

Software tool randomizes DHS security activities, thwarting terrorists and criminals

The Assistant for Randomized Monitoring Over Routes (ARMOR) tool prevents criminals and terrorists from predicting where and when security patrols will conduct their rounds or set up checkpoints. The Transportation Security Administration (TSA), Federal Air Marshal Service (FAMS) and U.S. Coast Guard (USCG) are all using versions of ARMOR.

ARMOR uses game-theoretic algorithms to randomize security schedules and plans, making it difficult for adversaries to plan how they will avoid security forces when plotting illegal activities. It also enables security forces to maximize the effectiveness of their limited resources.

First airport security, then harbor security managers deploy tool

In 2007, DHS Center of Excellence for Risk and Economic Analysis of Terrorism Events (CREATE) developed the first version of ARMOR with research funding from the Science & Technology Directorate's Office of University Programs.

ARMOR was piloted at the Los Angeles International Airport (LAX) for police to randomize their vehicle checkpoints and canine unit patrols. ARMOR resulted in increased seizures of illicit drugs and weapons.

CREATE then customized the ARMOR program, developing:

- IRIS (Intelligent Randomization in International Scheduling) for FAMS;
- GUARDS (Game-theoretic Unpredictable And Randomly Deployed Security) for TSA; and
- PROTECT (Port Resilience Operational Tactical Enforcement to Combat Terrorism) for USCG

Homeland Security Operational Applications

- LAX police use ARMOR for scheduling security patrols
- TSA/FAMS use IRIS for enhanced scheduling of air marshals
- TSA is deploying GUARDS nationwide for enhanced airport security
- USCG is expanding the PROTECT pilot from Boston to New York to enhance port patrols/coastal security

Recognition of ARMOR

- February 2009, CREATE researchers received special commendation for ARMOR from the City of Los Angeles for "outstanding contributions to the security of our nation"
- March 2009, CREATE researchers received the DHS Science & Technology Impact Award
- October 2010, Dr. Milind Tambe (CREATE) received the Christopher Columbus Fellowship Foundation's Homeland Security innovative research award in Border and Transportation Security
- August 2011, CREATE researchers received the Commander, First Coast Guard District's Operational Excellence Award
- September 2011, CREATE researchers received a Certificate of Appreciation by the Office of Law Enforcement/FAMS for Outstanding Achievement

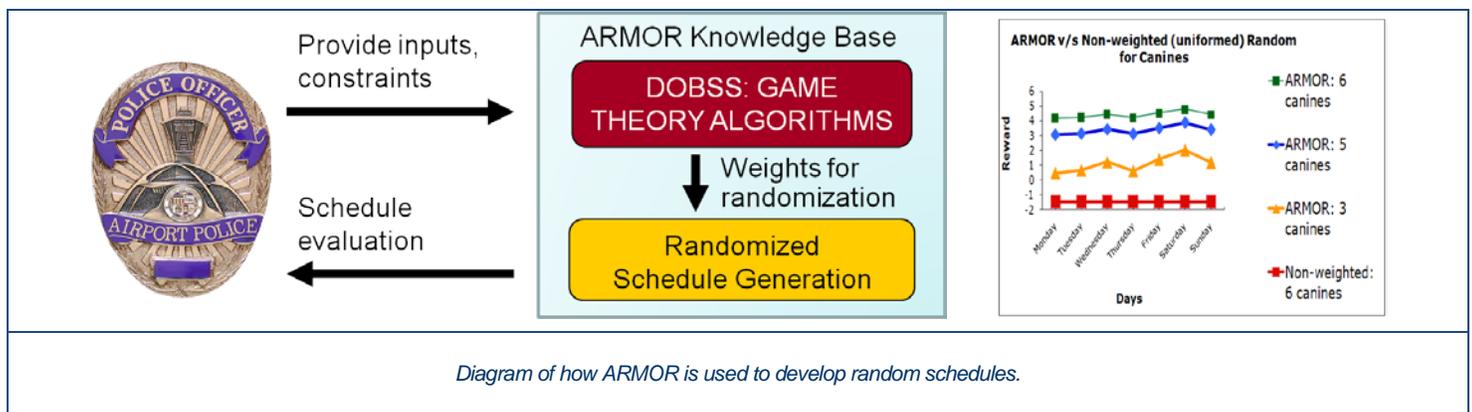


Diagram of how ARMOR is used to develop random schedules.



DHS Science and Technology Directorate

Using Game Theory to Thwart the Adversary: ARMOR



**Homeland
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