower sites. The areas in yellow indicate Counties that contain tower sites which are capable of providing the MOTOBRIDGE System and the Digital Trunked Radio System (P-25). Like with any other radio system, actual coverage depends on issues such as terrain, frequency band, antenna height, weather, functionality of the end-user radio equipment, etcetera.

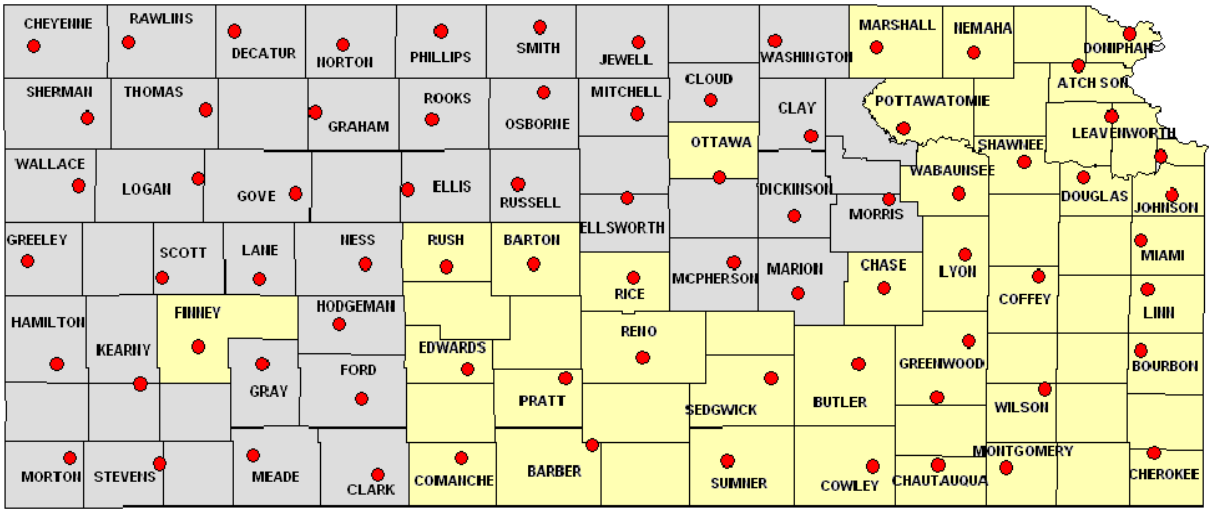

Figure 1 – KDOT / MOTOBRIDGE tower sites

Currently, MOTOBRIDGE is operational in roughly half of the state. The remainder of the system (39 sites) will be complete by September, 2010. *Appendix B* contains a map indicating where MOTOBRIDGE is currently operational and the expected completion date for the remainder of the state.

Using both national and state interoperability channels, MOTOBRIDGE can connect or "patch" pre-determined channels between disparate radio systems. This can be accomplished on a single site (Bourbon VHF patched to Bourbon UHF) or across multiple sites (Bourbon VHF patched to Sumner 800 MHz). *Appendix C* lists the call-in, tactical, and digital trunked channel names and frequencies used on the MOTOBRIDGE System including:

- **VHF Low Band (State channels)**
- **VHF High Band (National Channels)**
- **UHF (National Channels)**
- **800 MHz (National Channels)**
- **KHP Event Talkgroups (Kansas Digital Trunked System users)**

A channel patch is managed through an Operator at the Kansas Highway Patrol (KHP) Communications center by manipulating a software-based MOTOBRIDGE console.

One national or state call-in channel has been designated for each band of radio spectrum. The call-in channels are used to make requests for a MOTOBRIDGE patch and are monitored by KHP on each site at all times.

Like the call-in channels, a number of tactical channels have been established to promote shared-channel interoperability. These tactical channels are assigned in a checker-board fashion at all MOTOBRIDGE sites throughout the state. These tactical channels are patched through the MOTOBRIDGE System to provide cross-band and/or multi-site communications systems. Repeaters are utilized for tactical channels in the UHF and 800 MHz bands. Although the tactical channels are not continuously monitored by the KHP Dispatch center, following the general usage guidelines in Section 4, the tactical channels are available for use 24 hours a day, 7 days a week.

For users of the statewide 800 MHz Digital Trunked Radio System, a KHP Event Talkgroup has been assigned to each site. These talkgroups can be used for both patch requests and tactical connections. Figure 2 is a map providing an example of tactical channel assignments at several tower sites.

