**Concordia Institute for Information Systems Engineering**

**INSE 6400 Principles of Systems Engineering**

Project Name

# RFID BASED LUGGAGE HANDLING SYSTEM IN AIRPORTS

Submitted to

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## 1. INTRODUCTION

Although many technologies are capable of supporting processes for baggage tracking, selecting the right technology requires study and expertise. Via enhanced cooperation between airports, airlines, and other stakeholders in the airport community, ACI World promotes better baggage management, including the right technology. In order to find better options, this partnership allows for a full review of baggage handling processes, including the latest relevant regulations. We can categorize baggage tracking into two groups i.e, Manual tracking and technology-based tracking [1].

However, in airports, baggage mishandling is a common problem, and mishandled baggage costs airlines billions of dollars annually. The current baggage handling system (BHS) in airports is accurate for baggage identification and routing information on barcode tags. This approach is human-based and vulnerable to high error rates that result in luggage being misplaced or lost. Because manual barcode scanning is needed, it is difficult to count consignments. A successful BHS (Baggage Handling System) with advanced technologies and a growing number of airline travelers is crucial. In addition, there is a need for an integrated system for quicker and simpler baggage handling. These errors can be removed by overall machine automation [2].

The barcode tags used in the RFID tags will be replaced by the tags in the current method. By moving within the range of an antenna connected to an RFID scanner, the tags are scanned. Since RFID technology uses radio waves, regardless of its direction, the scanner will penetrate through the luggage and read the tag. This increased scanning capability would reduce the rate of scanning failure to almost zero [3]

## 2. RFID

Radio Frequency Identification (RFID) is a wireless technology used for tracking. This technology allows computer devices to read the identity of the electronic tag from a descriptive distance. Effective identification and routing of luggage will increase to a rate where it is uncommon for passengers to lose baggage by introducing an RFID tagging and tracking procedure. The ability to differentiate RFID tags attached to luggage with an installed scanner was the focus of the use of RFID here. The information can be used by the airport for routing purposes after scanning and by the passenger via the application that offers actual-time tracking alerts [4].

### 2.1 BASIC RFID SYSTEM

There are three main components of the RFID system [4]:

- RFID tag - The tag consists of data and antenna storage microchip. To identify the object item, a unique serial number is allocated and data such as price, time, date, development, and product composition can also be stored. Some tags also have the ability to perform basic data cryptography and access control with certain computing capabilities.
- Reader - It consists of the RF module, control unit, and coupling part that is used to interrogate tags via RF communication. It also has a secondary interface for the transmission of the information contained in tags to communicate with backend systems.
- Backend Applications - It aggregated, filtered, and measures the data collected by readers and then process the dynamic product data (e.g. location, history, and current analysis).

Types of RFID System [5]:

There are two types of RFID tags, which are active RFID and passive RFID.

- Passive RFID: The tags used in passive RFID systems receive power from the electromagnetic energy emitted by the RFID reader since they have no internal power generation source.
- Active RFID: On the other hand, RFID tags that use battery power are used in active RFID networks, where their own signal is transmitted.

Besides, it is possible to find RFID tags of numerous styles and sizes. In addition, according to particular program criteria, RFID tags can be customized, but they can be very costly. Passive RFID is used in airport baggage handling, as it has several benefits over active RFID. Passive RFID tags are lower in price and due to smaller sizes, they can be conveniently tagged to luggage.

**2.2 HOW IT WORKS**

RFID organizes each step of the luggage handling process. Starting with the check-in process, the passenger can select one of the two options for receiving information about the luggage. One is a phone and another option is a bracelet that is provided upon request. Generally, passengers like to go with the phone option however in case of a discharged battery or no phone, the passenger can opt for a bracelet. The passenger is then instructed regarding how the bracelet works [6].

When the luggage is placed on the conveyor, the RFID reader reads the tag data and records the starting of the trip. RFID keeps tracking the luggage as it moves through the conveyor to make sure that the baggage is delivered to the right gate or flight. Simultaneously, the database system processes the data sent by the RDIF system and retrieves from it the passengers' information in order to know the bracelet ID and be able to send the tracking information.

