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SCHOOL OF COMPUTING

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BATTLE BOOK

PERSONNEL & TRANSPORTATION
MANAGEMENT SYSTEM

Jonathan Echavarria
Dr. Frances Grodzinsky & Dr.Cenk Erdil
Computer Science



SCHOOL OF COMPUTING

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ABSTRACT

Currently, there is no straightforward solution to facilitate control of a rapid and deployable solution to track movements of military personnel and their associated gear. Most implementations rely on utilizing local copies of tabulated data, such as a spreadsheet application software, to monitor local movements, which creates disconnected, small pockets of vital troop data. Moreover, as these local copies get written over, the capability to track the overall progress of troops to optimize military logistics disappears with each update. Some troops utilize cloud-based document management applications, but due to minimal user access management and shared administrative accounts, tracking changes is exceptionally challenging. To tackle this, we have implemented an application that utilizes distributed, cloud-based databases with a simple management interface [1]. Using the Battle Book, troops can cut down on time maintaining standardized military troop movement forms and improve communication time with the chain of command. Battle Book also provides a reliable, redundant, and scalable system to serve the needs of the military maneuvers in various sizes.

I. INTRODUCTION

The Battle Book is a Transportation and Personnel Management System focused on the needs of the transportation of logistics in the military. Currently, there is no sound implementation to facilitate the control of a rapid and deployable solution to track such movements. A common spreadsheet application (e.g., Microsoft Excel) is typically the only way to create and track such data, which creates disconnected, small pockets of data, with very little capability to share, and limited control on who sees the data, which makes it also a vulnerability due to the sensitivity of data [2]. Moreover, as there is no control over this open format, data can also be easily modified by anyone or replicated. In addition, with spreadsheets, there is no standardized method to create document templates in electronic formats, as these forms are then printed on paper, and modified manually to complete and submit to the higher ranks in the chain of command. This also causes delayed confirmation and response from upper management, and thus results in hours of wasted training time, and late departures.

The Scope of the Battle Book project is to cut down on time creating such templates and gathering the correct information on a cloud-based secure infrastructure. This also helps maintain accurate accountability within various command personnel and allow management to be updated with tracking location and status of personnel and their gear. This can potentially cut down on time for preparation for future exercises without the hassle of gathering information manually. We utilize a cloud-based infrastructure that supports multiple interfaces, which provides a reliable, redundant, and scalable system to serve the needs of military maneuvers in various sizes, from a platoon to a battalion. The rest of this poster is organized as follows. Section II provides details of our implementation. Section III summarizes our contributions and lists next steps.

II. IMPLEMENTATION

The Battle Book utilizes Amazon Web Services (AWS) platform, and particularly uses EC2 [3] and RDS [4] instances on the back end. Data is only accessible through a stand-alone interface program developed in C#. This application program allows anyone with the right permissions to view or manage the data, and to build military manifests to expedite the movement of troops and their gear. Following sections A through H, provide details of each module of the Battle Book.



A. AUTHENTICATION & ACCESS CONTROL

To log into the Battle Book, users enter their credentials to identify their access. Proving a higher level of security against brute force attacks and SQL injections; the Battle Book login allows three failed attempts before locking the system for 30 seconds. Also, at the ninth attempt the Battle Book terminates. Furthermore only certain characters are allowed, minimizing possibility of SQL injections. To increase password security, MD5 encryption has been implemented on the RDS. Once credentials are verified the account is granted and allowed to prompt the main module with their given access. Only administrators are able to see the administrative tab.

