



Weapon Management System for Avant Garde Floating Armoury

**A dissertation submitted for the Degree of Master
of Information Technology**

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Declaration

The thesis is my original work and has not been submitted previously for a degree at this or any other university/institute.

To the best of my knowledge it does not contain any material published or written by another person, except as acknowledged in the text.

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This is to certify that this thesis is based on the work of **Mr. KGCM Kariyawasam** under my supervision. The thesis has been prepared according to the format stipulated and is of acceptable standard.

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Abstract

Avant Garde Floating Armoury uses an Information Management System to fulfill their service to the customers. The Current system is manual and it uses word processing software's such as Microsoft office package for data processing. This method is very time consuming and it make staff extra work. The staff have to document everything in the business and it impacts the company's daily processes. Current system could not handle large amount of data hence highly inflexible, Business continuity is at risk in case of damage to information and analysis data is also very difficult.

Therefore the objective of this project was to design and develop a system that provides a solution to solve existing issues, improve the efficiency and effectiveness of the whole processes and mitigate the risk. After carefully analyzing the requirements, a new Information System was proposed and designed.

System was implemented using Visual Studio .NET (ASP. NET) and SQL Server handles the database components. The entire application could be run on Windows platform. Apart from the implementation, the development practice included a proper Quality Assurance process, user training sessions, and demonstration to improve the benefits of the system. An information system is an imperative requirement which directly affect customer satisfactions and the business progress. Therefore, it is essential to establish and enforce a proper system that will serve as a tool in utilizing processes in the most efficient manner.

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List of Abbreviations

AGMS	Avant Garde Maritime Security
OBST	On Boat Security Team
SQIRO	Sampling, Questioners, Interviews, Background Reading, Observations
LA	Local Agent
PC	Principle Company
SDLC	Software Development Life Cycle
IDE	Integrated Development Environment
GUI	Graphical User Interface
SSMS	SQL Server Management Studio
HTML	Hypertext Markup Language
CSS	Cascade Style Sheet

CHAPTER 1: Introduction

Sri Lanka Navy's Weapon Management System for Avant Garde Floating Armoury contains a list of requests to be filled and then prompts users to pick the necessary armoury items, which keeping at the Sri Lanka Navy floating with safety and high security protecting government policies (National Security). The system provides them with easy access and shaping information, store management may be used to automate a service fulfillment process and also manage in and outward items of armory. Automation is the replacement of human workers by technology.

This application takes care of all requests reducing cost for documentation, transportation while improving efficiency and security of the service. It significantly improves service quality, optimizes flow of items and shortens routes within user and floating Amary. It also improves visibility and decision making providing efficient execution of task using this fast and reliable computerized method.

1.1 Background of the Organization

Initially Avant Garde as a Private company was started as private company. It is known as Avant Garde Maritime Security (AGMS). AGMS provides a comprehensive range of total risk mitigation solutions including onboard security personnel (armed and unarmed) on contract basis to Private Maritime Security Companies, onboard armed security personnel for protection of fishing vessels, weapon storage on floating armouries, air and Sea transportation of weapons and related equipment's and training of international sea marshals. Totally Floating Armousies part has been handed over to the Sri Lanka Navy due to the various reasons. Main reason is the National Security. Now it is conducted by Sri Lanka navy as On Boat Security Team (OBST).

1.2 Overview of the current System

As the diagram depicts below current Sri Lanka Navy's Weapon Management System for Avant Garde Floating Armoury is associated with two more parties, namely the principal company and local agents. Principal companies own the weapons and local agent's plays intermediates role by establishing a link between principle companies and Sri Lanka Navy.

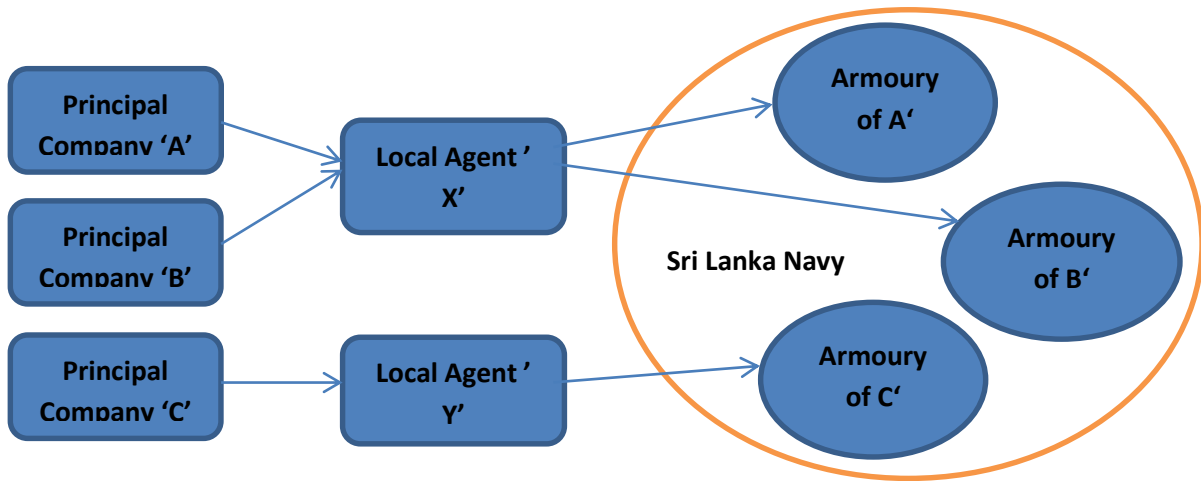


Figure 1.1: Overview of Weapon Management System for Avant Garde Floating Armoury

1.3 Problem Statement

Current weapon handing over and taking over procedures are inaccurate and confidentiality of the documents are not maintained. Further, it results in the waste of lot of stationaries and valuable time. Otherwise human errors are unavoidable because “Error is Human” and “Making mistake is a part of the learning curve”.

To get an iternary of the items available at the Avant Garde Floating Armoury, it would take days even weeks to prepare because all the paper work for that particular month has to be analyzed. There is no way to monitor current stocks and current jobs as it is a tedious and almost impossible task. Considering the importance of this process, an online system was really necessary in view of obtaining reliable, accurate and timely reports needed for other administrative works of Sri Lanka Navy. As the intermediate a Local Agent takes weapons from Principle Companies who owns the weapons, they ledgerize it and then send them to one of the armouries that they are associated with. Weapons handing over and taking over from armouries will only be done by an authorized representative of the Local Agent.

1.4 Objective of the proposed system

Objective of this project is to develop a weapon storage management system for on-board Security Team in Sri Lanka Navy which maintains accurate transaction details of weapons/ other armoury items and getting transaction details for the recovery list and to provide required information.

Proposed weapon storage management system will have a user friendly interactive web interfaces and reports with required details and charts for the users who are working in on-board security team (Local Agent). Since Principal Companies, Local Agents and Armouries

are at different locations. Online system is a must. Further considering the security restrictions in Sri Lanka Navy Armoury it is not possible for a Local Agent visit them each time to take a stock. Standalone solution therefore fails to address the problem.

If we analyse the relationships between these three parties, we could observe that there are both one to one and one to many relationships. As an example, Principle Companies have one to one relationships Local Agents while Local Agents have one to many relationships with different Armouries making this problem even harder.

It will maintain three types of access levels as operators, approvers and administrator to maintaining an accurate stock of weapon and other armoury items.

1.5 Scope of the Project

The proposed System will be a comprehensive web based stock control solution. This is capable of handling, monitoring and recording different kind of transactions between Local Agents and Sri Lanka Navy armouries. Further it maps the relationship between Local Agents and Principle Companies to maintain the authenticity. An in detail description of the scope is given below.

- a. Maintain company wise armoury items stock.
- b. Maintaining details related to one to one relationship between Principle Companies & Local Agents and one to many relationships between Local agents & Armouries. In addition details about person who are authorized to do transactions is also to be stored.
- c. Check correctness of details submitted by Principal Company
- d. Provide accurate recovery list to make the invoicing easy.
- e. Maintain all the details of the allocation/reallocation of weapons from Armouries and details regarding the handover and takeover procedures between Principle companies and Local Agents.

f. Alert administrators if someone unauthorised tries to access or to detect anomalies in transactions (Ex: Unusual amount of handover and takeover of weapons) and send the feedback of the transactions to Local Agents.

g. Facilitate following reports

- ❖ Daily handover & takeover of weapon between Local Agent and Principle Company.
- ❖ Daily allocation of weapons in Armoury.
- ❖ Daily stock report of weapons.
- ❖ Transactions details of the weapon stocks.
- ❖ Details of moveable/nonmoving weapons.
- ❖ Details of weapons conditions (Ex. OP/ NON OP status)
- ❖ Details of inquiries from Local Agents and Principle companies.

1.6 Advantages

- ❖ Eliminate data redundancy
- ❖ Increase the efficiency of the existing process
- ❖ Provide better user friendly environment
- ❖ Cost savings
- ❖ Increased efficiency
- ❖ Increased Security of the Data

1.7 Disadvantages

- ❖ High Initial Expenses
- ❖ Complexity
- ❖ Lack of computer knowledge
- ❖ Lack of trained person

CHAPTER 2: Background/ Literature Review

This chapter gives a systematic review of the basic theoretical and empirical literature on management and relevant similar systems found in the industry and how the functionalities of the system fulfill the requirements of the existing system. The following reviews help to understand what how to develop proper application through manual system providing required service with high security.

2.1 Similar Systems

Even though there are many stock management systems, there is no project which directly addresses the problems faced by SLN when they manage their floating armories. When I referred the web I found projects which address some of the stock management concepts I utilized.

SALESBINDER is not only the Inventory Management System. It has more features like Accounting, Purchasing, Marketing ...etc. Only Inventory Management section has been compared with this system as follows. [1]

Basic Features	AGFAS.navy.lk	salesbinder.com
Working online	Yes	Yes
User friendliness	Simple and not common	Common thing and Complex
Easy to work	Yes	Yes
Security Access	Very High use Authentication Certificate	Basic Security
Multi Access	Yes	Yes
Data Accuracy	Very high	High
Feed Back	Customer get feedback SMS and Email	Nothing
Item Filtering Method	Good, It is used AJAX RadControls	Normal method
Identifying Items	Use Serial Number and Item Number	Use Barcode Mechanism
Item Picture	Yes	Yes

Table 2.1: Comparing Features with Similar System

2.2 The Nature and Scope of Inventories

Inventory is the total amount of goods and materials contained in a store at any given time. Store owner need to know the precise number of items on their shelves and storage areas in order to place order or control losses.

Inventory is often the largest item in the current assets category and must be accurately counted and valued at the end of each accounting period to determine a company's profit or loss. This Organizations gives the service, generally keep a day to day record of changes in inventory to ensure accurate and on-going control.

2.3 Types of Inventories

Materially, there are 4 types of inventories only as explained above. [2] Following types of inventories are either the reasons to hold those 4 basic inventory or business requirement for the same. Some of them are suitable strategies for certain businesses.

2.3.1 Movement Inventories

This is also known as transit or pipeline inventories. This involves the transfer of substantial amount of items the transfer organization to required places.

2.3.2 Buffer Inventories

These are held so as to protect against uncertainties of demand and supply. Buffer inventory, also called buffer stock or safety stock, is a cushion of supply in excess of forecast demand.

2.3.3 Anticipatory inventories

These are held for the reason that a future demand for the product is anticipated

2.3.4 Decoupling inventories

A stock retained to make the independent control of two successive operations possible.

2.3.5 Cycle inventories

An inventory system where counts are performed continuously, often eliminating the need for annual overall inventory

2.4 Inventory Management

Inventory management is all about knowing what is on hand, where it is in use and how many services. It is very easy because there is particular way handle the event. Organization functions on military setup. There are own rules and regulation.

2.4.1 Importance of Inventory Management

Inventory management has always been important, it has become more important over the past several decades. As the needs of companied increase, they must in turn increase demands on their suppliers.

[3]The importance of inventory management is

- ❖ The institution has to maintain adequate inventory for smooth activities of supply items.
- ❖ It has to minimize the investment in inventory to enhance firm's profitability.
- ❖ It helps in maintaining a tradeoff between issuing items and on charge items which results into increase the efficiency and correctness.
- ❖ Inventory management facilitates maintaining adequate inventory for smooth sales operations.
- ❖ Inventory management avoids the stock-out problem that a firm otherwise would face in the lack of proper inventory management.
- ❖ Inventory management suggests the proper inventory control system to be applied by a firm to avoid losses, damages and misuses.

2.5 Audit Process

[4]There are three processes to auditing as follows.

- ❖ Planning
- ❖ Fieldwork
- ❖ Reporting

System throws up count with numbers, description and location number. The operator goes to the location, counts the quantity available and updates the list, which is then fed into the system. The system economizes the physical quantity with system quantity and throws up discrepancy report, which is further worked to tally and adjust inventory.

2.6 Backup Procedure

Data is the most important aspect of your [5]the operating system can be reinstalled and so can applications, but it may be difficult or impossible to recreate your original data.

It is essential that you always back up your important information and have a plan for recovering from a system failure. An attacker could crash a computer's operating system or data may be corrupted or wiped out by a hardware problem. Computers can be lost, stolen, or destroyed in a fire or other catastrophe.

You should back up your personal or critical work data on a regular basis. This means copying your files over to a protected system that you can access when those files are needed.

2.6.1 Suggestions for backups

- ❖ Encrypt backups that contain sensitive data.
- ❖ Keep extra backups off-site in a secure location (in case of property damage).
- ❖ Verify your backups to make sure files are retrievable.
- ❖ Sanitize or destroy your backups (e.g., tapes, CDs) before discarding them.

CHAPTER 3: Analysis and Design

This chapter describes the detailed description of requirement gathering process, requirements specification and object oriented design of the system. The requirement specification section includes the identified functional requirements and non-functional requirements. Furthermore, Use cases and Sequence diagrams are used to describe the functionalities of the proposed Hardware Management solution.

Analysis

Software analysis is Software engineering Method. It is used to abstract conceptual model through the actual situation. Following effect is to find suitable conceptual model for my project.

3.1 Requirement Analysis

Requirement analysis plays a major role in a software development process. Initially it is done as a necessity before the project commences. Usually requirements analysis occupies capturing both functional and non-functional requirements. The successfulness of the project always depends on the way of doing the requirement analysis. Requirement gathering, Analyzing requirements and recording requirements are three main activities involve in requirement analysis

The problem analysis was done in precise manner when considered with the actual problem domain. Requirements analysis involves frequent communication with system users to determine specific feature expectations, resolution of conflict or ambiguity in requirements as demanded by the various users or groups of users, avoidance of feature creep and documentation of all aspects of the project development process from start to finish. Energy should be directed towards ensuring that the final system or product conforms to client needs rather than attempting to mold user expectations to fit the requirements

In here concern on requirement gathering from the client and analysing gathered data. This is the most important phase in the Software Development Life Cycle (SDLC) of the project as

the state of affairs of the client can be evaluated here. The requirements can be defined clearly to ensure the design and implementation success. Different kinds of tools are being used to do the analysing to find a solution to the expectations.

3.2 Requirement Gathering

Requirement gathering or requirement eliciting is the process of addressing the needs and conditions of the new system. [6]There are many fact gathering techniques available for analysis, such as SQIRO (Sampling, Questioners, Interviews, Background Reading, Observations) among them Observation, Interviewing and Background Readings were used in this project work.

3.2.1 Interviews

This is one of the best methods to collect accurate information from stakeholders. Operator, Agent and Manager had been interviewed. It was enabled to share different knowledge in different user point of view. Main drawback in this method was limited time availability of resource persons due to present busy environment. With the interview observed that they have different educational backgrounds so designing system should be understandable for all users those who use system.

With the operation officers and some of the staff initial informal discussions were carried out and was able to get some time from their busy schedule to do the formal interview. During the interview it was clear that they were facing more difficulties with regard handling the stock & maintained it. Further it was clear how the whole operations taking place in this organization. It was difficult to reach top level management personnel due to their busy schedule and was unable to interview them.

3.2.2 Sample Documents and Manuals

Sampling is also a good method for gathering user requirements. This include forms, reports, screen designs and records and also can be examined to determine the type and extent of information. This was used as it was convenient to get the documents from the authority and had the chance to refer their manuals as they were really in need of an automated system.

Stock books, Sales reports, Purchase orders, Goods Issuing s and Goods Receiving had been carefully examined to obtain proper knowledge about the manual process. Also it's assisted to design required formats to be included in to the proposed system. Document analysis used for

thoroughly to design this system because it is very difficult to gather data from other methods. This method is very useful for because all the transactions has been recorded with the supervision. So data is reliable when considering the other methods.

3.2.3 Questionnaires and Surveys

Questionnaires and surveys take a different approach for interviews for the purpose of gathering information. The focus shifts from the flexible and friendly approach provided by interviewing to the preparation of unambiguous questions and statements for the gathering of more precise information. Provide structure type question to user and obtain brief idea about specific areas. These questionnaires prepared based on the educational level of the users and these data helped to develop proper system without any out of boundary implementations.

3.2.4 Survey

Majority of information related to surveys were collected through internet. Related blogs & forums had been referred and analyzed demo versions of existing similar systems of proposed system to capture main valuable concepts. Above forms of methods examined thoroughly to get a proper picture with the required system. This requirement gathering method assists to add value addition functionalities to the system to satisfy the customer.

3.2.5 Observation

Observation is the study of users in their day to day activities and performance of assigned tasks and duties. By observing users it was noted that process flows, awkward steps, pain points and opportunities for improvement. Also observed the existing manual system users and assisted to gather valuable key points to be developed.

3.3 Non-Functional Requirements

One of main concern part of the project is non-functional requirements. There may be reject the whole project, violates the one non-functional requirement. Those are often called qualities of a system. It is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors. Followings are Nonfunctional requirements of the system.

A system may be required to present the user with a display of the number of records in a database. [7]This is a functional requirement. How up-to-date this number needs to be, is a

non-functional requirement. If the number needs to be updated in real time, the system architects must ensure that the system is capable of updating the record count within an acceptably short interval of the number of records changing.

- ❖ **Integrity:** Integrity requirements define the security attributes of the system, restricting access to features or data to certain users and protecting the privacy of data entered into the software.

- ❖ Security is a must for this project. Persons are dealing with the weapons.

- ❖ **Availability:** A system's availability, or "uptime," is the amount of time that it is operational and available for use. This is specified because some systems are designed with expected downtime for activities like database upgrades and backups.

- ❖ **Efficiency:** Specifies how well the software utilizes scarce resources: CPU cycles, disk space, memory, bandwidth, etc.

- ❖ **Flexibility:** If the organization intends to increase or extend the functionality of the software after it is deployed, that should be planned from the beginning; it influences choices made during the design, development, testing, and deployment of the system.

- ❖ **Portability:** Portability specifies the ease with which the software can be installed on all necessary platforms, and the platforms on which it is expected to run.

- ❖ **Performance:** The performance constraints specify the timing characteristics of the software. Certain tasks or features are more time-sensitive than others; the nonfunctional requirements should identify those software functions that have constraints on their performance.

- ❖ **Reliability:** Reliability specifies the capability of the software to maintain its performance over time. Unreliable software fails frequently, and certain tasks are more sensitive to failure (for example, because they cannot be restarted, or because they must be run at a certain time).

- ❖ **Reusability:** Many systems are developed with the ability to leverage common components across multiple products. Reusability indicates the extent to which software components should be designed in such a way that they can be used in applications other than the ones for which they were initially developed.

- ❖ **Robustness:** A robust system is able to handle error conditions gracefully, without failure. This includes a tolerance of invalid data, software defects, and unexpected operating conditions.
- ❖ **Scalability:** Software that is scalable has the ability to handle a wide variety of system configuration sizes. The nonfunctional requirements should specify the ways in which the system may be expected to scale up (by increasing hardware capacity, adding machines, etc.).
- ❖ **Usability:** Ease-of-use requirements address the factors that constitute the capacity of the software to be understood, learned, and used by its intended users.

3.4 Functional Requirement

A functional requirement defines a function of a software system or its component. A function is described as a set of inputs, the behavior, and outputs. Functional requirements may be calculations, technical details, data manipulation and processing and other specific functionality that define what a system is supposed to accomplish. Behavioral requirements describing all the cases where the system uses the functional requirements are captured in use cases. Followings are the functional requirements of the new system.

- ❖ **Create users (give the access the System)**
System administrator creates the user name and password giving privileges in several steps users. Giving Authority is very important to increase the security of the system. Reading, editing and the deleting are the main point to create authorized users. Some users get all privileges. Someone gets only read only. This function is very valuable section like this project because security is a must.
- ❖ **Initiate Job Request**
Principle Company initiates the Job Request trough Local Agent.
- ❖ **Forward Job Request**
First get the initiate job request which is created by Principle Company and forwarded it to Sri Lanka Navy.

- ❖ **Create Job**
Operator of the **Weapon Management System for Avant Garde Floating Armoury** of Sri Lanka Navy creates a Job.
- ❖ **Approval of the Job**
After creating the Job it should be get the approval from the system administrator.
- ❖ **Cancel the Job**
One and only person who cancel the Job is the System administrator.
- ❖ **Edit the Job**
One and only person who cancel the Job is the System administrator.
- ❖ **Add Items**
Operator of this system adds Items then it should be got the approval from the System administrator.
- ❖ **Edit Items**
After first save the items editing can be done by system administrator.
- ❖ **Delete Items**
After first save the items editing can be done by system administrator.
- ❖ **Feed Back**
After getting approval of the Job, the operator is the person who does the feedback.
- ❖ **Get reports**
System Administrator and the Operator can get the report as they needed.
- ❖ **Search Details**
System Administrator and the Operator can get the report as they needed.

- ❖ **View Stock**
System Administrator and the Operator can see the whole stock but Local Agent and Principle Company can see own stock only.

3.5 Recommended Hardware Requirements

There are two main types of hardware requirement.

- ❖ Organization (Server) Side
- ❖ Client Side

3.5.1 Organization Side Hardware Requirements

- ❖ Two Mid-end servers (One server is backup server (Mirror Server) with
 - 2.6 Ghz with 15 MB cash, 6 cores Processor
 - 16 GB Ram
 - 5TB Haedisk
- ❖ Two LED 17”monitors
 - 1366*768 resolution
 - 16 bit colour

3.5.2 Client Side Hardware Requirements

- ❖ Personal computer with
 - Intel core i3 3.4 Ghz 3MB cash
 - 1GB Ram
 - 500 GB Hardisk
- ❖ LED 17” monitor
 - 1366*768 resolutions
 - 16 bit colour

3.6 Recommended Software Requirements

- ❖ Server Side Requirements
 - Windows server 2012
 - Visual Studio 2012(Mainly #)
 - SQL Server 2012
- ❖ Client Side Requirements
 - Windows 10 Operating System

3.6.1 Recommended Operating Systems

An operating system (OS) is software, consisting of programs and data, that runs on computers and manages computer hardware resources and provide common services for efficient execution of various application software.

For hardware functions such as input and output and memory allocation, the operating system acts as an intermediary between application programs and the computer hardware, although the application code is usually executed directly by the hardware and will frequently call the OS or be interrupted by it. Operating systems are found on almost any device that contains a computer from cellular phones and video game consoles to supercomputers and web servers.

Examples: Some of popular modern operating systems for personal computers are Linux/GNU, Mac OS X, and Microsoft Windows.

3.7 Language Specifications

3.7.1 Visual Studio

Microsoft Visual Studio is an integrated development environment (IDE) from Microsoft. It is used to develop computer programs for Microsoft Windows, as well as web sites, web applications and web services. Visual Studio uses Microsoft software development platforms such as Windows API, Windows Forms, Windows Presentation Foundation, Windows Store and Microsoft Silverlight. It can produce both native code and managed code.

