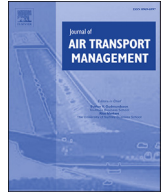




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## Keeping cargo security costs down: A risk-based approach to air cargo airport security in small and medium airports

Duarte Amorim da Cunha\*, Rosário Macário, Vasco Reis

CERIS, CESUR, Instituto Superior Técnico, Universidade de Lisboa, Avenida Rovisco Pais, 1049-001 Lisboa, Portugal

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### ABSTRACT

European Union regulations are not sensible to the proportionality of measures and provide fixed orientations and standards irrespective from the dimension of the airports. Additional security measures have been added over the years resulting in increasing security-related costs. The cost structure of security exhibits the existence of a relevant fixed component, concerning staff, equipment, or certification. Notable, smaller, and medium airports support higher costs of security than larger airports, due to the low volumes of cargo and passenger movements. Alternative approaches, notably risk based, have been advocated to support the definition of security procedures at airport level. Although studies have been conducted, none was found concerning these types of airports.

This paper presents a research aimed to analyse the appropriateness of a risk based approach in the context of small to medium airports. The research focused in understanding whether such approach could provide tailored security requirements and, ideally, lower costs.

A case study considering six airports - Horta, Lisbon, and Ponta Delgada (Portugal), and Adana Şakirpaşa, Erkipet International and Istanbul (Turkey) - of different sizes and located in different regions was conducted. The results make evident the advantages of a risk based approach to define appropriate security procedures, although it is not evident that a risk based approach will lower costs.

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### 1. Introduction

According to EUROCONTROL,<sup>1</sup> there are little more than 2000 airports in Europe that handle IFR (Instrument Flight Rules) flights, with only 500 having more than 1000 IFR departures per year (Wegner and Marsh, 2007), and from which only about 300 board more than 15 000 passengers per year (European Commission, 2015). In 2013, a total of 14.4 million tonnes of air freight were transported through EU airports, (European Commission, 2015). If we consider the Top 25 airports that handle the largest freight traffic amount *per se*, together they sum up to almost 12.8 million tonnes of air freight handled in 2013 and even the Top 5 sum almost

7 million tonnes. This means that only 1.6 million tonnes are handled by the remaining airports, but we should bear in mind that not all smaller airports handle freight. In the absence of a classification of airports by size regarding the amount of cargo loaded, and since we do not solely consider cargo specialized airports, we use the definition of small and medium airports by number of departures per year, being small and medium airports those with a maximum of 3.000 and 6.000 departures respectively.

Regional airports are vital for economic growth of Europe's regional communities. The worldwide connection and speed of air travel gives remote regions more accessibility than other means of transport being an enabler for social development and economic growth. In Norway, for example, a study concluded that residents in remote regions have a higher frequency of travel by air on domestic services than the national average (Halpern and Bråthen, 2011). In the same study, the main reasons for travel for residents in those remote regions was work, followed by visiting family and friends. But the global financial crisis created a great impact on these airports, and their recovery has not been as quick as the rest of the industry. Nevertheless, in 2014 regional airports recovered as much as in the earlier years (Sadler, 2015).

\* Corresponding author.

E-mail addresses: [duartecunha@tecnico.ulisboa.pt](mailto:duartecunha@tecnico.ulisboa.pt) (D. Amorim da Cunha), [rosariomacario@tecnico.ulisboa.pt](mailto:rosariomacario@tecnico.ulisboa.pt) (R. Macário), [vascoreis@tecnico.ulisboa.pt](mailto:vascoreis@tecnico.ulisboa.pt) (V. Reis).

<sup>1</sup> We should also consider that these values provided by the EUROCONTROL refer to loading and unloading of freight which, in cases of transfer freight, may consider the same consignment twice.

Due to its high price, air freight (which include the transportation by air of cargo and mail) is competitive mainly for long distances and relatively light, high-value or perishable goods, and time-sensitive cargo. As an example, for typical air freight consignments, the high-value machine parts and manufacturing equipment, electronic components for manufactured goods, consumer electronics, jewellery, and perishable items as flowers, fruits, and even fresh fish. Hence, it plays a relevant role in moving certain types of goods across the globe, consequently some sectors could be seriously affected by eventual disruptions (e.g. remote regions) (Williams and Bräthen, 2010).

Regarding security risks, the ones related with terrorism include the hijacking of an aircraft with the intention to be used as a weapon of mass-destruction, as it was done in the 9/11 attacks, or the introduction of an explosive on passenger aircrafts thru the cargo supply chain, resembling the Yemen air cargo bombs in 2010. Other security risk associated with terrorism is the introduction of weapons or CBRN (chemical, biological, radiological, and nuclear) devices. Theft, smuggling and cargo with undeclared and potentially harmful material also consists as a security risk (Price and Forrest, 2013). Air cargo can be considered as exposed to this very same list of potential risk, although the larger impact caused by any incident engaging human lives makes full air cargo less attractive for terrorism attacks.