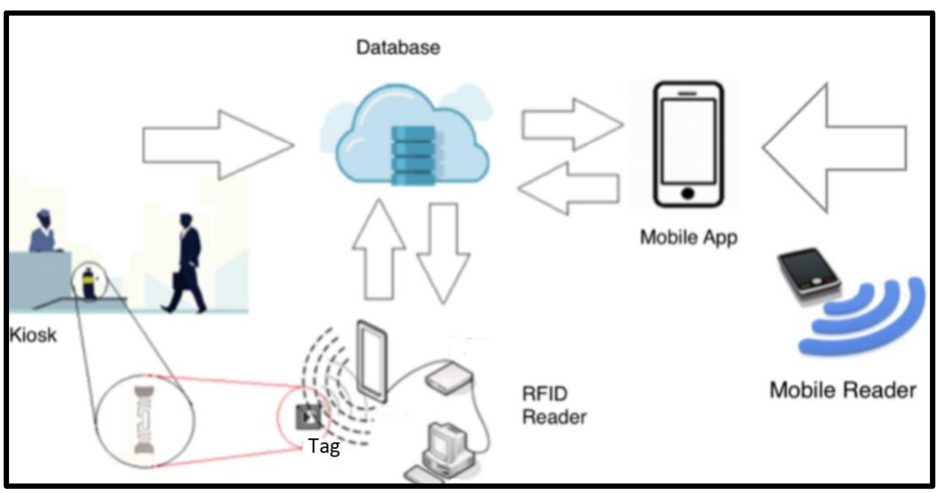


*Figure 1: RFID process [6]*

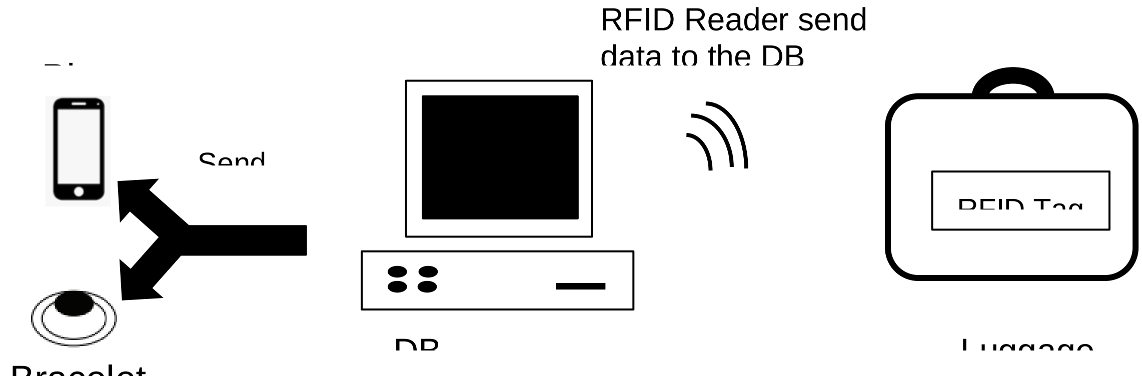


*Figure 2: Interaction between the RFID-based system components [6]*

**3. PROBLEM IDENTIFICATION**

According to the SITA Baggage Report 2016, there are many as 23.1 million bags are manhandled and misplaced in airports [7]. Why does this happen?

- Bag loaded in the wrong airport
- Wrong destination
- Missing baggage at the destination
- The label got damage.

Most of these issues are human errors, which can be taken care of by enhancing the process using RFID technology.

**3.1 PROBLEMS WITH BARCODES TAGS** [6], [7]

- The read-rate can be as poor as 65 percent if the barcode tags are folded or wrinkled.
- The error rate is high, as the procedure is human operational, leading to lost bags as well as misrouted deliveries.
- Just 10 bits of barcode information can be encoded, meaning only small data can be captured.
- Information can not be modified until placed in a barcode tag. When passenger-related details change, new barcodes should be tagged and scanned after they are printed.
- Barcode tags must be in the line of sight for scanning and retrieval of data from them.

**3.2 ADVANTAGES OF USING RFID TAGS**

A baggage tag containing an RFID tag enables an airline to more efficiently track luggage. At this time, the most common process depends on a barcode system that needs tedious scanning. Here is the impact on the airline industry that the RFID tag system could have [6], [7].

**For passengers:**

- Reduced check-in time
- All way bag tracking

- Simplified bag drop process
- Self-service attitude
- Fewer queues

**For airlines and airports:**

- Improved customer's satisfaction
- Reduced costs
- Enhanced operational efficiency
- Fewer departure delays
- Passengers preferences tracking

## 4. SYSTEM FEASIBILITY ANALYSIS

RFID integration involves various stages like defining project scope and the place for equipment installation, Hardware and software installation, staff learning RFID systems. Hence, there is very much a need of conducting a system feasibility analysis. A feasibility analysis is used to ensure that the proposed project plan is theoretically/technically feasible as well as economically justifiable. In short, it tells us whether a project is worth the investment. Based on our findings we divided the feasibility analysis of RFID into four types of the feasibility study [8].

### 4.1 OPERATIONAL FEASIBILITY

Operational viability means that, once it has been established, the proposed luggage handling system will be used successfully [8].

**INTERNAL FACTORS**

In this portion, the benefits and disadvantages of the proposed method are analysed.

- **Storage:** RFID tags can hold more bits of data than conventional barcode tags, so it is easier to track RFID tags.
- **Performance:** With RFID readers enabled, because this mechanism is human-independent, the RFID tags can be scanned and read quicker. In the event of being misplaced or misrouted, the bags may even be tracked back.
- **Efficiency:** When radio frequency waves are used to scan the tags, RFID tags have a higher read rate than barcode tags. So, than barcode tags, RFID tags are more accurate and effective.
- **Cost:** information can be changed once stored in an RFID tag, while in the case of barcode tags, information can not be changed once stored, and new tags must be printed if there is a change in passenger-related information. So, relative to barcode tags, RFID tags are more economical.
- **Customer Care:** Consumers can expect improved airline management as travellers are tracked in real time and more information is collected for a drop in the amount of baggage lost or misrouted.
- **Control:** The handling of RFID luggage is an autonomous and automatic human operation, while conventional monitoring of barcodes involves manual sorting and is vulnerable to error.