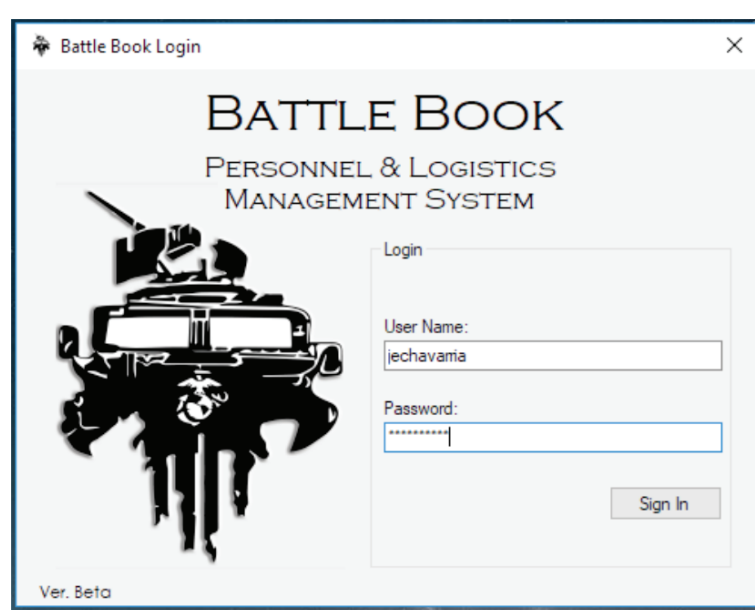


Figure 1. Login screen for the Battle Book.

Depending on the access, an actor can see either the administrator or the regular user tab. From there the actor can navigate to the other modules or tabs. A clock on the left top corner outputs the current time and date from the local machine. There is an option to logout. Lack of frequent interaction from the actor will trigger a timeout warning popup window with an additional 90-second timer, and lack of interaction to that warning will cause an auto-logout.



Figure 2. Dashboard and welcome screen.

B. PERSONNEL MODULE

The personnel module is where personal data is maintained. This module various features, such as: (i) printing, (ii) exporting to excel, and so on. Furthermore, a "Display All" button which pops a full size window that can be used with a second display to have the entire personnel data displayed, which allows the actor to have better control over the workspace and navigation on multiple screens.

