BRINGING AUTOMATED RWIS INFO TO THE MOTORIST ADVERSE

National Rural ITS & ITS Arizona Annual Meeting – Rural ITS Weather Applications Oct 23, 2018

WEATHER SLOW DOWN



MANAGING TRAFFIC, MOVING PEOPLE.



F. Todd Foster, P.E. VP of ITS Engineering Ver-Mac, Inc.



Do MORE with your existing RWIS / ITS Infrastructure to solve real problems



GOALS



BASIC SERVICE

- RWIS Systems & Devices Exist in Most Areas of Concern
 - These devices gather data and record RWIS information
- Many of these systems can also provide operator alerts
- Operators get Flooded with Tasks When Things Go Bad

SEMI-AUTOMATIC SERVICE

- RWIS Systems Provide Automatic Adverse Weather Alerts
- Operators Verify & Then Decide on What & How to Warn the Public

FULLY-AUTOMATED SERVICE

- RWIS Servers Communicate Directly to Warning Devices (Flashers, Signs, etc.)
- RWIS-Warning Device Systems Record:
 - All Incoming Weather Data (of interest)
 - All Warning Device Activities
 - Monitor Health (Data Feeds, Communication Loss & Loss/Low Power)
 - Auto-Alerts for Weather & System Outputs
 - Quick & Easy Reporting & Data Exporting

SYSTEM - LEVELS OF SERVICE









SYSTEM - LEVELS OF SERVICE

MANAGING TRAFFIC, MOVING PEOPLE.

APPLICATIONS

APPLICATIONS



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WET ROADWAYS - HYDROPLANING



Measurement



WET ROAD – WATER ACCUMULATION





---- WindAvg ---- WindGust - WindGust

WIND DATA (AVG, GUST & DIRECTION)







Flood Detection System



FLOODED ROADWAYS

http://www.atstraffic.ca/case-studies/flood-detection-system/









Photo courtesy of EPCOR via the **Flooding & Flood Prevention** page.

FLOODED ROADWAYS / UNDERPASSES







- 1. 2 of 3 Sensors triggered by real-time flood conditions.
- 2. Automatic text/email alerts are sent to distribution list and message boards are automatically activated.
- 3. Personnel can log in to access on site cameras & verify flood conditions/override false alarms.
- 4. Additional countermeasures (i.e. emergency services) are deployed (if required).

FLOODED ROADWAYS / UNDERPASSES













ENVIROTECH SENSORS, INC

www.envirotechsensors.com

PA I-81 Smart Work Zone with Automated Visibility System Logic







SLOW TRAFFIC 1 MILES - REDUCE SPEED AHEAD 9/29/2015 4:48:43 PM 9/29/2015 4:53:04 PM 9/29/2015 4:58:01 PM SLOW TRAFFIC 1 MILES - REDUCE SPEED AHEAD 9/29/2015 5:10:24 PM WORKZONE 3 MILES AHEAD - MAINTAIN SAFE DISTANCE 9/29/2015 5:16:17 PM SLOW TRAFFIC 2 MILES - REDUCE SPEED AHEAD 9/29/2015 5:21:19 PM SLOW TRAFFIC 1 MILES - BE ALERT DENSE FOG 9/29/2015 5:23:17 PM 9/29/2015 5:27:13 PM SLOW TRAFFIC AHEAD - BE ALERT DENSE FOG 9/29/2015 5:31:13 PM 9/29/2015 5:36:10 PM SLOW TRAFFIC 1 MILES - BE ALERT DENSE FOG 9/29/2015 5:37:16 PM 9/29/2015 5:39:10 PM SLOW TRAFFIC AHEAD - BE ALERT DENSE FOG 9/29/2015 5:48:07 PM 9/29/2015 6:01:10 PM 9/29/2015 6:05:11 PM SLOW TRAFFIC 1 MILES - REDUCE SPEED AHEAD 9/29/2015 6:06:02 PM SLOW TRAFFIC 2 MILES - REDUCE SPEED AHEAD