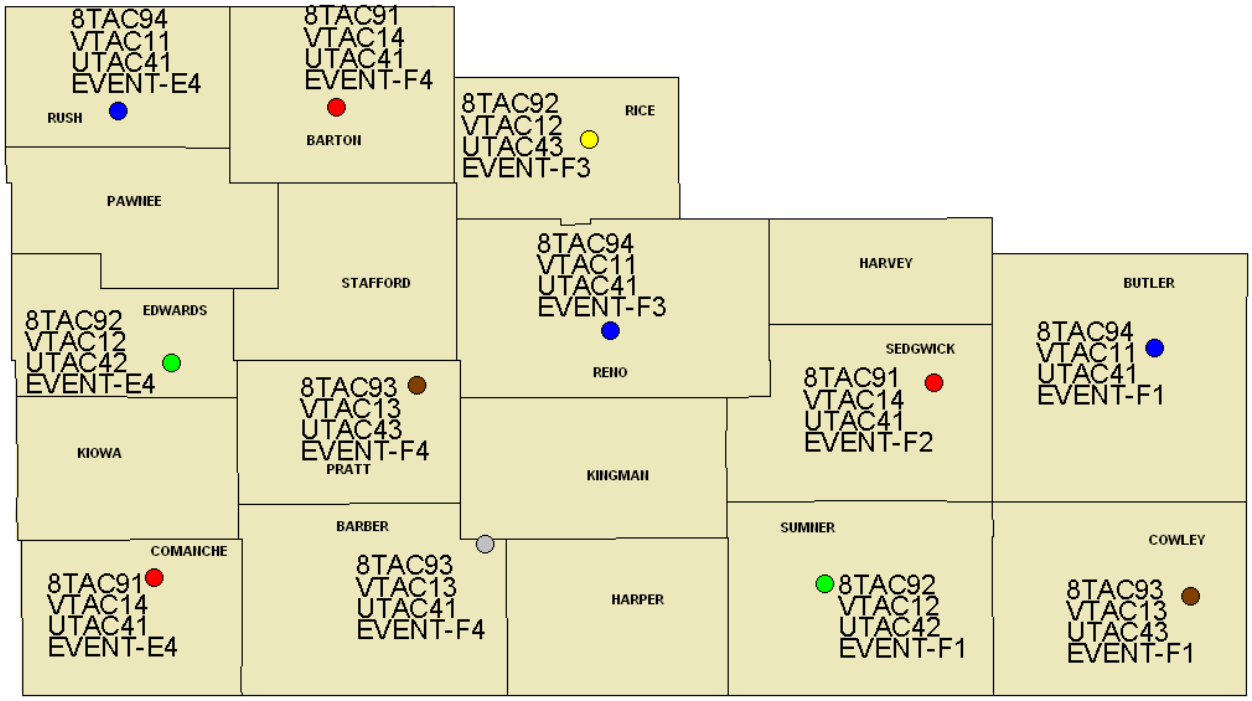

Figure 2 – Tactical channel assignment per site

4. Usage

MOTOBRIDGE is intended for multi-disciplinary or multi-jurisdictional use when other common means of radio communications are not available. Generally, the system should be used by responders and critical facilities during activities that directly impact life safety and the preservation of property.

MOTOBRIDGE channels may be temporarily used by agencies that have unexpectedly lost local communications infrastructure due to external forces. If the system is being used for this purpose, KDOT and KHP should be notified in order to avoid disruptions (such as maintenance) of service.

4.1 Patch Request Procedure

A MOTOBRIDGE patch can be requested in a variety of ways including:

- **Radio by using a call-in channel**
- **Telephone by calling KHP Dispatch at the number designated for the troop serving your area or *47 from a cell phone**
- **Teletype to KHP from a PSAP**

Some basic information is required in any situation when requesting a MOTOBRIDGE patch. The person asking for the patch, also known as a "requestor", must identify themselves, provide their location, and provide the site(s) and radio bands to be patched. If a requestor does not know which site(s) will best suit their location, KHP Operators will evaluate the location and determine the site which provides the best coverage.

Use the following procedure to initiate a MOTOBRIDGE patch via radio:

- **Contact "KHP Dispatch" on the designated call-in channel and identify by using home city/county + radio number (Logan County 601) or agency/facility name (Logan County Hospital). The requestor should also indicate their current location by county.**

- **Once KHP answers, request a MOTOBRIDGE patch then provide the bands and location(s) of the patch.**

- **Remain on the call-in channel. As a courtesy, KHP will notify the requestor that the patch is ready and the appropriate tactical channels to be used. Once complete, users will switch to the tactical channels to communicate.**

An example:

"Logan County 601 to KHP Dispatch from Wallace County"
"KHP Dispatch.... go ahead"
"Request MOTOBRIDGE patch"
"Go ahead with request"
"Patch Wallace UHF to Wallace VHF"
"Wallace VTAC12 and Wallace UTAC42 are patched and ready"

The KHP Operator may request additional contact information from the requestor at the time of the patch request. This information may be necessary to check the status of the patch or to verify a request to discontinue the connection.

4.2 Patch Notification Procedure

In many cases, end users of a MOTOBRIDGE patch will be aware that the patch is being connected. This is accomplished by on-scene coordination through word of mouth or by other electronic means such as telephone or teletype. *Every effort to coordinate a patch in the field should be taken.*

In some cases, a patch may be requested without the targeted user's knowledge. Generally, this applies when a requestor does not have the means to notify or coordinate with the target user. This is known as a "cold call". In the event of a cold call, KHP Dispatch will make every effort to notify the target user. To do so, KHP Operators will need guidance from the requestor such as the agency, name or radio number of the target, and their agency contact information, if available. Unless notified of a cold call situation at the time of request, KHP Dispatch will assume that the patch has already been coordinated in the field. *It is the responsibility of the requestor to ask for a cold call notification.*

4.3 Patch Discontinuation

A MOTOBRIDGE patch will remain active until a request is made to KHP Dispatch to discontinue. In situations where a patch would be considered short-term, typically measured in minutes or hours, KHP Operators will verify the continued need for the patch in four hour intervals from the time of the original request to ensure that a patch is still being utilized. During a large-scale incident or disaster, measured in days or weeks, regular verification will not be performed. A MOTOBRIDGE patch will not be discontinued unless positive verification is made from the requestor or their agency.

Generally, discontinuation of a patch should be handled by the person or agency who requested the original activation. Discontinuation of a patch via radio request should be made on the call-in channel. Following the same procedure as patch activation, provide the location(s) and bands to be discontinued.

4.4 License Requirements

All fixed-site MOTOBRIDGE base-stations and repeaters located on the KDOT towers are owned by KDOT and licensed through the FCC. Any other base-station, control-station or repeater at the local level using the National or State Interoperability channels must be licensed by the FCC to the appropriate local government agency.

For mobile and portable use, the National Interoperability Channels are covered under a "blanket license". If an agency is ELIGIBLE for a FCC part 90 radio license, the National Interoperability Channels may be programmed into equipment without having the channels individually licensed to the agency. **The state VHF Low-Band channels (39.58/39.70) used by MOTOBRIDGE require an FCC license through a local agency for fixed and mobile / portable use.**

Users of the Digital Trunked Radio System require no local licensing for the use of the system, assuming that the proper documentation has been filed with KDOT. Licenses for these channels are coordinated and held by KDOT on behalf of the local agency.

