

Vehicle Probe Project Web Conference

Status Update

February 24, 2009

I-95 Corridor Coalition

www.I95Coalition.org



Call Courtesies

- Please give your name and agency before asking your question (at least the first time)
- Please keep your phone muted until asking a question or speaking (press *6 to mute/unmute individual phone lines)
- Please press *0 to speak to an operator for questions regarding audio
- Please call 610-662-5569 for difficulties with the web application

I-95 Corridor Coalition

www.I95Coalition.org



Agenda

<i>Topic</i>		<i>Speaker</i>
1	Introductions and Welcome	Bill Stoeckert
2	Validation Effort	Stan Young
3	Data Application and Use	Phil Tarnoff
4	Monitoring Site Update	Rick Schuman
5	ITS America 2009 Annual Meeting Presentations	Karen Jehanian
6	Contract Update <ul style="list-style-type: none">• Data Use Agreement Status• Expansion Status• Payment Process	Kathy Frankle
7	Agency Updates <ul style="list-style-type: none">• Expansion Plans	All
8	Review of Action Items from this call	Karen Jehanian
9	Next Webcast	Karen Jehanian

I-95 Corridor Coalition

www.I95Coalition.org



Introductions and Welcome

Bill Stoeckert
I-95 Corridor Coalition

I-95 Corridor Coalition

www.I95Coalition.org



Validation Effort

Stan Young

University of Maryland (UMD)

I-95 Corridor Coalition

www.I95Coalition.org



Data Validation Status

- Initial Validation
 - Data Collected July through October 2008
 - Included Northern VA, MD, DE & NJ
 - Validation report released Jan 2009, on web site
- INRIX data is meeting the contract specs

Data Validation Status (cont.)

- Ongoing validation commencing
 - NC & Central VA
 - Data collected in Oct and Nov 2008
 - Results to be released in Feb 2009
 - Delaware data collected in Feb 2009
 - Maryland – March 2009
 - New Jersey – April 2009
- Process continues to evolve to address
 - Latency measures, filtering, outliers, etc.

I-95 Corridor Coalition

www.I95Coalition.org



Validation Methodology

- Based on Bluetooth sensor technology
- Statistical measures for comparison:
 - Absolute Average Speed Error (< 10 MPH)
 - Speed Error Bias (+/- 5 MPH)
- Measured against the Standard Error of the Mean (SEM) band
 - 95th confidence band on the ground truth mean

Validation Methodology (cont.)

- Specs are applied to freeways with flows/demand exceeding 500 vehicles per hour per direction
- Accuracy is assessed in four speed ranges

0 - 30 MPH

30-45 MPH

45-60 MPH

> 60 MPH

I-95 Corridor Coalition

www.I95Coalition.org



Initial Validation Results

(Jan 2009 - NJ, MD, DE & VA)

State	As Measured Against the SEM Band		Hours of Data Collection
	Absolute Speed Error < 10 MPH	Speed Error Bias < 5 MPH	
All States			
0-30 MPH	5.90	3.80	28.7
30-45 MPH	6.90	2.20	53.0
45-60 MPH	2.30	0.20	325.3
> 60 MPH	2.30	-1.70	1176.5
All Speeds	2.52	-1.08	1583.5

