

# Integrated Remote Sensing and Visualization (IRSV) System for Transportation Infrastructure Operations and Management

Second National Advisory Committee Meeting  
March 13, 2009, Long Beach, CA



# Agenda

- Report to NAC
  - 12:00 pm PDT to 1:30 pm Progress Report
  - Project Introduction Hauser
  - Team Reports
    - Structure/LiDAR Chen/Wanqiu
    - Knowledge Modeling Tolone/Lee/Rashna
    - Visualization Xiaoyu/Ribarsky/Chang
    - Flyover Image Analysis Chen/Rice/Boyle
    - AMBIS Z/ Eguchi
- Open Floor Discussion (Interactive session plus Q&A)
  - 1:45 to 2:30 pm Chen/Eguchi (Facilitators)
- Schedule/Tasks for Remainder of Project
  - 2:30 pm to 3:00 pm Eguchi / Chen

# Project Overview

- Project Goals:
  - 1) to encourage high-level Commercial Remote Sensing and Spatial Information (CRS-SI) technology applications to bridge infrastructure monitoring;
  - 2) to demonstrate such applications to and industry-wide audience.
- Research objective: to develop an **Integrated Remote Sensing and Visualization system (IRSV)** that integrates CRS-SI for bridge monitoring and maintenance.
- Target population: **Charlotte and Mecklenburg County, NC.**
- Project sponsored by **USDOT-RITA.**
- Project manager: Mr. **Caesar Singh.**

# Research Challenges

1. Remote sensing for bridge routine inspection is a new idea – other than seismic areas and perhaps a few others
2. What can remote sensors reveal about a bridge? - depends on specific CRS technology.
3. Geo-referenced, high resolution visualization concept for bridge data presentation remains in the research stage.