Visual Studio includes a code editor supporting IntelliSense (the code completion component) as well as code refactoring. The integrated debugger works both as a source-level debugger and a machine-level debugger. Other built-in tools include a forms designer for building GUI applications, web designer, class designer, and database schema designer. It accepts plug-ins that enhance the functionality at almost every level including adding support for source-control systems (like Subversion) and adding new toolsets like editors and visual designers for domain-specific languages or toolsets for other aspects of the software development lifecycle .

3.7.2 C Sharp (programming language)

[8]The correct title of this article is C# (programming language). The substitution or omission of the # is because of technical restrictions.

C# (pronounced as see sharp) is a multi-paradigm programming language encompassing strong typing, imperative, declarative, functional, generic, object-oriented (class-based), and component-oriented programming disciplines. It was developed by Microsoft within its .NET. C# is one of the programming languages designed for the Common Language Infrastructure.

C# is a general-purpose, object-oriented programming language. Its development team is led by Anders Hejlsberg. The most recent version is C# 6.0 which was released in 2015.

3.8 Database Specification

3.8.1 SQL Server

[9]Originally released in 1989 as version 1.0 by Microsoft, in conjunction with Sybase, SQL Server and its early versions were very similar to Sybase. However, the Microsoft-Sybase partnership dissolved in the early 1990s, and Microsoft retained the rights to the SQL Server trade name. Since then, Microsoft has released 2000, 2005 and 2008 versions, which feature more advanced options and better security.

SQL Server is Microsoft's relational database management system (RDBMS). It is a full-featured database primarily designed to compete against competitors Oracle Database (DB) and MySQL.

Like all major RDBMS, SQL Server supports ANSI SQL, the standard SQL language. However, SQL Server also contains T-SQL, its own SQL implementation. SQL Server Management Studio (SSMS) (previously known as Enterprise Manager) is SQL Server's main interface tool, and it supports 32-bit and 64-bit environments.

SQL Server is sometimes referred to as MSSQL and Microsoft SQL Server.

3.9 Feasibility Study

Feasibility study is a vital process in order to find out the strengths weaknesses. Opportunities and threats (SWOT) of a proposed system to fulfil the main. Requirements of the system. A detailed feasibility study was carried out regarding this System, mainly focusing on the following facts.

3.9.1 Technical Feasibility

This method mainly focuses on gaining an understanding of the present technical resources of the organization and their applicability needs to be incorporated to the proposed system. It is an evaluation of both hardware and software. Users must know how to interact with the computer.

3.9.2 Operational Feasibility

This is an evaluation to determine whether the system is operationally acceptable. It also assess that how well system solve the users problem and how well it'll be useful to the end users of the system. To ensure success, desired operational outcomes must be imparted during design and development. The proposed systems functions were analysed to see whether they accomplish the user's requirements. User satisfaction was very important factor when designing the system.

3.9.3 Legal Feasibility

In this system legal feasibility involves some part as it is a Private organization. There was a process to get approved from the top level management. When it was requested it nearly took a month as it had to go through many levels of authority. And most important factor was their data should be secured. Local Agent signed agreement with Ministry Of Defence (MOD) for this project. It is the main agreement. Meanwhile I also come to the agreement, if anything happens in this duration I must take the responsibility for those things. Any information that users have given to the system will not be shared with anyone and stored by not violating DPA 2008. It was very difficult task to work on it because of legal things that have in authority

3.9.4 Economic Feasibility

Economic analysis is the most frequently used method for evaluating the effectiveness of a new system. In here analyzed the existing manual system with proposed system. In this analysis considered the manual system time wastage of each processes, number of employee used and their salary and costs, paper wastage as weak points. However, compared to proposed system, it was noted that majority of drawbacks stated in the manual process could be reduced with proposed system. Hence, proposed system would be economically viable project. In this system, service is the converting the economic benefit path.

Typically involves cost benefits analysis process. There will be a cost involved with implementing the system such as maintaining equipment and training the users. According to their rules and regulations first must get the approved budget report. Since they have already got approval for their budget includes these functionalities. Economic feasibility considers the following

- ❖ The cost to conduct a full system investigation.
- ❖ The cost of hardware and software for the class of application.
- ❖ The benefits in the form of reduced cost or fewer costly errors
- ❖ The cost if nothing changes (i.e. the proposed system is not developed)
- ❖ The proposed system is economically feasible because

- ❖ The system requires very less time factors.
- ❖ The system will provide fast and efficient automated environment instead of slow and error prone manual system, thus reducing both time and man power spent in running the system
- ❖ The system will have GUI interface and very less user-training is required to learn it.
- ❖ The system will provide service to view various information for proper examination decision making

3.10 Database Analysis

Database design is an important place in designing a system. During this phase care should be taken to avoid redundancy of information storing into a database, since it leads to wastage of memory space.

3.10.1 Normalization Techniques

Database Normalization is a technique of organizing the data in the database. Normalization is a systematic approach of decomposing tables to eliminate data redundancy and undesirable characteristics like Insertion, Update and Deletion Anomalies. It is a multi-step process that puts data into tabular form by removing duplicated data from the relation tables.

Normalization is used for mainly two purposes,

- ❖ Eliminating redundant (useless) data.
- ❖ Ensuring data dependencies make sense.

Normalization rule are divided into following normal form.

- ❖ First Normal Form
- ❖ Second Normal Form
- ❖ Third Normal Form
- ❖ BCNF

I consider the First, Second and Third Normal forms for this project.

Design

System design phase produces the design specification for the system to be developed. It is necessary to draw the relevant diagrams while designing the system. Well drawn diagrams will ease the designer's job. Development methodology should also need to confirm here on the design phase.

3.11 Class Diagram

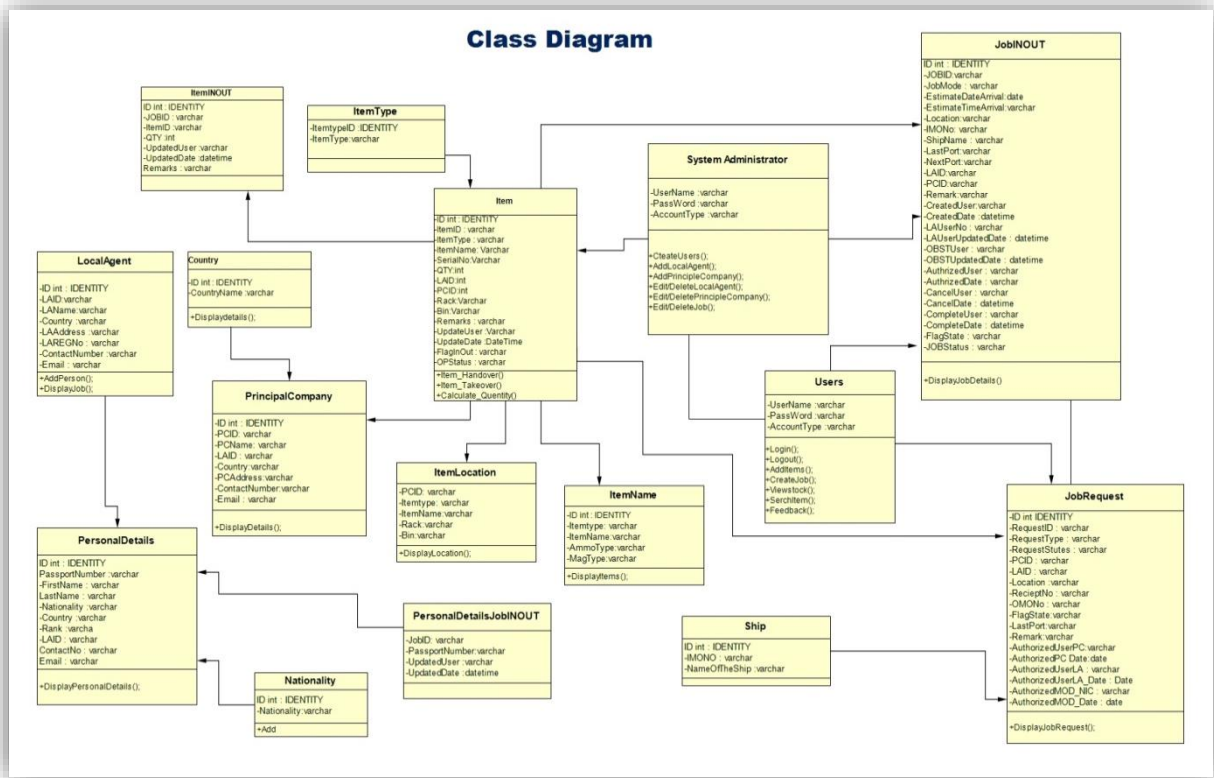


Figure 3.1: Class Diagram

3.12 Use Case Diagrams

A use case is a description of a set of sequences of actions, including variants that a system performs to yield an observable result of value to an actor. A use case involves the interaction of actors and the system. An actor represents a coherent set of roles that users of use case play when interacting with these use cases. Actors can be human or they can be automated Systems.

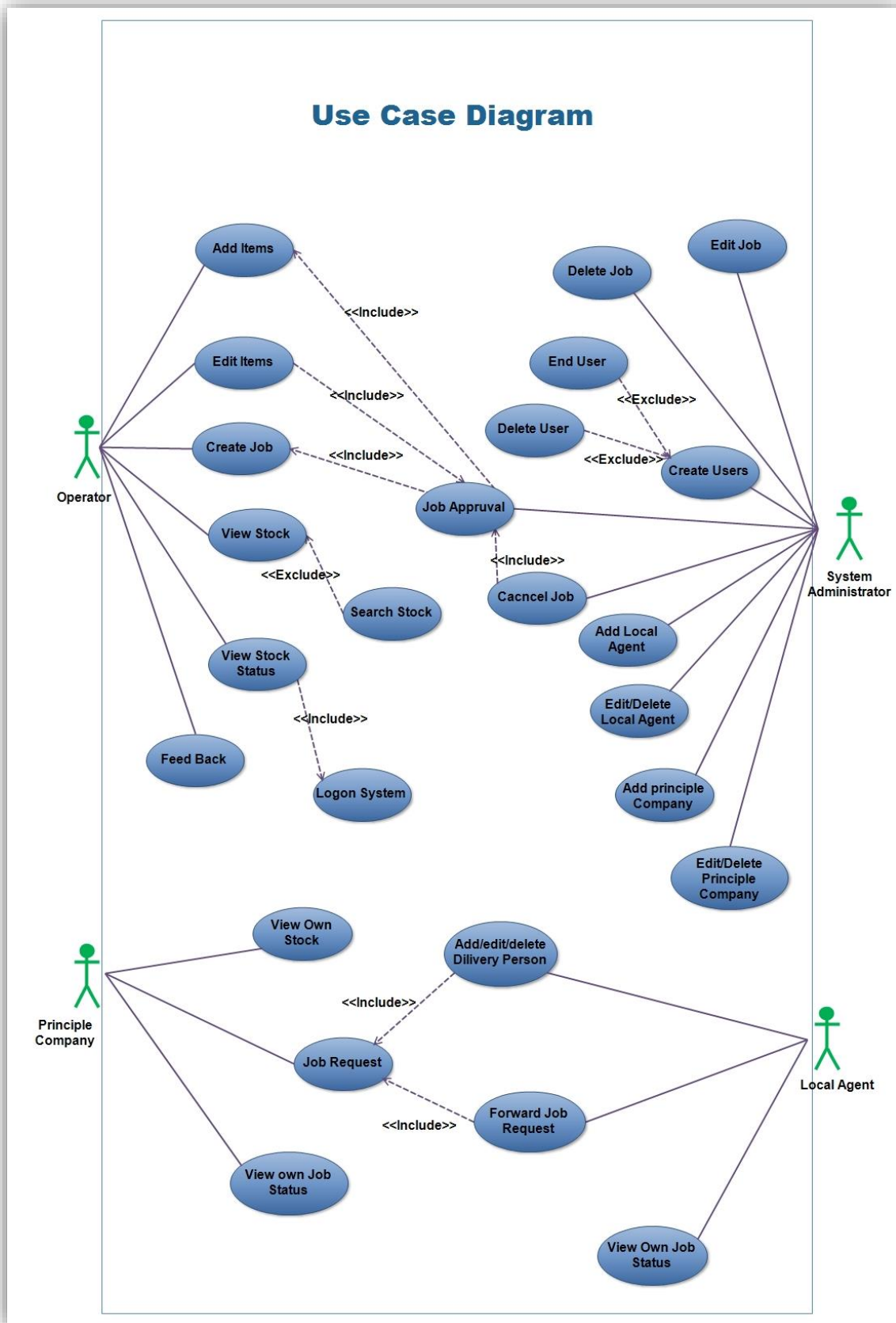


Figure 3.2: Use Case Diagram

3.13 Activity Diagrams

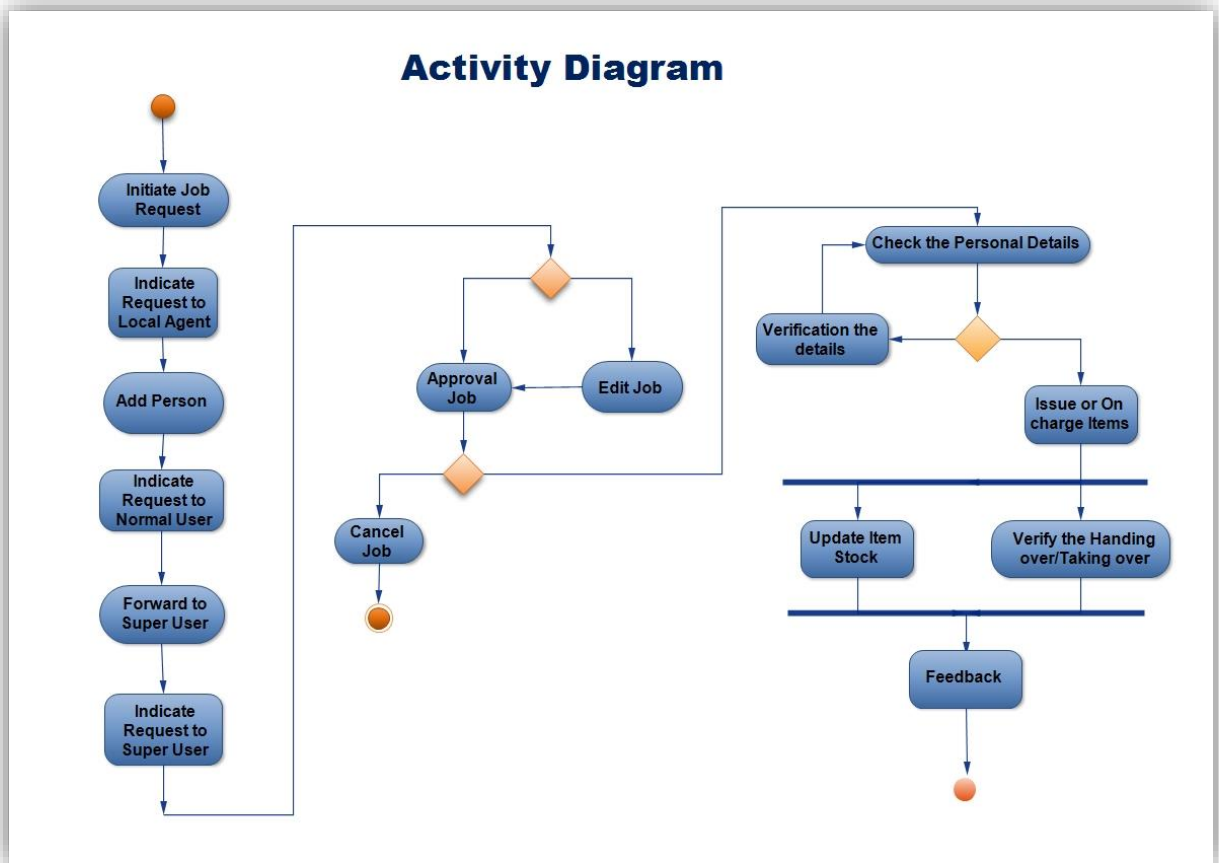


Figure 3.3: Main Activity Diagram

3.14 Sequence Diagrams

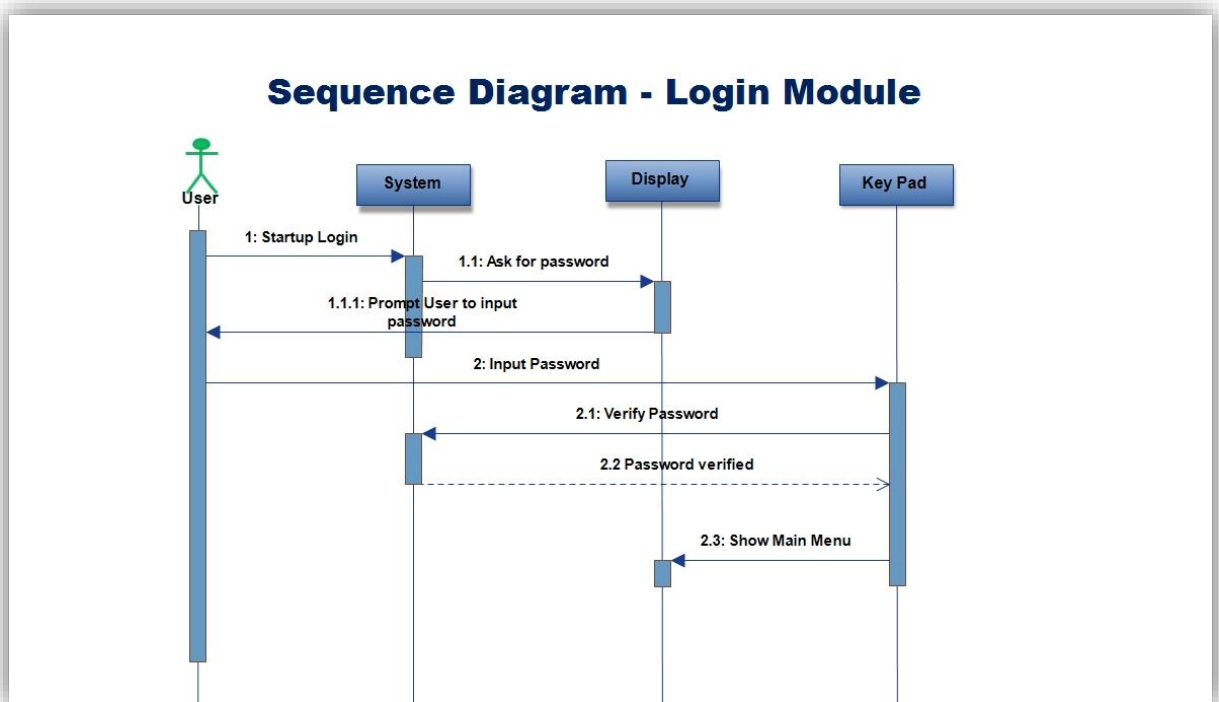


Figure 3.4: Login Sequence Diagram

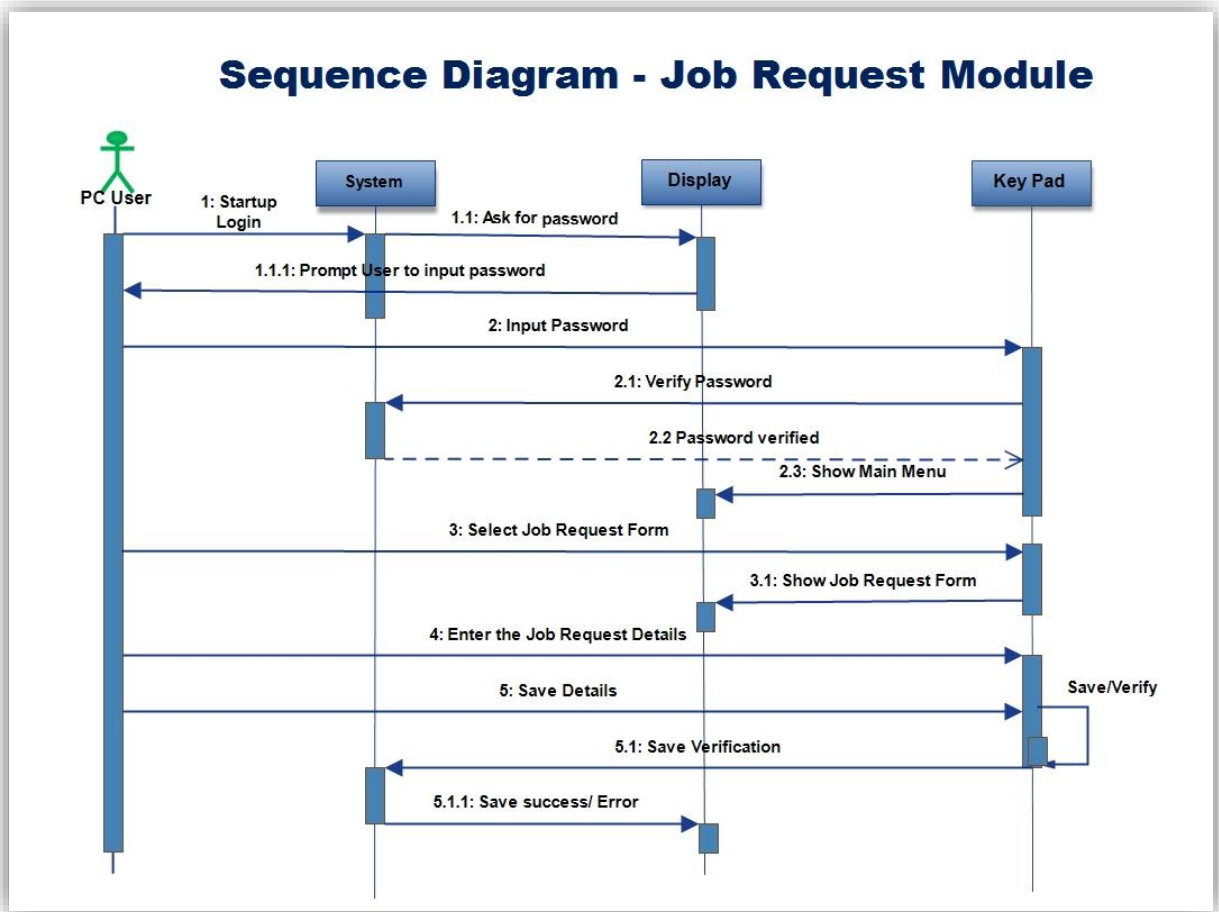


Figure 3.5: Job Request Sequence Diagram

3.15 User Interface Design

Possibility of user error occurrences is considerably high in the absence of a good user interface design. Because of this good user interface design is vital to the success of a system. Most of the application system users are interested in using graphical user interfaces because of the following advantages.

- ❖ Easy to learn and handle
- ❖ Facility of using multiple screen (Windows)
- ❖ Fast and immediate accessibility to anywhere on the screen

Therefore GUI is designed to allow users to execute operations they are authorized and many more. Furthermore, following characteristics are considered in interface designing process.

- ❖ **Windows** - Capability of using multiple windows simultaneously on the user's screen
- ❖ **Icons** - Icons represent different types of information.
- ❖ **Menus** - Commands are selected from a menu rather than typed in a command language.
- ❖ **Pointing** – A pointing device such as a mouse is used for selecting choices from a menu or indicating items of interest in a window.
- ❖ **Graphics** - Graphical elements can be mixed with text on the same display.

