



FHWA Intelligent Compaction HMA In-Place Density Study 2011-2014

ID HMA IC Field Project Planning Meeting No.3

By
FHWA IC Team

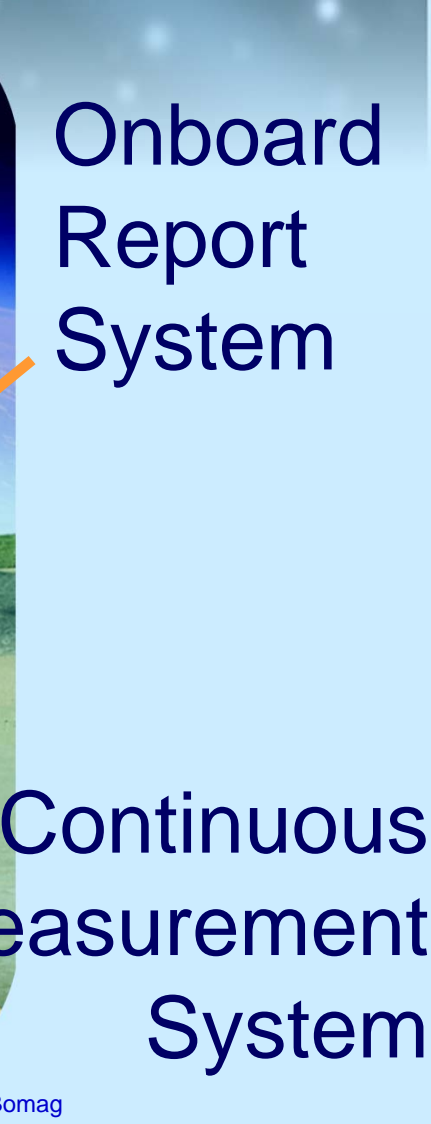
Agenda

- Overview of the FHWA IC Project
- Review Schedule/Activities
- Coordinate Work/Responsibilities
- Review Experimental Plan

