INFORMATION SYSTEM FOR AIR SECURITY IN UGANDA

CASESTUDY: ENTEBBE INTERNATIONAL AIRPORT

BY

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FINAL MARK

A PROJECT REPORT SUBMITTED TO THE COLLEGE OF APPLIED SCIENCE AND TECHNOLOGY FOR THE PARTIAL FULFILLMENT OF THE REQUIREMENTS OF THE AWARD OF THE DIPLOMA IN COMPUTER SCIENCE IN KAMPALA INTERNATIONAL UNIVERSITY.

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Approval

This research project has been submitted for the purpose of fulfilling the requirements of the university with an approval of the university supervisor from the school of computer studies and also my presence.

Supervisor's name MR. KASAWULI FAIK

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Signature .....

Date 27-09-12

Acknowledgement

I do extend my sincere gratitude and thanks to God the creator who has awarded me with the breath of life until today and to all the people who have been courageous and supportive throughout in this process of studies before and in the university, I couldn't have managed to make it myself.

Also special regards towards my parents and guardians who actively supported me financially, provided love and care and lastly to my teachers throughout my academic journey for imparting knowledge into me for the purpose of brightening my future time.

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Abstract

This research project consists of five chapters, background of study, literature review, system study and investigation, implementation and discussion, conclusion and recommendations.

Chapter one consists of the introduction, background to the study, problem statement, objectives, research questions, the scope of the study, significance and justification.

The literature review comprises of the information system, related system, management information system, data base and conclusion.

The system study and investigation includes data collection techniques, data sources, data analysis and presentation, systems requirements and analysis specification, system design and entities with attributes.

CHAPTER ONE

1.0 Introduction

In Uganda, Entebbe International Airport is the majorly and commonly used terminal for both air passengers and air cargo. Civil Aviation Authority is the organization managing the handling service. The Information system for the airport cannot meet the required standards of the up to date technology. With this there is need for system upgrades and use modern gadgets at all check points to tighten the security sector.

Most of the information was derived from observation and direct interviews with airport workers and security personnel at the airport check points and a few respondents from the questionnaires.

Airport operators and managers require access to large amount of data to perform their daily tasks. There is a need for an application that makes easy accessibility of data. The aim of the system is to provide an easy way for management of security and communication of the airport information based on the database of respective entries.

1.1 Background to the study

Duncan G Copeland discussed the evolution of airline security systems from their inception as manually maintained inventories of seat availability, through their description as anticompetitive weapons used unlawfully to obtain and exercise monopoly power. The evolutionary perspective reveals interdependent industry, company and technology forces that shaped the pattern of competition. Although many facets of the airline experience are unique to the air transport industry, the authors identify three features with broad implications for the strategic use of information technology. First, large installed processing capacity can be a source of economies of scale and scope. Second, established technical competence is a necessary requirement for

gaining competitive advantage. Finally, sustainable advantage need not be the result of extraordinary vision, but the result of consistent exploitation of opportunities revealed during the evolution of adaptable systems.

Different security and communication management systems supports the airport companies' operations to improve security and communication through backing up and storing information concerning about the passengers, cargo and luggage. It also demonstrates the database principle behind the scene of the system.

Airports operators and managers require access to large amount of data to perform their daily tasks. They often access information from different ways like air passengers, air cargo. Therefore to improve their operations, there is a need for an application that makes easy accessibility of data. The aim of the system is to provide an easy way for management of security and communication of the airport information based on the database of the respective entries.

The International Civil Aviation Organization (ICAO) has adopted new standards of airport security by strengthening security standards through the implementation of new Standards and Recommended Practices (SARPS) and the introduction of aviation security oversight programs to determine the level of compliance of ICAO member states.

As a result of these changes, all signatory countries of the East Africa have required to upgrade and modernize their airport security processes, systems and equipment in air transport to ensure the long-term health of the air transport industry.

In Uganda, the Uganda Civil Authority is the organization managing the services of transportation of air passengers and air cargo. The Civil Aviation Authority was created by an Act of Parliament in 1994 as a state agency of the Ministry of Transport, Housing and

Communication. The mandate of the CAA is to coordinate and oversee Uganda's aviation industry, including licensing, regulation, air search and rescue, air traffic control, ownership of airports and aerodromes, Ugandan and international aviation law, representing Uganda in an international capacity to the aviation community, and to all other aviation matters. Head offices are at Entebbe International Airport in Entebbe. Current business of the CAA includes the construction of the new cargo terminal and customs building at Entebbe Airport.

With the establishment of a global economy, the role of civil aviation, both in the transportation of cargo and passengers, has become a critical component to the development of all the sectors of the economy. The new standards include the development of a national aviation security plan, a system of regulations, procedures and guidelines to meet the international standards, a cadre of experience and trained inspectors to oversee the operators and the installation of equipment required to prevent criminal acts against civil aviation. These standards apply to airlines, airports, the air traffic system, and all the personnel involved in the provision of aviation services.

1.2 Problem statement

The information about the passengers and air cargo on the air airport are captured with a weak system which provides a slow accessibility and response of the required data. This makes the passengers and air cargo to stay for a long time at the registration and check points for which they are likely to miss their planes.

Due to Reams of procedure documents stockpiled nearby for reference during incidents. Staff turnover in these critical positions due to information overload which cause a host of problems for administrators. Besides these problems, the unpredictability of security video and data communications is accidentally damaged by numerous construction projects at the airport. Infrastructure and component failures also cause system down time. For many new systems,

routine maintenance and virus protection updates require interruption of active video monitoring, control and recording. Therefore, there have been regular reports regarding insufficient security gadgets at both checking points and in the whole environment at large. There is check point breach in a way that if one travels often, one has probably encountered the fallout from a screening checkpoint security breach. Typically, a person of interest gets lost while passing through a checkpoint carrying something they shouldn't. The airports then evacuate terminals to comb the facility for the culprit and to facilitate individual re-screening of passengers.

1.3 Objectives

1.3.1 General objectives

To develop an improved, effective security and communication system for their purpose of allowing quick functionality and transparency to the operators and administrators.

1.3.2 Specific objectives

i. To investigate into the existing security system and find out if it meets the requirement to serve.
ii. To analyze requirements for building a better information system.
iii. To integrate with varied existing systems.
iv. To increase communication between airport operators, airport managers, and law enforcement.

1.5 Scope of the study

1.5.1 Subject scope:

This is also referred to as the content scope. The study content is security of communication channels to and from the information system at Entebbe.

1.5.2 Time scope:

The study covered the period of six months. The researcher spent three months in the field, one month analyzing and the other two writing a report.

1.5.3 Geographical scope

The researcher visited a number of airports and airfields in Uganda and the main offices of the authorities i.e.: CAA that is responsible for security at Entebbe International Airport.

1.6 Significance

The proposed system serves as a system to improve security and communication at the airport through increasing the accessibility of data and information in authorized personals, efficiency and administration of the communication and security, it supports decision making by directors or executives, reduce the duplication of the data entries. The system reduces intruders who would make the airports insecure. This is an advantage in the security and communication of the airport.

1.7 Justification

Aviation threats rose with the attacks made on the September 11, 2001 in United States of America, which led to renewed emphasis on airport security in the whole world. Before the tragedy, government policy led to a suboptimal level of security. The fundamental problem was not simply the use of private security firms, but rather the reliance on airline financing and poor Aviation Administration oversight. After 9/11 a federalized security system was put in place.

The events of September 11, 2001, raised troubling questions regarding the reliability and security of the world commercial air travel. For commercial air travel to be highly secure, there must be very high levels of technical competence and sustained performance; regular training; structure redundancy; collegial, decentralized authority patterns, reliable and timely information and protection from external interference in operations.

Jason McCauley (2004) discussed the need for a simulated luggage-screening task and observers participated in five sessions of a task requiring them to search for knives hidden in x-ray images of cluttered bags. Sensitivity and response times improved reliably as a result of practice. Eye movement data revealed that sensitivity increases were produced entirely by changes in observers' ability to recognize target objects and not by changes in the effectiveness of visual scanning. Moreover, recognition skills were in part stimulus-specific, such that performance was degraded by the introduction of unfamiliar target objects.

1.8 Operational definitions

1.8.1 **Air Passenger**

This is referred to person who intends to travel in the aircraft but he/she isn't operating or working on it.

Air passengers include both domestic and international air craft passengers of air craft carriers registered in the country.

1.8.2 **Air Cargo**

This is referred to goods carried in an aircraft or luggage that is carried in the cargo hold of a plane.

1.8.3 **Air Security**

Airport security referred to the techniques and methods used in protecting airports and aircraft from crime or referred to the state of feeling safe from worry while traveling using an aircraft.

1.8.4 **Communication**

This is referred to method that is used for traveling to and from a place or sending messages between places.

