



Advanced Transportation Controller

ITS Firmware

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Intelligent Transportation Systems

Oregon DOT

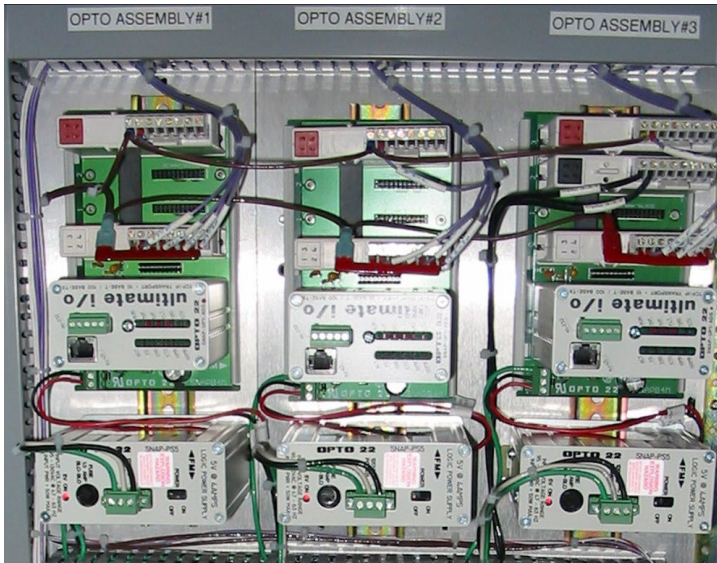
Background

ITS Unit is responsible for roadside warning systems that require control systems.

Control systems were originally developed with a variety of hardware and software.

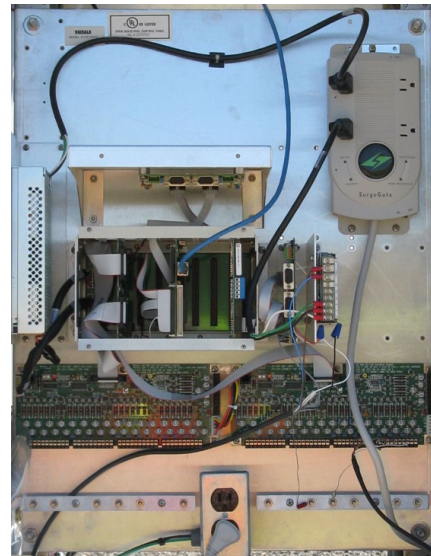
OPTO 22

Programmable Logic Controllers



Vaisala

Remote Processing Units



Relay Based

Control Systems



Challenges Included:

- Vendor Changes
- Discontinued Products
- Special Training
- Complicated Configuration
- Unsupported Devices
- Non-Standard Statewide

Advanced Transportation Controller (ATC)

- ✓ Contract was established to use Intelight ATC for **traffic signals** and **ramp metering**.
- ✓ **Programming services** was included for software support.
- ✓ ITS issued a work order contract to develop control functions as the **ITS Firmware**.
- ✓ Used existing ODOT ITS control systems statewide as template for firmware.
- ✓ Vendor Intelight (now **Q-Free**) owns the source code, new product to sell.
- ✓ Q-Free supports **continued modification** of firmware as needs change.
- ✓ **Statewide standard** for ODOT ITS roadside control systems.



ITS Firmware Communication

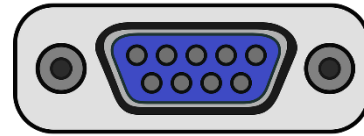
Contact Closure

- Flashing Beacons
- Blank-out Signs
- Control Functions



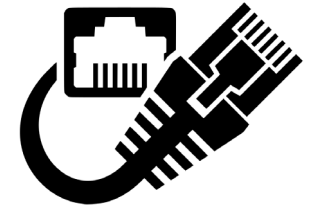
Sensors via Serial

- 2 ports for RS-232
- Converters can be used for RS-485 or RS-422



Sensors via Network

- Ethernet
- Modbus



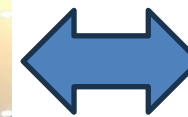
NTCIP (National Transportation Communications for ITS Protocol)