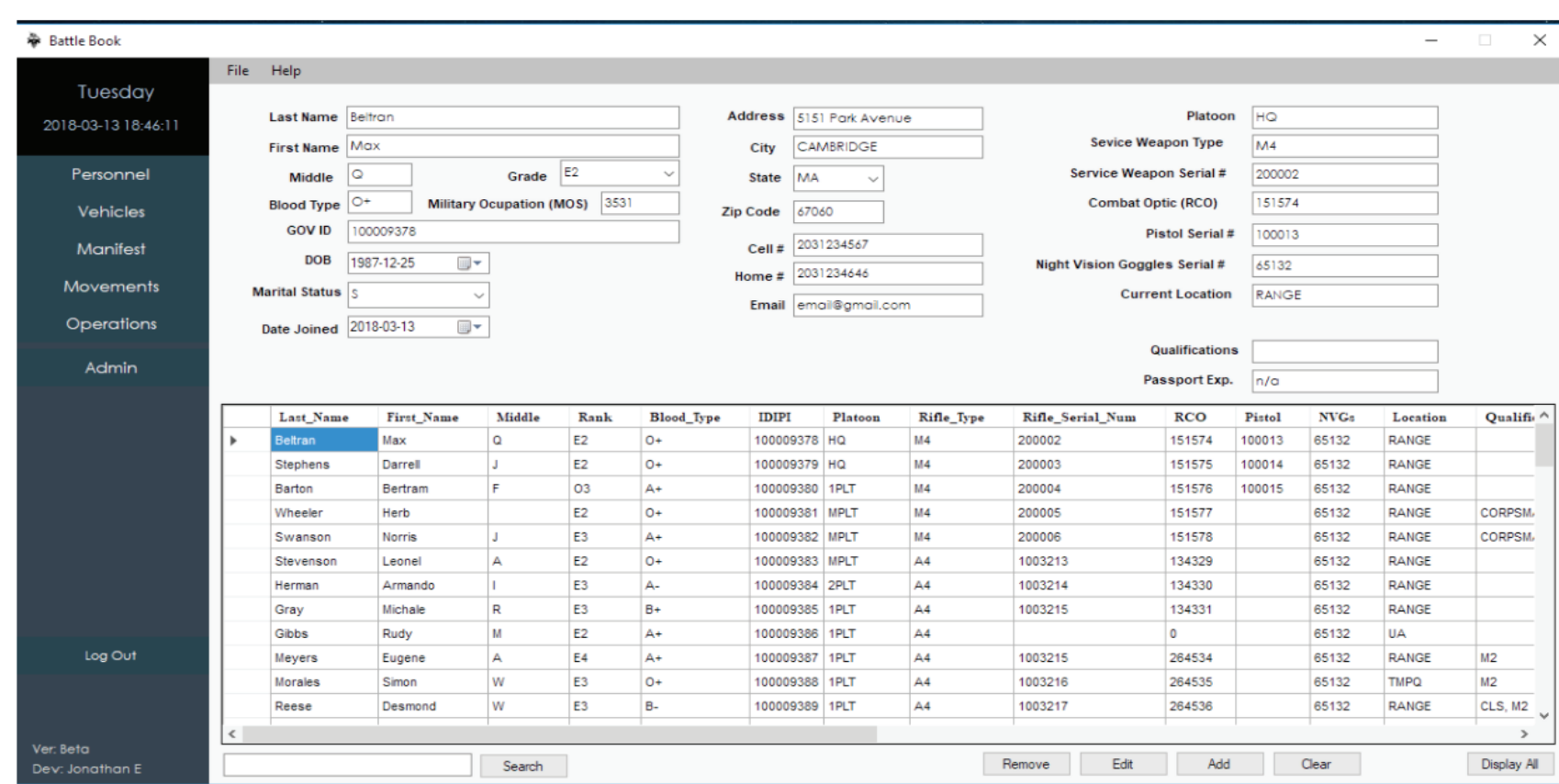


Figure 2. Personnel module overview, where all personal data is maintained.

C. VEHICLES MODULE

The vehicle module is similar to the personnel module tracking the status of assigned vehicles, and manage them. It allows the actors to later on add them to the manifest or track the vehicle readiness. This module also allows the actor to either print or export to excel.

