IN PLANE TERMS

Our AIM for Physical Access Control

Physical access control systems play a central role in airports, where both the provision of timely access and preserving the security of sensitive areas are paramount.

The Airports of the Future Project (AoTF) looks at how an Airport Information Model (AIM) can assist security administrators.

Your Problem

Airport security administrators face competing demands. They need to ensure they can assign access for airport spaces as efficiently as possible.

The main aim is to comply with the ‘least privilege principle’, whereby the employee is assigned the minimal resources required for their role.

In the context of physical access, this requires practical information such as possible paths to a room, security characteristics of possible paths and environmental conditions (for example in case of emergency) under which each path is useable.

As airports often span multiple locations, sometimes with several multi-story buildings which host different zones (all with specific security conditions), the system is highly complex.

Traditional approaches to access assignment use human experts and 2 dimensional floor plans.

The problem with this method is that it is neither scalable nor verifiable.

Our Solution

The AoTF has developed an innovative solution to this problem using an Airport Information Model (AIM). An AIM is an information repository and a virtual representation of airport buildings.

The current prototype (figure 1) implementation can assist with several administrative functions such as;

Visual Policy Specification and Inconsistency Detection: this prototype allows administrators to create complex access control rules for physical spaces using visualization of the target building.

For example, an administrator can select a particular set of spaces in AIM and directly assign them to users or roles as well as specifying a set of constraints under which these spaces should be accessible.

The prototype can check across existing policy rules and flag potential inconsistencies with respect to the constraints that have already been defined.
Path Finding: An important function of this tool is the ability to determine all potential paths to a destination. It maps physical spaces from the AIM into a graph with doors as weighted ‘nodes’ connecting them, based on security criteria. The administrator can specify what conditions that must be satisfied. Some of these conditions include, shortest path, the path that goes through CCTV camera monitoring, and so on.

Visual Access Audit: In this mode, the administrator can visualise and analyse past access paths. For instance, the tool can show the paths that a user has taken as well as the areas where he/she was denied access. Furthermore, the administrator can select a user or a role and visually compare the spaces they can access (based on the policy) and the spaces they have actually accessed in the past. This can be useful in identifying redundant access permissions that accumulate over time. The same access audits can also be used in other operational analysis such as time spent by a user in a given space. Assuming that coming and going is also controlled, it is possible to extract the length of time a maintenance technician spends in a given space and compare it with their job assignments.

What Next?

We are implementing a mobile application that allows an Incident Response (IR) coordinator who uses the described prototype to communicate with IR team members. The mobile application enables the coordinator to determine the proximity of staff to the incident area. The coordinator can facilitate their access by assigning access permissions if needed, providing them with the 3D map of the accessible paths, and keep track of their location.

Want more information?

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