

## Appendix D – Radio, Cell Phone and Broadband Problem: the need for telecommunications planning.

### The Problem

Crowded Frequencies Complicate Emergency Communications. To many locations are without cell coverage and towns do not have broadband services sufficient to operate mobile data terminals in their emergency vehicles.

Vermont's emergency responders rely on radio communications to talk to each other in critical situations. But clear space on the airwaves are not available to fire and police in Central Vermont. Other Vermont dispatchers as well as French-speaking Canadian taxi cab companies interfere with dispatching in Central Vermont.

Specifically, the fire department members of Capital West, dispatched out of the Montpelier Police Department suffer the greatest amount of interference. According to Scott Bagg, chair of the Capital West Communications Committee, Cap West wants a system that is going to be able to transmit and reach all the towers simultaneously and he wants all the responders, no matter if they are in Cabot or Roxbury, to hear each other and be able to talk to each other through a unified, dedicated system<sup>1</sup>.

Fred Cummings, dispatch supervisor in Montpelier, states too much radio traffic can lead to dispatchers missing transmission and this can have life and death consequences<sup>2</sup>.

In summary, interference from outside agencies including Canadian commercial entities and the interference caused by too many people talking on the radio (talk over) leads to dispatcher frustration and difficulties in providing efficient communications. This problem has existed for some time and must be faced and fixed.

At a meeting with representatives of the Capital Fire Mutual Aid System members they spoke of a lack of adequate cell coverage in many of their towns as being a big problem. The Fire Chief in East Montpelier highlighted the problem advising that he relies heavily on two-way radio communications when dispatched to a call because cell coverage is poor. Reliance on two-radio communications contributes to the overcrowded frequencies and "talk over" problems.

### The Solution

Capital Fire Mutual Aid System and their Communications Committee (Capital West) have been working on solutions for radio interference for some time. A proposal for a radio simulcast system was received in January of 2017, costing approximately \$1,223,526.

**Simulcast** refers to the process of transmitting the same signal from *different tower locations over the same frequency at the same time*. For public safety communications, this typically means multiple towers: configured to transmit the exact same communications, on the exact same frequencies, at

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<sup>1</sup> Crowded Radio Frequencies Complicate Emergency Communications, VPR News, December 11, 2015.

<sup>2</sup> Crowded Radio Frequencies Complicate Emergency Communications, VPR News, December 11, 2015.

precisely the same time. This can result in better coverage of a wide-area or a dense area with higher populous and/or buildings<sup>3</sup>.

The Capital West Communications Committee agreed that a simulcast radio system is the solution. Two new tower sites, new repeater equipment, new FCC licensing, reprogramming of radios are all part of the solution.

The Barre City Police Department has also expressed the need to improve their radio system by implementing a radio simulcast system. To develop an efficient single site public safety dispatching center all public safety entity's in Central Vermont must be part of simulcast system. Therefore, proper engineering and design must be part of the solution and factored into ongoing planning.

Participating in other groups, such as the Central Vermont Communications Union District and the Public Safety Broadband Commission (FirstNet), will help promote the need for improved services in Central Vermont.

Sharing in the cost for improvements is a critical factor in implementing solutions to these communication problems. A rough cost estimate for acquiring a radio simulcast system for fire departments participating in the Capital West Communications Committee has been prepared. This cost estimate assumes a capital cost of \$1.6 Million dollars, paid back over 20 years at a 3% interest rate. The annual cost based on this assumption is presented below.

