

# System requirement specification

Company D

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# 1. Scope

## 1.1 Identification

The project aims to extend a baggage handling system CrisBag, which is already under development. The extension has been requested additionally to accommodate for security demands of the airport.

Delivery of the system envelopes design of the extension, configuration of the CrisBag components, integration of screening machines into the system, power demands calculations for the extension, full installment of the extension as well as testing.

## 1.2 System overview

The extension is focused on verifying harmlessness of the processed baggage before it is loaded onto the planes. The extension will provide additional security via screening machines SecureScreen RX 5001 and situational manual check in case the machine detects a potential threat or cannot guarantee the harmlessness of the baggage. No baggage will leave this extension unless proven safe for transport.

See *Beumer Group Case Description* for more details on the case and what the system is meant to be.

## 1.3 Document overview

The purpose of this document is to provide a single and clear formulation of the requirements associated with the system. It provides a base for development and helps create the proper product that fulfills all stakeholder needs.

Requirements shall only depict what has been agreed with the customer, thus representing the functionality and characteristics said customer is paying for. Any changes the customer requires that are not covered by the existing requirements are to be considered change requests and paid for by the customer. If any changes need to be made that are covered by a requirement are to be treated as defects - the customer need not pay for them.

# 2. Referenced documents

- Beumer Group Case Description
- Traceability Matrix Document

# 3. Requirements

All requirements documented in this section are as specified and agreed with the customer.

## 3.1 Required states and modes

The system has two states:

1. **Regular System Use** - the system is active and operational. Live conveyor belts, transport tracks, stackers and other moving components are hazardous and pose a risk of injury to any maintenance staff.
2. **Maintenance** - the system is inactive and all typically moving/live components are immobile to allow maintenance staff to carry out repairs and other tasks without health hazards.

## 3.2 System capability requirements

The following requirements specify system behaviour.

**Note:** unsecure baggage is baggage without security approval.

Identifier	System Capability Requirement
SCR-1	The system must have 70 seconds pass from the moment the baggage enters the extension to the moment the baggage reaches the additional screening area.
SCR-2	The system must have 30 seconds pass from the moment the baggage exits the additional screening area to the moment the baggage reaches the entry point to the Ultimate Control track.
SCR-3	The system must allow for baggage to be manually removed through an offset workstation in the Ultimate Control area.
SCR-4	The system must allow for baggage to be manually transported from the Ultimate Control Area to the search room and destruction area after being removed from the system.
SCR-5	The system must have all baggage that was marked as unsecure by the additional screening machines wait for the final result from the operator.
SCR-6	The system must allow for baggage cleared in the Ultimate Control area to be loaded into the system through one dedicated workstation..
SCR-7	The system must <b>not</b> allow for totes with baggage to pass the Ultimate Control area, regardless of other elements being in error.
SCR-8	The system must allow for bags at the Ultimate Control area to be loaded to an empty tote and paired with it with the use of a hand-held scanner or manually entering the proper code with a keyboard.

### 3.3 System internal interface requirements

Identifier	System Internal Interface Requirement
<b>SIIR-1</b>	The SecureScreen RX 5001 additional screening machines must have a software interface

Regarding **SIIR-1** - the software interface configuration will control marking of the baggage and tote as well as the communication between machines and routing of the tote.

### 3.4 Security and privacy requirements

Identifier	Security and Privacy Requirements
<b>SPR-1</b>	The system must not allow any unsecure baggage to go through, regardless of mechanical errors.
<b>SPR-2</b>	The system must have all baggage that is marked as unsecure or not marked from initial screening prior to the extension, routed to the additional screening area.
<b>SPR-3</b>	The system must have all baggage that is marked as unsecure by the additional screening machines and the operator, routed to the Ultimate Control area.
<b>SPR-4</b>	The system must have all baggage that is marked as secure in the additional screening area, routed to the planned destination.

### 3.5 Computer resource requirements

Identifier	Computer Resource Requirement
<b>CRR-1</b>	The electrical installation must be extended with the following components: <ul style="list-style-type: none"><li>• 1 Main Control Cabinet (MCC)</li><li>• 4 Field Control Cabinets (FCC)</li></ul>

### 3.6 System quality factors

All electrical components must comply to European regulations for industrial electrical components.

