

Rural Intersection Collision Avoidance System (RICAS)



KICK-OFF MEETING

presented to
RICAS Advisory Group

presented by
RICAS Research Team

February 3, 2009

US 53 and STH 77



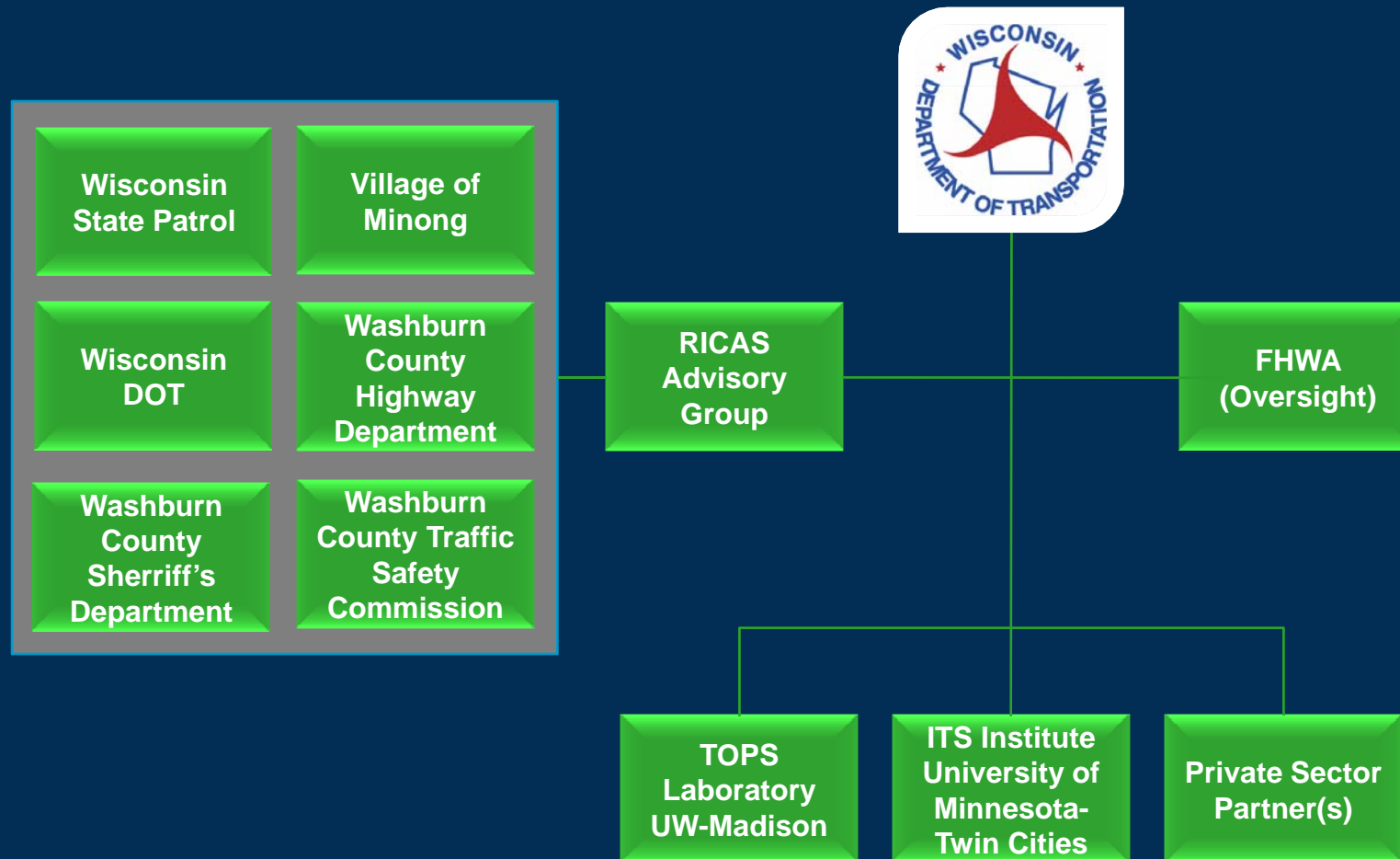


Agenda

1. Introductions (5 min.)
2. Role of the RICAS Advisory Group (10 min.)
3. US 53 and STH 77 Safety Characteristics (5 min.)
4. US 53 Corridor Preservation Study (10 min.)
5. Development of RICAS: the Minnesota Experience (20 min.)
6. RICAS in Wisconsin (15 min.)
7. Project Schedule (10 min.)
8. Outreach Activities (10 min.)
9. Future RICAS Advisory Group Meeting Dates (5 min.)



