



Federal Highway Administration Long-Term Bridge Performance Program

Long-Term Bridge Performance Program Update

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Southeast Bridge Preservation Partnership Meeting, April, 2015

FHWA LTBP Program

- Initiated in 2008
- Intended as a 20+ year *long-term research effort* to improve our knowledge of “Bridge Performance”
- Funding was designated in “SAFETEA-LU” - surface transportation authorization legislation (August 2005)
- “MAP-21” - Moving Ahead for Progress in the 21st Century
 - The first multi-year transportation authorization enacted since 2005

Long-Term Bridge Performance (LTBP) Program

- Definition of Bridge Performance:

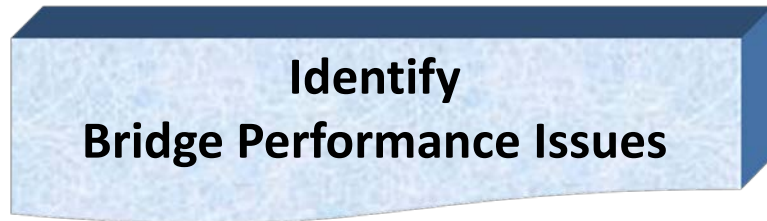
Bridge Performance Encompasses How Bridges Function and Behave Under the Complex and Interrelated Factors they are Subjected to Day In and Day Out:

- Traffic Volumes
- Loads
- De-Icing Chemicals
- Freeze-Thaw Cycles
- Environment
- Extreme Events
- Method of Design
- Construction Materials
- Age
- Maintenance History

Long-Term Bridge Performance (LTBP) Program

- **Vision:** The LTBP Program will Serve as the National Platform for Strategic Long-Term Investigation of In-Service Bridge Performance.
- **Mission:** Foster Improved Bridge Performance, Health, Stewardship, and Management Through the Analysis of Data Collected Over a 20-Year Period on a Large Representative Sample of U.S. Highway Bridges. To achieve this, the Program is Designed to Produce or Support Improved Deterioration Models, Reliable Life-Cycle Cost and Forecasting Models, Design Procedures, and Decision-Making Tools.