3.15.1 Design Layout

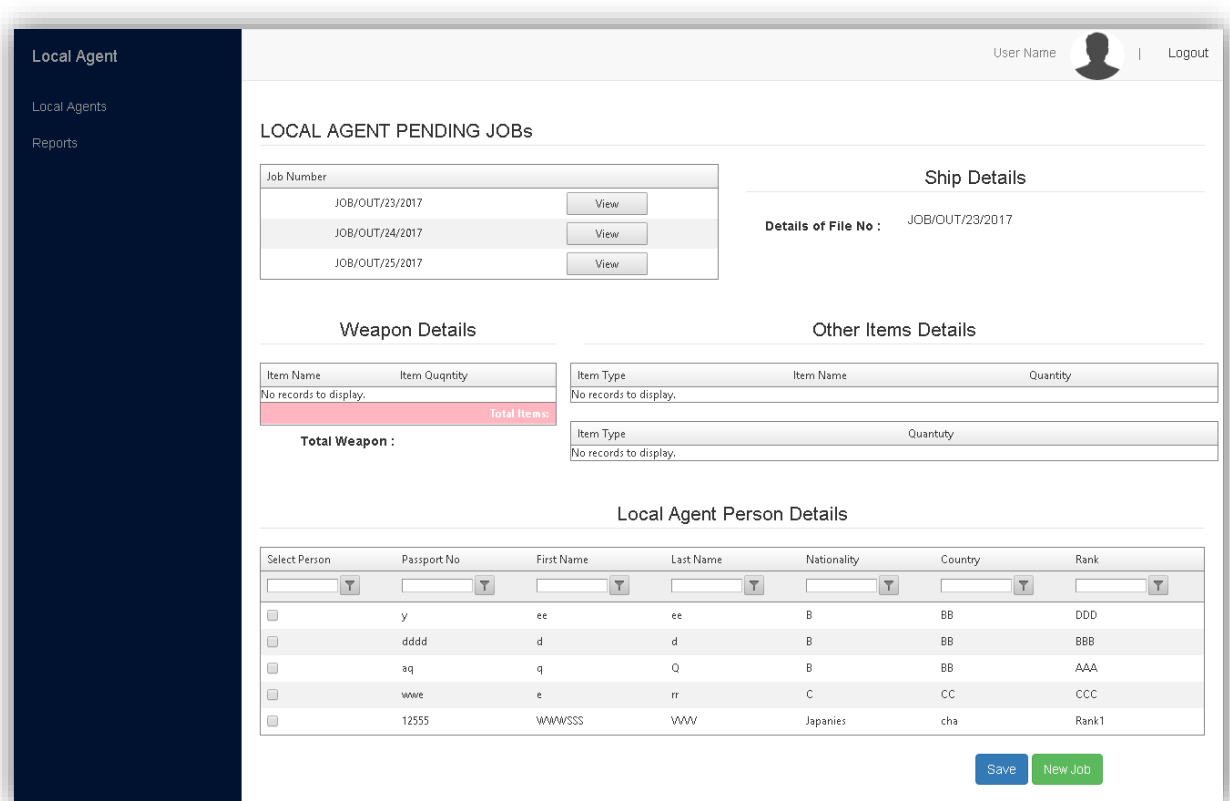


Figure 3.6: Local Agent Pending Job View

First Name	<input type="text"/>
Last Name	<input type="text"/>
NIC	<input type="text"/>
Passport Number	<input type="text"/>
Contact Number	<input type="text"/>
Email Address	<input type="text"/>
Image	<input type="text"/> <input type="button" value="Browse..."/>
Account Type	---SELECT--
Company Type	---SELECT--
[lblError]	
<input type="button" value="Add New"/> <input type="button" value="Save"/> <input type="button" value="Update"/> <input type="button" value="Delete"/>	

Figure 3.7: Input Personal Details

Authorized Person Pending Jobs												
<table border="1"> <tr> <td>Job Number</td> <td><input type="text"/></td> </tr> <tr> <td colspan="2" style="text-align: center;">No records to display.</td> </tr> </table>			Job Number	<input type="text"/>	No records to display.							
Job Number	<input type="text"/>											
No records to display.												
Details of File No :Label												
Estimate Date Arival	[lblEDA]	Estimate Time Arival	[lblETA]									
Location	[lblLocation]											
Ship Details												
IMO No	[lblIMO]											
Ship Name	[lblShipName]											
Last Port	[lblLastPort]	Next Port	[lblNextPort]									
Flag Status	[lblFlagStatus]											
Remarks	[lblRemarks]											
Item Details												
<table border="1"> <tr> <td>Item Name</td> <td>Item Quqntity</td> <td></td> </tr> <tr> <td colspan="2" style="background-color: #f0f0f0;"></td> <td style="text-align: right;">Total Items:</td> </tr> <tr> <td colspan="3" style="text-align: center;">No records to display.</td> </tr> </table>				Item Name	Item Quqntity				Total Items:	No records to display.		
Item Name	Item Quqntity											
		Total Items:										
No records to display.												
<table border="1"> <tr> <td>Item Type</td> <td>Item Name</td> <td>Quantity</td> </tr> </table>				Item Type	Item Name	Quantity						
Item Type	Item Name	Quantity										

Figure 3.8: Authorized Person Pending Jobs

CHAPTER 4: Implementation

4.1 Introduction

This chapter describes the activities that were carried out during the development phase of the Avant Garde Floating Armoury System .The designing part of the system leads to the implementation which comes out with the final result of the system designing. To implement the system design it is a must to handle the database to store the information which is entered to the system.

4.2 Technology Selection

C# (ASP.Net) programming language is used to implement the web application. Therefore Microsoft SQL Server 2012 and the Apache server are used in handling the database to store the data that should be retrieved later. The provided in the IIS 8 was used to connect the database with the project coding. IIS 8 was used to handle the implementation of the system which is basically carrying the designing part of the system. Coding was conducted under some general constraints and rules as it is very much essential to maintain same quality in every module to avoid malfunctions and defects.

4.3 Development Environment

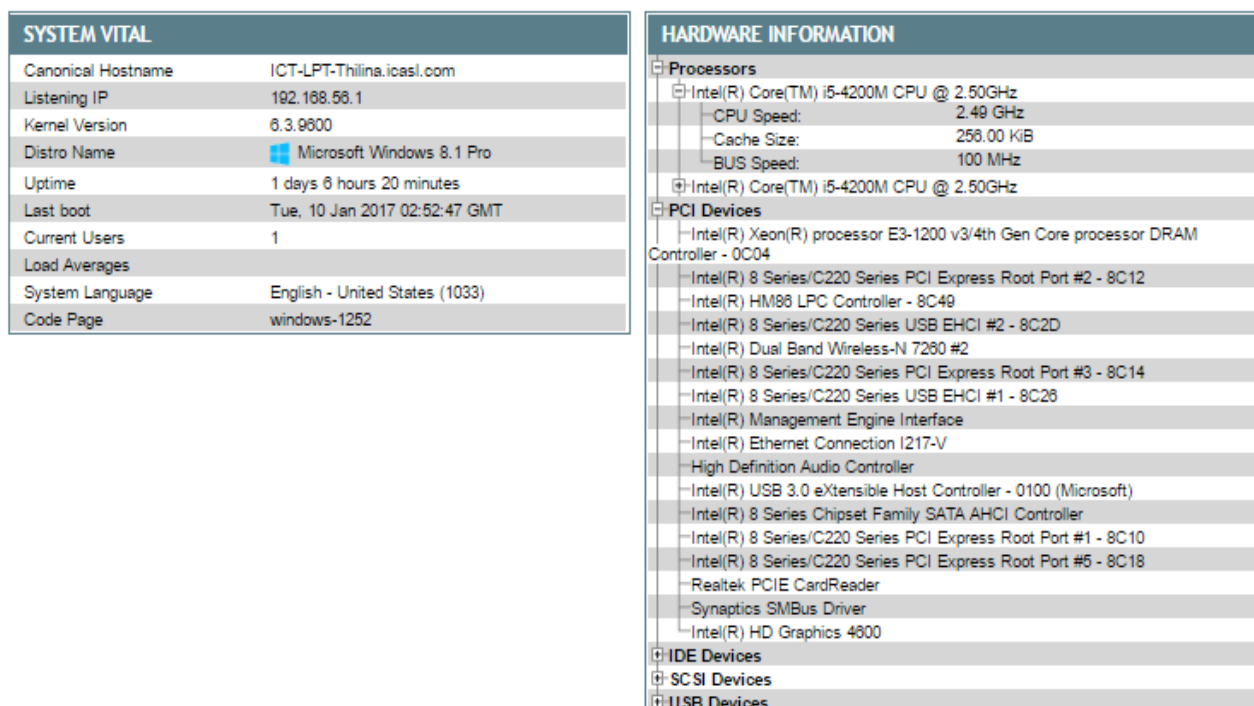


Figure 4.1: Hardware Details

Development		
Components		Version
Web Server	IIS	IIS 8
Development Language	ASP.Net C#	2012
Database	SQL Server	Server 2012
Framework	.net	4.0

Table 4.1: Software Configuration

4.4 Development IDEs

4.4.1 Visual Studio 2012

[10]Microsoft Visual Studio is an integrated development environment (IDE) from Microsoft. It is used to develop computer programs for Microsoft Windows, as well as web sites, web applications and web services. Visual Studio uses Microsoft software development platforms such as Windows API, Windows Forms, Windows Presentation Foundation, Windows Store and Microsoft Silverlight. It can produce both native code and managed code.

Visual Studio includes a code editor supporting IntelliSense (the code completion component) as well as code refactoring. The integrated debugger works both as a source-level debugger and a machine-level debugger. Other built-in tools include a forms designer for building GUI applications, web designer, class designer, and database schema designer. It accepts plug-ins that enhance the functionality at almost every level including adding support for source-control systems (like Subversion) and adding new toolsets like editors and visual designers for domain-specific languages or toolsets for other aspects of the software development lifecycle.

Visual Studio supports different programming languages and allows the code editor and debugger to support (to varying degrees) nearly any programming language, provided a language-specific service exists.

4.4.2 Visual Studio - For Code and Design

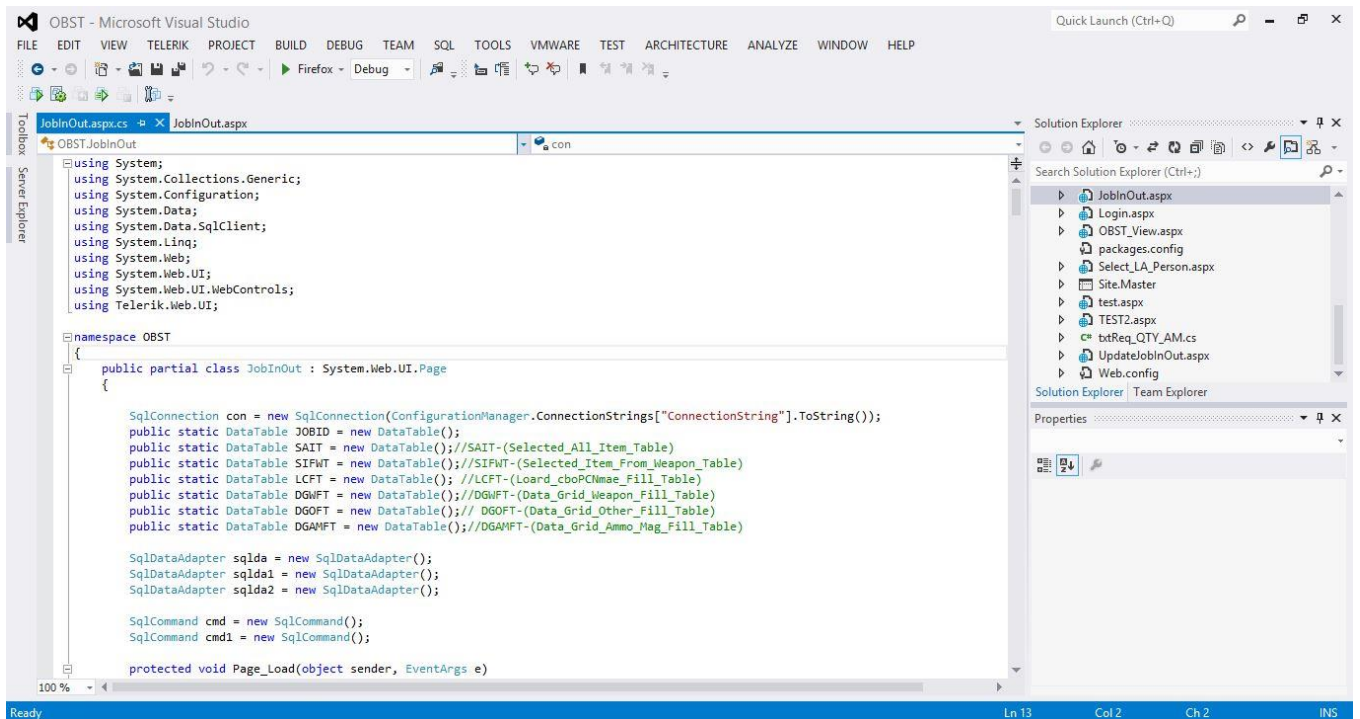


Figure 4.2: Visual Studio IDE

4.4.3 SQL Management Studio

SQL Server Management Studio (SSMS) is an integrated environment for accessing, configuring, managing, administering, and developing all components of SQL Server and Azure SQL Database. SSMS combines a broad group of graphical tools with a number of rich script editors to provide access to SQL Server to developers and administrators of all skill levels.

SSMS combines the features of Enterprise Manager, Query Analyzer, and Analysis Manager, included in previous releases of SQL Server, into a single environment. In addition, SSMS works with all components of SQL Server such as Reporting Services and Integration Services. Developers get a familiar experience, and database administrators get a single comprehensive utility that combines easy-to-use graphical tools with rich scripting capabilities.

4.4.4 SQL Management Studio

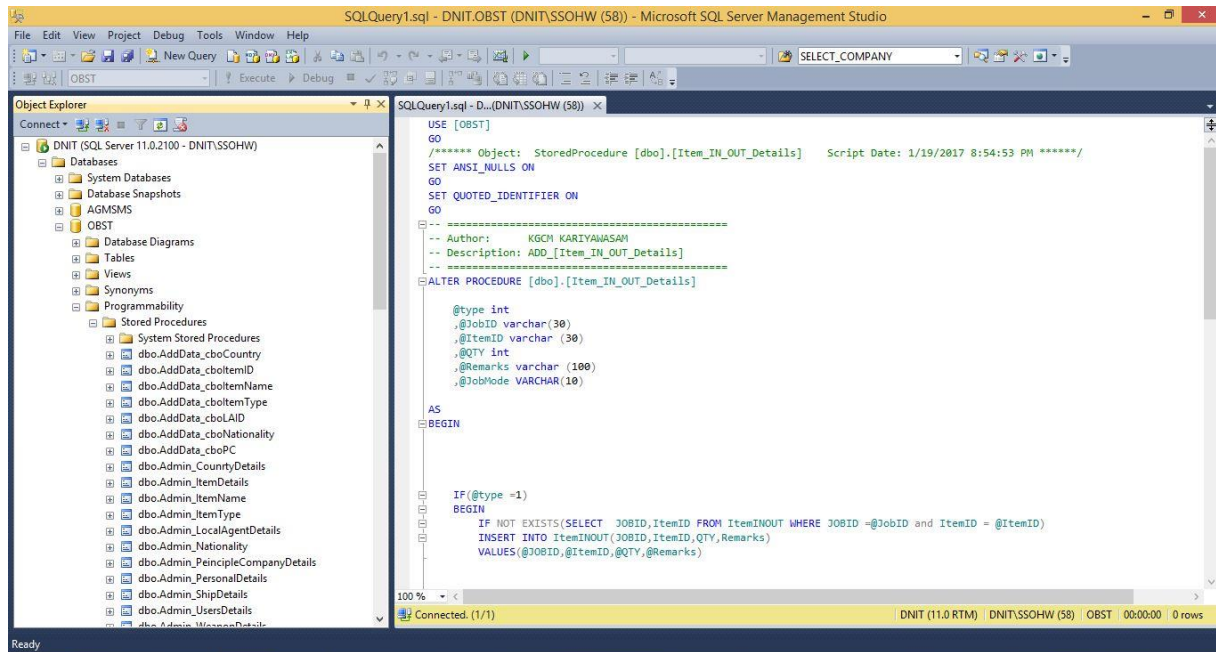


Figure 4.3: Code for MySQL for table creations, store procedures and functions creations

4.4.5 Bootstrap

Bootstrap is the most popular HML, CSS and JAVA Script framework for developing responsive, mobile first projects on the web.

4.5 Web Environment

Development		
(Windows 8 Business Edition)		
Components		Version
Web Server	IIS	8
Development Language	ASP.Net	2012
Database	SQL Server	2012
Framework	.net	4.0

Table 4.2: Development Server Configuration

4.6 Screenshots

4.6.1 Main Page – Authorized Person Job View

The screenshot displays the 'OBST Details' page for an authorized user. The page is divided into several sections:

- Pending Job Details:** A form with a 'Job Number' field containing 'JOB/OUT/30/2017' and a 'View' button. To the right, it says 'Details of File No : JOB/OUT/30/2017'.
- Weapon Details:** Two tables. The first table lists items with columns 'Item ID', 'Item Name', and 'Serial No'. The second table lists items with columns 'Item Name' and 'Item Quantity', showing a total of 3 weapons.
- Other Item Details:** Two tables. The first table lists items with columns 'Item ID', 'Item Type', 'Item Name', and 'Quantity'. The second table lists items with columns 'Item Type' and 'Quantity'.

At the bottom right, there are 'Save' and 'New Job' buttons. The top right corner shows 'User Name' and a 'Logout' button.

Item ID	Item Name	Serial No
ITEM/1/Wea	T56	5566722
ITEM/33/Wea	T56	23311444
ITEM/43/Wea	T81	433355

Item Name	Item Quantity
T56	2
T81	1
Total Weapons: 3	

Item ID	Item Type	Item Name	Quantity
ITEM/46/Amm	Ammo	7.62mm	8
ITEM/49/Amm	Ammo	7.81mm	8
ITEM/51/Mag	Mag	Mag_T56	8
ITEM/53/Mag	Mag	Mag_T81	8
ITEM/59/Oth	Other	Travel Puchers	7

Item Type	Quantity
Ammo	16
Mag	16
Other	7

Figure 4.4: Main Page – Admin User view

4.6.2 Main Page – Login Page

The screenshot shows the login page for the 'Avant Garde Floating Armoury Management System'. The page features a dark header with the system name and a logo. Below the header, there is a large image of various firearms and ammunition. To the right of the image is a 'Signin Here' form with fields for 'Username' and 'Password', and buttons for 'cancel' and 'Login'.

Welcome to Avant Garde Floating Armoury Management System

Signin Here

Username:

Password:

Figure 4.5: Login Form

4.7 Design Patterns

Consider with Asp and Bootstrap run the major role here. An object is a singleton if the application can include one and only one of object at the time. For example connection to the database through the database handler is exclusive.

```
<td class="auto-style53"><strong style="font-size: small">Weapon Selectuion</strong></td>
<td>
  <telerik:RadGrid ID="dgWeapon" runat="server" AutoGenerateColumns="False" CellSpacing="0" GridLines="None" Height="300px" Width=
  <ClientSettings>
    <Scrolling AllowScroll="True" UseStaticHeaders="True" />
  </ClientSettings>
  <MasterTableView>
    <CommandItemSettings ExportToPdfText="Export to PDF" />
    <RowIndicatorColumn FilterControlAltText="Filter RowIndicator column" Visible="True">
      <HeaderStyle Width="20px" />
    </RowIndicatorColumn>
    <ExpandCollapseColumn FilterControlAltText="Filter ExpandColumn column" Visible="True">
      <HeaderStyle Width="20px" />
    </ExpandCollapseColumn>
    <Columns>
      <telerik:GridTemplateColumn FilterControlAltText="Filter CheckBox column" HeaderText="Select Item" UniqueName="Check
      <ItemTemplate>
        <asp:CheckBox ID="SelectWeapon" runat="server" AutoPostBack="True" OnCheckedChanged="SelectWeapon_CheckedCha
        </ItemTemplate>
      </telerik:GridTemplateColumn>
      <telerik:GridBoundColumn DataField="ItemID" FilterControlAltText="Filter ItemID column" HeaderText="Item ID" UniqueN
      </telerik:GridBoundColumn>
      <telerik:GridBoundColumn DataField="ItemType" FilterControlAltText="Filter ItemType column" HeaderText="Item Type" U
      </telerik:GridBoundColumn>
      <telerik:GridBoundColumn DataField="ItemName" FilterControlAltText="Filter ItemName column" HeaderText="Item Name" U
      </telerik:GridBoundColumn>
      <telerik:GridBoundColumn DataField="SerialNumber" FilterControlAltText="Filter SerialNo column" HeaderText="Serial N
      </telerik:GridBoundColumn>
      <telerik:GridBoundColumn DataField="QTY" FilterControlAltText="Filter QTY column" HeaderText="Quantity" UniqueName="
      </telerik:GridBoundColumn>
    </Columns>
    <EditFormSettings>
      <EditColumn FilterControlAltText="Filter EditCommandColumn column">
```

Figure 4.6: Connection Method

```
<%@ Page Title="" Language="C#" MasterPageFile="~/Site.Master" AutoEventWireup="true" CodeBe
<%@ Register assembly="Telerik.Web.UI" namespace="Telerik.Web.UI" tagprefix="telerik" %>
<asp:Content ID="Content1" ContentPlaceHolderID="HeadContent" runat="server">
  <style type="text/css">

    .auto-style17 {
        height: 24px;
    }
    .auto-style19 {
        height: 19px;
    }
    .auto-style20 {
        height: 20px;
    }
    .auto-style22 {
        font-size: small;
    }
    .auto-style23 {
        height: 9px;
        width: 111px;
    }
    .auto-style24 {
        height: 27px;
        width: 111px;
    }
    .auto-style31 {
        height: 9px;
        width: 95px;
    }
    .auto-style36
    {
        height: 19px;
        width: 95px;
    }
  </style>
</asp:Content>
```

Figure 4.7: Data Grid Design Code

4.8 Specific Code Segment

Instated of direct sql query in data layer, it has been used Store procedures to write and read from the database.

```
con.Open();

cmd = new SqlCommand("[Select_Company_Items_Weapon]", con);
cmd.CommandType = CommandType.StoredProcedure;
cmd.Parameters.Add("@PCID", SqlDbType.VarChar).Value = cboPCName.Text;
cmd.ExecuteNonQuery();
sqlda.SelectCommand = cmd;
sqlda.Fill(DGWFT);
dgWeapon.DataSource = DGWFT;
dgWeapon.DataBind();
con.Close();
```

Figure 4.8: Stored Procedure Code Segment

CHAPTER 5: User Evaluation and Testing

5.1 Introduction

“Evaluation is a systematic determination of a subject's merit, worth and significance, using criteria governed by a set of standards. It can assist an organization, program, project or any other intervention or initiative to assess any aim, realisable concept/proposal, or any alternative, to help in decision-making; or to ascertain the degree of achievement or value in regard to the aim and objectives and results of any such action that has been completed. The primary purpose of evaluation, in addition to gaining insight into prior or existing initiatives, is to enable reflection and assist in the identification of future change.

Evaluation is often used to characterize and appraise subjects of interest in a wide range of human enterprises, including the arts, criminal justice, foundations, organizations, government, health care, and other human services.”

5.2 Evaluation Techniques

There were various types of evaluation techniques used to evaluate the software. Some of the main methods listed below,

- ❖ Testing.
- ❖ Focus groups.
- ❖ Inspection.
- ❖ User feedbacks.

5.3 Testing

A proper system testing should be carried out to evaluate the system and it helps to see and understand its compatibility as a solution for the problem domain. Software testing is most often done and at this phases working with executable system components. The test results developer to identify and minimize errors (software bugs) in the system during the development itself. Using the Iterative RUP software development life cycle made it possible to test the system.

Quality and the reliability of the system is another key factor in making the web application a success. Since users do not like to access to the web applications which causes invalid or inaccurate results. Few methods of testing were applied throughout the duration of this project to ensure the quality of the web application and to detect the introduction of regressions in the source code during the development process.