**EXTERNAL FACTORS:**

This section addressed the external possibilities and risks relevant to the introduction of the proposed framework.

- The excitement of the airline industry for the introduction of the new system.
- Government oversight.
- The excitement of travellers to adopt the new baggage handling scheme.
- Conflicts between the airline and airport markets.
- Anonymity of information on passengers contained in RFID tags.

For the study of internal operating viability, a 5-point scale calculation approach was used where 1 represents bad and 5 represents superior.

| **Operational Feasibility** | **Weight** | **Radio Frequency Identification** | **Back Tracking** | **Information Storage** | **Software Maintenance** | **Microcontroller** | **GPS-GSM Module** |
|---|---|---|---|---|---|---|---|
| **Storage** | 4 | 3 | 5 | 5 | 2 | 2 | 2 |
| **Performance** | 5 | 5 | 4 | 5 | 5 | 5 | 5 |
| **Efficiency** | 5 | 5 | 5 | 4 | 5 | 3 | 4 |
| **Cost** | 4 | 2 | 3 | 3 | 2 | 3 | 3 |
| **Customer Services** | 4 | 1 | 4 | 4 | 3 | 1 | 4 |
| **Control** | 4 | 4 | 3 | 4 | 4 | 4 | 3 |
| **Total Scores** | | 90 | 105 | 109 | 94 | 80 | 93 |

*Table 1. Weighted decision matrix for internal operational feasibility [9] and [Class lecture - Decision Making 1]*

**4.2 TECHNICAL FEASIBILITY**

This section would examine the ability of current technical tools and expertise to fulfil current criteria for the RFID baggage handling system. For the study of internal operating viability, a 5-point scale calculation approach was used where 1 represents the lowest and 5 represents the highest.

| Technical Feasibility | Weight | Radio Frequency Identification | Back Tracking | Information Storage | Software Maintenance | Micro-controller | GPS-GSM Module |
|---|---|---|---|---|---|---|---|
| **Resources** | 4 | 3 | 5 | 5 | 2 | 3 | 3 |
| **Technical Expertise** | 5 | 5 | 5 | 4 | 5 | 3 | 4 |
| **Reliable Airport Environment** | 5 | 2 | 4 | 2 | 4 | 2 | 3 |
| **Handling Upgraded System** | 4 | 3 | 2 | 5 | 4 | 5 | 3 |
| **Easy Application** | 3 | 4 | 2 | 2 | 3 | 3 | 4 |
| **Total Scores** | | 71 | 79 | 76 | 78 | 66 | 71 |

*Table 2. Weighted decision matrix for technical feasibility [9], [Class lecture - Decision Making 1]*

### 4.3 ECONOMIC FEASIBILITY

The cost-effectiveness of a planned device has been calculated in terms of economic viability. The cost and drawbacks of each technology have been evaluated here [10].

| Cost Estimation | Radio Frequency Identification | Back Tracking | Information Storage | Software Maintenance | Micro-controller | GPS-GSM Module |
|---|---|---|---|---|---|---|
| **Testing** | 11000 | 6000 | 21000 | 3000 | 1500 | 1300 |
| **Hardware** | 92000 | 2000 | 23000 | 18000 | 30000 | 22000 |
| **Engineers Remuneration** | 23000 | 10000 | 42000 | 7000 | 11000 | 8000 |
| **Database Update** | 42000 | 21000 | 11000 | 5000 | 2500 | 1700 |
| **System design** | 12000 | 8000 | 16000 | 800 | 2000 | 1100 |
| **Modeling** | 10000 | 6000 | 13000 | 2000 | 1500 | 900 |
| **Total** | 190000 | 53000 | 126000 | 19600 | 48500 | 35000 |

*Table 3. Development cost feasibility [10]*

| Cost Estimation | Radio Frequency Identification | Back Tracking | Information Storage | Software Maintenance | Micro-controller | GPS-GSM Module |
|---|---|---|---|---|---|---|
| **Components Cost** | 210000 | 18000 | 165000 | 21000 | 135000 | 70000 |
| **Training** | 30000 | 26000 | 19000 | 29000 | 5000 | 3000 |
| **After-Sale Service** | 98000 | 105000 | 65000 | 35000 | 85000 | 55000 |
| **Database Update** | 22000 | 6000 | 9000 | 11000 | 2000 | 1800 |
| **Facility Retainment** | 18000 | 8000 | 11000 | 16000 | 12000 | 9000 |
| **Improving Production Facility** | 150000 | 62000 | 71000 | 53000 | 42000 | 35000 |
| **Total** | 528000 | 225000 | 340000 | 165000 | 281000 | 173800 |

*Table 4. Annual operating cost feasibility [10]*

#### 4.3.1 ECONOMIC BENEFITS

RFID has also other advantages than barcodes, such as [10], [11]:

(a) Billions of dollars that were historically missing due to baggage mishandling may be rescued. RFID is used to track and handle the physical transfer of baggage, create and transmit simple data flows, and synchronise real-time work between participants in the supply chain. By minimising stock losses and increasing exposure and unification in the supply chain, such capacity increases operating efficiency.