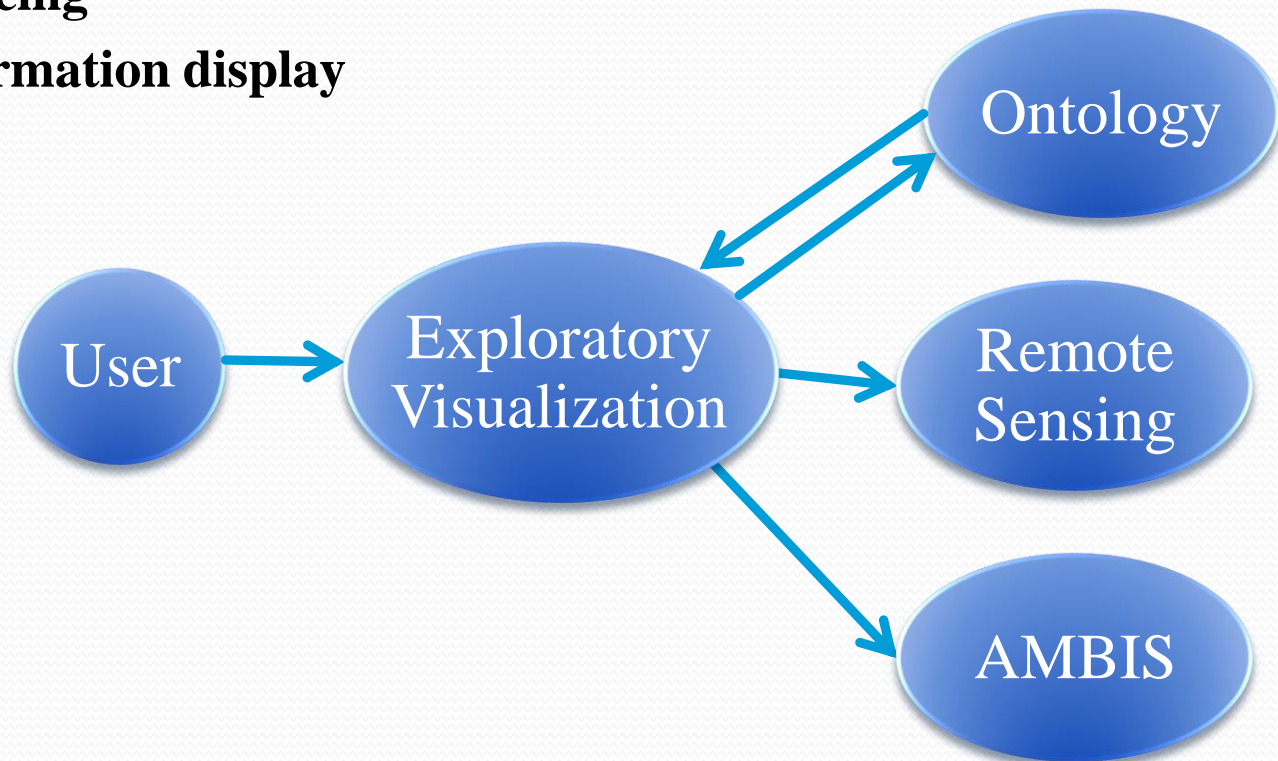


# Solutions to Research Challenges

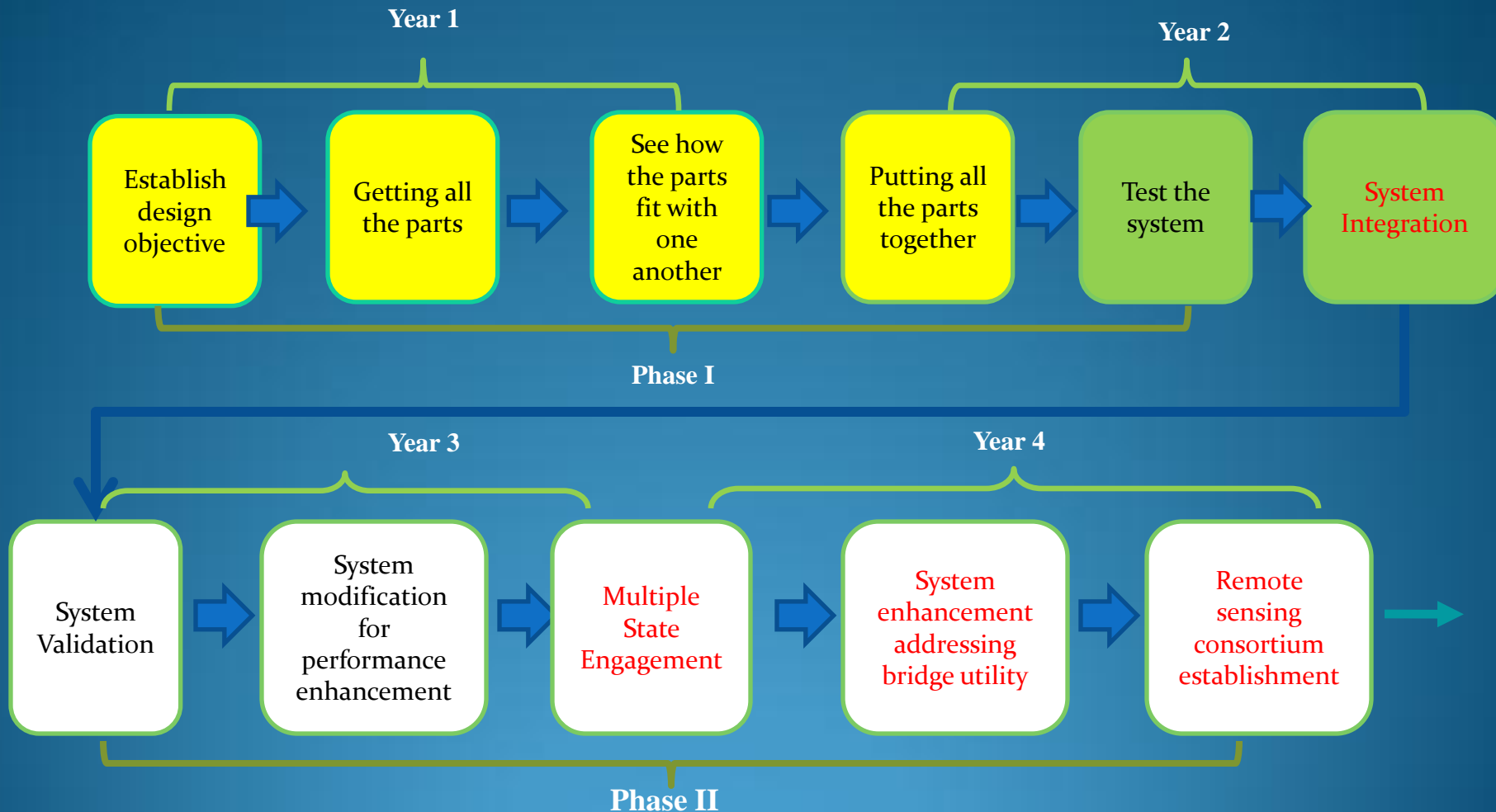
1. Establish multi-variate data structure on GIS-based visualization platform, utilizing ontology output.
2. Use research team and advisory committee to address system-related issues including data fusion, evaluation algorithms, LiDAR, and high resolution aerial photography for data application and visualization.
3. Collaborate with CDOT and NCDOT to address remote sensing data interpretation, advanced image processing and bridge management.

