

Risk Analysis Workbench (RAW)
Michael Orosz, et al., USC Information Sciences Institute
 mdorosz@isi.edu

1. Overview.....	1
2. Research Accomplishments	1
3. Applied Relevance	3
4. Collaborative Projects	3
5. Research Products	4
5.2. Presentations	4
5.3. Models, Databases, and Software Tools and Products	4
6. Education and Outreach Products	4

1. Overview

The Risk Analysis Workbench (RAW) is a software platform where risk-based resources (e.g., models, tools, databases, case studies, etc.) from various sources (e.g., CREATE, FAZD, START, etc.) can be accessed and shared. RAW serves as a repository of risk-based resources that can be tapped for use by a variety of users including researchers, analysts, and policy/decision-makers. Access to resources is controlled via user and group authentication and membership.

In addition to serving as a risk-based resource repository, a long-term objective of the CREATE RAW project is to develop a common modeling environment (CME) in which various resources, with varying levels of accessibility, can be electronically “linked” to form composite analytical systems that target specific risk-based problems. To help achieve this goal, basic research was initiated in Year 3 and continued into Year 4 in the areas of semantic networks and cyber-security technologies. In addition, a collaborative effort with FAZD Center was undertaken to develop an infrastructure that supports server-based operations.

Potential uses of the RAW technology in the private sector include workspace management (collaboration, resource sharing, and access control) and decision-support operations (risk assessments, current situational awareness, “what-if” analysis).

2. Research Accomplishments

Over the past year, the following efforts were undertaken to improve and/or extend the CREATE Risk Analysis Workbench (RAW):

- Development of a fine-grain access control mechanism was completed
- Enhanced software infrastructure to support RAW server-based operations
- A new graphical user interface (based on feedback from the initial user testing), populated with new resources from the CREATE and START centers
- Extended the software to support education and outreach within the CREATE user community (support for course ISE 590 at USC).

As currently implemented, RAW is a repository of vetted resources with fine grain access control. As new “vetted” resources became available at CREATE and the other centers of excellence

“This research was supported by the United States Department of Homeland Security through the Center for Risk and Economic Analysis of Terrorism Events (CREATE) under grant number 2007-ST-061-000001. However, any opinions, findings, and conclusions or recommendations in this document are those of the authors and do not necessarily reflect views of the United States Department of Homeland Security.”

(COEs), they were added to RAW. The following resources were added to RAW and made available to the RAW user community over the past year:

- Models
 - NIEMO economic model (CREATE)
- Databases
 - Global Terrorism Database (START)
 - Terrorism Research Center
 - Electrical grid databases (CREATE)
- Border security case study (CREATE)
- Documentation/Reports/Links
 - Assessing and Managing the Terrorism Threat (DOJ)
 - DHS Portals
 - Risk-Based Economics Course (ISE 590) (Adam Rose course materials)

Access to a particular resource is gained by entering RAW and then downloading - to a local system (i.e., laptop, etc.) – a copy of the desired resource.

Although RAW is currently a resource repository, the ultimate goal is to deliver a system that allows server-based operations, work group collaborations, and the development of composite models using resources available within RAW. In support of these objectives, the CREATE RAW team, over the past year and in collaboration with FAZD Center, extended RAW to support server-based operations which handle situations where it's not practical or desirable to allow users direct access to resources (i.e., the resource resides and is accessed from a RAW server). As a proof-of-concept, a sample problem was run using the NIEMO model running remotely on the RAW server was demonstrated.

This same infrastructure will also support work group formations and the common modeling environment (CME) where various resources are electronically “linked” to form composite analytical systems.

During the Year 4 effort, a major overhaul of the cyber-security features of the system was completed (work initially started in Year 3). Previously to this effort, access control to sensitive resources was implemented with a temporary placeholder that was difficult to administer and, in some cases, open to failure. This new effort brought the RAW technology into compliance with industry specified best-practices and procedures.

In the last quarter of Year 3 and into Year 4, RAW was extended and populated with CREATE-based resources to support a risk-based economics course (ISE 590) taught by Dr. Adam Rose. Students taking Dr. Rose's course access and download course materials via the RAW graphical user interface (GUI). Dr. Garrett Asay was successfully trained by ISI on the procedures required for accessing and loading course materials into RAW. Dr. Asay then successfully trained a student to perform these same procedures.