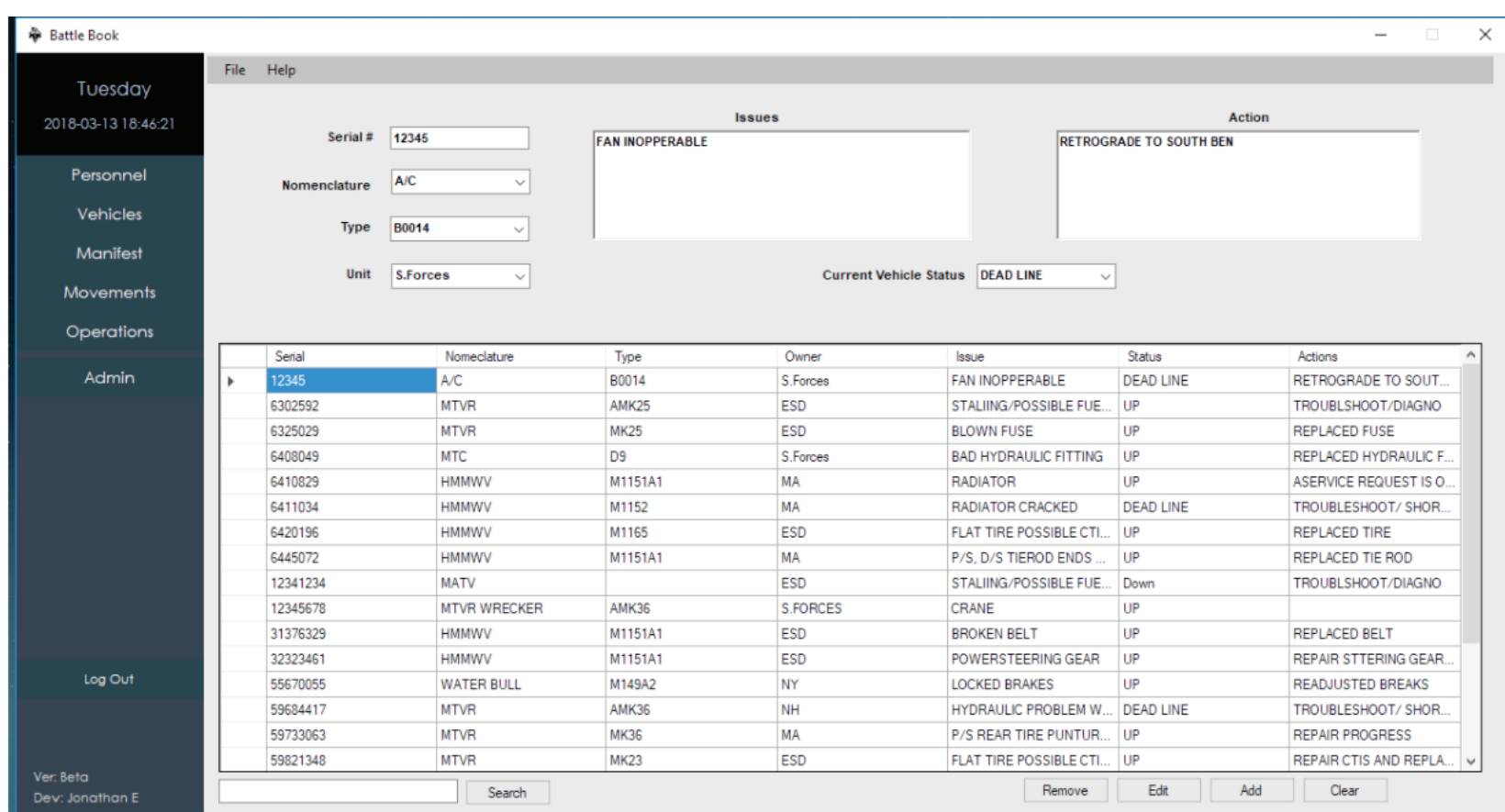


Figure 3. Vehicles module to manage vehicle details and operations.

D. MANIFEST MODULE

This module is the main idea behind the Battle Book. In this module actors can create a manifest for convoys gathering information of individuals and vehicles from the data stored in the personnel and vehicle modules. The manifest currently uses a generic template which counts the personnel, vehicles and weapons. It has the necessary information to allow the actor to print it and submitted to higher command. Also, this module can be exported to a spreadsheet.