IC Definition

Global Positioning System GPS

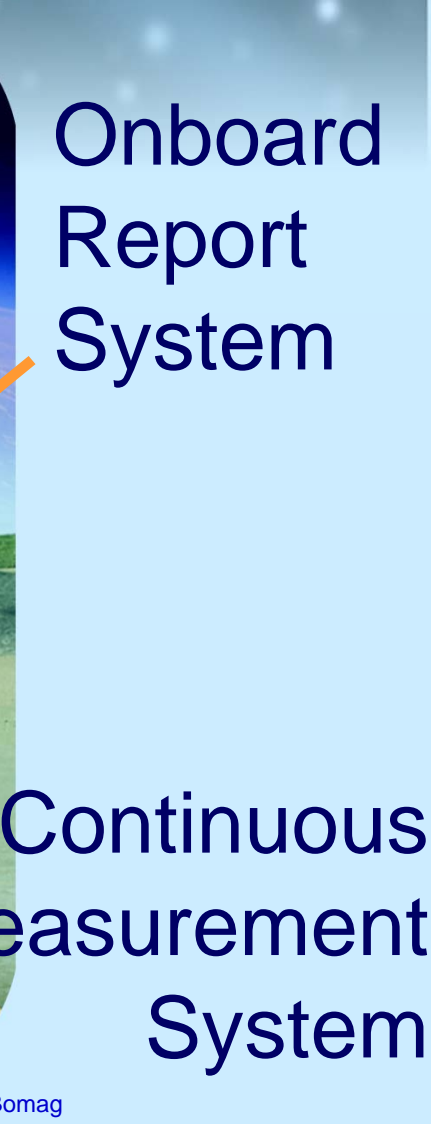
Temperature Sensors



Onboard
Report
System

Continuous
Measurement
System

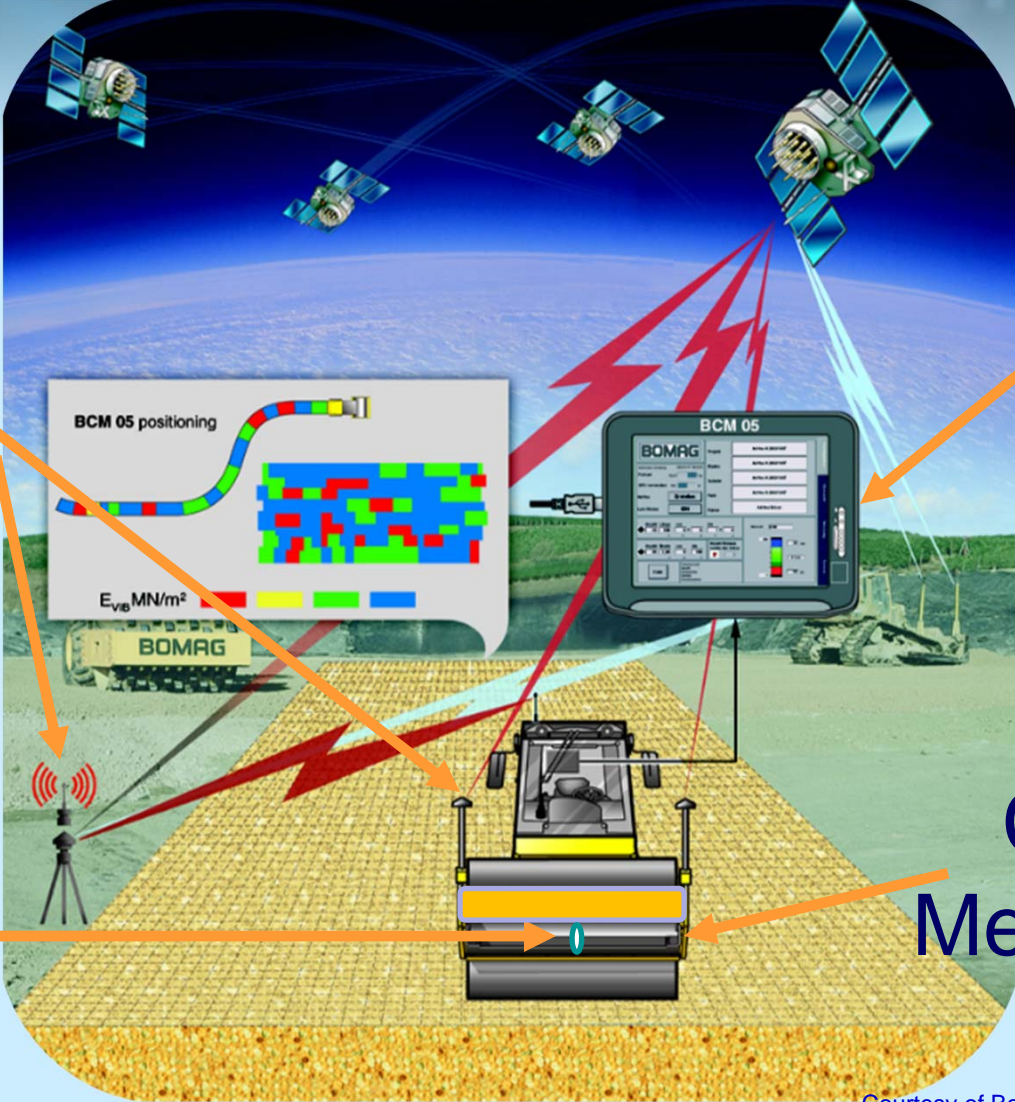
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Onboard
Report
System