(b) Higher customer loyalty would mean better earnings. Hence, the goodwill and prestige of the airline firms will also increase.

C) The anti-counterfeiting functionality of RFID invention is generally known as an additional component supported by RFID chip-based tags and is addressed in part in the tracking and handshaking functions of properties and goods.

(d) Sensor feature RFID tags can measure physical conditions , such as temperature and humidity, and record whether any thumps on the product have been felt. If these parameters are modified, the software may invoke an alert or deactivate a remedial action. For anti-tampering purposes, condition monitoring may also be used, such as recognising changes in some of the actual conditions of the baggage or sensing when the sticker is peeled off.

### 4.4 SCHEDULE FEASIBILITY

The overall length of the project will include the time needed to start the project, find the right vendors, hire qualified experts, identify the project in terms of scope and split the whole project into sprints and task management and other out of reach deliverables.

| Project Planning | Project Initiation (Analysis and Scoping) | Designing System | Buying And Testing Hardware | Database Integration | System Testing | Pilot Phase | Final Implementation |
|---|---|---|---|---|---|---|---|
| 3 months | 2 months | 1 month | 2 months | 3 months | 2 months | 2 months | 3 months |

*Table 5. Schedule feasibility [11]*

It is not a matter of the feasibility matrix setting targets on what to develop and what not to build, since each project feature is as important as any other feature. This category of the project contains only important features that, since they are all interrelated, all need to be installed. Thus, it is estimated that the entire project will take 1.5 years to complete.

It is shown from Table 6 that Backtracking and Radio Frequency Recognition are the most weighted technologies. However, if it is seen that any downside in the feasibility study is outweighed by the improvement of the luggage tracking device for RFID bases, the other technologies should be evaluated simultaneously.

## 5. SYSTEM OPERATIONAL REQUIREMENTS

Possible compliance forecasts and processes that may pose risks to the implementation of the RFID policy in baggage monitoring are organisational criteria. Operational criteria also demonstrate how RFID can work in the environment of the airport baggage system and how travellers will use it to track the live location of their baggage. In the machine operation, we will ask questions about the success of our project that will represent the operating requirements of the project in response.

### 5.1 DEFINING SYSTEM OPERATIONAL REQUIREMENTS

Figure 1 defines all device operating criteria in a novel way with the possibility of baggage tracking using RFID and creates a method to build an effective and accurate tracking system for our new implementation. Includes the organisational definition:

#### 5.1.1 PURPOSE DEFINITION

The uniform bar-code tag is used by nearly all airports for baggage monitoring. These tracking tags are not as accurate as the RFID tracking scheme of the proposed IoT platform that takes into account the primary read rate. Standardized tagging adds more to injury than RFID marks.The intelligibility of bar code identification is greatly impaired by the dust and oil pollutants available in the air and the surfaces of the aircraft where the luggage is kept. RFID avoids the need for human intercession and can hold amazing details, such as location, place, weight, living place, etc. As a procedure, RFID starts with an uncommitted RFID gear tag issued at the check-in counter and added to the luggage to be tracked for only one ride. The luggage tags will be removed after the journey.

### 5.1.2 ADAPTABILITY

In the event that the computing burden of a validation convention increases instantly as the number of tags increases, the device is not adaptable. Taking into account that countless marks would be needed for most RFID implementations, e.g. a vast library with a huge number of books and a tag for each book; simplicity is a fundamental property in RFID frameworks.

### 5.1.3 ENVIRONMENT FACTORS

RFID tags are also able to survive in harsh weather conditions. Unlike bar-code stickers, they are resistant to the dust and oil available in the field. These tags are more efficient because the environment is not a factor that can degrade the quality of these tags.