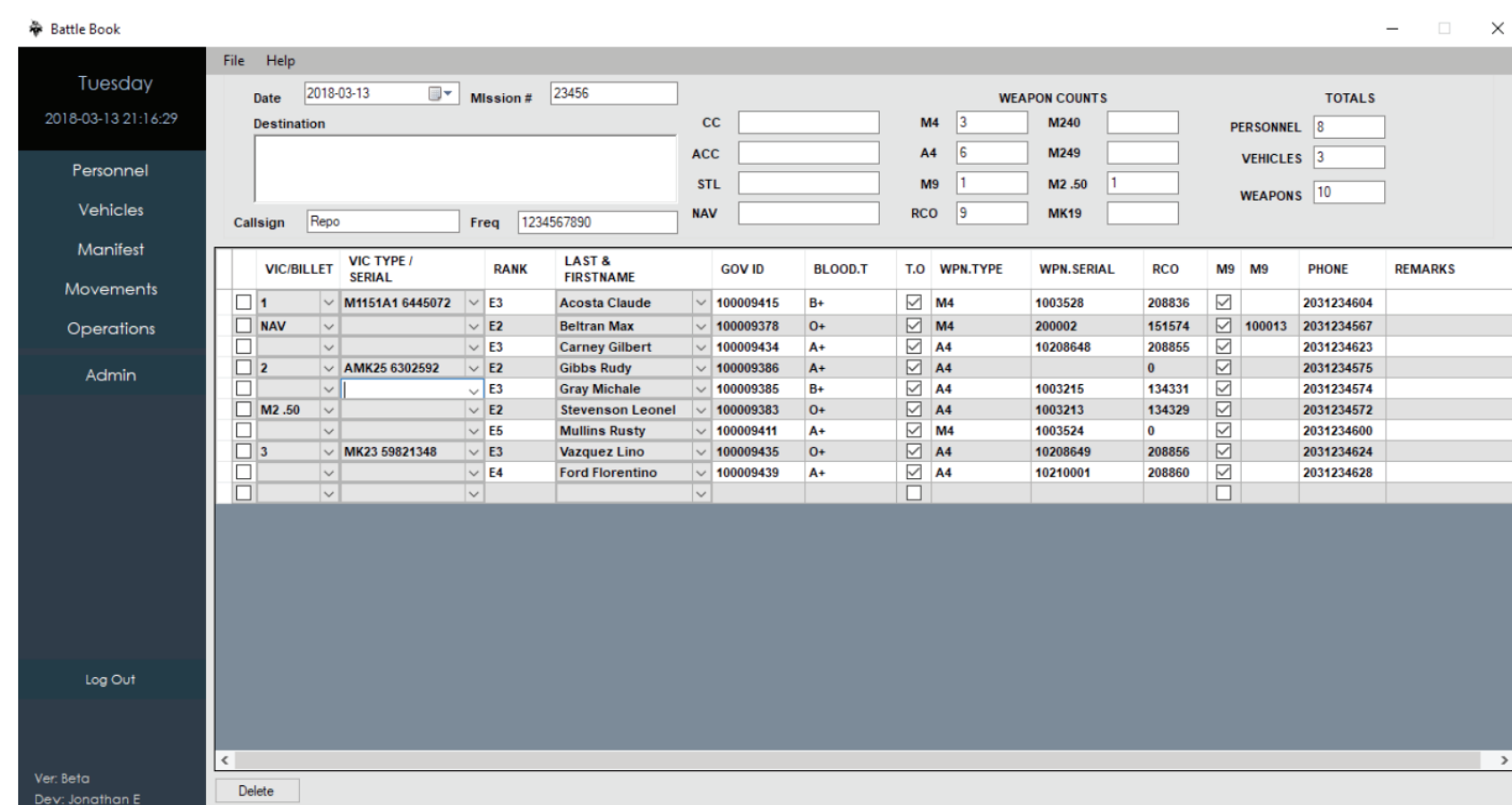


Figure 4. Manifest (main) module, where the actors can create a manifest for convoys gathering information of individuals and vehicles based on existing data.

E. MOVEMENTS MODULE

Similar to the manifest module, this module instead focuses on alternative methods of transportation other than a vehicle convoy. Thus, no vehicles information is needed.