1.8.5 **Aircraft**

Referred to vehicle that is able to fly by gaining support from the air, or, in general, the atmosphere of a planet. It counters the force of gravity by using either static lift or by using the dynamic lift of an airfoil, or in a few cases the downward thrust from jet engines.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents the reviewed literature related to the topic of study. This section explores how the mobile body and, specifically, the face have become a site of observation, calculation, prediction, and action in the process of moving across borders. The section explores how in the circulatory space of the airport/border, the body's circulatory systems, biological rhythms, and affective expressions have become objects of suspicion mobile surfaces from which inner thoughts and potentially hostile intentions are scrutinized, read, and given threatening meaning by the newest modes of airport security and surveillance. Examined according to the vector modes of historicity and virtual possibility, as well as the internal and external play of intention and feeling, the paper uncovers an increased attention to differential axes of mobility of past and future, surface and interior. The paper situates these techniques within the preemptive securitization of mobility across borders which, it is argued, has found its referent object in the primal realm of affective capacities.

2.1 Information systems

Samidh Chakrabarti, Aaron Straus (2002) discussed the improvement of the efficiency of airport security screening, the U.S. Federal Aviation Administration (FAA) deployed the Computer Assisted Passenger Screening system (CAPS) in 1999. CAPS attempts to identify potential terrorists through the use of profiles so that security personnel can focus the bulk of their attention on high-risk individuals. In this paper, we show that since CAPS uses profiles to select passengers for increased scrutiny, it is actually less secure than systems that employ random searches. In particular, we present an algorithm called Carnival Booth that demonstrates how a terrorist's cell can defeat the CAPS system. Using a combination of statistical analysis and computer simulation, we evaluate the efficacy of Carnival Booth and illustrate that CAPS is an ineffective security measure. Based on these findings, we argue that CAPS should not be legally permissible since it does not satisfy court-interpreted exemptions to the U.S. Constitution's Fourth Amendment. Finally, based both on our analysis of CAPS and historical case studies, we provide policy recommendations on how to improve air security.

Seidenstat, P. (2004), discussed the September 11, 2001, led to renewed emphasis on airport security in the United States. Before the tragedy, government policy led to a suboptimal level of security. The fundamental problem was not simply the use of private security firms, but rather the reliance on airline financing and poor Federal Aviation Administration (FAA) oversight. After 9/11 a federalized security system was put in place. The current system of tightened security is substantially more costly and should be evaluated in terms of its cost-effectiveness compared to a public–private approach.

H. George Frederickson (17 DEC 2002) discussed the events of September 11, 2001, have raised troubling questions regarding the reliability and security of American commercial air travel. This article applies the concepts and logic of high–reliability organizations to airport security operations. Contemporary decision theory is built on the logic of limited or buffered ration ability and is based on the study of error–tolerant organizations. The concept of high–reliability organizations is based on the study of nearly error–free operations. For commercial air travel to be highly secure, there must be very high levels of technical competence and sustained performance; regular training; structure redundancy; collegial, decentralized authority patterns; processes that reward error discovery and correction; adequate and reliable funding; high mission valence; reliable and timely information; and protection from external interference in operations. These concepts are used to inform early–stage issues being faced by both local airports and the newly established Transportation Security Administration.

2.2 Related systems

Jason McCauley (2004) discussed an experiment where examined visual performance in a simulated luggage-screening task. Observers participated in five sessions of a task requiring them to search for knives hidden in x-ray images of cluttered bags. Sensitivity and response times improved reliably as a result of practice. Eye movement data revealed that sensitivity increases were produced entirely by changes in observers' ability to recognize target objects and not by changes in the effectiveness of visual scanning. Moreover, recognition skills were in part stimulus-specific, such that performance was degraded by the introduction of unfamiliar target objects.

Davies, P(2003) discussed the imposition of the air security charge, which was required to recover the costs of enhanced security and Canadian airports, and increase security vigilance have heightened interest with regard to the influence of cost increases and travel delays on the demand for passenger service for short haul routes. This paper assesses the impact of changes to passenger costs and travel time in the Edmonton-Calgary market. The road distance between the cities is only 300km and the majority of traffic travels by private automobile. The Edmonton-Calgary city-pair market is ideal for this type of analysis because of the controversy surrounding the role of the downtown Edmonton Municipal Airport and the eventual decision to consolidate passenger service at the Edmonton International Airport in 1996, which resulted in substantial changes in costs and travel time for passengers.

2.3 Management information system

MIS Quarterly discusses the evolution of airline reservations systems-from their inception as manually maintained inventories of seat availability, through their description as "anticompetitive weapons used "unlawfully" to obtain and exercise monopoly power. The evolutionary perspective reveals interdependent industry, company, and technology forces that shaped the pattern of competition. Although many facets of the airline experience are unique to the air transport industry, the authors identify three features with broad implications for the strategic use of information technology. First, large installed processing capacity can be a source of economies of scale and scope. Second, established technical competence is a necessary requirement for gaining competitive advantage. Finally, sustainable advantage need not be the result of extraordinary vision, but the result of consistent exploitation of opportunities revealed during the evolution of adaptable systems.

Legner, C. Thiesse, F(Jan.-March 2006) Frankfurt airport's operating company, Fraport AG, integrated RFID and a mobile application with its asset management systems. The benefits include better planning, control, and documentation of technicians' work as well as improved process quality. This article summarizes not only the technology Fraport tested at Frankfurt airport but also the process flow and facility-management changes it adopted.

2.3.1 Benefits of management information system

They benefit in the different ways;

- They are used for management planning.
- They are used for decision making.
- They are used to speed up the work.
- They are easy managerial activities for administration.

2.3.2 Barriers of management information system

They do tend to create conditions that are termed to be barriers and are as follows;

- Psychological failure and double bind.
- Leadership based more on competence than formal power.
- Decreased essentiality.

2.4 Database

It refers to organized collection of data for differently purposes usually in the digital form. The data is typically organized to modal aspects of reality in a reality in a way that supports processes requiring this information. The database is termed to be both to the users' views as logical and physical materialization of its data. It is database management system in which data is stored in the tables and the relationships among the data are also stored in the table. It is a database management system that is based in the rational modal. A short definition of the data can be accessed in many different ways without having to change the table forms.

2.4.1 Classification of database

- Relational database modal.
- Object database modal
- Hierarchical database modal.
- Network database modal.
- Object relational database modal.
- Relational database management system.

2.4.1.1 Network databases

The network database modal was designed to solve some of the more serious problems with the hierarchical database modal. Specifically, the network modal solves the problem of data redundancy by representing relationships in terms of sets.

2.4.1.2 Hierarchical databases

The hierarchical database modal defines hierarchical arranged data. The most intuitive way to visualize this type of relationship is by visualizing an upside down tree of data. In this tree, a single table acts as the root of the database from which other tables branch out.

2.4.1.3 Relational database

These database matches data by using common characteristics found within the data set. The resulting groups of data are organized and are much easier for many people.

2.4.1.4 Warehouse database

Warehouse database archive data from operational databases and often from external sources such as market research firms. Often operational data undergoes transformation on its way into the warehouse, getting summarized, anonym zed; reclassified etc. the warehouse becomes the central source of data for use by managers and other end users who may not have access to operational data. Some basic and essential components of data warehousing include; retrieving, analyzing and mining data, transforming, loading and managing data so as to make it available for further use.

2.4.1.5 End-user database.

These databases consist of data developed by individual end-users. Examples of these are collections of documents, spreadsheets, presentations, multimedia and other files. Several products exist to support such databases.

2.4.2 Database security

Database security concerns the use of a broad range of information security controls to protect databases (potentially including the data, database application, functions, database systems, the database servers and the associated network links against compromises of their confidentiality,

integrity and availability). It involves various types of controls such as technical, procedural and physical. Database securities are as below;

- Access control
- Auditing
- Authentication
- Encryption
- Integrity controls
- Backups

2.4.3 Database maintenance

There are different means of maintaining the databases and they are as follows;

- Updating indices.
- Backing up the database data.
- Using one stop backups.
- Creating periodic backups.
- Compacting the database.
- Packing tables
- Restoring the database.
- Database security
- Encryption.

2.4.4 Types of databases

There are two types and these are analytical and operational databases.

2.4.4.1 Analytical databases

Analytical is the primarily static, read only databases which store archived, historical data for analysis. For example, a company might store records over the last ten years in an analytic database and use that database to analyze strategies in relationship to demographics.

2.4.4.2 Operational databases

Operational database on the other hand are used to manage more dynamic bits of data. This type of database allows you to do more than simply view archived data. Operational databases allow you to modify that data.

2.4.5 Advantages of databases

1. Reduced data redundancy
2. Reduced updating errors and increased consistency
3. Greater data integrity and independence from applications programs
4. Improves data access to users through use of host and query languages.
5. Improves data security.
6. Reduced data entry, storage and retrieval costs.
7. Facilitated development of new application program.

2.5 Conclusion

With the establishment of a global economy, the role of Civil Aviation, both in the transportation of cargo and passengers, has become a critical component to the development of all the sectors of the economy. New standards of airport security must be adopted by strengthening security standards through the implementation of new Standards and Recommended Practices and the use of new technologies to oversee the inversing number of crimes at airports. As a result of these changes, all signatory countries of the East Africa have required to upgrade and modernize their airport security processes, systems and equipment in air transport to ensure the long-term health of the air transport industry.

CHAPTER THREE
SYSTEM STUDY AND INVESTIGATION

3.0 Introduction

This chapter discusses description of methods required to achieve the set of objectives of the proposed system. It also gives proper explanation of the exact methods and tools used and the reasons for choosing them.