4.5 Signaling

For the purpose of this document, signaling is defined as any non-voice signal produced by radio equipment to identify, notify, or otherwise dispatch and coordinate responders. Examples of signaling include, but are not limited to:

- **Paging**
- **DTMF**
- **Voice Encryption**
- **Push-to-Talk identification**
- **Alert tones**

MOTOBRIDGE uses nationally recognized interoperability channels designated for multi-jurisdictional and multi-disciplinary use. Currently, there are no national signaling standards for these channels. The lack of standards could potentially lead to confusion and channel congestion. To avoid unnecessary confusion and to reduce channel congestion, signaling functions are not allowed on the MOTOBRIDGE system.

5. NIMS Compliance

Based on Presidential Directive (HSPD)-5, in 2005, Kansas Executive Order 05-03 established the National Incident Management System (NIMS) as the statewide standard for incident management. The current Kansas Emergency Response Plan was developed using NIMS principles, including the use of the Incident Command System (ICS), an integrated system of multi-agency coordination centers, and joint public information. Local emergency operations plans have been, or are currently being developed, from the same principles. The Kansas Response Plan (KRP) is developed and maintained by the Kansas Division of Emergency Management.

5.1 Plain Language

Over-the-air common terminology, otherwise known as plain-language, during an emergency or disaster is a requirement of the NIMS. Currently, the use of plain-language on local communications systems while conducting normal operations is addressed by individual agency policy. A multi-agency response to an incident requires the use of plain-language for emergency operations.

MOTOBRIDGE is designed for multi-jurisdictional and multi-disciplinary use. To avoid confusion stemming from the use of non-standard codes, plain language should be used at all times while communicating on MOTOBRIDGE. The use of 10-codes and similar signaling codes should be avoided.

5.2 Incident Command System (ICS) Support

With the occurrence of a disaster or pre-planned event where the Incident Command System (ICS) may be implemented, MOTOBRIDGE can be used in support of the event. The Incident Commander or his/her designee within the ICS has authority to utilize MOTOBRIDGE as deemed necessary to coordinate and fulfill the communications needs of the appropriate responders.

6. Training and Exercise

As with any other tool used by emergency responders, communications equipment and systems such as MOTOBRIDGE should be regularly trained and exercised upon to promote familiarity and ease of use. As a general rule, agencies should train and exercise on communications equipment and protocol at least once annually. MOTOBRIDGE training could be as simple as a review of this document or subsequent training materials and a review of communications equipment to locate the channels used by the system.

A group exercise at a staff meeting or similar event should involve a patch request to KHP and a brief test of the patch on the tactical channels. Similar MOTOBRIDGE exercises are encouraged during other types of events such as a county or region-wide disaster exercise. To ensure the exercise will not interfere with more urgent emergency operations, as a courtesy, KHP Dispatch should be notified prior to the start of the exercise.

NOTE: Beginning in 2009, the Kansas Office of Emergency Communications (KS-OEC) will be providing instructor driven "MOTOBRIDGE Basic Training". These courses will be held at several locations in each of the Kansas Homeland Security Regions. By request, KS-OEC staff will consider additional training events on a case-by-case basis. Contact information for the KS-OEC is listed in *Appendix A*.

7. System Administration and Trouble Reporting

The Kansas MOTOBRIDGE System is maintained by the Kansas Department of Transportation (KDOT). Questions concerning the administration and maintenance of the MOTOBRIDGE system should be directed to the KDOT system administrator via telephone. Appendix A lists the contact information for system administration, trouble reporting, and operational concerns.

The Kansas Department of Transportation strives to provide the best quality communications systems. In order to do so, KDOT communications personnel need to know of any troubles or malfunctions of the MOTOBRIDGE system as soon as possible. System trouble reports should be directed to the KDOT Communications Section at (785)296-3661. This is a recorded line after hours and on weekends. This is the same policy used for tower site notifications from the general public. In an emergency, after hours and weekend trouble reports should be directed to the KHP Central Dispatch Center via telephone or teletype. End user equipment (mobile, portable, base/control station) functionality and maintenance is the responsibility of the agency or department which owns the equipment.

The Kansas Highway Patrol is responsible for operating the MOTOBRIDGE consoles through taking patch requests and making patch connections. Concerns about the operations level of MOTOBRIDGE functionality can be directed to the KHP Central Dispatch Center supervisory staff.

Many local and regional response agencies have purchased mobile gateway devices that provide channel patch capabilities similar to MOTOBRIDGE. Many of these mobile devices also rely upon using the National Interoperability Channels. The combination of mobile and fixed-site communications gateway equipment using the same frequencies commonly raises a concern about interference between the two systems. KDOT Communications staff will work in conjunction with the mobile gateway user to determine the cause of potential interference between the mobile device and MOTOBRIDGE. If it is determined that interference exists between the two systems, KDOT and local staff will work together to decide the best course of action to resolve the issue.

8. Equipment Requirements Quick Reference

- **To operate on the MOTOBRIDGE system, users must have the channels used by the system properly programmed into their radio equipment.**

- **With the exception of VHF Low-Band, conventional radio equipment must have the capability of narrowband (12.5 KHz) operation in order to properly program the channels.**

- **By order of the Kansas SIEC, all public safety mobile and portable radio equipment purchased under the Public Safety Interoperable Communications (PSIC) Grant, and FY 2008 and subsequent Homeland Security Grant Programs must have sufficient channel capacity to allow programming of the National Interoperability Channels designated for the radio band(s) being purchased. The order also states that all such equipment acquired will have the National Interoperability Channels programmed according to the NPSTC / KS SIEC Channel Naming Plan (Post Attachment 1) at the time of purchase.**

DOCUMENT APPROVAL

This document has been reviewed by the members of the Kansas Statewide Interoperability Executive Committee (SIEC) in order to ensure adherence with the Kansas Statewide Communications Interoperability Plan and to the principles of public safety communications. Any future revisions, other than information contained in the Appendix sections, must have SIEC approval prior to implementation. Requests for modification or revision of this document should be directed to Kansas Office of Emergency Communications (KS-OEC) staff. Contact information for the KS-OEC is located in Appendix A.

On this 12th day of February, 2009, Version 1.0 of the MOTOBRIDGE System Description and Standard Operating Procedures has been approved by the Kansas Statewide Interoperability Executive Committee.

