



# Remote Operation of Movable Bridges



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# What is Remote Operation?



# Coast Guard Coordination

- How will the bridge/waterway be viewed?
- Communication Protocol
- How will Operator determine bridge safe to lower?
- Security
- Problems



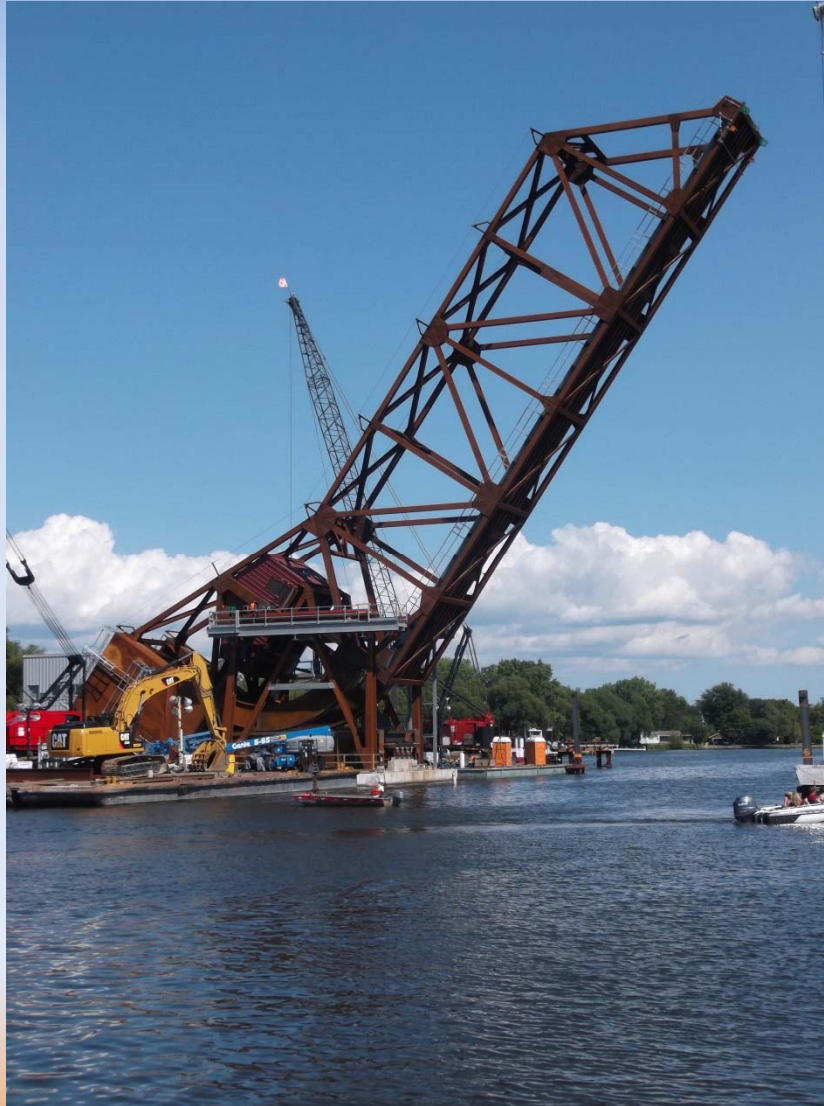
# WHY?

- Reduced Staff
- Reduction in Operating costs
- Increased Efficiency
- Improved Visibility