> PA I-81 Smart Work Zone with Automated Visibility System Logic













APPLICATION – AUTOMATED WIND WARNING SYSTEM



Annual Conference + Exhibit

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Wind conditions

Trans-Canada Hwy, Dvision No. 3, Subd. H. ML. Canada

Problem: The Wreckhouse area, in the SW part of Newfoundland, spans 40-50 km on the Trans-Canada Highway. Wreckhouse has a unique wind funneling phenomenon due to the topography of the local area. Wind gusts can exceed 180km/h, overturning larger vehicles.

Solution: An automated ITS solution, using existing Environment Canada -Automated Weather Station (AWS) data to provide real-time automated warning messages for traffic entering the wind zone.

<u>Success:</u> 16 warnings were triggered in January 2010, 3 of which advised all motoring traffic to pull over. Since its installation the Wind Advisory System has significantly decreased wind related incidents.

Project References

Eric Gionet, Wood (Formerly AMEC) eric.gionet@woodplc.com

APPLICATION – AUTOMATED WIND WARNING SYSTEM









AUTOMATED WIND WARNING SYSTEM





Direction







---- WindAvg ---- WindGust - WindGust

E٧	vent								
9	DateTime	ActivationType	ActivationDetail	FullMessage					
	05/05/2018 6:58:48 AM	Automation		HIGH WIND ADVISORY	WIND GUSTS EXCEEDING 85 KM/H	TRUCKS ADVISED TO PULL OVER			
	05/05/2018 8:18:53 AM	Automation		HIGH WIND ADVISORY	WIND GUSTS EXCEEDING 100 KM/H	ALL TRAFFIC ADVISED TO PULL OVER			
	05/05/2018 11:30:49 AM	Automation		HIGH WIND ADVISORY	WIND GUSTS EXCEEDING 85 KM/H	TRUCKS ADVISED TO PULL OVER			

ALL TRAFFIC ADVISED TO PULL OVER

AUTOMATED WIND WARNING SYSTEM







APPLICATION – SNOW / ICE ON ROADS





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APPLICATION – SNOW / ICE ON ROADS

APPLICATION – SNOW / ICE ON ROADS

VER-MAC

	EXISTING SIGN			FROFCAED aron					1			
			Ĩ						seal	EI Group 200-1980 JASPER AVE Tel: 700-428-4800 Environment, A.B. 15J 355 Far: 700-425-254 own/Bgroup.com	ALBERTA TRANSPORTATION	HWY 22 SEVERE WIND SIGNAGE
							bar scale	PAPER SIZE			drawing title)
					-		NTS	TABLOID 11 X 17	1		HWY 22 SEVERE WIND SIGNAGE	
1.1	PRELIMINARY	JUL 2013	SA				drawn by	approved by			SIGN LOCATION OVERVIEW	Contract no. IBI-29812
1	RELIMINARY	JUL 2013	SA				N. CHITTICK	B. PEIERS				(drowing no. REV 11)
no.	description	ch	ecked r	o. description	date	appd	checked by	last saved		CONTRACTOR IOR NUMBER		LINAD/22 20942 4
<u> </u>				issue doto			S. ABJ	16-Aug-13		COMINICION SOB HOMBER		(HW122-29012-1 SH 1)



LOCATION: HWY 22 SB, 600M SOUTH OF HWY 540 INTERSECTION

National Rural Intelligent Transportation Systems Annual Conference + Exhibit

LOCATION: HWY 533 WB, WEST OF HWY2 JUNCTION

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TemperatureIndexed



PrecipitationRate



--- PrecipitationRate



Temperature

--- Air - Air ---- WetBulb - WetBulb - Dew - Dew



MeasurementIndexed

----- 1 - WaterLevel - WaterLevel - WaterLevel - WaterLevel

RWIS-DMS COMBINED DATA (ALBERTA)