I-95 Corridor Coalition

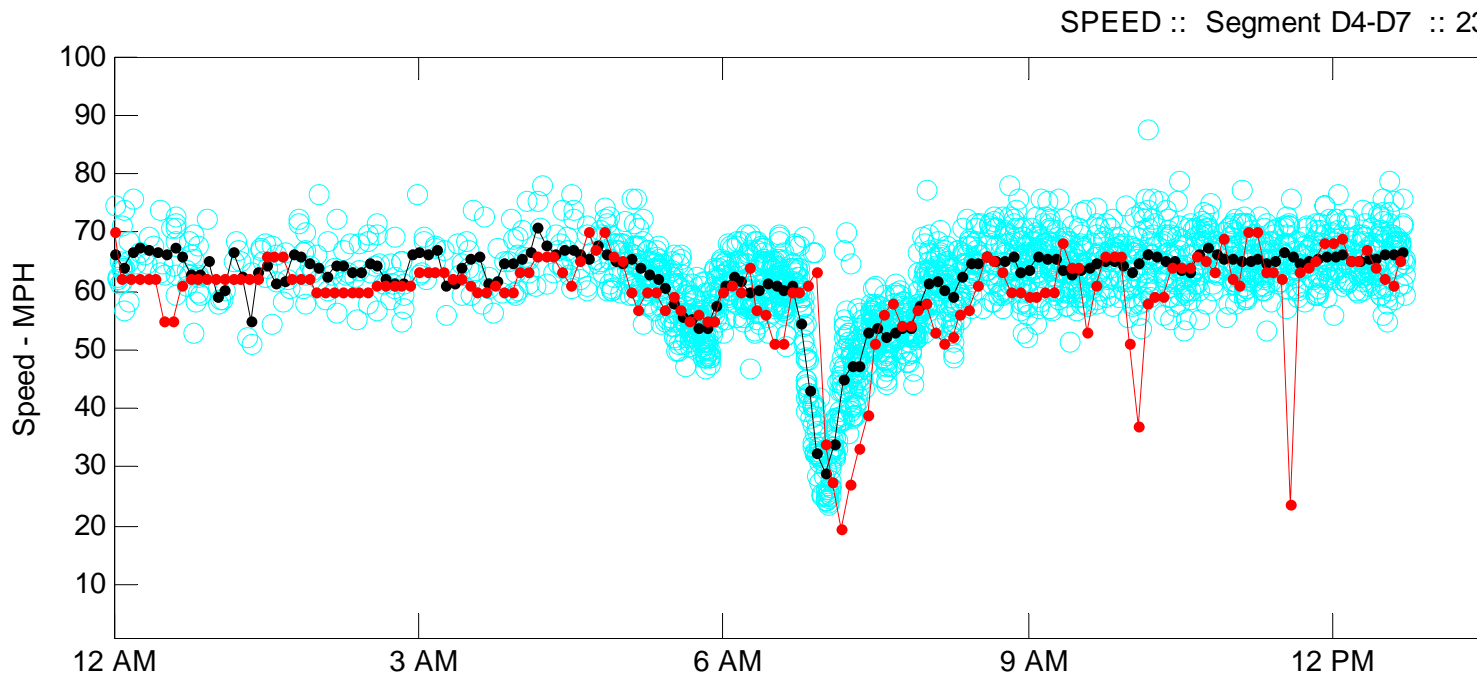
www.I95Coalition.org



Issues for Continued Study

- False alarms and other short-duration, deviations of INRIX GPS data from the Bluetooth data
- Appropriate outlier filtering of Bluetooth data
- Special purpose lanes
- Data lag calculation
- Travel time variability and its impact on both the bluetooth and GPS data

Example of False Alarm / Short Duration Spike



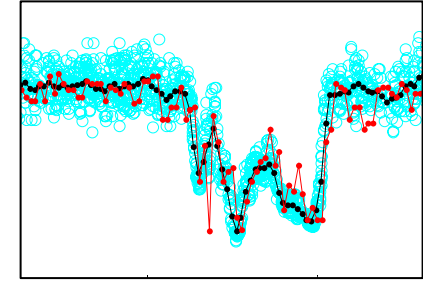
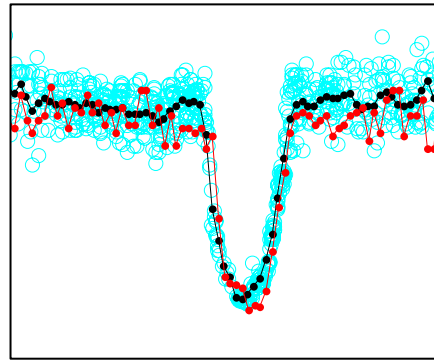
I-95 Corridor Coalition

www.I95Coalition.org

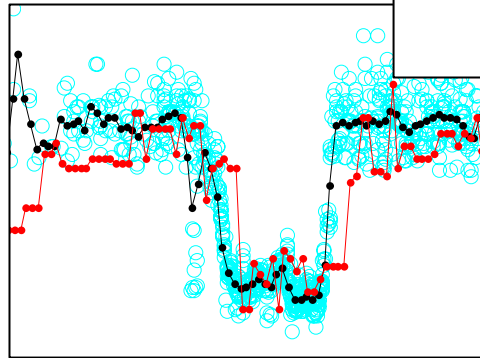
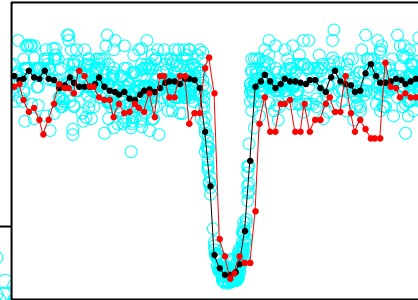


Examples of Data Lag

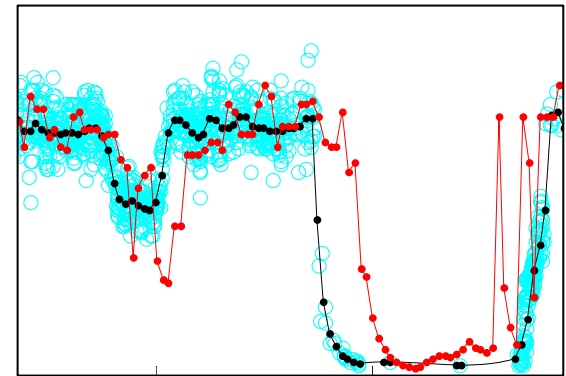
Minimal



Moderate



Maximum



I-95 Corridor Coalition

www.I95Coalition.org



Summary

- INRIX data generally meets the specifications
- Data characteristics and accuracy must be understood to properly design data applications for travel times on message signs, 511, etc.
 - Study of INRIX data during congestion events provides insight to better integrate/apply data
 - All validation data is available for use and viewing
- Ongoing validation efforts and application development must continue in parallel

Data Application and Use

Phil Tarnoff

UMD

I-95 Corridor Coalition

www.I95Coalition.org



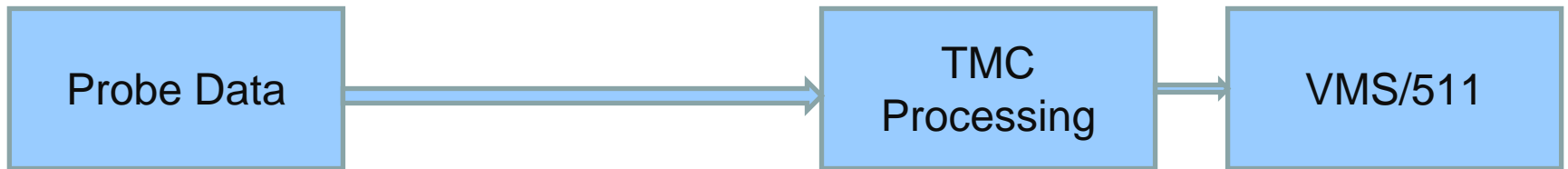
Probe Data for Real-Time Applications

- UMD validation demonstrated that vehicle probe data satisfies contractual requirements
- Probe data is adequate to support TMC and archive applications
- Questions remain regarding the use of data for real-time traveler information

