EMERGENCY COMMUNICATIONS STUDY

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For NVDA
2004-2005

Homeland Security Study

This study was conducted between April 2004 and January 2005 in Caledonia, Essex nad Orleans counties in north eastern Vermont, and extended to neighboring areas of NH and the Canadian border. The purpose of the study was to assess emergency communications needs for each community/municipality in the region. We assessed the state of existing emergency communications, identified gaps and make recommendations for closing those gaps, coordinating with local, regional, state and federal initiatives. .

The report summarizes the data collected, and provides suggestions to solve problems with infrastructure.

Summary

The findings are based on the following studies:

- frequencies
- antenna locations
- use issues-- (first responders–dispatch, EMS, fire and mutual aid)
- inventory of fixed and mobile communications assets

Findings–problems and their impact

- significant infrastructure deficits
- significant dead spots
- frequency interference
- departments individually develop methods to mitigate infrastructure deficits
- equipment at department level good, but capabilities cannot be fully utilized
- lack of direct, unit-to-unit communications ability
- significant inefficiency in reporting procedures and response times
- lack of inter-departmental communications ability
- dispatch overload

Recommended solutions

- additional antennas, or change of antenna placement
- add fiber connectivity
- utilize existing fiber where possible
- utilize multiple backhaul links
- look toward regional solutions
- use topography to regional/inter-community advantage
- create seamless wireless coverage on north-south interstate
- addition of data send-and-receive equipment

Focus of the Study, Methodology and Primary Findings

The primary focus of this study was to inventory both fixed and mobile communication assets in the three county region of northeastern Vermont. This involved researching records and physical visits to identify antenna locations and assigned frequencies, meeting with department personnel as users of the communications system and equipment to understand the effectiveness of the existing system, unique department needs, and an extensive telephone survey to inventory equipment held by emergency departments in each community.

The study was largely successful, and resulted in a detailed understanding of deficiencies and capabilities of the infrastructure and equipment at the unit level, allowing recommendations for improving emergency communications in the area.

We obtained information on how the system is used, where it works, and where it falls short. While emergency personnel were knowledgeable about the state of communications in their respective areas they were less knowledgeable about they specifics of the equipment used. The telephone survey inventory was less complete than expected both because repeated phone calls were not returned and personnel were unable to provide information concerning the specifics of the equipment used by their departments. Equipment makes and types vary considerably from one department to another. The department and unit level equipment inventory as completed is included in the attached data.

We identified several problems common to most departments:

Most significantly there is a **substantial infrastructure deficit** throughout the region, resulting in substantial communication dead spots. At the same time, individual departments have developed creative ways to communicate given these deficits and resultant dead spots.

There are several levels of infrastructure inadequacy. Some of these areas infrastructure deficits can be addressed with additional radio antennas and/or different radio antenna placement, but other areas will require extended fiber connectivity.

Recent purchases of radio equipment upgraded communications capabilities within individual departments, but the capability of department and unit level equipment generally exceeds the capability of the overall communications system. Therefore, **significant infrastructure re-design and deployment is necessary to significantly improve emergency communications in the region**.

The design should include redeployment of some existing equipment to more advantageous vantage points, as well as the addition of new equipment. Engineering design to improve both intra and inter-community communications capability must take existing fiber loops into consideration, and create economically affordable additional loops.

Topographic issues create the majority of dead spots. Additional antennas, and more point of present (POP) locations for fiber loops will alleviate many of these issues. Placement of these POPs will have to take the topographic challenges into account to optimize their utility.

One way to resolve the multiple dead spots throughout the region is to create multiple backhaul links dispersed to mitigate the many topographic impediments. This would allow for both use of radio and uninterrupted communications in areas presently blocked by these topographic impediments. Advantage should also be taken of the timing of Northlink--which is currently in the design and engineering phase–in order to take emergency needs into consideration and incorporate as many loop configurations as are financially affordable.