Continuous
Measurement
System

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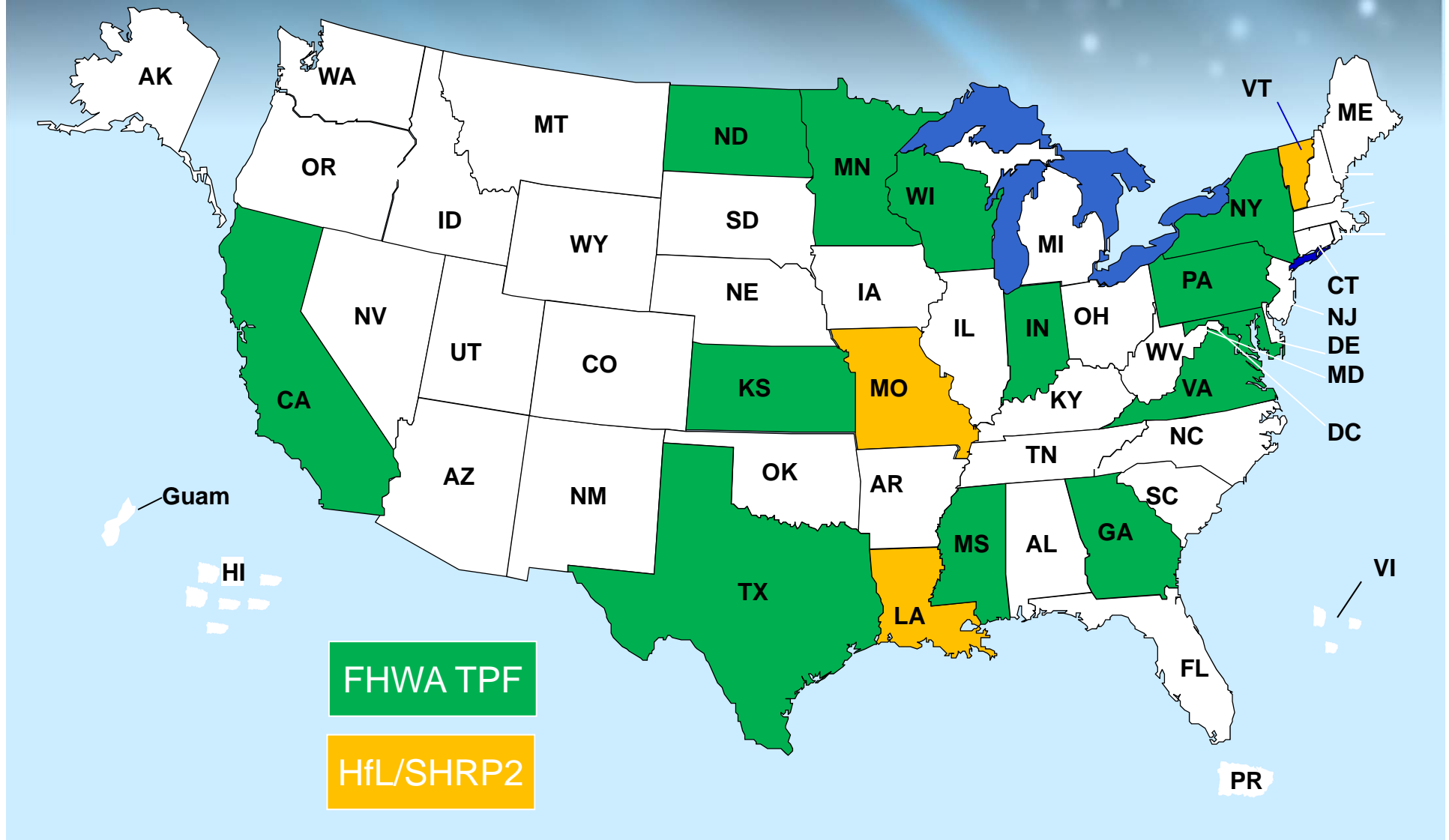