3.1 Data collection technique

The main techniques which were used to collect data from the field include:

3.1.1 Interview technique.

This refers to a process of collecting a variety of information by asking the chosen sample a few questions. The interviews may be structured/unstructured or both. This calls for immediate response from the respondent, gives one an opportunity to probe further and get detailed information about the study area, it also saves time if the sample size is small for interviewing. Although it's difficult to put together interview information given that one have variances responses from different respondents involved in the process, there is likelihood of interviewer bias for instance leaving out the information, he is biased about.

3.1.2 Questionnaire technique

This involves administering a set of questions related to the study area. It is mainly used when the researcher aims at conducting a field research and it's the most preferred of them all. In order to save time and costs, questionnaires will be left behind to respondents to fill in their free time. This provides limited information about the study area therefore cannot be used in isolation.

3.1.3 Observation technique

Involves collecting information through directly observation. This involves, gathering of first hand information because one is directly observing, eliminates issues of exaggeration and omissions regarding on employees behavior to do their work, helps the researcher to interfere with the environment in which the study variables are located, information obtained through observation can be used as evidence in courts of law. However, there are tendencies to alter the

environment in which one is performing his/her duties and not suitable for work that takes a considerable long period of time for example mental efforts.

3.2 Research

The useful methodology technique to be is research was not overlooked.

The research intends to be qualitative in nature with much of the information being represented statistically and other from trade journals, reference books and internet which is the widest source of information. The researcher intends to use tables and other relevant figures to give the findings.

Research at times involves weakness as like time consuming, accessing to appropriate source of information. This makes the process long and tiresome.

3.3 Data sources

3.3.1 Primary sources

This is the source of data where data is derived directly from the fields or sites.

Some of the primary sources of data are the direct interview and questionnaire. The interview deals directly with the people concerned and questionnaires are pieces of papers with questions given to people concerned with the problem to answer depending on the way they feel about the problem.

3.3.2 Secondary sources

The secondary sources where data was gathered from are; internet, library text books and published research materials, journal articles where information about the study area.

3.4 Data analysis and presentation

3.4.1 Data processing

Data processing refers to the activity of manipulating the data collected to derive meaning out of it. Before actual processing begins, the data must go through proper sorting, coding and classify according to what the study is about. Then data is processed using several techniques which include; descriptive technique, using tables and using other computer assisted techniques such as Microsoft word and statistical packages .Data processing is also referred to as data analysis.

3.4.2 Data presentation

Data presentation refers to the activity of classifying the activities as well as the challenges involved into general and specific to ease defining by the researcher.

3.4.3 Research design

The research design depends on the workers and the customers where data is collected by use of observations and then samples are taken.

3.4.4 Sampling selection

The sampling design used was random sampling design which involves the game of chance/probability knowledge in the process of coming up with a sample. Under random design, all the items of the population are said to have equal chances of being selected to form a sample that is why I think that is the most appropriate for the research study.

3.4.5 Population sample size

The study focused on the customers and employees of the organization. The targets were the educated and uneducated customers and employees. A representative sample of 30 customers and 20 workers were selected from the total population.

Category	No of persons	Respondents	Response rate
Customers	30	23	46%
Workers	20	16	32%
Total	50	39	78%

Table1: A representative sample of customers and workers

3.5 Systems requirements and analysis specification

The section looks at what the researcher intends to collect on the existing system and the areas to be investigated include;

3.5.1 User requirements

These are the requirements which the system must have to allow the user of the run the required duties or roles on the system normally.

- It must be compatible so as to work on the different the different types of computers.
- It must use different types of languages to accommodate and ease understanding of people from different origins.
- It must deal with errors automatically made by the user of the system.
- It must be quick and reliable.
- It must be easy to use in the process of inputting, storing updating and outputting of data.

3.5. 2 Functional requirements

These are requirements which the system must have to perform the required tasks or services and these are some of them as below;

- The system should allow data input from the forms and allow storage in the intended databases.
- The system should allow the different users to view the required information.
- The system should well secure storage of data.
- The system should allow ease access of data required by the authorized users.
- The system should allow automatic elimination of errors.
- The system should allow ease access, retrieval and update of data.
- The system should be quick and timely reports.

3.5.3 Non functional requirement

These are requirements that constrain the system functionalities and they are as follows;

- The system building should be completed within the stipulated time.

- The system building should be completed with the use of stated requirements.
- The system users should require less training to operate the system.

3.5.4 Systems requirements

The building of the system required the following;

- Form designs
- Report designs
- Database design
- Coding
- Testing

3.5.5 Software requirements

- Operating system (window XP).
- Database Management System (Ms Access).
- Microsoft Visual basic 6.0.

3.5.6 Hardware requirements

- Processor (3GHZ processor speed)
- RAM disk (256MB RAM)
- Pentium II or higher
- Hard disk 60 or higher (60GB or higher)

3.6 System design

The system is designed to replace the existing one which is associated with numerous errors in the running of the duties of security at the airport like poor communication. The new system is modernized with a graphical user interface and database system for ease and friendly use. The system is automated to produce reports and quick communication among the users.

3.6.1 Description of the system

The system is designed with forms, database tables, reports, queries, and switchboard to allow ease retrievals, updates, search, ease access, storage and user interaction.

The system has forms which act as user interface to allow user interaction, database tables to allow storage of data in a very much secure way to allow ease access of information, reports to output data on the sheets required by the users of the system, queries to ease search for required data, switchboard to direct the user to the required form for use. The system is associated with a login form which requires password and a username to access the system to prevent unauthorized users. The database tables are built to achieve the level of integrity accuracy and consistency.

3.6.2 System development life cycle

The section deals with how activities of building the system are packaged or broken to allow quick construction. The user interface for interaction will be built, the databases for storage of data and the reports to output the data required.

3.6.3 Prototyping

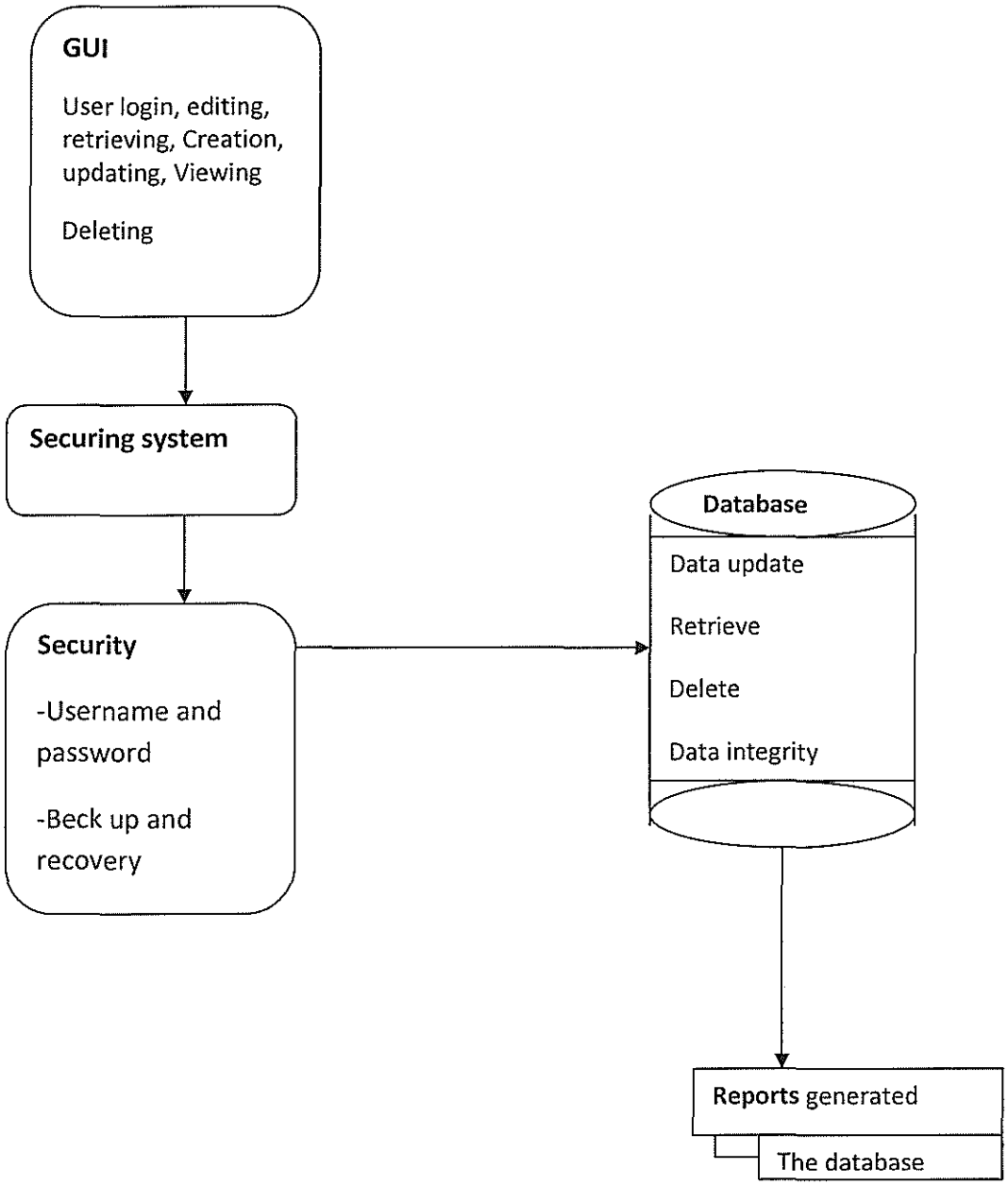

Figure1: System design

3.6.4 System testing and verification

The process of testing and verification of the system will be carried out throughout the system development and then the different pieces of the system will be combined together to determine how well they can perform their tasks. The top down approach of integration is expected to be used to identify defaults. Through this, the system will be able to meet the required objectives.

