

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.

Mon Oct 12 10:21:33 1998

Search Name : rockwell
State(s) searched : IA IL WI
Radio Service : ~~BUSINESS~~CONVENTION (gb)
Frequency Band : 854.76250 - 860.98750 MHz
Frequencies included : 20
Site Location : 42 02 00 091 38 57
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.

Mon Oct 12 10:21:21 1998

Frequencies Searched
**** Combined ****

FREQUENCY (MHz)	# CSN	# MOBLS	CO-CHAN DIST(mi)	DIR SIGN	CALL SIGN	STATE	ADJ DIST(mi)	DIR SIGN	CALL SIGN	STATE
854.76250	2	6	5.96	240	WPK564	IA	4.95	193	WPHM878	IA
854.78750	3	75	12.26	249	WPEY454	IA	5.96	240	WPK564	IA
854.81250	2	0	6.58	193	WPJN822	IA	7.81	207	WPJG600	IA
854.83750	3	0	7.81	207	WPJG600	IA	6.58	193	WPJN822	IA
855.01250	4	35	2.78	92	WPIR461	IA	5.85	197	WPLA231	IA
855.03750	1	0	5.85	197	WPLA231	IA	2.78	92	WPIR461	IA
855.06250	1	355	46.77	308	WPIE380	IA	5.85	197	WPLA231	IA
855.08750	1	0	25.25	163	WPHQ373	IA	37.30	28	WPLB970	IA
855.26250	1	0	5.85	197	WPLA231	IA	1.30	90	WPKM593	IA
855.28750	1	0	5.85	197	WPLA231	IA	5.85	197	WPLA231	IA
855.31250	1	20	14.81	51	WPFM590	IA	5.85	197	WPLA231	IA
855.33750	0	0	101.95	253	WPLA232	IA	14.81	51	WPFM590	IA
855.51250	2	220	37.06	325	WPIE379	IA	5.85	197	WPLA231	IA
855.53750	1	0	5.85	197	WPLA231	IA	5.85	197	WPLA231	IA
855.56250	1	0	5.85	197	WPLA231	IA	5.85	197	WPLA231	IA
855.58750	1	0	5.85	197	WPLA231	IA	5.85	197	WPLA231	IA
855.76250	1	0	5.85	197	WPLA231	IA	1.30	90	WPKM593	IA
855.78750	2	355	37.85	171	WNVL474	IA	5.85	197	WPLA231	IA
855.81250	1	0	5.85	197	WPLA231	IA	4.07	197	KNEP533	IA
855.83750	6	0	4.07	197	KNEP533	IA	5.85	197	WPLA231	IA

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

Mon Oct 12 10:21:21 1998

Results
**** Combined ****

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

855.33750 0 0 101.95 253 WPLA232 [A 14.81 51 WPFM590 [A

NEXT BEST FREQUENCIES

855.06250 1 355 46.77 308 WPIE380 [A 5.85 197 WPLA231 IA
 855.78750 2 355 37.85 171 WNVL474 [A 5.85 197 WPLA231 IA
 855.51250 2 220 37.06 325 WPIE379 [A 5.85 197 WPLA231 IA
 855.08750 1 0 25.25 163 WPHQ373 [A 37.30 28 WPLB970 IA
 855.31250 1 20 14.81 51 WPFM590 [A 5.85 197 WPLA231 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 2 0 91 38 57
 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
855.06250	SOLFAN	YB	46.8	308	FB2	WPIE380	BLACK HAWK	IA
855.06250	SOLFAN	YB	46.8	308	MO	WPIE380	BLACK HAWK	IA
855.06250	PIONEER HI BRED INTE	GB	[116.9]	105	MO	WNPO327	[BUREAU]	IL
855.08750	ALLEN, ALBERT R	GB	25.3	163	FB2C	WPHQ373	JOHNSON	IA
855.31250	MC GOVERN, GARY	GB	14.8	51	FB2C	WPFM590	LINN	IA
855.31250	MC GOVERN, GARY	GB	14.8	51	MO	WPFM590	LINN	IA
855.33750		None Found.						
855.51250	SOLFAN	YB	37.1	325	FB2	WPIE379	BUCHANAN	IA
855.51250	SOLFAN	YB	37.1	325	MO	WPIE379	BUCHANAN	IA
855.51250	NEXTEL COMMUNICATION	GB	69.1	119	FB6C	WPHQ467	SCOTT	IA
855.78750	UNION ELECTRIC COMPA	YO	37.8	171	FB2	WNVL474	WASHINGTON	IA
855.78750	SOLFAN	YB	46.8	308	FB2	WPIE380	BLACK HAWK	IA
855.78750	SOLFAN	YB	46.8	308	MO	WPIE380	BLACK HAWK	IA

