



I-59/I-20 Smart Work Zone Overview
Alabama Section ASCE
September 2018

What is a Smart Work Zone System?



Queue

Trailer-Mounted Queue Detection

- Wavetronix HD SmartSensor
- Dual Beam/Sidefire Technology
- 22 lanes or 250 ft
- 230 watt solar / 30-day battery bank
- Cellular Communication
- 17 ft mast

The Queue Trailer is a portable trailer that provides a versatile and lightweight platform with a small footprint to mount a microwave radar unit to detect speed, volume and occupancy for up to 22 lanes of traffic. When equipped with ASTI's communication package, the Queue Trailer can provide data remotely to a variety of information-gathering components.



Features

- Industrial-grade trailer to give years of dependable service
- Reports the speed, length and classification of individual vehicles
- Adjustable solar array for maximum exposure to sun
- Optional digital cellular communications
- Detects up to 22 lanes of traffic
- Accurately detects lane changing vehicles
- Available as a portable unit or permanent mount
- Removable tongue
- Battery bank sized for 30-day autonomy



MVT

Mobile Video Trailer

- CohuHD RISE 4228 Dome
- Network/IP
- High quality night vision
- 560 watt solar / 30-day battery bank
- Cellular Communication
- 30 ft mast

The MVT provides a portable, self-contained all-weather, trailer-mounted equipment platform. Through the use of wireless communication, the MVT provides the end user a rapidly deployable real-time video system viewable from a remote location. The MVT can be used as a stand-alone camera system or tied into a larger existing CCTV system.



Features

- Can use virtually any camera
- Additional mast heights available
- Day/Night, Adjustable
- Pan/Tilt/Zoom IP addressable cameras
- 32-ft. extendable mast with 360-degree lockable rotation
- Capable of providing streaming or snapshot video
- Optional electric hoist available for rapid deployment
- Battery bank sized for 30-day autonomy
- Industrial-grade trailer to give years of dependable service
- Microwave and digital cellular communications available
- 360-degree adjustable solar array for maximum exposure to sun
- Custom options are available and can include a Wavetronix sensor for traffic detection



SMC

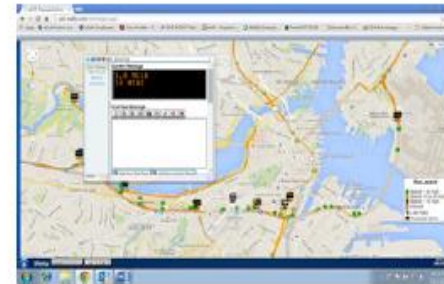
Message Board Trailers

- LED Full Matrix
- Text, graphic symbols or both
- 140 watt solar
- Cellular Communication
- Remote Programmable
- 13 ft mast

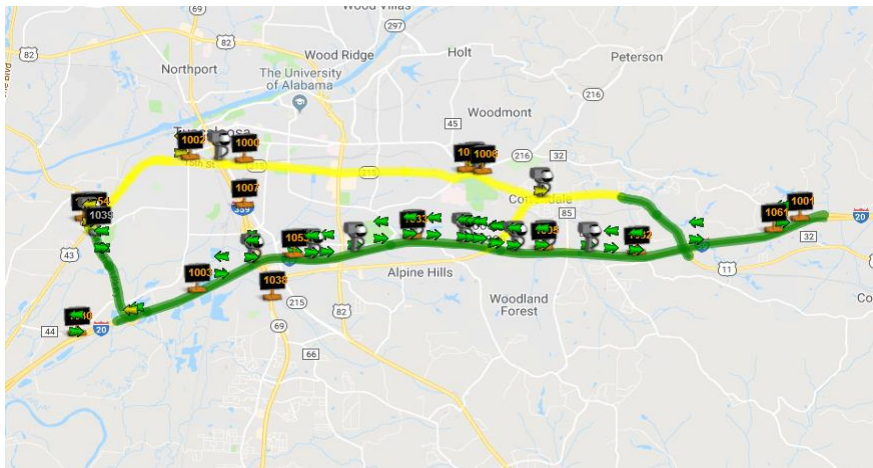
One of the key components of a portable ITS System is to provide real time messages to the traveling public. The results of having real time traffic conditions posted to a message board fleet are:

- Alternate Routing and Trip Planning
- Reduction in Collisions and Accidents
- Decreased Volume through Work Zone
- Safer Work Zone for Workers
- Safer Experience for Motorists
- Convenient Travel Time Messaging

All SMC Message Board Trailers can be integrated into a portable solution providing the flexibility needed for all roadway conditions.



Smart Work Zone Adds



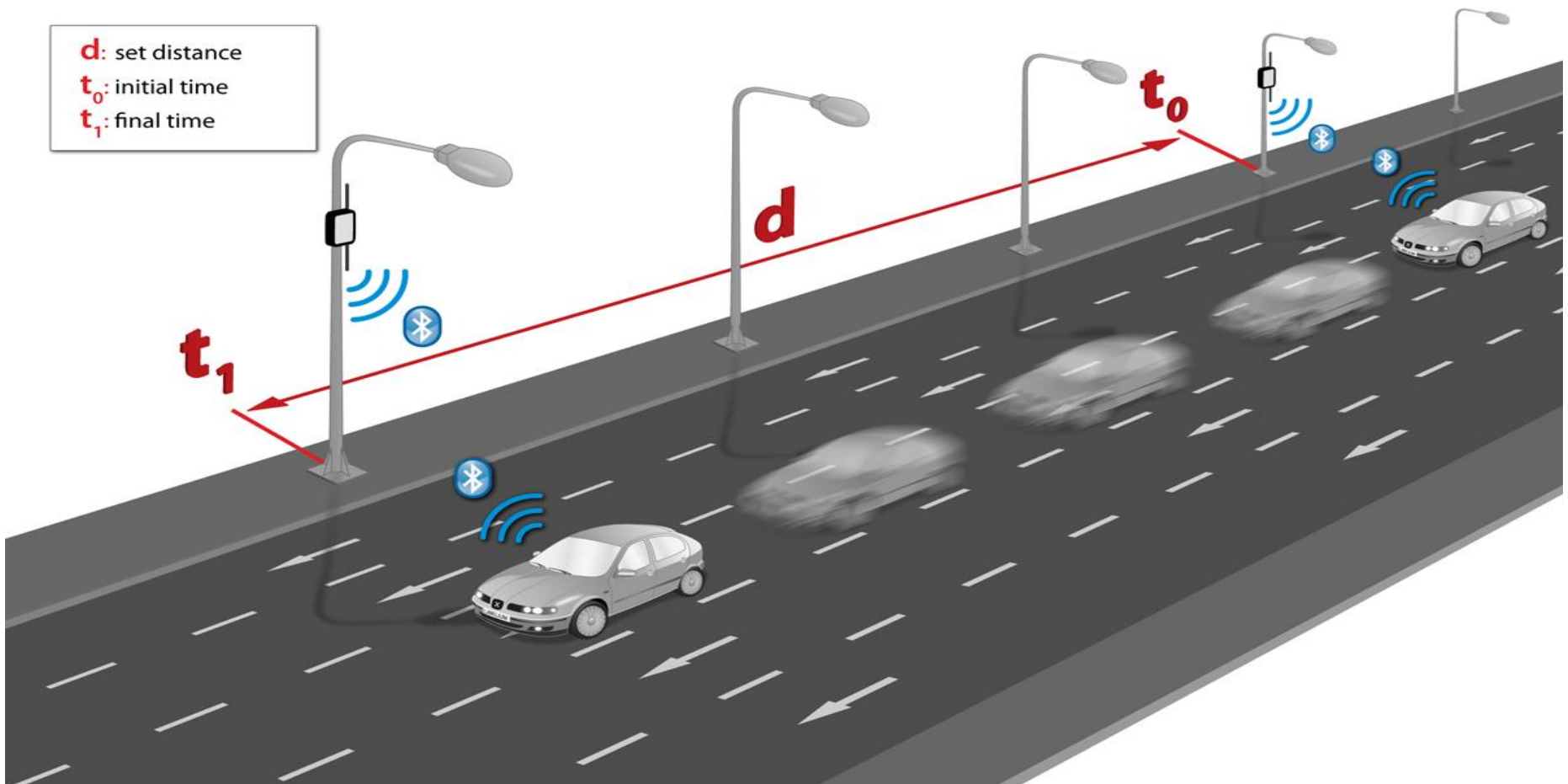
Probe Data



Bluetooth Readers

Bluetooth Travel Times

d : set distance
 t_0 : initial time
 t_1 : final time



How Does A SWZ Work?

- Most systems are set up for 60 second polling.
- Queue detectors are usually set at ½ mile increments for the best real time data collection.
- Each sensor is polled for speed, volume, density, volume and classification.
- That data collected determines which message set to post.
- “Real Time” traffic conditions are then reported to the message boards, the project website, the 511 page, DOT personnel, the TMC and anyone that has access to the system.

Secure User Web Access

ASTI Transportation | x

asti-traffic.com/tcm/login.aspx

Apps eSoft Admin Lo... eSoft Employee... Your Profile - P... SAP SCDOT Net... eVA - Virginia's ... WebEx Enterpri... PennDOT ECMS Delaware Bid S... GSA Advantage... Google Accounts

Please Log In

Us**e**r**n**a**m**e**s** **a**n**d** **P**a**s**s**w**o**r**d**s** **a**r**e** **c**a**s**e-**s**e**n**s**i**t**i**v**e**

Enter your Username

Enter your Password

Log In

Forgot your password? Click [here](#) to reset.

Loaded!

Menu

7:35 PM
04/05/2015

7:35 PM
4/5/2015

Multiple Projects - Single Access Point

The screenshot shows a web browser window with the following elements:

- Browser Tab:** ASTI Transportation | x