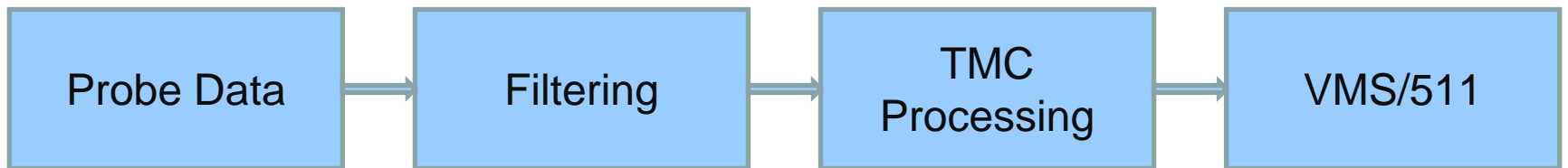
A Two-Pronged Effort to Address the Questions

- UMD - filtering techniques to smooth the probe data's peaks and valleys
- INRIX – confidence scores to permit assessment of data quality
- Complementary approaches that could be used separately or together

Typical Data Flow



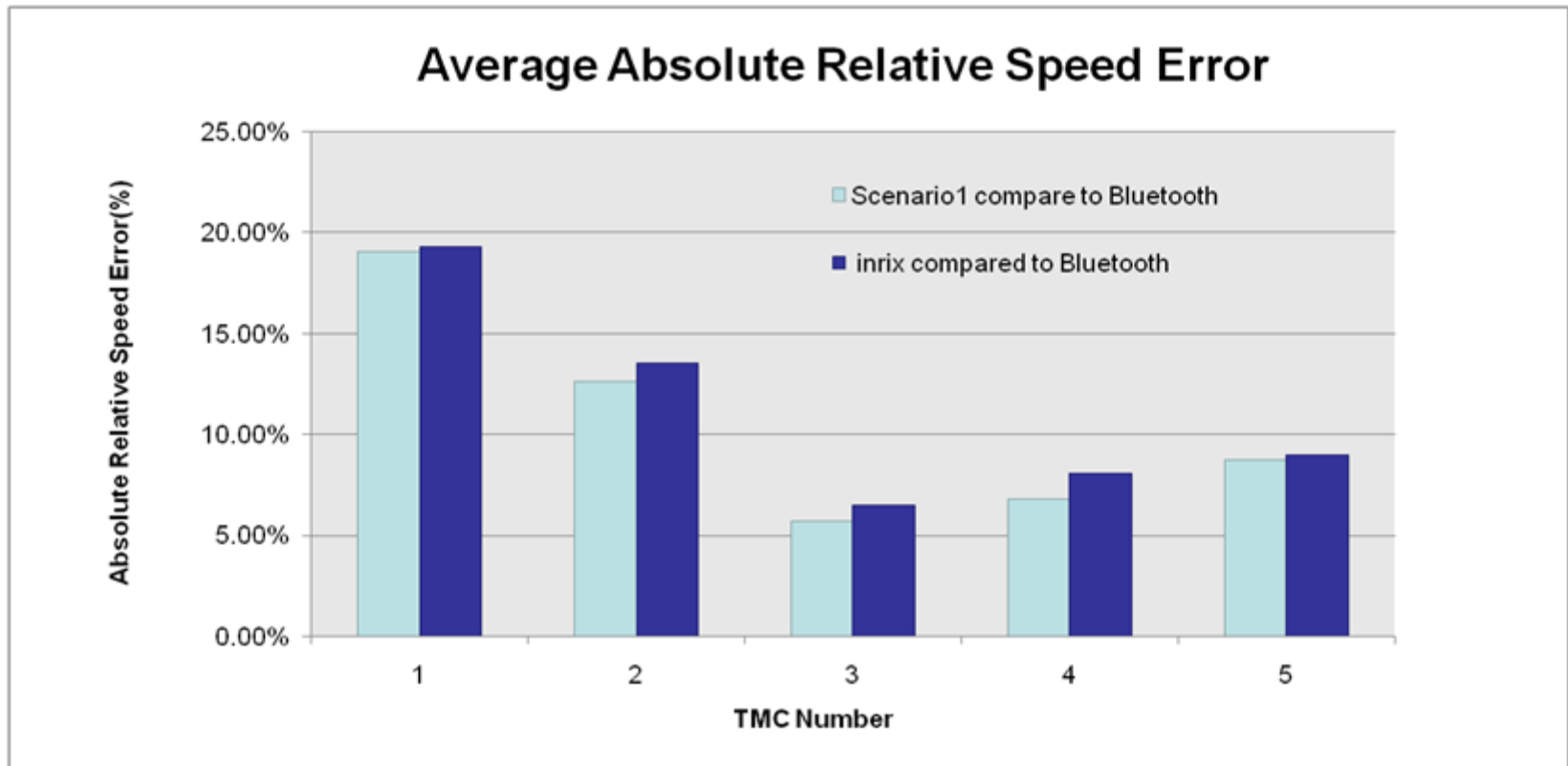
Data Flow With Filtering



Filtering

- Smooths abrupt changes in travel time values
- Many different types of filtering available
- Six different techniques investigated
- The most successful technique is designated Scenario 1 in the following slides
- Results are for six TMC segments on I-95 in northern Virginia