Testing was another most important part of the project. Some Testing processes were carried out throughout the project. Testing was based on main two categories,

5.3.1 Validation and Verification.

Validation - Check whether the system meets its customer requirements.

Verification - Check whether system meets its all functional requirements.

Testing was improved the system's quality. This was a critical phase of the Software life cycle. Therefore testing must be done throughout the project life cycle (Pressman, 2001)

5.3.2 Test Plan

Test plan is a document containing the detailed systematic approach to test a system. It basically consists of the details of how the system will be in final workflow. To get a proper outcome from the testing procedure a test plan is created before the implementation of the system covering all types of phases. Entire testing process is guided by the Test plan and also test cases are designed to execute that feature with possible inputs and outputs.

It has logically three major components,

- ❖ Database Testing.
- ❖ Software Testing.
 - Functional Testing
 - Compatibility Testing
 - Validity Testing

I planned to test as indicated following table considering above mentioned facts.

ID	Description of Test
	Database Testing
1	Whether data consistency is existed?
2	Whether data integrity and no error are in the data?
3	Whether database queries are executed correctly?
4	Whether data is retrieved correctly?
5	Whether data is updated correctly?
	Function Testing
1	Whether outgoing links from all the pages from the specific domain are tested?
2	Whether all internal links are tested?
3	Whether links are jumping on the same pages?
4	Whether there are any orphan pages?
5	Whether any broken links are in all above mentioned links?

Validity Testing	
1	Whether all validations on each field are checked?
2	Whether default values of the field are checked?
3	Whether invalid inputs to the fields in the forms are checked?
Compatibility Testing	
1	Whether web sites are easy to use?
2	Whether instructions are provided clearly, correct meaning and satisfy the purpose?
3	Whether main menu are provided in each pages and consistent?
4	Content Testing
6	Whether dark color and unsuitable fonts are used?
7	Whether all the anchor links are worked properly?
8	Whether images are placed properly with proper size?
9	Browser Compatibility. Whether web application is tested on internet explorer, Firefox, Google chrome, Opera, Safari browsers with different versions?

Table 5.1: Documentation of Test Planning

5.3.3 Test Case

Test case is an outline which tests a feature or set of features. It provides developer a systematic approach for testing. Therefore it will ensure the completeness of test and provide the highest likelihood for uncovering errors in the software.

Test case consist of

- ❖ Test Case ID
- ❖ Module Name
- ❖ Objective
- ❖ Expected Result
- ❖ Actual Result

The test cases were made to fulfill the above mentioned test plan. In this system relevant test cases are attached herewith as Appendix E.

Otherwise Following testing types were used to success to test plan in this system.

- ❖ Unit Testing
 - White-box Testing
- ❖ System Testing
- ❖ Regression Testing
- ❖ Acceptance Testing
 - Black-box Testing

5.3.4 Unit Testing

Unit testing was done for individual units. In computer programming, unit testing is a software testing method by which individual units of source code, sets of one or more computer program modules together with associated control data, usage procedures, and operating procedures, are tested to determine whether they are fit for use. Unit tests are short code (fragment the code) created by programmers or occasionally by white box testers during the development process.

Unit testing was done while implementing the project as mentioned above. First selected method or function as part of the code. Using break point run the program then I debugged the selected unit. Then I checked result whether it is correct or not.

E.g.: Login module was tested with three types of cases.

- Username and password was provided and it logged in to the system.
- When the username was entered correctly and password was wrong, it failed to log in and showed an error message.
- When both of these fields were provided incorrectly, it failed to log in to the system.

5.3.4.1 White-box Testing

This is done to test the systems internal structure. White-box testing is a method of testing software that tests internal structures or workings of an application, as opposed to its functionality. In white-box testing an internal perspective of the system, as well as programming skills, are used to design test cases. The tester chooses inputs to exercise paths through the code and determine the appropriate outputs.

5.3.5 System Testing

System testing is carried out at the completion of the integration testing. The purpose of system testing is to prove that the software meets the agreed user requirements and works in the target environment. System testing covers both functional and non-functional requirements. I evaluated the whole system covering all activities then check the result whether correct or not comparing with identified functional and non-functional requirements.

E.g.: By logging into the system and routing through different processes the whole system was tested.

5.3.6 Regression Testing

This is done after changes are made to a system application. This test is to prove that the change has been made correctly and that change has not introduced any new errors. As indicated above, I met different type of errors. Then I got solution following under mentioned steps.

- ❖ First defects were fixed.
- ❖ The defect mentioned in the testing has been created, reviewed, and accepted
- ❖ If defect has been repeatable, it was properly documented. Again do the step one until correct the defect.

5.3.7 Acceptance Testing

Customers are responsible for verifying the correctness of the acceptance tests. Formal testing with respect to user needs, requirements, and business processes conducted to determine whether or not a system satisfies the acceptance criteria and to enable the user, customers or other authorized entity to determine whether or not to accept the system. Usually, Black Box Testing method is used in Acceptance Testing.

I have done acceptance testing using questionnaire. It was engaged main type of four users (Super user, Operator, Principle Company user and Local Agent user) in this system. The result sheets of questionnaire are attached herewith as Appendix E.

5.3.7.1 Black-box Testing

This type of testing is done without testing its internal structure. Testing is done only to see whether it meets desired outputs.

Black Box Testing, also known as Behavioral Testing, is a software testing method in which the internal structure/ design/ implementation of the item being tested is not known to the tester. These tests can be functional or non-functional, though usually functional.

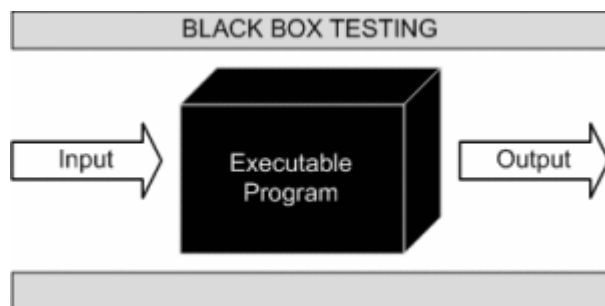


Figure 5.1: Black Box Testing Method

5.3.8 Test Users

For the success of the testing it is important to select test users. At the beginning IT branch sailors involve in testing to find out system is user friendly and the language is useful to them. Principle Companies and Local agents were selected who had good IT knowledge and tested the admin components discussed the results with the manager. Other management modules were also tested because top level management couldn't involve in this process.

5.3.9 Test Automation Tools

Automated software testing is becoming more and more important for many software projects in order to automatically verify key functionalities, test for regressions and help teams run a large number of tests in a short period of time. Selenium is an open source tool that allows performing functional testing for both web application and desktop applications. With help of selenium it's easy to automate browser events and record and replay the script. Working with selenium was very easy. The example result is indicated as figure 18.

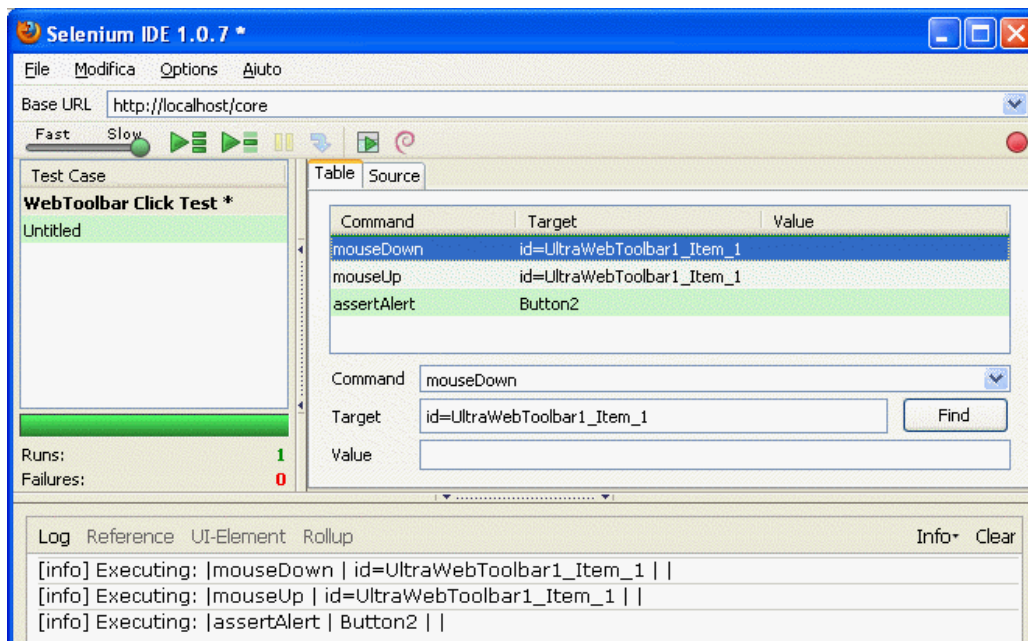


Figure 5.2: Automation Tool Selenium IDE

5.3.10 Testing Framework

A testing framework or more specifically a testing automation framework is an execution environment for automated tests. It is the overall system in which the tests will be automated. It is defined as the set of assumptions, concepts, and practices that constitute a work platform or support for automated testing.

5.4 Focus groups.

A focus group is a structured discussion with pre-selected individuals intended to collect information or gauge opinion on a specific issue or idea. The group is led by an impartial facilitator in a non-threatening environment. In community development, focus groups provide a deliberative venue for learning, trust-building, creative problem solving, and ultimately serve as a way for citizens to influence strategic community planning and development. Software Developing Team of Sri Lanka Navy was my main focus group. They share their experience and give their valuable advice to make a good system.

5.5 User feedbacks.

This is also an important part of the evaluation. It can take the form of freeform text comments and also it is about what user feels about the system. After making a prototype they gave the feedback. Otherwise type of users involves fulltime to the Design Process and Coding process.

5.6 Inspection.

“Inspection in software engineering refers to peer review of any work product by trained individuals who look for defects using a well-defined process. An inspection might also be referred to as a Fagan inspection after Michael Fagan, the creator of a very popular software inspection process.” (Software Inspection)

CHAPTER 6: Conclusion and Future Work

The project was successfully implemented in the Sri Lanka Navy. It was a good experience to work with such a system and the staff as it was challenging in many ways. As the system is helping the higher authority to have controls over activities and budget allocation they were really happy about the system and want further additions to be done to the system. Requirement gathering was not that easy as they had busy schedules as well they were scared of the technology as they were used to all manual work for a long time especially with the senior staff members.

Used technology and methodology was helpful to overcome all the difficulties and it was a good choice. As there are lots of rules and regulations in the government set up it was bit hard getting the work done.

6.1 Future Improvements

The system encountered some additional functionality to enhance the more security of this process. The following are the future enhancements consider.

- Introduce the Barcode system to identify the items.
- Implement the Access control system using finger print scanner machine.
- Introduce automated system for manual payment process and account creating process

6.2 Lesson Learnt

The knowledge and experience gained throughout the course of the project was really good experience. It enabled me to apply software development techniques and processes. This project provided valuable experience in relating how we used software development in a real world scenario.

This project enabled me to identify new software development technologies such as Ajax, crystal reports and C# (ASP.net). This motivated me to research and learns new software development theories and frameworks like bootstrap being used globally and gain exposure to new web development technologies.

Also, it was learnt that properly documenting the user requirements at the initial stage and verifying while developing enables us to have a good rapport with the user and allows identifying new requirements.

This project enabled me to enhance my software development skills and gain valuable professional experience within the industry.

6.3 Achievement of objectives

- **Expecting to align manual operations and past and easy records maintenance.**
By implementing the workflow methodology to the system, most of manual operations have been aligned and responsibilities are being spread according to that.
- **Expanding the client base and client satisfaction in providing flexible services**
Client satisfactions are being increased by online Job Creating notifications, providing quick and flexible service to their needs
- **Manage Resources and avoid unnecessary stock items delay**
Real time stock monitoring and controlling facility (eg: Stock Reorder Level) have been given through the system
- **Real time reporting**
Report generating facilities for Past Service records, Invoices and Items which are purchased from the Service have been given specific Permission Level.
- **Increase the security of the weapon dealing**
System is going proper presider preventing loos point of misplace of the items

Appendix A: Design

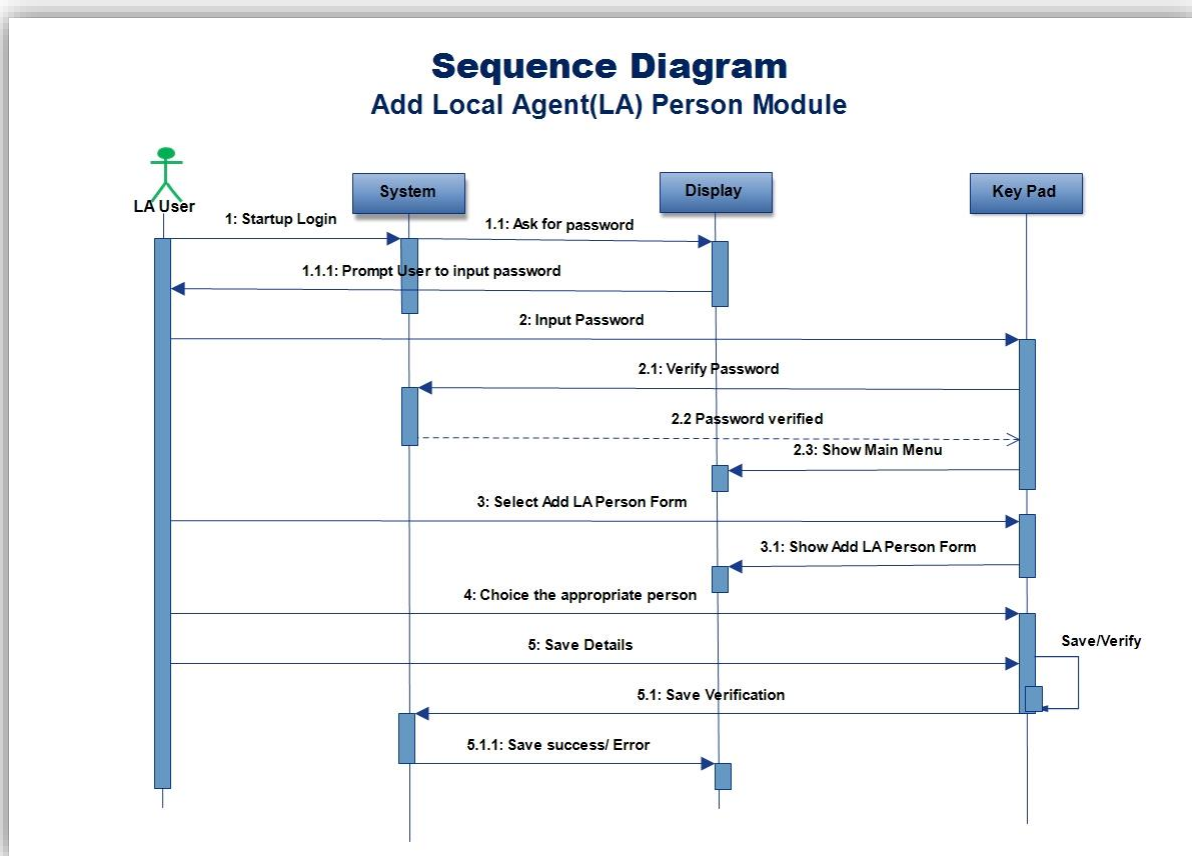


Figure A1: Local Agent Sequence Diagram

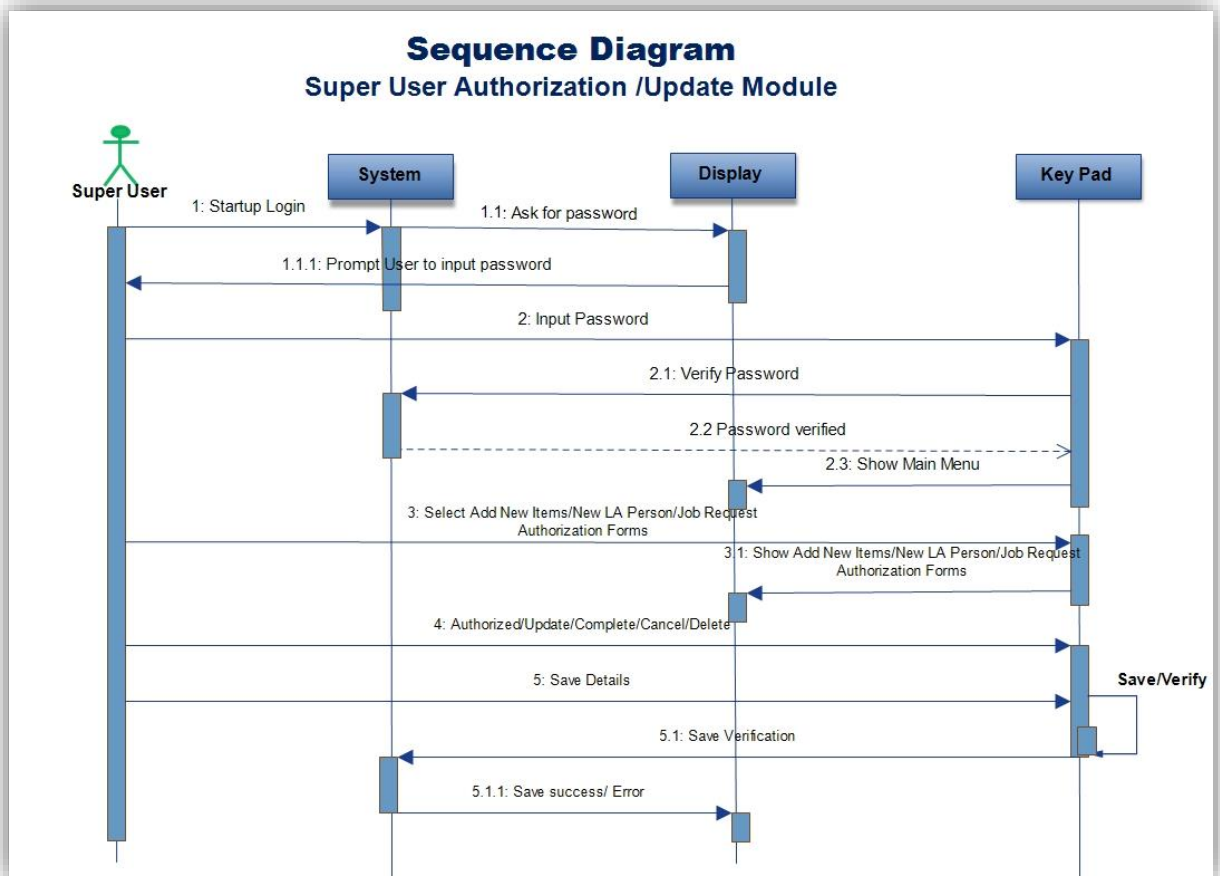


Figure A2: Super User Sequence Diagram

Appendix B: Design Layouts

Dashboard | User Name | Logout

Job Manager | Reports

Job Handling Form

Job Mode --SELECT--

Estimate Date Arival

Estimate Time Arival

Location

Ship Details

IMO No

Ship Name

Last Port

Next Port

Flag Status

Remarks

Principle Company

Weapon Selection

Select Item	Item ID	Item Type	Item Name	Serial Number	Quantity
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
No records to display.					

Enter Ammo & Mag Quantity

Weapon Name	ItemType	Item Name	Total Qty	Reserved Qty	Available Qty	Requested Qty
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
No records to display.						

Other Item Selection

Select Item	Item ID	Item Name	Total Quqnity	Reserved Quantity	Available Quantity	Requested Quantity
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
No records to display.						

View All Selection

Item ID	Item Type	Item Name	Serial No	Requested Quantity
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
No records to display.				

Figure B1: Job Requesting Form

Item Details

Item Name	Item Quqntity
Total Items:	
No records to display.	

Item Type	Item Name	Quantity
No records to display.		

Item Type	Quantity
No records to display.	

[More Details](#)

Item ID	Item Type	Item Name	Item Quqntity
No records to display.			

[Authorized](#)
[New Job](#)
[Update](#)
[Cancel](#)
[Delete](#)

Authorized Person Pending Jobs

Item Details

Item Name	Item Quqntity
Total Items:	
No records to display.	

Item Type	Item Name	Quantity
No records to display.		

Item Type	Quantity
No records to display.	

[More Details](#)

Item ID	Item Type	Item Name	Item Quqntity
No records to display.			

[Authorized](#)
[New Job](#)
[Update](#)
[Cancel](#)
[Delete](#)

Authorized Person Pending Jobs

Figure B2: Item Details Form

Register
Logout
Home
Administration
Reports

Pending Job Details

Job Number
No records to display.

Details of File No :Label

Weapon Details

Item ID	Item Name	Serial No
No records to display.		

Item Name	Item Quantity
Total Weapons:	
No records to display.	

Other Item Details

Item ID	Item Type	Item Name	Quantity
No records to display.			

Figure B3: Pending Job Details

Appendix C. Test Cases

5.4.3 Login Module

Test Number	Test Description	Steps to test	Expected results	Actual Result
01	Validate the account status.	Enter the correct user name and pass word	Display Home page	Display Home page
02	Validate user input details.	Enter Invalid user name and Pass word	Display error message	Display error message
03	Validate user input details.	Empty User name and pass word	Display message	Display message
05	Validate user input details.	Enter only a user name	Display error message	Display error message
06	Validate user input details.	Enter only a pass word	Display error message	Display error message
07	Validate user input details.	Enter by pressing Enter Key	Login to the home page	Login to the home page

Table C1: Login module

5.4.4 Add User Module

Test Number	Test Description	Steps to test	Expected results	Actual Result
01	Save the employee details	Without Filling all required fields	Error Message: "Enter"	Error Message
02	Save the employee details	Filling all required fields	Save successfully with message.	Save successfully
03	Save the employee details	Fill the age field using character value	Error message	Error message
05	Save the employee	Enter numeric & length	Save successfully	Save successfully
06	Delete employee details.	Enter the correct User Name and click the search button. Then display all the details according to the User Name number. Press the delete button.	Display prompt message and when press yes display the message box when press no display the error message.	yes
07	Update employee details.	Enter the correct NIC number and click the search button. Then display all the details according to the NIC number. Update the fields except NIC.	Display prompt message and when pressed yes display the message box when press no display the error message	yes

Table C2: Login module

5.4.5 Searching

Test Number	Test Description	Steps to test	Expected results	Actual Result
01	Report search	Select province, district, zone, office, service and personal according to that select the radio button for the category. Then click the search button. According to that display the results. In the result table provide search button for the category. Then type the name or number to find the details what you want.	Display the results according to category.	yes
02	Job attended list	Type the first number in the search area. According to that display all the numbers of that system provides.	Display the results in the area	yes
03	Weapon type Wise information search	Enter the correct building number and click the search button. If there were results according to number then display all the details according to the building number.	When provided with correct number, display the results or display the error message.	yes
04	Search users	Enter the correct user id and then select the option pending users, presently registered users, and Bann users. According to the type search the category.	When searching Correct users are displayed in the results if not display error message.	yes
05	Weapon information search	Provide vehicle number in the searching area. Then click the search button. If there is results according to the number display it	When search correct vehicle number display the results according to the number. If not display the error message.	yes

Table C3: Login module

5.4.6 Report generation module

Test Number	Test Description	Steps to test	Expected results	Actual Result
01	Total item report.	Select from and to dates. Then click the search button. According to the details click the print button. Then display the print menu.	Display details according to the select dates. If not display no results.	yes
02	Weapon scheduling report	Select the zone and the district. Then click the radio button according to category zone or district. Then select the date from and to.	When entering correct options display the details according to it and count the total records of it.	yes
03	Weapon information report	First Select the options such as Item Type, Principle company wise and personal according to that select the radio button for the category. Then click the search button. According to that display the results. In the result table provide search button for the category. Then type the name or number to find the details what you want. If you wants report pdf file click the print button.	Display the results according to the selection, display total records and Item type wise. If input incorrect option no results displayed in the system.	yes
04	Requests acceptance/not acceptance report	Select the option show acceptance request, show no acceptance request and click the search button.	Display results according to the selected option. And have the filtering option on it. The names should be changed according to category.	yes
05	Personal report	First Select the options such as Principle Company service and personal according to that select the radio button for the category. Then click the search button. According to that display the results. In the result table provide search button for the category. Then type the name or number to find the details what you want. If you wants	Display the results according to the selected option.	yes

		report pdf file click the print button.		
06	Users report	First Select the options such as personal according to that select the radio button for the category. Then click the search button. According to that display the results. In the result table provide search button for the category. Then type the name or number to find the details what you want. If you wants report pdf file click the print button.	Display the results according to the selected option.	yes

Table C4: Report generation module

Appendix D: User Manual

USER MANUAL

AVANT GARDE FLOATING ARMOURY SYSTEM

1. Introduction

Sri Lanka Navy's Weapon Management System for Avant Garde Floating Armoury contains a list of requests to be filled and then prompts users to pick the necessary armoury items, which keeping at the Sri Lanka Navy floating with safety and high security protecting government policies (National Security). The system provides them with easy access and shaping information, store management may be used to automate a service fulfillment process and also manage in and outward items of armoury. Automation is the replacement of human workers by technology.