Finally, the RAW graphical user interface was greatly modified to reflect feedback from initial alpha-release testing. New graphics, messaging, and linking were implemented to help better inform the user community on topic understanding and related topics.

RAW has been presented to several national labs (LLNL and PNL) and at DHS-sponsored S&T review conferences (DHS S&T Review – March 2008). In addition, RAW was presented to non-DHS government agencies including the NRO, IARPA, USDA (APHIS and CEAH), and ONR. Finally, RAW was presented to the DHS RMA group and is being considered for use as a platform for RMA model archiving and evaluation.

3. Applied Relevance

A major problem in today's research environment is that there is no single source for researchers and policy/decision-makers to access for recommendations, information, and resources to risk-based questions and problems. In addition, there is no readily available collaborative environment that addresses the following questions and requirements:

- What research and/or risk assessments have been undertaken in the areas I'm interested in?
- Who can I contact or collaborate with?
- Are there existing resources that I can use for my research and/or use to answer risk-based questions?
 - How can I access and use these resources?
 - How can I leverage what has already been done?
 - What are the assumptions behind these resources?
- How accurate, current, and reliable is the data/information?
- Is my data protected? Can I control access to my data/information?
- What's new?
- Who has accessed my research? How's it being used?

The Risk Analysis Workbench (RAW) is designed to address these concerns. Based on user feedback (from Year 3 demonstrations and exercises), the RAW platform was extended to support improved resource access control, work group collaboration, and server-based execution of risk-based models and systems. During Year 4, contact was made with DHS RMA, USDA APHIS, and IARPA to discuss their operational needs and how RAW could address them. DHS RMA is interested in using RAW as a platform to archive risk-based models and serve as a platform for model evaluation. USDA APHIS is tasked with developing the DHS Joint Modeling Operations Center (JMOC) and RAW may meet their operational needs. An initial discussion with IARPA took place regarding using RAW as a portal for subject matter experts to access and store critical intelligence information for the PAINT/RAMPARTS project. Communications are on-going with all of these organizations.

4. Collaborative Projects

With funding from the DHS sponsored National Center for Foreign Animal and Zoonotic Disease at Texas A&M University, we developed the necessary infrastructure software (iLands – Information Landscapes) to support server-based operations.

Funding from the IARPA sponsored RAMPARTS project was used in extending the iLands (Information Landscapes) software platform to support enhanced group collaboration and resource access control.

5. Research Products

Research Products (Please detail below)		#
5a	# of peer-reviewed journal reports published	0
5a	# of peer-reviewed journal reports accepted for publication	0
5a	# of non-peer reviewed publications and reports	0
5a	# of scholarly journal citations of published reports	0
5b	# of scholarly presentations (conferences, workshops, seminars)	2
5b	# of outreach presentations (non-technical groups, general public)	2
5c	# of products delivered to DHS, other Federal agencies, or State/Local	0
5c	# of patents filed	0
5c	# of patents issued	0
5c	# of products in commercialization pipeline (products not yet to market)	0
5c	# of products introduced to market	0

5.1. Presentations

5.2. Models, Databases, and Software Tools and Products

Prototype RAW software is available to CREATE and other users via [http:// http://sputnik.isi.edu/create/](http://sputnik.isi.edu/create/). Upgrades to this software continue to be made and are available via the same URL.

6. Education and Outreach Products

Education and Outreach Initiatives (Please detail below)	#
# of students supported (funded by CREATE)	0
# of students involved (funded by CREATE + any other programs)	1
# of students graduated	0
# of contacts with DHS, other Federal agencies, or State/Local (committees)	5
# of existing courses modified with new material	0
# of new courses developed	0
# of new certificate programs developed	0
# of new degree programs developed	0

We had one student (Chris Lovdahl - Undergraduate) who was partially funded by CREATE. Chris helped in the development of the iLands infrastructure software.

Contacts:

- DHS Chem-Bio Division in the S&T Directorate.
 - Tam Garland – Branch Chief of Agriculture Security at DHS
 - Leland Ellis – Chief Agriculture Advisor
- DHS Test and Standards Division in the S&T Directorate
 - Charles Hutchings – Deputy Director, Modeling and Simulation
- USDA Animal and Plant Health Inspection Service (APHIS)
 - Mark Teachman – Director, Interagency Coordination, National Center for Animal Health Emergency Management