- Address Bar:** asti-traffic.com/tcm/login.aspx
- Navigation Bar:** Includes icons for Apps, eSoft Admin Lo..., eSoft Employee..., Your Profile - P..., SAP SCDOT Net..., eVA - Virginia's..., WebEx Enterpri..., PennDOT ECMS, Delaware Bid S..., GSA Advantage..., and Google Accounts.
- Map:** A Google Map of the Concord, New Hampshire area. The map shows major roads (I-93, I-89, I-95) and various towns. Three blue location markers are visible on the map, each with a small icon above it.
- ASTI Communicator Window:** A floating window titled "ASTI Communicator" with the following content:
 - Header: Welcome Todd Hartnett
 - Section: Select your user status (Normal)
 - Section: Users Online
 - PRuggiero@dot.state.nh.us
 - bblodeau@dot.state.nh.us
 - Section: Messages (empty)
- Map Legend:** A legend box in the bottom right corner of the map area with the following items:
 - Speed > 45 mph (Green tree icon)
 - Speed 15 to 45 mph (Yellow tree icon)
 - Speed < 15 mph (Red tree icon)
 - Inactive (Grey house icon)
 - Live Video (Blue house icon)
 - Roadside Alerts (Yellow house icon)
- System Tray:** Shows the Windows taskbar with icons for Internet Explorer, File Explorer, Google Chrome, and a red icon. The system clock displays 7:13 PM on 4/5/2015.

View All Field Devices At Once

The screenshot displays a web browser window with the URL `asti-traffic.com/tom/login.aspx`. The browser's address bar and tabs are visible, showing various open applications like 'eSoft Admin Lo...', 'eSoft Employee...', 'Your Profile - P...', 'SAP SCDOT Net...', 'eVA - Virginia's ...', 'WebEx Enterpri...', 'PennDOT ECMS', 'Delaware Bid S...', 'GSA Advantage...', and 'Google Accounts'.