Developmental & Execution



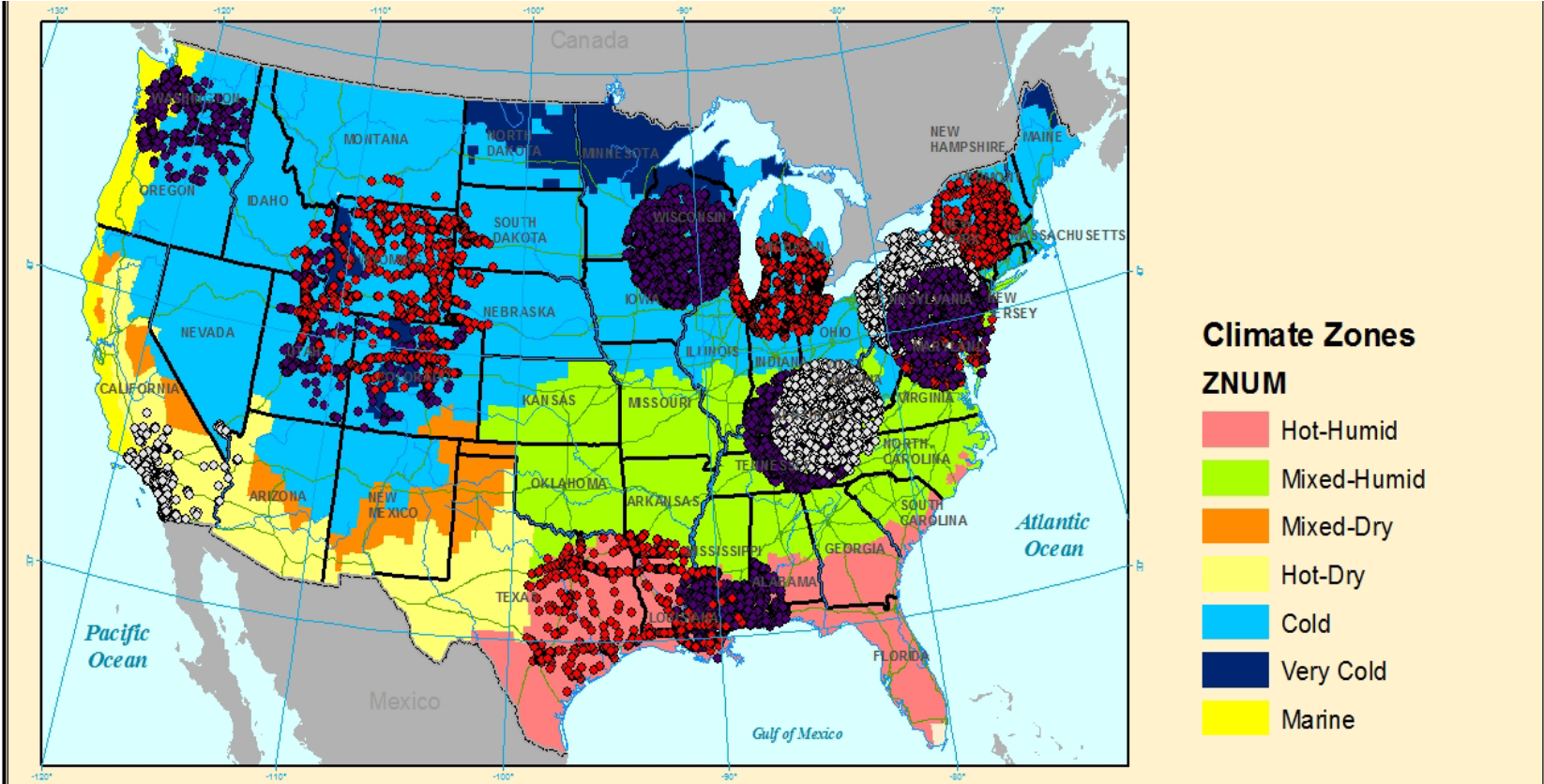
**Focus Group
Meetings
With 15 States**

Category	Issue
Decks	Untreated Concrete Bridge Decks
Decks	Treated Concrete Bridge Decks
Joints	Bridge Deck Joints
Bearings	Bridge Bearings
Steel Bridges	Coatings for Steel Superstructure Elements
Concrete Bridges	Verify Condition of Strands and Tendons

Selection Criteria for Candidate Bridges

- **Bridge Type:**
 - **Steel Multi-Girder Bridge with CIP Deck**
 - **Prestressed Concrete Multi-Girder Bridge with CIP Deck**
 - **Box Girder and Adjacent Box Beam Bridges**
- **State Owned (also representative of local bridges)**
- **Eliminate if service under is RR**
- **$10\text{ m} \leq \text{Max Span Length} \leq 50\text{m}$**
- **Maximum of 4 lanes on bridge**
- **$\text{ADT} \leq 50,000\text{ VPD}$**
- **Built after 1960**

Bridge Types and Sample Size (Most Common Bridges)