Overall Results (% error) For 24 hour Period

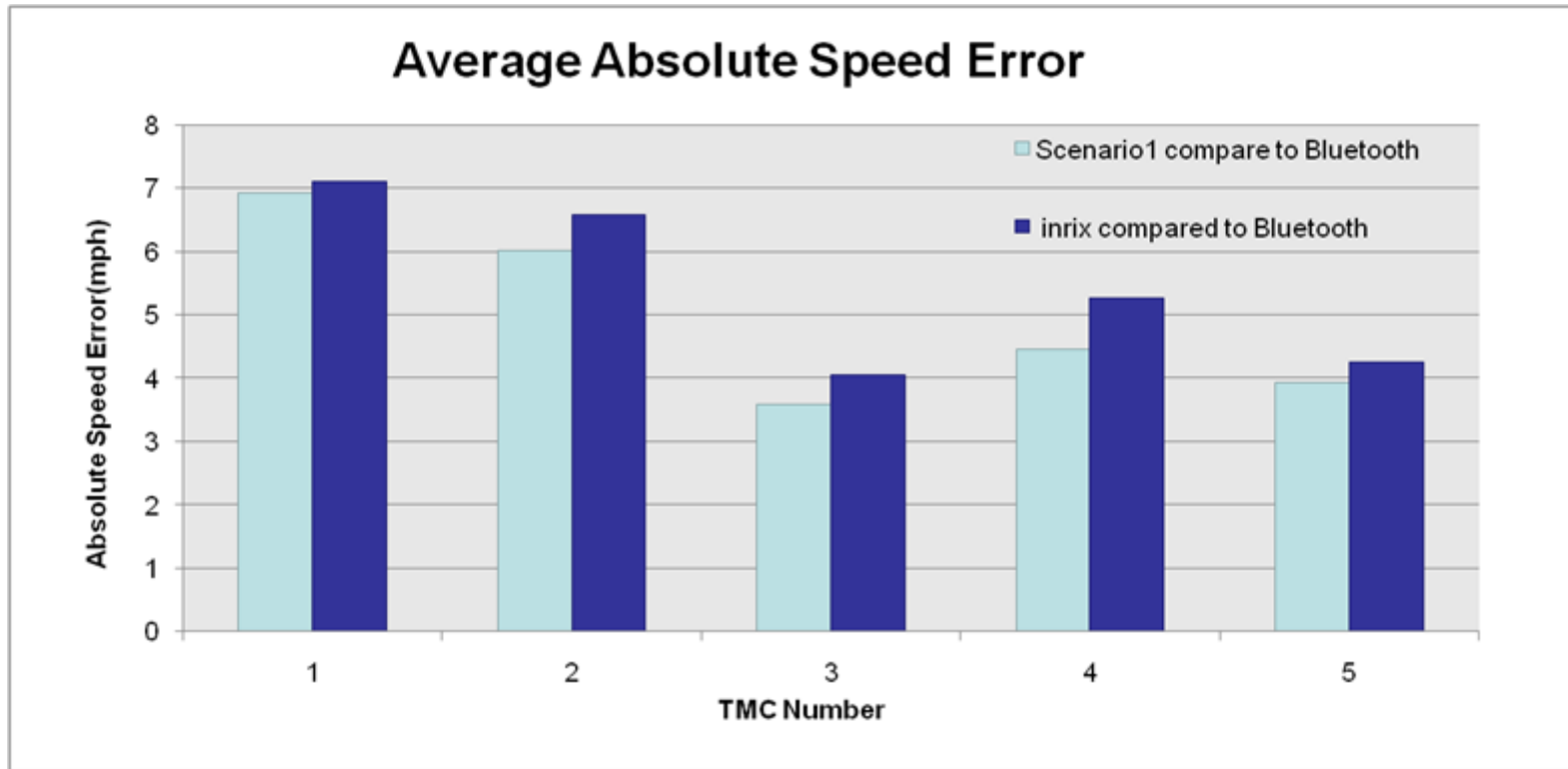


I-95 Corridor Coalition

www.I95Coalition.org



Results (error in mph) For 24 hour Period

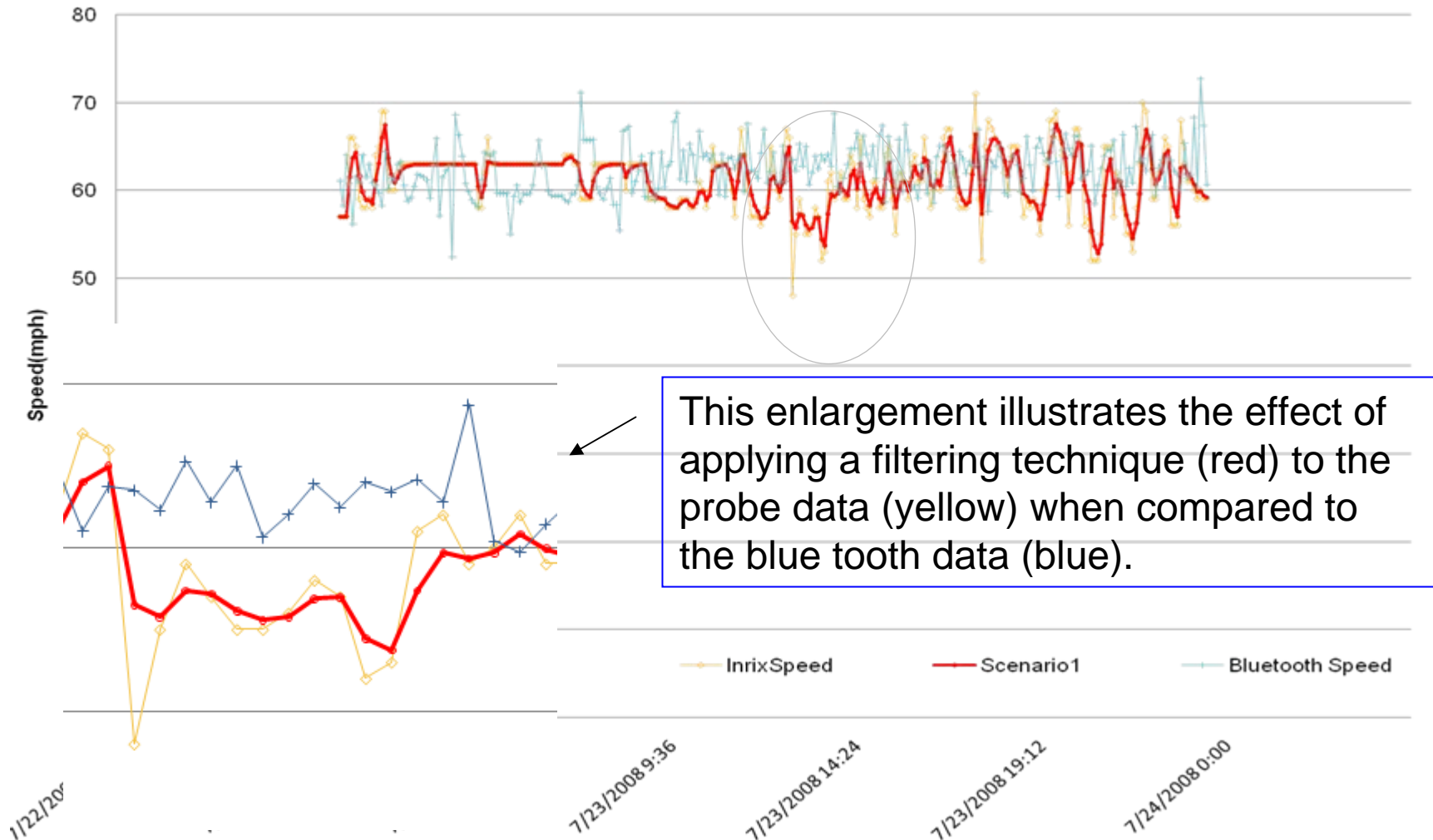


I-95 Corridor Coalition

www.I95Coalition.org



Effects of Applying Filtering To Probe Data

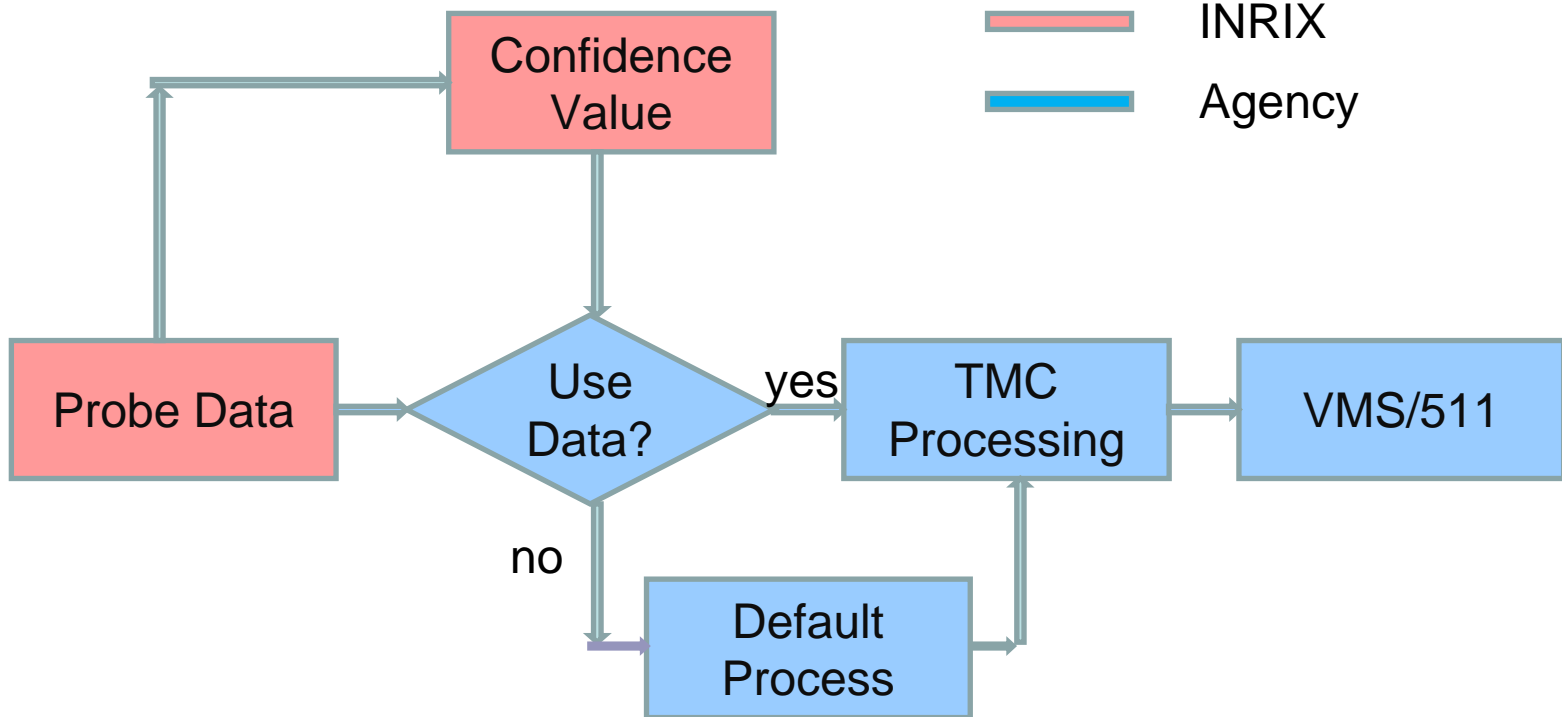


I-95 Corridor Coalition

www.I95Coalition.org



Data Flow With Confidence Values



Default Processes

- To be determined by the agency
- Should be based on confidence value
- Potential processes include:
 - Discontinue the use of data that falls outside of a predetermined confidence value
 - Use default (historical) data
 - Human intervention – i.e. operator selects value to display
 - Expand the range of displayed travel times

Confidence Value Update

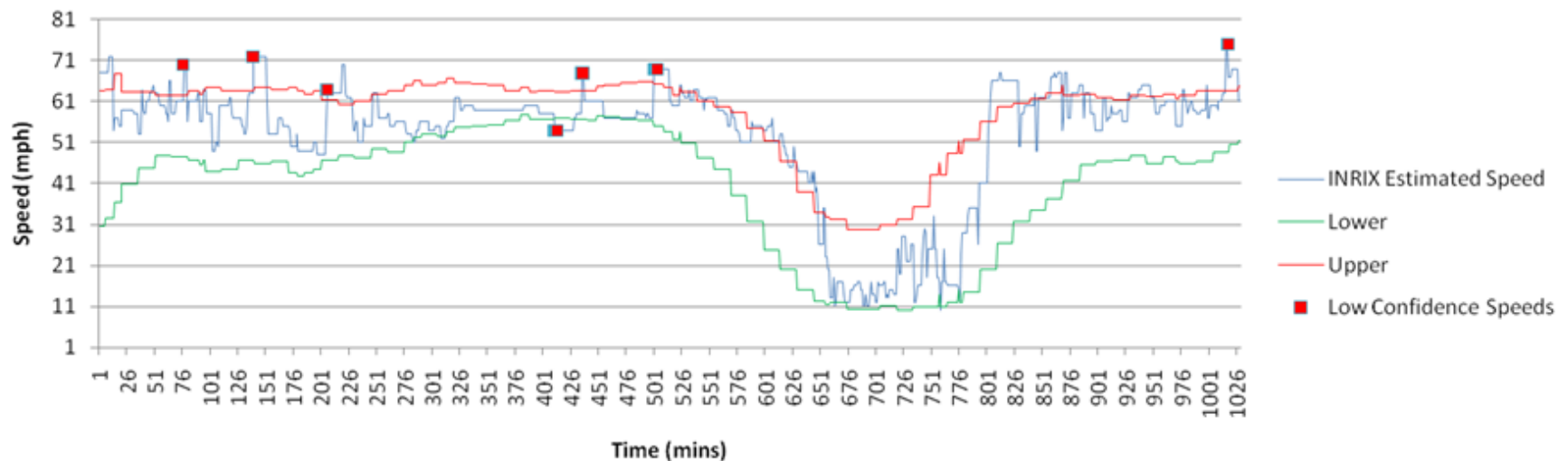
- “Score” was initial attempt