The main content is a map of a region in Virginia, showing major roads and towns. A series of colored markers (green, yellow, red, and black) are plotted along a road corridor, representing the locations of field devices. Three inset photographs provide visual details of these devices:

- The top-left inset shows a roadside construction site with orange traffic barrels, a red 'AHEAD OF WORK' sign, and a large black sign.
- The bottom-left inset shows a mobile device on a trailer with solar panels.
- The right-side inset shows a tall, thin tower structure on a trailer, also equipped with solar panels.

A 'Map Legend' box in the bottom right corner of the map area defines the markers:

- Green tree icon: Speed > 45 mph
- Yellow tree icon: Speed 15 to 45 mph
- Red tree icon: Speed < 15 mph
- Black square icon: Inactive
- Camera icon: Live Video
- Black square icon: Roadside Alerts

The browser's taskbar at the bottom shows the Windows Start button, a 'Menu' button, and several application icons. The system tray in the bottom right corner displays the time as 7:15 PM and the date as 4/5/2015.

Current Speeds Lane By Lane

Current Sensor Data

Speed

W Lanes Average Speed: 59

Lane #1	59.7
Lane #2	58.4

E Lanes Average Speed: 61.7

Lane #3	62.2
Lane #4	61.1

Volume

W Lanes Total: 33 Hourly: 1298 Daily: 15526

Lane #1	15
Lane #2	18

E Lanes Total: 31 Hourly: 1267 Daily: 15110

Lane #3	17
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Map Legend

- Speed > 45 mph
- Speed 15 to 45 mph
- Speed < 15 mph
- Inactive
- Live Video
- Roadside Alerts
- Low Voltage
- On Override

Map | Satellite

Q1018 device view

Q1018 Data

Q1018 Reports

Q1018 Info

Geo-Fences

Loaded!

Google

Menu ASTI Communicator User Information - trisha@barricades.com Q1018 device view Next update in: 18

3:07 PM 09/07/2018

Type here to search

Real Time Video

The screenshot displays a real-time video monitoring interface. On the left, a window titled "1009 device view" shows a live video feed of a multi-lane highway with several vehicles. The video feed includes a timestamp: "I-20/I-59 MM73 09-07-2018 11:51:57 AM". Below the video feed is a "Menu" bar with options for "ASTI Communicator" and "1009 device view".

On the right, a map shows the geographic area covered by the video feed, including locations like Wood Villas, Wood Ridge, Holt, Peterson, Woodmont, Alpine Hills, and Woodland Forest. The map features a yellow and green highlighted route with various vehicle tracking icons. A "Map Legend" box is visible, listing the following icons and their meanings:

- Speed > 45 mph (Green arrow)
- Speed 15 to 45 mph (Yellow arrow)
- Speed < 15 mph (Red arrow)
- Inactive (Grey arrow)
- Live Video (Camera icon)
- Roadside Alerts (Warning sign icon)
- Low Voltage (Lightning bolt icon)
- On Override (Yellow exclamation mark icon)

The interface also includes a "Map" and "Satellite" toggle, a "Google" logo, and a Windows taskbar at the bottom showing the time as 11:52 AM on 09/07/2018.

View All Current Cameras W/ A Video Wall

1022 - Alabama_Tusca



1010 - Alabama_Tusca



1009 - Alabama_Tusca



1008 - Alabama_Tusca



1037 - Alabama_Tusca



1036 - Alabama_Tusca



1021 - Alabama_Tusca



1020 - Alabama_Tusca



Current Conditions

The screenshot displays a web-based traffic management interface. The browser window shows the URL `asti-traffic.com/tcm/login.aspx`. The main map area shows a road network around Madison, Mississippi, with several traffic sensors labeled m01 through m10. A 'M04 device view' window is open, showing a 'Current Message' of 'CONST AHEAD 6 MINS' in orange text on a black background. Below this, an 'Override Message' section contains a 'Remove page' button and a display time of 3 seconds. A legend for 'Speed Sensor Colors' is visible in the bottom right, indicating colors for speeds < 15 mph (red), 15-45 mph (yellow), > 45 mph (green), and Inactive (grey). The interface includes a menu bar at the bottom with 'ASTI Communicator' and 'M04 device view' options, and a taskbar at the very bottom showing the Windows Start button and several open applications.

