

# Preliminary design - Company B

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## Revision

Date	Author	Version	Change Description
13-03-2020	CI & JD	0.1	Blank space
15-03-2020	CI & JD	0.2	Flow chart and PBS

<b>1 Scope</b>	<b>3</b>
<b>2 Referenced Documents</b>	<b>3</b>
<b>High Level Architecture</b>	<b>4</b>
<b>Project Plan</b>	<b>5</b>

# 1 Scope

The objectives for this project is to deliver an extension to the airports already existing CrisBag system. The extension is referred to as 'Baggage Handling Upgrade'. This document describes the technical preliminary design of the extension and is based on the requirements in the System Requirement Specification document [1].

# 2 Referenced Documents

[1] System Requirement Specification (SRS)

[2] [https://europa.eu/european-union/eu-law/legal-acts\\_en](https://europa.eu/european-union/eu-law/legal-acts_en)

### 3 High Level Architecture

The flowchart on figure 1 shows how baggage enters the system and the steps it goes through to either be cleared or eventually destroyed.

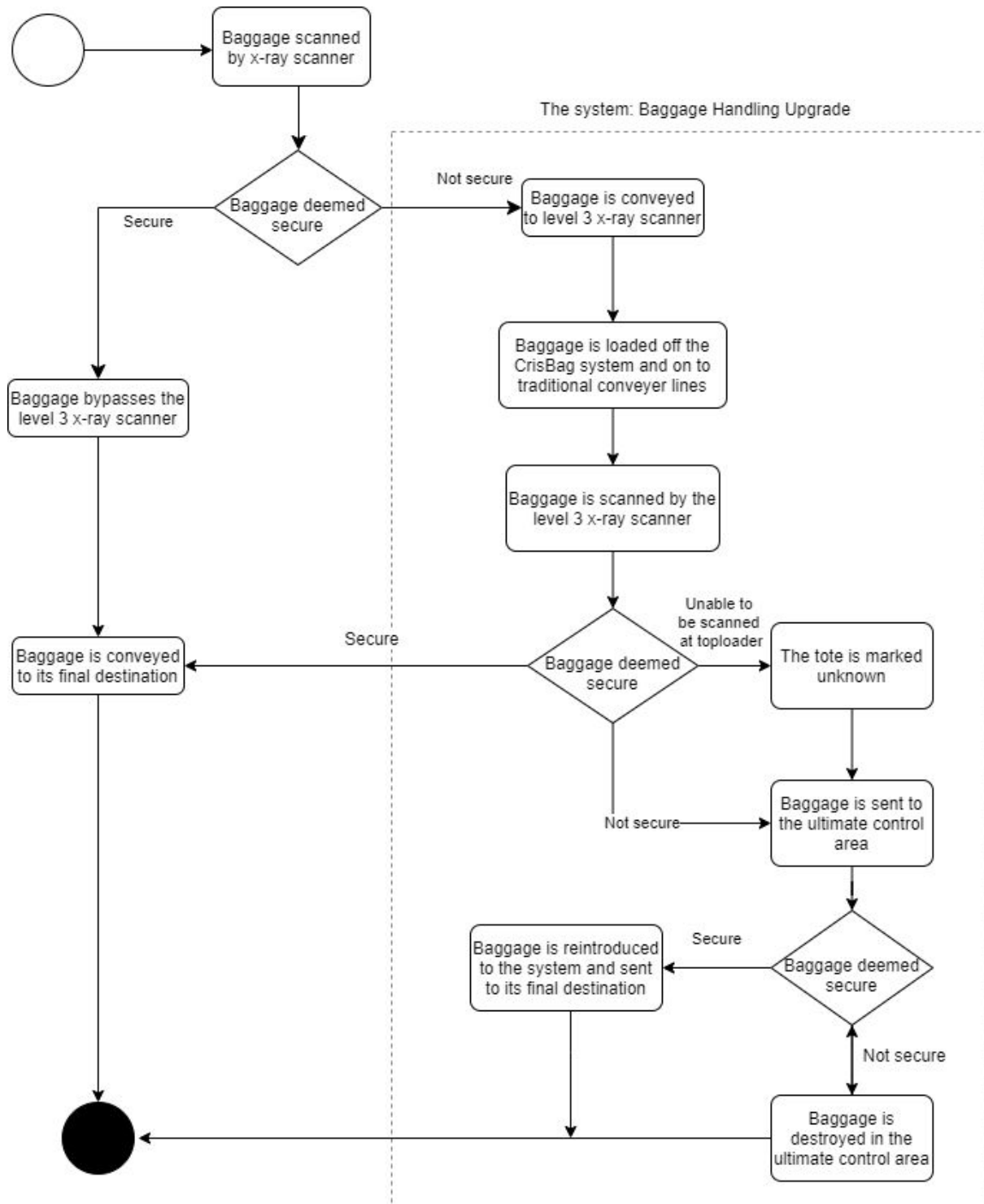


Figure: 1 Flowchart showing the life-cycle of a bag when scanned prior to the extension and how it is handled in the extension.