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Kent Koehler, Chairperson

APPENDIX SECTION

APPENDIX A- POINTS OF CONTACT

Kansas Department of Transportation (KDOT)

Contact	Phone	Notes
Communications System Supervisor	(785)296-5948	System admin. and operational concerns
24 Hour Report Line -- Non-emergency Trouble Reports	(785)296-3661	Non-emergency trouble reports. Recorded on evenings and weekends

Kansas Highway Patrol (KHP)

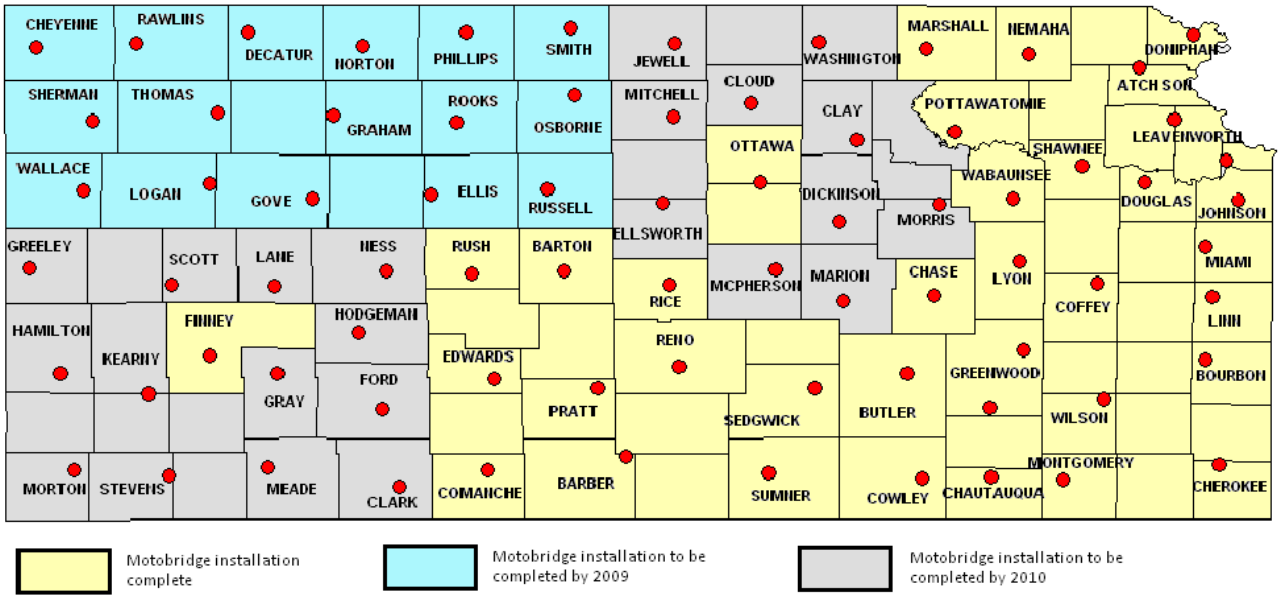
Contact	Phone	Notes
To coordinate a MOTOBRIDGE patch via phone or report emergency after-hour system malfunctions, use the following:		
Central Dispatch / Salina Designate desired Troop	(785)827-4437	Salina Dispatch
Central Dispatch / Salina Statewide from mobile phone	*47	Salina Dispatch
KHP Troop M (Communications) Supervisors		
Capt. Randy Moon—Troop M (Communications) Cmdr.	(785)827-3065	KHP operational concerns
Lt. Scott Harrington—Troop M Supervisor	(785)368-6515	KHP operational concerns
Lt. Martin Berneking—Troop M Supervisor	(785)827-3065	KHP operational concerns

Office of Emergency Communications (KS-OEC)

Contact	Phone / e-mail	Notes
Jason R. Moses—Interoperable Communications Coord.	(785)274-1799 ofc. (785)217-8471 cell jr.moses@us.army.mil	Planning / Training & Exercise
J.L. Ellis—Training and Exercise Specialist	(785)861-3097 ofc. (785)438-0470 cell jimmy.ellis3@us.army.mil	Training & Exercise
Scott Ekberg—Training and Exercise Specialist	(785)861-3098 ofc. (785)438-8440 cell scott.ekberg@us.army.mil	Training & Exercise

APPENDIX B- CONSTRUCTION SCHEDULE

KDOT 800 MHz Tower Sites



APPENDIX C- MOTOBRIDGE FREQUENCIES

National and State Interoperability Channels

LOW BAND FREQUENCIES (STATE FREQUENCIES)				
CHANNEL NAME	MOBILE RX.	RX. P.L.	MOBILE TX	TX. P.L.
LCALLKS	39.580	156.7	39.580	156.7
LTACKS	39.700	156.7	39.700	156.7
VHF FREQUENCIES (NATIONAL FREQUENCIES)				
CHANNEL NAME	MOBILE RX.	RX. P.L.	MOBILE TX	TX. P.L.
VCALL10	155.7525	156.7	155.7525	156.7
VTAC11	151.1375	156.7	151.1375	156.7
VTAC12	154.4525	156.7	154.4525	156.7
VTAC13	158.7375	156.7	158.7375	156.7
VTAC14	159.4725	156.7	159.4725	156.7
UHF FREQUENCIES (NATIONAL FREQUENCIES)				
CHANNEL NAME	MOBILE RX.	RX. P.L.	MOBILE TX	TX. P.L.
UCALL40	453.2125	156.7	458.2125	156.7
UCALL40D	453.2125	156.7	453.2125	156.7
UTAC41	453.4625	156.7	458.4625	156.7
UTAC41D	453.4625	156.7	453.4625	156.7
UTAC42	453.7125	156.7	458.7125	156.7
UTAC42D	453.7125	156.7	453.7125	156.7
UTAC43	453.8625	156.7	458.8625	156.7
UTAC43D	453.8625	156.7	453.8625	156.7
800 MHZ. FREQUENCIES (PRE-REBANDING) (NATIONAL FREQUENCIES)				
CHANNEL NAME	MOBILE RX.	RX. P.L.	MOBILE TX	TX. P.L.
8CALL90	866.0125	156.7	821.0125	156.7
8CALL90D	866.0125	156.7	866.0125	156.7
8TAC91	866.5125	156.7	821.5125	156.7
8TAC91D	866.5125	156.7	866.5125	156.7
8TAC92	867.0125	156.7	822.0125	156.7
8TAC92D	867.0125	156.7	867.0125	156.7
8TAC93	867.5125	156.7	822.5125	156.7
8TAC93D	867.5125	156.7	867.5125	156.7
8TAC94	868.0125	156.7	823.0125	156.7
8TAC94D	868.0125	156.7	868.0125	156.7