Radio Project Annual Costs	\$109,076.00	Readiness	Dispatching								
		50.000%	50.000%								
		Fire Calls	28.139%	EMS Calls	71.861%						
TOWN / CITY	Avg Calls	FIRE % of Calls	Eq Gnd List	% EqGL	Avg Calls	MEDICAL % of Calls	Eq Gnd List	% EqGL	Budget Readiness	Budget Dispatching	Budget Total
Barre City	574	21.759%	4,699,410	7.888%	2,086	30.963%	4,699,410	9.684%	\$5,005.76	\$15,474.25	\$20,480.01
Berlin	262	9.932%	6,834,530	11.472%	332	4.928%	6,834,530	14.083%	\$7,280.07	\$3,455.53	\$10,735.60
Cabot	68	2.578%	1,532,130	2.572%	190	2.820%	1,532,130	3.157%	\$1,632.01	\$1,500.89	\$3,132.89
E Montpelier/Calais	127	4.814%	3,961,850	6.650%	370	5.492%	4,963,030	10.227%	\$5,028.67	\$2,891.24	\$7,919.91
Marshfield	64	2.426%	1,333,050	2.238%	0	0.000%	0	0.000%	\$343.39	\$372.31	\$715.70
Middlesex	102	3.867%	2,043,370	3.430%	149	2.212%	2,043,370	4.211%	\$2,176.58	\$1,460.16	\$3,636.74
Montpelier	466	17.665%	8,315,700	13.958%	1,381	20.499%	8,315,700	17.136%	\$8,857.80	\$10,744.71	\$19,602.51
Moretown	56	2.123%	2,140,980	3.594%	0	0.000%	0	0.000%	\$551.51	\$325.77	\$877.28
Northfield	136	5.155%	3,259,180	5.471%	820	12.172%	3,259,180	6.716%	\$3,471.64	\$5,561.42	\$9,033.07
Plainfield	74	2.805%	1,150,500	1.931%	177	2.627%	1,150,500	2.371%	\$1,225.50	\$1,460.16	\$2,685.66
Roxbury	22	0.834%	677,430	1.137%	0	0.000%	0	0.000%	\$174.50	\$127.98	\$302.49
Waitsfield/Fayston	117	4.435%	6,894,490	11.573%	0	0.000%	0	0.000%	\$1,775.99	\$680.63	\$2,456.63
Walden	42	1.592%	1,005,990	1.689%	40	0.594%	1,005,990	2.073%	\$1,071.57	\$477.03	\$1,548.60
Washington	47	1.782%	1,019,700	1.712%	88	1.306%	1,019,700	2.101%	\$1,086.17	\$785.35	\$1,871.52
Waterbury/Duxbury	255	9.666%	8,368,760	14.047%	636	9.440%	8,368,760	17.245%	\$8,914.32	\$5,183.29	\$14,097.61
Williamstown	137	5.193%	3,181,850	5.341%	385	5.715%	3,181,850	6.557%	\$3,389.27	\$3,036.68	\$6,425.95
Woodbury/Calais	56	2.123%	2,251,620	3.779%	44	0.653%	1,250,440	2.577%	\$1,589.86	\$581.74	\$2,171.59
Worcester	33	1.251%	904,430	1.518%	39	0.579%	904,430	1.864%	\$963.39	\$418.85	\$1,382.24
	<b>2,638</b>	<b>100%</b>	<b>59,574,970</b>	<b>100%</b>	<b>6,737</b>	<b>100%</b>	<b>48,529,020</b>	<b>100%</b>	<b>\$54,538.00</b>	<b>\$54,538.00</b>	<b>\$109,076</b>

<sup>3</sup> RadioReference.com, <https://wiki.radioreference.com/index.php/Simulcast>

## Plan

The following are steps that can be taken to advance the solutions to these problems.

### Telecommunications – Broadband and Cellular

- Seek input from the CVPSA member, Capital Fire Mutual Aid System, to determine their interest in working on this issue.  
Time Required: 2 Months
- Contact the Central Vermont Communications Union District to determine what if any synergy can be created by working together to bring attention to public safety telecommunication needs.
  - Contract, if necessary with someone, to determine cell phone coverage areas to document areas that need coverage.  
Time Required: 1 Month
- Continue to promote the need for increased broadband and cellular coverage in Central Vermont with our Congressional delegation, the Vermont General Assembly and the Governor's office.  
Time Required: On going
- Seek input and/or contract with a firm that can conduct a comprehensive plan for public safety telecommunications planning in Central Vermont.  
Time Required: 9 Months

### Radio Simulcast Solution

- Seek input from the CVPSA member, Capital Fire Mutual Aid System, to determine their interest in working on this issue.  
Time Required: 2 Months, can be combined with task above.
- Travel to each Town and meet with all Select Board members to develop an understanding of the problem and to seek their support in finding a funding solution.  
Time Required: 6 – 8 Months
- Continue to seek federal funding for this solution. This task becomes important after visiting with all towns and getting their unified support for a solution to the radio problem. A unified committed understanding of the problem and the need for a solution should bode well in any future grant application.  
Time Required: On going.
- Contract with a radio engineering firm to help design a solution that includes all public safety entities in Central Vermont (Cap West and Barre City Police) ensuring all radio system work efficiently with the new single site dispatch center.  
Time Required: 6 Months
- Consider a sole source solution, which would negate the task above, using Motorola product acquisition. Determine if Motorola can perform the proper engineering design to ensure to the purchase, siting and design of additional radio towers. Determine if an approximate \$1.2-\$1.6 project should be sole sourced.  
Time Required: 3 Months
- Determine if the Burlington Communications proposal can be done in phases and seek appropriate funding for the phases. Implement work as funding is found.
  - Time Required: 7 – 12 Months

The telecommunications planning and radio improvement project is expected to be a minimum two-year endeavor to perform the planning and seek funding opportunities necessary to move to implementation.

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