Speed





Salinity



---- RelativeHumidity - RelativeHumidity





---- 1 - Salinity ---- 2 - Salinity

RWIS-DMS COMBINED DATA (ALBERTA)







RWIS-DMS COMBINED DATA (ALBERTA)







RWIS-DMS AUTOMATION OVERRIDES (ALBERTA)



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Device Data									R18 100 1	
Rang	e Week 🔹 👻	Period	10 minutes - Dev	vices Expo	rt Defau	t 🔻				
Start	10/1/2018 12:00 AM 🔷 15				_					
End	10/8/2018 12:00 AM 🚖 📊	Merge	e Devices Parar	neters Gene	rate					
Device Nice								Tomore		
	ne Event							Temperat	eratureindexed	
All Devices	DateTime	DeviceName	Message	ActivationType	Condition	PrecipitationSit	BlackIce		TemperatureIndexed	
	10/5/2018 12:14:00 AM	RAB022-30			Dry	NoPrecipitation	NoIce 🖌		Temperaturenidexed	
	10/5/2018 12:19:00 AM	RAB022-30			Dry	NoPrecipitation	NoIce		160	
	10/5/2018 12:24:00 AM	RAB022-30			Dry	NoPrecipitation	NoIce			
	10/5/2018 12:29:00 AM	RAB022-30			Dry	NoPrecipitation	NoIce			
	10/5/2018 12:34:00 AM	RAB022-30			Dry	NoPrecipitation	NoIce			
	10/5/2018 12:39:00 AM	RAB022-30			Dry	NoPrecipitation	NoIce		140	
	10/5/2018 12:44:00 AM	RAB022-30			Dry	NoPrecipitation	NoIce			
	10/5/2018 12:49:00 AM	RAB022-30			Dry	NoPrecipitation	NoIce			
	10/5/2018 12:52:47 AM	RAB022-30			Frost	NoPrecipitation	BlackIce			
	10/5/2018 12:54:00 AM	RAB022-30			Frost	NoPrecipitation	BlackIce			
	10/5/2018 12:59:00 AM	RAB022-30			Frost	NoPrecipitation	BlackIce -			
	10/5/2018 1:03:43 AM	Hwy 22 NB DMS	CAUTION	Automation						
			TCY							
			SECTIONS							
	10/5/2018 1:03:43 AM	Hwy 22 NB DMS	COUTION	Automation						
	10/0/2010 1100.107101	11119 22 110 01113		Automation						
			SECTIONS							
	10/5/2010 1 04 00 404	D 4 D 0 2 2 2 0	one mono		F .	N.B. 1 N.C.	DI 17		2 Oct 12:00 AM 3 Oct 12:00 AM 5 Oct 12:00 AM 7 Oct 12:00 AM 8 Oct	:00 AM
	10/5/2018 1:04:00 AM	RAB022-30			Frost	Noprecipitation	Blackice			
	10/5/2018 1:06:48 AM	RAB022-30			Diy	Noprecipitation	Noice		RAB022-30 - 1 - RoadSurfaceRAB022-30 - 1 - SubRoadSurfaceRAB022-30 - 1 - FreezePoi	nt
	10/5/2018 1:09:00 AM	RAB022-30			Dry	Noprecipitation	Noice		- RoadSurface - SubRoadSurface - FreezePoint	
							•			

- Pick Custom Parameters
- Merge Inputs & Outputs
- Produce Quick & Easy Custom Reports-Graphs

🕝 Select Statistic Types 📃 💻 📼									
Availables			S	elected					
ParentFolder Percentage	RelativeHumidity	•		ActivationDetail					
Position	Relativer furnitity			Direction	WindAvg				
PrecipitationRate			Direction	WindGust					
PrecipitationSituation			FullMessage						
Pressure				Measurement	WaterLevel				
RadarGap	Gap			Speed	WindAvg				
RadarHeadway	Headway			Speed	WindGust				
RadarOccupancy	Occupancy			Status					
RadarSpeed	Speed		>>	TemperatureIndexed	FreezePoint				
RadarSpeed85	Speed85		>>	TemperatureIndexed	Pavement				
RadarVehiclesCount	VehiclesCount			TemperatureIndexed	RoadSurface				