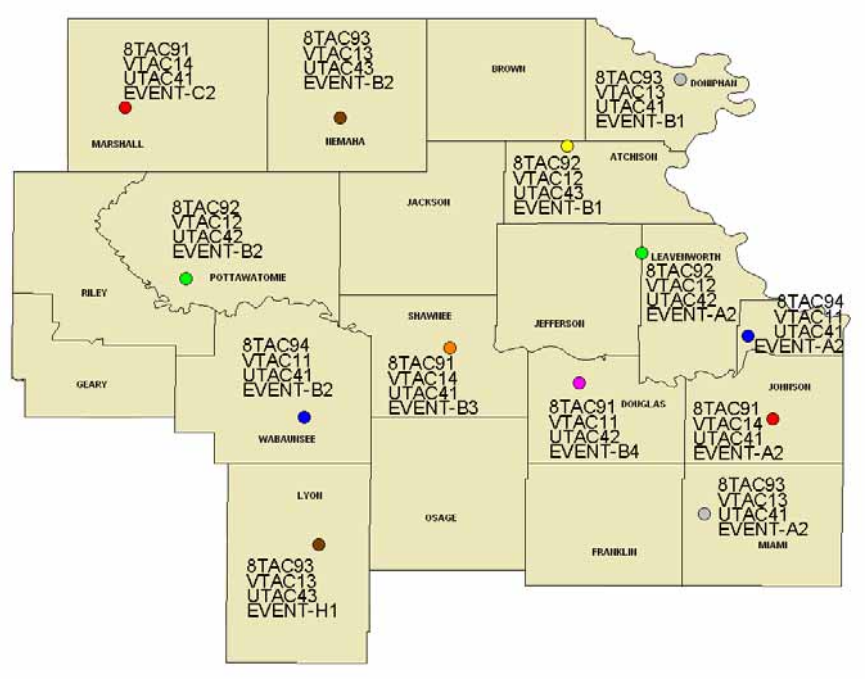
D= DIRECT / TALKAROUND CHANNELS

DIGITAL EVENT TALKGROUPS

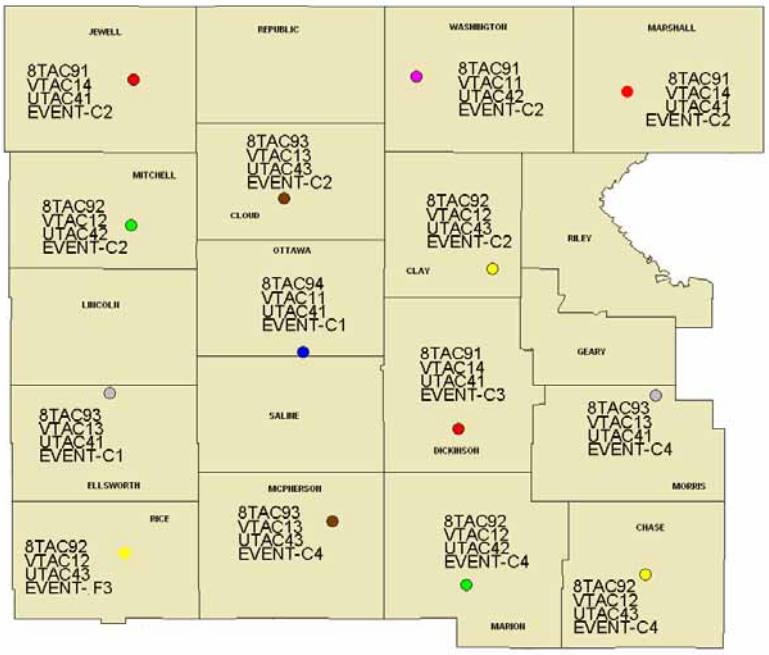
TROOP A (KANSAS CITY AREA)
TALKGROUP NAME
A-EVENT-1
A-EVENT-2
A-EVENT-3
TROOP B (NE KANSAS AREA)
TALKGROUP NAME
B-EVENT-1
B-EVENT-2
B-EVENT-3
B-EVENT-4
TROOP C (NC KANSAS AREA)
TALKGROUP NAME
C-EVENT-1
C-EVENT-2
C-EVENT-3
C-EVENT-4
TROOP D (NW KANSAS AREA)
TALKGROUP NAME
D-EVENT-1
D-EVENT-2
D-EVENT-3
D-EVENT-4
TROOP E (SW KANSAS AREA)
TALKGROUP NAME
E-EVENT-1
E-EVENT-2
E-EVENT-3
E-EVENT-4
TROOP F (SC KANSAS AREA)
TALKGROUP NAME
F-EVENT-1
F-EVENT-2
F-EVENT-3
F-EVENT-4
TROOP H (SE KANSAS AREA)
TALKGROUP NAME
H-EVENT-1
H-EVENT-2
H-EVENT-3
H-EVENT-4