Role of the RICAS Advisory Group



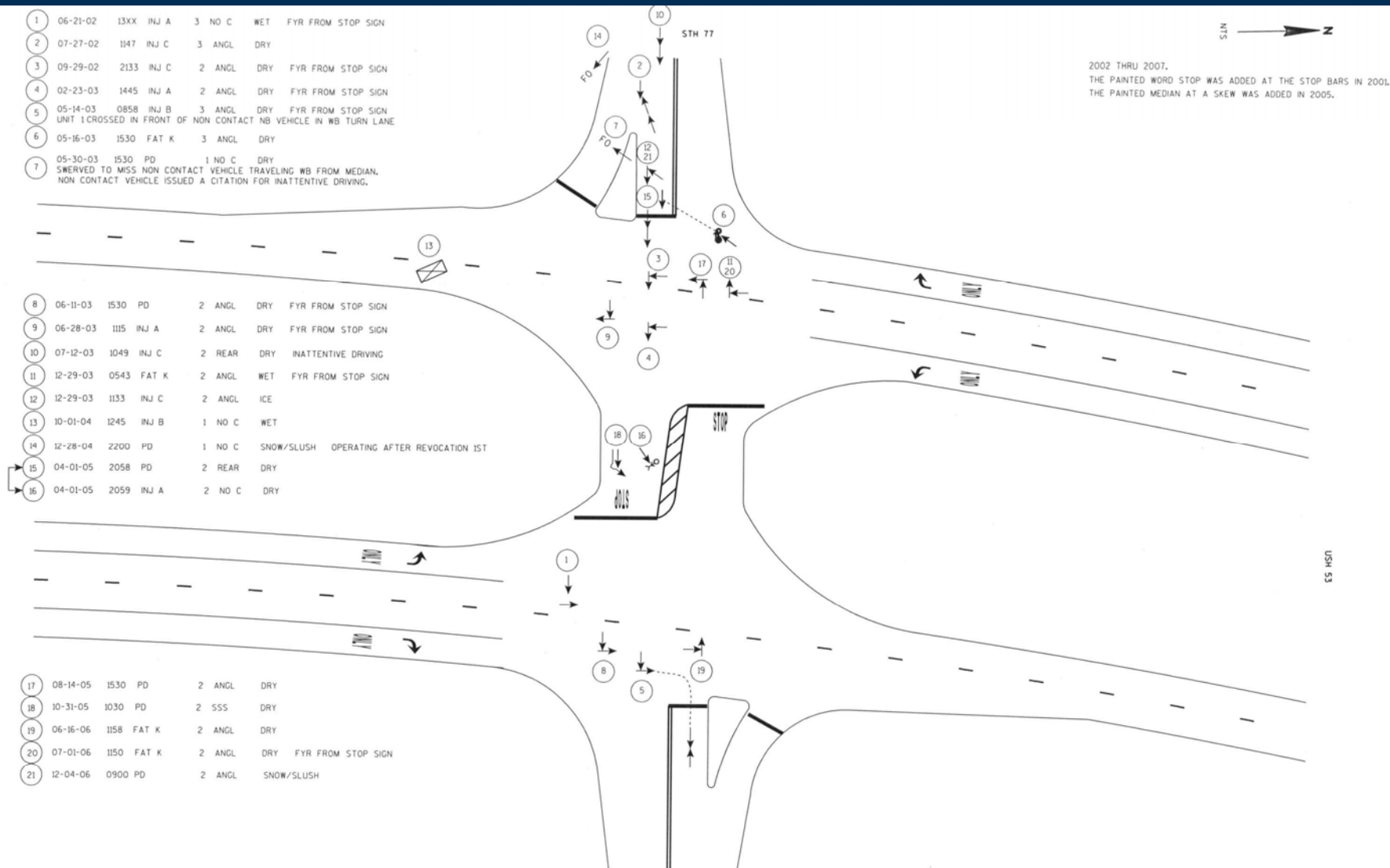


Role of the RICAS Advisory Group

- Advise on overall concept of operations
- Provide local perspectives on issues related to RICAS
- Guide requested outreach activities with local stakeholders
- Serve as a voice for the project