This application takes care of all requests reducing cost for documentation, transportation while improving efficiency and security of the service. It significantly improves service quality, optimizes flow of items and shortens routes within user and Floating Armoury. It also improves visibility and decision making providing efficient execution of task using this fast and reliable computerized method.

There are four main actors in this system as indicated follows. The document which User Manual is prepared to increase their easiness with proper guidance.

- ❖ **System Administrator (Super User)**
- ❖ **Principle Company User**
- ❖ **Local Agent User**
- ❖ **Operator (Office User)**

2. **Login**

When browse the agfa.navy.lk/ , pop up following Figure 1 page. Then all users can login to their main pages using their password. There are separate main pages respectively user type.

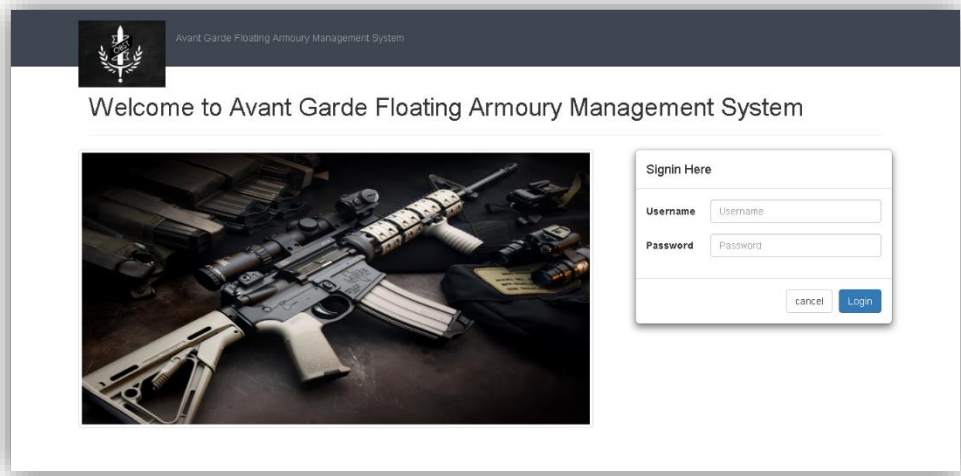


Figure 1: Login Form

3. Home page of Super User

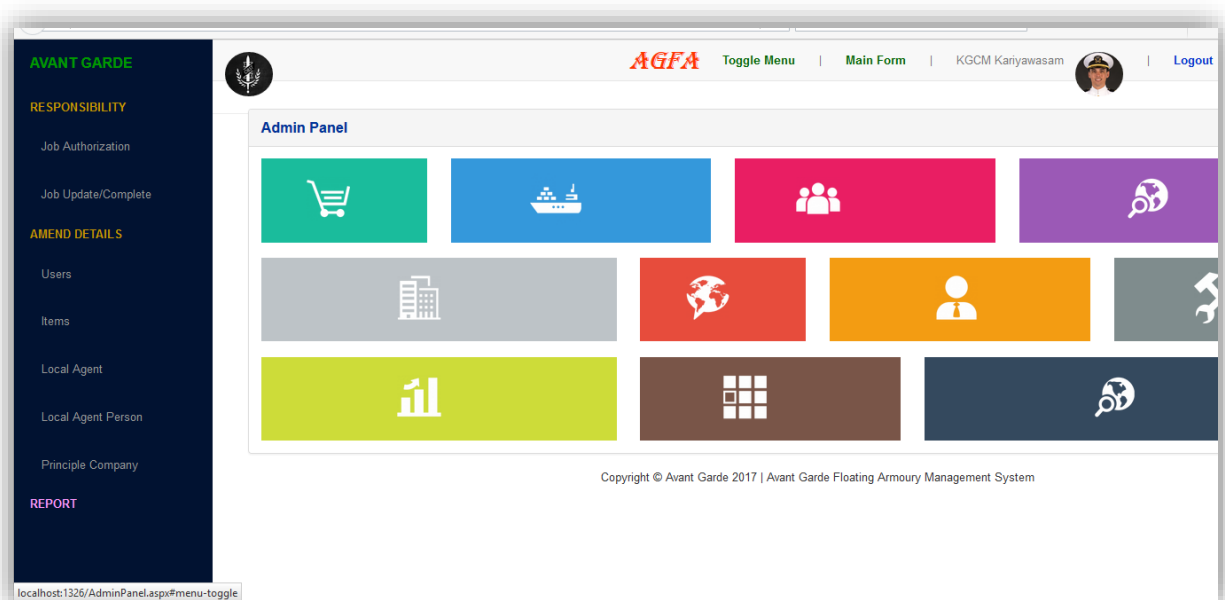


Figure 2: Main Page of Super User

After enter the system you can visible following links from the left hand Conner

- ❖ Responsibility
 - Job Authorization
 - Job Update/Complete
- ❖ Amend Details
 - Users
 - Items
 - Local Agent

- Local Agent Person
 - Principle Company
- ❖ Reports

a. Job Authorization

When you go to the Job Authorization, you can authorize, update, cancel or delete the job. The relevant page is indicated as figure 3.

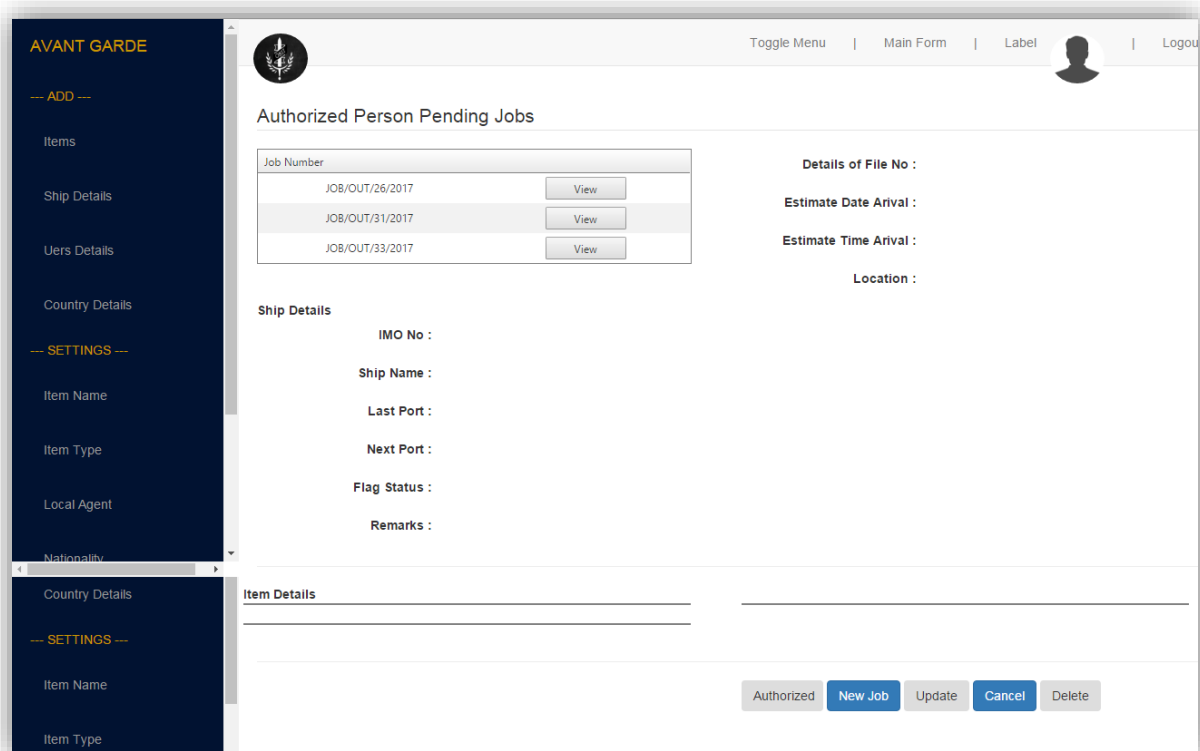


Figure 3: Job Authorized/ Update Page

(1) To authorize a job or jobs, select the check box/boxes (Number 1) then press the “**Authorized**” button (Number 2) as indicate in Figure 4.

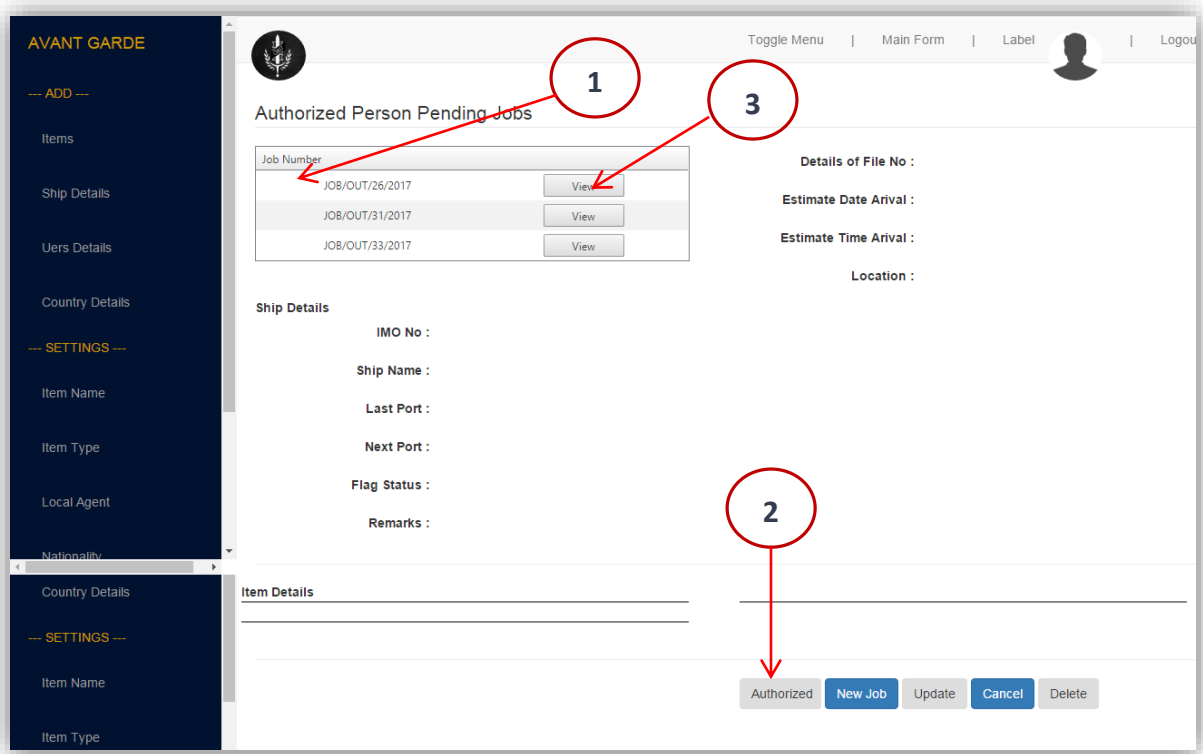


Figure 4: Job Authorized/ Update Page

(2) If need to check the details of relevant job before authorized, press the “**View**” button (Number 3) as indicate Figure 4. More details can be seen, after press “**More Details**” button (Number 1 in Figure 5).

(3) If need to edit the job, press the “**Update**” button (Number 2 in Figure 5). Update page is viewed in Figure 6. There are four Check boxes naming Basic Details, Weapon Details, Other Item Details and Personal Details. If you want to amend Basic details, select the Basic Details Check Box (Number 1 in Figure 6). After editing Details use the “**Basic Details Update**” button (Number 2 in Figure 6).

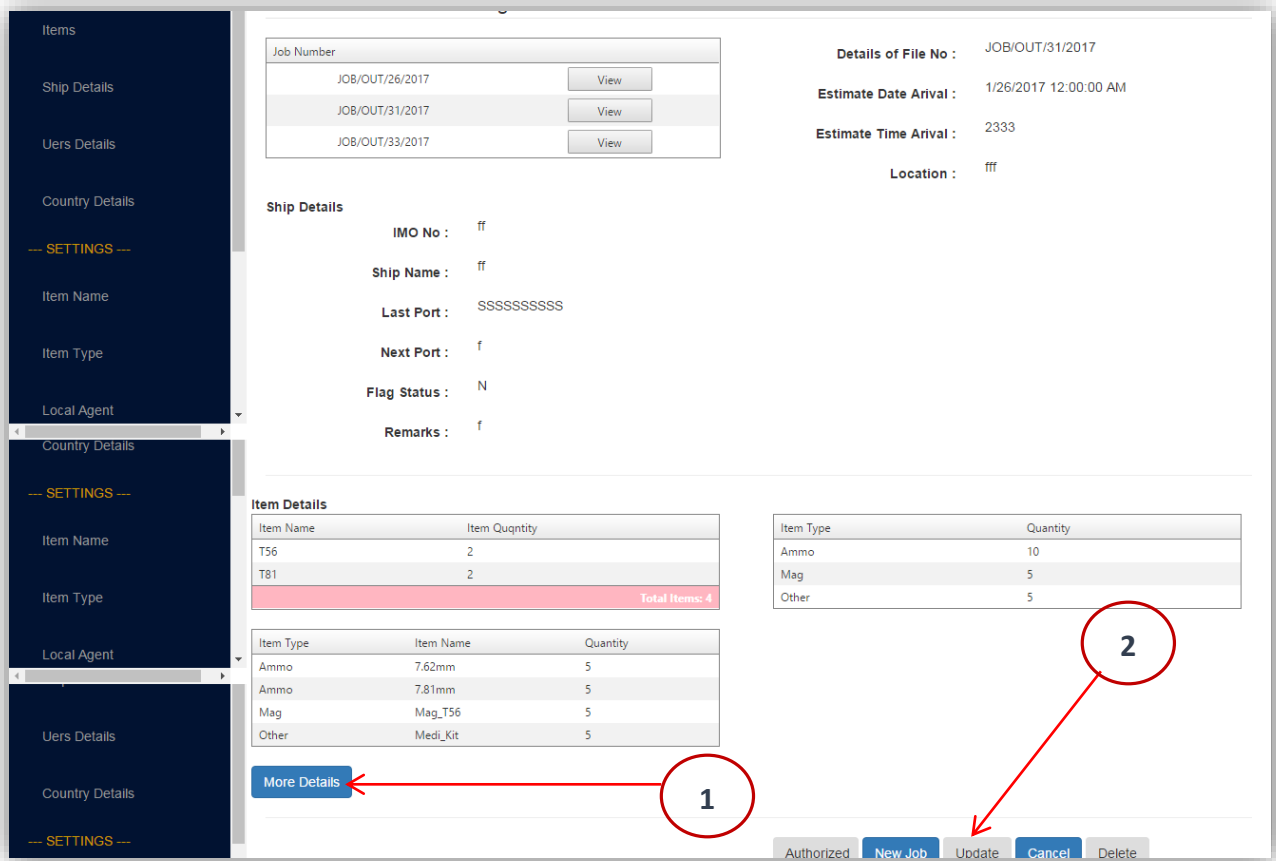


Figure 5: Job Authorized/ Update Page

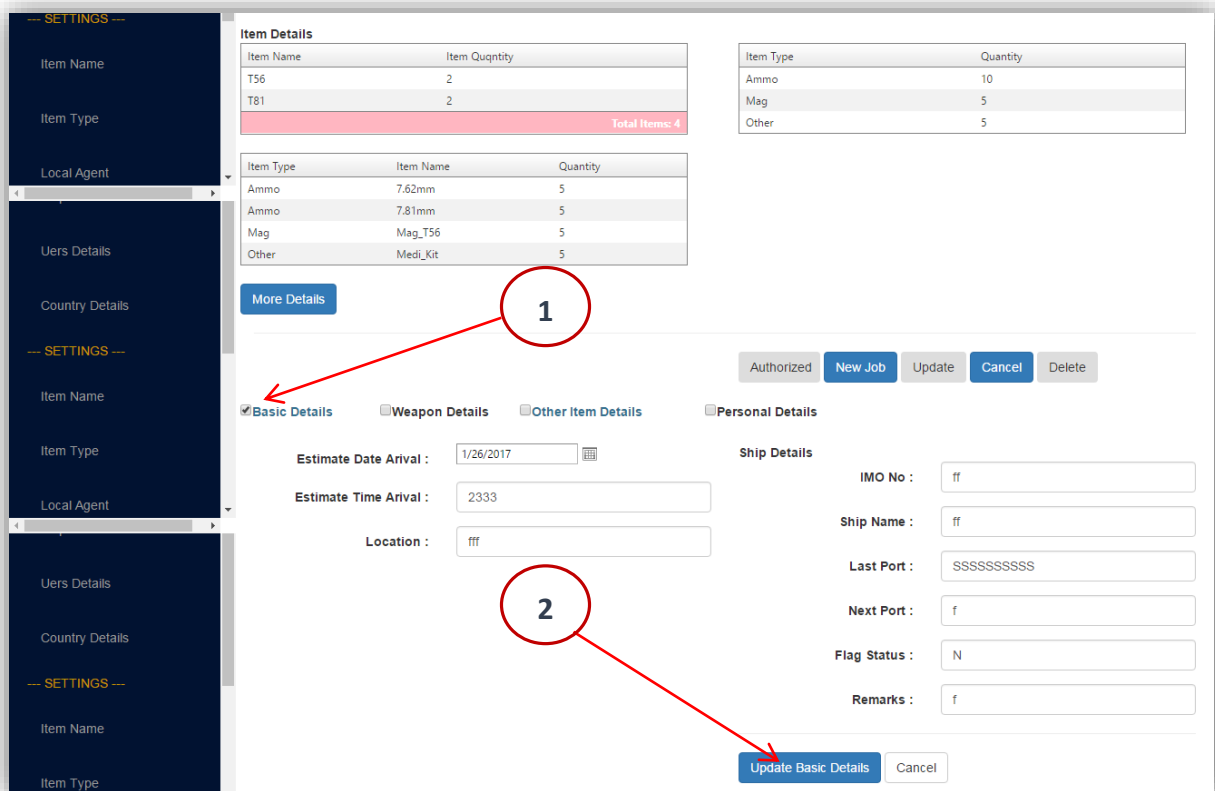


Figure 6: Job Authorized/ Update Page

(4) If you want to amend **Weapon Details**, select the Weapon Details Check Box (Number 1 in Figure 7). After editing Details use the “**Weapon Details Update**” button (Number 2 in Figure 7). If you want to add new Weapons for this job, Press the “**Add New Weapon**” button (Number 3 in Figure 7). Then select the new Weapon, click Save New Weapon.

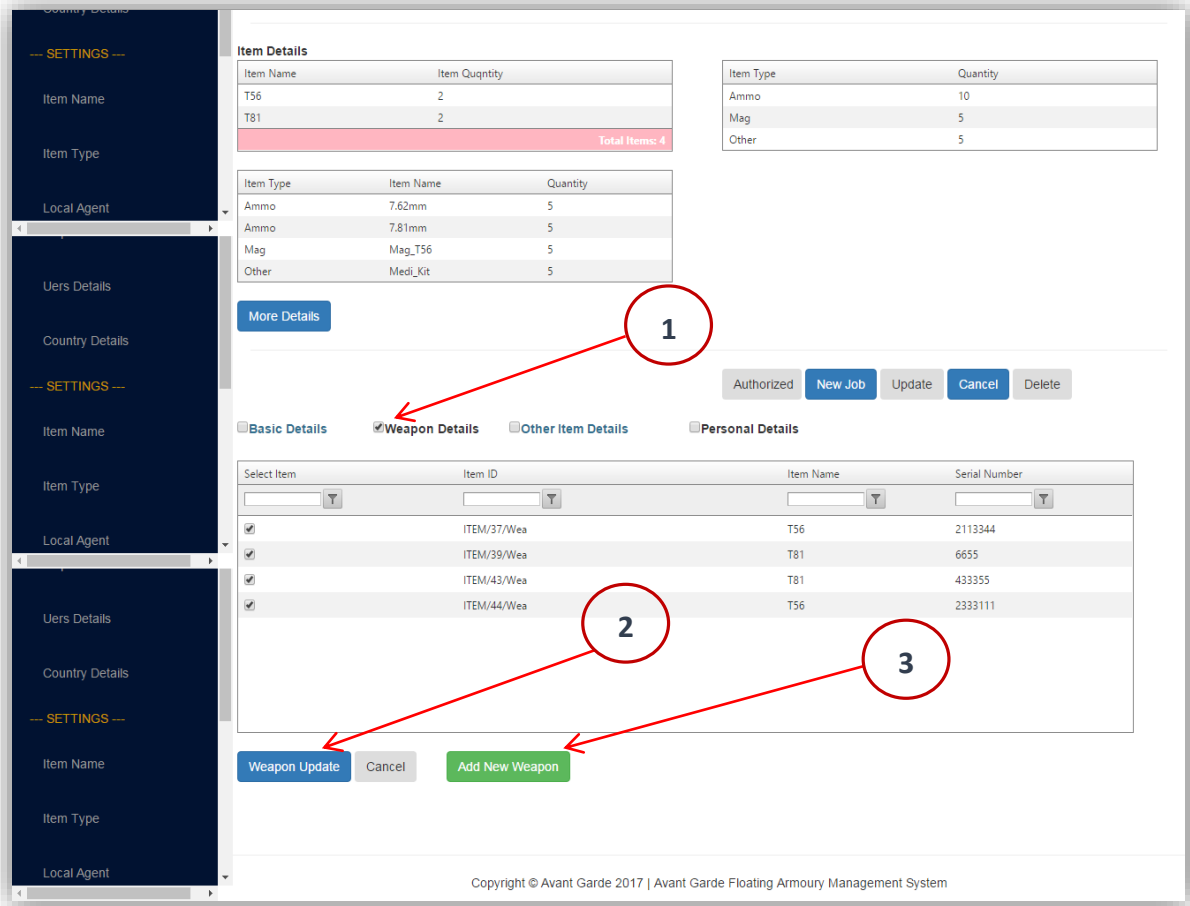


Figure 7: Job Authorized/ Update Page

(5) If you want to amend **Other Item Details**, select the Other Item Details Check Box (Number 1 in Figure 8). After editing Details use the “**Other Item Details**” button (Number 2 in Figure 8). If you want to add new Item for this job, Press the “**Add New Item**” button (Number 3 in Figure 8).