The major subsystems comprising the system, are defined by the Product Breakdown Structure diagram on figure 2.

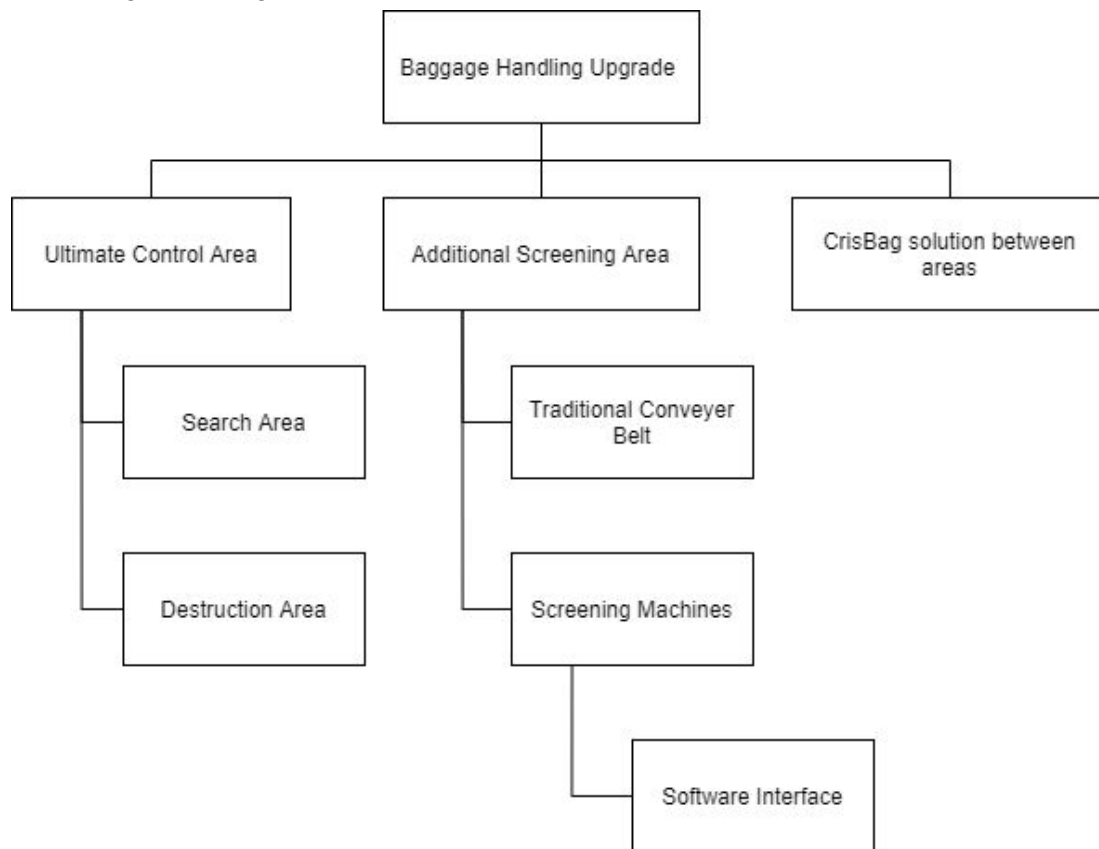


Figure: 2 Product Breakdown Structure of the Baggage Handling Upgrade

## 4 System Design by Requirements

The following section gives a preliminary description of how the requirements defined in SRS [1] will be designed into the solution of the system.

### 4.1 Requirement 1

To avoid totes with baggage to go through the Ultimate Control Area there will be develop some mechanical device which will make it only possible for empty totes to pass through. This mechanical device will not be depended on electricity nor any other state of the system.

### 4.2 Requirement 5

A checkpoint with a queue system must be implemented allowing Airport Personnel to examine baggage. The checkpoint must stop totes from passing until Airport Personnel lets the tote through, using either a mechanical or a digital interface.

### 4.3 Requirement 7

A system of Crisbag modules must be set up to allow totes to be transported from the entry point to the point of additional scanning.

### 4.4 Requirement 8

The baggage must wait for a result from the additional screening machine before being routed past the manual inspection area. For this to be possible, the transport system must be able to stop if the baggage is yet to receive its result. This is done with a combination of software, hardware, and mechanical engineering.

### 4.5 Requirement 9

In the second offset workstation, figure 3 - blue circle, an empty tote will be parked so that it is possible to manually load cleared baggage back onto the system.