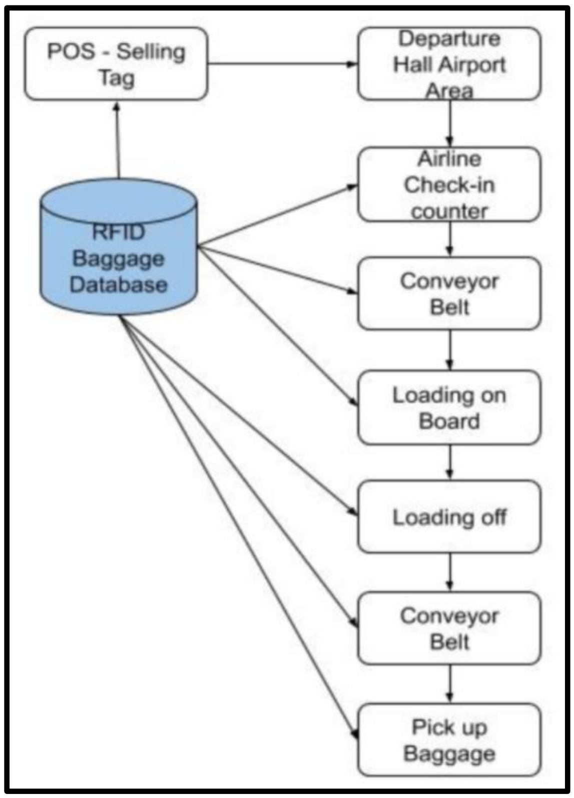


*Figure 3: System Operational Requirements [11]*

### 5.1.4 ANTI-FORGERY

An attacker might probably capture a tag, examine it by analysing the magnifying instrument, get to know all the details in the tag, and construct a false version of it, as various labels will be spread in the RFID applications. Apart from the broken one, though, an attacker would not have the chance to duplicate multiple stickers. If any confidential information is exchanged by a few tags, so it is easy to find all other tags that contain that information.This will also cause the next question, as the messages that are transmitted would be decoded by an attacker. In this way, the confidential information on a tag will be authenticated to the identifiers, so that multiple brands have separate secret information and they are all safe. Placing the tag in a secure memory to preserve the hidden data is one potential remedy. In addition, retaining and using long-term hidden information in tags for authentication is not feasible, since a single broken mark may jeopardise each label and reveal the tag's secret information. In this design, we identify an RFID device that is checked against the replication attack as long as the tag's secret information is authenticated to the tag and validated from aloof or dynamic skimming attacks, accepting that an attacker may breach and expose the information in a tag [12].

### 5.1.5 ANONMITY

RFID tags must respond to any tag at every point a passenger sends a question message. This leads to a security concern in the situation in which an attacker addresses the reactions or renders them unsurprising. An attacker may be prepared to chase a sticker, and thus therefore its owner, and gather data for a criminal purpose. Along these lines, the reactions of tags should be spontaneous, with the goal of avoiding any data in the exchange between a tag and a rider. Due to their convenience, a portion of the proposed authentication systems uses hash formulas as well as symmetric key exchange in contrast to public key calculations. In comparison, public key implementations struggle to fulfil the specific specifications of the above-mentioned RFID frameworks.

### 5.1.6 EFFECTIVENESS

RFID is a development that will continue to transform the aviation industry and may be the catalyst for the transition it wants [12]. The development of a systematic reconsideration of essential modes of action should be given by RFID. The goal is to reduce the number of lost parcels, which is simultaneously a nightmare for both travellers and carriers. Of the 1.5 billion packs transported on business flights, about 0.07 are lost last year. Random situations also set up commodity network plans and their executions. We need regular responses and appropriate changes in tactics.They take up to 90 % of the time expended by the workforce and may have real financial consequences, provided that extraordinary cases represent just 10% of company activities. To stop something similar to the lack of consumer goodwill, treating each lost bag saves airlines an average of $100, or around $1 billion a year for the industry as a whole.A major problem is that computers that handle objects as they travel between travellers and planes misinterpret distorted or broken barcode tag names, resulting in a degree of accuracy as low as 80 percent. For distinct causes, bar-code labels fail. The coding is confused, triggering mishandled baggage, whether the scanner is unlikely to be dark, even if the sticker is dusty, damaged, smirched, or facing the wrong way.In contrast, RFID tags have rate of accuracy that exceed 95%. The tag is stirred by a beat of radio waves when a bag with an RFID tag passes through a scanner, which reacts by transmitting a little information.

## 6. FUNCTIONAL ANALYSIS AND ALLOCATION

As the traditional practice of manually controlling the luggage manually became impossible for most airlines, the need to establish an RFID came into being. Airlines now use barcodes to mark a baggage using a barcode scanner with a specific identification number, while RFID will also do the same.

The added benefit of RFID is that it does not require a person to check the barcode and point the object to the barcode scanner as the RFID tag will be sensed within its proximity range by the device. Human interaction can be minimized when using this mechanism because the RFID tags can be automatically scanned and the data is compared until it hits the RFID reader. RFID can also be used via radio frequency transmission to monitor the passage of baggage at the airport. RFID is an automatic data storage and recognition technology.

### 6.1 SYSTEM FUNCTIONAL BREAKDOWN

As shown in Figure 2, the radio frequency recognition device that is used to track luggage in airports can be broken down.