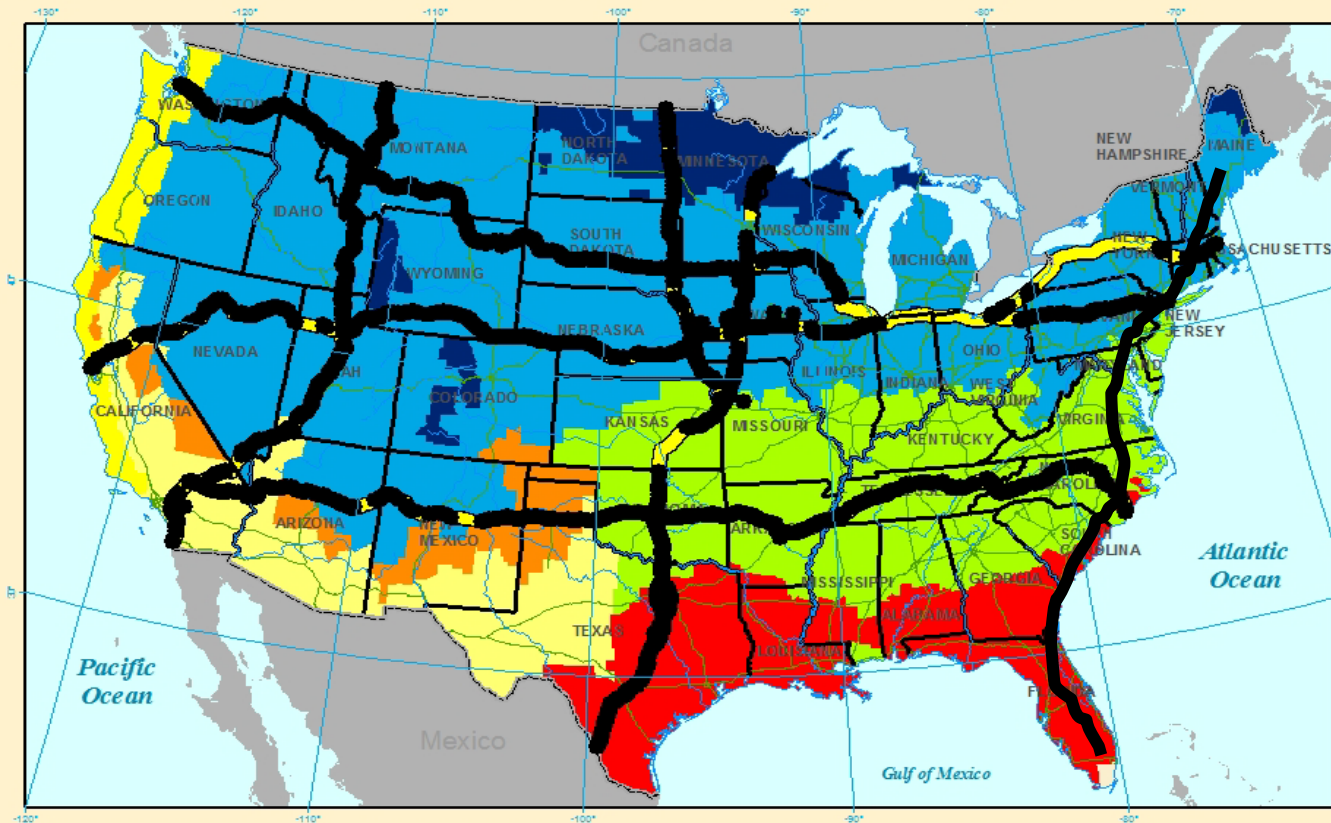


14 Suggested Clusters

Albers Projection
 Central Meridian: -96
 1st Std Parallel: 20
 2nd Std Parallel: 60
 Latitude of Origin: 40



Corridors



Corridor Candidates

4890 bridges of all types meeting other selection criteria

Albers Projection
Central Meridian: -96
1st Standard Parallel: 20
2nd Standard Parallel: 60
Latitude of Origin: 40