Potential suppliers must quote:

- The actual components
- Factory acceptance testing
- Onsite installation
- Transport and insurance to the client site

### 3.7 Design and construction constraints

**The CrisBag system** is already established and given to this project to utilize for the extension. Design and construction depends heavily on the characteristics and functionality available through CrisBag.

	Identifier	Design and Construction Constraints
Screening Machines	DCC-1	The <b>additional screening machines</b> in the additional screening area are of type SecureScreen RX 5001.
Space Constraints	DCC-2	The <b>Search Office</b> in the Ultimate Control area must have size 15m <sup>2</sup> (6m x 2.5m)
	DCC-3	The <b>Destruction Area</b> in the Ultimate Control area must have size 10m <sup>2</sup> (5m x 2m, with free high 3m)

## 4. Quality provisions

All components are to be inspected. It must be ensured that they correspond to the related regulations.

All calculations for electrical and mechanical areas are to be inspected for potential errors.

All and any documents and code made for the extension is to undergo peer-inspection at the very least and may not be accepted without approval.

Models of the system may be built to allow simulations and cut down on cost and time necessary for manual testing and demonstrations. Simulations may range from those for a few components working together to those for the system in its entirety.

The system itself may be separated into modules that can undergo manual testing on a smaller scale in-house to ensure certain behaviours and to potentially analyse how closely the models follow reality.

Table below depicts requirements and a description of the quality test to be performed in order to assure high quality for each requirement.

## System Capability Requirements (SCR)

SRC Requirement ID	Requirement	Method description
SCR-1	The system must have 70 seconds pass from the moment the baggage enters the extension to the moment the baggage reaches the additional screening area.	A precise measurement action to be undergone to ensure the time amounts to 70 seconds in all cases.
SCR-2	The system must have 30 seconds pass from the moment the baggage exits the additional screening area to the moment the baggage reaches the entry point to the Ultimate Control track.	A precise measurement action to be undergone to ensure the time amounts to 30 seconds in all cases.
SCR-3	The system must allow for baggage to be manually removed through an offset workstation in the Ultimate Control area.	Manually remove baggage from the belt and observe. Repeat multiple times to ensure correct results.
SCR-4	The system must allow for baggage to be manually transported from the Ultimate Control Area to the search room and destruction area after being removed from the system.	Manually remove baggage from the belt and observe. Repeat multiple times to ensure correct results.
SCR-5	The system must have all baggage that was marked as unsecure by the additional screening machines wait for the final result from the operator.	Simulate unsecure baggage multiple times to ensure correct results.
SCR-6	The system must allow for baggage cleared in the Ultimate Control area to be loaded into the system through one dedicated workstation.	Load multiple baggages multiple times onto the belt manually and observe to ensure correct results.
SCR-7	The system must <b>not</b> allow for totes with baggage to pass the Ultimate Control area, regardless of other elements being in error.	Multiple tests to ensure that totes with baggage will pass the Ultimate Control area and observe the results.
SCR-8	The system must allow for bags at the Ultimate Control area to be loaded to an empty tote and paired with it with the use of a hand-held scanner or manually entering the proper code with a keyboard.	Multiple tests to load baggage onto totes and scan them and observe the results.

**System internal interface requirements (SIIR)**

SIIR Requirement ID	Requirement	Method description
SIIR-1	The SecureScreen RX 5001 additional screening machines must have a software interface	Observe whether CrisBag system can access the screening from SecureScreen RX5001.

**Security and privacy requirements (SPR)**

SPR Requirement ID	Requirement	Method description
SPR-1	The system must not allow any unsecure baggage to go through, regardless of mechanical errors.	Simulate unsecure baggage, observe until not a single unsecure baggage is let through.
SPR-2	The system must have all baggage that is marked as unsecure or not marked from initial screening prior to the extension, routed to the additional screening area.	Rejected baggage has to pass all additional screenings in all cases.
SPR-3	The system must have all baggage that is marked as unsecure by the additional screening machines and the operator, routed to the Ultimate Control area.	Rejected baggage has to pass all control in the Ultimate control area without failing once.
SPR-4	The system must have all baggage that is marked as secure in the additional screening area, routed to the planned destination.	Multiple tests will be performed with baggage approved in additional screening area. These must be correctly sorted and conveyed to the planned destination.

### Computer resource requirements (CRR)

CRR Requirement ID	Requirement	Method description
CRR-1	The electrical installation must be extended with the following components: <ul style="list-style-type: none"><li>• 1 Main Control Cabinet (MCC)</li><li>• 4 Field Control Cabinets (FCC)</li></ul>	Individual tests of MCC & FCC to ensure its functionality and safety.

