

EXHIBIT 1

Description Of Research Program

The system is intended to meet the requirements of government public safety and transit authorities for highly integrated systems that provide fleet vehicle monitoring and location tracking, route assignment and schedule adherence, passenger information systems and dispatch center control functions including two way messaging. The system will serve police and emergency service vehicle fleets, fixed route transit systems and para-transit systems. Therefore, testing and development of this system on unused 800 MHz frequencies pairs is in the public interest.

Differential position corrections, data messages and polling requests will be continuously transmitted from the base stations to the mobiles. Each base station operates in a full duplex mode, simultaneously transmitting and receiving on one frequency pair for maximum efficiency. The mobile units respond to the polling requests and transmit information on a time division multiple access basis. The mobiles operate in the half duplex mode, quickly switching from receive to transmit and back to receive. To substantially improve polling speed, one mobile radio is dekeying at the same time the next radio is keying. Spectrally efficient Gaussian Minimum Shift Keying (GMSK) is utilized for all data transmissions. The system accomplishes high data rates, 4800 to 9600 BPS, at high polling rates, with standard low cost analog mobile radios

The system consists of fixed base equipment (communication equipment and computers) and mobile equipment (mobile data terminals, differential GPS receivers and communications equipment) along with associated computer software.

For the purposes of the proposed experimental operations, the requested frequencies will be used in the following manner:

Main Site

The frequency pairs Tx 856.9375 – Rx 811.9375 and Tx 854.9875 – Rx 809.9875 will be used at a fixed site at 5265 Rockwell Drive, Cedar Rapids, Iowa facility, in conjunction with three mobile transmitters, to design a multi-channel data system. Multiple data channels are required to achieve the necessary high throughput in large implementations of the system. All mobile vehicles will be sent data including position correction information and each vehicle will be polled and respond in rapid succession.

NOTE: Rockwell Collins has picked the requested frequency pairs because they are used by no current Commission approved station, or pending application, within 100 miles of the proposed operations. Rockwell will terminate transmissions on these frequencies and seek new frequencies if and when a licensed operator requires use of these frequencies in or around the proposed area of operations.

Remote Site

The frequency pair Tx 855.3375 – Rx 810.3375 will be used at a remote fixed site at 1693 Sweet Terrace, Central City, Iowa, in conjunction with the three mobile transmitters, to design a multi-site algorithm. In future implementations, large fleets of vehicles may roam over large geographic areas and thus hand off routines must be developed and tested. Because the sites are approximately 15 miles apart and the range of the mobile radios is often less than 15 miles, this arrangement will meet our testing and development needs.

Objectives Sought to be Accomplished

The objective to be accomplished is the development of an efficient high speed, multi-channel and multi-site data system with rapid polling to enhance the operation, command and control of large fleets. It is intended to service fleets exceeding 1000 vehicles. It is our objective to substantially reduce system voice communications required by dispatchers and dramatically increase the collection of vehicle data. This data may then be used to increase the operating efficiency of the fleet. These goals have already been accomplished by our existing system on smaller single channel, single site deployments. The requested frequencies are required to develop and test a larger version of the system.

How the Program Will Increase the Utilization of the Radio Art

Through this experimental program, our fleet management and communication system will increase the utilization of the radio art by accomplishing all of the following requirements:

1. High data rate messages
2. High polling rates
3. Two way data messaging
4. Multi-Channel radio operation
5. Multi-Site radio operation

All current public safety and transit fleet management systems are deficient in one or more of the above requirements. To meet the needs of larger fleets all these requirements must be met or exceeded.

Public Safety

Mon Oct 12 10:26:29 1998

Search Name : rockwell13
 State(s) searched : IA IL WI
 Radio Service : ~~ESCONV~~ (gp)
 Frequency Band : 854.76250 - 860.98750 MHz
 Frequencies included : 70
 Site Location : 42 13 02 091 31 42
 Cochannel distance : 70.00 miles
 Adjacent distance : 0.00 miles
 Check for nearby stations : NO
 Check for nearest airport(s) : NO

Lock-out Frequencies :

(None)

Indicates a license expired as of the current month.

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Frequencies Searched
**** Combined ****

