Airport Operational Security Assessment

The MITRE Corporation's Center for Advanced Aviation System Development's (MITRE/CAASD's) Dynamic Security Model is a MITRE-funded, agent-based simulation designed to enable operational assessments of the impacts and effectiveness of airport security against potential adversary attacks.

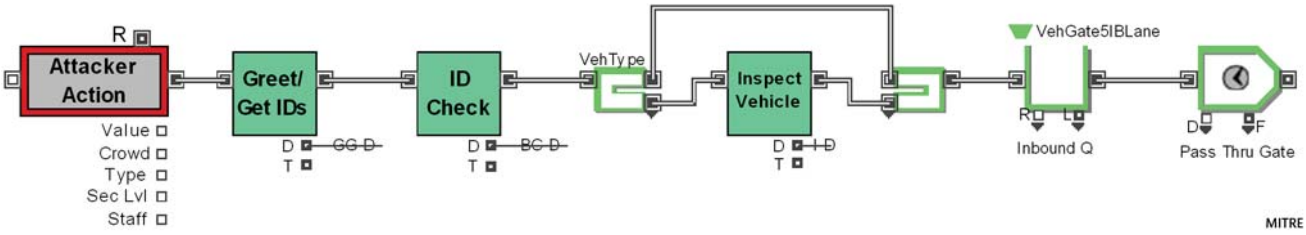
The model was developed in collaboration with the Director of Security at a major United States international airport. Security is simulated through a series of interactions between potential attackers and the airport's defenses.

As potential attacker agents approach an interaction with the defense, they identify their surroundings, using the available security posture information to determine their next step, which may be to continue, retreat, or to detonate a weapon.

The defense agent consists of the airport's security installations, including both sensors and security staff. Any type of sensor can be defined and modeled, and defense actions depend on what is identified by the sensor or staff member. Sensors already defined include heat and motion detectors, video cameras, roving patrols, walk-through metal detectors, screening technology, identity verification, vehicle gates, and vehicle inspection points, and these can be either fixed or portable (including air, marine, vehicle, or personal).

The Dynamic Security Model was conceived to assess tradeoffs, such as technology versus additional staff, and the effectiveness of infrastructure (such as a fence) versus a particular technology (such as surveillance and/or the use of patrols). The model is written in ExtendSim®, a modular modeling environment that includes its own database and allows models to be built and modified quickly by connecting existing and custom function blocks. Model outputs include both measures of the effectiveness of security, such as the success rate in detaining attackers, and the impacts of security on airport users, such as queue lengths and waiting times.

This model could be extended and modified to simulate other security operations (such as ports of entry, buildings, campuses, and military bases), given that the major elements of the model (including physical barriers) already exist. Its defense and adversary agent structures and associated interactions allow easy modification and analysis both in breadth and depth. Within a short time, a specific model can be developed collaboratively with local subject matter experts by extending the model to support analyses of alternatives and requirements. The figure shows an example of model logic: a truck attempting to pass through a vehicle gate.



Dynamic Security Model High-Level Vehicle Gate Logic [1]

[1] In this code module, a truck approaches a vehicle gate; its operator "sees" factors such as the value of the area, its security level, and its staffing, and decides on an action. If the truck proceeds, Identifications (IDs) are collected and checked and the truck may be inspected. The truck could be detained or turned away at each of those three steps; the connectors attached to the bottom of those blocks pass the number of vehicles detained or turned away to an output display.

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