Courtesy of Bomag

FHWA Pooled Fund IC Project 2007-2011

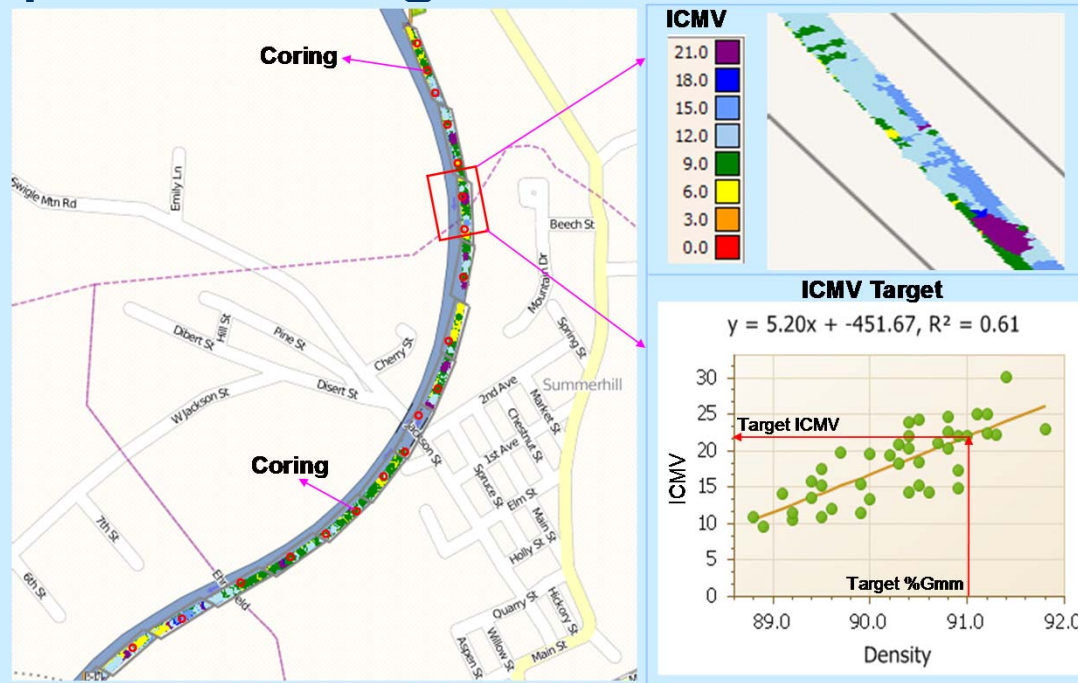
- Demonstrate HMA IC Technologies to Agencies and Industry
- Develop Experience and Expertise within DOT Organizations
- Assist the DOT's in the development of Quality Control Specifications
- Identification and prioritization for further research and data analysis

