gis IN motion.





| **CLIENT: UP MANAGEMENT** | **TEAM NAME:**  **GIS IN MOTION** | **DATE: 11 September 2023** |
| --- | --- | --- |



**MOVE@UP**

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# Executive Summary

This document serves to describe how the individual requirements meet the business need for the project which has been approved. This is achieved through the project scope statement, the list of stakeholders and their interests in the project, the user stories, and the requirements. The project of creating the Move@UP application has been awarded to the GIS in motion team, which is made up of four individuals that are performing work for the project to achieve its objectives. This team aims to formulate solutions based on the effective use of both geographical and spatial information.

## Project Scope

This section contains the project scope, which is a rough overview of the Move@UP application. It includes both the aim of our product, as well as the purpose it serves. Secondly, it contains the list of deliverables, which are functions that the Move@UP application should accomplish. Thirdly, the project acceptance criteria, followed by the exclusions from the project, which are the aspects that will be left out or added in after the project completion stage, in later updates. Following the exclusions section are the project constraints, such as time or cost. Finally, the assumptions that are made about the product in order to help stakeholders identify the necessary resources to create the Move@UP application.

## Stakeholders

This project contains the following main stakeholders: University of Pretoria (UP) administration, the staff and faculty and finally, the students. The additional stakeholders include facilities management, safety and security personnel, the university’s legal experts, the University of Pretoria’s department of communication and marketing , the IT department and finally the project team members. The interests of these stakeholders vary. With that of UP administration being the efficient management of campus, the allocation of resources, student satisfaction, data security and privacy, strategic goals, current system analysis, long term viability and regulation compliance. Secondly, the interests of the staff and faculty include efficient campus navigation, accessibility, scheduling and planning integration, customization and personalization, safety and security, data privacy, local amenities, and services and then efficiency and productivity. Thirdly, the students’ interests are efficiency of navigation, information accessibility, campus amenities and services, information about buildings on campus, user-friendliness of the interface, mobile compatibility, and data security as well as privacy. Furthermore, the interests of the additional stakeholders include that of the facilities management which focus on ensuring that the campus facilities are not only managed efficiently but are also maintained. The interest of safety and security personnel is the safety and security of both students and staff within the UP campus. The interest of the university’s legal experts mainly focuses on ensuring that the project outcomes comply with all the relevant laws, regulations and policies. Not forgetting the interests of UP’s department of communication and marketing being the branding, communication, and promotion of Move@UP (product) to the university audiences. And lastly, the interests of the IT department being the technical feasibility of the product and the security of the web-map.

## User Stories

There are 12 user stories in the Move@UP project that explain the features that are written from the perspective of the end users. The end users include students, lecturers, guest lecturers, postgraduate students who did their undergraduate degrees at different universities, maintenance, and cleaning staff and finally the dean of the University of Pretoria. These user stories include the description of each user, their needs, and their struggles.

## Requirements

The functional requirements that describe what the Move@UP application should do and nonfunctional requirements that describe how the Move@UP application should work are mentioned in this project. The functional requirements include improving the campus navigation to reduce congestion, finding efficient routes to lecture venues, easily locating specific buildings, services, less and as well as regularly congested communal areas and eateries, locating entrances close to relevant lecture venues, and finally, easily navigating to specific locations around campus. In addition, the nonfunctional requirements include gaining insight into the students’ navigation struggles and improving campus familiarity for the users

# Change Log

| **Date** | **Action** | **Author** |
| --- | --- | --- |
| 5/9/2023 | Document Created | Keren Benjiman |
| 5/9/2023 | Added user stories | Brett Harzon |
| 5/9/2023 | Added user stories | Keren Benjiman |
| 8/9/2023 | Added user stories | Prudence Mcena |
| 9/9/2023 | Added user stories | Suzanna Spooner |
| 9/9/2023 | Added requirements table | Brett Harzon |
| 10/9/2023 | Added executive summary | Prudence Mcena |
| 10/9/2023 | Added project scope | Keren Benjiman |
| 10/9/2023 | Edited document structure | Prudence Mcena |
| 11/9/2023 | Added Stakeholders | Suzanna Spooner |
| 11/9/2023 | Edited Document Structure | Suzanna Spooner |
| 11/9/2023 | Added User-Story Map | Brett Harzon |
| 11/9/2023 | Added Use-Case diagram | Brett Harzon |
| 11/9/2023 | Added Database Diagrams | Keren Benjiman |
| 11/9/2023 | Finalized Document Structure | Keren Benjiman |
| 11/9/2023 | Added contributions table | Keren Benjiman |
| 11/9/2023 | Edited Contributions Table | Keren Benjiman |
| 11/9/2023 | Edited contributions table | Brett Harzon |
| 11/9/2023 | Edited contribution table | Prudence Mcena |
| 12/9/2023 | Edited contribution table | Suzanna Spooner |