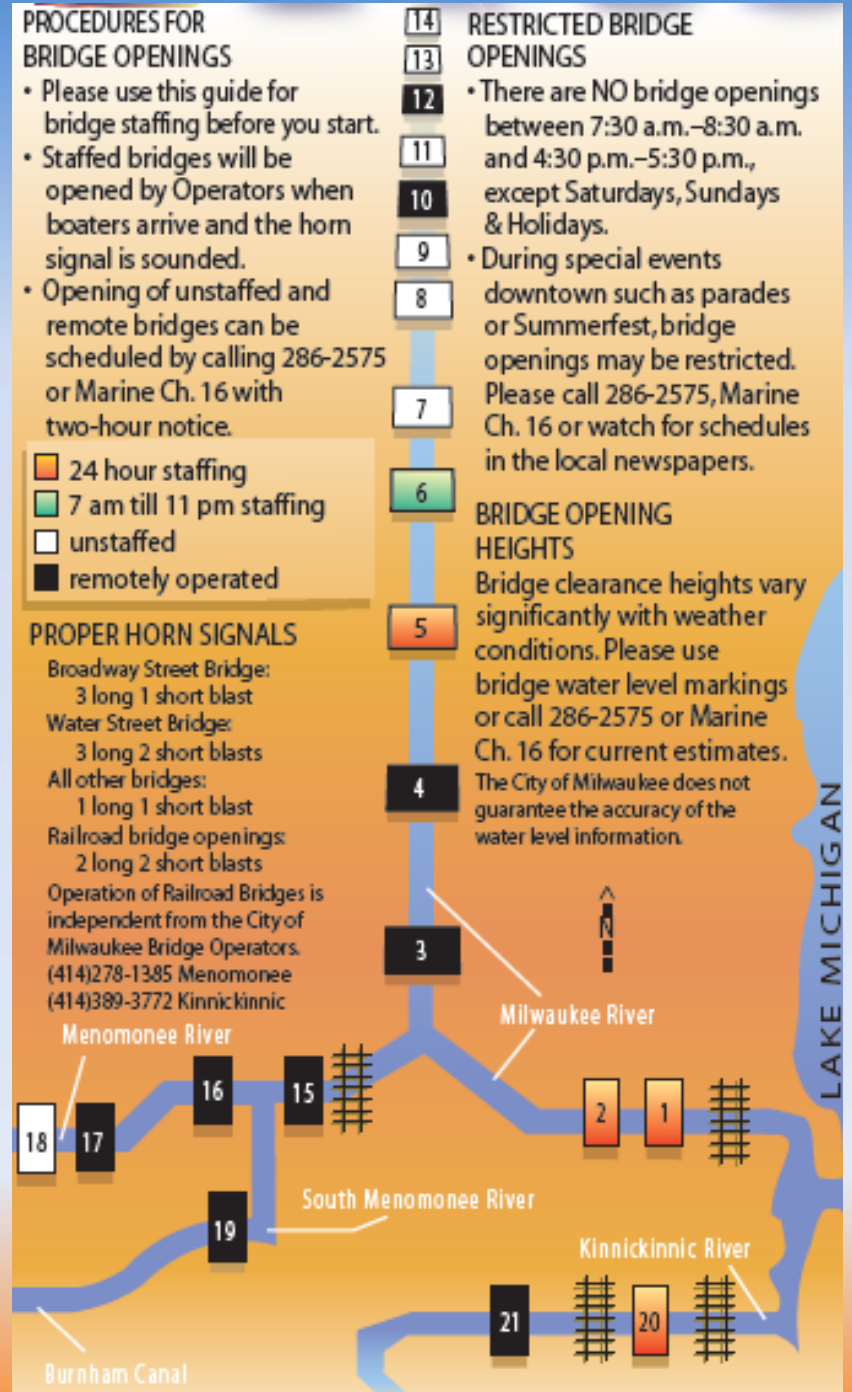


# Railroads



# City and State Owned/Operated

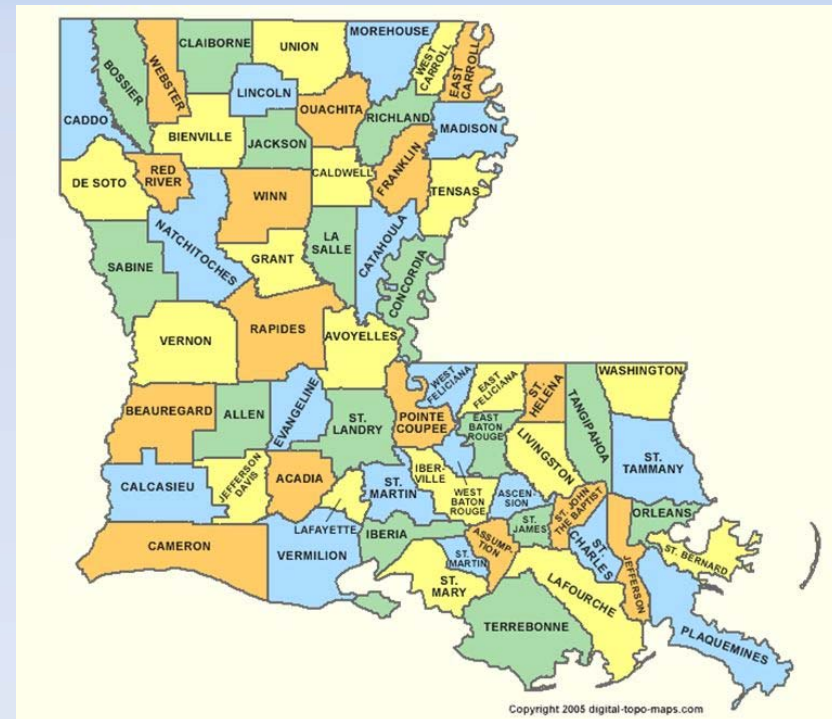
- Milwaukee Since Early 1990's
- Manitowoc 1995
- WisDOT - 2009



# Project Overview



- Feasibility Study
- Over 100 State Owned/Operated Movable Bridges
- Design Pilot Program





