

Airport Risk Assessment Model (ARAM): Increasing the Effectiveness of Airport Security Countermeasures

Presented to the 20th Workshop for Advanced Development for Security Applications (ADSA20), Northeastern University, Boston, MA **May 16, 2019**

Natalie Heller

Robert Brigantic, Nick Betzsold, Bryan Gerber, Ann Lesperance, Casey Perkins, and Todd Billow



PNNL is operated by Battelle for the U.S. Department of Energy



AIRPORT RISK ASSESSMENT MODEL



- This project was funded by the US Department of Homeland Security Science and Technology Directorate (DHS S&T) under contract HSHQPM-16-X-00169
- Pacific Northwest National Laboratory is operated by Battelle for the U.S. Department of Energy under Contract No. DE-AC05-76L01830

Security Science PM-16-X-00169 for the U.S. 0



- Increase the effectiveness of airport security countermeasures
- Founded on core DHS risk doctrine, ARAM is a risk-based, intel-driven decision platform to assess and quantify terrorism risk at airports and optimally deploy available countermeasures to minimize risk overtime
- Automatically optimizes recommended assignment locations of deployable security countermeasures
- Airport security countermeasures work together in innumerable combinations to counter potential threats and to create uncertainty in minds of potential adversaries
 - What's best?



ARAM AIRPORT RISK ASSESSMENT MODEL







ARAM Contact Information

• For more information contact:

Natalie C. Heller, ARAM Co-PI **Research Scientist** NATIONAL SECURITY DIRECTORATE

Pacific Northwest National Laboratory Richland, WA 99352 USA Tel: (509) 375-4326 natalie.heller@pnnl.gov

Dr. Robert T. Brigantic, ARAM PI **Chief Operations Research Scientist** NATIONAL SECURITY DIRECTORATE

Pacific Northwest National Laboratory Richland, WA 99352 USA Tel: (509) 375-3675 robert.brigantic@pnnl.gov



- ARAM Objectives
- Background and Highlights
- Risk Basics
- ARAM Methodology/Implementation
- Benefits

6



ARAM Objectives

- Increase the effectiveness of airport security countermeasures
 - Decide on best use of discretionary resources (risk-based)
 - Account for multiple threats
 - Provide unity of effort across stakeholder organizations to reduce duplication of effort
 - Track risk and risk reduction trends over time
- Easy to use



Risk Reduction and Resource Assessment Model

- Operational since 2008, first model to quantify risk from VBIEDs and now active threats to WA State Ferries
- Uses risk based approach vs. screening percent
- Optimizes placement of WA State Patrol officer/canine teams to minimize risk to ferry system
- Spin-offs include ARAM from the Sea-Tac Airport





Airport Risk Assessment Model

- Developed by Pacific Northwest National Laboratory one of the first models to dynamically quantify risk from terrorist threats at airports
- Automatically optimizes recommended assignment locations of deployable security countermeasures
- Demonstrated to DHS S&T, TSA, Port of Seattle Security/Police Department, and Delta Airline Security
- Operationally deployed at Sea-Tac Airport in Spring 2019, with additional airports to follow
- Sponsored by DHS S&T Apex Screening at Speed





AIRPORT RISK ASSESSMENT MODEL



Risk Quantification Basics

- Founded on core DHS risk doctrine, ARAM is a risk-based, intel-driven decision platform to assess and quantify terrorism risk at airports and optimally deploy available countermeasures to minimize risk overtime
- Airport security countermeasures work together in innumerable combinations to counter potential threats and to create uncertainty in minds of potential adversaries
 - What's best?

tel-driven orts and overtime le combinations of potential



Definitions and Risk Analysis Introduction

- *Risk*: Potential for an unwanted outcome resulting from an incident, event, or occurrence, as determined by its likelihood and the associated consequences
- *Risk Score*: Numerical result of a semi-quantitative risk assessment methodology
 - Gauges the combination of *threat, vulnerability,* and *consequence* at a specific moment and location
- Basic risk equation:





Risk Steering Committee

DHS Risk Lexicon 2010 Edition

September 2010





Risk Analysis Methodology

- Consider different potential threats and assess overall risk to airport over time
 - Method starts by decomposing core components of risk into respective subcomponents
 - Subcomponents assessed based on characteristics at airport and potential threats of concern



airport over time ive subcomponents otential threats of



- ARAM measures the risk of an airport and allocates resources in the most effective and efficient manner
- Effective because the countermeasures are going to places where they are the most needed

"You can't manage what you don't measure" – Peter Drucker







Thank you



AIRPORT RISK ASSESSMENT MODEL