# Project Scope

This section provides a detailed project scope statement, which aims to assist in creating a detailed work breakdown structure. It has the following sections:

* Product scope description
* Deliverables
* Acceptance Criteria
* Exclusions
* Constraints
* Assumptions

## Product Scope

*A rough overview of the product, including the aim and what purpose it serves*

GIS in Motion will develop Move@UP in order to improve the mobility of students around the University of Pretoria Hatfield Campus. The Move@UP application will provide an interactive campus map, allowing relevant stakeholders to find buildings, pathways, services and other amenities in a cohesive and complete mapping environment. The Move@UP application also contains a dashboard that shows necessary information regarding mobility around the University of Pretoria Hatfield Campus.

## Deliverables

*Project deliverables needed in order to meet the objective*

* Create web map that shows peak foot traffic around University of Pretoria, Hatfield Campus
* Create web map that shows off-peak foot traffic around University of Pretoria, Hatfield Campus
* Create web map that shows highest areas of congestion around University of Pretoria, Hatfield Campus
* Create web map that shows busiest free time areas around University of Pretoria, Hatfield Campus
* Create web map that shows busiest entrances around University of Pretoria, Hatfield Campus
* Visualize data using a dashboard

## Project Acceptance Criteria

*Requirements for a successful project*

* Successful implementation of web maps
* Successful data visualization of qualitative and quantitative data
* Improve University of Pretoria Hatfield Campus navigational ability by 5%
* Reduce lecture tardiness by 5%

## Project Exclusions

*Outside the boundaries of the project, but may be added in future projects*

* Live-data: Ideally, the map would be able to show where there are currently large amounts of foot-traffic, or congestion. However, this is currently outside the scope of the project, and has therefore been excluded.

## Project Constraints

*Potential Project constraints*

* Surveys must fall in line with the POPIA act
* Time limitations – The project can only be worked upon for roughly 7 hours a week.
* Budget – The project has a limited budget
* GIS in Motion should follow the values of University of Pretoria

## Project Assumptions

*Assumptions in order to assist stakeholders in estimating resources*

* Bugs or errors will not be present in the application
* Students will utilize the Move@UP application
* The UP-Marketing team will adequately advertise the Move@UP application

# Stakeholders

## Main Stakeholders



### UP Administration

The university administration’s interest stems from their responsibility for overseeing the university’s strategic goals, facilities and operations. Their specific interests in this project will include:

1. **Efficient Management of Campus**

They have focused many of their resources to create efficient campus management. They want the map to streamline campus operations for all campus users, as efficient campus management is crucial for overall effectiveness and productivity.

1. **Allocation of Resources**

They have a set budget each year, and they are responsible for using their resources wisely - thus, they are particularly interested in how their resources are used to make and maintain this product. Any deviation from the university’s budget may result in financial instability for the university.

1. **Satisfaction of Students**

The product will ultimately affect student satisfaction - and a satisfied student is more likely to excel academically, and positively engage with the Tuks community. Better performance by the students results in a better ranking of the university, which they are always looking to improve.

1. **Data Security and Privacy**

They want assurance that the data is handled correctly in terms of ethical and legal compliance - any data breaches could have serious consequences for the university.

1. **Strategic Goals**

Strategic goals and objectives for campus development, technology integration, and improving the university's reputation are frequently set by university administration. By demonstrating the university's dedication to technology, innovation, and student services, the web map project can help achieve these objectives.

1. **Current System Analysis**

The web map ought to work together with all current university systems, such as those for scheduling, security, and facility management. By using the map to increase the effectiveness of these systems, administrators hope to maximise its effectiveness.

1. **Long Term Viability**

The web map's long-term survival worries the administrators. As the campus changes, they want to make sure the map is accurate and current. This can entail routine map upkeep and updates.

1. **Regulation Compliance**

Administrators at the university are in charge of making sure the project complies with all applicable laws and guidelines, including those governing intellectual property rights, data protection, and accessibility.

This project’s web-map aligns with the University Admin’s strategic goals  for efficient campus management in a safe environment for students, while being ethically and legally compliant. Thus, their role is crucial in overseeing the success of the project.