Current Message
CONST
AHEAD
6 MINS

Override Message
Remove page
Display Time: 3 (secs)

Speed Sensor Colors:
Red: < 15 mph
Yellow: 15-45 mph
Green: > 45 mph
Grey: Inactive

View All Current Messages

Not secure | www.traffic-asti.com/tcm/login.aspx

Current Messages

1000:

1001:

1002:

Map Legend

- Speed > 45 mph
- Speed 15 to 45 mph
- Speed < 15 mph
- Inactive
- Live Video
- Roadside Alerts
- Low Voltage
- On Override

Menu ASTI Communicator Current Messages Next update in: 25

10:34 AM 09/07/2018

The screenshot displays a web-based traffic monitoring interface. At the top, a dark purple banner contains the text 'View All Current Messages'. Below this is a browser window showing the URL 'www.traffic-asti.com/tcm/login.aspx'. The main area is a map of a region in Alabama, including areas like Northport, Wood Ridge, Holt, Peterson, Woodmont, Alpine Hills, and Woodland Forest. The map features a color-coded speed overlay: a yellow line indicates speeds between 15 and 45 mph, and a green line indicates speeds above 45 mph. Various icons are placed along the routes, representing different vehicle statuses such as 'Live Video', 'Roadside Alerts', 'Low Voltage', and 'On Override'. On the left side, there is a 'Current Messages' panel with three sections labeled '1000:', '1001:', and '1002:'. Each section contains a black rectangular area with several yellow plus signs, likely representing message locations or status indicators. A 'Map Legend' box in the bottom right corner provides a key for the icons and colors used on the map. At the bottom of the browser window, there is a navigation bar with 'Menu', 'ASTI Communicator', and 'Current Messages' buttons, along with a 'Next update in: 25' timer. The Windows taskbar at the very bottom shows the system clock as 10:34 AM on 09/07/2018 and includes various application icons.

Scheduling/Overriding Of Messages

M06 device view

You can select additional devices from the 'Group Boards' list box to override or change the default message on multiple message boards simultaneously.

Group Boards

- M01-North
- M03-North
- M04-North
- M05-North
- M07-North
- M08-South
- M09-South

Select All Devices

Begin Time:

End Time:

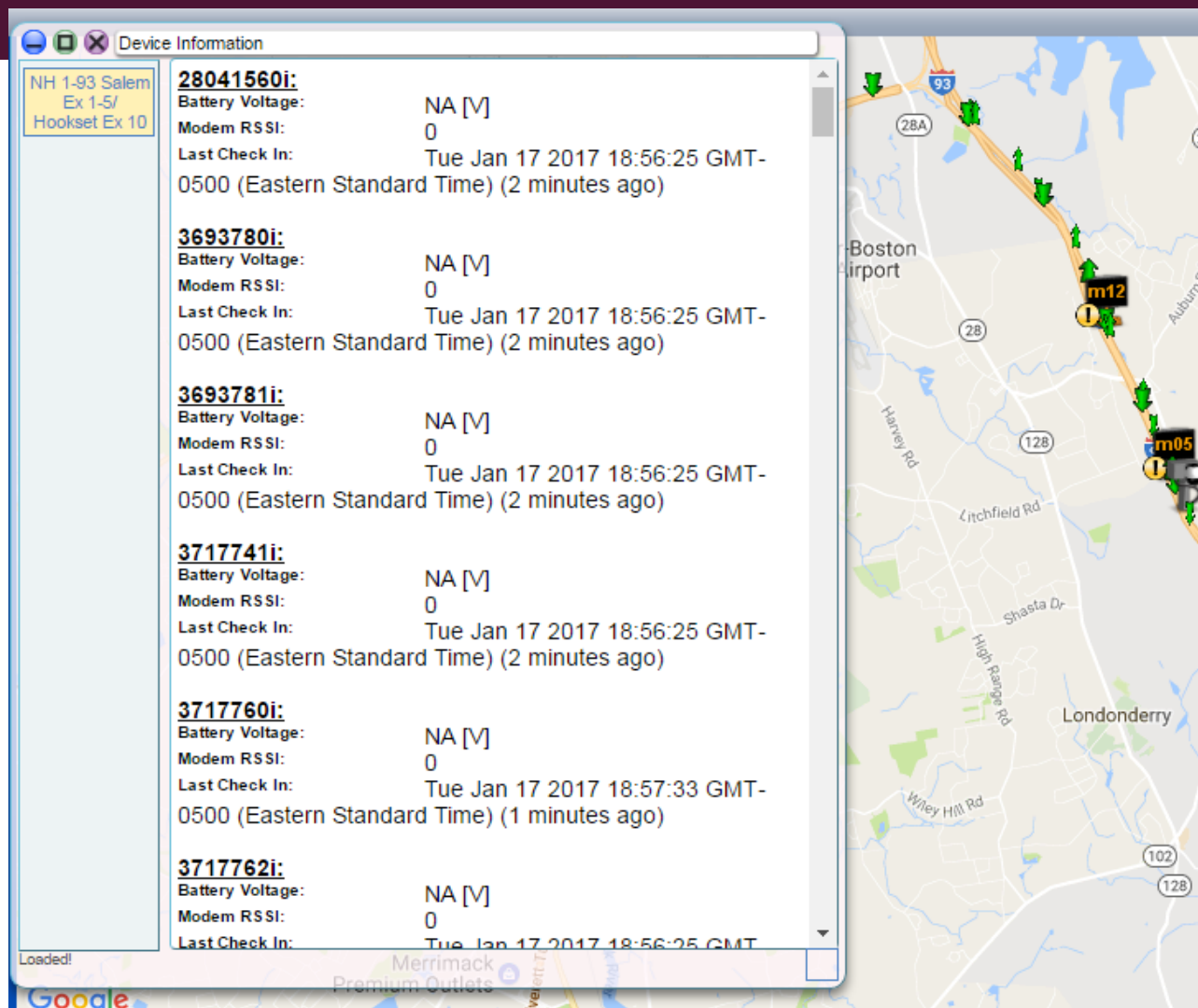
Current Override Schedules
(no schedules)

Loaded!

Preserve

Map showing message boards (m03, m04, m05, m12) along a route in Derry, Londonderry, and surrounding areas.

View Device Voltage / Modem RSSI / Check In



The screenshot displays a web application interface. On the left, a sidebar shows a list of devices: "NH 1-93 Salem", "Ex 1-5/", and "Hookset Ex 10". The main content area is titled "Device Information" and lists details for five devices. Each entry includes the device ID, Battery Voltage, Modem RSSI, and Last Check In time. To the right of the text is a map showing a route with several green location markers. Two of these markers are labeled "m12" and "m05". The map includes labels for "Boston Airport", "Londonderry", and various roads like "Harvey Rd", "Litchfield Rd", "Shasta Dr", "High Range Rd", and "Wiley Hill Rd".

Device ID	Battery Voltage	Modem RSSI	Last Check In
28041560i:	NA [V]	0	Tue Jan 17 2017 18:56:25 GMT-0500 (Eastern Standard Time) (2 minutes ago)
3693780i:	NA [V]	0	Tue Jan 17 2017 18:56:25 GMT-0500 (Eastern Standard Time) (2 minutes ago)
3693781i:	NA [V]	0	Tue Jan 17 2017 18:56:25 GMT-0500 (Eastern Standard Time) (2 minutes ago)
3717741i:	NA [V]	0	Tue Jan 17 2017 18:56:25 GMT-0500 (Eastern Standard Time) (2 minutes ago)
3717760i:	NA [V]	0	Tue Jan 17 2017 18:57:33 GMT-0500 (Eastern Standard Time) (1 minutes ago)
3717762i:	NA [V]	0	Tue Jan 17 2017 18:56:25 GMT-0500 (Eastern Standard Time) (2 minutes ago)

