DHS Countermeasures Test Bed

David Hoyt, Brigham Young University

NAI, James Schek, Lawrence Livermore National Laboratory

BYU BRIGHAM YOUNG UNIVERSITY

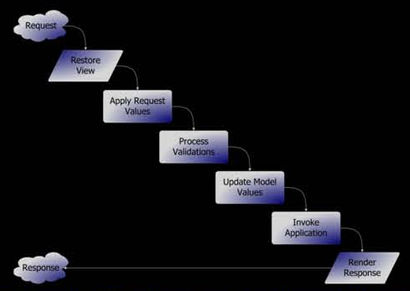
In an era of heightened national security, the Countermeasures Test Bed (CMTB) provides safety and security to the United States by defining technical and operational requirements for radiation detection and interdiction technology, as well as an effective means of managing field operations and data.

Are We Safe?

A radiological threat has the potential to cause significant economic damage and loss of life. Radiological Dispersal Devices or "dirty bombs" are easier to construct or acquire than a nuclear weapon. While the loss of life due to a RDD may be small, the radiological materials dispersed can cost millions of dollars to decontaminate and render structures uninhabitable. The successful detonation of a single nuclear weapon would be catastrophic, causing significant human losses and economic damage (both locally and nationally). In addition to nonproliferation efforts, the United States is investing in detection and interdiction technologies to prevent the use of radiological threats.

How Does it Work?

The CCS uses Java Server Pages (JSP) and Java Applets to minimize maintenance costs and to easily integrate user feedback into the interfaces. All user interfaces apply a common database backend to store information. This facilitates the cooperation of law enforcement, scientists, and other field personnel by allowing them to share information and view real-time response and analysis. Recently, a new technology called Java Server Faces (JSF) was introduced to the project allowing further business and presentation logic separation as well as support for alternative user interfaces (such as handheld devices).



JSF Lifecycle: JSF implements an execution model that allows the same code to display similar output on different devices.

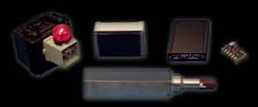
Why Java Server Faces?

JSF delivers rapid user-interface development and provides much of the plumbing that would need to be implemented by hand using JSP. It includes:

- A set of prefabricated user-interface components
- An event-driven programming model
- A component model that enables third-party developers to supply additional components

What's Being Done?

Controlled field and laboratory testing has already been coupled with actual operational testing at various facilities to produce an effective means for detection. The data-gathering requirements and geographically dispersed nature of the project led LLNL to develop a Command and Control System (CCS) to facilitate field operations and data management activities. Significant time was spent with field personnel developing operations procedures to minimize disruptions when switching from manual to automated operations.

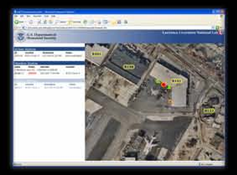


Left to Right: Siren and alarm box, camera, controller computer, support electronics
Front: Detector Crystal

A nuclear physicist demonstrates the use of an ARAM Radiation Detector in a mobile configuration; ARAM is one of several detectors used in the CMTB.

What's Happening Now?

The CCS framework is being reconstructed and enhanced to take advantage of JSF technology and prepare itself for future upgrades and development. This includes new user-interface components and a dynamic templating system fully integrated into Integrated Development Environments (IDEs) for quick deployment and testing.



A screenshot of the CMTB in action.

This work was performed under the auspices of the U.S. Department of Energy by University of California Lawrence Livermore National Laboratory under contract No. W-7405-Eng-48.

UCRLxx-xxxxxxx