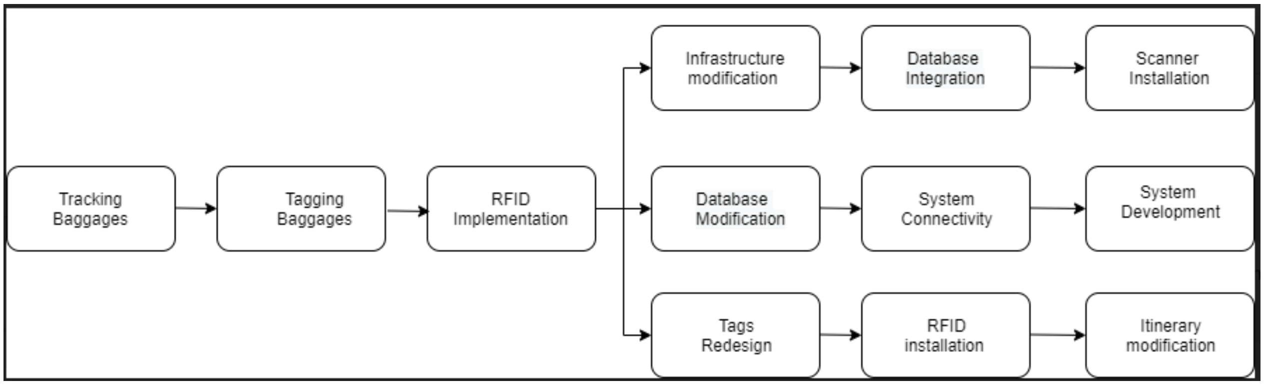


*Figure 4: System Functional Breakdown [13]*

### 6.2 FUNCTIONAL ANALYSIS

A functional flow block diagram is used for functional analysis of RFID system [14].

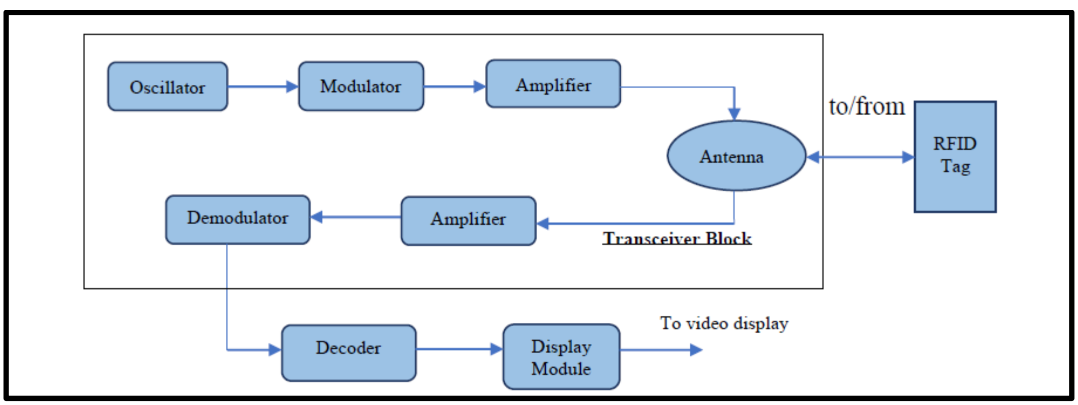


*Figure 5: Block diagram of RFID tag Reader [14]*

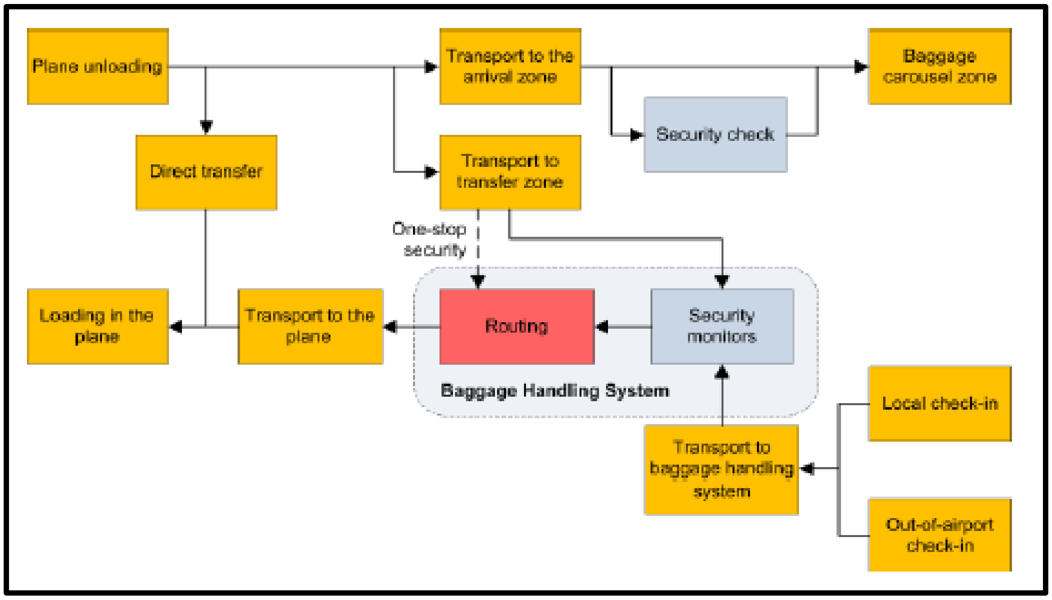


*Figure 6: Process of Transmission of the baggages [15]*

### 6.2.1 BREAKDOWN OF RFID READER

RFID reader consists of three main subsystems such as the transceiver, the display module, and the decoder [13].

- For direct contact with the RFID tag, the transceiver's antenna is used and it also includes a receiver to get the response.
- The RFID tag can pass the data in the form of an amplitude modulated signal, so the reader will funnel the data into the signal to amplify it. The signal is demodulated by the reader until the filtration is completed, in order to receive the signal emitted by the RFID tag.
- The decoder will decipher the transmitted signal in order to get the identity data and then the demodulator will perform the appropriate transformations.
- All the information is sent to a video display module at the final stage to get the output data by producing the appropriate signals.