Historical Speed, Volume And Density Reporting Features

ASTI Transportation | x

asti-traffic.com/tcm/login.aspx

q20 Data
q20 Reports
q20 Info
Geo-Fences

Select Report Type

Please select a report type
Please select a report type
-----GenericDevice Reports-----
All Events from All Users
All Events from Current Users
Device Action (Current User)
Device Update (Current User)
Device Action (All Users)
Device Update (All Users)
Battery Voltage
GPSData
-----RealTimeMeasurementSensor Reports-----
Speed, Volume, Density
Monthly Average Data
Bin Classification

Map Legend

- Speed > 45 mph
- Speed 15 to 45 mph
- Speed < 15 mph
- Inactive
- Live Video
- Roadside Alerts

Menu ASTI Communicator q20 device view

7:20 PM
4/5/2015

Smart Work Zone in Action

STOPPED TRAFFIC 3 MILES

Override Message Editor
Show old interface

Current Message
STOPPED TRAFFIC 4 MILES

Override Message Editor
Show old interface

Current Sensor Data

Speed	
W Lanes Average Speed:	63.3
Lane #1	63.8
Lane #2	61.8
Lane #3	64.9
E Lanes Average Speed: 8.1	
Lane #4	7.5
Lane #5	8.5

Volume	
W Lanes Total:	33 Hourly: 923 Daily: 15962
Lane #1	10
Lane #2	13

Menu ASTI Communicator 1003 Messages Log Results 1003 device view 1040 device view Q1016 device view Next update in: 19


Type here to search

1:37 PM 9/6/2018

Benefits Of A SWZ

- Reduce the amount of rear end collisions and secondary crashes.
- Gets traffic information to the traveling public immediately.
- Congestion alerts can be sent to Traffic and TSMO engineers allowing them to override system messages if necessary.
- Data gathered enables forecasting/adjustments to traffic control plans.
- Safer work zone for workers and the traveling public.

Why?

A photograph of a road construction site. The scene is filled with numerous orange and white traffic cones arranged in a line, creating a narrow lane for traffic. Several cars are visible, including a white SUV in the foreground and a white van further back. The background shows a line of trees and a utility pole. The overall image has a slightly desaturated, purple-tinted appearance.

In 2015 there were an estimated 96,626 crashes in work zones nationally

Why?

In 2015
Alabama had
2,452 crashes
in work
zones and 23
were fatal.

Year	Work Zone		Truck-Involved Work Zone		Pedestrian-Involved Work Zone		Work Zone Worker
	Fatal Crashes	Fatalities	Fatal Crashes	Fatalities	Fatal Crashes	Fatalities	Fatalities
2007	32	35	9	10	1	1	0
2008	11	12	1	1	2	2	0
2009	7	8	0	0	0	0	0
2010	9	9	2	2	2	2	4
2011	8	9	1	1	1	1	2
2012	8	9	1	2	3	3	1
2013	10	12	4	5	3	3	4
2014	12	12	4	4	1	1	5
2015	23	24	3	4	4	4	5
2016	12	13	4	4	5	5	8

Interesting Statistics

- Stanford economists have demonstrated that the average value of a year of quality human life is about \$129,000.
- Average US life expectancy – 79.8
- Do the math - $\$129\text{k} \times 79.8 = \mathbf{\$10,294,200}$ Human Life Value
- Fatal Crashes in Alabama 23 in 2015
- Do the math - $\mathbf{\$236,766,600}$ million in Human Life Loss due to roadway accidents
- So, what's the cost of not implementing work zone safety?

ANY QUESTIONS?



Thank you for your time today!

Corey Rhodes

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