US 53 and STH 77 Safety Characteristics



US 53 Corridor Preservation Study

- **Project Overview**
 - Map Long Term Vision
 - 75 Miles Between Rice Lake and Superior
- **Intersection Considerations in Minong Area**

Project Website:

<http://www.dot.wisconsin.gov/projects/us53corridor/>



Development of RICAS: the Minnesota Experience



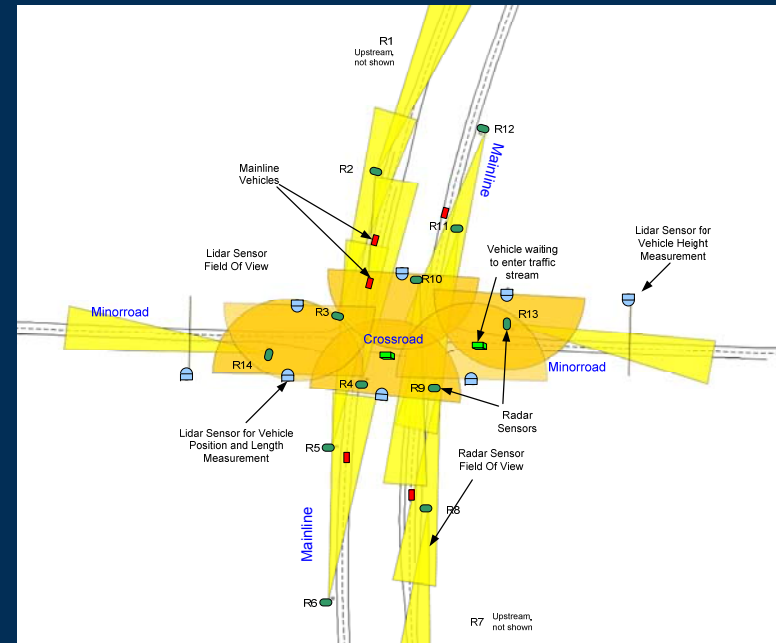
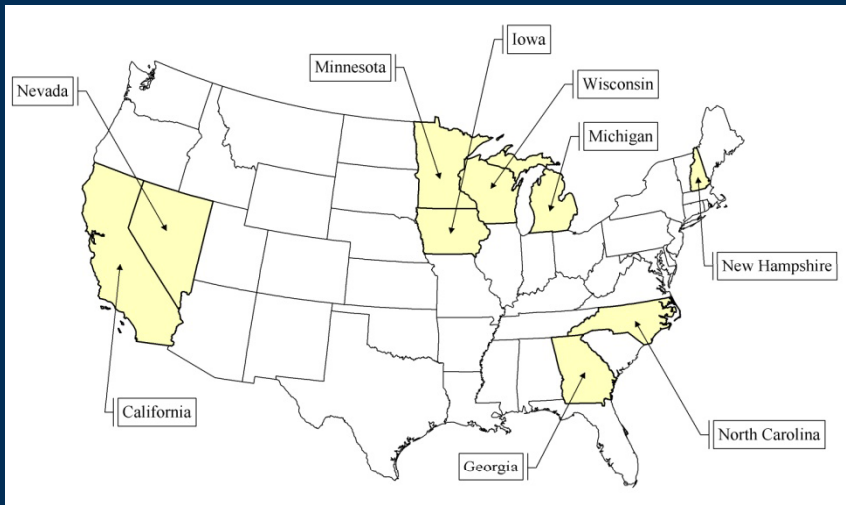
● Origins

- Started as means to address Inter-Regional Corridor (IRC) Safety
 - Priority of Al Pint, Mn/DOT IRC Manager
- Project Known as Intersection Decision Support (IDS)
 - Idea was to support safe decisions at by driver attempting to cross or enter major road traffic stream from minor road
- Goals
 - Determine mechanism to identify candidate intersections
 - Not reduce traffic volumes on minor road (i.e., no traffic signals)
 - Provide the safety benefits of a traffic signal
 - Take a prohibitive reference frame (i.e., never tell a driver it is “safe” to go; instead, tell a driver when it is unsafe to go)
 - Price goal: 4-way traffic signal (< ~\$250K)
 - Nationally deployable system