FHWA/TPF IC Projects 2007-2011

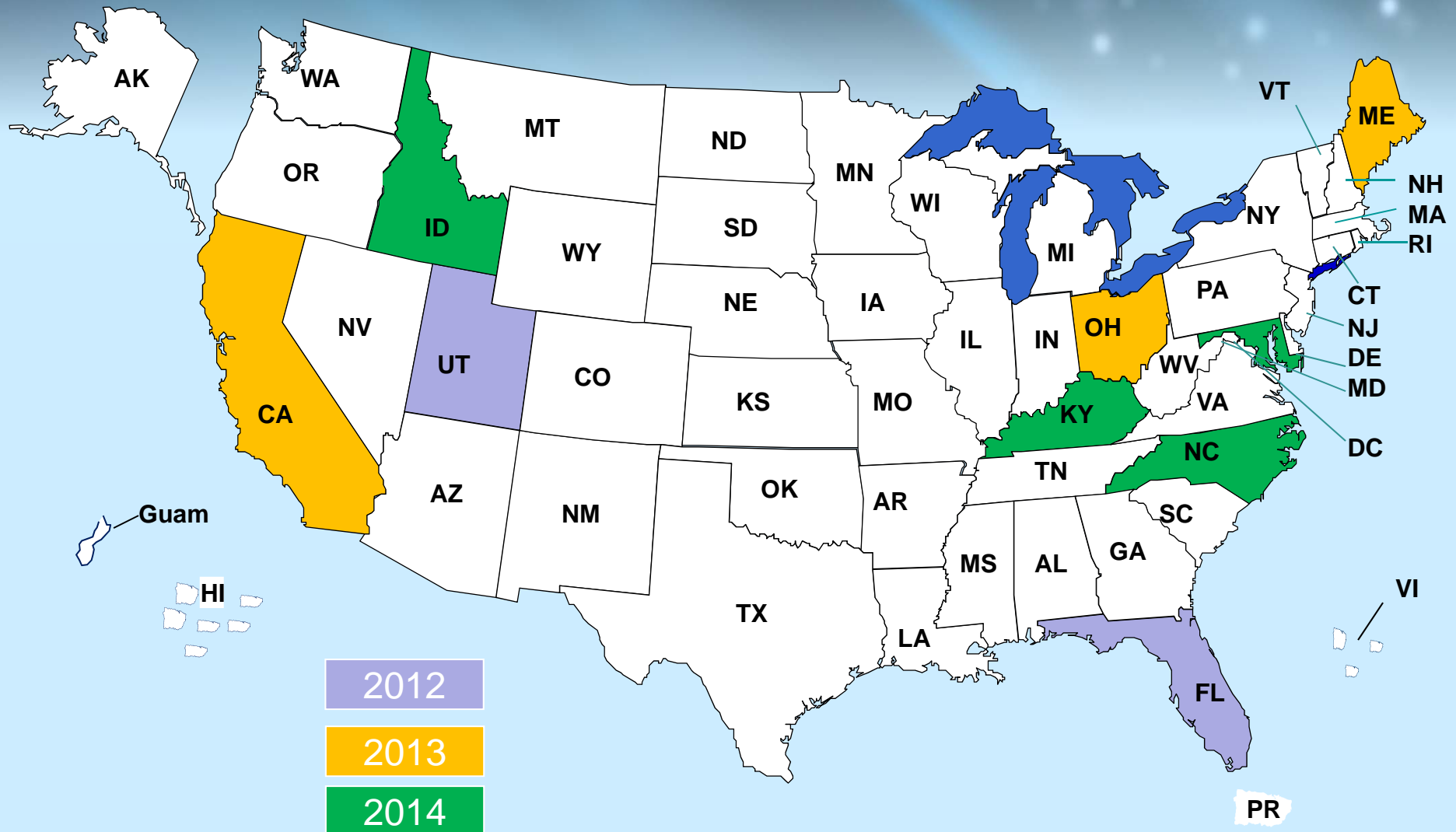


FHWA IC-HMA Density Study 2011-2014

- Relate IC measurement and other records to HMA in-place density
- Improve usage of IC for QC/QA



FHWA HMA Density - IC Study 2011-2014



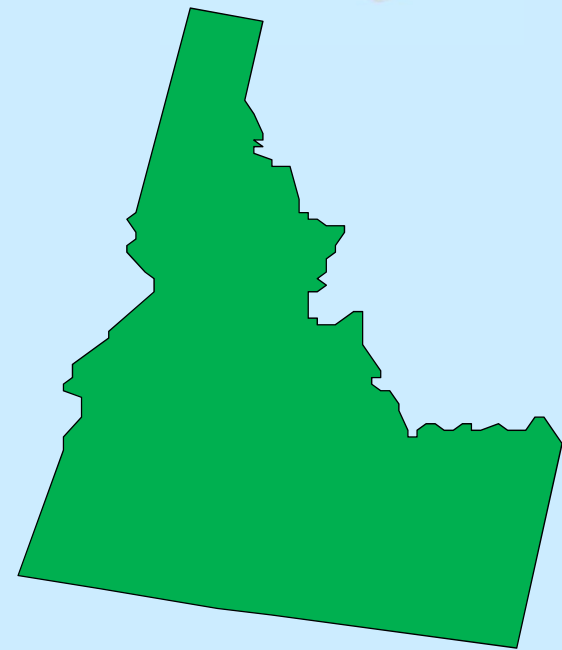
FHWA IC-HMA Density Study Team Members

- Victor (Lee) Gallivan
 - FHWA - COTR
- George Chang
 - Transtec Group - PI
- Bob Horan
 - AI - Facilitator



ID IC Field Project

- US-95
- North of Coeur d'Alene
- IDT District 1
- Main lane construction
- Early May, 2014



Stages of IC Field Projects

- IC Training (1/2 day)
- Field Testing (2~3 days)
- Open House (1/2 day)