# IRSV System

- IRSV: a high-tech bridge data visualization and management system that can be utilized by bridge engineers to better manage their assets via a total viewpoint that includes:
  - **remote sensing**
  - **geo-referencing**
  - **spatial information display**



# MODIFIED PROJECT TIMELINE



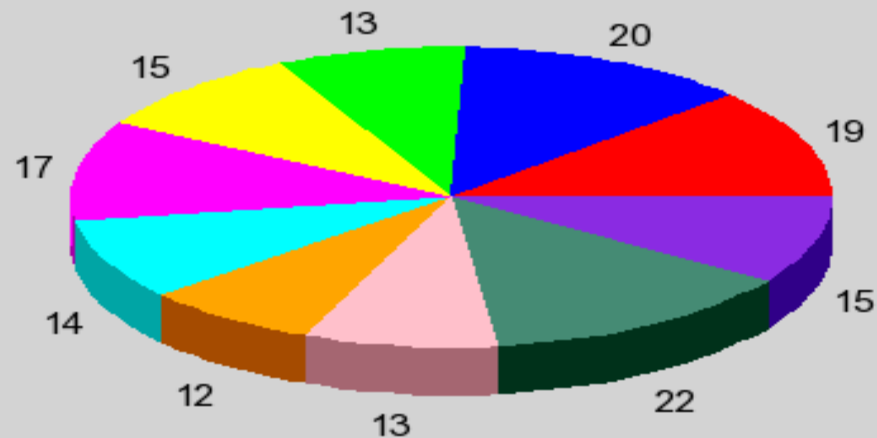
# Additional Tasks for 2009

- Partnership Outreach
- Current interested states and local agencies with BMS responsibilities: North Carolina, New York, Iowa, Alabama, Texas, California
- Initial contact with Michigan (Oakland County)
- National Bridge Management Survey with AASHTO Collaboration
- Partnered with Boyle Consulting for Flyover Aerial Photography



# Survey Outcome

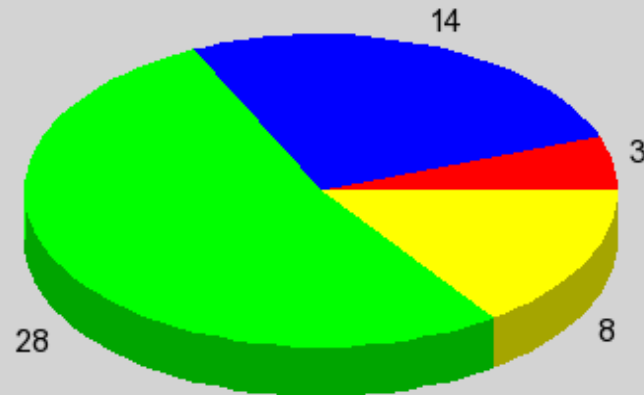
In August 2008, an Ad Hoc committee representing AASHTO, ASCE, and SEI produced a "White Paper on Bridge Inspection and Rating." There are 10 recommendations made by the committee. Please check all recommendations that you feel, at this time, are needed by your state's Bridge Management program.