## 5. Requirements traceability

The table below provides traceability between the requirements specified in this document and the use cases given by Beumer (Beumer Group Case Description).

Use Case Reference	Use Case	Requirement IDs
R1	Regardless of mechanical errors, operational faults etc. no baggage must be able to go through the area without having been security approved	SPR-1
R2	From the point of entry, to the point of additional screening, there must pass at least 70 seconds	SCR-1
R3	From passing additional screening until reaching entry point of manual inspection, at least 30 seconds must pass	SCR-2
R4	The unsecure bags in the CrisBag totes are conveyed through two additional screening machines, foreseen to be of type SecureScreen RX 5001. A software interface must be made.	SIIR-1, DCC-1
R5	Bags can manually be removed from the system through one offset workstation. They can then be manually transported to the search room and destruction area to complete the security process	SCR-3, SCR-4
R6	Specified areas are as per below: -Search office: 13m <sup>2</sup> (6m x 2.5m) -Destruction area: 10m <sup>2</sup> (5m x 2m, with free high 3m)	DCC-2, DCC-3
R7	Items rejected at first screening (prior to the extension), or with no result supplied, must be routed to Additional Screening Area	SPR-2, CRR-1

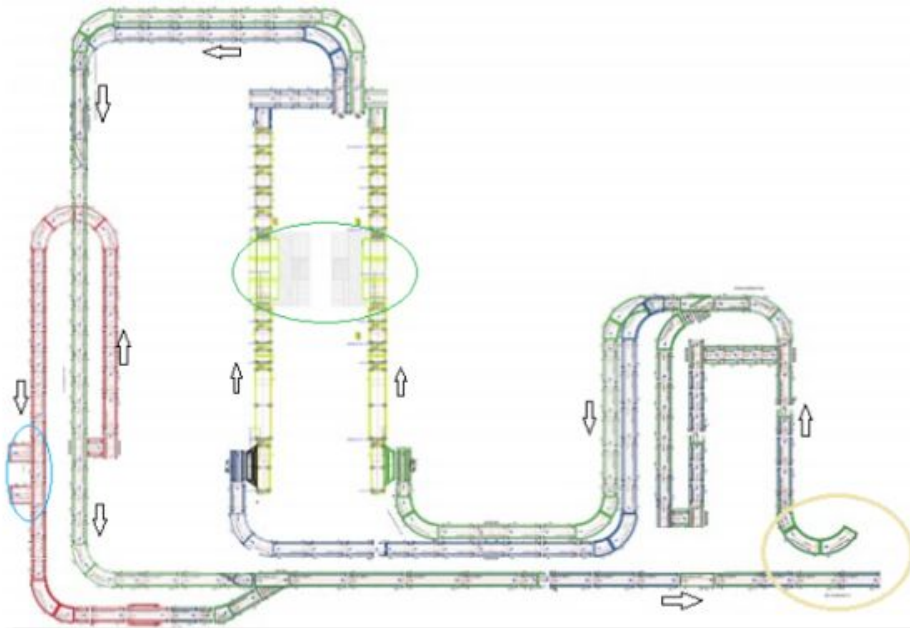


<b>R8</b>	Items rejected in the additional screening machine, must wait for the final result from the operator, after which rejected items are sorted to the manual handling area for inspection. Cleared items are sorted to the planned destination.	SCR-5, SPR-3, SPR-4
<b>R9</b>	It shall be possible to load cleared items back to the system at the manual handling areas.	SCR-6
<b>R10</b>	It must not be possible to send full totes through the manual handling area. Even if other elements are in error	SCR-7
<b>R11</b>	Secure bags are then re-introduced to the system through one dedicated workstation. Bags are loaded to an empty tote and associated by a hand-held scanner/or keyboard	SCR-6, SCR-8

See Traceability Matrix Document for more information.

## 6. Other

The following image depicts the layout of the extension.



**The yellow circle** is the point of entry from the main supply into the extension.

**The green circle** is the Additional Control Area, which holds two additional screening machines.

**The red track** is the track toward the Ultimate Control area.

**The blue circle** is the Ultimate Control area itself. It has one workstation for taking baggage off the system, and a second workstation for loading baggage back into the system.