Development of RICAS: the Minnesota Experience



● Pooled Fund Studies



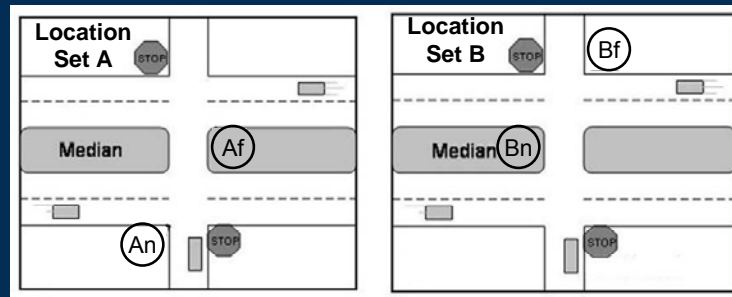
Results:

- Drivers reject gaps consistently across different geographic areas
- Driver gap rejection insensitive to vehicle size, time of day, time waiting, weather
- Gap rejection does depend on intersection geometry (primarily non-median separated)

Development of RICAS: the Minnesota Experience



● Signing Studies



Location Study

Content Studies

Baseline

Driver recognize hazard, gather information, decide on safety condition, and choose action

Alert

Driver must gather information, decide on safety condition, and choose action.

Display

Driver must decide on safety condition, and choose action.

Warn

Driver must choose action.

Advise

Driver must choose to comply.



System detects hazard.

System detects hazard & presents information relevant to vehicle gap. Prohibited actions also indicated.

System detects hazard and provides warning levels based on gap thresholds. Prohibited actions also indicated.

Prohibited actions indicated (unsafe action advisory).

Development of RICAS: the Minnesota Experience



- Signing Studies



Simulator Studies

On-Road Studies



Development of RICAS: the Minnesota Experience



Development of RICAS: the Minnesota Experience



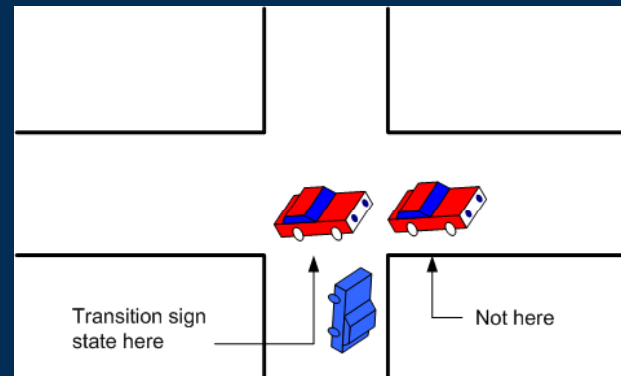
- Play Cannon Falls Videos

Development of RICAS: the Minnesota Experience



- Findings

- Drivers during on-site testing comprehend the sign
- Drivers behavior has changed: drivers using the sign reject gaps smaller gaps more frequently than drivers not using the sign
 - This is indicative of safer behavior: we want drivers to reject small gaps
- Timing
 - The assumed 1 second sign comprehension time is likely too much; 0.5 seconds appears to be closer
 - The Sign should transition states when the car enters the crossroad, not after it clears:





RICAS in Wisconsin

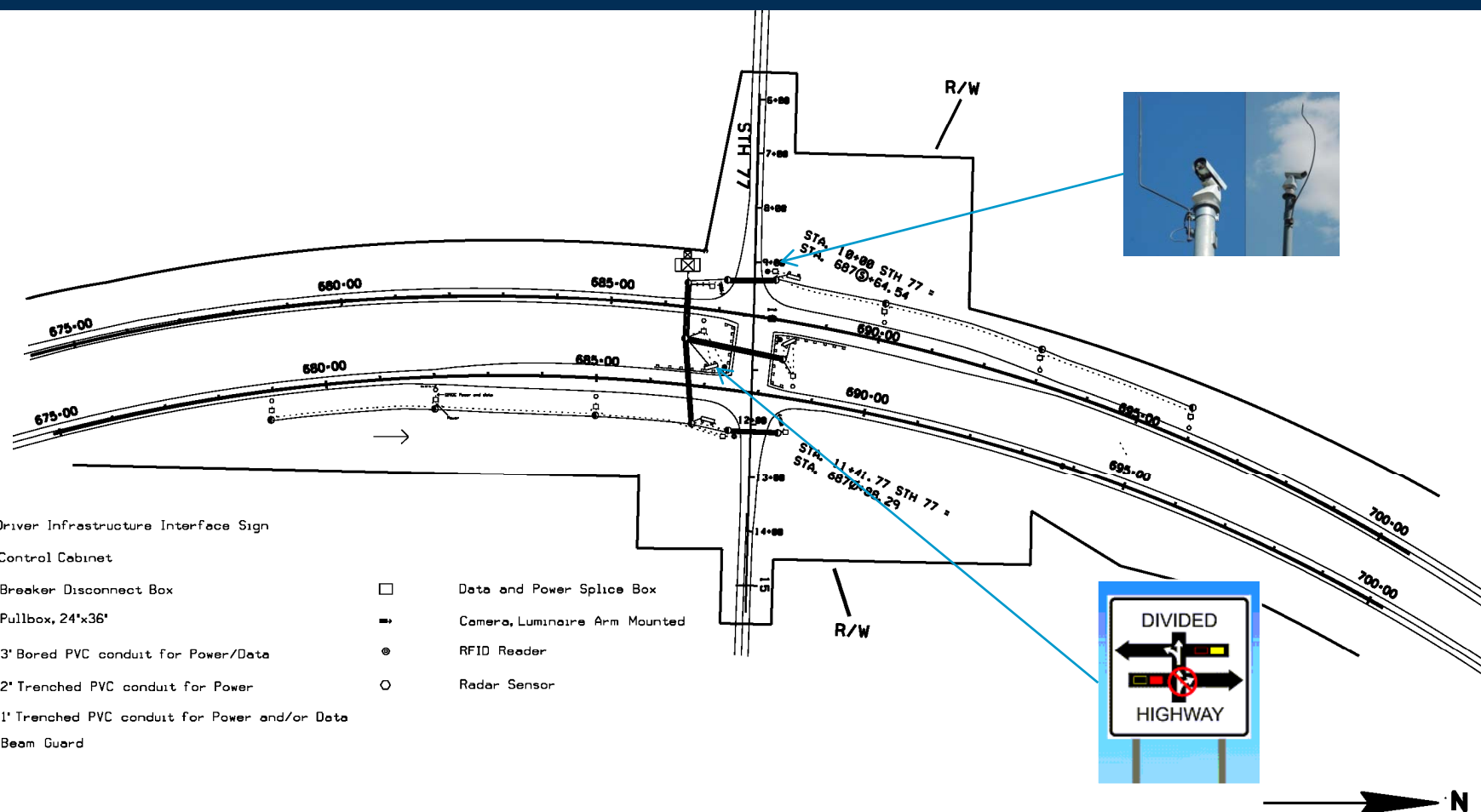
- **Project Goal - Demonstrate technology that improves the safety of rural thru-stop intersections by providing drivers information that promote safer gap selection (i.e., intersection crossing)**
- **Expected Benefits**
 - Reduce frequency of crashes at US 53 and STH 77
 - Better understanding of driver behavior, both by frequent and infrequent users of the intersection
 - Documentation of the safety benefits to support a benefit- cost analysis
 - Pending proper evaluation, provide motivation for further deployments throughout the U.S.