APPENDIX D- MOTOBRIDGE TACTICAL MAPS

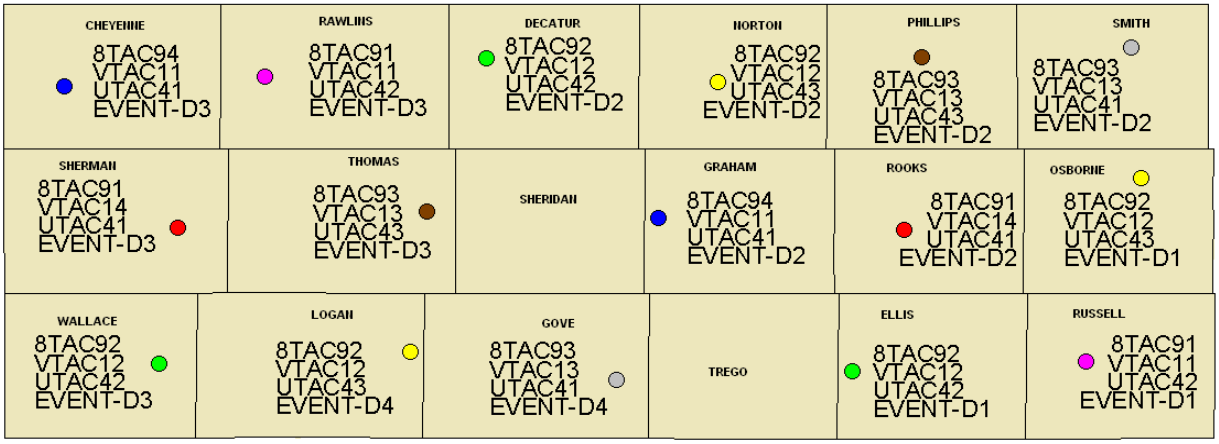
NORTHEAST KANSAS



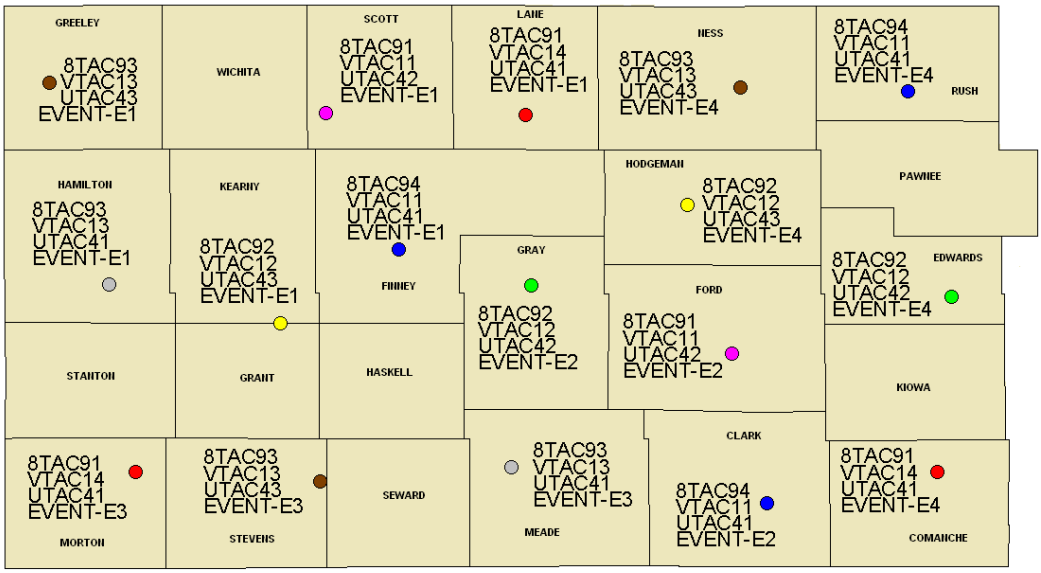
NORTH CENTRAL KANSAS



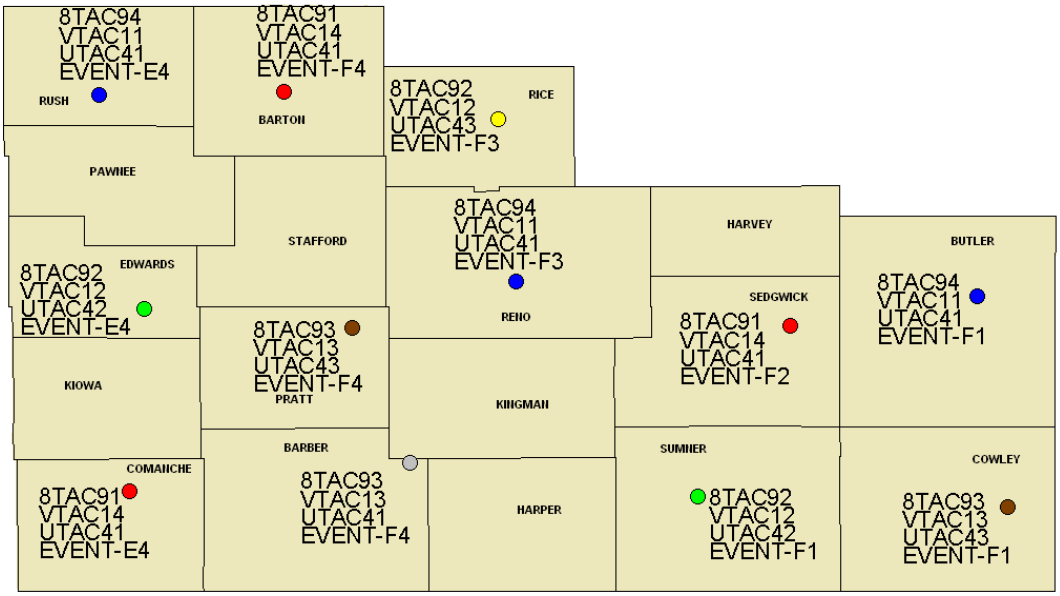
NORTHWEST KANSAS



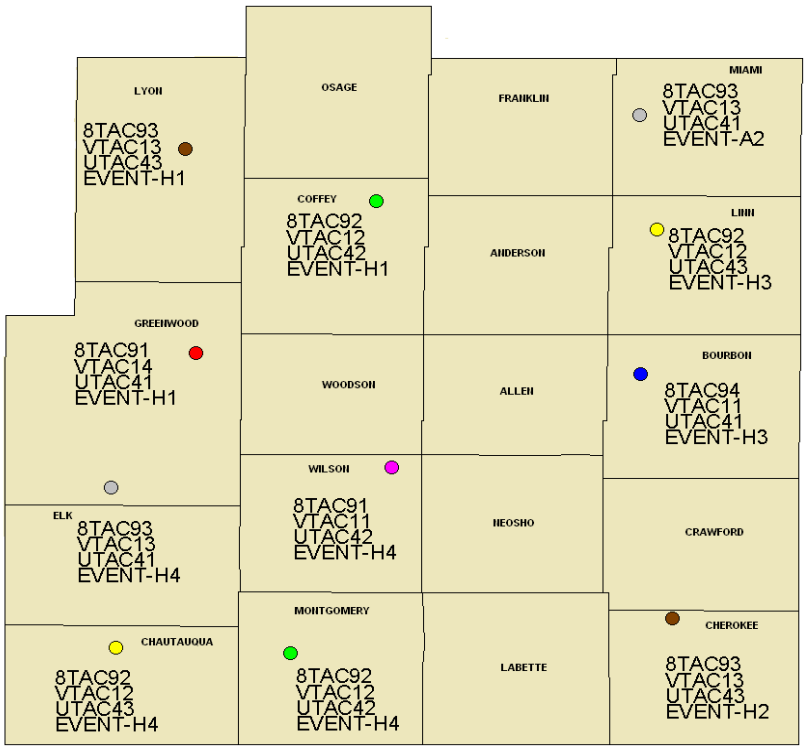
SOUTHWEST KANSAS



SOUTH CENTRAL KANSAS



SOUTHEAST KANSAS



APPENDIX E- SIEC MEMBERSHIP

Member Name / Title	*Agency Represented*	*POC Email*	*POC Telephone*
ADJUTANTGENERAL MAJ. GEN. TOD BUNTING	KANSAS ADJUTANT GENERAL	Tod.Bunting@us.army.mil	(785) 274-1001 W
COL. TERRY MAPLE	KANSAS HIGHWAY PATROL	TMaple@khp.ks.gov	(785)296-6800 W
SECRETARY OF TRANSP. DEB MILLER	KANSAS DEPT. OF TRANSPORTATION	dmiller@ksdot.org	(785)296-3461 W
UNDERSHERIFF RICHARD OLD LYON CO. SHERIFF	KANSAS SHERIFF'S ASSOCIATION	rold@lyoncounty.org	(620)342-5545 W
DIRECTOR OF SAFETY TYLER BREWER AUGUSTA DPS	KANSAS ASSN. OF CHIEFS OF POLICE	tbrewer@augustadps.org	(316)775-4500 W
CHIEF BOB MCLEMORE COLBY FIRE DEPT.	KANSAS STATE FIRE CHIEFS ASSOCIATION	firechief@cityofcolby.com	(785)460-4454 W
KERRY MCCUE ELLIS CO. EMS	KS EMERG. MEDICAL SUPPORT ASSN.	ecems@ellisco.net	(785)628-9461 W
JAMES REED SUMNER COUNTY EMERGENCY COMMUNICATIONS	KANSAS EMERGENCY MANAGEMENT ASSOCIATION	jreed@co.sumner.ks.us	(620)326-3398 W
KENT KOEHLER SEDGWICK CO. DIVISION OF INFO. AND OPS.	KANSAS CHAPTER OF APCO	kkoehler@sedgwick.gov	(316)660-9877 W

POST ATTACHMENT 1- NPSTC/KS SIEC CH. NAMING PLAN