- Central System Data Collection
- Variable Message Signs



Peer-to-Peer

- Peer ATC ITS Firmware Communication over Ethernet



Road and Weather Information Station

RM Young AT/RH
Air Temperature
Relative Humidity



RM Young Wind Monitor
Wind Speed
Wind Direction



Vaisala DSC/DST-111
Surface Condition
Surface Temperature
Grip Factor
Visibility



Acromag
4-20mA to Modbus



Serial Converter
RS-485 to RS-232



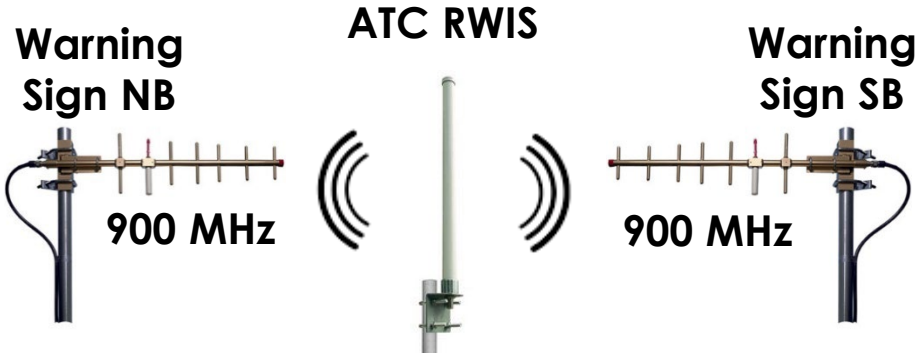
116 Sites
Statewide

ATC

ITS Firmware



High Wind Warning



Locations:

- Yaquina Bay US101 MP 141
- Port Orford US101 MP 300
- Humbug Mt. US101 MP 306
- Gold Beach US101 MP 327

Sensors:

- RM Young Wind Monitor



Flood Warning

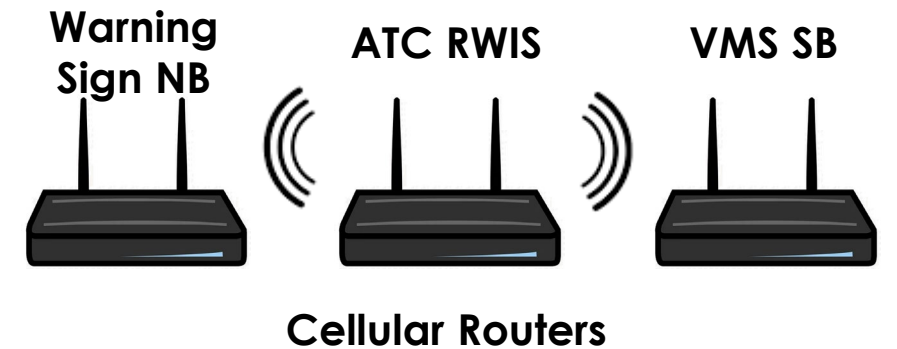


Locations:

- Seaside US101 MP 23
- Cushman OR126 MP 3
- Portland OR217 MP 2

Sensors:

- AMETEK Drexelbrook Ultrasonic VeriGAP
- Float Sensor



Congestion Warning



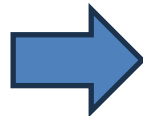
Locations:

- Donald-Aurora
- OR99E Railroad Tunnel
- I-5 Salem at Kuebler
- US30 at Longview Bridge

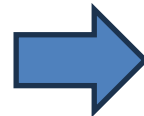
Sensors:

- Wavetronix HD

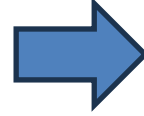
Downstream Ramp Sensor



Middle Ramp Sensor



Upstream Ramp Sensor



VMS/ATC 1 Mile Ahead



STOPPED TRAFFIC

CONGESTION AHEAD RIGHT LANE

CONGESTION ONE MILE AHEAD RIGHT LANE



Speed and Sharp Curve Warning

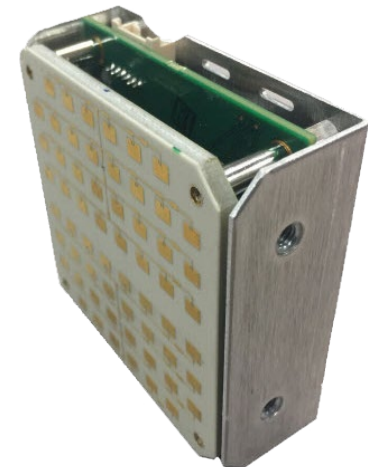


Locations:

- Cornelius Pass OR127 MP 3
- Dolph Junction OR22 MP 10
- Dexter Lake OR58 MP 14
- Walton OR126 MP 36

Sensors:

- Decatur SI-3C
- Wavetronix HD



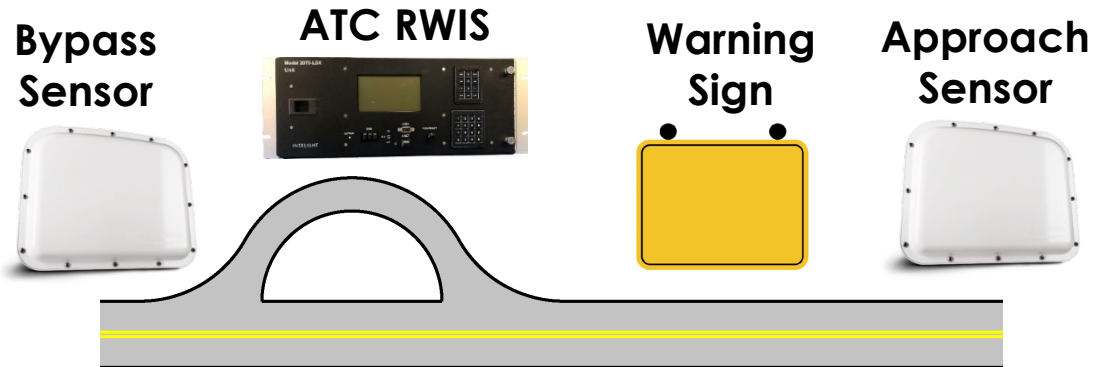
Overlength Warning

Locations:

- OR242 McKenzie Pass
- US395 NB & SB Ukiah

Sensors:

- Wavetronix HD
- Inductive Loops
- RM Young AT/RH



Gate Control



Locations:

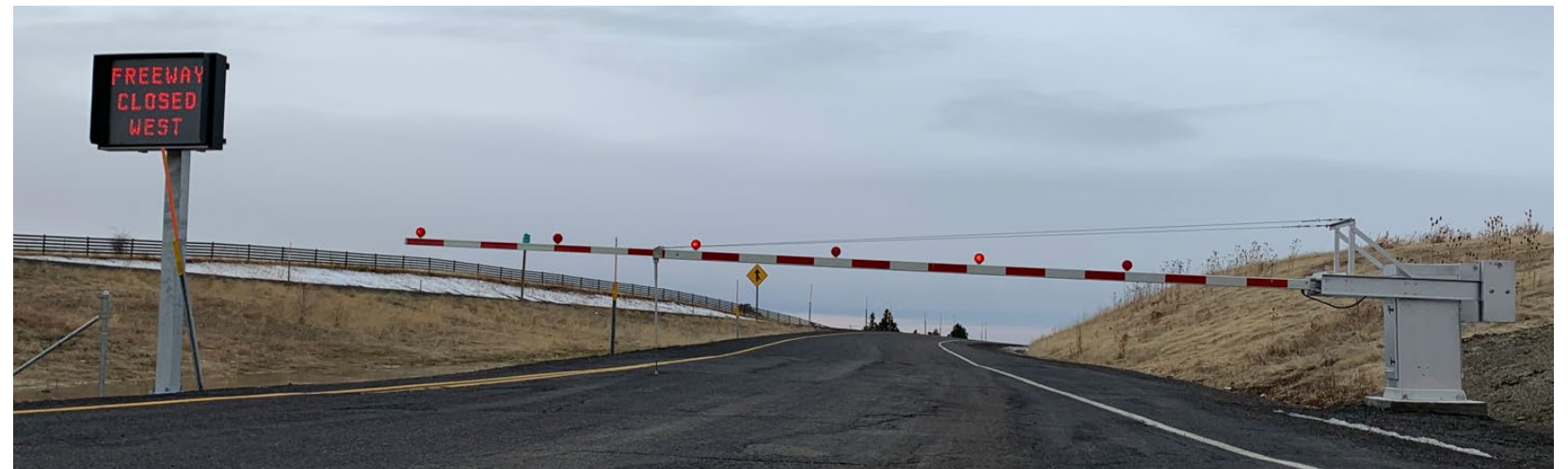
- Multnomah Falls
- Farewell Bend
- Cabbage Hill
- La Grande
- I-84 Exit 216 (Pendleton)