- Different inspection intervals
- Better QA/QC measures
- Consistent inspector qualifications
- National bridge inspection manual
- Closer collaboration between bridge inspection and maintenance/repair
- National uniform load ratings
- Centralized system for documenting critical deterioration elements
- Standardized NDE evaluations
- Consistency in terminology (functionally obsolete, structurally deficient, etc.)
- Timing/scheduling of improvements based on BMS output

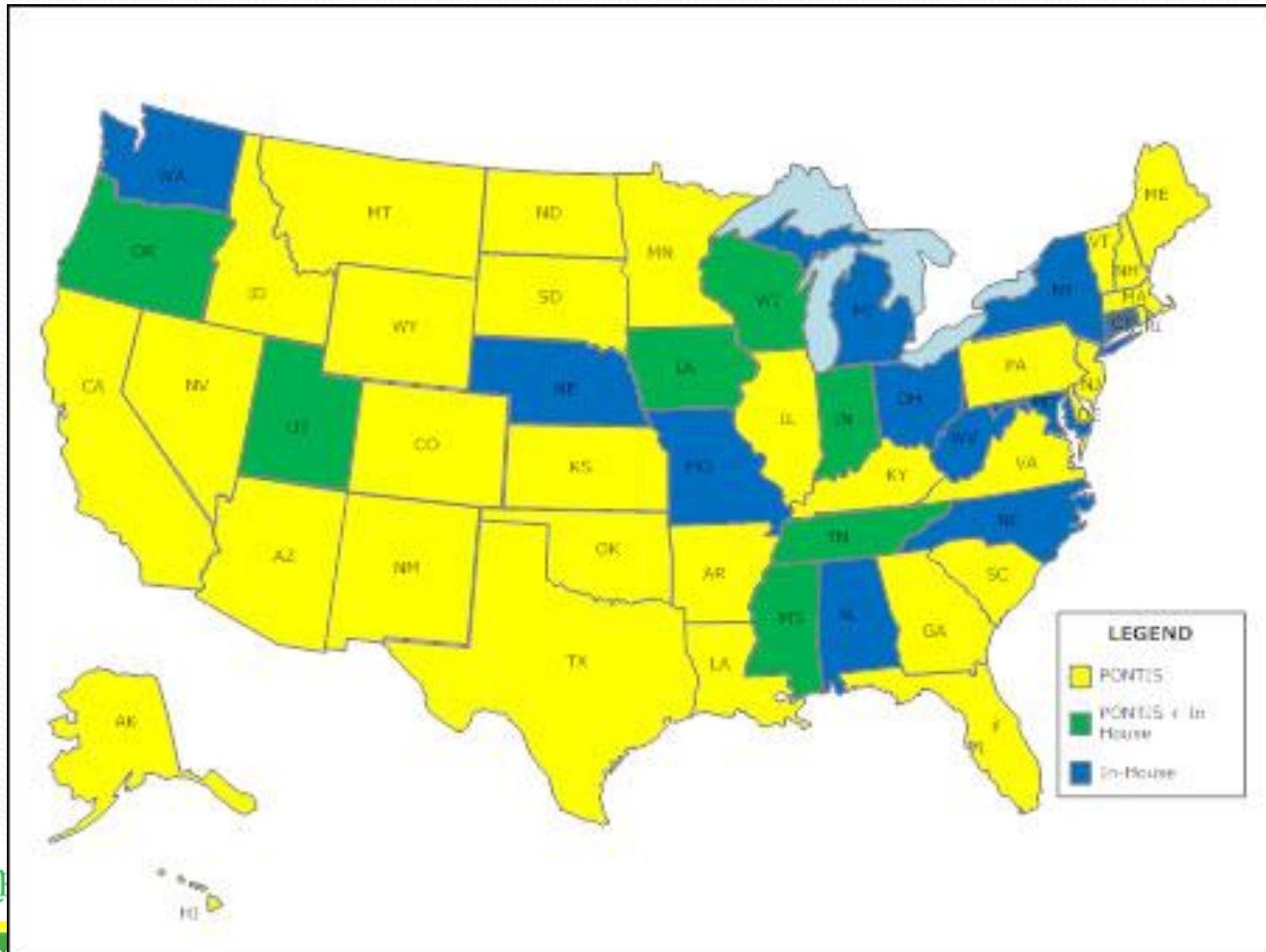
# Survey Outcome

What are the biggest barriers in your department to implement innovations that may strengthen your Bridge Management System?