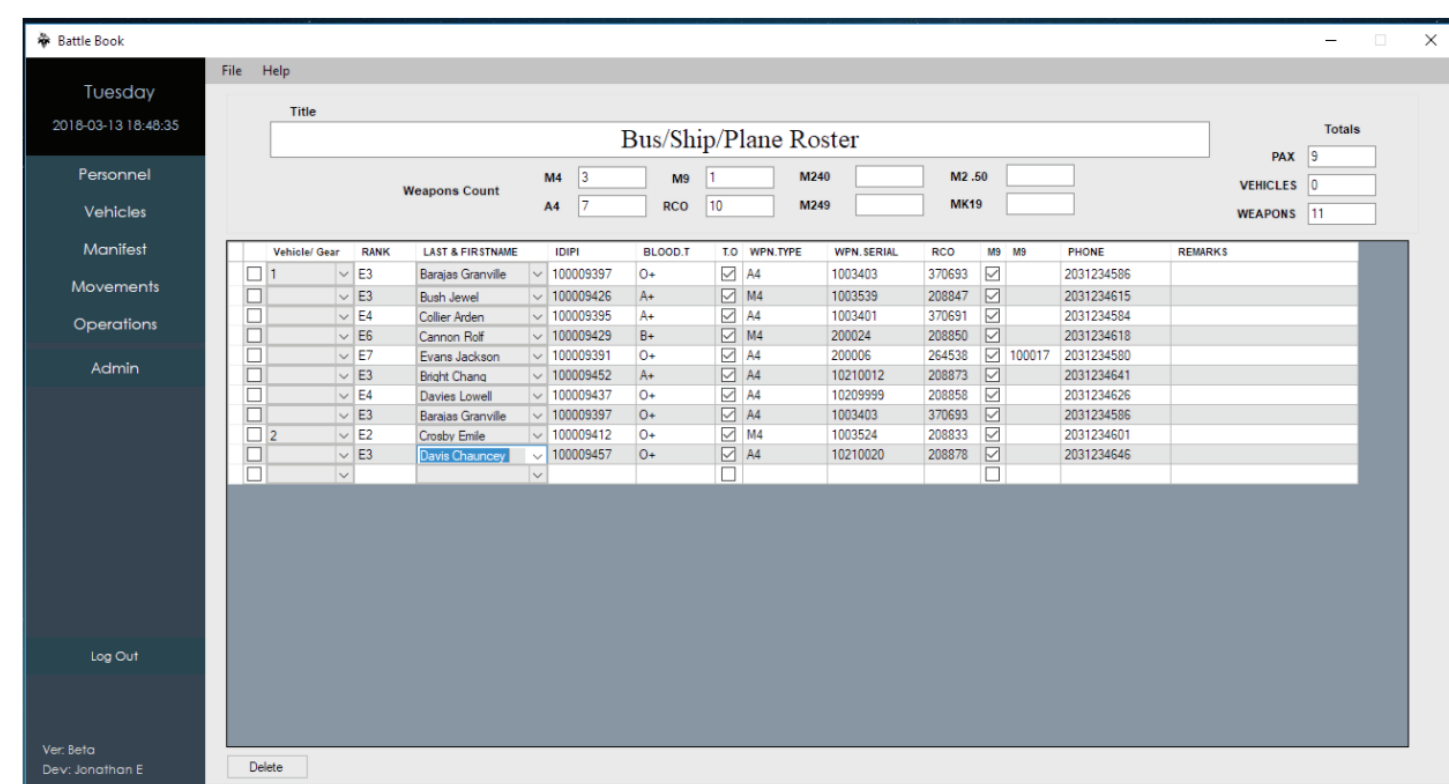


Figure 5. Movements module to track unit movements with transportation alternatives

F. OPERATIONS MODULE

This module does simple calculations and basic statistical analysis from data on both the personnel and vehicle modules. On the left, Operational Readiness of the Command is calculated by the status of their location. For example, if a unit member is unavailable, a formal military unavailability status, such as Temporary Not Physically Qualified (TMPQ) or Unaccounted (UA) will be assigned to the unit member, and the Battle Book automatically counts against the overall of the operational readiness bringing the percentage down by the total number of members. On the right, the Vehicle Readiness status by unit or as a whole is tracked. The Vehicle readiness calculates the number of vehicles that are assigned as up against the number of vehicles listed as down in need of repair) or deadline (broken unable to operate). The actor can choose either to list the readiness of all or unit.