 - “The validation process revealed that the score was not a significant indicator of the data quality and, as previously stated, should be used only as an indication of the manner in which the reported data has been calculated.”
- Will provide both value and score
- Working on new confidence value (INRIX, Coalition staff and UMD)
 - December 3 Meeting, February 4 Telecon
 - INRIX internal research and testing

Confidence Value Update cont'd

- Factors
 - Amount of real-time data points (currently used in “Score”)
 - Track with historical average band for day/time (New)
 - Likelihood current value fits with recent past values (New)
- New output parameter
 - 0-100 value; higher the better
 - Allows users to set thresholds to, e.g.,:
 - Flag data as suspicious
 - Stop automated processing
- Testing ongoing
 - Initial testing going well
 - Plan to work with UMD to operationally test before full scale roll-out
 - Hope to have operational for agency use in 2009

Graphic Representation of the Process

INRIX Speed and Low Confidence Points



I-95 Corridor Coalition

www.I95Coalition.org



Next Steps

- Additional analysis to be performed using one-minute data for more segments
- Additional validation required for all techniques
- Report to be prepared advising on use of techniques along with anticipated results
- Looking for candidate test sites
- States must:
 - Decide which combination of techniques to use
 - Identify default actions for low confidence values

I-95 Corridor Coalition

www.I95Coalition.org



Monitoring Site Update

Rick Schuman

INRIX

I-95 Corridor Coalition

www.I95Coalition.org



Topics

- Stats and Other News
- Ongoing Improvements
- Next Round of Feedback/Input

I-95 TRAFFIC MONITORING

Home Traffic Archive My Account Help

I-95 Vehicle Probe Project

I-95 CORRIDOR COALITION

INRIX

For project background, please visit <http://www.i95coalition.net/i95/> and review information specific to the Vehicle Probe Project.

