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Joe Claborn

Institute of Nuclear Materials Management
36th Annual Meeting
Palm Desert, California
July 9-12, 1995

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ABSTRACT

Local Area Network Material Accountability System (LANMAS) core software provides the framework of a material accountability system. It tracks the movement of material throughout a site and generates the required material accountability reports. LANMAS is a network-based nuclear material accountability system that runs in a client/server mode. The database of material type and location resides on the server, while the user interface runs on the client. The user interface accesses the data stored on the server via a network. The LANMAS core can be used as the foundation for building required materials control and accountability (MCA) functionality at any site requiring a new MCA system. An individual site will build on the LANMAS core by supplying site-specific software. This paper will provide an update on the current LANMAS development activities and discuss the current direction of the LANMAS project.

Current Status

Major Milestones. The following LANMAS major milestones provide an overview of the project status. See Table I.

Software Requirements Specification

During the last year LANMAS development has proceeded at a very fast pace. A user's meeting was held in Los Alamos to review the Software Requirements Specification (SRS). As a result of that meeting, the software requirements were refined to better reflect the need of implementing sites to capture many levels of material information. As a result of the review meeting, the following structure was adopted to capture information surrounding the material inventory.

*This work supported by the US Department of Energy, Office of Safeguards and Security.
Each material in the inventory can be characterized by any number of elements. Each element can be characterized by any number of isotopes. By fully characterizing the chemistry of the material, the information in the database provides the foundation for satisfying the multitude of customer needs.

The Independent Verification and Validation (IV&V) of the SRS was completed. The IV&V team found several areas of the SRS that required additional work. Most of these were issues, such as the proper use of the word "shall," and were not related to material accountability. These have been completed. Revision 3 of the SRS reflects those changes.

Preliminary Design

During the design phase, the requirements are expanded into a system design that addresses each of the requirements. The design specifies the working plans for the various software components, interfaces, functions, data structures, and data flows. The design phase is aided by the creation of a prototype that clarifies the requirements. The design phase is divided into a preliminary design and a detailed design that further refines the preliminary design. A Preliminary Design Review (PDR) meeting was held in Los Alamos where the initial design work was presented. Details of each major functional area were presented, including the database structure to support the function and an initial functional decomposition. The reviewers provided valuable feedback to the LANMAS project team. In most cases the feedback was incorporated into the detailed design process.

Detailed Design

The draft of the detailed design, the Software Design Description (SDD), was released to interested sites. This document is over 400 pages long. It gives the details of the user interface screens and the functional units that make up the code. Rather than have an SDD review meeting in Los Alamos, review meetings were held at the Westinghouse Savannah River Site, Idaho National Engineering Laboratory, Westinghouse Hanford Corporation, Argonne West, and Lawrence Livermore National Laboratory. By having the design review meeting at each interested site, the site was able to have more people involved in the review process and the project team was able to devote more time to each specific site. At the design review meeting, the code-in-progress was demonstrated. As a result of these meetings, many sites requested an early release of the code-in-progress to aid the implementing site in their site-specific design and coding. The request resulted in the development of a LANMAS beta program.

The database structure used in the LANMAS beta version was released to the IV&V team who analyzed the database design. The project team has received a draft copy of the database analysis report.

Code Phase

The code phase includes the transformation of the software components identified in the design phase into coded, tested units. A beta version of the code is being released in July of 1995 to five sites. The beta version will include the following functions:
Material Movements
- Send Material to InTransit
- Receive Material from InTransit
- Combined Material Move
- Receive Material from an External Site
- Ship Material to an External Site

Material Transformations
- Material Split
- Material Combine

Containerization
- Place Material inside a Container
- Take Material out of a Container

Inquiries
- List Material By Location
- List Container Contents
- List Material Status
- List Material in Transit
- Report Transaction Details
- List Material Activity

NMMSS Reporting
- DOE 741, 733, 733A Reports

Instrument Control
- Calibration Check
- Take a Measuring Instrument Out of Service
- Put a Measuring Instrument in Service
- List Instrument Status

TID Tracking
- List TID Status
- Apply TID
- Remove TID

System Admin Functions
- User/Groups Authorizations
- Editing the Configuration Tables

The two major areas not included in the beta release are the decay function and the general calculation method used in the transformation of material. These will be added in a subsequent release.

Testing Phase
During the testing phase, the integrated system is evaluated to determine whether or not the requirements have been satisfied. The testing is documented in the test plan results. The draft of the LANMAS System Test Plan has been completed. The IV&V team is preparing for the LANMAS testing effort.

Current Status
The initial beta release of the software code will be in July of 1995. The beta version will be continuously improved with the test version of the code released to the IV&V test team in October of 1995. The IV&V test team has 8 weeks to test the code. The formal release of the LANMAS software will be in November of 1995.

Core And Site-Specific Relationship
An individual site will build on the LANMAS core by supplying site-specific software. The site will customize the user interface screens to meet its needs. The database can be extended by adding site-specific tables and by adding code into two predefined software "hooks" that are included in each major functional area.

Future Directions
After the initial delivery of the LANMAS core in 1995, it is anticipated that in addition to ongoing support for LANMAS implementations, the following areas will be addressed:
- **Site-Specific Customization:** When the LANMAS core is delivered to an implementing site, the LANMAS core project team will work closely with the site LANMAS implementors to customize the core for each site. This level of interaction can range from custom function development to educating the local implementors about LANMAS so they can develop site-specific functions.

- **Integration With the National Accounting System:** By sending the national accounting system data instead of reports, the functionality of the national system could be improved.

- **Variance Propagation:** A variance propagation module is planned as an add-on module to LANMAS.

- **Nondestructive Assay Interface:** An interface to nondestructive assay equipment is planned as an add-on module to LANMAS.