On September 29, 2008, the Kansas SIEC adopted a set of standards for the National Interoperability Channels. The standards are those recommended by the National Public Safety Telecommunications Council (NPSTC). Additionally, state standards were adopted for VHF Low-Band frequencies that are not recognized nationally for interoperability. The current version of the channel standards are attached to this document for reference.

NPSTC Channel Naming Plan- With Short Name Supplemental Addendum

FCC-Designated Interoperability Channels With Short Names Included

As adopted by the Kansas SIEC on 9/29/2008 including Kansas Low-Band Frequencies

Please review the entire document before programming radio equipment

Yellow= Kansas statewide recognized Interoperability Channels

BAND: N = 11.25 kHz modulation bandwidth (narrowband)
W = 16 or 20 kHz modulation bandwidth, depending upon band (wideband)

VHF LOW BAND

Pending FCC

LLAW1 THROUGH LFIRE4 ARE COMMON FREQUENCIES DESIGNATED FOR INTEROPERABILITY. EACH FREQUENCY REQUIRES AN FCC LICENSE. AGENCIES CAN ADOPT THESE FREQUENCIES AT THEIR OWN DISCRETION.

LCALLKS and LTACKS are also used by the Kansas MOTOBRIDGE System and require local FCC Licensing for any use.

VHF HIGH BAND

The VHF Channels in Yellow are recognized for national interoperability use. FCC Licensing is not required for mobile / portable programming. Licensing is required for base, control, and repeater stations. **These channels are also used by the Kansas MOTOBRIDGE System.**

VFIRE21 THROUGH VLAW32 ARE ADDITIONAL COMMON FREQUENCIES DESIGNATED FOR INTEROPERABILITY. EACH FREQUENCY REQUIRES AN FCC LICENSE. AGENCIES CAN ADOPT THESE FREQUENCIES AT THEIR OWN DISCRETION.
*****VLAW31 IS THE NEW NAME FOR THE CHANNEL COMMONLY KNOWN AS "NATIONAL LAW", "NLEEC", OR "NLEMARS". The name should be changed while narrowbanding.**