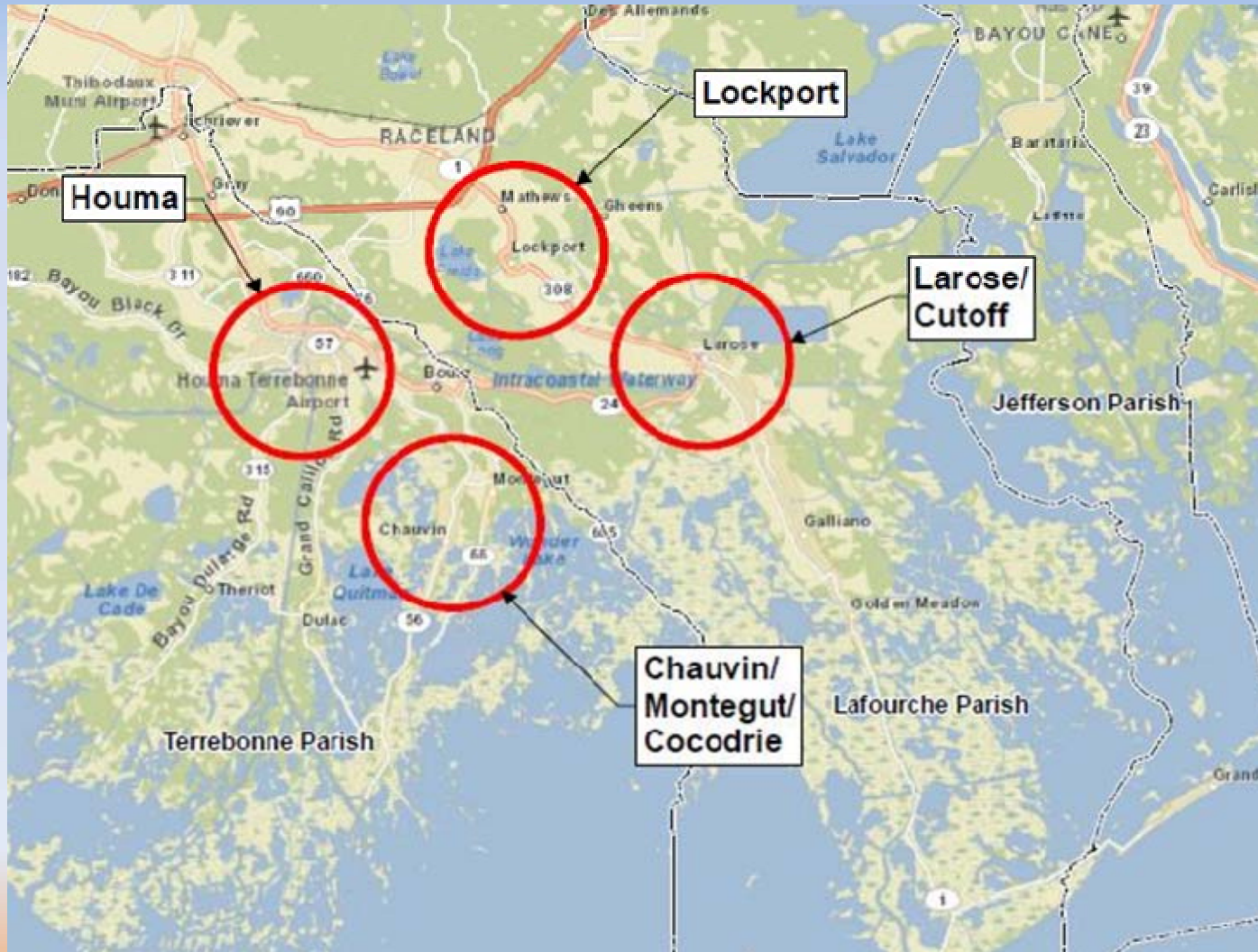
# Considerations

- Number of Operators
- Operating Schedule
- Number of Openings
- Proximity to Other Bridges
- Types of Bridges





# Project Overview



- 5 Groups of Bridges
- 17 Movable Bridges

# Site Investigation

- Bridge
- Waterways
- Intersections
- Utilities
- Interviews





# Concerns

## Vehicles

- Traffic Signals & Gates
- Advance Warning Lights



## Pedestrians

- Traffic Gates & Strobes
- Warning Signs





# Adverse Weather

Darkness

Fog

Rain

Hurricanes



# Problem Matrix

PROBLEM	PRIMARY ACTION	SECONDARY ACTION
Loss of video signal for museum at Tayco Street Bridge.	Suspend remote operation of Tayco Street Bridge. Contact Tim Jacobson or Jeff <u>Nieland</u> to lock museum.  Resume remote control once museum is locked	Notify WisDOT bridge maintenance staff of the problem.
Loss of video signal for roadway at Tayco Street Bridge.	Suspend remote operation of Tayco Street Bridge. Contact Tim Jacobson or Jeff <u>Nieland</u> to activate the on-call tender.	Notify WisDOT bridge maintenance staff of the problem.  Resume remote control upon notification from WisDOT bridge maintenance staff.