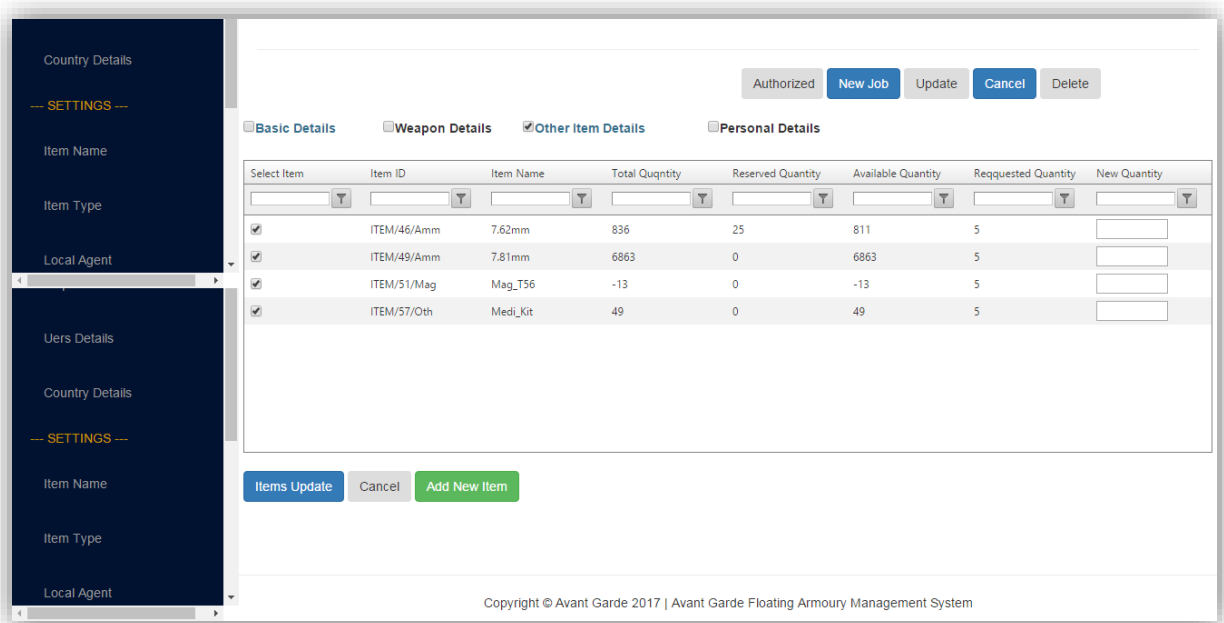


Figure 8: Job Authorized/ Update Page

Note : There is Filter Facility of the Grid to ease the selection.

(6) If you want to amend **allocated Person Details**, select the Personal Details Check Box (Number 1 in Figure 9). After editing Details, use the “**Update Person**” button (Number 2 in Figure 9). If you want to add new Person for this job, Press the “**Add New Person**” button (Number 3 in Figure 9). Then select the new person and click save button.

Note : There is Filter Facility of the Grid to ease the selection.

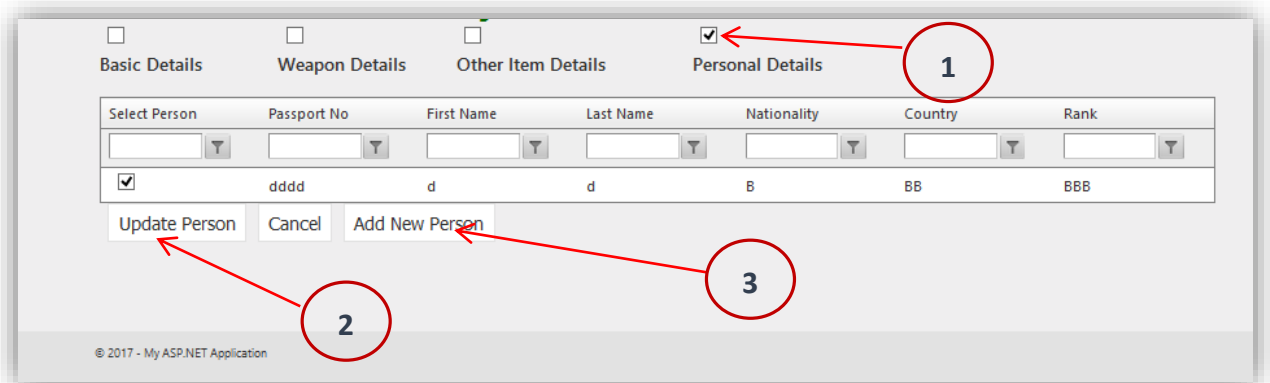


Figure 9: Job Authorized/ Update Page

b. Job Update/ Complete

(1) Select check box/boxes which after the actual transaction job/jobs. Then select the “**Job Complete**” button.

(2) If once want to update particular job’s details which not completed job yet, enter the job number and fresh “**Search**” button. Then follow the Authorization Module Steps.

c. Amend Users Details

(1) When you go to the amend user’s details, select “**Users**” button then following page (Figure 10) popup the screen.

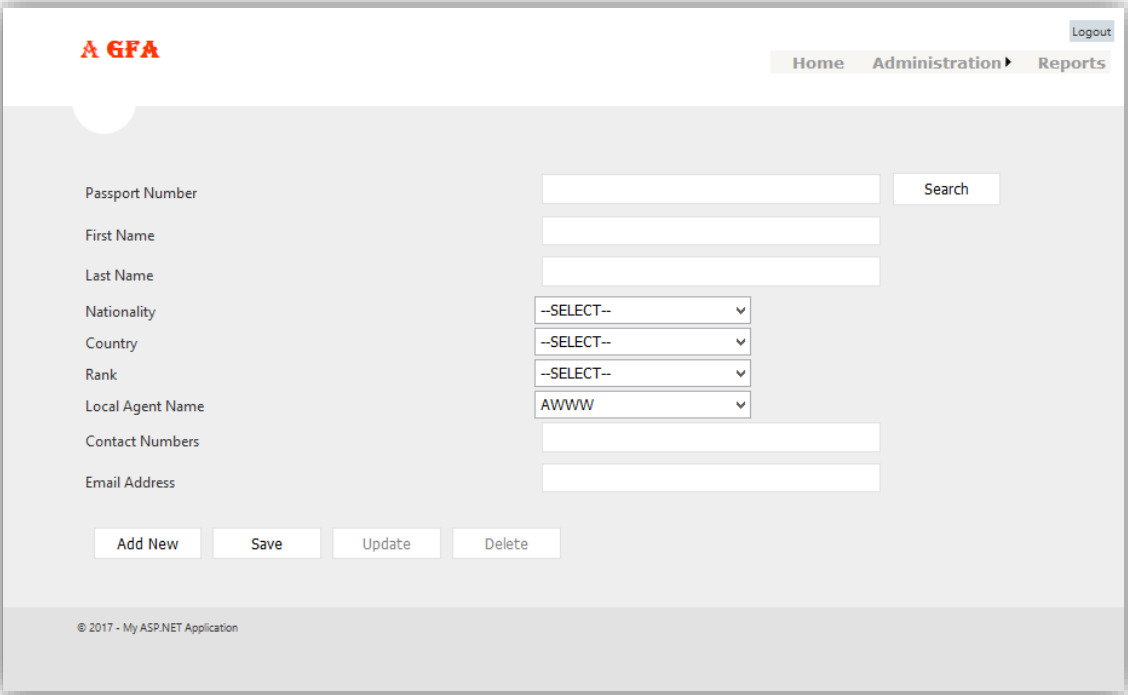


Figure 10: User Details Amended Page

(2) If you want to add a **new user**, Press the “**Add New**” button (Number 1 in Figure 11) and enter the data. Then select “**Save**” button (Number 2 in Figure 11). If you want edit the details, first enter the user name then press the “**Search**” button (Number 3 in Figure 11). Now you can edit the details. After editing details press the “**Update**” button (Number 4 in Figure 11). If you want to remove the user from the system, Press the “**Delete**” button (Number 5 in Figure 11).

Note: After the search the User, the “Update” and “Delete” buttons are activated.

Passport Number Search

First Name

Last Name

Nationality --SELECT--

Country --SELECT--

Rank --SELECT--

Local Agent Name AWWW

Contact Numbers

Email Address

© 2017 - My ASP.NET Application

Figure 11: User Details Amended Page

d. **Amend Item Details**

(1) When you go to the amend Item details, select “**Items**” button then following page (Figure 12) popup the screen.

Item Type --SELECT--

Item Name Serial Number

Quantity Status --SELECT--

Principle Company

Remarks

Refresh Save

Item ID Search

Item Type --SELECT-- Serial Number

Item Name Status --SELECT--

Quantity

Principle Company

Rack Bin

Remarks

Refresh Update Delete

Figure 12: Item Details Amended Page

(2) If you want to add a new Item, Press the “**Refresh**” button (Number 1 in Figure 13) and enter the data. Then select “**Save**” button (Number 2 in Figure 13). If you want edit the details, first enter the Item ID then press the “**Search**” button (Number 3 in Figure 13). Now you can edit the details. After editing details press the “**Update**” button (Number 4 in Figure 13). If you want to remove the user from the system, Press the “**Delete**” button (Number 5 in Figure 13).

Note: After the search the User, the “Update” and “Delete” buttons are activated and Data editing Panel.

The image shows a web interface for managing item details. It consists of two main sections. The top section is for adding or saving a new item, featuring input fields for Item Type (a dropdown menu), Item Name, Quantity, Principle Company, Remarks, Serial Number, and Status (a dropdown menu). Below these fields are two buttons: 'Refresh' and 'Save'. The bottom section is for editing an existing item, featuring input fields for Item ID, Item Type (a dropdown menu), Item Name, Quantity, Principle Company, Rack, Bin, and Remarks. Below these fields are three buttons: 'Refresh', 'Update', and 'Delete'. Red circles with numbers 1 through 5 are placed over the 'Refresh', 'Save', 'Search', 'Update', and 'Delete' buttons respectively, with red arrows pointing to them from the text above.

Figure 13: Item Details Amended Page

e. **Amend Local Agent**

(1) When you go to the amend Local Agent details, select “**Local Agent**” button then following page (Figure 14) popup the screen.

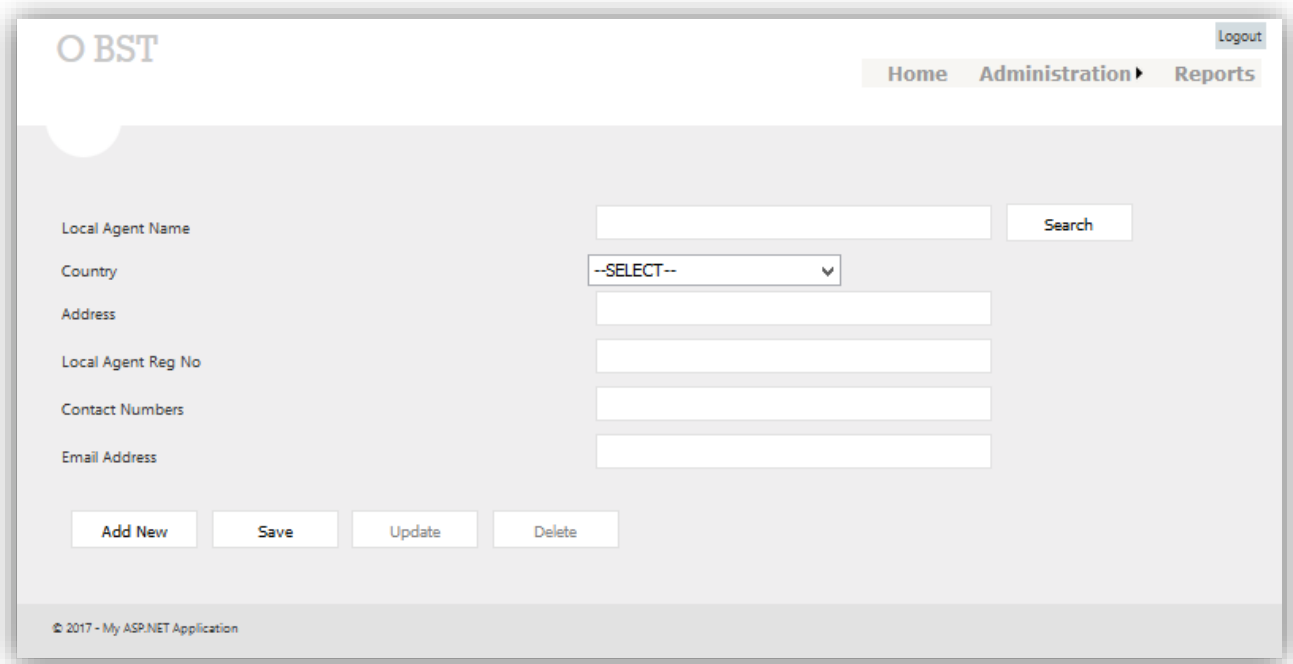


Figure 14: Local Agent Details Amended Page

(2) If you want to add a new Local Agent, Press the “**Add New**” button (Number 1 in Figure 15) and enter the data. Then select “**Save**” button (Number 2 in Figure 15). If you want edit the details, first enter the Local Agent name then press the “**Search**” button (Number 3 in Figure 15). Now you can edit the details. After editing details press the “**Update**” button (Number 4 in Figure 15). If you want to remove the user from the system, Press the “**Delete**” button (Number 5 in Figure 15).

Note: After the search the User, the “Update” and “Delete” buttons are activated.

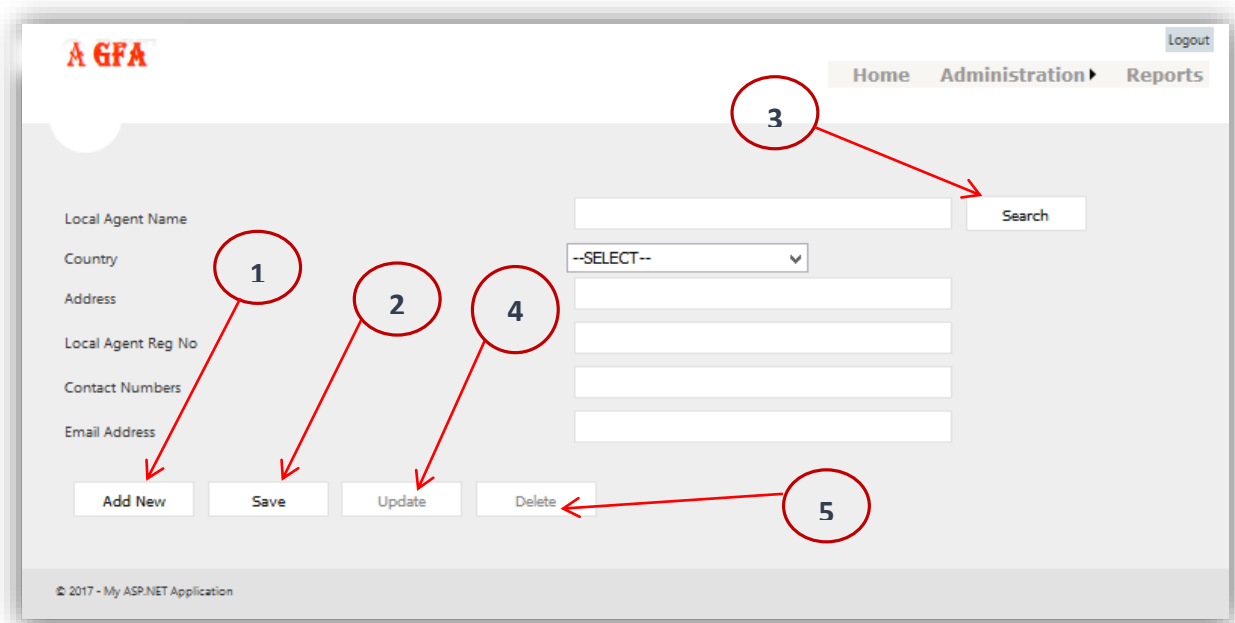


Figure 15: Local Agent Details Amended Page

f. **Amend Local Agent Person**

(1) When you go to the amend Local Agent Person details, select “**Local Agent Person**” button then following page (Figure 14) popup the screen.

The screenshot displays a web application interface for amending local agent person details. The page features a header with the 'A GFA' logo and navigation links for 'Home' and 'Administration'. The main content area contains a form with the following fields and controls:

- Passport Number: Text input field with a 'Search' button to its right.
- First Name: Text input field.
- Last Name: Text input field.
- Nationality: Dropdown menu with '--SELECT--' as the current selection.
- Country: Dropdown menu with '--SELECT--' as the current selection.
- Rank: Dropdown menu with '--SELECT--' as the current selection.
- Local Agent Name: Dropdown menu with 'AWWW' as the current selection.
- Contact Numbers: Text input field.
- Email Address: Text input field.

At the bottom of the form, there are four buttons: 'Add New', 'Save', 'Update', and 'Delete'. The footer of the page contains the text '© 2017 - My ASP.NET Application'.

Figure 16: Local Agent Person Details Amended Page

(2) If you want to add a new Local Agent person, Press the “**Add New**” button (Number 1 in Figure 17) and enter the data. Then select “**Save**” button (Number 2 in Figure 17). If you want edit the details, first enter the Passport Number then press the “**Search**” button (Number 3 in Figure 17). Now you can edit the details. After editing details press the “**Update**” button (Number 4 in Figure 17). If you want to remove the user from the system, Press the “**Delete**” button (Number 5 in Figure 17).

Note: After the search the User, the “Update” and “Delete” buttons are activated.

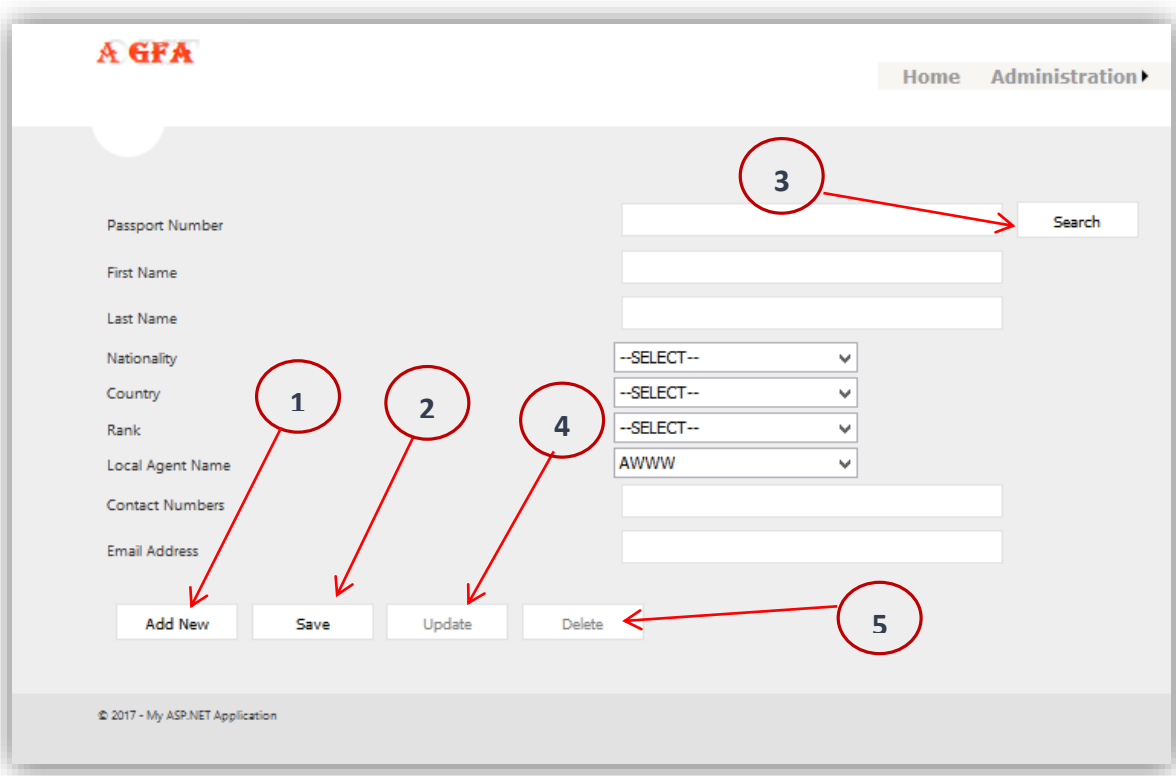


Figure 17: Local Agent Person Details Amended Page

g. Amend Principle Company

(1) When you go to the amend Principle Company details, select “**Principle Company**” button then following page (Figure 18) popup the screen.

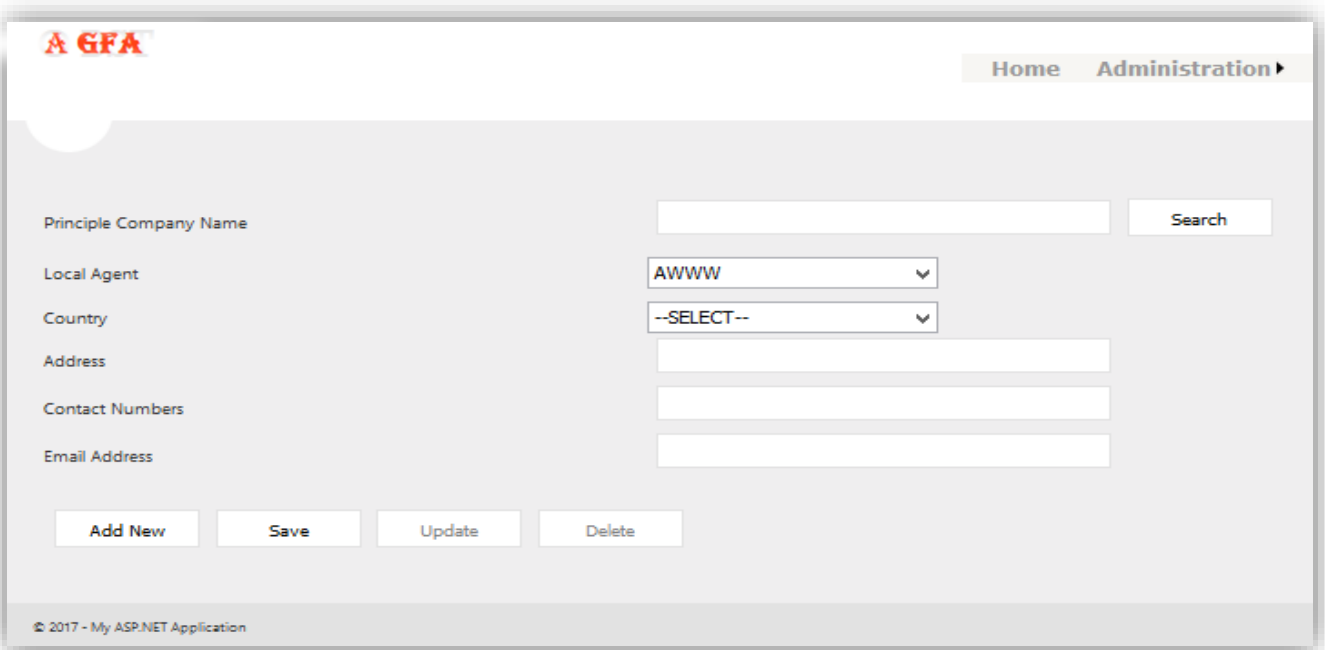


Figure 18: Principle Company Details Amended Page

(2) If you want to add a new Principle Company, Press the “**Add New**” button (Number 1 in Figure 19) and enter the data. Then select “**Save**” button (Number 2 in Figure 19). If you want edit the details, first enter the Principle Company name then press the “**Search**” button (Number 3 in Figure 19). Now you can edit the details. After editing details press the “**Update**” button (Number 4 in Figure 19). If you want to remove the user from the system, Press the “**Delete**” button (Number 5 in Figure 19).