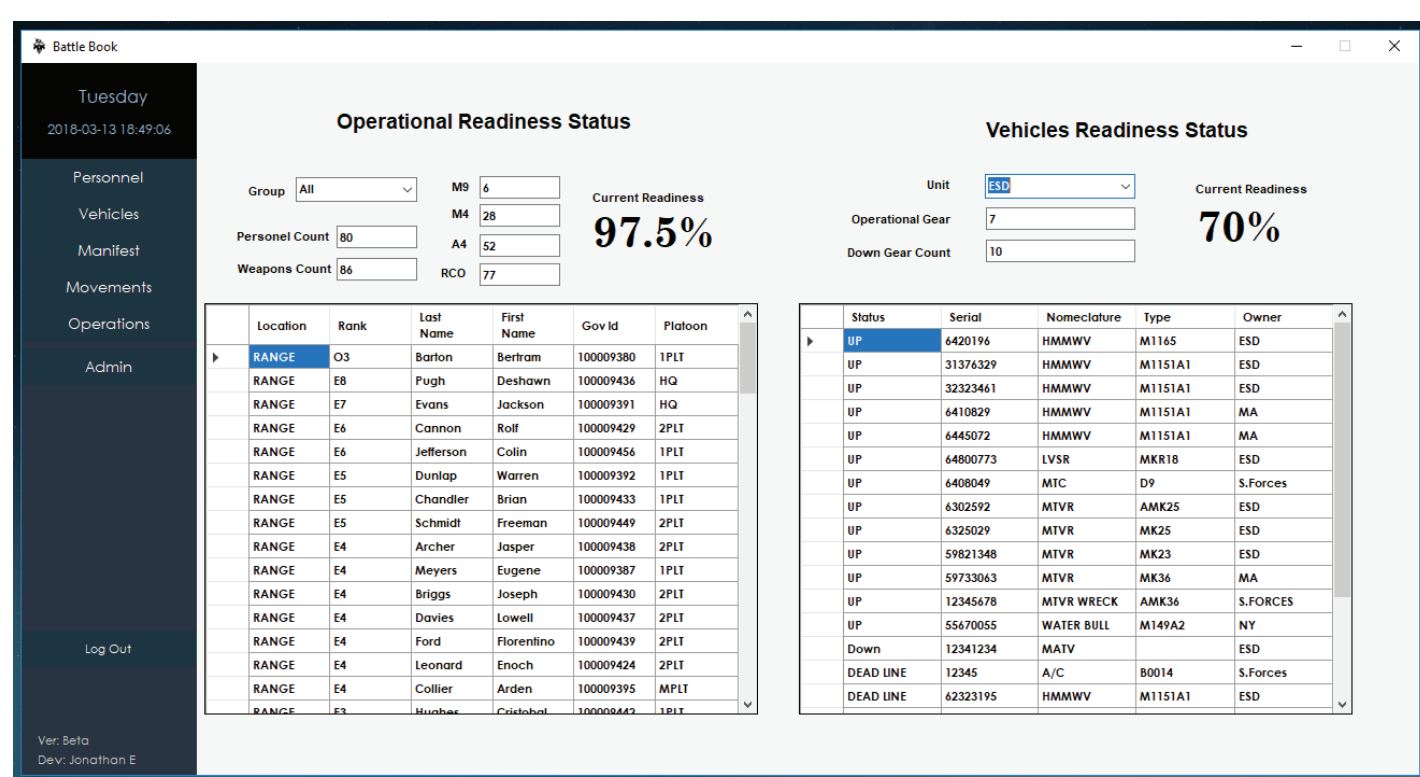


Figure 6. Operations module to track individual and vehicle statistics.

H. ADMINISTRATIVE MODULE

This module determines the level of access for each user role. Any administrative user can register new users; however, regular (i.e. non-administrative) users are not allowed to give access to other people. Assigned administrators can also perform other administrative functions on regular users, such as removing users, but not on other administrative users. When creating a new user account, it verifies that the username does not exist and enforces selecting a secure password form with a minimum number of characters and a combination of alphanumeric and special characters.