3.6.5 Specification requirements

This shows full explanation of the behaviors of the proposed system.

3.6.5.1 Accuracy

The system is constructed to provide proper, orderly, organized and collect services expected to be performed by the users in the process of operation.

3.6.5.2 Consistency

The system will allow no data redundancy in the performance its tasks to allow consistency to be achieved in the operation performed by the users.

3.6.5.3 Reliability

The proposed system will provide a reliable storage task to the information inputted through the graphical user interface.

3.6.5.4 Easy operation

The proposed system will ease tasks performed without delay and wastage of time.

3.6.5.5 Safe storage

The proposed system will provide proper storage of data

3.6.5.6 Automated error presentation

The proposed system will eliminate errors automatically when the users are performing tasks.

3.6.5.7 Immediate retrieval

The proposed system will allow quick search and update of the data.

3.7 Entities and attributes

The information to be captured by the system is mostly about the following entities as below;

- Air workers
- Air travelers or passengers
- Air cargo

3.7.1 The entity relationship table

ENTITY	RELATIONSHIP	ENTITY
User	Logins	Switchboard
User	Selects	Form
User	Records	Passenger data
User	Records	Worker data
User	Records	Luggage

Table 2: Entity relationship table

3.7.2 The entity relationship diagram

The table is entitled to the use of context diagrams, data flow charts and entity relationship diagrams (ERDs) for the conceptual design. The logical and physical designs are used at database design phase of the project. The data entered in the system should be stored in the server in the database and then searched for the important tasks by the system users.

The design of the new system takes the following symbols;