RICAS in Wisconsin

- Video of Minong Crash

RICAS in Wisconsin



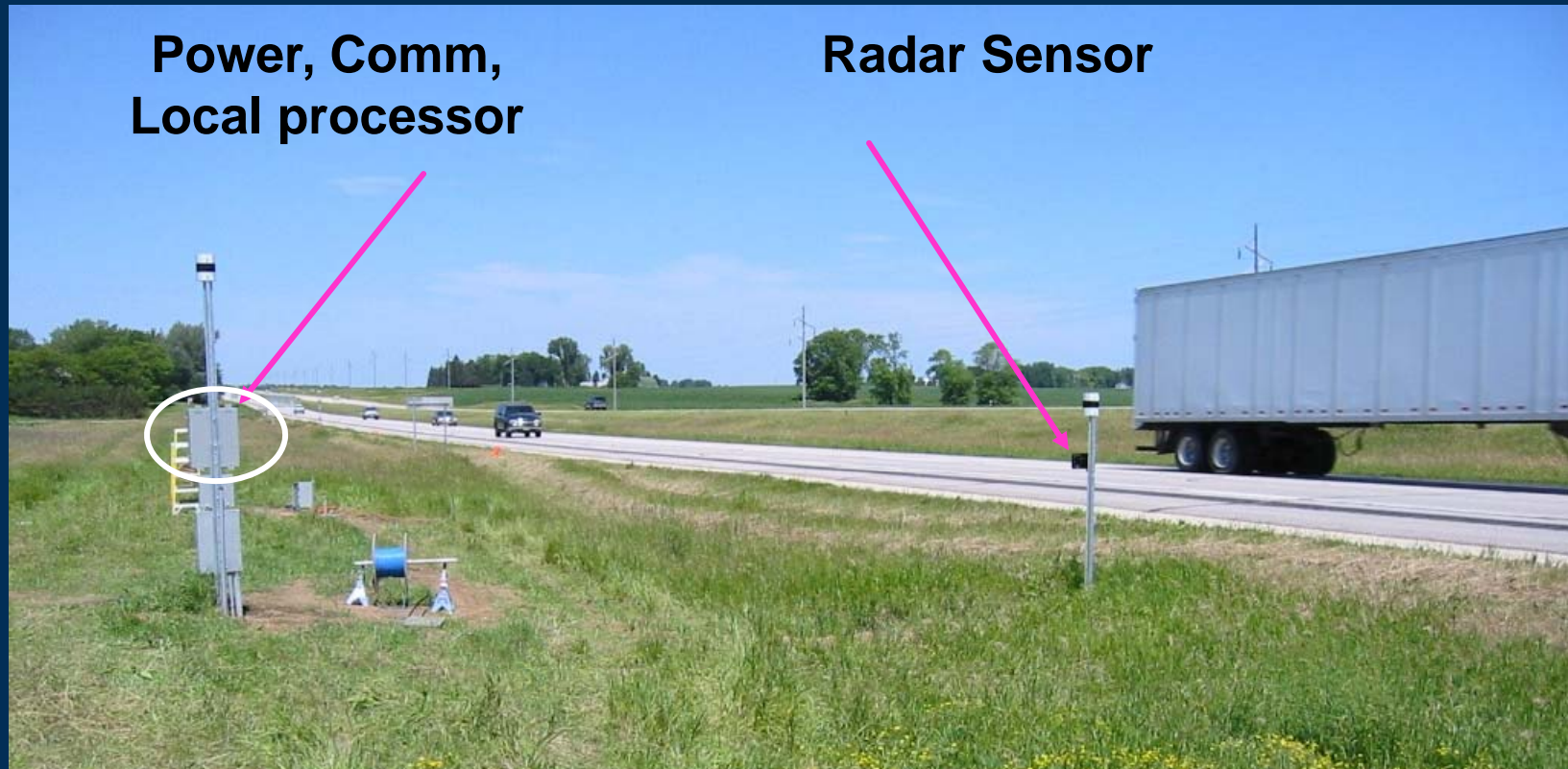
Rural Safety Innovation Program: Rural Intersection Collision Avoidance System

Plan View

Mainline Radar Station



Mainline Radar Station Array





RICAS in Wisconsin

A Team Approach

WisDOT Electrical Section Procure/Installation	WisDOT Procurement Bid	Research Team Installation	Private Partner
Cabinet	Conduit, directional drill	Mainline sensors	DII display boards
Conduit, trench/plow	Beam guard	Computation system in cabinet	
Power cables	Mainline sensors (supply only)	RFID tags and readers	
Pull boxes/hand holes	Computation system in cabinet (supply only)	Cellular modem	
Bases for cabinet and camera masts (if required)	RFID tags and readers (supply only)	Airtime for the cellular modem	
DII sign posts	Modem (supply only)	Ethernet extenders	
Detector mounting posts	Ethernet extender (supply only)	Ethernet cabling	
Camera Mounting to light pole	Video cameras (supply only)	Video camera connections	
Post Installation	Sensor Cabinets (supply Only)	Ethernet Cabling Terminations	
Sensor Cabinet Installation	Posts (supply only)		
Cabinet Disconnect			
Ethernet cabling			



Project Schedule

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Design												
Bids/Order Materials												
Construction												
Testing												
Go Live												
Data Collection											12	mo



Outreach Activities

- **Intended to avoid intensive driver education – technology is supposed to be intuitive**
- **Available to provide limited outreach meeting support based on Advisory Group Feedback**
- **Work with Local Media**
- **Limited outreach material will be developed**
 - **Tri-fold brochure**
 - **Website**
 - **Presentations**



Future RICAS Advisory Group Meeting Dates

- Meeting 2: April 7 - Pre-Underground Construction Status
- Meeting 3: August 4 – Pre-Aboveground Installation Status
- Meeting 4: October 6 – Pre-Testing Status
- Meeting 5: December 8: Post Operations Status



QUESTIONS