855.06250 Mhz has 1 callsigns with 355 mobile units within 70 miles.
 855.06250 Mhz has 2 callsigns with 375 mobile units including NA's.
 855.08750 Mhz has 1 callsigns with 0 mobile units within 70 miles.
 855.08750 Mhz has 2 callsigns with 30 mobile units including NA's.
 855.31250 Mhz has 1 callsigns with 20 mobile units within 70 miles.
 855.51250 Mhz has 2 callsigns with 220 mobile units within 70 miles.
 855.51250 Mhz has 3 callsigns with 230 mobile units including NA's.
 855.78750 Mhz has 2 callsigns with 355 mobile units within 70 miles.

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.

ATTN: Curt Wilson

Mon Oct 12 10:23:46 1998

Search Name : rockwell2
 State(s) searched : IA IL WI
 Radio Service : **INDCONV.** (go)
 Frequency Band : 854.76250 - 860.98750 MHz
 Frequencies included : 20
 Site Location : 42 02 00 091 38 57
 Cochannel distance : 70.00 miles
 Adjacent distance : 0.00 miles
 Check for nearby stations : NO
 Check for nearest airport(s) : NO

* highlighted freqs are best choices for you.

Lock-out Frequencies :

(None)

* Indicates a license expired as of the current month.

** Mon Oct 12 10:23:35 1998

Frequencies Searched
 **** Combined ****

FREQUENCY (MHz)	# CSN	# MOBLS	CO-CHAN DIST(mi)	DIR SIGN	CALL SIGN	STATE	ADJ DIST(mi)	DIR SIGN	CALL SIGN	STATE
854.86250	3	0	37.30	28	WPLB970	IA	7.81	207	WPJG600	IA
854.88750	3	0	37.30	28	WPLB970	IA	37.30	28	WPLB970	IA
854.91250	2	0	37.30	28	WPLB970	IA	37.30	28	WPLB970	IA
854.93750	2	0	37.30	28	WPLB970	IA	37.30	28	WPLB970	IA
855.11250	4	0	37.30	28	WPLB970	IA	25.25	163	WPHQ373	IA
855.13750	3	0	37.85	171	WNNH901	IA	37.30	28	WPLB970	IA
855.16250	7	0	62.68	57	PN088762	WI	37.30	28	WPLB970	IA
855.18750	2	0	37.30	28	WPLB970	IA	26.78	167	WPAR475	IA
855.36250	3	0	18.70	13	WNNH902	IA	37.30	28	WPLB970	IA
855.38750	2	0	37.30	28	WPLB970	IA	18.70	13	WNNH902	IA
855.41250	1	0	37.30	28	WPLB970	IA	32.06	222	WNNH901	IA
855.43750	4	0	32.06	222	WNNH901	IA	1.30	90	WPKM593	IA
855.61250	2	0	29.39	88	WNNH901	IA	5.85	197	WPLA231	IA
855.63750	2	0	62.78	120	WPLB969	IA	29.39	88	WNNH901	IA
855.66250	7	0	46.03	349	PN088761	IA	37.30	28	WPLB970	IA
855.68750	1	0	37.30	28	WPLB970	IA	46.03	349	PN088761	IA
855.86250	3	0	31.58	265	WNNH902	IA	3.99	194	WPKX698	IA
855.88750	6	0	3.99	194	WPKX698	IA	31.58	265	WNNH902	IA
855.91250	3	0	37.30	28	WPLB970	IA	3.99	194	WPKX698	IA
855.93750	3	0	40.69	69	WPBI314	* IA	37.30	28	WPLB970	IA

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

Mon Oct 12 10:23:35 1998

Results
 **** Combined ****

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

None found. Co-channel distance 70.00. Adj. channel distance 0.00.