Many emergency departments use cellular technology, in addition to radios, but only two cellular carriers, Unicel and Verizon, have coverage, and those only in parts of the region. Their base stations are located in strategically important points, but their canopy is generally non-existent in many of the study area communities, and lack of commercial viability for wireless impedes the development of an inclusive canopy by private concerns. However, this may change somewhat since interstate 91, going north to south, must be covered by 2007 to meet the mandate of The National Telecommunications Act.

Deficit Impact and Recommended Solutions

The methods used to collect information included face to face interviews, telephone interviews, and record research. The assembled information identified issues considered to be critical flash points and became the basis for the findings of this report. Communication issues of Police, Fire, Emergency Medical Services and Dispatch Services In organizing this study the primary focus is on inventorying communication assets--both fixed and mobile. The inventory involved researching records to identify locations of antennas and assigned frequencies, meeting with several departments to discuss the effectiveness of the existing systems, and a telephone survey.

Inadequate infrastructure:

Throughout the Kingdom there are multiple "dead spots," or areas where wireless communications is impossible. This is an annoyance expressed by cell phone users, but it is a serious issue for first responders, EMS, fire and police units using existing municipal communications systems. The primary reason for these dead spots is a lack of antenna infrastructure through out the area, but terrain challenges and communication systems designed to allow municipal communications further complicate the problem.
Existing systems were designed on a municipal, rather than a regional basis, with the result that inter-municipality communications are poor, even though intra-municipality communications may be workable. Nevertheless, most communities do not have 100% wireless coverage.
In most municipalities emergency responders have developed methods to deal with intra-community communications challenges. For example, when emergency responders are called to an emergency they dispatch a vehicle to a high point and relay messages to the dispatcher for any additional equipment or manpower needs because direct communications between personnel at the site and the dispatcher are impossible. Historically communities consider communications within their boundaries first, and only secondarily consider coordinating communications capabilities with neighboring communities

Inefficient reporting procedures

The reporting requirements of incident response creates a significant drain on available man hours and often is redundant in nature. Because the communications capabilities are limited in the area reports cannot be transmitted from site to department, but must instead be physically transferred. In addition, this requires a written report, followed by a report entered into the

department system. The use of mobile unit computers with automatic data transfer over wireless connections would significantly increase efficiency of a department and reduce redundancy and man hours expended on reporting procedures. Minimally, this requires that each unit have a computer and the infrastructure be sufficient to up load information to a central computer filing system.

Inter-community coordination

Looking at system design on a regional, rather than municipal basis would allow for improved inter-community communications, essential for mutual aid situations, and situations that might require more than one department at a scene. Currently, area communications systems are designed to work within a community. However, this design strategy inhibits effective inter-community communications. While certainly intra-community communications are essential, if not primary, they need not be exclusive. Engineering and planning the system from a regional view point would not exclude intra-community communications, but instead enhance them.

Dispatch overload

Dispatch overload frequently occurs because of the inability of different units or departments to communicate directly with one another, and the need for individual units to go through dispatch to access central data files. Currently each unit must use dispatch as a central transmitter of information, creating not only inefficiency of communication and time delays, but also creating a serious overload problem at the dispatch level.
This overload can be dealt with by upgrading infrastructure and equipment at the individual unit level allowing direct unit-to-unit communication. In addition, it would be efficacious to connect mobile computer units to central data bases in order that individual units can access information directly when necessary. through mobile computer units to central data banks.

Cell phone coverage

Although there are six licensed carriers covering this area only two have any coverage and it is poor to fair at best. The following carriers are licensed for this area:

Verizon	Coverage Poor to Fair
Unicel	Coverage Fair
US Cellular	Poor
Cingular	None
T-Mobile	None
Sprint / Nextel	None the Nextel system has limited service on the edges

Equipment status

Major upgrades in communication equipment at the department level and an increase in specialized equipment dedicated to the area has taken place in the past three years. However,

should be automated to allow for data to flow from backhaul sources directly to the police unit (without using dispatchers), and the officer should be able to use hand-free equipment rather than using hand-held controls.