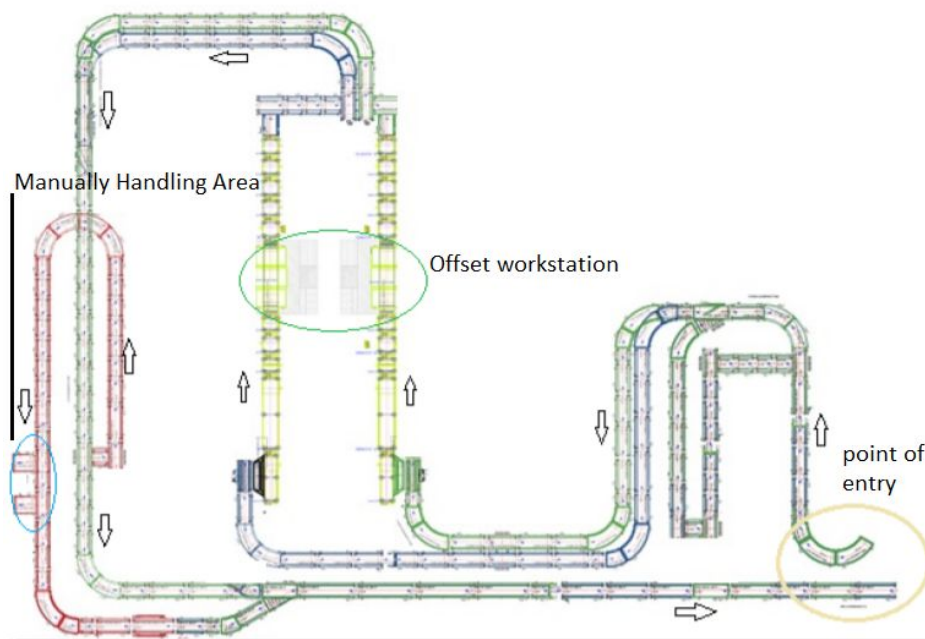


Figure: 3 Layout of extension

#### 4.6 Requirement 2

The time it takes to transport totes from the entry point and the point of additional screening must take at least 70 seconds. This should be done by using a scanner that detects an incoming tote, and stops the underlying transport module for 70 seconds.

#### 4.7 Requirement 3

The time it takes to transport totes from the point of additional screening to the entry of manual inspection must take at least 30 seconds. This should be done by using a scanner that detects an incoming tote, and stops the underlying transport module for 30 seconds.

#### 4.8 Requirement 4

The unsecured baggage in the CrisBag totes are conveyed through either one of two additional screen machines of the type SecureScreen RX 5001. Since the SecureScreen RX 5001 machines are not supplied, there must be made an software interface, and a mechanical connection between the conveyor belts of SecureScreen RX 5001 and the CrisBag conveyor system. The empty CrisBag totes must be transported to the end of SecureScreen RX 5001 conveyor belts, where a CrisBag module loads the baggage back onto the CrisBag totes - The screening is now done.

#### 4.9 Requirement 12

Airport Personnel need access to the additional screening error, with enough clearance for the personnel to safely remove dangerous baggage from the additional screening area.

#### 4.10 Requirement 6

The ultimate control area must be made to fit within the space constraints. The space constraints being:

- Destruction area: 10m<sup>2</sup> (5m x 2m, with free high 3m), see figure 4.
- Search office: 15m<sup>2</sup> (6m x 2.5m)

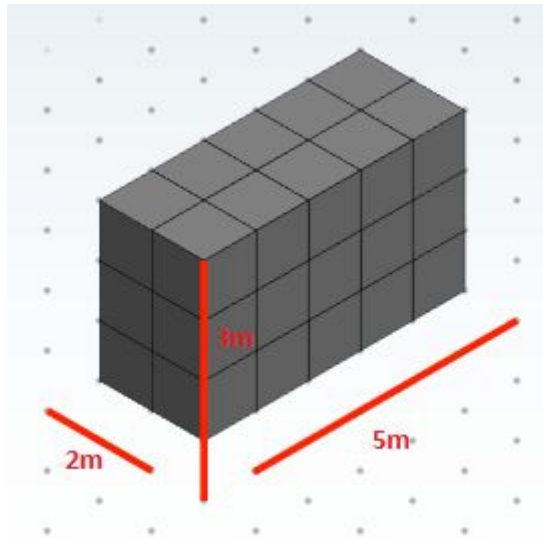


Figure: 4 destruction area, each box is 1 cubic meter.

#### 4.11 Requirement 10

To ensure that all unsecure baggage is manually inspected, CrisBag totes entering the manual handling area must pass a mechanical filter, that does not allow non-empty totes to pass between the two offset workstations.

#### 4.12 Requirement 11

There must be a single dedicated workstation, where baggage can be manually loaded onto an empty CrisBag tote. The dedicated workstation is the second workstation show on figure 3 in the blue circle.

#### 4.13 Requirement 14

Using standard CrisBag modules rejected baggage must be sent to the manual handling area and cleared baggage must be sent to their planned destination.

#### 4.14 Requirement 13

Baggage reintroduced to the system after being cleared at the manual handling area must be added to a tote, and assigned to the tote using a handheld scanner.



#### 4.17 Requirement 17

All components designed for the system must comply to the European regulations for industrial electrical components [2].