NEXT-BEST-FREQUENCIES

855.63750	2	0	62.78	120	WPLB969	IA	29.39	88	WNNH901	IA
855.16250	7	0	62.68	57	PN088762	WI	37.30	28	WPLB970	IA
855.66250	7	0	46.03	349	PN088761	IA	37.30	28	WPLB970	IA
855.93750	3	0	40.69	69	WPBI314 *	IA	37.30	28	WPLB970	IA
855.13750	3	0	37.85	171	WNNH901	IA	37.30	28	WPLB970	IA

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

(null)

Autofind BEST & NEXT BEST FREQUENCIES

Bandwidth checked : 0.02500 MHz
 State(s) : IA IL WI
 Coordinates : 42 2 0 91 38 57
 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
855.13750	IES UTILITIES INC	GO	37.8	171	FB2C WNNH901	WASHINGTON	IA
855.13750	IES UTILITIES INC	GO	42.5	30	FB2C WNNH907	DELAWARE	IA
855.13750	IES UTILITIES INC	GO	69.2	291	FB2C WNNH903	GRUNDY	IA
855.16250	INTERSTATE POWER COM	YO	62.7	57	FB2C PN088762	GRANT	WI
855.16250	INTERSTATE POWER COM	YO	62.7	57	FB2C PN254776*	GRANT	WI
855.16250	INTERSTATE POWER COM	YO	62.7	57	FB2C WPBI314 *	GRANT	WI
855.16250	NEXTEL COMMUNICATION	YX	62.8	120	FB2C WPLB969	SCOTT	IA
855.16250	INTERSTATE POWER CO	YO	68.4	325	FB2C PN254777*	BREMER	IA
855.16250	INTERSTATE POWER CO	YO	68.4	325	FB2C WPBI315 *	BREMER	IA
855.16250	INTERSTATE POWER COM	YO	68.4	325	FB2C PN088761	BREMER	IA
855.63750	NEXTEL COMMUNICATION	YX	62.8	120	FB2C WPLB969	SCOTT	IA
855.63750	SMART SMR OF ILLINOI	YX	67.5	146	FB2C WPLB950	MERCER	IL
855.66250	INTERSTATE POWER CO	YO	46.0	349	FB2C PN254777*	FAYETTE	IA
855.66250	INTERSTATE POWER CO	YO	46.0	349	FB2C WPBI315 *	FAYETTE	IA
855.66250	INTERSTATE POWER COM	YO	46.0	349	FB2C PN088761	FAYETTE	IA
855.66250	INTERSTATE POWER COM	YO	62.7	57	FB2C PN088762	GRANT	WI
855.66250	INTERSTATE POWER COM	YO	62.7	57	FB2C PN254776*	GRANT	WI
855.66250	INTERSTATE POWER COM	YO	62.7	57	FB2C WPBI314 *	GRANT	WI
855.66250	NEXTEL COMMUNICATION	YX	62.8	120	FB2C WPLB969	SCOTT	IA
855.93750	INTERSTATE POWER COM	YO	40.7	69	FB2C PN088762	JONES	IA
855.93750	INTERSTATE POWER COM	YO	40.7	69	FB2C PN254776*	JONES	IA
855.93750	INTERSTATE POWER COM	YO	40.7	69	FB2C WPBI314 *	JONES	IA

855.13750 Mhz has 3 callsigns with 0 mobile units within 70 miles.
 855.16250 Mhz has 7 callsigns with 0 mobile units within 70 miles.
 855.63750 Mhz has 2 callsigns with 0 mobile units within 70 miles.
 855.66250 Mhz has 7 callsigns with 0 mobile units within 70 miles.

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.