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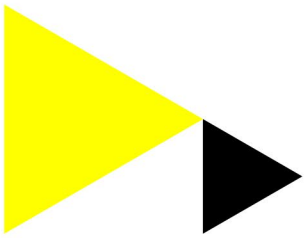

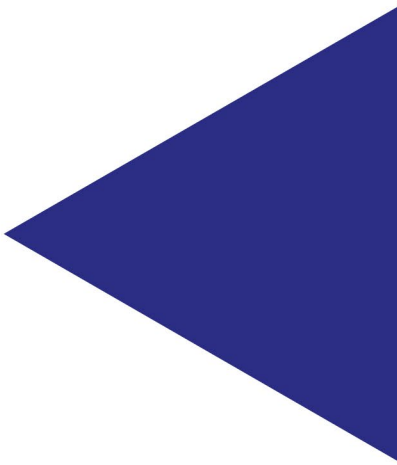

Design of Selective lines for Security Filters in Airports and Multimodal Terminals

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ABSTRACT

Security check in airports and multimodal terminals is a fundamental process for keeping the security at optimal level. This process needs to be accomplished with the highest standards, however, there is always the necessity that efficient processing of passengers must be performed. In this study, we present an initial analysis of custom fit lines of security that distinguish between the types of passengers so that the advantage of not carrying a lot of luggage is in the benefit of the passenger, providing a more efficient process of security check in these types of systems.

Keywords: simulation, customfit, facility, design

1. INTRODUCTION

Security check in multimodal terminals is a fundamental process for keeping the security at optimal level. This process needs to be accomplished with the highest standards, however, in order to achieve those, it is necessary to perform a thorough review of passengers and their belongings. Depending on the profile of the passengers, the belongings can range from toys, liquids to food and electronics.

Traditionally security process has been designed with the paradigm of *one size fits all*, which means that no matter what profile of passengers are entering to the airport, they need to be check with high accuracy. For these reasons airports invest constantly in the state of the art scanners for people.

The scanning process in most of the cases reduces the processing time of passengers and depending on the lay out of the security area, sometimes, this process becomes unfair since some passengers are over reviewed and in some cases due to the check of passengers that need to be reviewed, passengers who carry few things need to wait for other to be reviewed.

The current paper presents a study for analyzing a different paradigm for managing passengers. In this approach, instead of making a *one size fits all* approach we develop a *custom fit* approach for processing different categories of passengers.

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2. METHODOLOGY

For the analysis we followed the methodology developed by Mujica et al (2018) which is presented in Figure XX

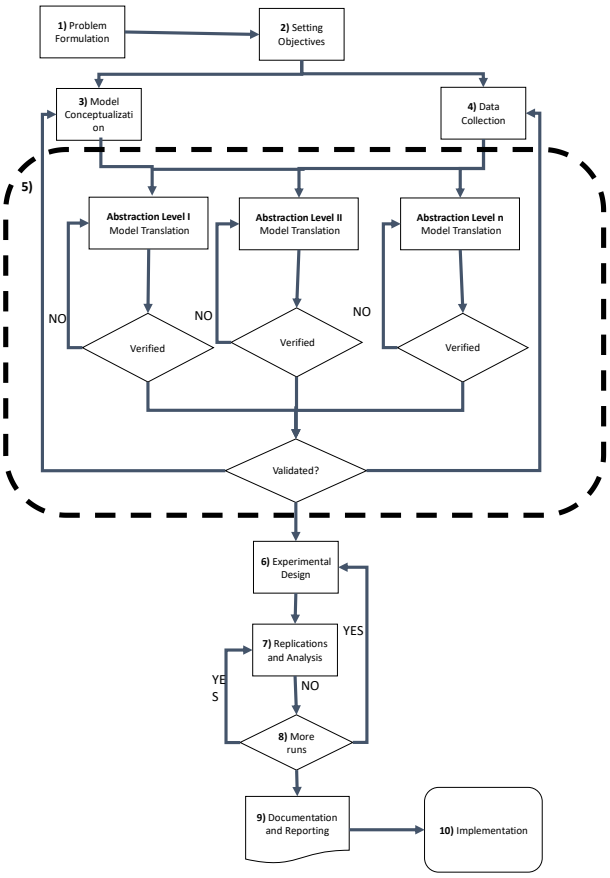

Figure 1: Simulation methodology for designing a security system

In the particular case of the security, the study was based on real and public information of one security zone in one airport in Latin America.