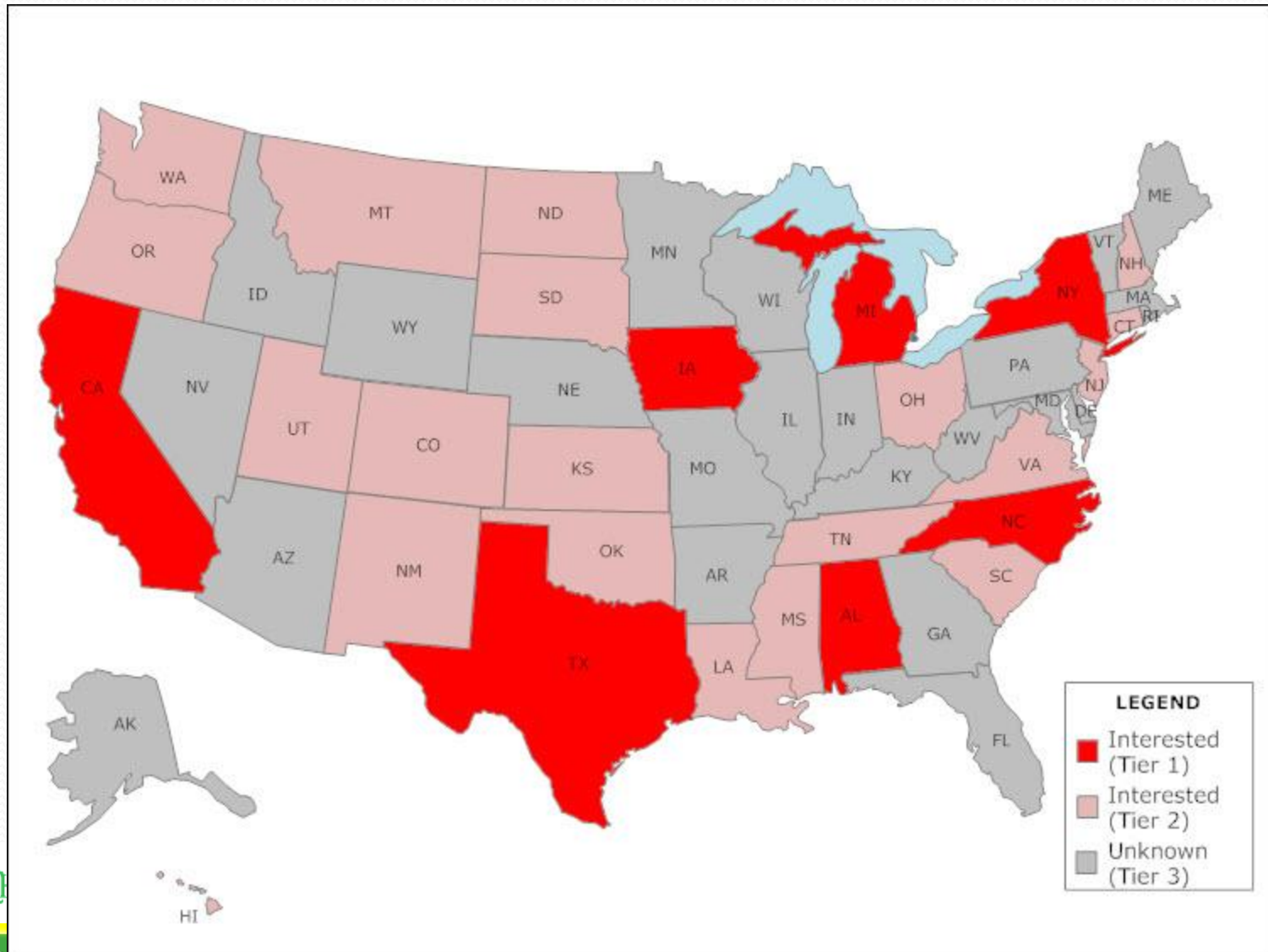


- Cost-effective tools for data management
- Cost-effective approaches for analysis, priority-setting, and decision-making
- Lack of sufficient personnel/ money/ other resources
- Other

# BMS/PONTIS Use In USA



# States in IRSV Research



# Does a State's Inspection Procedure exceed NBIS Standards?