Loss of video signal for waterway at Tayco Street Bridge.	Suspend remote operation of Tayco Street Bridge. Contact Tim Jacobson or Jeff <u>Nieland</u> to activate the on-call tender.	Notify WisDOT bridge maintenance staff of the problem.  Resume remote control upon notification from WisDOT bridge maintenance staff.
Loss of audio signal for Tayco Street Bridge.	Suspend remote operation of Tayco Street Bridge. Contact Tim Jacobson or Jeff <u>Nieland</u> to activate the on-call tender.	Notify WisDOT bridge maintenance staff of the problem.  Resume remote control upon notification from WisDOT bridge maintenance staff.
Computer problems at the Racine Street Bridge.	Contact WisDOT bridge maintenance staff.	If the problem cannot be immediately corrected by WisDOT, suspend remote operation of Tayco Street Bridge and contact Tim Jacobson or Jeff <u>Nieland</u> to activate on-call tender.  Resume remote control upon notification from WisDOT bridge maintenance staff.
Inability to raise gates to release traffic.	Suspend remote operation of Tayco Street Bridge and contact Tim Jacobson or Jeff <u>Nieland</u> to activate on-call tender.  Contact police department to re-direct traffic until gates can be raised.	Notify WisDOT maintenance staff of the problem.  Resume remote control upon notification from WisDOT bridge maintenance staff.
Inability to raise or lower	Suspend remote operation of Tayco Street	Notify WisDOT bridge maintenance staff of