The model first was developed to represent current conditions and then we proposed a modification on the lines so we evaluate the performance improvement in the system.

The next figure illustrates the simulation model of the current situation in the security area.

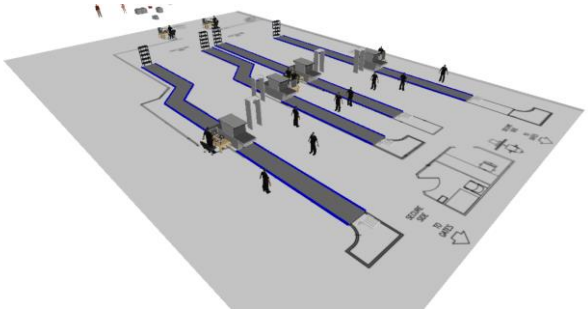

Figure 2: Security area under study

2.1. Custom Fit Design

The proposed design of *custom fit* depend more on the profile of passengers that use the airport. Worldwide, airports vary on the type of passengers that use them. For instance in *low cost airports* a big amount of passengers are people that travel light with a carry-on luggage and back packs, these types of airports can be found in many places around Europe and on the globe, just to mention some of them Frankfurt Hahn in Germany, Eindhoven Airport in The Netherlands, Toluca in Mexico, and many more in the US or abroad. In other types of airports, like big hub airports like Atlanta in the US or Schiphol in The Netherlands, the mixture of passengers is more diverse but this not prevents from using a *custom fit* approach.

The main premises to confirm with the study are the following:

- There are travelers that travel light or heavy in terms of luggage to carry.
- Light passengers can move faster in the airport processes while heavy passengers carry more luggage and/or companions (family)
- It is possible to design specific lines for different type of passengers
- The overall performance will be much better than the one following the paradigm *one size fits all*
- It is possible to implement *custom fit* without jeopardizing the level of security.

Regarding this design, we kept a similar layout of lines, however, we dedicated one or two to different passengers.

For the traffic (passengers) using the facilities, we considered the total demand of the airport and we considered the proportion that should pass through that area. This is just to have a similar dimension as to which the area has been designed. In this initial approach, we assumed an equal distribution of passengers. The previous assumption has been done since the study aims at identifying the impact of this *custom fit* approach for security. For particular cases a modification of this analysis should be performed.

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3. EXPERIMENTS AND RESULTS

The following table illustrates the types of experiments that were designed for the study.

We considered two different types of demand:

1) A limited amount of passengers
2) A continuous amount of passengers during the day

Table 1: Experimental Design

	Type of Demand	
OSFA	Limited Passengers	Continuous demand
CF	Limited passengers	Continuous Demand

With this initial design we can identify the following indicators of performance

- Total processing time
- Current throughput
- Average waiting times / Type of passenger
- Queue Lengths

Considering those indicators it is possible to identify if the impact for the considered type of passengers is significative or not.

The percentage of passengers considered in the demand are presented in the following table

Table 2: Passenger Percentage

	Passenger Mix
Passengers without luggage	14%
Passengers with 1 Luggage	70%
Passengers with 2 luggage	16%

4. CONCLUSIONS AND RESULTS

In the conclusions we will present and discuss the findings of our study.

REFERENCES

Evans W.A., 1994. Approaches to intelligent information retrieval. Information Processing and Management, 7 (2), 147–168.

Bruzzone A.G., Longo F., 2005. Modeling & Simulation applied to Security Systems. Proceedings of Summer Computer Simulation Conference, pp. 183-188. July 24-28, Philadelphia (Pennsylvania, USA).

Risk, Mora, Batatia, 2018,. Optimization of Passenger Screening Operations in Air Terminals, Transportation Research Procedia, vol.35, pp. 23-34