FREQUENCY (MHz)	# CSN	# MOBLS	CO-CHAN DIST(mi)	DIR SIGN	CALL SIGN	STATE	ADJ DIST(mi)	DIR SIGN	CALL SIGN	STATE
854.96250	1	0	66.58	134	WNJU503	IA	23.18	29	WPLB970	IA
854.98750	0	0	137.11	89	KQM631	IL	13.26	195	WPIR461	IA
855.21250	1	200	38.81	180	WPAR475	IA	13.61	201	WPKM593	IA
855.23750	1	1430	13.61	201	WPKM593	IA	19.93	204	WPLA231	IA
855.46250	1	1430	13.61	201	WPKM593	IA	40.93	8	PN088761	IA
855.48750	1	0	58.52	155	KNNR256	IA	13.61	201	WPKM593	IA
855.71250	0	0	107.56	102	WPKW428	IL	13.61	201	WPKM593	IA
855.73750	1	1430	13.61	201	WPKM593	IA	19.93	204	WPLA231	IA
855.96250	0	0	106.53	105	KUO985	IL	13.61	201	WPKM593	IA
855.98750	1	1430	13.61	201	WPKM593	IA	35.24	164	KNRU272	IA
856.21250	1	0	38.53	182	WPKN529	IA	39.85	266	WPED725	IA
856.23750	0	0	72.25	134	KNNF757	IL	36.68	183	WNXG714	IA
856.26250	1	0	36.68	183	WNXG714	IA	18.05	203	WNNH900	IA
856.43750	0	0	72.25	134	KNNF757	IL	43.18	299	WPLT232	IA
856.46250	1	0	49.63	64	KAA845	IA	13.61	201	WPKM593	IA
856.48750	2	1490	13.61	201	WPKM593	IA	39.85	266	WPED725	IA
856.71250	2	469	37.87	65	WPKW425	IA	13.61	201	WPKM593	IA
856.73750	1	1430	13.61	201	WPKM593	IA	37.87	65	WPKW425	IA
856.76250	0	0	72.25	134	KNNF757	IL	13.61	201	WPKM593	IA
856.93750	0	0	146.97	115	WPKW403	IL	32.52	303	WPIE379	IA
856.96250	0	0	116.67	60	WNXW548	WI	13.61	201	WPKM593	IA
856.98750	1	1430	13.61	201	WPKM593	IA	35.24	164	KNRU272	IA
857.21250	1	0	38.53	182	WPKN529	IA	39.85	266	WPED725	IA
857.23750	0	0	72.25	134	KNNF757	IL	36.68	183	WNXG714	IA
857.26250	1	0	36.68	183	WNXG714	IA	18.05	203	WNNH900	IA
857.43750	0	0	72.25	134	KNNF757	IL	21.93	206	WPJG600	IA
857.46250	1	0	50.74	66	WPKY375	WI	58.52	155	KNNR256	IA
857.48750	1	0	58.52	155	KNNR256	IA	39.85	266	WPED725	IA
857.71250	2	469	37.87	65	WPKW425	IA	13.61	201	WPKM593	IA
857.73750	1	1430	13.61	201	WPKM593	IA	37.87	65	WPKW425	IA
857.76250	0	0	72.25	134	KNNF757	IL	13.61	201	WPKM593	IA
857.93750	0	0	124.36	87	WNVW882	IL	19.93	204	WPLA231	IA
857.96250	0	0	116.67	60	WNXW548	WI	13.61	201	WPKM593	IA
857.98750	1	1430	13.61	201	WPKM593	IA	35.24	164	KNRU272	IA
858.21250	0	0	77.78	81	WPF639	IL	38.07	329	WPEF415	IA
858.23750	0	0	72.25	134	KNNF757	IL	36.68	183	WNXG714	IA

858.26250	1	0	36.68	133	WNXG714	IA	18.05	203	WNNH900	IA
858.43750	0	0	72.25	134	KNNF757	IL	21.93	206	WPJG600	IA
858.46250	1	0	50.74	66	WPKY375	WI	13.61	204	WPJL359	IA
858.48750	1	0	18.15	204	WPJL359	IA	39.85	266	WPEE779	IA
858.71250	1	0	50.74	66	WPKY375	WI	39.35	187	KNIY812	IA
858.73750	0	0	116.67	60	WNXW548	WI	50.74	66	WPKY375	WI
858.76250	0	0	72.25	134	KNNF757	IL	46.00	290	WPIE380	IA
858.93750	1	0	18.15	204	WPJL359	IA	19.93	204	WPLA231	IA
858.96250	0	0	116.67	60	WNXW548	WI	13.61	201	WPKM593	IA
858.98750	1	1430	13.61	201	WPKM593	IA	18.98	203	WPEZ677	IA

[] 's Around a distance indicate the distance was obtained from another record under the same call sign.

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Frequencies Searched
**** Combined ****