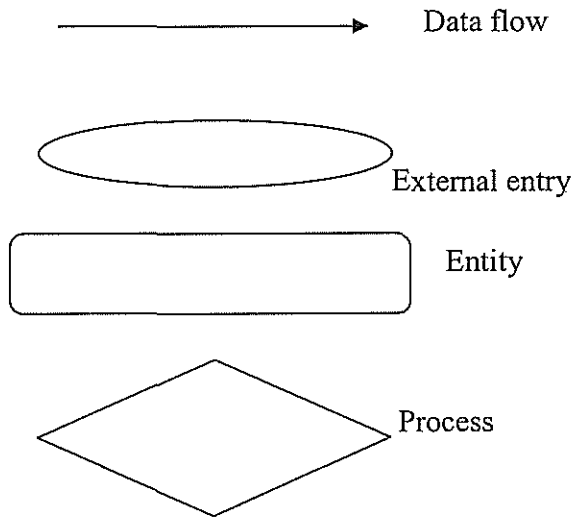

Figure 2: System symbols

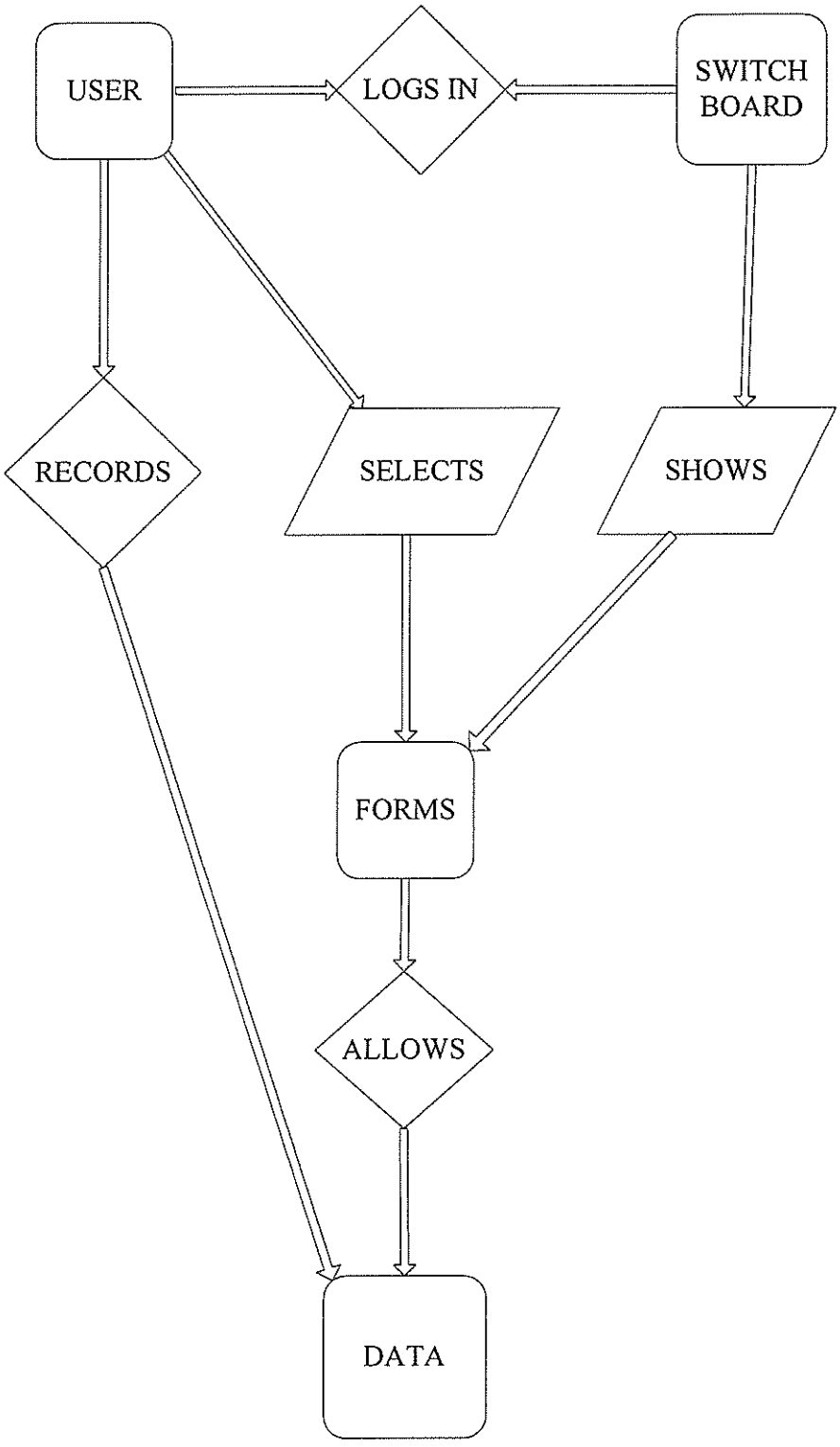

Figure 3: Simple data modal

Case diagrams

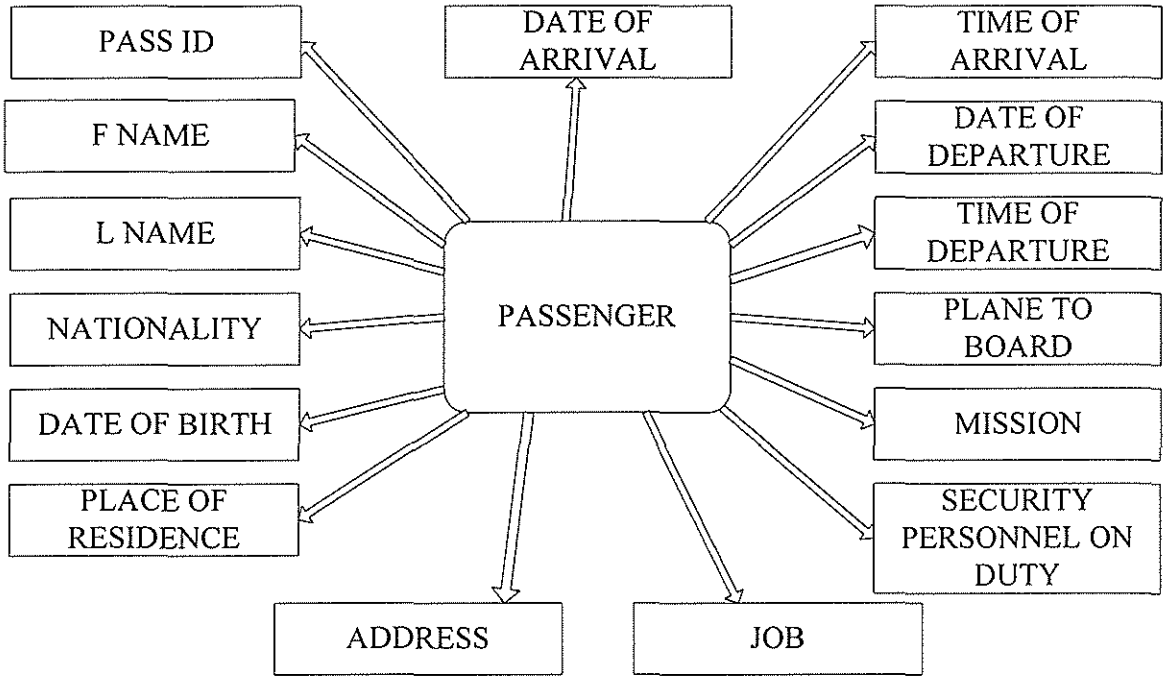

Figure 4: Passenger case diagram

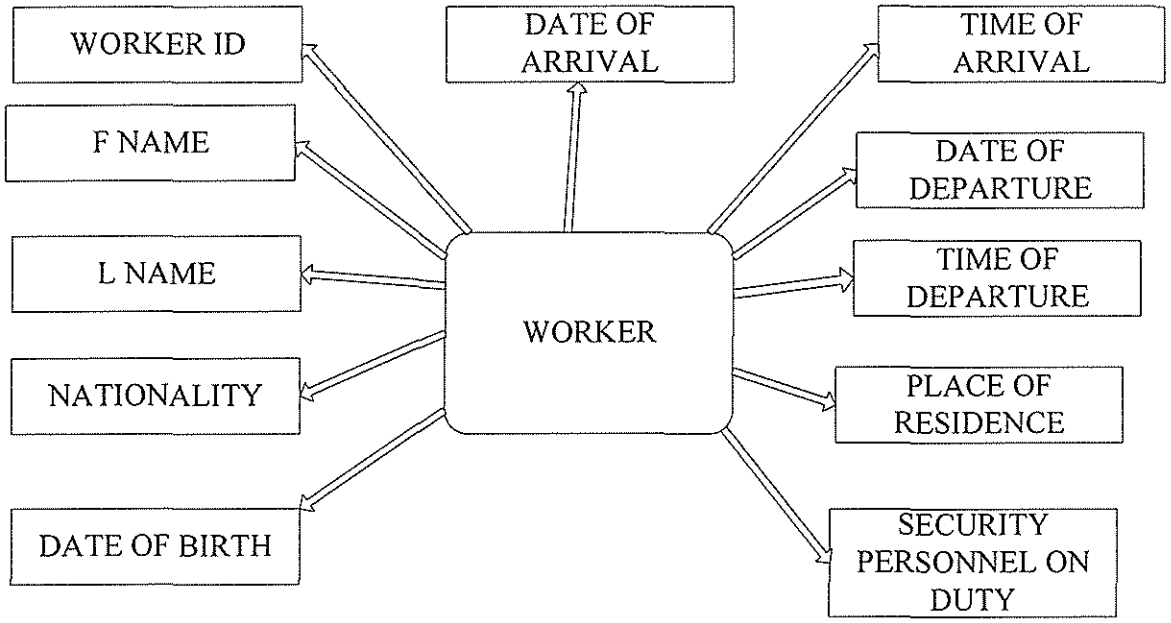

Figure 5: worker case diagram

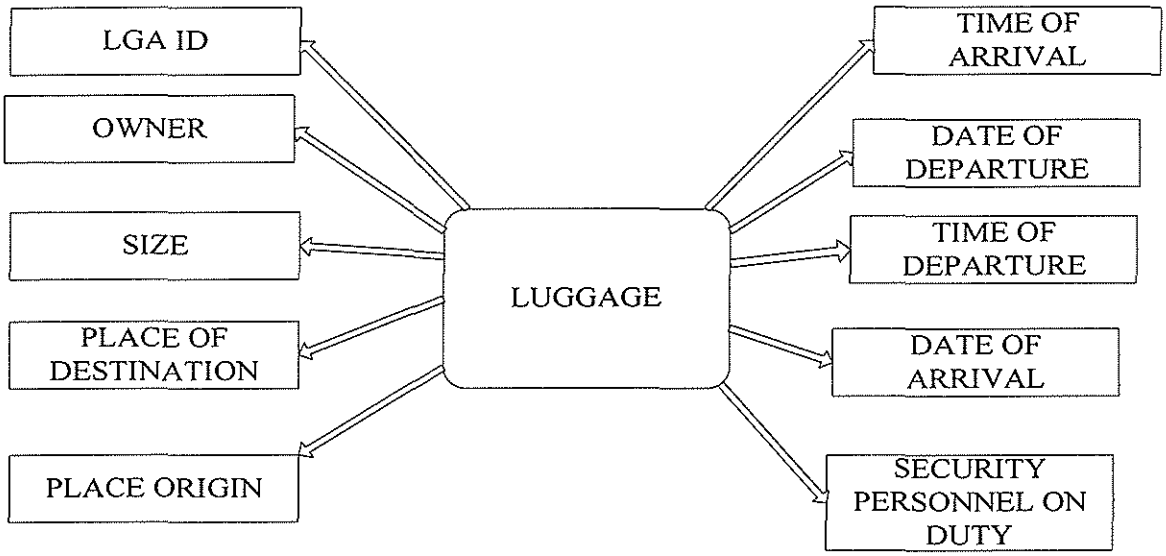

Figure 6: Luggage Case diagram

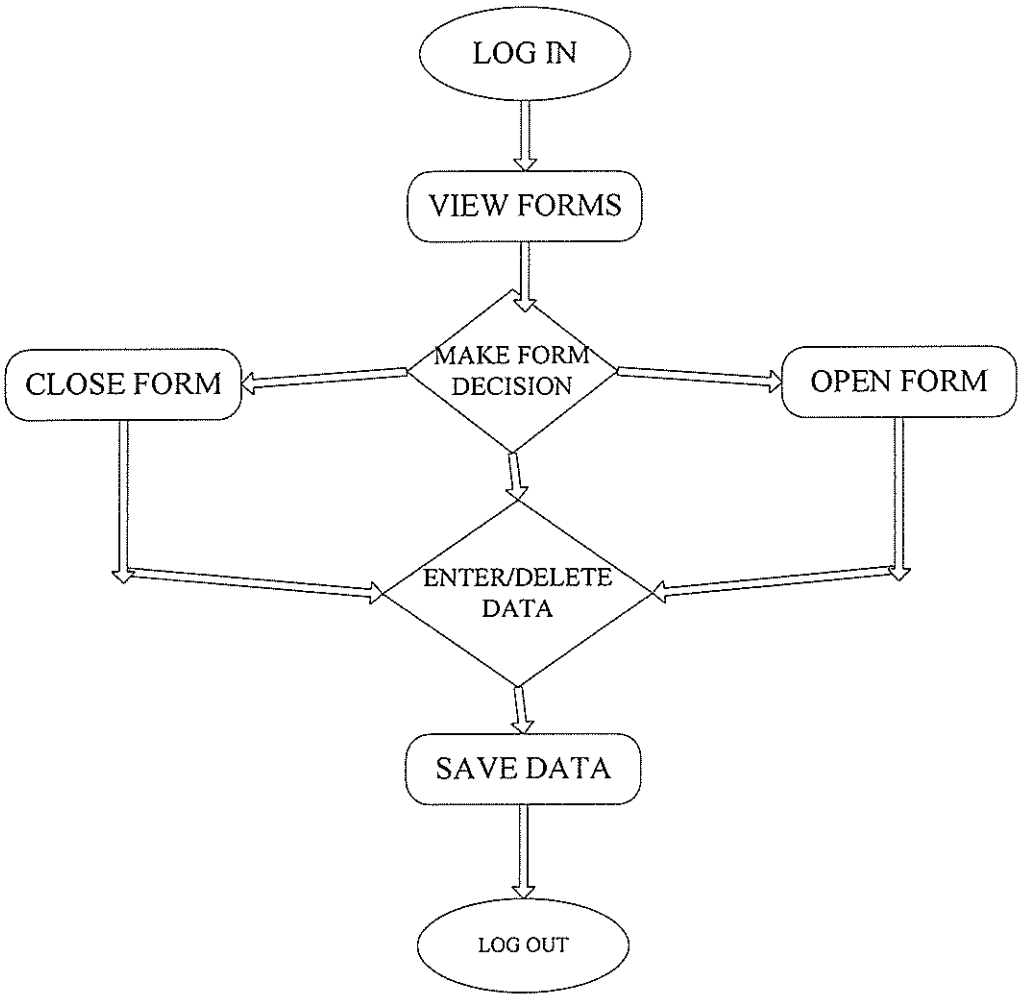

Figure 6: Activity diagram

CHARPTER FOUR

SYSTEM ANALYSIS AND DESIGN

4.0 Introduction

This section gives the general description of delivery and implementation of the system to allow execution of the tasks.

The system is implemented by use of Microsoft visual basic and Microsoft access. The graphical user interface is implemented using Microsoft visual basic and the database is implemented using the Microsoft access. The system is expected to run on the different computers.

