



Weigh-in-Motion (WIM) Technology for In-Theater Applications

for

83rd Annual Meeting of Transportation Research Board Military Transportation Committee – AT035

8-10 A.M., Wednesday, January 14, 2004
Executive Room, Omni Shoreham Hotel
2500 Calvert St., NW, Washington, DC

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What is Required Operationally?

Weigh in Motion Technologies for In-Theater Applications

- Enabling System(s) to Insure Army Units are Strategically Responsive
- Facilitates the **Rapid Loading** of Army Equipment and Cargo onto Strategic and Theater Lift Assets
 - Provides **Loading Data Readily** Acceptable to Air Force and Navy
 - **Portable** MANPRINT Enabled System
 - **Reduces Unit Deployment/Movement Preparation Tasks**
 - **Number** of Required Tasks
 - **Time** to Execute Tasks
 - **Reduces Personnel Dedicated to Deployment Tasks**
 - Installation Personnel Required
 - Unit Personnel Required
 - A/DACG & JI Personnel Required
 - **Integrates with** ATI, TC-AIMS II, GTN **Systems to Provide Near-Real Time Tracking and In-Transit Visibility**



What is Required Technically?

Weigh in Motion Technologies for In-Theater Applications

- Proposed Essential Technical Requirements

- WIM**

Weigh-in-Motion

Axial Weight

&

GW

- + VMB**

+ Vehicle

Measurements

&

Center-of-Balance

- + DRIA**

+ Data Reception,

Integration

&

Acceptance



Today's Weighing Methods (Real World Experiences)

Weigh in Motion Technologies for In-Theater Applications

- Manual “Tape Measure” Approach
 - Manpower and Resource Intensive
 - Slow and Awkward
 - Does Not Provide For Configuration Changes at POE
 - Potential for Manual Errors
- Lack of Accurate and Current Center of Balance Data
 - Equipment Variables (amount of fuel, type of loading, etc.)
 - Manuals and Reference Documents Address Characteristic Data
 - Databases Difficult to Keep Up to Date
- Lack of Automated Data Collection and Transfer
 - Measurements “hand-jammed”
 - Data “Mailed” versus “Transferred”



Why Weigh-in-Motion (WIM)?

Weigh in Motion Technologies for In-Theater Applications

- Increases Safety during Performance of Duties
- Reduces Manpower Required for Weighing Process
- Reduces Time Required for Deployment Process
- Eliminates Stress, Weather Related and Other Human Errors
- Enables:
 - Weighing and Recording Individual Tire and/or Axle Weights
 - Measuring and Recording Spacing Between Axles
 - Calculating Vehicle Center of Balance
 - Transferring Collected Data Electronically