Long-Term
Bridge Performance
Program

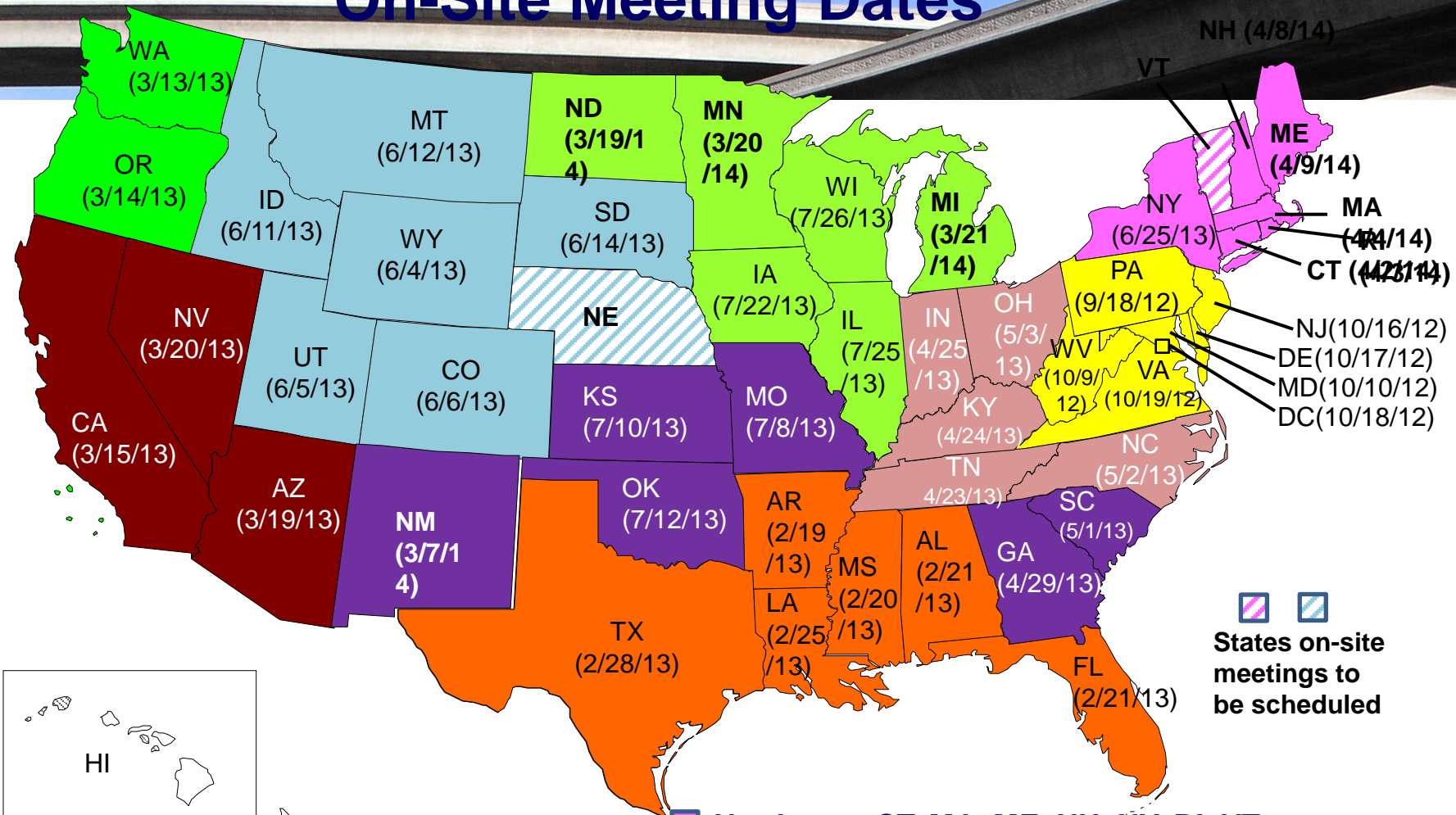
East-West

I-40, I-70, I-80, I-90, I-94

North-South

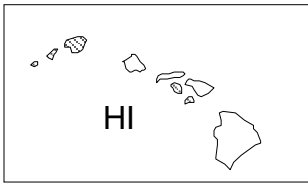
I-95, I-35, I-29, I-15, I-5

On-Site Meeting Dates



States on-site meetings to be scheduled

- Northeast:** CT, MA, ME, NH, NY, RI, VT
- Mid-Atlantic:** DC, DE, MD, NJ, PA, VA, WV
- East Central:** IN, KY, OH, TN, NC
- Mid West (Central):** IA, IL, MI, MN, WI
- Gulf Coast:** AL, AR, FL, LA, MS, TX
- Rocky Mountains:** CO, ID, MT, NE, SD, UT, WY
- NW:** OR, WA
- SW:** AZ, CA, NV
- Corridor:** GA, KS, OK, MO, ND, NM, SC