- **Firefighting units** utilize specialized equipment that is housed in fire stations throughout the area. Specialized training to use and maintain this equipment is conducted by the local fire units. Delivery of specialized equipment to emergencies outside of the home area requires decision making on several levels, which is unwieldy and inefficient given the current lack of connectivity.
  If connectivity were improved and more automatic those units first to arrive at the scene could notify specialized equipment operators of the potential need for their equipment. As equipment needs in a specific situation changed or became clear to the site commander rapid deployment of equipment could be realized with more efficient communications and operations than currently exist.

- **All emergency vehicles** should be outfitted as temporary base stations with the ability to track the vehicle's occupants--up to a two mile radius--when they exit the vehicle. The vehicle would be capable of automatically broadcasting movements back to the dispatcher or site commander. Effort should be placed on developing systems that allow units to bypass the dispatcher and collect data or communicate directly with other emergency units.

COLOR CODE
FREQUENCY ASSIGNED TO TOWN
CONTRACTED TO OTHER TOWNS
UNORGANIZED TOWNS & GORES
CALEDONIA COUNTY
ESSEX COUNTY
ORLEANS COUNTY

03/28/05

TOWNS	FIRE DEPARTMENTS		POLICE DEPARTMENTS		EMS		DISPATCH	PUBLIC SAFETY		PUBLIC WORKS			SHERIFF	
	1	2	1	2	1	2	1	1	2	ELECT	WATER	HIGHWAY	1	2
Albany	WPGS217													
Averill	BEECHER FALLS FIRE	BRIGHTON FIRE DEPT			COLEBROOK EMS									
Avery Gore														
Barnet	BARNET FIRE DEPT		ST JAY POLICE		CALEX EMS	BARTON EMS	TWIN STATE MUTAL AID					KNNS934		
Barton	KNBB552				WNUM497							WPFA864		
Barton/Orleans	BARTON FIRE DEPT				BARTON EMS							KNAV986		
Bloomfield	N. STRATFORD FIRE DEPT						COLEBROOK DISPATCH							
Brighton	KB94421				WNZA399							WPFD375		
Brownington														
Brunswick	BRIGHTON FIRE DEPT	BEECHER FALLS FIRE			BRIGHTON EMS	COLEBROOK EMS								
Burke	E BURKE FIRE DEPT	W BURKE FIRE DEPT			LYNDON EMS									
Canaan/Beecher Falls	KY876				COLEBROOK EMS									
Charleston	WPBQ707											WPDU725		
Concord	CONCORD FIRE DEPT				CALEX EMS		ST JAY DISPATCH							
Coventry														
Craftsbury	WNXK680													
Danville	WNSU702				DANVILLE EMS							WNDM827		
Derby	KNAV997									WPJL470	KNNS883	WNPD258		
E Burke	WPHE692				LYNDON EMS									
East Haven	E HAVEN FIRE DEPT				LYNDON EMS		ST JAY DISPATCH							
Ferdinand	BRIGHTON FIRE DEPT	BEECHER FALLS FIRE			BRIGHTON EMS	COLEBROOK EMS								
Glover	WPBI354				WNZR553									
Grandby	CONCORD FIRE DEPT				LANCASTER EMS		ST JAY DISPATCH							
Greensborough	KJG202	KNNT267										WNPB771		
Groton	KNAQ908				WOODSVILLE EMS									
Guildhall														
Hardwick	KKV518		WPML716		KSJ200		KNNH214	KSU589	WAN503	WPEC653				
Holland												WPQJ425		
Irasburg	KNAV998													
Jay	KNFA381							KNAN857				KNNV691		
Kirby	CONCORD FIRE DEPT				CALEX EMS	LYNDON EMS	ST JAY DISPATCH							
Lemington	N. STRATFORD FIRE DEPT				BRIGHTON EMS	COLEBROOK EMS	COLEBROOK DISPATCH							
Lewis														
Lowell	WNVN725	WNXI303												
Lunenburg	LUNENBURG/GILMAN FIRE DEPT				LANCASTER EMS							WPDZ370		
Lyndon	KRP874		LYNDON POLICE DEPT		KKR374			KSU667	WAN504		WPRG699			
Maidstone					LANCASTER EMS									
Morgan														
Newark	NEWARK FIRE DEPT				LYNDON EMS		ST JAY DISPATCH					WNAL652		
Newport	WNRL775		WPUG430	WPVX794	KSN222			KSU637	WGT85	WPKY735	WPZV304	KTX759	WNBK846	WNXM238
North Troy	KNAX747													
Norton	BEECHER FALLS FIRE	N. STRATFORD FIRE DEPT			BRIGHTON EMS									
Peacham	KOM719											WNJR363		
Rygate	RYGATE FIRE DEPT				WOODSVILLE EMS		TWIN STATE MUTAL AID					WPQK255		
Sheffield/Wheelock	KNBF263													
St Johnsbury	KQS721		KSU669	WPSM646	WPHR207	WPUC548		KVM627	WBR290	WPBR877	WPBR786	WNCE423		
Stannard	GREENSBOROUGH FIRE DEPT	SHEFFIELD/WHEELOCK FIRE DEP			HARDWICK EMS					WPNY905				
Sutton	SUTTON FIRE DEPT				LYNDON EMS		ST JAY DISPATCH					WPXN799		
Troy	KMK800											WPBM546		
Victory	CONCORD FIRE DEPT				CALEX EMS	LYNDON EMS	ST JAY DISPATCH							
W Burke	E BURKE FIRE DEPT													
Walden	KYU890	WNZD716			DANVILLE EMS									
Warners Grant														
Warren Gore														
Waterford	WATERFORD FIRE DEPT				CALEX EMS		ST JAY DISPATCH					WNSC739		
Westfield														
Westmore												WPJQ470		
Wheelock	KNBF263				LYNDON EMS									
Outside NEK														
Montpelier VT							WNWZ946							
Stratford NH														
Colebrook NH							KNGX627				WNAZ593	KA55273		
Landcaster NH					KRF485									
Woodsville NH					KVP679									
Lincoln NH					WNGB371									
Haverhill NH							KSI676							