Sensors:

- Wavetronix HD

Equipment:

- B&B Roadway VW-4 Gate



Ice Warning



Locations:

- VSL Corridors Statewide
- I-84 Cabbage Hill
- Butte Creek OR140 MP35

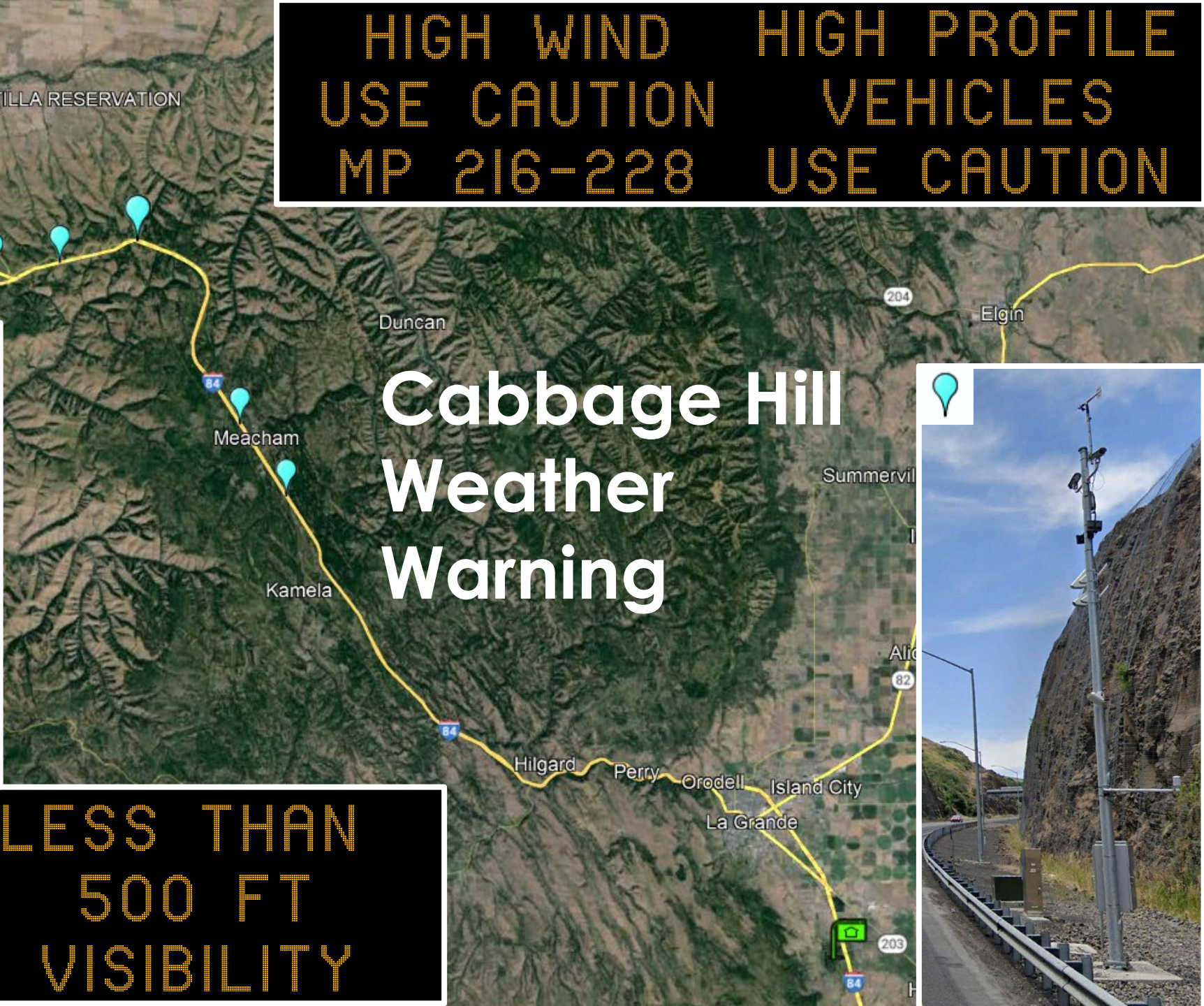
Sensors:

- Vaisala DSC/DST-111





HIGH WIND HIGH PROFILE
USE CAUTION VEHICLES
MP 216-228 USE CAUTION



LOW VISIBILITY LESS THAN
USE CAUTION 500 FT
MP 216-228 VISIBILITY



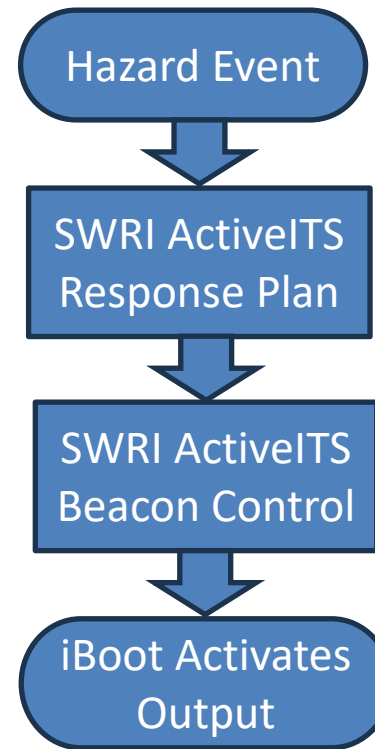
ActiveITS System

Group Filter: --None--

Set Op Status | Refresh Status | Add Message | Resend Top Message | Blank Queue | Modify | Merge | Unmerge | Remove | Short Status | Detailed Status | Set Brightness | Set Control Mode | Other Controls

Home | Queue | Queue Message | DMS

Name	Roadway/Dir	Op Status	Queue State	No. Msgs	Last Sent	Current Message	Type
I-84 MP 17.30 EB Troutdale	I-84 Eastbound	Active	Completed	0	N/A	Off	Beacon
I-84 MP 44.60 WB Cascade Locks	I-84 Westbound	Active	Completed	0	N/A	Off	Beacon
OR38 MP 16.97 WB Scottsburg	OR38 Eastbound	Active	Completed	0	N/A	Off	Beacon
OR6 MP 42.25 WB Gales Creek	OR6 Westbound	Active	Completed	0	N/A	Off	Beacon
R3 Test iBoot G2	OR38 Eastbound	Out of Service	Completed	0	N/A	Off	Beacon
Test Lab Beacon 2	I-205 Northbound	Out of Service	Completed	0	N/A	Off	Beacon
US199 MP 29.15 SB CaveJunction	US199 Southbound	Active	Completed	0	N/A	Off	Beacon



SWRI ActiveITS System:

- Beacon Control
- Response Plan System

Equipment:

- Dataprobe iBoot-G2





THANK YOU!

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