

Rapid Development, Prototyping and Testing of Portable Weigh-In-Motion (WIM) Systems for Military Applications – Program Initiative

Background: The Department of Defense's (DoD) Armed Forces must maintain the capability to rapidly project massive combat power anywhere in the world with minimum preparation time. Currently, DoD units use portable individual wheel weight or fixed in-ground static scales, tape measures, and calculators to determine vehicle axle weights, total vehicle and cargo weight and center of balance for vehicles and cargo to be transshipped via railcar, ship, or airlifted in support of military and humanitarian operations. **The process of manually weighing and measuring all vehicles and cargo subject to these transshipment operations is time-consuming, labor-intensive, and most importantly is prone to human errors that can result in safety hazards and inaccurate data.** The identification, weight and center of balance information on each piece of cargo and vehicle must be manually entered into logistics load planning systems introducing the high likelihood of human key-stroke error into the deployment preparation process. Incorrect information introduced into the Defense Transportation System (DTS) can negatively impact onward movement of cargo and vehicles in theater, needlessly delaying essential supplies and equipment to the soldier and more importantly creates a safety hazard. The importance of having correct, timely information in the DTS for use by all services cannot be overstated. In austere areas of operations, scales may not be available at all, and the vehicle and cargo weight and center of balance must be estimated. This process is even more susceptible to human error. The lack of a standardized airlift-weighing system for joint service use also creates redundant weighing and manual data entry requirements at the cost of scarce resources and time.

Program Initiative Basis and Objective: The WIM program leverages several complementary technology demonstration and development efforts underway in the U.S. Army, U.S. Air Force, and ORNL and is reducing the above mentioned manual processes, and mitigates the safety and operational concerns. This program is firmly rooted in guidance provided in the DoD Transformation Planning Guidance published in April 2003. The WIM program links together projects under an umbrella concept for coordinated development of hardware as well as interfaces with appropriate command and control, and logistic systems and databases. The synchronized, rapid, spiral development of these technologies will significantly improve the end-to-end flow of military unit equipment and cargo across transportation nodes; processing and loading times of combat units; and the effectiveness and efficiency of existing automated tools and databases. WIM systems are considered physical data-gathering devices for the TC-AIMS II. The objective of the WIM program is threefold:



- **Objective 1:** The first objective is to develop a man-portable WIM scale that satisfies the requirement for obtaining accurate vehicular data for air transport at austere theater facilities. This portable WIM scale can also be used in unit staging areas to complement or

replace the fixed scales at power projection platforms. **It will be capable of obtaining data in static as well as a dynamic weighing mode.** A concomitant effort includes upgrading the fixed-site scales at power projection platforms with this WIM technology to conduct dynamic as well as static weighing.

- *Objective 2:* **The second objective is to develop automatic linkages of vehicle/cargo identification data and weight/balance data with TC-AIMS II and other logistics planning systems so that the process is fully automated as well as dynamic.**
- *Objective 3:* **The third objective is to expand WIM capabilities to include determining vehicle/cargo dimensional data for input into TC-AIMS II.**

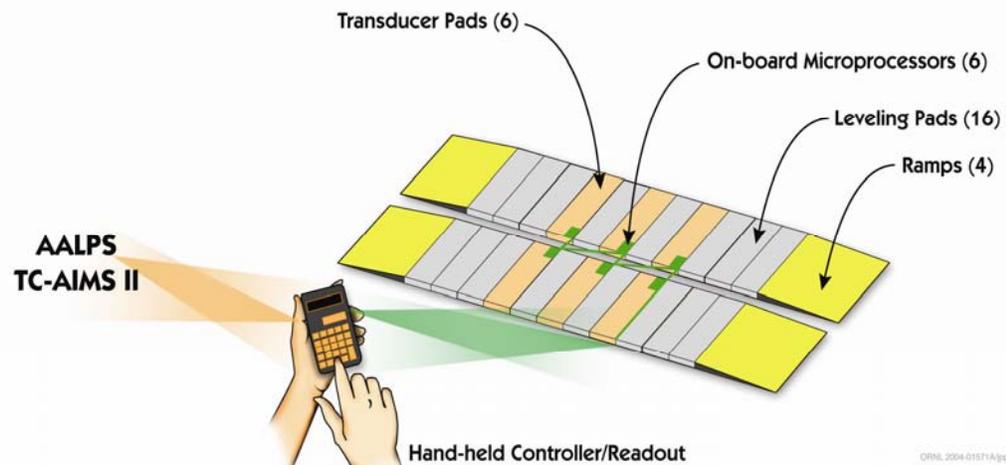
Attaining these objectives will transform the current weighing process into one that is more rapid, more accurate, safer, and less manpower intensive.

The current WIM Generation II system does:

- Capture automated vehicle identification.
- Determine (calculate and record) the weight and center of balance.
- Update the real-world “actual” data electronically into Automated Air Load Planning System (AALPS) for load planning and manifesting purposes; and into Transportation Coordinators’ Automated Information for Movement System II (TC-AIMS II) for operational planning, deployment, execution purposes and in-transit visibility.

WIM Generation II Availability:

- Limited Production scheduled for 2nd Quarter FY05
- Lead time dependent on placement of order – Available, beginning 3rd Quarter FY05



Points of Contact:

Robert K. Abercrombie, Ph.D., David L. Beshears
Oak Ridge National Laboratory, P.O. Box 2008, MS 6418, Oak Ridge, TN 37831-6418
Phone: (865) 241-6537
Fax: (865) 576-5943
E-mail: abercrombier@ornl.gov, beshearsdl@ornl.gov