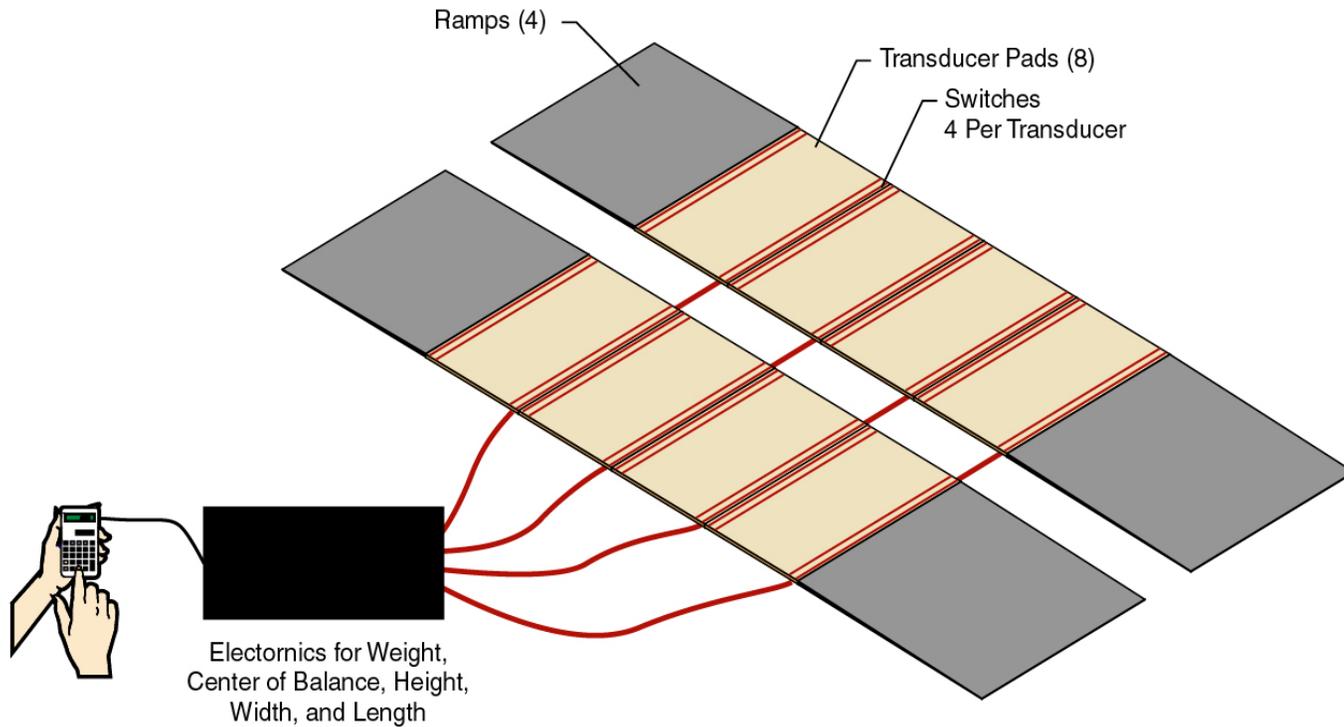
Portable Weigh-in-Motion

- *Portable*
- *Fully automated—no operator error*
- *Wireless technology and load-planning*
- *Determines weight, center of balance, axle weight and spacing*
- *500% productivity increase, save 40 minutes per plane*



Portable Weigh in Motion

Weigh in Motion Technologies for In-Theater Applications



ORNL 98-2671A3C EFG



Weigh in Motion Verification Test Results

Weigh in Motion Technologies for In-Theater Applications

- Vehicles Use:
 - 5 Ton Truck, 2.5 Ton Truck, 1 Ton Truck and a Tractor with 40 Ft. Trailer
- Test Results:
 - Suitcase-Type Scale 25.3 Minutes
 - vs. WIM Prototype System 4.4 Minutes
- Reduced Weighing/Calculation Time by a Factor of 5.75 (More Than a 500% Increase in Productivity)
- Simplified Operations



5 Ton Truck Crossing WIM

Demonstration at Ft. Bragg on May 13-14, 2003

Weigh in Motion Technologies for In-Theater Applications



Weigh in Motion Demonstration at Ft. Bragg on May 13-14, 2003

Weigh in Motion Technologies for In-Theater Applications

	Static Scales	Individual Wheel Weight Scales	Portable Weigh in Motion System
2 axles	3 min 36 sec	3 min 18 sec	1 min 39 sec
3 axles	5 min 9 sec	4 min	2 min 15 sec
4 axles	9 min	7 min 46 sec	3 min 13 sec
5 axles	10 min 30 sec	8 min 42 sec	2 min 32 sec



*Sponsored by United States Army Logistics Transformation Agency and
United States Transportation Command*



Portable Weigh in Motion Potential

Weigh in Motion Technologies for In-Theater Applications

- Increased Speed and Productivity
- Investigate:
 - Using State-of-the-Art Load Cell Transducers (upgrade 1st Generation Prototype)
 - Increasing Sets of Transducers
 - Thereby increasing accuracy to $< +/- 1-2\%$
 - Evaluate Optimum Transducer Spacing
 - Leverage Sunk Costs by Incorporating:
 - Latest State-of-the Art Data Acquisition Techniques
 - Lesson Learned in High-Speed and Static Scale Conversion Program to Portable WIM



Weigh in Motion Benefits

Weigh in Motion Technologies for In-Theater Applications

- Portable and Reduces Manpower thereby Increases Productivity
- Eliminates Human Error
- Support Army, DCS G-4 Transformation Charter
 - Enhanced Deployability
 - Reduced Logistics Footprint
 - Reduced Cost
- Supports Joint Focused Logistics Campaign Plan
 - Rapid Projection
 - Rapid Force Maneuver with AOR
 - Rapid Return to Home Station
- Assist Global War on Terrorism (GWOT)
 - Redeployments from Austere Location
 - Crisis Action Intra- and Inter-Theater Movements
 - Coalition Considerations
 - Joint Considerations