### Staff and Faculty

Interests mainly reflect their roles within the university - with very specific needs. Their main interest is how it affects their everyday life. Their key interests in the project include:

1. **Efficient Campus Navigation**

Staff and faculty desire an interactive web map that makes it simple for them to find offices, conference rooms, and classrooms, thus saving them time and lowering their level of frustration.

1. **Accessibility**

They want specific accessibility information, such as accessible entrances, lifts, and ramps, to be included on the map.

1. **Scheduling and Planning integration**

Planning daily plans requires precise and current location data from faculty and employees. They are looking for a map that easily connects to their scheduling software and shows meeting locations, office locations, and class locations.

1. **Customization and personalization**

Users could have preferred ways to look at the campus map. Faculty and staff desire the option to alter the map view, for example by emphasising particular structures or establishing default map layers.

1. **Safety and Security**

Faculty and staff also want to be able to access safety and security capabilities within the map, including emergency contact details, evacuation routes and real-time campus incident notifications.

1. **Data Privacy**

Faculty members and staff want to know that their personal information and preferences are safeguarded when they use the web map, and they expect data privacy rules to be adhered to.

1. **Local Amenities and Services**

Faculty and staff may also want to know about off-campus amenities such as restaurants and banks. Knowing about on-campus amenities like dining and health services is important for scheduling breaks and meals.

1. **Efficiency and productivity**

The Faculty and Staff’s main objective is a web map that improves productivity, efficiency, and overall campus experience. They want a map that makes their day-to-day workflows and interactions more efficient and convenient.

The staff and faculty remain an important stakeholder in this project, as they will also be the ones to utilise the final we-map, and hopefully enhance their overall experience on Campus

### Students

The students are the main focus of the project, as they will be the majority users of the final product. Their focus is enhancing their campus experience by improved navigation and accessibility to valuable information. The main interests of this stakeholder are:

1. **Efficiency of Navigation**

Students want to be able to easily find their way to their classes, lectures, offices, and other campus amenities with the help of the web map. They need a convenient way to find their way around campus, especially during hectic class hours.

1. **Accessibility Information**

Students with disabilities or staff who work with students or staff who have a disability want the map to have detailed information about accessible pathways, entrances, lifts, and other amenities.

1. **Campus Amenities and services**

Students love knowing about on-campus facilities and services, like dining, libraries, health services, and recreation areas, so they can plan their break times and free time accordingly.

1. **Building information**

Students are interested in accessing detailed information about classrooms, lecture halls, and campus buildings, including room numbers, capacities, and any unique features or accessibility options.

1. **User-friendliness of interface**

Students like a user-friendly and easy-to-understand interface that doesn’t require a lot of training or tutorials.

1. **Mobile compatibility**

Since many students are on their phones or tablets, they anticipate that the web map will be mobile-friendly and available on their phones and tablets for easy navigation.

1. **Privacy and Data Security**

Students want to know that when they use the web map, their personal information is safe and secure. They want to know that their data is processed in accordance with privacy laws.

Collaboration between the student representatives and the project team is vital to ensure the success of the project.

## Other Stakeholders



### Facilities Management

Their responsibilities focus on overseeing and maintaining the physical infrastructure of the university. Thus, their interests focus on ensuring efficient management and maintenance of the campus facilities. They are also responsible for the faculty staff that fall under each department. Their focused interests may include:

1. **Accurate Faculty and Building Information**

Facilities managers rely on the web map for accurate and timely data about buildings, facilities and their layouts, including room numbers, utilities, HVAC, and more.

1. **Energy efficiency and Sustainability**

Facility managers may want to emphasise energy efficient buildings, sustainable processes, and green amenities on the map, which is in line with the university’s sustainability objectives.

1. **Integration with the current management systems**

Integration with legacy facility management systems is essential. This enables more efficient maintenance scheduling, resource utilisation, and energy consumption.

1. **Accessible facilities**

When it comes to accessibility, accessibility is a top priority for facilities management stakeholders. They want to make sure that the map includes information about accessible entrances, accessible elevators, accessible ramps, etc.

1. **Long term viability and maintenance of the map**

Facilities management stakeholders want to know that the web map will be around for the long term. They want to know that it will be updated, maintained, and improved over time as the campus changes.

1. **Maintenance and Schedule planning**

The web map can also be used to schedule and plan maintenance activities. Stakeholders in facilities management may want to use the web map to manage repair teams and allocation of resources.