CALL SIGNS		LATITUDE			LONGITUDE			LOCATION	ADDRESS				km radius
	WNGB371	44	2	31.2	71	40	3.3	Lincoln Police Sta	RT 112	Lincoln	NH	Grafton	40
	KSI676	44	3	51.2	72	7	5.3	Twin state Mutal Aid Fire Association		West Newbur	VT	Orange	40
	KSI676	44	6	12.2	72	1	44.3	Twin state Mutal Aid Fire Association	RT 100	Haverhill	NH	Grafton	40
	WNWZ946	44	7	0.2	72	16	4.3	summit of Pierson Mountain		Topsham	VT	Orange	40
	WNWZ946	44	7	28.2	72	28	53.4	Summit of Mount Pleasant		Williamstown	VT	Orange	40
	KVP679	44	8	10.2	72	1	14.3	Cottage Hospital	Swift Wat	Woodsville	NH	Grafton	
	KSI676	44	9	26.2	71	41	59.3	Twin state Mutal Aid Fire Association	Cannon M	Franconia	NH	Grafton	40
	WNWZ946	44	10	26	72	36	37	On Irish Hill	Berlin	Barre	VT	Washingtc	40
	KNAQ908	44	12	0.2	72	11	58.3	Frie Dept	Main St	Groton	VT	Caledonia	
	WPQK255	44	12	34.2	72	4	12.3		73 Witters	Rygate	VT	Caledonia	20
	KNNS934	44	17	0.2	72	2	58.3	Town Garage	US Rt5	Barnet	VT	Caledonia	20
WNJR363	KOM719	44	20	0.2	72	9	58.3	Fire Sta on Mountain Rd		Peacham	VT	Caledonia	16
	KSI676	44	21	14.2	71	44	21.3	Twin state Mutal Aid Fire Association	Manns Hil	Littleton	NH	Grafton	40
	WNWZ946	44	22	26.2	72	12	20.4	Cabot Plains		Cabot	VT	Washingtc	40
	WNSC739	44	22	30.2	71	55	8.3		Mad Brool	Waterford	VT	Caledonia	16
	WNWZ946	44	22	51.2	72	40	54.4	Loomis Hill		waterbury	VT	Washingtc	40
	WPBR876	44	23	44.2	72	1	33.3	SCADA S end Tank		St Johnsbury	VT	Caledonia	
	WNWZ946	44	24	22.2	71	58	12.3	Fairbanks Mountain		Waterford	VT	Caledonia	40
	KQS721	44	24	22.2	71	58	6.4	Fairbanks Mountain		St Johnsbury	VT	Caledonia	48
	WNSU702	44	24	26.2	72	8	33.4	Fire Sta	2 Railroad	Danville	VT	Caledonia	80
	WPSM646	44	24	32	72	0	10	Police Dept	Parker Av	St Johnsbury	VT	Caledonia	32
	WPBR786	44	24	32.2	72	1	5.3	SCADA Main St Pump Sta		St Johnsbury	VT	Caledonia	
	WPBR786	44	24	37.2	72	0	59.3	SCADA Wastewater Treatment Plant		St Johnsbury	VT	Caledonia	
	WPBR876	44	25	0.2	71	58	55.3	SCADA Higins Hill Water Tank		St Johnsbury	VT	Caledonia	
	WNDM827	44	25	0.2	72	7	58.4	Town Offiec		Danville	VT	Caledonia	16
WBR290	KVM627	44	25	1.2	72	1	13.3	County court House	27 Main S	St Johnsbury	VT	Caledonia	