FREQUENCY (MHz)	# CSN	# MOBLS	CO-CHAN DIST(mi)	DIR DIST(mi)	CALL SIGN	STATE	ADJ DIST(mi)	DIR DIST(mi)	CALL SIGN	STATE
859.21250	0	0	77.78	81	WFFF639	IL	39.85	266	WPEW448	IA
859.23750	0	0	72.25	134	KNNF757	IL	37.37	179	WNXG714	IA
59.26250	1	0	37.37	179	WNXG714	IA	18.05	203	WNNH900	IA
859.43750	0	0	72.25	134	KNNF757	IL	21.93	206	WPJG600	IA
859.46250	1	0	50.74	66	WPKY375	WI	13.61	201	WPKM593	IA
859.48750	2	1490	13.61	201	WPKM593	IA	39.85	266	WPEE779	IA
859.71250	1	0	50.74	66	WPKY375	WI	39.35	187	KNIY812	IA
859.73750	0	0	116.67	60	WNXW548	WI	50.74	66	WPKY375	WI
859.76250	0	0	72.25	134	KNNF757	IL	32.52	303	WPIE379	IA
859.93750	0	0	124.36	87	WNVW882	IL	61.83	76	WPJX780	IL
859.96250	0	0	116.67	60	WNXW548	WI	13.61	201	WPKM593	IA
859.98750	1	1430	13.61	201	WPKM593	IA	18.98	203	WPEZ677	IA
860.21250	0	0	77.78	81	WFFF639	IL	38.07	329	WPEF415	IA
860.23750	0	0	72.25	134	KNNF757	IL	37.37	179	WNXG714	IA
860.26250	1	0	37.37	179	WNXG714	IA	18.05	203	WNNH900	IA
860.43750	0	0	72.25	134	KNNF757	IL	21.93	206	WPJG600	IA
860.46250	1	0	50.74	66	WPKY375	WI	13.61	201	WPKM593	IA
860.48750	1	0	13.61	201	WPKM593	IA	39.85	266	WPEE779	IA
860.71250	1	0	50.74	66	WPKY375	WI	39.35	187	KNIY812	IA
860.73750	0	0	116.67	60	WNXW548	WI	50.74	66	WPKY375	WI
860.76250	0	0	72.25	134	KNNF757	IL	19.93	204	WPLA231	IA
860.93750	1	0	18.15	204	WPJL359	IA	13.61	201	WPKM593	IA
860.96250	1	0	13.61	201	WPKM593	IA	18.15	204	WPJL359	IA
860.98750	1	0	33.99	180	WNXG746	IA	13.61	201	WPKM593	IA

[] 's Around a distance indicate the distance was obtained from another record under the same call sign.

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Results
**** Combined ****

FREQUENCY (MHz)	# CSN	# MOBLS	CO-CHAN DIST(mi)	DIR DIST(mi)	CALL SIGN	STATE	ADJ DIST(mi)	DIR DIST(mi)	CALL SIGN	STATE
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BEST USEABLE FREQUENCIES

856:93750	0	0	146.97	115	WPKW403	IL	32.52	303	WPIE379	IA
854:98750	0	0	137.11	89	KQM631	IL	13.26	195	WPIR461	IA
859.93750	0	0	124.36	87	WNVW882	IL	61.83	76	WPJX780	IL
857.93750	0	0	124.36	87	WNVW882	IL	19.93	204	WPLA231	IA
858.73750	0	0	116.67	60	WNXW548	WI	50.74	66	WPKY375	WI
859.73750	0	0	116.67	60	WNXW548	WI	50.74	66	WPKY375	WI

860.73750	0	0	116.67	60	WNXW548	WI	50.74	66	WPKY375	WI
856.96250	0	0	116.67	60	WNXW548	WI	13.61	201	WPKM593	IA
857.96250	0	0	116.67	60	WNXW548	WI	13.61	201	WPKM593	IA
858.96250	0	0	116.67	60	WNXW548	WI	13.61	201	WPKM593	IA

NEXT BEST FREQUENCIES

859.96250	0	0	116.67	60	WNXW548	WI	13.61	201	WPKM593	IA
855.71250	0	0	107.56	102	WPKW428	IL	13.61	201	WPKM593	IA
855.96250	0	0	106.53	105	KUO985	IL	13.61	201	WPKM593	IA
859.21250	0	0	77.78	81	WPF639	IL	39.85	266	WPEW448	IA
858.21250	0	0	77.78	81	WPF639	IL	38.07	329	WPEF415	IA

[] 's Around a distance indicate the distance was obtained from another record under the same call sign.

Autofind BEST & NEXT BEST FREQUENCIES

Bandwidth checked : 0.02500 MHz
State(s) : IA IL WI
Coordinates : 42 13 2 91 31 42
Co-Channel Distance : 70 miles
Adjacent Distance : Not Checked
Check only one service : NO

FREQUENCY (MHZ)	LICENSEE	SRV	DST (mi)	DIR TYPE	CALL SIGN	COUNTY	STATE
854.98750		None	Found.				
855.71250	IOWA, STATE OF	GP	[108.2]	263 MO	WPBQ578	[STORY	] IA
855.96250		None	Found.				
856.93750		None	Found.				
856.96250		None	Found.				
857.93750		None	Found.				
857.96250		None	Found.				
858.21250		None	Found.				
858.73750		None	Found.				
858.96250		None	Found.				
859.21250		None	Found.				
859.73750		None	Found.				
859.93750		None	Found.				
859.96250		None	Found.				
860.73750		None	Found.				

854.98750 Mhz has 0 callsigns with 0 mobile units within 70 miles.
854.98750 Mhz has 1 callsigns with 10 mobile units including NA's.

NA Coordinates for this record are not available.
* Indicates a license expired.
S Indicates this frequency licensed for secondary use.
[] 's Around distance or county name indicates county was obtained from another record under the same call sign.