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RWIS-DMS AUTOMATION (ALBERTA)





I-35 & Homestead Lane Interchange Project Traffic Information System -Johnson County



CUSTOMIZED PUBLIC WEB SITES





XML FEED EXAMPLE

<?xml version="1.0"?>

<ntcipMessage xsi:noNamespaceSchemaLocation="http://www.amec.com/weather/ntcip.xsd"</pre> xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" dataTime="20140826T175500" type="obs" source="Mayfield Road"><value name="windSensorAvgDirection.1">205</value><value name="windSensorAvgSpeed.1">63</value><value name="windSensorGustDirection.1">215</value><value name="windSensorGustSpeed.1">97</value><value name="essAtmosphericPressure.0">9843</value><value name="essAirTemperature.1">298</value><value name="essWetbulbTemp.0">240</value><value name="essDewpointTemp.0">218</value><value name="essMinTemp.0">146</value><value name="essMaxTemp.0">300</value><value name="essRelativeHumidity.0">62</value><value name="essPrecipSituation.0">3</value><value name="essPrecipRate.0">0</value><value name="essSnowfallAccumRate.0">0</value><value name="essPrecipYesNo.0">2</value><value name="essPrecipitationStartTime.0">1408822690</value><value name="essPrecipitationEndTime.0">1408822750</value><value name="essPrecipitationOneHour.0">0</value><value name="essPrecipitationThreeHours.0">0</value><value name="essPrecipitationSixHours.0">0</value><value name="essPrecipitationTwelveHours.0">0</value><value name="essPrecipitation24Hours.0">0</value><value name="essSurfaceStatus.1">3</value><value name="essSurfaceTemperature.1">465</value><value name="essPavementTemperature.1">1001</value><value name="essSurfaceSalinity.1">0</value><value name="essSurfaceFreezePoint.1">0</value><value name="essSurfaceBlackIceSignal.1">2</value><value name="essSurfaceWaterDepth.1">255</value><value name="essPavementSensorError.1">2</value><value name="essSubSurfaceTemperature.1">255</value><value name="essSubSurfaceSensorError.1">2</value><value name="essSurfaceStatus.2">3</value><value name="essSurfaceTemperature.2">472</value><value name="essPavementTemperature.2">1001</value><value name="essSurfaceSalinity.2">0</value><value name="essSurfaceFreezePoint.2">0</value><value name="essSurfaceBlackIceSignal.2">2</value><value name="essSurfaceWaterDepth.2">255</value><value name="essPavementSensorError.2">2</value><value name="essSubSurfaceTemperature.2">255</value><value name="essSubSurfaceSensorError.2">2</value></ntcipMessage>

511 Travel Info

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XML FEEDS – INTO & OUT OF AUTOMATED SYSTEMS



- MAKE BETTER USE OF EXISTING RWIS INFRASTRUCTURE
- AUTOMATE REAL-TIME ALERTS TO KEY PERSONNEL
- ALLOW TMC/TOC PERSONNEL TO FOCUS ON NON-AUTOMATED TASKS
- OPERATORS CAN STILL VERIFY & OVERRIDE AUTOMATED SYSTEMS
- HAVE QUICK & EASY ACCESS TO CUSTOM REPORTS & GRAPHS

BOTTOM LINE IS THE INCREMENTAL COST TO DO MORE WITH YOUR EXISTING RESOURCES IS LOW AND THE BENEFITS IN INCREASED SAFETY & CUSTOMER SATIFICATION IS HIGH



Questions? L Contact:

todd.foster@ver-mac.com Phone: 888-488-7446

MANAGING TRAFFIC, MOVING PEOPLE.

JAMLOGIC