	WPBR877	44	25	2.2	72	1	19.3	SCADA Water Dept OFC		St Johnsbury	VT	Caledonia	
WNCE423	KQS721	44	25	8.2	72	1	20.3	Fire Dept	36 Main S	St Johnsbury	VT	Caledonia	48
	WPBR877	44	25	12.2	72	1	5.3	SCADA Fire Sta		St Johnsbury	VT	Caledonia	
	KSU669	44	25	15.2	72	1	12.3	Police Dept	50 Main S	St Johnsbury	VT	Caledonia	16
	KYU990	44	25	19.2	72	15	54.4	RFD West Danville	Cabot Rd	Walden	VT	Caledonia	
	WPBR876	44	25	20.2	71	56	46.3	SCADA Stiles Pond Reservoir		St Johnsbury	VT	Caledonia	
	WPBR786	44	25	23.2	71	59	54.3	SCADA Assisqua Ave Pump sta		St Johnsbury	VT	Caledonia	
	WPBR876	44	25	23.2	72	1	38.3	SCADA Overcliff Tanks		St Johnsbury	VT	Caledonia	
	WPBR786	44	25	26.2	71	58	47.3	SCADA Fairbanks Pump sta		St Johnsbury	VT	Caledonia	
	WPBR877	44	25	30.2	71	57	52.3	SCADA Higgins Pump sta		St Johnsbury	VT	Caledonia	
	WPBR876	44	25	34.2	72	0	44.3	SCADA Airport Hill Tank		St Johnsbury	VT	Caledonia	
	WPBR877	44	25	44.2	72	0	1.3	SCADA Hoods Pump sta		St Johnsbury	VT	Caledonia	
	WPBR877	44	25	44.2	72	0	53.3	SCADA Oak St Well		St Johnsbury	VT	Caledonia	
	WPBR876	44	26	8.2	72	0	30.3	SCADA Brezzy Hill pump Sta		St Johnsbury	VT	Caledonia	
	WPBR786	44	26	9.2	72	1	7.3	SCADA Old Center Rd Pump sta		St Johnsbury	VT	Caledonia	
WPUC548	WPHR207	44	26	43.2	72	0	29.3	Northeastern Vermont Regional Hospital	Hospital D	St Johnsbury	VT	Caledonia	48
WNZD716	KYU990	44	26	50.2	72	15	54.4	Fire Sta		Walden	VT	Caledonia	24
	WPBR876	44	26	58.2	72	0	57.3	SCADA St jay Center Pump sta		St Johnsbury	VT	Caledonia	
	WPDZ370	44	27	40.2	71	41	18.3	Lunenburg Town Hall	US RT 2	Lunenburg	VT	Essex	8
	WAN503	44	29	17.2	72	22	8.4		Mackville	Hardwick	VT	Caledonia	
	KKV518	44	29	26.2	72	20	58.4		98 Harwic	Hardwick	VT	Caledonia	13
	KRF485	44	29	34.2	71	39	28.3	Weeks Memorial Hospital	Middle St	Lancaster	NH	Coos	24
KKV518	KSJ200	44	30	0.2	72	21	58.4		17 Hardwi	Hardwick	VT	Caledonia	24
WPML716	KSU589	44	30	17.2	72	22	8.4	Memorial Bldg	Church St	Hardwick	VT	Caledonia	
	WPEC653	44	31	49.2	72	23	10.4		West hill	Hardwick	VT	Caledonia	16
	KNNT267	44	32	0.2	72	19	58.4	Greensborough Fire Sta					8
WAN504	KSU667	44	32	0.2	72	0	22.3	Police Depat	200 Main :	Lyndonville	VT	Caledonia	