LTBP Products for Research Purposes

LTBP Protocols - Created over 150 protocols for bridge infrastructure field assessment and evaluation

LTBP Bridge Portal - Developed an advanced web-based centralized data storage and retrieval application

LTBP Data-Driven Deterioration Modeling Methodology - Developed methodology for a data-driven deterioration and forecasting model to be used within the LTBP Bridge Portal

NDE Technologies - Developed, deployed, and validated a number of automated and semi-automated bridge deck assessment tools

Long-Term Bridge Performance Index - Developing, testing, and validating a data-driven bridge performance index

Bridge Practice Timelines - Creating timelines of changes in bridge practices from 1960 to the present to provide context and assistance for analyzing results obtained from field evaluations of bridges

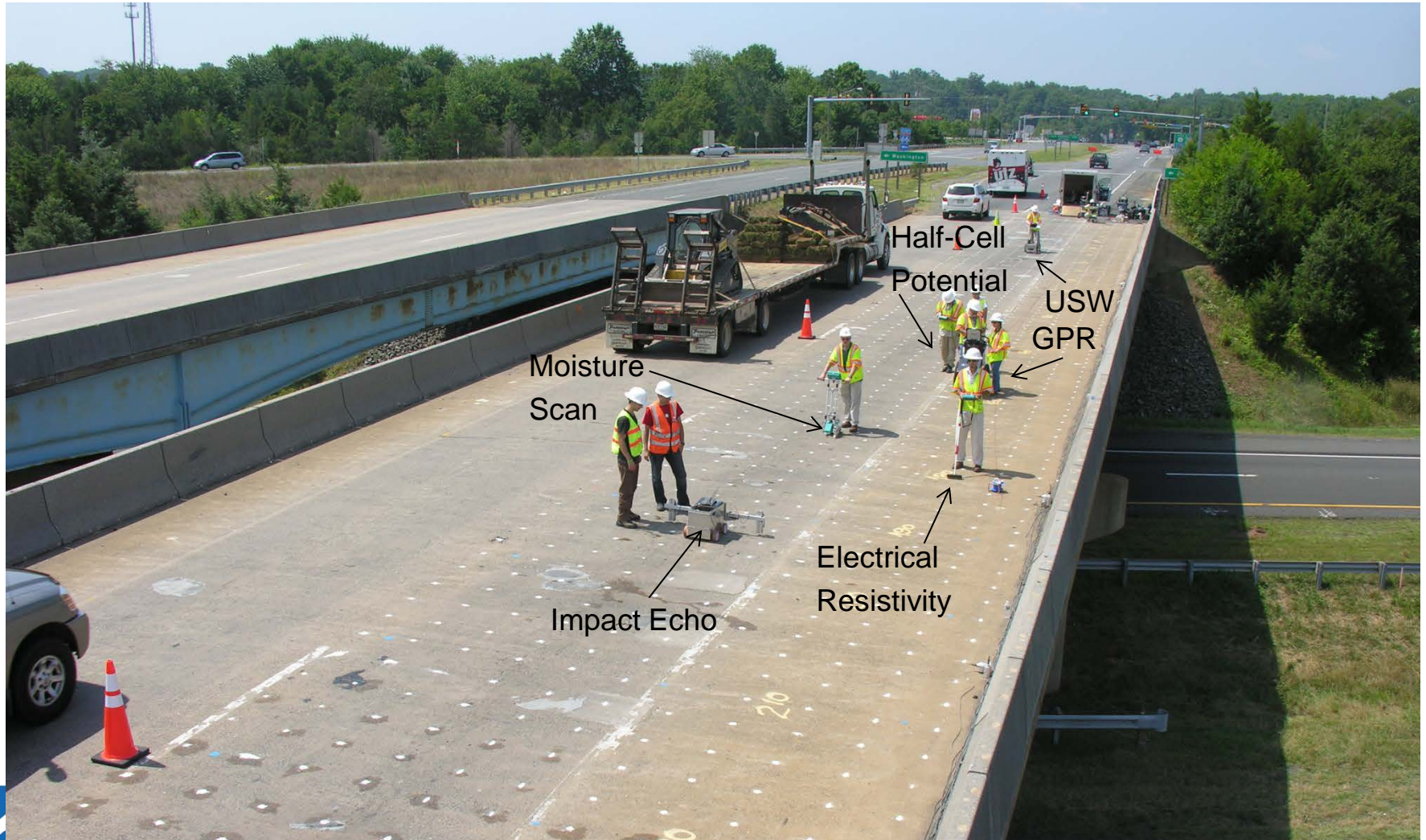
LTBP Contractors and Tasks

- **Michael Baker Jr., Inc.**
 - Visual Inspection and Material/Physical Sampling for 2 Gulf Clusters
- **Parsons Brinckerhoff, Inc.**
 - Visual Inspection for NW and SW Clusters
- **Pennoni Associates, Inc.**
 - Data Collection and Validation, Protocols, WIM, Technical Support
- **Professional Service Industries, Inc. (PSI)**
 - Bridge Documentation Data Collection and Legacy Data Mining for 3 Mid-Atlantic Clusters and 1 NE Cluster
- **Rutgers University**
 - Data Collection, Legacy Data Mining Remaining Clusters and Corridors (Paper Studies), Protocols, Data Management

Data Collection: Untreated Bridge Decks, Joints, and Bearings

Contractor	Cluster	States
Rutgers	Mid-Atlantic Steel; Mid-Atlantic Prestressed Concrete	DE, NJ, MD, PA, VA, WV (2 nd round of testing and additional bridges: July 2014)
Michael Baker	Gulf Steel; Gulf Prestressed Concrete	AL, AR, FL, LA, MS, TX (August 2014)
PSI	Mid-Atlantic Steel, Mid-Atlantic Prestressed Concrete; Mid-Atlantic Concrete Box; NE Steel	CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VA, VT, WV (August 2014)
PB	NW Prestressed Concrete; SW Concrete Box	AZ, CA, NV, OR, WA (August 2014)