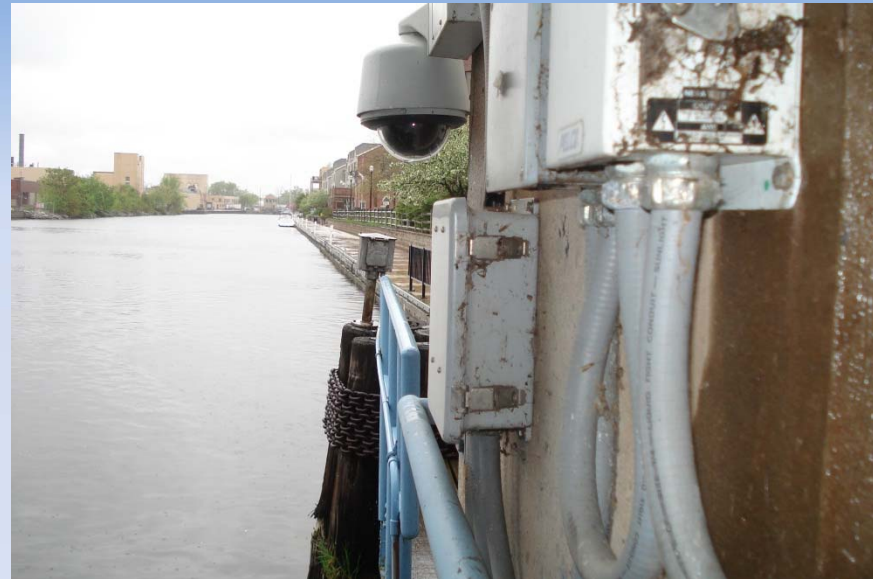
# Operational Analysis

PARISH	STRUCT. #	NAME OF BRIDGE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG	Total
LAFOURCHE	4070112131	GALLIANO	177	162	204	269	265	275	232	217	233	228	192	157	218	2611
LAFOURCHE	8292000011	LAROSE PONTON III	194	173	213	225	198	180	192	218	139	190	0	142	172	2064
LAFOURCHE	0640503281	LAROSE	860	854	933	995	983	1003	988	1015	853	987	902	886	938	11259
LAFOURCHE		BAYOU LAFOURCHE BRIDGE AT LAROSE														
LAFOURCHE	8291400791	LOCKPORT	12	11	20	19	22	15	14	20	12	15	12	31	17	203
LAFOURCHE	8292700011	NEW LOCKPORT BRIDGE	18	15	22	20	21	25	14	21	11	11	16	29	19	223
LAFOURCHE	829000001	CHAMPANGE/HARRELSON	7	4	10	5	5	1	3	1	6	2	1	10	5	55
LAFOURCHE	0640601401	LOCKPORT CO.CANAL	14	12	19	13	18	25	13	31	18	8	12	24	17	207
TERREBONNE	2473000011	SARAH	54	49	57	63	66	65	53	61	65	65	56	60	60	714
TERREBONNE	2473001581	MONTEGUT	57	73	92	107	174	175	135	157	142	193	136	111	129	1552
TERREBONNE	2470204101	BOUDREAUX	308	166	507	839	1476	1262	431	781	1138	1026	496	297	727	8727
TERREBONNE	2480204001	HUMBLE CANAL	47	40	59	54	206	174	33	111	133	152	130	50	99	1189
TERREBONNE	8550800171	NAVAGATION CANAL	637	545	657	706	785	733	797	965	633	732	722	629	712	8541
TERREBONNE	2459009801	DULARGE	404	371	434	465	533	363	484	501	429	444	451	373	438	5252
TERREBONNE	8551400011	PROSPECT BRIDGE	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TERREBONNE	2460100021	DAGILEVILLE	7	9	21	26	37	17	15	17	9	11	8	17	16	194
TERREBONNE	8550800001	HOWARD AVE	4	8	7	14	4	8	2	7	0	0	0	5	5	59