Candidate Double Drum IC Rollers

Bomag



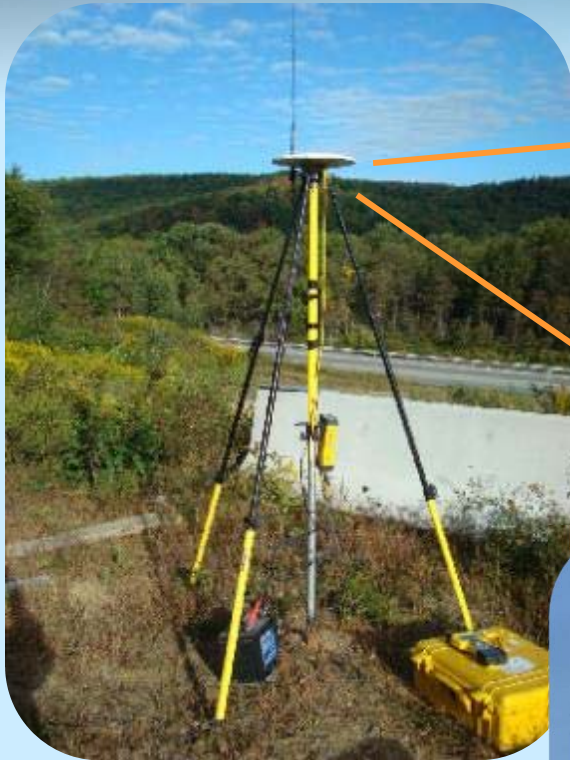
HAMM-Wirtgen



Sakai



Real Time Kinematic (RTK) GPS



GPS Base Station

**Connected
by Radio Link**

Roller GPS Radio/Receiver