4.1 System features

4.1.1 System login interface

This is a form which is used to access the system resources. This requires a password and username to access the system resources and these must be known by only the authorized users of the system. The password and username must be kept secretly to avoid unauthorized user of the system. This prevents linkage of data into improper hands.

4.1.2 System graphical user interface forms

The graphical user interface form is the means which is used by the system users to interact with the system. The graphical user interface is so attractive and friendly to the users to avoid errors in the process of interacting with the system. It must automatically prevent errors found during the performing of the tasks by using the system.

4.1.3 Database tables

The database tables are designed to allow the storage of data inputted by the users through the use of the graphical user interface. The enables the quick access of the information required since data is kept into the database tables safely. The database allows retrieval, update and access of data. The database tables have high level integrity and consistency to avoid data redundancy. This also enables the system to achieve high level.

These means through which a user can interact with different forms at the same time by use of the key inserted on the one form to allow access of another forms in the same system. This allows quick and friendly use of the system.

4.1.4 Reports

These are means through which information is outputted on the sheets like papers for use on the extra duties. This is implemented with this requirement to allow computer illiterates.

4.1.4 Queries

This is a means through which information is retrieved, updated, searched and viewed for quick access of data.

4.2 SCREEN SHOTS

4.2.1 Login form

This is a form which is signed in the system and it's also used to provide security to the system. It achieves this by the use of the username and the password which are only known by the authorized user of the system. Therefore the user of the system should be able to know the password and the username.

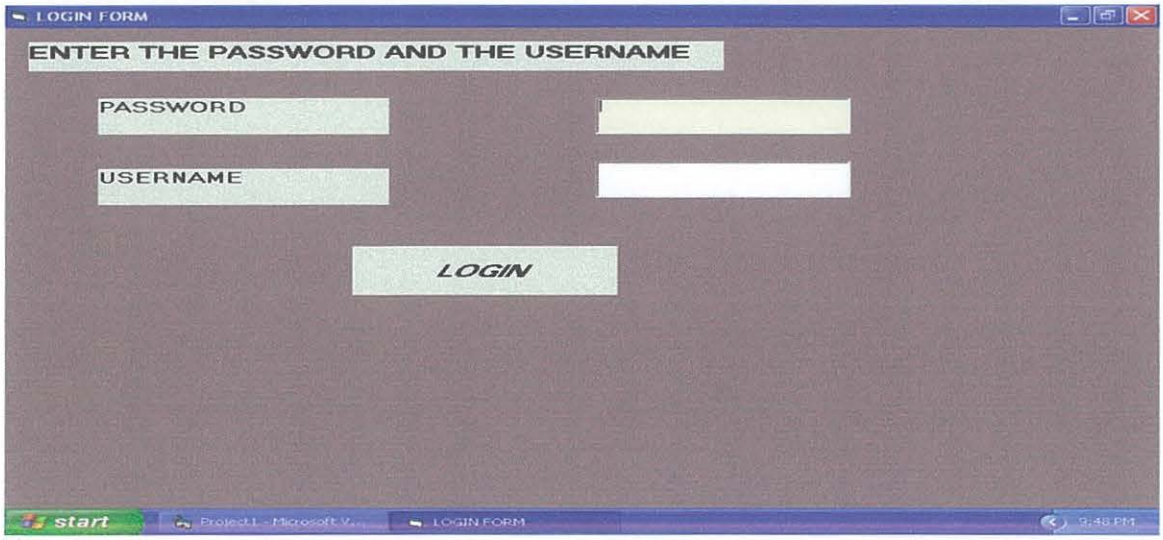

Figure 7: Login form

4.2.2 SWITCHBOARD

This is a form which is used to direct the system user to the required form which is needed for use and how to get. This form contains three command buttons which means there are only three main forms for use.

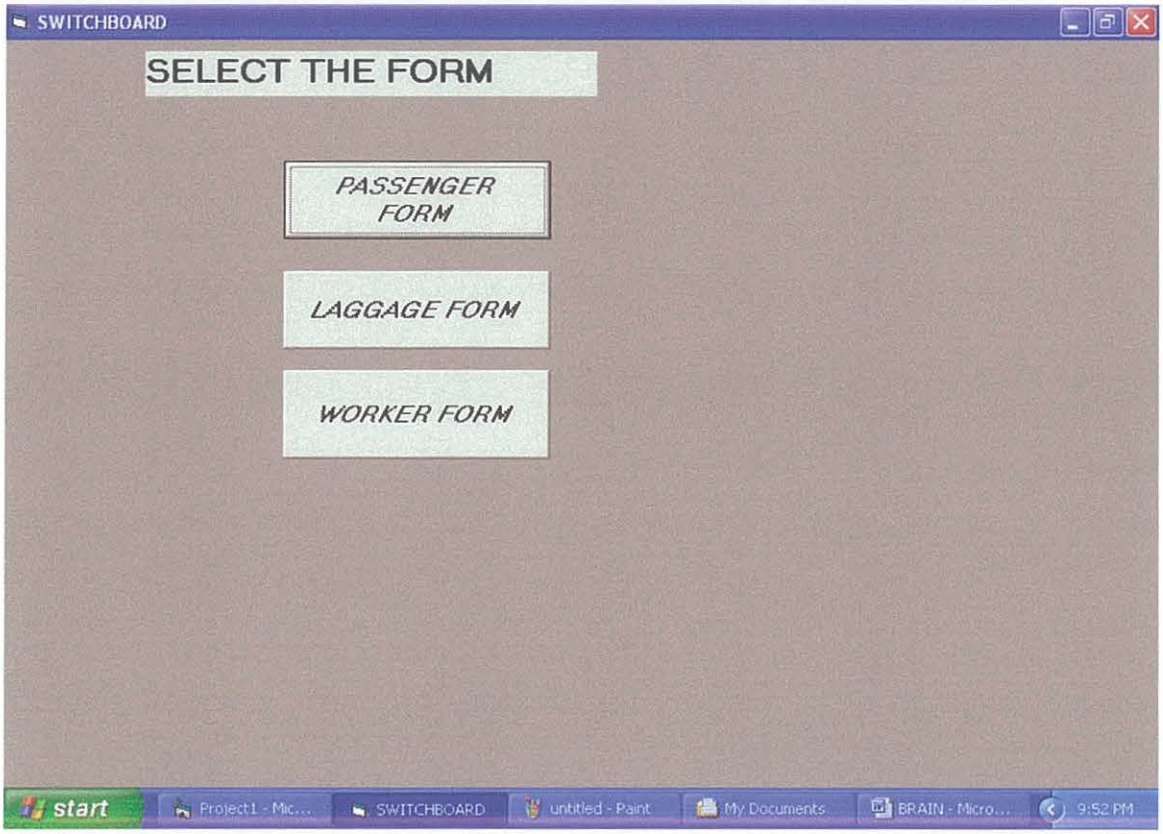

Figure 8: switchboard

4.2.3 PASSENGER FORM

This is a form which is used to enter data/information about the passengers. The information is very vital in terms of air security. It contains command buttons which are used to retrieve, remove and save the data into the databases. The passenger form is made so attractive and made easy to by the users and it require little training.