Note: After the search the User, the “Update” and “Delete” buttons are activated.

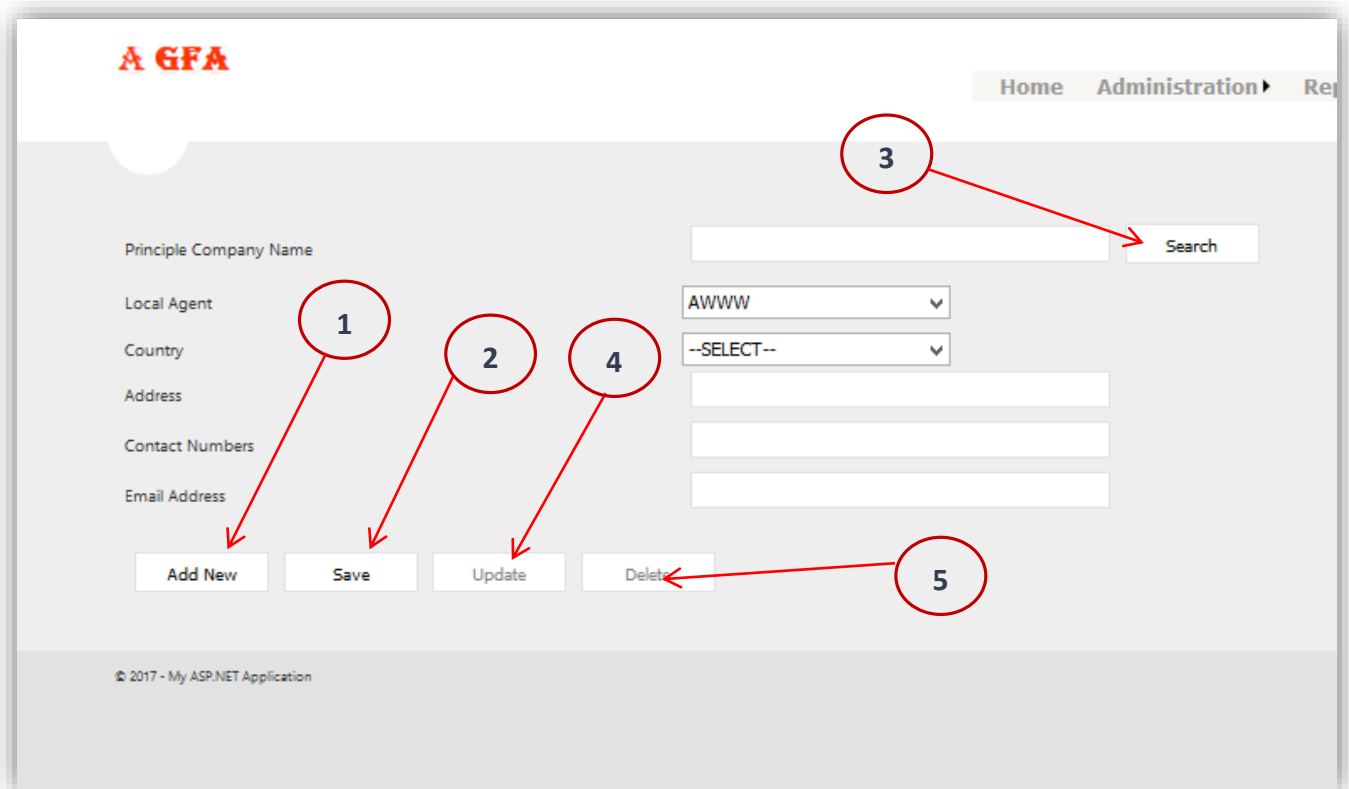


Figure 19: Principle Company Details Amended Page

h. Reports

(1) When you go to get Reports, select “**Reports**” button then following page (Figure 14) popup the screen.



Figure 20: Report Page

(2) If you want to get Excel or PDF print out of relevant job, press the “**Print/Export Jobs**” button (Figure 20). If you want to get report according to the job number, press” **Issue/Receive Summary**” button (Figure 20). If you want to get report according to the Date /Month of the job, press” **Issue/Receive Summary Chart**” button (Figure 20). If you want to get report about to the Local agent person (Sea Marshal), press” **Sea Marshal Details**” button (Figure 20). If you want to get report about to Ship Details, press” **Ship Details**” button (Figure 20). If you want to get report about to Principle Company, press” **Company Details**” button (Figure 20).

4. Home page of Principle Company

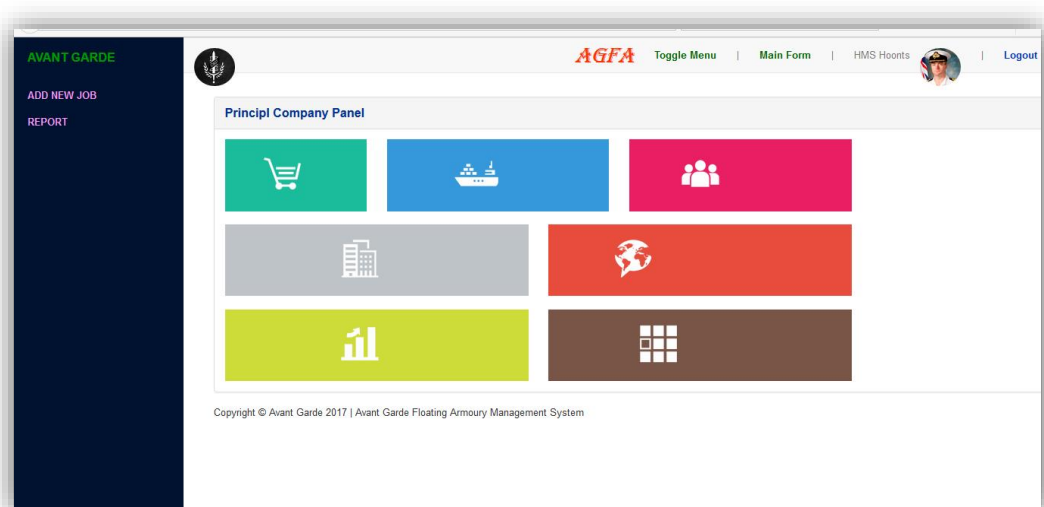


Figure 21: Main Page of the Principle Company

After Login the system you can visible following links from the left hand Conner

- ❖ Job Request
- ❖ Report

a. **Job Request**

When you go to the Job Request, you can get the facility to create a new job including Weapons and Other Items. The relevant page is indicated as figure 21. If you want to add a New Job, need to follow the under mentioned steps.

Step 1: Select the Job Mode (Number 1 in Figure 21), and then feed the Basic Details of the Job.

Step 2: Select the required Weapons using relevant Check box (Number 2 in Figure 21). Filtering facility of the Grid gives to help to find the needed Weapons.

Step 3: Select the required Magazine and Ammunitions using relevant Check box (Number 3 in Figure 21). Then you have to input required amount of the Magazine and Ammunitions in the respective text box (Number 4 in Figure 21). Filtering facility of the Grid gives to help to find the needed Magazine type and Ammunition type.

Step 4: Select the required Other Items using relevant Check box (Number 5 in Figure 21). Then you have to input required amount of the Other Items in the respective text box (Number 6 in Figure 21). Filtering facility of the Grid gives to help to find the needed Items.

Step 5: Save the Job using “Save” button. Before the save, you can check summery (Number 7 in Figure 21) of the requested items.

Report

According to the Para 3, h able to get the required reports.

Dashboard

Job Manager

Reports

User Name | Logout

Job Handling Form

Job Mode --SELECT-- Search

Estimate Date Arival

Estimate Time Arival

Location

Ship Details

IMO No

Ship Name

Last Port

Next Port

Flag Status

Remarks

Principle Company Select

Weapon Seleutuion

Select Item	Item ID	Item Name	Serial Number
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
No records to display.			

Enter Ammo & Mag Quantity

Select Item	Weapon Name	Item Type	Item Name	Total Quantity	Available Qty	Requested Qty
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
No records to display.						

Other Item Selection

Select Item	Item ID	Item Name	Total Quqntity	Reserved Quantity	Available Quantity	Requested Quantity
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
No records to display.						

View All Selection

Item ID	Item Type	Item Name	Serial No	Requested Quantity
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
No records to display.				

Save
Add New

5.

Figure 22: Create Job Request of the Principle Company

5. Home page of Local Agent

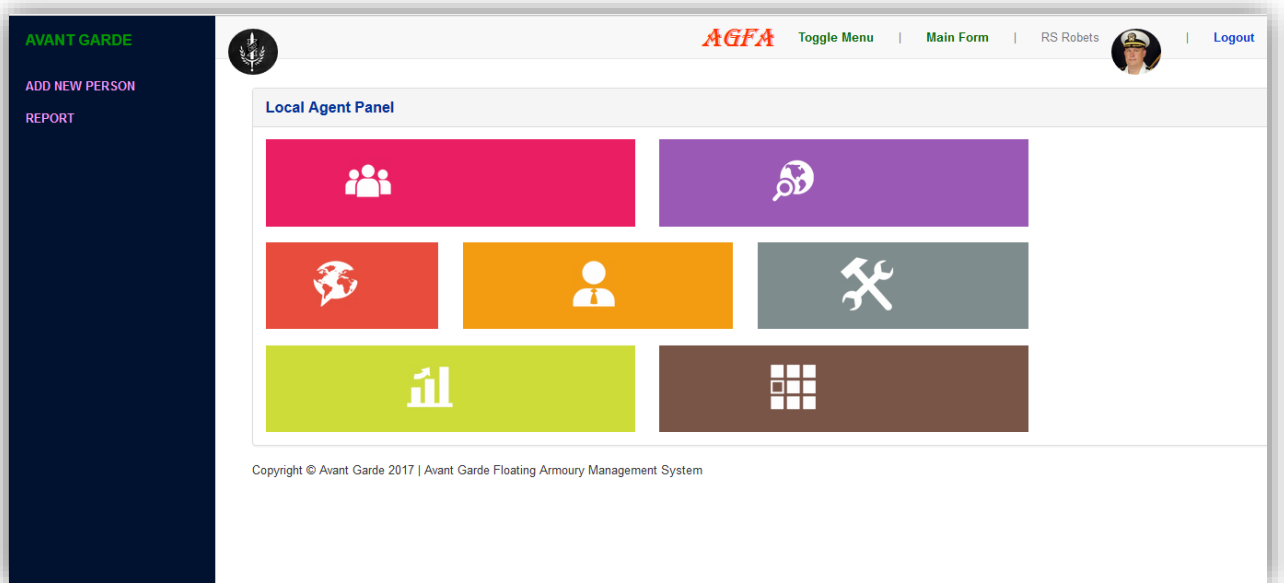


Figure 23: Main Page of the Local Agent

After Login the system you can visible following links from the left hand Conner

- ❖ Add Local Agent Person
- ❖ Report

a. Add Local Agent Person

When you go to the adding Local Agent persons, you can get the facility to feed the new Local Agent person to the system. The relevant page is indicated as figure 24. If you want to add a Local Agent Person for New Job, need to follow the under mentioned steps.

Step 1: Select a Pending Job of Local Agent user using “View” button (Number 1 in Figure 24).

Step 2: Select the suitable Person using relevant Check box (Number 2 in Figure 24). Filtering facility of the Grid (Number 3 in Figure 24) gives to help to find the needed Person.

Step 3: Save the Job using “Save” button.

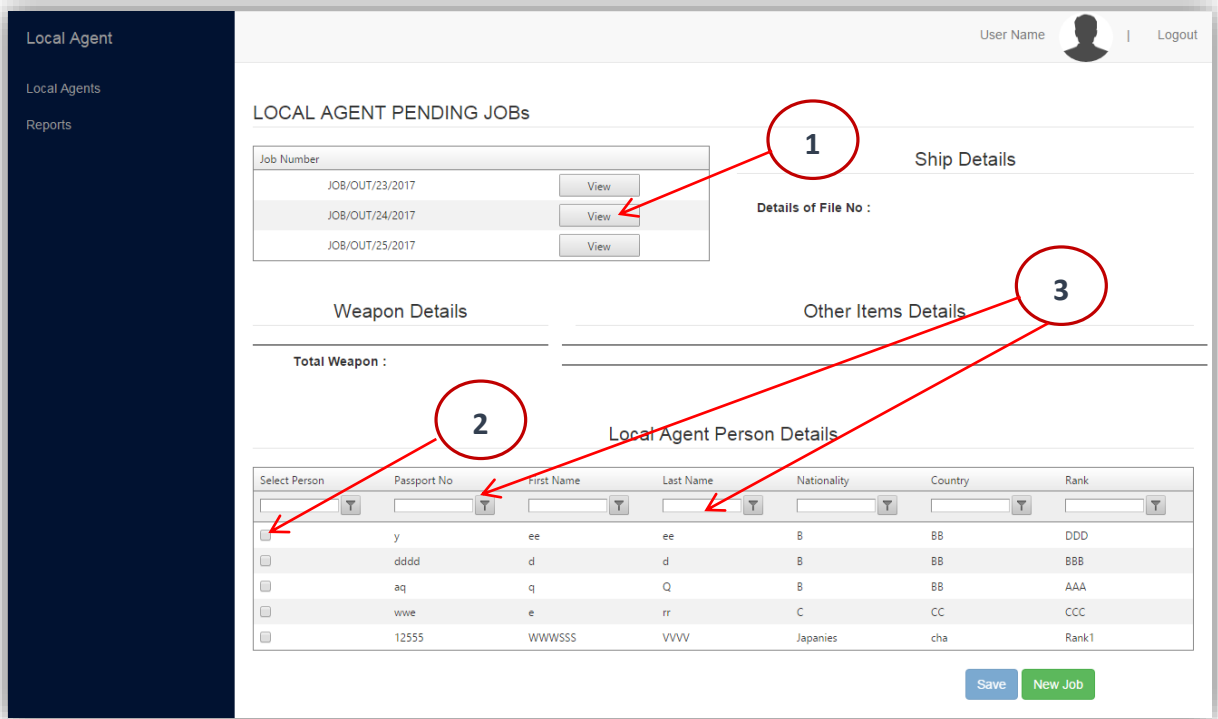


Figure 24: Add Local Agent Person Page

b. Reports

According to the Para “3, h” able to get the required reports.

6. Home page of Operator (Office User)

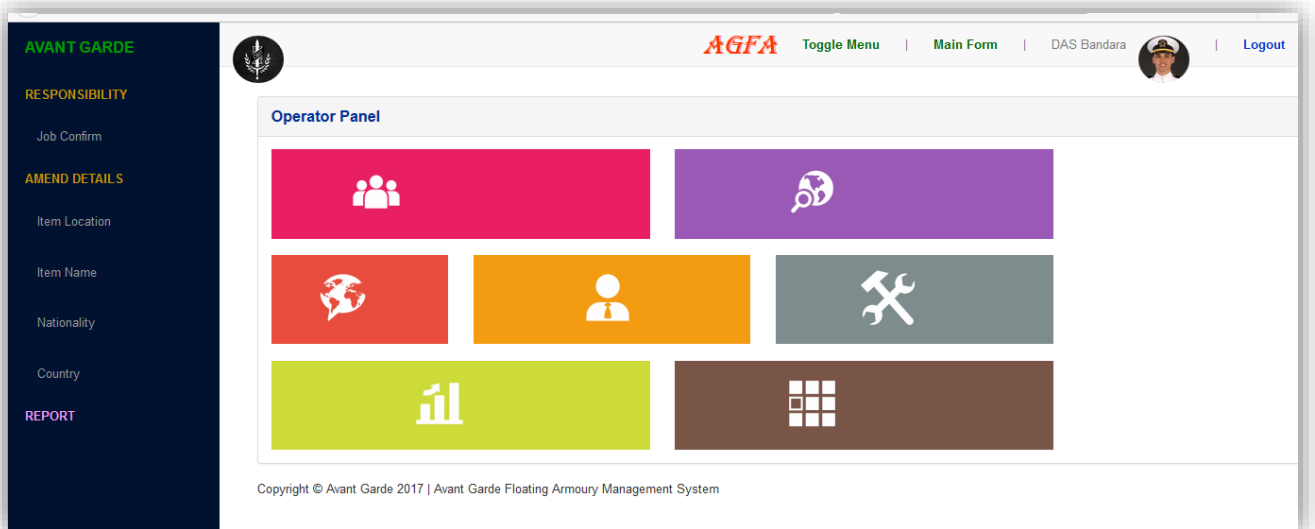


Figure 25: Main Page of Operator

After Login the system you can visible following links from the left hand Conner

- ❖ Responsibility
 - Job Conform
- ❖ Amend Details
 - Item Location
 - Item Name
 - Nationality
 - Country
- ❖ Reports

a. Job Conform

When you go to the Job Conform, you can check the all details of job. After checking job details you have to select the check box (Number 1 in Figure 26) then you can conform the job using “**Conform**” button (Number 2 in Figure 26). The relevant page is indicated as figure 26.

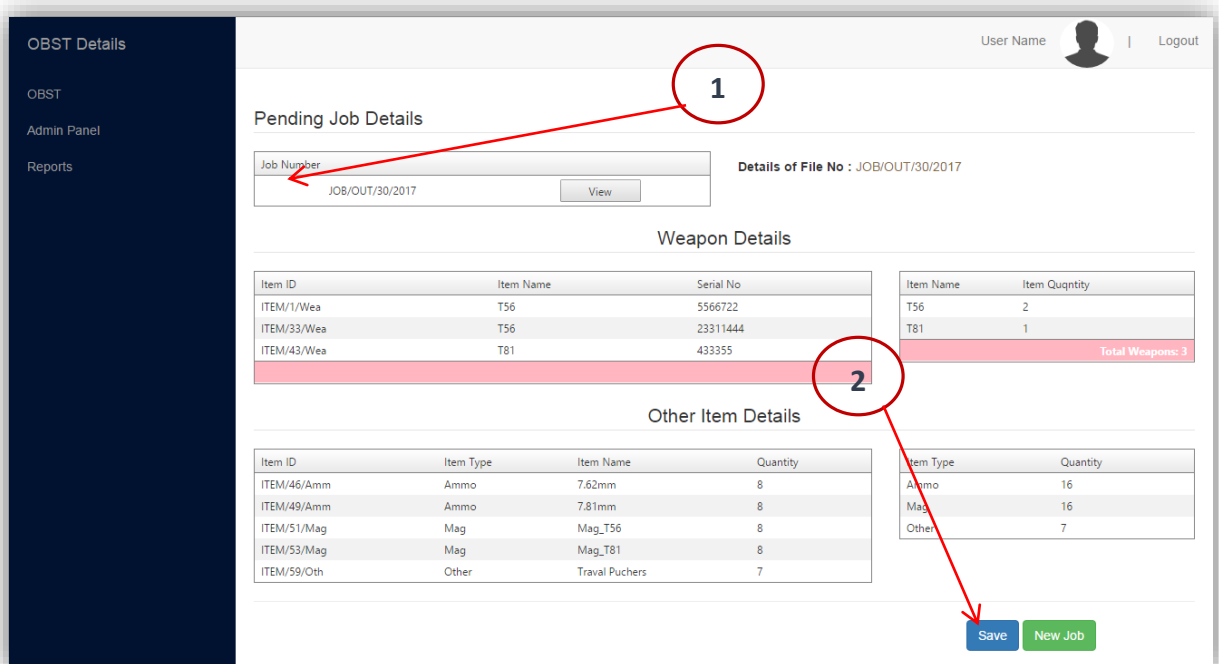


Figure 26: Job Conform Page of Operator

b. Amend Item Location

(1) When you go to the amend Item Location details, select “Item Location” button then following page (Figure 27) popup the screen.

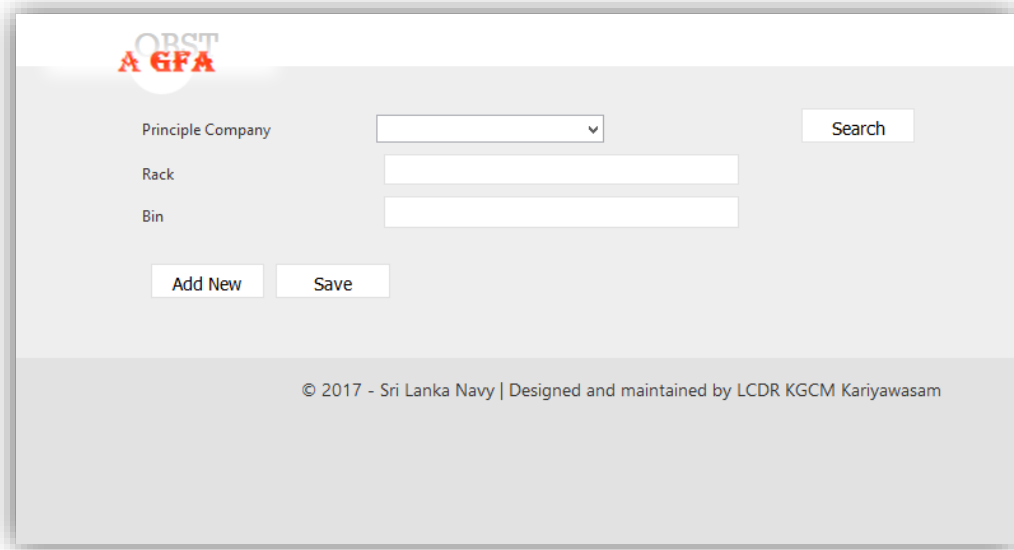


Figure 27: Job Conform Page of Operator

(2) If you want to add a new Location, Press the “**Add New**” button (Number 1 in Figure 28) and enter the data. Then select “**Save**” button (Number 2 in Figure 28). If you want edit the details, first enter the Principle Company name then press the “**Search**” button (Number 3 in Figure 28). Now you can edit the details. After editing details press the “**Update**” button (Number 4 in Figure 28). If you want to remove the user from the system, Press the “**Delete**” button (Number 5 in Figure 28).