The literature concerning security in general in small and medium airports is very reduced. A search<sup>2</sup> conducted on the Science Direct database yield a total of 266 papers, addressing mostly screening technologies, rather than aviation security strategies or policies. The papers focusing on cost and finance of aviation security are mainly directed to passenger security, rather than to air cargo. Regarding air cargo security, a reduced number of articles was found, all relating to screening technologies, once again. The literature discusses the security challenges in general and not specifically in the case of small to medium airports, and are more focused on passenger security, rather than air cargo and mail security (Gillen and Morrison, 2015).

The current security procedures are imposed in a top-down approach starting with ICAO guidelines aiming to promote a harmonisation in all airports. The objective is to impose a maximum vulnerability threshold, which all airports must comply. Although theoretically adequate, this approach presents some practical limitations. Foremost, regional specificities can be considered solely to a small extent. These may include airports localised in remote regions, such as island, in which the threat is almost inexistent. The consequence is the need to implement security procedures without a rational justification. Secondly, security costs exhibit a substantial fixed component (e.g., equipment or staff) and high economies of scale. Hence, air transport agents will endure proportionally higher security costs than those located in larger airports. If these costs are too high, their survivability is in jeopardy. Indeed, smaller exporters and freight forwarders may opt for other means of transport, in deterrence of air transportation. Additionally, in case of remote regions, the alternatives may not be suitable, due to limited accessibility of these regions.

There is also a discussion on who is responsible for security: National Security is a public good since everyone benefits from it and cannot exclude anyone or anything. It is provided by national governments thru national police, military or other defence forces. This contrasts with the current aviation security paradigm where there is a user-pays principle with the increasing taxes on security (Prentice, 2015).

Alternative approaches to airport security have been advocated, namely risk based approach (Cole, 2014; McLay et al., 2010; Wong and Brooks, 2015), because they deliver tailored security procedures according to local contextual conditions. The customisation of security procedures promotes costs and resources rationalisation. Thus far, the debate has neglected the small and medium airports, which are those that borne higher security-related costs.

The purpose of this paper is to discuss eventual advantages in using a risk based approach for air freight security in small and medium airports, instead of the top-down approach that is currently imposed.

In the next chapter, a brief explanation of the current security framework for air cargo and mail will be presented, as well as considerations on its positive and negative aspects. The third chapter will present a case study where a qualitative risk assessment to a group of six airports with different sizes and in different contexts is made, and a comparison of costs in each airport, in order to examine the cost-benefit of the current security procedures. The last chapter will present our conclusions and the next steps on our research in this topic.

## 2. Regulatory framework for security

### 2.1. Current air cargo security paradigm

The 9/11 tragic events placed transport security under attention from worldwide authorities at the passenger level, but the October 2010 events involving the finding of two package-bombs in Britain and Dubai, originating from Yemen and destined for two synagogues in the USA, showed worldwide authorities that cargo and mail security should also be object of concern.

The International Civil Aviation Organization (ICAO – a specialized United Nations agency) sets the general rules and principles aimed at “safeguarding International Civil Aviation against Acts of Unlawful Interference”, to be implemented in each of the Contracting States and running the USAP, an audit programme to monitor the compliance of states with its SARPs.

In Europe, and in line with the ICAO SARPs (Standard and Recommended Practices), the Regulation (EC) 300/2008 sets the common rules and basic standards on aviation security and, therefore, on air cargo and mail security, and replaces the former Regulation (EC) 2320/2002. It sets general orientations and mechanisms for monitoring compliance which are adopted through the ordinary legislative procedure. The measures supplementing the basic standards and the detailed implementing aspects are adopted by the EC through the committee procedure. On its turn, the Commission Implementing Regulation (EU) 2015/1995 of 5 November 2015 lays down the detailed measures for implementation of the common basic rules and principles specified in the Regulation (EC) 300/2008.

At the national level, although it is the respective national authorities' responsibility to implement and enforce EU law, the EC has means to assess and enforce such implementation and conduct audits and inspections to all Member States concerning both authorities and operators.

A hierarchical relation is established (Fig. 1) in what concern the information details and the degree of compliance. The Information detail increases from the ICAO and EC, as legislators, to the airport stakeholders, as for example, the airport operators themselves, airlines, ground handlers, etc., while the responsibility for compliance increases in the opposite direction.

For air cargo and mail, the EU framework establishes that all consignments shall be subject to security controls prior to being loaded onto an aircraft. Security controls have to be applied by the air carrier itself or by a regulated agent, known consignor, or

<sup>2</sup> Search done the 2nd December 2015 to the following words in title and key-words: airport, aviation, security.

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