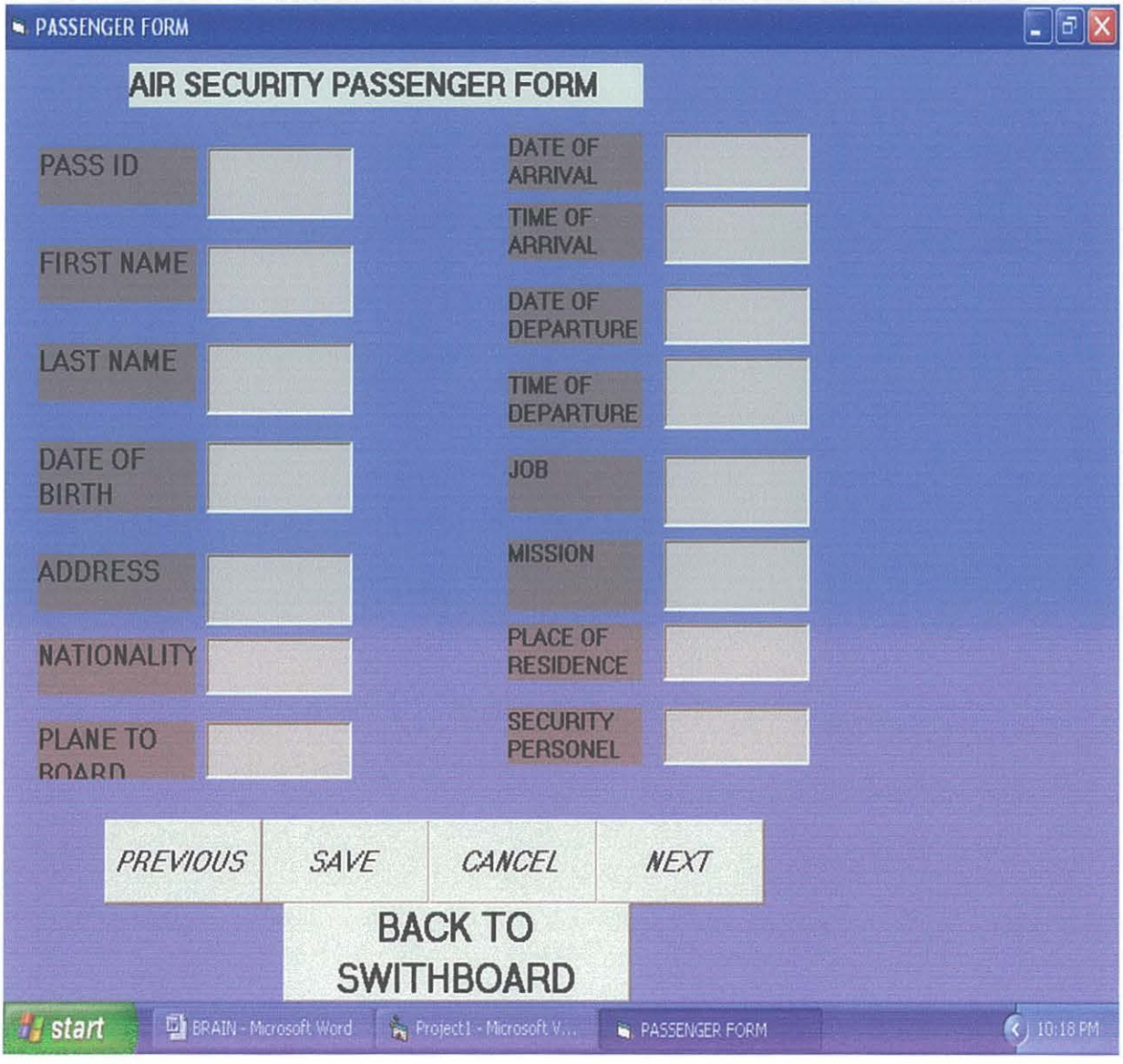

Figure 9: passenger form

4.2.4 WORKER FORM

This is a form which is used to enter data/information about the workers. The information is very vital in terms of air security. It contains command buttons which are used to retrieve, remove and save the data into the databases. The worker form is made so attractive and made easy to the users and it require little training.

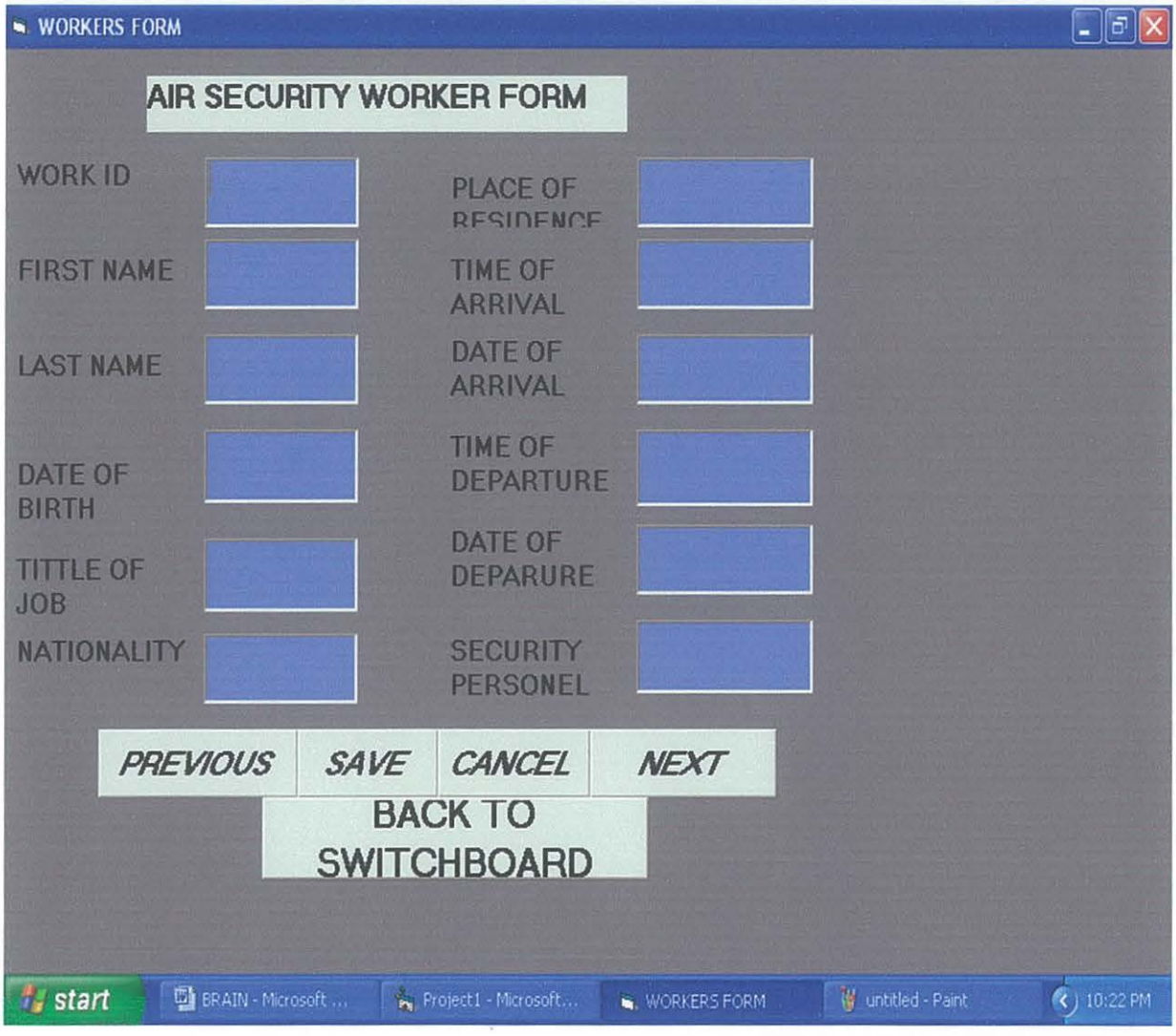

Figure 10: Worker form

4.2.5 LUGGAGE FORM

This is the table which is used to store data for the luggage and it's also allows data integrity. This table also allows retrieving of data through querying. The table is partitioned into columns to allow understanding of the data stored in them. The partitions are called fields for identifying the items.

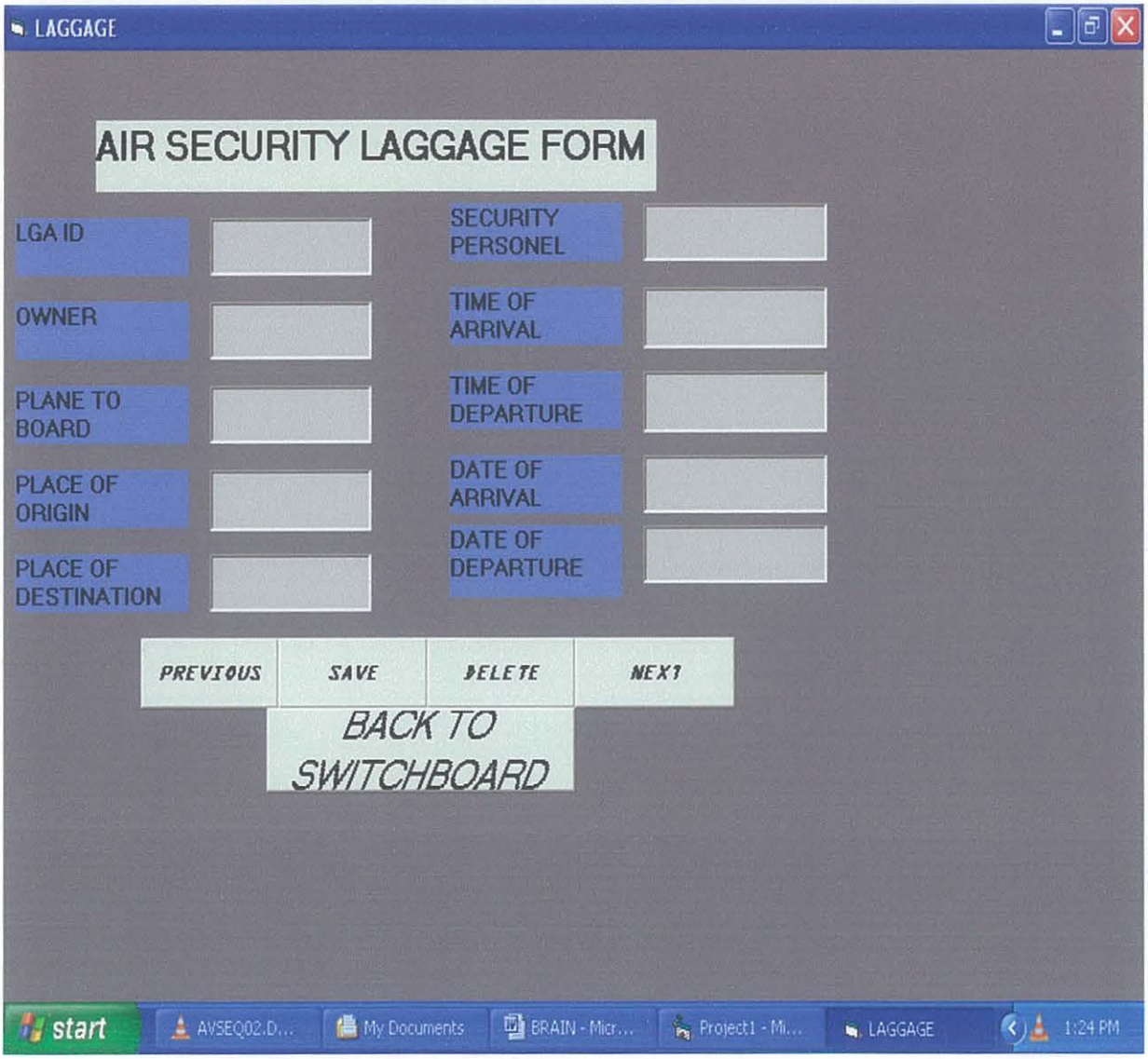

Figure 11: Luggage form

4.3 TABLES

4.3.1 PASSENGER TABLE

This is the table which is used to store data for the passengers and it also allows data integrity. This table allows also retrieving of data through querying. The table is partitioned into columns to allow understanding of the data stored in them. The partitions are called fields for identifying.