INRIX® is a registered trademark of INRIX, Inc. Copyright © 2008 INRIX, Inc. All rights reserved. | [INRIX Corporate Site](#) | [Email Support](#)

I-95 Corridor Coalition

www.I95Coalition.org



Stats and Other News

- Stats (through 2/19/09)
 - Users
 - 119 registered users
 - Availability
 - 99.8+% (requirement: 99%)
 - Archive
 - 77 archive requests
- News
 - Inauguration and INRIX Demo Site
 - Traffic tile overlays feature coming soon via SAFETRIP
 - Interface Guide Update will follow

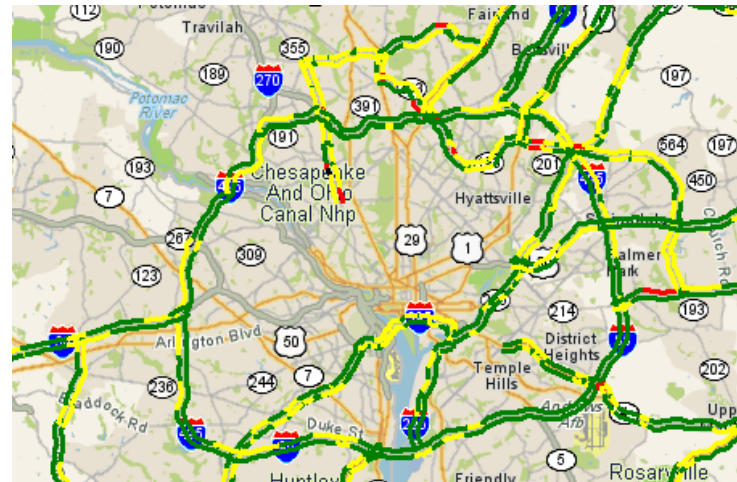
Ongoing Improvements

- Background Map – updated in early February
 - “Better” Map Used in Inauguration Site
 - Updated monitoring site shortly thereafter to same map

Previous Background Map



Updated Map



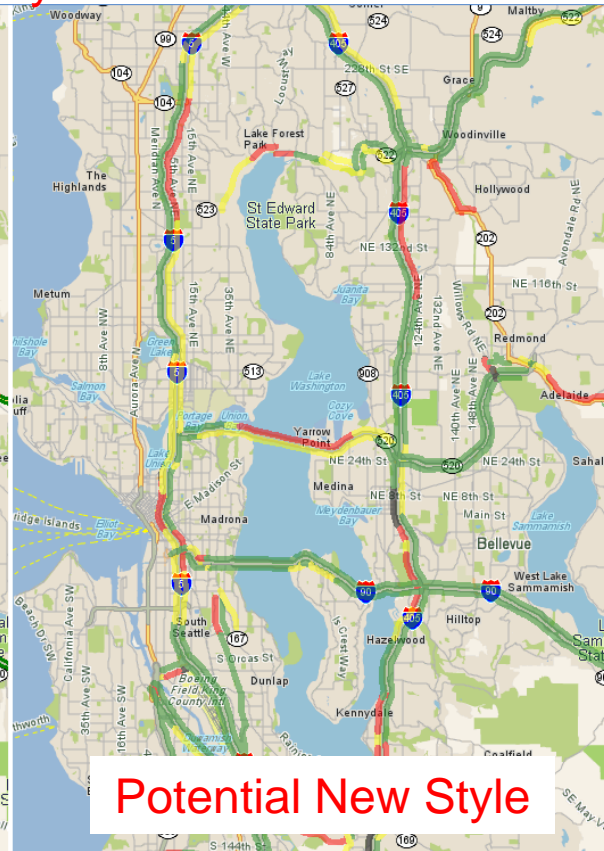
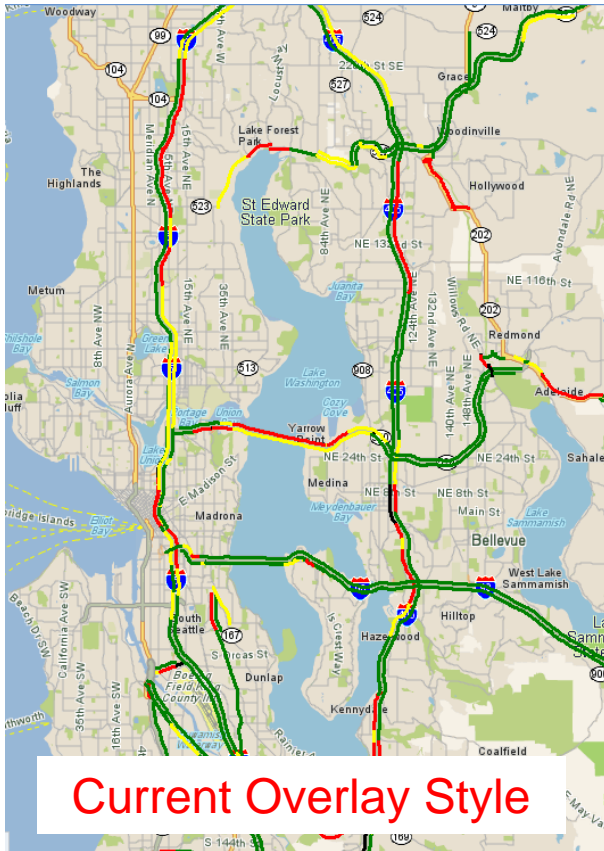
I-95 Corridor Coalition

www.I95Coalition.org



Ongoing Improvements (2)?

Possible Overlay Enhancement?



I-95 Corridor Coalition

www.I95Coalition.org



Next Round of Improvements?