GPS Rover

GPS Rovers for Point Tests



TopCon

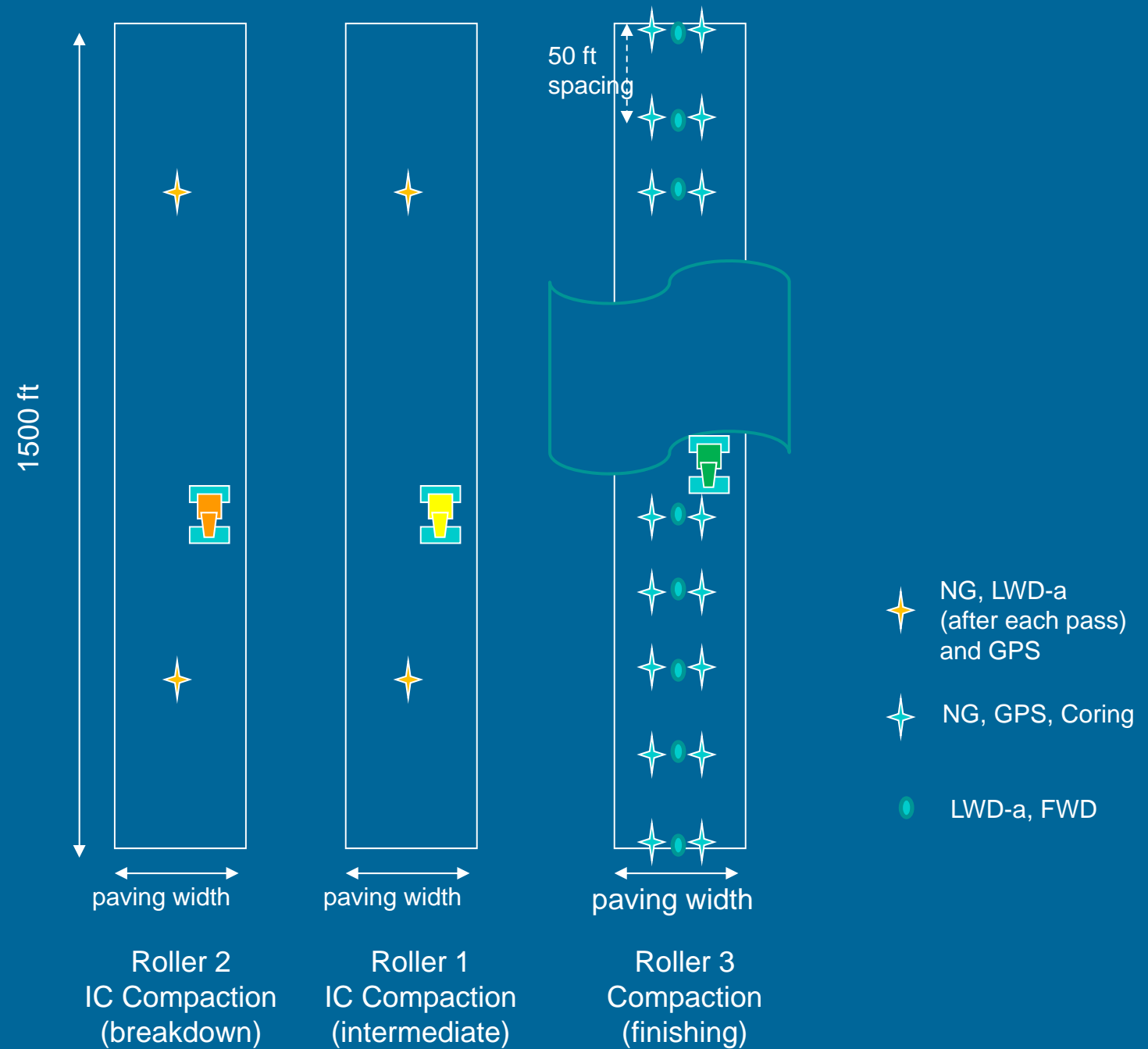


Trimble



OmniSTAR

Day 2 – Test Section



Cores

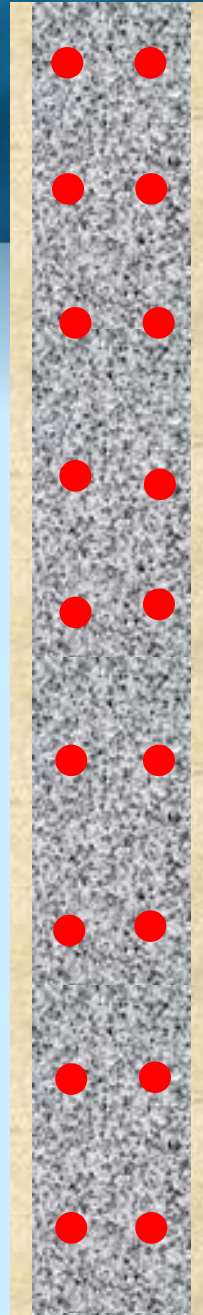
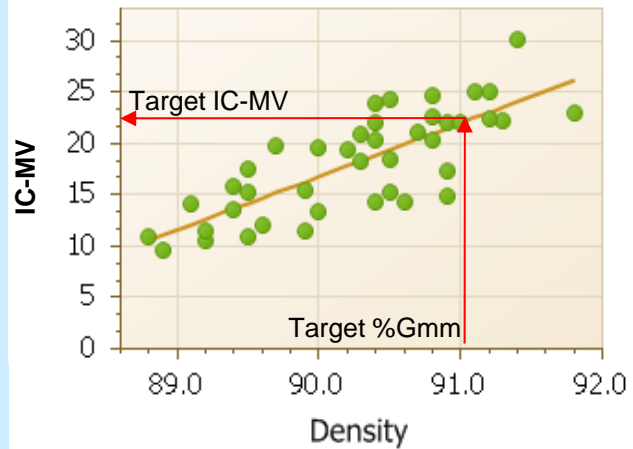