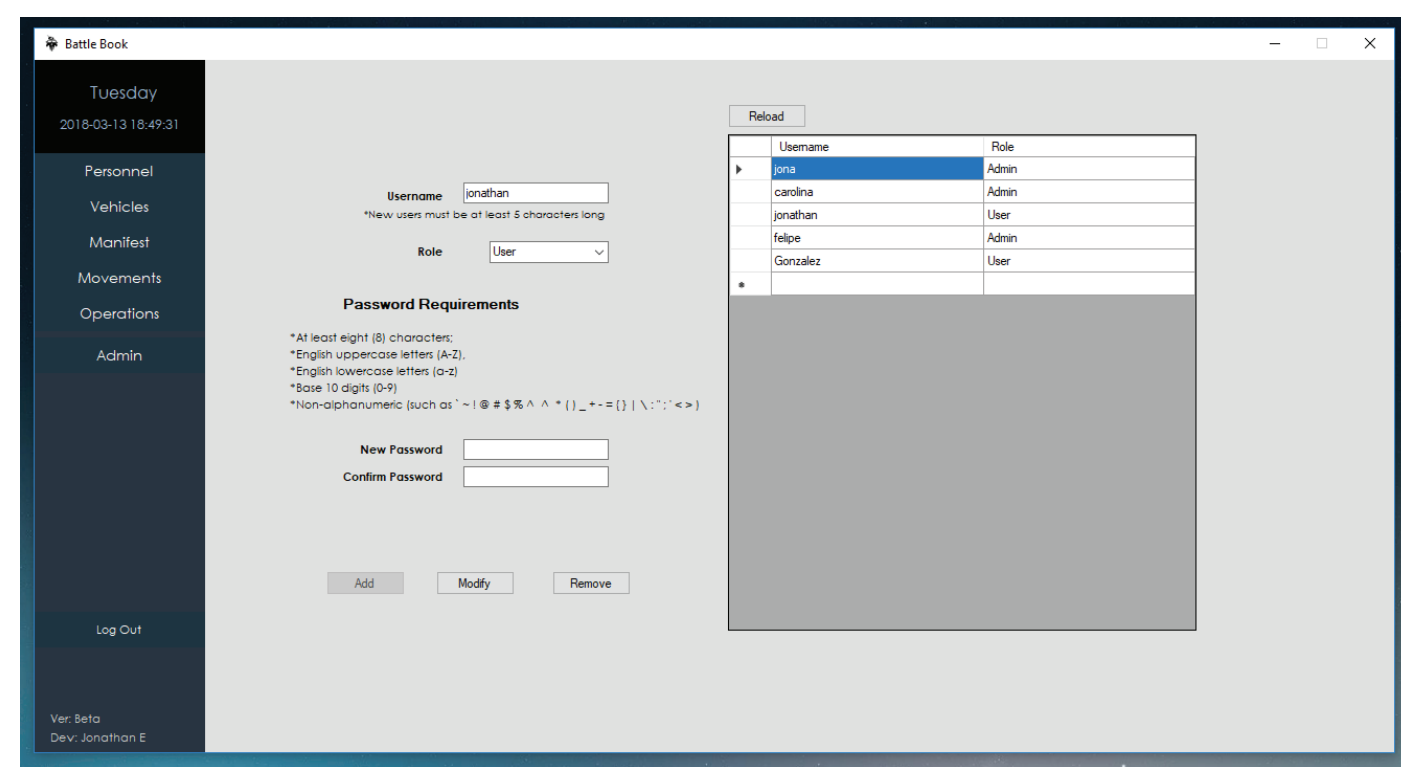


Figure 7. Administrative module to maintain user accounts and access details.

III. SUMMARY & FUTURE WORK

The Battle Book has been an idea, a way to facilitate and improve what has always been a major struggle with logistics [5] in properly tracking military unit movements. The Battle Book is a solutions hub that brings together military members with the right access to create a manifest or track a movement accurately within a couple of minutes, with all operational data stored on the cloud, and then be retrieved as needed. Furthermore, it also provides a reliable workspace where the data can be securely shared among multiple military members on the chain of command. We plan to implement additional modules and provide more functionality on the Battle Book, based on our features list that we have gathered by employing surveys of active military members who test use our product, as Figure 8 shows.



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