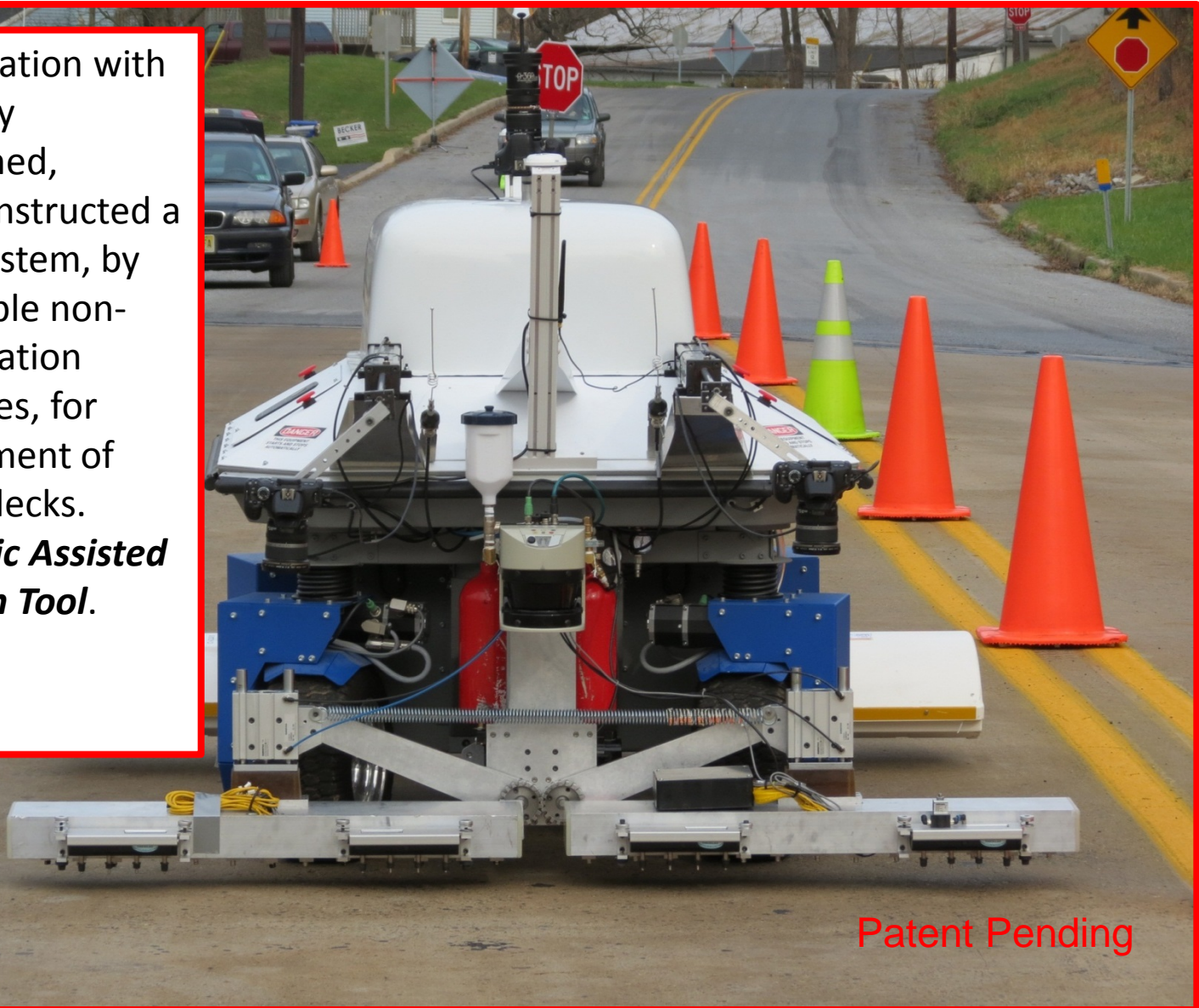
NDE Data Collection



Need For Automated Data Collection

FHWA in collaboration with Rutgers University envisioned, planned, designed, and constructed a novel (robotic) system, by integrating multiple non-destructive evaluation (NDE) technologies, for condition assessment of concrete bridge decks.

RABIT™ – Robotic Assisted Bridge Inspection Tool.



Key Contacts—LTBP Program

- **Website:**
<http://www.fhwa.dot.gov/research/tfhrc/programs/infrastructure/structures/ltbp/>
- **Federal Highway Administration:**
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FHWA LTBP Program

Gulf Region – Data Collection

- States – Alabama, Arkansas, Florida, Louisiana, Mississippi & Texas
- Contractor- Michael Baker International
PM - Richard Dunne; richard.dunne@mbakerintl.com; 609-468-7051(c)
Field Mgr. – Mitch Carr; mitch.carr@mbakerintl.com; 601-622-8262 (c)
- Bare Concrete Decks – Steel Girder & Concrete Girder bridges
Alabama* - 1 Concrete Reference Bridge & 1 Concrete Cluster Bridge
Arkansas*- 4 Steel Cluster Bridges
Florida – 2 Concrete Cluster Bridges
Louisiana* – 1 Steel Reference Bridge, 3 Steel & 3 Concrete Cluster Bridges
Mississippi* – 1 Steel Reference Bridge, 1 Concrete Reference Bridge and
3 Steel & 3 Concrete Cluster Bridges
Texas – 2 Concrete Cluster Bridges

* Identified bridges not finalized

FHWA LTBP Program

Gulf Region – Data Collection

- Data Collection Anticipated to begin late Spring or early Summer 2015
- Pre-Data Collection Activities:
 - State Approval of MOT/MPT Plans (including hours)
 - State Approval of the concrete patch material for back-filling cores
- Data Collection Activities:
 - Visual Inspection
 - Non-Destructive Testing
 - Coring and Sampling
- Goal is to perform all data collection activities in one day per bridge



Thank You!

Questions?