CHANNEL AND NAMING STANDARD

NPSTC / KS SIEC Name	*Short Name (6 char)***	*Rx FREQ*	*Rx CTCSS*	*Tx FREQ*	*Tx CTCSS*	*BAND*
VHF LOW BAND						
LLAW1	LLAW1	39.4600	156.7	45.8600	156.7	W
LLAW1D	LLAW1D	39.4600	156.7	Simplex	156.7	W
LFIRE2 (pend)	LFIRE2	39.4800	156.7	Simplex	156.7	W
LLAW3D	LLAW3D	45.8600	156.7	Simplex	156.7	W
LFIRE4	LFIRE4	45.8800	156.7	Simplex	156.7	W
LCALLKS	LCALKS	39.5800	156.7	Simplex	156.7	W
LTACKS	LTACKS	39.7000	156.7	Simplex	156.7	W
VHF HIGH BAND						
VCALL10	VCAL10	155.7525	none*	Simplex	156.7	N
VTAC11	VTAC11	151.1375	none*	Simplex	156.7	N
VTAC12	VTAC12	154.4525	none*	Simplex	156.7	N
VTAC13	VTAC13	158.7375	none*	Simplex	156.7	N
VTAC14	VTAC14	159.4725	none*	Simplex	156.7	N
VFIRE21	VFIR21	154.2800	156.7	Simplex	156.7	N
VFIRE22	VFIR22	154.2650	156.7	Simplex	156.7	N
VFIRE23	VFIR23	154.2950	156.7	Simplex	156.7	N
VFIRE24	VFIR24	154.2725	156.7	Simplex	156.7	N
VFIRE25	VFIR25	154.2875	156.7	Simplex	156.7	N
VFIRE26	VFIR26	154.3025	156.7	Simplex	156.7	N
VMED28	VMED28	155.3400	156.7	Simplex	156.7	N
VMED29	VMED29	155.3475	156.7	Simplex	156.7	N
VLAW31	VLAW31	155.4750	156.7	Simplex	156.7	N
VLAW32	VLAW32	155.4825	156.7	Simplex	156.7	N

	Rx FREQ	Rx CTCSS	Tx FREQ	Tx CTCSS	BAND
UHF					
	The UHF and 800MHz Channels in Yellow are recognized for national interoperability use. FCC Licensing is not required for mobile / portable programming. Licensing is required for base, control, and repeater stations. **These channels are also used by the Kansas MOTOBRIDGE System.** ****800 MHz channels are shown for both pre and post rebanding.**				
800 MHz (Pre-Rebanding)					
	866.0125	156.7	821.0125	156.7	W
	866.0125	156.7	Simplex	156.7	W
	866.5125	156.7	821.5125	156.7	W
	866.5125	156.7	Simplex	156.7	W
	867.0125	156.7	822.0125	156.7	W
	867.0125	156.7	Simplex	156.7	W
	867.5125	156.7	822.5125	156.7	W
	867.5125	156.7	Simplex	156.7	W
	868.0125	156.7	823.0125	156.7	W
	868.0125	156.7	Simplex	156.7	W

NPSTC / KS SIEC Name	Short Name (6 char)**	Rx FREQ	Rx CTCSS	Tx FREQ	Tx CTCSS	BAND
UHF						
UCALL40	UCAL40	453.2125	none*	458.2125	156.7	N
UCALL40D	CAL40D	453.2125	none*	Simplex	156.7	N
UTAC41	UTAC41	453.4625	none*	458.4625	156.7	N
UTAC41D	TAC41D	453.4625	none*	Simplex	156.7	N
UTAC42	UTAC42	453.7125	none*	458.7125	156.7	N
UTAC42D	TAC42D	453.7125	none*	Simplex	156.7	N
UTAC43	UTAC43	453.8625	none*	458.8625	156.7	N
UTAC43D	TAC43D	453.8625	none*	Simplex	156.7	N
800 MHz (Post-Rebanding)						
8CALL90	CAL90	851.0125	156.7	806.0125	156.7	W
8CALL90D	CAL90D	851.0125	156.7	Simplex	156.7	W
8TAC91	TAC91	851.5125	156.7	806.5125	156.7	W
8TAC91D	TAC91D	851.5125	156.7	Simplex	156.7	W
8TAC92	TAC92	852.0125	156.7	807.0125	156.7	W
8TAC92D	TAC92D	852.0125	156.7	Simplex	156.7	W
8TAC93	TAC93	852.5125	156.7	807.5125	156.7	W
8TAC93D	TAC93D	852.5125	156.7	Simplex	156.7	W
8TAC94	TAC94	853.0125	156.7	808.0125	156.7	W
8TAC94D	TAC94D	853.0125	156.7	Simplex	156.7	W

NOTE: For VHF Low Band, 156.7 Hz is recommended as a national standard for emergency use. However, it is advisable to follow the national law enforcement CTCSS plan to minimize atmospheric skip interference that can plague this band during periods of high sunspot activity.

NOTE: 6 character short name to only be used in radios that can not support the full 8-character name. If the longer NPSTC-recommended name is 6 characters or less, it is also used for the short name, otherwise the name is abbreviated. 800 MHz short names have been approved by NPSTC. Other short names will be addressed during the ANSI standardization process.

NOTE: Tx CTCSS for paired UHF and 800 MHz channels may vary to permit transmitter steering for multi-site systems. However, use of multi-CTCSS base receivers is recommended so that systems always respond to 156.7 Hz as a national emergency tone. For 800 MHz channels, CTCSS plans and operational procedures often are addressed in 800 MHz Regional Plans.

(*) NOTE: At a future date to be determined during the ANSI standardization process, it is recommended that all nationwide interoperability channels have 156.7 Hz CTCSS on both receive and transmit frequencies. During the transition period, it is recommended that channels marked with an asterisk and already narrowbanded (VCALL/TAC and UCALL/TAC channels) should be programmed for CTCSS on subscriber transmit only, with carrier squelch on receive.

CONVERSION CHART

VHF	
OLD NAME	NEW NAME
V CALL	VCALL10
V TAC-1	VTAC11
V TAC-2	VTAC12
V TAC-3	VTAC13
V TAC-4	VTAC14
UHF	
OLD NAME	NEW NAME
U CALL	UCALL40
U TAC-1	UTAC41
U TAC-2	UTAC42
U TAC-3	UTAC43
800 MHz	
OLD NAME	NEW NAME
I CALL	8CALL90
I TAC-1	8TAC91
I TAC-2	8TAC92
I TAC-3	8TAC93
I TAC-4	8TAC94

This chart is intended as a cross reference for those who have already programmed the National Interoperability Channels using the original naming convention. The chart can be cut out and used by responders until the new naming convention is programmed into their radio equipment.