CALL SIGNS			LATITUDE			LONGITUDE			LOCATION	ADDRESS				km radius
		WPRG699	44	32	1.2	72	2	29.3	SCADA	Presidents	Lyndonville	VT	Caledonia	
		KRP874	44	32	17.2	72	0	9.3		Grove St	Lyndonville	VT	Caledonia	32
		WPRG699	44	32	30.2	72	0	17.3	SCADA	East St	Lyndonville	VT	Caledonia	
		WPRG699	44	32	36.2	72	1	42.3	SCADA	Calista Av	Lyndonville	VT	Caledonia	
		WPNY905	44	33	0.2	72	12	58.4		Stannard I	Greensboro E	VT	Caledonia	10
		KKV518	44	33	0.2	72	27	58.4	Fire Sta	US RT 15	Hardwick	VT	Caledonia	13
		KKR374	44	33	4.2	72	1	27.3	Vail Bildg	Vail Hill	Lyndon	VT	Caledonia	25
		WPRG699	44	33	16.2	72	1	42.3	SCADA	Rt 114	Lyndonville	VT	Caledonia	
		WPRG699	44	33	22.2	71	59	28.3	SCADA Boom	Whipple H	Lyndonville	VT	Caledonia	
KNNH214 KSJ200	WNPB771	KJG202	44	34	0.2	72	17	58.4	D. Brochu Sr Res	Hardwick	E Hardwick	VT	Caledonia	8
		KNBF263	44	36	1.2	72	6	43.4	Intersection of TH 32 & TH 35		Sheffield	VT	Caledonia	32
		WPXN799	44	38	1.2	72	1	38.4		167 Under	Sutton	VT	Caledonia	40
		WNKK680	44	38	12.2	72	22	20.4	Fire Sta	Main St	Craftsbury	VT	Orleans	32
		WPHE692	44	40	35.2	71	56	0.3		Rt 114	E Burke	VT	Orleans	16
		WNZR953	44	42	16.2	72	11	20.4	Fire Sta	Rt 16	Glover	VT	Orleans	24
		WNAL652	44	42	19.2	71	52	21.3	Highway	2645 Islan	Newark	VT	Caledonia	40
		WNZR953	44	42	28.2	72	12	30.4	Borland Farm	Mullen Hill	Glover	VT	Orleans	32
		WPGS217	44	44	2.2	72	22	9.4	Town Garage		Albany	VT	Orleans	
		WPFA864	44	44	30.2	72	10	28.4			Barton	VT	Orleans	24
		KNBB572	44	44	35.2	72	10	37.4	Cematary Hill	West St	Barton	VT	Orleans	8
		WNUM497	44	45	10.2	72	15	28.4		Main St	Barton	VT	Orleans	16
		WPJQ470	44	45	50.2	72	5	35.4		2142 Cool	Barton	VT	Orleans	16
		WNVN725	44	48	2.2	72	26	54.4		RT 100	Lowell	VT	Orleans	24
		KNNV691	44	48	7.2	72	17	8.4			Jay	VT	Orleans	8
		KNAV998	44	48	13.2	72	16	33.4		RT 58	Irasburg	VT	Orleans	24
		KNAV966	44	48	35.2	72	12	22.4		1 Cross St	Orleans	VT	Orleans	3