# Site

- Cameras
- Video Recorders



# Sounds

- Microphones
- P.A. Systems



# Bridge Controls

- Host Console
- Remote Bridge Control Interface
- PLC
- Operator Interface



MODE: REMOTE    TAYCO STREET BRIDGE    DATE: 3/16/2007  
TIME: 10:09:40 AM

SEQUENCE  
OPENING    LEAF STOPPED

RAISE SPEED: CREEP SLOW FULL  
LOWER SPEED: CREEP SLOW FULL

WEST WEST BRAKES SET  
EAST EAST BRAKES RELEASED

HPU STATUS

SPAN SCREEN

PREVIOUS STATUS SIGNALS GATES LOCKS SPAN LOGS LOGIN CONTINUE

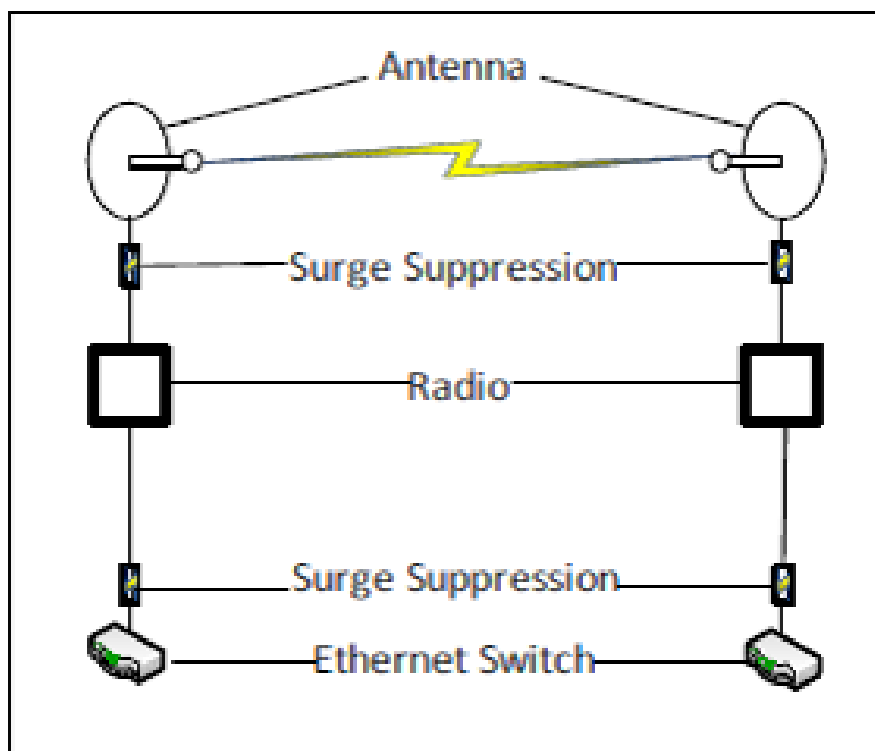
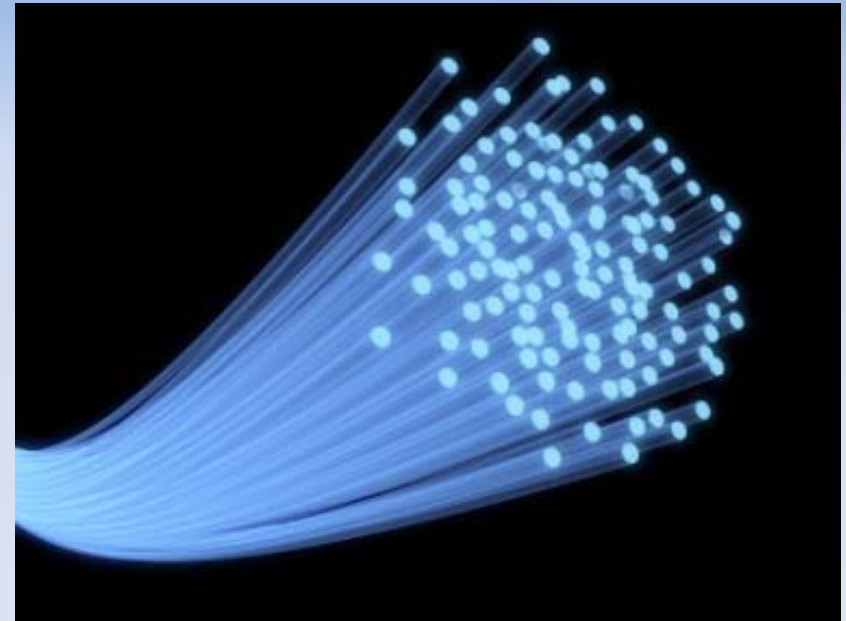
Alarm Time	Acknowledge Time	Description
3/16/2007 10:03:48 AM	3/16/2007 10:08:08 AM	UPS TAYCO ONLINE