Density



Correlation

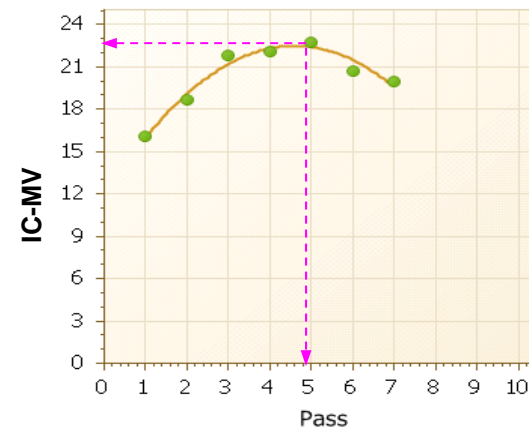
$$y = 5.20x + -451.67, R^2 = 0.61$$



IC Compaction



Compaction curve



Other Tests to Consider



Other Training to Consider

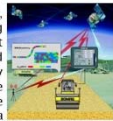


ICDM-Veda Workshop

Intelligent Compaction Data Management

What is Intelligent Compaction

Intelligent Compaction (IC) refers to the compaction of road materials, such as soils, aggregate bases, or asphalt pavement materials, using modern vibratory rollers equipped with an integrated measurement system, Global Positioning System (GPS) based mapping, onboard computer reporting system, and (optionally) a feedback control. By integrating measurement, documentation, and control systems, the use of IC rollers allow for real-time monitoring and just-in-time corrections in the compaction process. IC rollers also maintain a continuous record of color-coded plots that include number of roller passes, material stiffness measurement values, and precise location of the roller.



Benefits of Intelligent Compaction

- Improved uniform and consistent densities
- Increased productivity (cost savings)
- Reduction of highway repair costs
- Continuous record of material stiffness values
- Identification of non-compactable areas
- Improved Depth of Compaction.
- Fewer passes, fuel savings, operation savings, reach target of compaction, not over-rolled.
- Improve long term performance. Documentation of data (results), encourage best practices.



Veda



What is Veda

Veda (pronounced as "Vehda" meaning "knowledge") is a powerful software for viewing and analyzing geospatial data. It is developed by The Transtec Group and co-sponsored by the US Federal Highway Administration (FHWA) and Minnesota Department of Transportation (DOT).

Veda can import data from various intelligent compaction (IC) machines and sonic test rolling (STR) trucks to perform standard viewing, editing/layering, point tests, and analysis. Veda is important for standardization of IC technologies.

Training and data management is critical when implementing IC. Any loose links may make the success of any IC projects very difficult to achieve. Therefore, training workshops built around IC technologies and Veda will bridge gaps in IC implementation at any level.



FHWA IC Team

- Provide for Planning
 - Special provision and experimental plan
 - Conduct web meetings
 - Selection of IC rollers
- Provide for Field Demo
 - 2 ~ 3 personnel onsite
 - IC and Veda data management training
 - Arrange for HMA corings (~60 cores)
 - Data collection and analysis
 - Open House presentations and demo

IC Vendors

- Provide for Planning
 - Coordinate shipment of equipment
 - Users' manual, software, and sample data
- Provide for Field Demo
 - IC machine and system
 - IC training (equipment operation and system usage)
 - Onsite technical support (setup, de-setup IC)
 - Open House presentations and demo

Paving Contractor

- Provide for Planning
 - Paving schedule and selected test sections
 - HMA mix design, lab test data, typical section, drawing/plan file
 - Roller shipment address/contact (cell phone)
- Provide for Field Demo
 - Staff to be trained on IC
 - Personnel to operate IC roller(s)
 - Mobilization of IC rollers onsite
 - One density gauge and an operator
 - Fuel for IC rollers

DOT

- Provide for Field Demo/Tests
 - Staff to be trained on IC
 - Coring (2 rigs, 4" cores) and Lab bulk lab tests
 - FWD tests
 - Nuclear and non-nuclear density gauges and operators
- Provide for Open House
 - Invitations to DOTs, Cities, Counties, Universities, APA, and etc.
 - Meeting facility (indoor presentation and outdoor demonstration)
 - A LCD projector and a screen

Work Plan

Schedule	Activities
Day 0	<ul style="list-style-type: none">• GPS/IC setup and trial runs• GPS and IC data validation
Day 1	<ul style="list-style-type: none">• Project briefing• IC Training for roller operators• Training of roller operators• Compaction of the HMA layer• Conduct point tests after each roller pass
Day 2	<ul style="list-style-type: none">• Compaction of the HMA layer• Conduct point tests after each roller pass• Mark 60 locations within a 1500-ft section and conduct point tests (GPS/Nuke/LWD/Coring)
Day 3	<ul style="list-style-type: none">• Repeat the Day 1 operation.
Day 4	<ul style="list-style-type: none">• Open House

Open House

- Date: Thursday, TBA Date
- Time: 8:00 AM to noon
- Location: TBA by DOT
- Agenda
 - 8AM to 11AM - Indoor Presentation
 - 11AM to noon – IC/GPS Equipment Demo



For More Info on IC...

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