		WNZA399	44	48	51.2	71	52	47.3	Brighton Town Hall	Main St	Island Pond	VT	Essex	40
		WPFD375	44	48	58.2	71	53	6.3	Island Pond Fire Sta		Island Pond	VT	Essex	32
		KB94421	44	49	0.2	71	52	58.3			Brighton	VT	Essex	32
		WPBM546	44	49	40.2	72	24	23.4	Town clerks Office		N Troy	VT	Orleans	10
		WPBQ707	44	50	20.2	71	59	22.3	Town Garage	RT 105	East Charlest	VT	Orleans	40
		KNNS883	44	50	30.2	72	7	28.4						5
		WPDU725	44	50	59.2	72	1	20.4	Town Garage	Rt 105	E. Charleston	VT	Orleans	16
	WNAZ593	KNGX627	44	53	39.2	71	29	53.3	Dispatch Center	10 Bridge	Colebrook	NH	Coos	15
		KMK800	44	54	10.2	72	24	24.4	Fire Dept	Mill St	Troy	VT	Orleans	24
		KNAN857	44	54	59.2	72	30	43.4	Summit of Jay Peak		Troy	VT	Orleans	
			44	55	0.2	72	24	58.4			N Troy	VT	Orleans	1
		KNAV997	44	55	0.2	72	6	20.4			Derby Line	VT	Orleans	6
WGT85	KTX759	KSU637	44	55	20.2	72	13	3.4	Police Dept	74 Main S	Newport	VT	Orleans	
	WNXM238	KNNV691	44	55	30.2	72	31	31.4	Tramway Bldg		Jay	VT	Orleans	8
	WPVX794	WPUG430	44	55	54.1	72	14	27.3	Water Tank		Newport	VT	Orleans	15
		WNBK846	44	56	5.2	72	12	36.4	Sheriff's Office	Court Sq j	Newport	VT	Orleans	40
		WPZV304	44	56	40.2	72	11	15.2	Reservoir		Newport	VT	Orleans	15
		KNFA381	44	56	40.2	72	26	18.4		500 RT 24	Jay	VT	Orleans	
		WNRL775	44	57	0.2	72	18	32.4	Fire Sta		Newport	VT	Orleans	
		WNPD258	44	57	8.2	72	8	16.4		Rt 105	Derby	VT	Orleans	
		WPKY735	44	57	9.2	72	16	41.4	Newport Center	Rt 105	Newport	VT	Orleans	
	WNRL775	WPBO654	44	57	11.2	72	8	40.4	State Police Barracks		Derby	VT	Orleans	24
		WPJL470	44	57	16.2	72	6	34.4	SCADA Water Plant	Nelson Hil	Derby	VT	Orleans	
		KSN222	44	57	22.2	72	12	5.4	North Country Hospital & Health Ctr	1 Prouty D	Newport	VT	Orleans	
		WPJL470	44	57	35.2	72	7	23.4	SCADA Pump Sta	Pond Pum	Derby	VT	Orleans	
		WPQJ425	44	57	35.2	72	0	3.3		3159 Valle	Holland	VT	Orleans	20
		WPJL470	44	57	44.2	72	9	35.4	SCADA Water Tank	Quarry Hil	Derby	VT	Orleans	