### 6.3 FUNCTIONAL ALLOCATION

A practical system outline serves as a framework to identify the resources needed by the system to achieve its task. A function refers to a specific or independent procedure needed to accomplish a specific purpose that illustrates an activity to be done by the mechanism, or a repair action needed to restore usable usage to a faulty device.

Functional analysis is an algorithmic process of translating detailed parameters of device requirements and then specifying the methods needed to execute and manage the system [14]. This includes breaking system requirements to the subsystem level and, if applicable, down to the organisational framework to identify unique configuration criteria and/or limitations for the various system features. The goal is to develop the device architecture at the highest level that addresses both the requirements and the application.

One of the ways of automatic detection technology, such as RFID, is increasingly fitting robust products and their components. During its life cycle, the machine helps commodity information to be gathered, stored and distributed. Preferably, any useful data collected on RFID tags should be maintained as it becomes available, with updated data being incorporated into the tags. Nevertheless, in addition to the amount of potential lifecycle data, administrators need to be more vigilant when allocating data because of the restricted storage space of RFID tags. The problem of storage management is described in this work as an asymmetric knapsack challenge. The aim is to assess the quantity of units to be put on the tag in order to minimise the value of the existing unresolved data in the tag.

A binary encoded genetic algorithm is proposed and a systematic numerical analysis is conducted to show the viability of this technique [14]. Furthermore, we discuss some features of the most efficient approach that can be helpful in solving more complex problems. Different modes of identification systems such as radio frequency identification ( RFID) are currently being fitted with significant items and their parts. Passengers have the option to choose the mode of monitoring details during the check-in period, either by smartphone or a bracelet that is provided on request at the time of check-in for luggage. For travellers, the bracelet is a reasonable choice if their phone does not have a charge. If the luggage is placed on the conveyor belt, the reader applies an RFID tag to the luggage in order to track the luggage. At the same time, the RFID system transfers the data to the storage system for processing and retrieving passenger data in order to submit the tracking status in order to recognise their bracelet or cell device ID.9

In supplying the baggage to the right passenger at the correct location, this machine plays a crucial role. A warning message will be activated to warn the bracelet that luggage has landed on the conveyor belt [15]. If no luggage tracking status has been obtained by the passenger, the passenger can send an emergency message to the system in order to monitor the location of the luggage. The system administrator then responds with the correct solution.

