Weigh In Motion (WIM) Interfacing With TC-AIMS II and AALPS

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Abstract

Currently the Army manually identifies the vehicles and enters this information into TC-AIMS II. The Army also weighs vehicles manually calculates vehicle individual axle weights, total vehicular weight and manually measure the length of the vehicle. The center of balance data is then calculated, and this information is manually marked on the vehicle. This information is then manually transferred to the AALPS personnel who manually enter it into the AALPS system. Each of these steps in the process is prone to human error. By establishing (1) an automated data exchange link between the vehicle Radio Frequency Identification (RFID) tags and WIM; and (2) an automated data exchange link between WIM and AALPS, this WIM data has been automatically transferred from TC-AIMS-II to WIM and from WIM to AALPS thus eliminating those human errors and at the same time expediting the process. ORNL's modeling efforts, utilizing Rational Rose, were critical and instrumental to the success of automatically transferring this information electronically and seamlessly. Key use cases and data/information flow are presented here.

Figure 1. Interaction of Gen II WIM

Methods

- Rational Rose software
  - Powerful visual modeling tool aiding in the design of the software systems
  - Blueprint for system being built
  - Helps systems analysis by enabling individuals to design use cases and use case diagrams
  - Aids developers by generating skeletal code in:
    - C++
    - ADA
    - COBRA
    - JAVA
    - Visual Basic
    - XML

- Rose Model is picture of system from various perspectives
  - UML diagrams (use case, activity diagrams, sequence diagrams, and deployment diagrams)
  - Actors
  - Object
  - Deployment nodes
- Software development process
  - Inception Phase
    - Beginning of project
  - Elaboration Phase
    - Planning, analysis, architectural design
    - Development of use cases
    - Detailing the use cases
  - Construction Phase (current status)
    - System is analyzed and built
    - Generation of skeletal code
  - Transition Phase (current status)
    - Completion of software produce

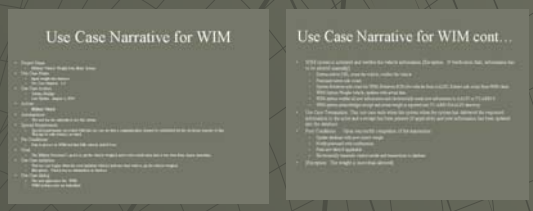

Figure 2. Rules and logic on building a sequence diagram

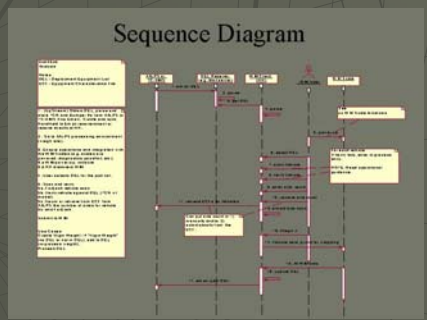

Figure 3. Complete sequence diagram

Conclusions

ORNL is providing WIM technical support to the United States Army Logistics Transformation Agency (USALTA), a Field Operating Agency of the Department of the Army Deputy Chief of Staff for Logistics, G-4. As part of ORNL's support to Logistics Transformation Agency Decision Support Package, ORNL is documented the Weigh In Motion (WIM) interfacing with Department of Defense's Joint Systems (1) Automated Air Load Planning System (AALPS) and (2) Transportation Coordinators' Automated Information for Movement System II (TC-AIMS II). This support is executing a comprehensive plan for the development of a data exchange capability between ORNL's WIM system and an appropriate automated information system such as the AALPS, and between WIM and DoD's radio frequency identification devices (RFID) tags and readers. This data exchange capability is essential in maximizing the current utility of the WIM system and is seen as a critical element in rapid Army global power projection/distribution. The execution of this comprehensive plan is a follow on to the USALTA WIM Field Demonstration that ORNL assisted with on 13-14 May 03 at Ft. Bragg/Pope Air Force Base, NC.

Future Plans

Upon completion of the actual WIM device, the interface software was integrated to produce a total WIM system. Once the WIM system, developed in FY04, is calibrated and tested, the military has requested that the integrated WIM system be used by troops in joint training exercises in preparation for its use in overseas theaters of operation. ORNL's modeling efforts, utilizing Rational Rose were critical, as well as instrumental, to the success of this project.

References

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