PASSENGER ID	PASS 01	PASS 02	PASS 03
F NAME	MATOVU	GINA	WINNY
L NAME	PETER	MAGGIE	JOLLY
DATE OF BIRTH	2/2/1975	5/8/1980	9/8/1990
NATIONALITY	UGANDAN	BRITISH	SOUTH AFRICAN
ADDRESS	P.O.BOX 333 K'LA	P.O.BOX 13 LDN	P.O.BOX 7654 S.A
PLANE TO BOARD	AF 277	AP 446	AJ 504
MISSION	TOUR	CONTRACT	EDUCATION
JOB	ENGINEER	BUSINESS LADY	STUDENT
PLACE OF RESIDENCE	MBALE	LONDON	SOWETO
ARRIVAL TIME	2:00PM	5:30AM	7:00PM
ARRIVAL DATE	4/5/2012	7/5/12	13/6/12
DEPARTURE TIME	3:00PM	8:00PM	3:PM
DEPARTURE DATE	7/9/12	4/10/12	18/12/12
SECURITY PERSONNEL	ODEK JULIUS	MALE PATRICK	JOHN MATHEW

Table 3: Passenger table

4.3.2 WORKER TABLE

This is the table which is used to store data for the worker and it's also allows data integrity. This table allows also retrieving of data through querying. The table is partitioned into columns to allow understanding of the data stored in them. The partitions are called fields for identifying the items.

WORKER ID	WO1	W02	W03
F NAME	JONA	MUSA	ISAAC
L NAME	MUTUNDA	LUMU	MILLS
DATE OF BIRTH	2/4/1977	4/3/1987	4/7/1977
NATIONALITY	KENYAN	UGANDAN	UGANDAN
JOB TITLE	MANAGER	LAGGAGE CARRIER	PILOT
PLACE OF RESIDENCE	ENTEBBE	KAMPALA	MASAKA
ARRIVAL TIME	7:20AM	7:00PM	5:45PM
ARRIVA DATE	5/2/12	6/2/12	10/3/12
DEPARTURE TIME	5:00PM	6:30PM	8:00PM
DEPARTURE DATE	7/2/12	9/3/12	15/3/12
SECURITY PERSONNEL	ONYONG DAVID	MUGISHA SAM	IGA PHILLIP

Table 4: Worker table

4.3.3 Luggage table

This is the table which is used to store data for the luggage and it's also allows data integrity. This table allows also retrieving of data through querying. The table is partitioned into columns to allow understanding of the data stored in them. The partitions are called fields for identifying the items.

LGA ID	LGA 01	LGA 02	LGA 03
OWNER	BUKENYA PAUL	SANYU MORRY	JANE GIN
SIZE	LARGE	SMALL	MEDIUM
PLANE TO BOARD	AF 200	AD 911	AM 022
PLACE OF DESTINATION	LAGOS	LOS ANGELES	LONDON
PLACE OF ORIGIN	KAMPALA	NAIROBI	JINJA
ARRIVAL TIME	3:00AM	7:00PM	4:00AM
SECURITY PERSONNEL	ONEK ALEX	MORGAN JOE	JOHN PAUL
DEPARTURE TIME	2:00AM	1:00PM	3:00PM
DEPARTURE DATE	11/12/13	4/01/14	3/2/14

Table 5: Luggage table

4.4 Conclusion

The new system built has come with new vital features which are very important in the purpose of serving security airport data and these are some of the importance as follows;

- Reduction of space consumed by the folders.
- Indexing of database files to improve search for data.
- Synchronization of information from different system user.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMANDATION

5.0 Introduction

The chapter portrays discussion, conclusion and recommendations according to the lessons learnt and the experience gained during the study.

5.1 Discussion

The new system is developed to provide air security to the airport and therefore it's constructed with more advanced features. The system is developed with a login form which is used to prevent unauthorized access into the system, the switch board which directs authorized users to the required form, databases which are used to store data as well as securing the data, the graphical user interface which is used to capture data and also allows interactions with users of the system. Therefore the system is developed with friendly and high speed of performance of the required tasks.

5.2 Conclusion

The research tells that there is poor security of the information at the airports in Uganda. The securing system of the airport is too ordinary and thus the air security information system provides a much better replace of the existing ordinary system. The air security information system can adequately;

- Record, capture and store information about passengers, workers and luggage as well as producing the required reports on timely basis.
- Authenticate every user attempting to log in the system through the use of the password and username.

Lessons learnt

The following are the lessons attained in the study as below;

In the process of studying, it has been found that most of the Uganda airports are still using ordinary systems which are slow in the performance of the tasks.

i. Due to low speed of the systems used, some passengers tend to miss their flights because of time wastage at the check points.

ii. The ordinary systems in most cases tend to jam or break down at the rash hours of passengers.

iii. It was noted noticed that ordinary systems which were used required several number of personnel to handle the job of data collection, capturing and storing therefore making process to expensive.

iv. It is noticed that some data collection methods are too tiresome

v. It noticed that programming is enjoyable if there is spirit of learning and discovering new features.

5.3 Recommendations

As a researcher, I recommend that the project writer and builders should also be considered as the greatest developers of the advanced technology in the nation today.

REFFERENCE

The Federal Aviation Administration's Layered Approach DA N I E L J. M E H A N

Privacy Impact Assessment for the Air Cargo Security Requirements April 14, 2006 Contact Point: Pamela Hamilton Director, Air Cargo Programs Transportation SecurityAdministration571.227.2623

Database Management for Airport Security Simulation Jonathan M. Branker Director Network Business Development SITA January 12, 2003

FAA'S NEXTGEN AIR TRAFFIC CONTROL SYSTEM A CIO's Perspective on Technology and Security Georgetown University Institute for Law, Science, and Global Security& Belington Cyber Security February 28, 2011

Future Airport Security Technologies posted by Airport News Technology Correspondent 11/01/2010

Airport Operations and Security Management Visual Defense Inc Category: Airport Security Management | 29/10/2007

APPENDIX I

INTERVIEW GUIDE

My name is SSEMWANJE BRIAN, a second year student of Diploma in Computer Science at Kampala International University. I am conducting a study about Information system for air security at Ugandan airports. I kindly request you to respond to these queries and I assure you the information got from you will be between me and you and that it shall only be used for purposes of report writing.

Thank you.

1. How good is the modern technology implementation at airports in Uganda?
2. What are the causes of Airport insecurity?
3. What measures have been put in place to overcome air insecurity?
4. How committed are the airport workers willing to do their duties in their respective departments?

APPENDIX II

QUESTIONNAIRE

My name is Ssemwanje Brian, a student at Kampala International University. Am carrying out a research on an Information System for Air Security in Uganda, my case study being Entebbe International Airport.

I kindly request you to answer the following questions: Please tick where applicable.

Name: ..... Sex: ..... Age: .....

Occupation: .....

1. Do you feel good while at the airport? ☐YES ☐NO
2. Why? .....
3. How often do you use the airport?

.....

4. What do you like about Entebbe International Airport?

.....

5. What are some of the challenges you face at the Airport?

.....

6. What have you put in order to overcome the challenges?

.....

7. How safe do you feel security wise while using this airport and its surrounding?

.....

8. How do you feel when you appear at check points for scanning?

.....

9. How long is the waiting time in check-in lines or security inspections?

.....

10. Have you got anything to say about that time?

.....

11. How much are you satisfied with the level of security in this particular area?

.....

12. What are the other security alternative methods have you ever gone through?

.....

13. What do you expect of this airport/which services are most important to you at this airport?

.....

14. In case of emergency, what alternative do u have?

.....

15. What was your best and worst experience at this airport?

.....

16. How good are the parking facilities and the value for money of parking facilities?

.....

17. How ease do you find your way through the airport?

.....

18. How do you find the value for money of restaurant / eating facilities?

.....

19. What are some of the improvements you like the government of Uganda to do at the airport?

.....

THANK YOU VERY MUCH AND I PROMISE TO YOU THAT THIS INFORMATION WILL REMAIN PERSONNAL.