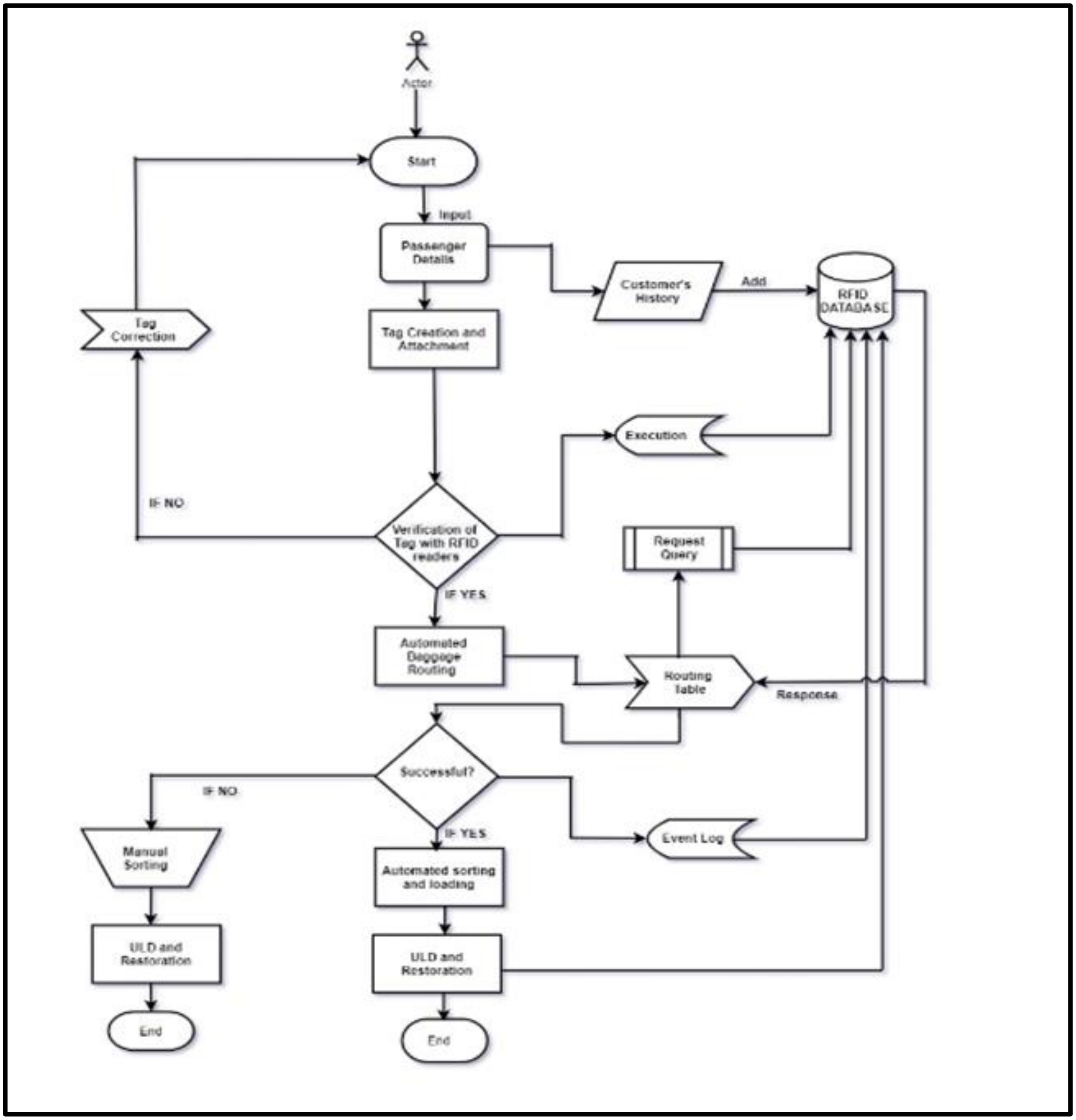


*Figure 7: Functional Allocation [16]*

## 7. TRADE OFF ANALYSIS OF RFID IN LUGGAGE TRACKING

Trade-off analysis measures the effect of reducing at least one main component and extends the option, structure or feature to at least another key element. Any effort to decide on decisions requires some degree of the decision-maker 's analysis and assessment. This approach also requires a more definitive method of assessment, one that can be emulated and used to justify or at least explain why specific decisions have been taken, and who has been identified with the basic leadership structure. The RFID baggage before understanding. We need to first examine all the problems faced by the current tracking systems in the handling system. In the RFID luggage handling system, all luggage data is contained in a tag that is attached to the luggage. Since it does not fit any other tag, this tag is special. Even when travelling in the luggage, one can track one's baggage whenever they want airplanes. To integrate this type of tracking system, we also need to include some other systems so that we can compare and pick the most successful one out of them. We will evaluate a variety of variables, and by allocating weight to them according to their expectations, we will see the process has greater weight. We should consider a more efficient implementation with a Greater weight system. In this project, luggage handling using RFID and luggage handling using Barcode tags are taken into account.

| | | **CASE 1 Luggage Tracking using RFID** | | **CASE 2 Luggage Tracking using Barcode** | |
|---|---|---|---|---|---|
| **Criteria** | **Weight** | **Score** | **Weighted Score** | **Score** | **Weighted Score** |
| **Storage** | 4 | 4 | 16 | 3 | 12 |
| **Performance** | 5 | 5 | 25 | 4 | 20 |
| **Efficiency** | 5 | 4 | 20 | 3 | 15 |
| **Cost** | 4 | 3 | 12 | 5 | 20 |
| **Customer Services** | 4 | 3 | 12 | 3 | 12 |
| **Control** | 4 | 4 | 16 | 3 | 12 |
| **Weighted Sum** | | | 101 | | 91 |
| **Cost** | | **$350** | | **$340** | |
| **Weighted Sum / Cost** | | **0.288** | | **0.267** | |

*Table 6: Trade of Analysis, RFID vs Barcode [9], [16] and [Class lecture - Decision Making 1]*

Depending on the specifications specified and the feasibility review, the configuration of the chosen tracking system is as follows:

1. We have to make the luggage tracking system more reliable so that less bags are lost and attackers do not reveal the sensitive information contained in the RFID tags.
2. Tags can operate under all weather conditions. None of the external factors can depend on the output of the tags.

3. At any given point, passengers should be able to know exactly where their luggage is live and monitoring will do this.
4. RFID monitoring will save the airport authority a massive amount of dollars, which they spend on lost luggage and customer repayments.

**8. CONCLUSION**

We have introduced an integrated luggage tracking device based on RFID in this paper. Customer satisfaction is improved by introducing this approach and baggage mishandling costs are minimised. RFID must overcome all disadvantages in the luggage tracking system in order to overcome. There are three key components, namely RFID hardware, bag localization, UIR middleware RFID. They are responsible for storing, filtering and aggregating the data that enables the luggage tracking system to be visualised. In various industries, such as metros, health care, security systems, etc., RFID technology is already in use. Using the RF data capture feature, RFID readers do not satisfy the demands of supply chain management. An RFID reader is recommended to overcome this issue. RFID technology will play a major part in enhancing airport security and services. In luggage handling, RFID technology can only replace the conventional barcode system if it is re-engineered and streamlined to its capability. We can decrease the amount of lost luggage and allow passengers to monitor their luggage at any given point by integrating a bracelet system and live tracking into RFID. In addition, to get even more fruitful results, a lot of research and research is needed in this field. The use of RFID technology in the luggage handling system won't fix all the issues entirely, but because of its features, it is better than the conventional barcode system.

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