

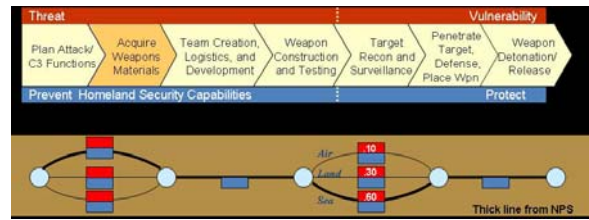
Applied Decision Analysis

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This project will apply decision and risk analysis techniques to important homeland security problems.

Brief Description - This project will apply decision and risk analysis to problems identified collaboratively with the S&T divisions and the operational agencies of the DHS. The following problems have been identified:

- Development of a set of objectives and measures for the DHS (for all S&T Divisions and the RMA Office) – continuation from Year 4
- Evaluation of explosives detection technologies (with Israel’s Technion Institute, for the Explosives Division) – now separately funded by the DHS International Office and S&T Explosives Division
- Expert elicitation assistance for RAPID (Risk Analysis Process for Informed Decision-Making) for the Risk Management and Analysis Office (RMA) of DHS.
- Evaluation of Advanced Spectrographic Portals for detection of radiological materials in containers in collaboration with the Domestic Nuclear Defense Office (DNDO) of DHS.



We plan to conduct at least two applications per year, so these applications represent examples for years four and five. We can add more applications with additional funding or conduct additional applications and disseminations in Year 6.

Objectives - The purpose of this project is to apply both traditional and advanced decision and risk analysis model and tools to address important problems of homeland security. In all applications we will develop user friendly computer tools, similar to those developed for the MANPADS model, to assist the clients at the DHS in their decision making process.

Interfaces to other Center Projects - The first sub-project (DHS objectives function) cuts across all center projects – in fact, we would hope that all CREATE projects and projects in other centers will use this objective function in their work. The other three sub-projects will interface with related CREATE activities in advanced decision and risk analysis.

Interfaces to non-Center Projects - The interfaces with non-Center projects depend largely on the sub-project. For example, the interface for the RAPID project will be with the HIS and the RMA Office of DHS; the interface for the ASP project will be with the DNDO Office of DHS.

Major Products and Customers - Each sub-project has clearly identified clients at the DHS as shown above.

Technical Approach

- DHS objective function - This sub-project will use standard techniques for developing objectives, measures, and tradeoffs to create an objective function for the DHS in the form of a multiattribute utility function. The main process is to conduct a series of interviews with DHS officials regarding desired objectives that the DHS may wish to pursue, create a means-ends network, identify a preliminary set of 5-10 fundamental objectives, and to develop appropriate measures for these objectives. The final step is to develop a set of tradeoffs and a corresponding rule for weighting and aggregating across objectives.
- Evaluation of explosives detection technologies – We proposed this project for Year 4 as part of CREATE’s activities and it has now been separately funded by the International Office of the S&T Directorate of the DHS. This project is in collaboration with Technion of Isreal.
- Expert elicitation for RAPID – In Year 4 we responded to requests fro technical assistance by the RMA Office of DHS to evaluate RAPID, which is a DHS-wide risk-based system for planning and budgeting. After completing the evaluation, we were asked to participate in the further development of RAPID, in particular, in the elicitation of threat probabilities. This process has now started with a meeting on scenario structuring and probability training. In Year 5 we will continue this expert elicitation process.
- Evaluation of Advanced Spectrographic Portals – the so called ASPs are much more expensive than the currently used systems and there has been extensive criticism by Congress and the GAO regarding the deployment of these advanced systems. Following a meeting with the Deputy Director of DNDO for Systems Engineering and Evaluation, we decided to do an independent evaluation similar to the MANPADS study. This work has started in Year 4 and will be completed in Year 5.

Major Milestones and Dates

Year 5

- Preliminary DHS objectives and measures, December, 2008
- Evaluation of explosive detection technologies – June 30, 2009
- Expert elicitation for RAPID – First round completed by December 31, 2008
- Evaluation of ASPs – first round completed by March, 2009

Year 6

- Reserved for dissemination and transfer of knowledge and tools