CALL SIGNS		LATITUDE			LONGITUDE			LOCATION	ADDRESS					km radius
	KNAX747	44	59	37.2	72	24	14.4	Fire Dept	Pleasant S	N Troy	VT	Orleans		24
	KYI876	44	59	58.2	71	30	18.3	Beecher Falls Fire Station		Beecher Falls	VT	Essex		16
	KNAV997	45	0	10.2	72	6	20.4	Fire Sta	Elm St	Derby Line	VT	Orleans		6.1
	KNGX627	45	0	45.2	71	15	0.3	Dispatch Center Ben Young Hill	Rt 145	Clarksville	NH	Coos		15
	KNGX627	45	6	48.2	71	15	0.3	Dispatch	Bridge St	Colebrook	NH	Coos		15
		44	26	43	72	0	31	St jay SCADA						
		44	30	0.2	72	0	48.3	St jay SCADA						
		44	32	16.2	72	49	45.3	Mt Mansfield						

LIST OF FIRST RESPONDERS

Dispatch Centers

- Colebrook
- St Johnsbury
- State Police - Derby
- Twin State

Fire

- Barnet Fire Dept.
- Concord Fire Dept
- East Haven Fire Dept.
- Groton Fire Dept.
- Peacham Fire Dept.
- Rygate Fire Dept.
- Derby Line Fire Dept.
- Beecher Falls Fire Dept.
- Hardwick Fire Dept.
- Jay Fire Dept.
- Albany Fire Dept.
- Barton Fire Dept.
- Brighton Fire Dept.
- Charleston Fire Dept.
- East Burke Fire Dept.
- Greensboro Fire Dept.
- Newark Fire Dept.
- Craftsbury Fire Dept.
- Danville Fire Dept.
- Glover Fire Dept.
- Irasburg Fire Dept.
- Lowell Fire Dept.
- Luenenburg Fire Dept.
- Newport Center Fire Dept.
- Newport City Fire Dept.
- North Troy Fire Dept.
- Orleans Fire Dept.
- Sheffield - Wheelock Fire Dept.
- St Johnsbury Fire Dept.
- Troy Fire Dept.
- Westmore Fire - Rescue

Emergency Medical Services

- Barton Ambulance
- Lyndon Rescue
- Hardwick Emergency Rescue Squad Inc
- Derby Line Ambulance Service
- Brighton Rescue Squad
- Glover Ambulance
- CALEX
- Colebrook Ambulance
- Danville Rescue
- Derby Ambulance Service
- Lancaster EMS
- Newport Ambulance
- Woodsville Ambulance

Hospitals

- Cottage Hospital Woodsville NH
- Copely Hospital Morrisville VT
- North Country Hospital & Health Center
- Northeastern Regional Hospital
- Upper CT Valley Hospital Colebrook NH
- Weeks Memorial Hospital Lancaster NH

Mutual Aid Associations

- Captial
- Central
- Colebrook
- Lancaster
- Northeast International Mutual Aid Inc.
- State Police - Derby
- Twin State Mutual Aid Association
- NorthPath
- U S Customs

Police

- State Police - Derby
- State Police - St Johnsbury
- St Johnsbury Police Department
- Newport Police Department
- Hardwick Police Department
- Lyndon Police
- No Troy Police
- Caledonia County Sheriff
- Essex County Sherriff
- Orleans County Sheriff