ALARMS (F1)  
ACK ALARM (F2)



# Communication

- Fiber Optic
- Wireless

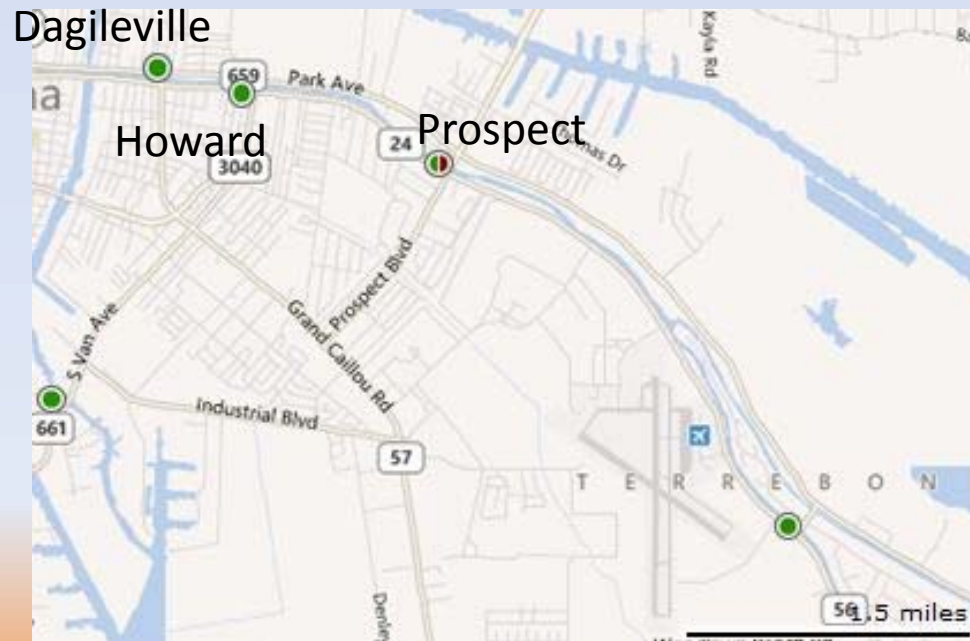


# Cost Analysis

- Construction Costs
  - Host Bridge
  - Remote Bridge(s)
  - Communication System
- Operator Costs
  - Labor
  - Benefits
- Number of Operators
- Maintenance Cost Difference

# Conclusions

- Houma
- \$222,000 per Year
- Return on Investment – 3 years





Questions?

**URS**