- Moving away from official scheduled “releases” of site to ongoing improvements
- If Project Team has interest, good time to refresh suggestions list for possible improvements
 - Timing to implement each would vary based on complexity/need
- From previous round suggestions:
 - Include traffic overlay at lower zoom levels
 - Revisit segment color schemes?
 - Speed vs. congestion; colors, thresholds, legend values, etc.
 - Edit regions/states on navigation bar
 - Make road shields more visible (new overlay style would help)
- Interest?

ITS America 2009 Annual Meeting Presentations

Karen Jehanian

KMJ Consulting, Inc.

I-95 Corridor Coalition

www.I95Coalition.org



ITSA 2009 Annual Meeting Presentations

I-95 Corridor Coalition Vehicle Probe Project

The concept of active vehicle probes holds great promise to address the “data gap” that has existed in transportation. Operations and travel information specialists alike would benefit from these data to obtain adequate and accurate information about the status of the network. This session presents the I-95 Corridor Coalition’s ground-breaking initiative involving government, private sector and academia, that now provides comprehensive and continuous real-time travel information (travel times and speeds) along more than 2800 centerline miles of roadway. The project has been actively providing data across six states since July 2008. This session also presents how the agencies are using the data and the results of the program evaluation.

Moderator	Bill Stoeckert
Vehicle Probe Project Overview	Rick Schuman
Data Validation	Phil Tarnoff
Travel Time Implementation in MD	Rick Dye
North Carolina Experience	Jo Ann Oerter
New Jersey Experience	Jim Hogan

I-95 Corridor Coalition

www.I95Coalition.org



Contract Update

Kathy Frankle

UMD

I-95 Corridor Coalition

www.I95Coalition.org



Topics

- Data Use Agreement (DUA) Status
- Expansion Status
- Payment Process

DUA Status

Core States	DE DOT	9-May-2008
	MD SHA	12-Jun-2008
	NC DOT	15-Aug-2008
	NJ DOT	19-Jun-2008
	PA DOT	----
	VDOT	26-Jun-2008
Other Coalition Members	ConnDOT	Inquired
	District of Col	almost signed
	FHWA	3-Sep-2008
	Florida DOT	Inquired
	MdTA	12-Dec-2008
	MTA Bridges	23-Jul-2008
	NJ Turnpike	12-Jan-2009
	NY DOT	25-May-2008
	PRTC	26-Nov-2008
	SC DOT	22-Jan-2009

I-95 Corridor Coalition

www.I95Coalition.org



Expansion Status

Core States	DE DOT	----
	MD SHA	----
	NC DOT	1-Nov-2008
	NJ DOT	8-Jul-2008
	PA DOT	----
	VDOT	----
Other Coalition Members	ConnDOT	Interested
	District of Col	----
	FHWA	N/A
	Florida DOT	----
	MdTA	----
	MTA Bridges	Interested
	NJ Turnpike	Covered by NJDOT
	NY DOT	Not sure yet
	PRTC	----
	SC DOT	Interested

I-95 Corridor Coalition

www.I95Coalition.org



Agency Updates

I-95 Corridor Coalition

www.I95Coalition.org



Maryland

- Prepared Guidelines for implementing travel time on Dynamic Message Signs (DMS)
 - Available on Coalition website (with Vehicle Probe documents)
 - Currently planning for only Vehicle Probe (VP) data to be used in travel times – In the future may incorporate with sensor data
- Building capabilities to automate travel time on DMS

Maryland (cont'd)

- Planning to incorporate VP data into 511 system (not likely in 1st release)
- Being considered for use by planning group with Regional Integrated Transportation Information System (RITIS) as a performance measure for traffic management strategies

Virginia

- Preparing a Concept of Operations on the use of Vehicle Probe data
 - How to disseminate the data
 - How to incorporate the data for use in travel times on DMS
 - How to integrate the data into 511 system

North Carolina

- Utilizing VP data within the Statewide Monitoring System
 - Entering events into web application for 511 system (and removing the incident when it is cleared)
 - Verifying incidents and providing feedback to callers to the Statewide Transportation Operations Center
 - Currently using only VP data but plan to combine with sensor data in the future

North Carolina (cont'd)

- IT Department working on integrating the monitoring site mapping (red, yellow, green) and incidents into the 511 website
- In the future, Planning Department may utilize the VP data

Pennsylvania

- Will be using other INRIX data through PA 511 contract

Delaware

- Waiting for results from most recent validation

New Jersey

- Integrating Vehicle Probe data with various sensor data into a “Data Fusion Engine” to determine best possible travel times.
- Signed a contract with ICx. Within 9 months, potential to provide travel time information:
 - On the 511 phone system – within the interactive voice response (IVR) system
 - Posted on the 511 webpage
 - Included on the “My NJ511” Personalized Travel Alert System
- The Planning Office will be analyzing and possible using the VP data as a basis for performance measures.
- By Mid-2009, travel times will be posted on DMS on select highways using existing sensor data.

I-95 Corridor Coalition

www.I95Coalition.org



Review of Action Items from this Webcast

I-95 Corridor Coalition

www.I95Coalition.org



Next Webcast

I-95 Corridor Coalition

www.I95Coalition.org



Questions?

- Bill Stoeckert at 774-207-0367 or wstoeckert@yahoo.com
- Stan Young at 301-403-4593 or seyoung@umd.edu
- Rick Schuman at 407-298-4346 or rick@inrix.com
- For contract expansion issues Kathy Frankle at 410 - 414-2925 or kfrankle@umd.edu

Thank You



**I-95 CORRIDOR
COALITION**

I-95 Corridor Coalition

www.I95Coalition.org



**I-95 CORRIDOR
COALITION**