Note: After the search the User, the “Update” and “Delete” buttons are

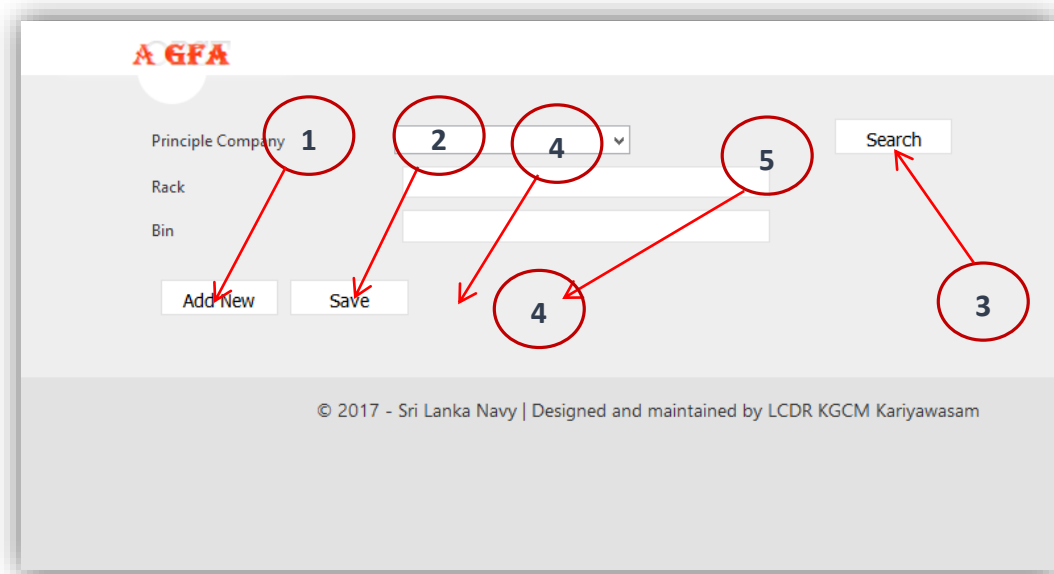


Figure 28: Item Location amended Page

c. **Amend Item Name**

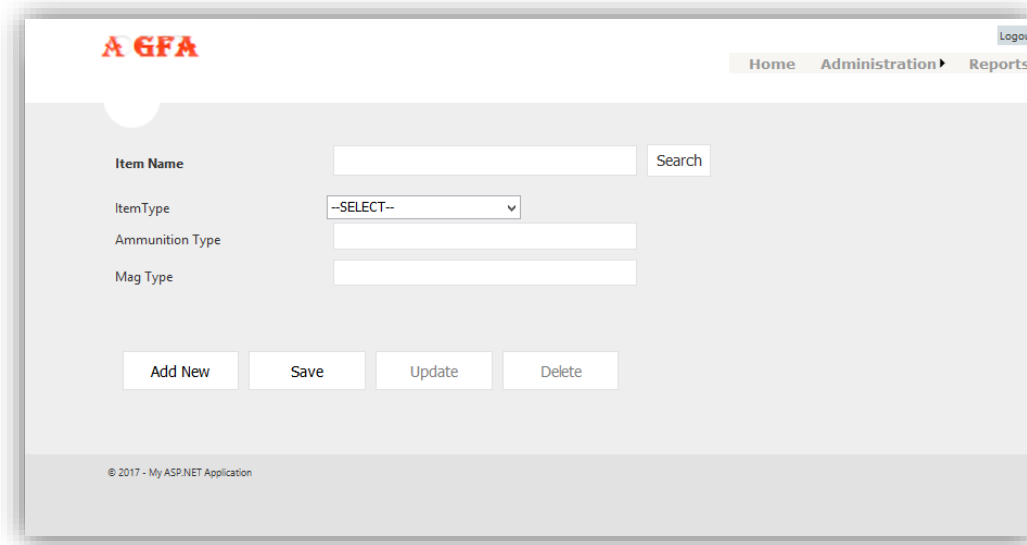


Figure 29: Item Name amended Page

(1.) When you go to the amend Item Name, select “**Item Name**” button then following page (Figure 29) popup the screen.

(2.) If you want to add a new Item, Press the “**Add New**” button (Number 1 in Figure 30) and enter the data. Then select “**Save**” button (Number 2 in Figure 30). If you want edit the details, first enter the Item name then press the “**Search**” button (Number 3 in Figure 30). Now you can edit the details. After editing details press the “**Update**” button (Number 4 in Figure 30). If you want to remove the user from the system, Press the “**Delete**” button (Number 5 in Figure 30).

Note: After the search the User, the “Update” and “Delete” buttons are

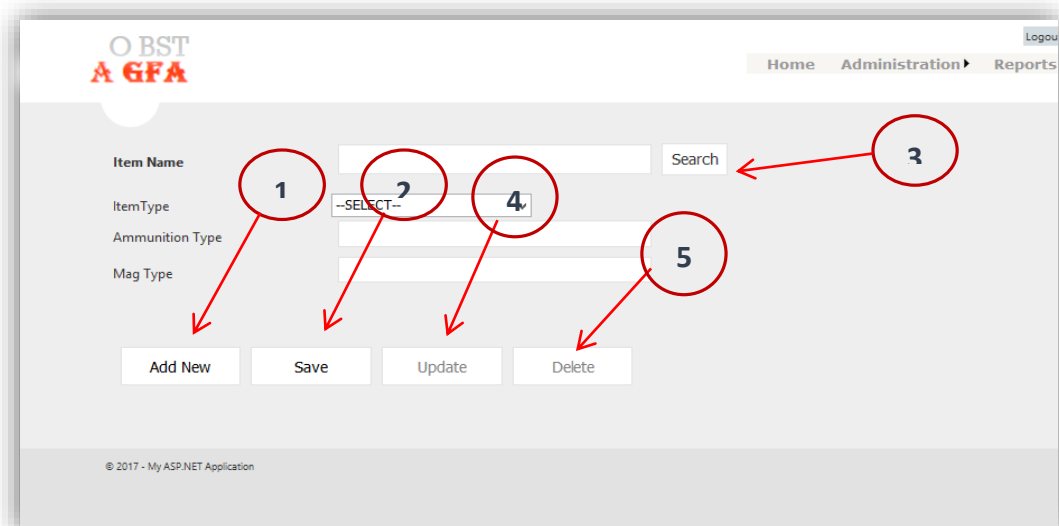


Figure 30: Item Name amended Page

d. **Amend Nationality**

(1) When you go to the amend Nationality, select “**Nationality**” button then following page (Figure 31) popup the screen.

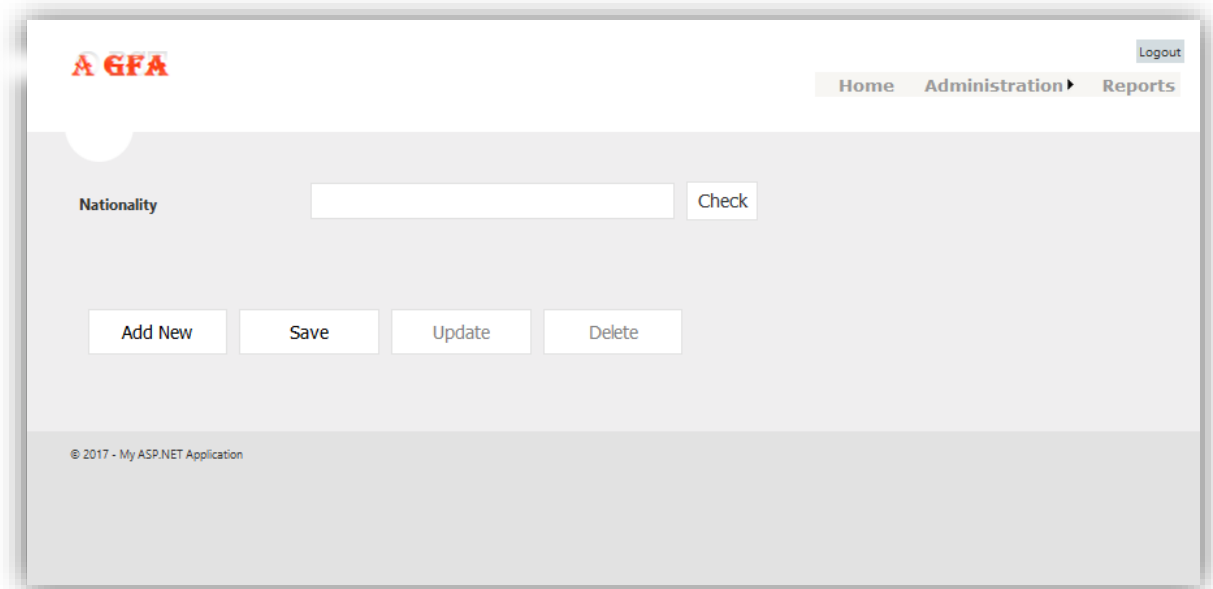


Figure 31: Nationality amended Page

(2) If you want to add a new Nationality, Press the “**Add New**” button (Number 1 in Figure 32) and enter the data. Then select “**Save**” button (Number 2 in Figure 32). If you want to edit the details, first enter the Nationality then press the “**Check**” button (Number 3 in Figure 32). Now you can edit the details. After editing details press the “**Update**” button (Number 4 in Figure 32). If you want to remove the user from the system, Press the “**Delete**” button (Number 5 in Figure 32).

Note: After the search the User, the “Update” and “Delete” buttons are

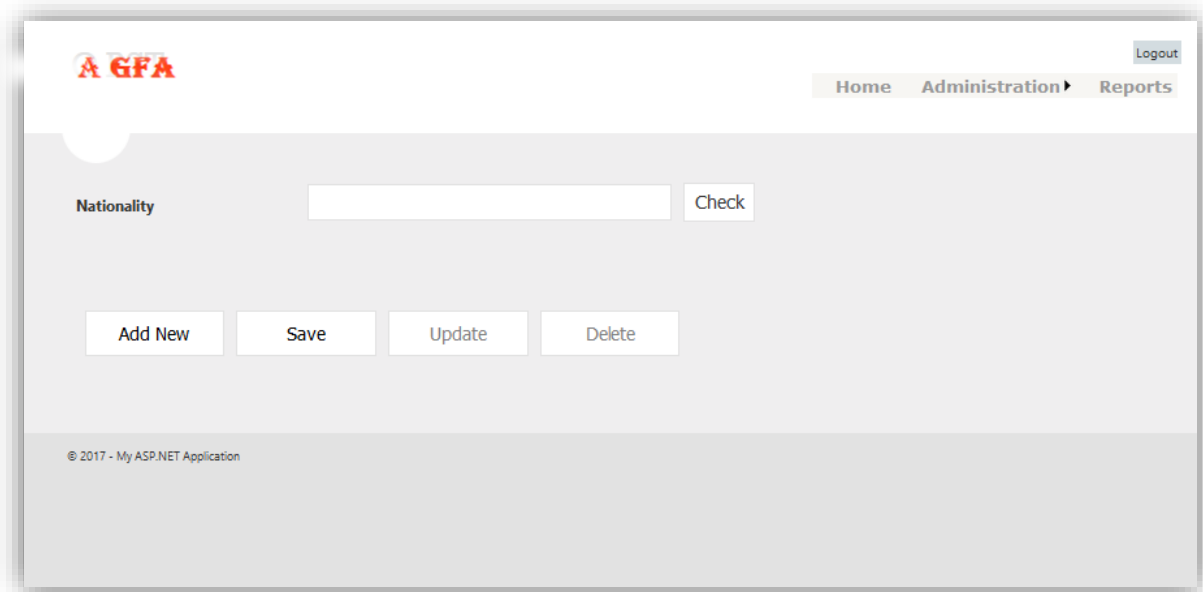


Figure 32: Nationality amended Page

e. **Amend Country**

(1) When you go to the amend Country details, select “**Country**” button then following page (Figure 33) popup the screen.

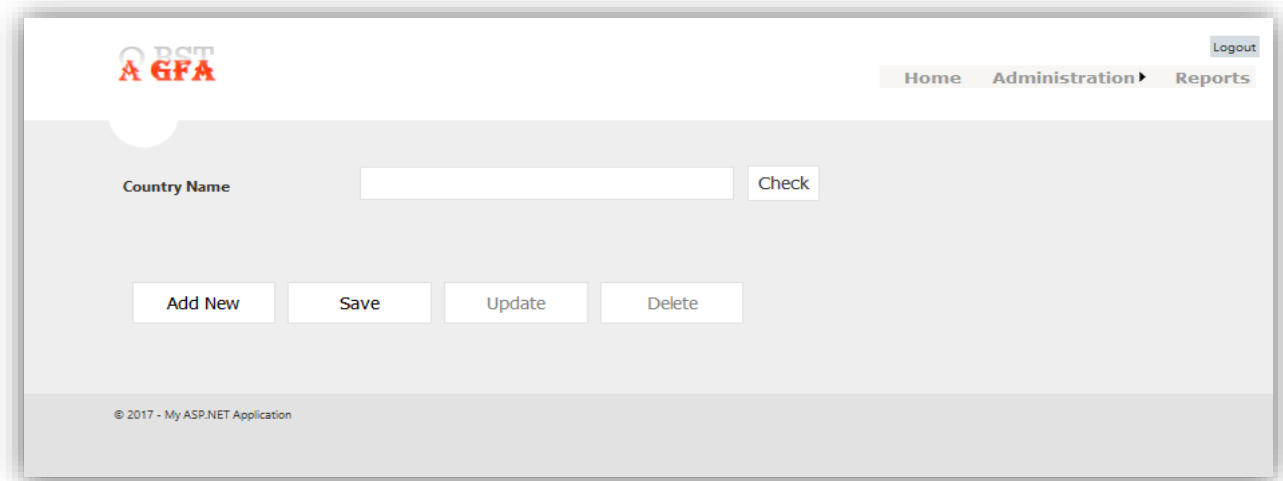


Figure 33: Nationality amended country Page

(2) If you want to add a new Country details, Press the “**Add New**” button (Number 1 in Figure 34) and enter the data. Then select “**Save**” button (Number 2 in Figure 34). If you want to edit the details, first enter the Country then press the “**Check**” button (Number 3 in Figure 34). Now you can edit the details. After editing details press the “**Update**” button (Number 4 in Figure 34). If you want to remove the user from the system, Press the “**Delete**” button (Number 5 in Figure 34).

Note: After the search the User, the “Update” and “Delete” buttons are

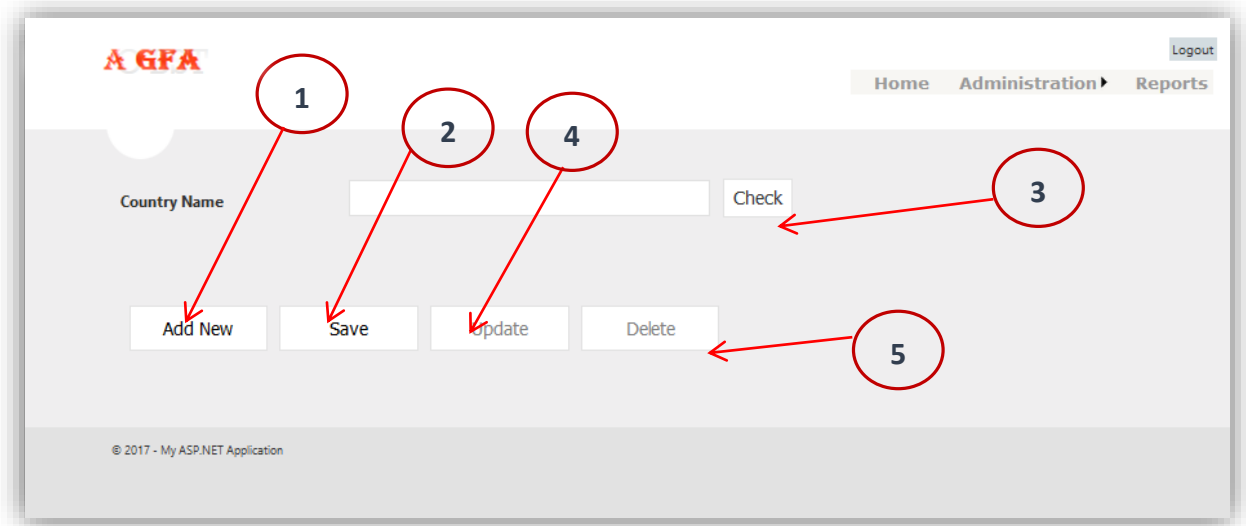


Figure 34: Nationality amended Page

f. Reports

According to the Para “3,h” able to get the required reports.

Appendix E: Questionnaire

User Acceptance Test

Name of System : - Weapon Management System For Avant Garde Floating Armoury (AGFA) Of Sri Lanka Navy

Description : - To Perform Acceptance Testing On AGFA System Front End Module

Purpose : - To Elicit Information On The Effectiveness Of AGFA System From The Consumers' Points Of View

Questionnaire

- In the Scale of 1 – 5, Please tick the best option for the following questions (5 =Excellent, 4 = Very Good, 3=Good, 2=Poor, 1=Very Poor)

1. Do you agree that AGFA System would definitely beneficial your Weapon Management procedure?

Very Poor Poor Good Very Good Excellent

2. Do you agree that AGFA System prototype application is user-friendly?

Very Poor Poor Good Very Good Excellent

3. Is there consistency in the theme used on this system?

If No, please which part or parts are not consistent?

c Very Poor Poor Good Very Good Excellent

4. Has the system satisfied your requirements of office environment?

Very Poor Poor Good Very Good Excellent

5. Do you think this system is better than existing manual approach?

Very Poor Poor Good Very Good Excellent

Other (please specify)

6. Do you agree that system can help save cost of learning?

Very Poor Poor Good Very Good Excellent

7. Did you encounter any difficulty while using the system?

If yes, please state the aspect of the system that was difficult?

Very Poor Poor Good Very Good Excellent

8. Kindly recommend any improvement(s) for this system (if applicable).

Completed by : HAKU Madumadavi (Not Compulsory)

Date : 2017.03.08

Thank You

User Acceptance Test

Name of System : - Weapon Management System For Avant Garde Floating Armoury (AGFA) Of Sri Lanka Navy
Description : - To Perform Acceptance Testing On AGFA System Front End Module
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Questionnaire

- In the Scale of 1 – 5, Please tick the best option for the following questions (5 =Excellent, 4 = Very Good, 3=Good, 2=Poor, 1=Very Poor)

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If No, please which part or parts are not consistent?

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Very Poor Poor Good Very Good Excellent

Other (please specify)

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Very Poor Poor Good Very Good Excellent

7. Did you encounter any difficulty while using the system?

If yes, please state the aspect of the system that was difficult?

Very Poor Poor Good Very Good Excellent

8. Kindly recommend any improvement(s) for this system (if applicable).

Completed by : LM Marabage (Not Compulsory)

Date : 2017.03.08

Thank You

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Other (please specify)

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If yes, please state the aspect of the system that was difficult?

Very Poor Poor Good Very Good Excellent

8. Kindly recommend any improvement(s) for this system (if applicable).

Completed by : MCM Silva (Not Compulsory)

Date : 2017.03.08

Thank You

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8. Kindly recommend any improvement(s) for this system (if applicable).

Completed by : MMI Probodani (Not Compulsory)

Date : 2017.03.08

Thank You

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Very Poor Poor Good Very Good Excellent

8. Kindly recommend any improvement(s) for this system (if applicable).

Completed by : OVA Chaturanga (Not Compulsory)

Date : 2017.03.08

Thank You

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Very Poor Poor Good Very Good Excellent

8. Kindly recommend any improvement(s) for this system (if applicable).

Completed by : SAKH KUMARA (Not Compulsory)

Date : 2017.03.08

Thank You

User Acceptance Test

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Very Poor Poor Good Very Good Excellent

8. Kindly recommend any improvement(s) for this system (if applicable).

Completed by : SMT Dananjaya (Not Compulsory)

Date : 2017.03.08

Thank You

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8. Kindly recommend any improvement(s) for this system (if applicable).

Completed by : WAAL Yasantha (Not Compulsory)

Date : 2017.03.08

Thank You

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8. Kindly recommend any improvement(s) for this system (if applicable).

Completed by : WDT H Dissanayaka (Not Compulsory)

Date : 2017.03.08

Thank You

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If yes, please state the aspect of the system that was difficult?

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8. Kindly recommend any improvement(s) for this system (if applicable).

Completed by : WKI Iresha (Not Compulsory)

Date : 2017.03.08

Thank You

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If yes, please state the aspect of the system that was difficult?

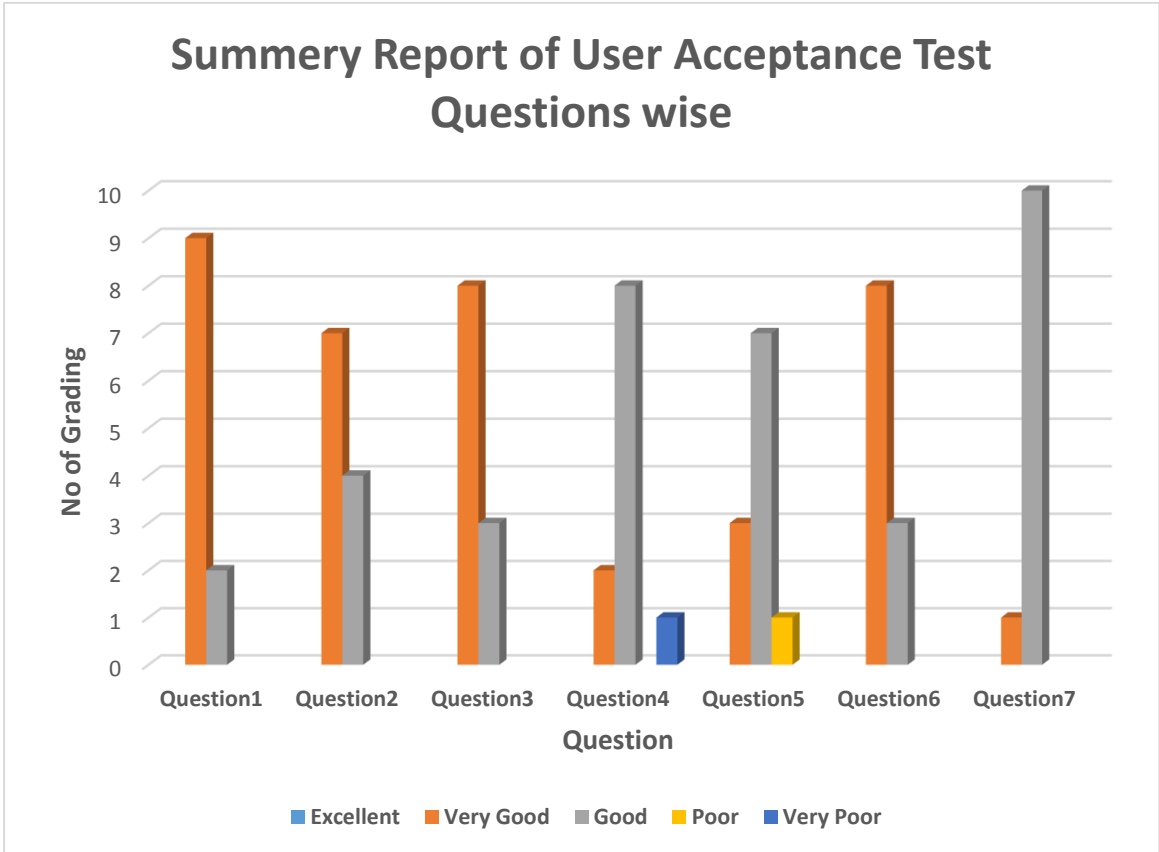
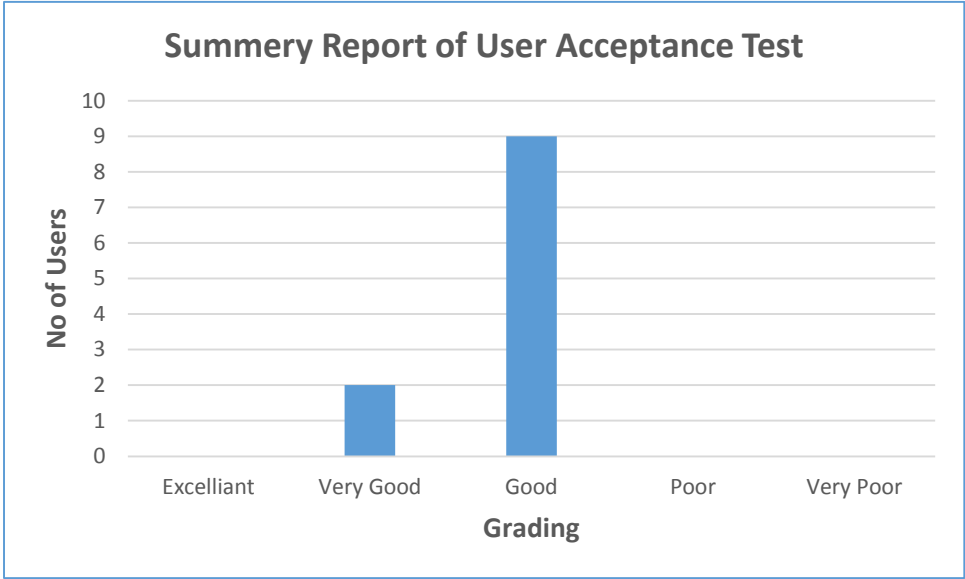
Very Poor Poor Good Very Good Excellent

8. Kindly recommend any improvement(s) for this system (if applicable).

Completed by : WT Lakshantha (Not Compulsory)

Date : 2017.03.08

Thank You



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