### Safety and Security Personnel

Their main focus is ensuring the safety and security of students and staff on the University of Pretoria’s campus (the campus community)

1. **Emergency preparedness and response**

Safety and security Professionals want their web map to play an important role in emergency preparedness & response. They want real-time information on emergency situations, evacuation routes and emergency equipment locations (fire extinguishers, for example).

1. **Contact information**

Safety and security stakeholders want emergency contact information to be readily available on the map, including the contact numbers of campus police, emergency medical services, and university departments.

1. **Entry points and access control**

Mapping Access Control Points, Security Checkpoints, and Card Reader Locations is a common request from safety and security stakeholders to improve campus safety.

1. **User safety training**

One way to improve campus safety is by providing users with safety training tools within the map.

1. **Data security and privacy**

Safety and security stakeholders want user data, particularly emergency reporting data, to be handled safely and in accordance with privacy laws.

1. **Integration with current campus security**

The map can also be used in conjunction with other campus security tools, such as security cameras or access control systems.

Collaboration with this stakeholder is important to achieve the objectives effectively, without putting any personnel at risk. Student and staff safety is of utmost importance to the university, and thus, should also be for this project

### University’s Legal Experts

This stakeholder includes legal counsel and compliance officers. Their primary focus will be that the project outcomes comply with all relevant laws, regulations and university policies. Theu main interests will include:

1. **Accessibility Compliance**

In many jurisdictions, the accessibility of the web map is a legal requirement. Legal professionals want the map to comply with accessibility standards, like WCAG, to avoid legal issues.

1. **Data Safety and Privacy Compliance**

Legal professionals are concerned about data protection and want to make sure that the data collection, storage and use of user data via the web map is compliant with data protection legislation such as the GDPR or local privacy laws.

1. **Intellectual property and licensing**

Legal professionals will assess the intellectual property rights in relation to map data, images and other content. The goal is to make sure the university has the correct licences and permissions in place for all materials used on the map.

1. **Regulatory Compliance**

If third party vendors or service providers are involved in the project, legal professionals may review and negotiate agreements to ensure compliance with legal requirements and to protect the university’s interests.

1. **Contractual Agreements**

If third party vendors or service providers are involved in the project, legal professionals may review and negotiate agreements to ensure compliance with legal requirements and to protect the university’s interests.

1. **Privacy Policy and Terms of Use**

Legal professionals will review and possibly create privacy policies and Terms of Use for the web map that outline user rights and obligations and the university’s data policies.

1. **University Policy Compliance**

Legal professionals will make sure the project complies with the university’s internal rules and regulations, including any technology, data, or digital communications policies.

1. **Training and Awareness**

Project team members may receive legal training or awareness programs from legal experts to ensure they are aware of and comply with legal requirements during the course of the project.

In order to minimise the legal risks, it is crucial in collaborating with the legal counsel to adhere to their specific interests

### Communications and Marketing Department of UP

This stakeholder is crucial to the promotion and final implementation of the product, as ultimately, this product will represent the University -  their interests will focus on the branding, communication and promotion of the product to the various University audiences. Their key interests will include:

1. **Branding and Design**

It’s also important to ensure the web map is in line with the university’s branding strategy. The marketing and communication team wants the map to be consistent with the school’s visual identity and design.

1. **Content Strategy**

Marketing teams want to create a content strategy that emphasises the map’s key characteristics, advantages, and applications in the real world. This includes creating stories and narrative around the map.

1. **User Engagement and Adoption**

The marketing and communication teams want to get the most out of the user experience. They want to get the word out about the web map to students, faculty and staff, and to the entire campus community.

1. **Feedback collection**

These stakeholders may establish feedback channels within the map or via other channels to collect user feedback and suggestions for improvements.

1. **User Training and Support**

Make sure users understand how to use the map. Marketing and communication departments may create training materials, guides, and support channels.

1. **Data Privacy**

One of the marketing and communication team’s top priorities is to ensure that the user data collected via the map is processed in accordance with data privacy regulations and university policies.

1. **Case Studies and User Testimonials**

This can be done by collecting and displaying user reviews and case studies that demonstrate the map’s impact on campus life.

1. **Social Media Integration**

One of the most important areas of focus is using university social media platforms to advertise your web map and reach out to the campus community. You can share news, advice, and user experiences.

1. **Public Relations**

The web map can also be used by marketing and communication departments as a PR tool to promote the university’s focus on innovation, technology and student services.

Successful coordination of communication and marketing of the product is key to achieving the product’s objectives, as it is what drives user engagement and adoption of the product.

### IT Department

This stakeholder's focal point centres around the technical feasibility of the product as well as the security of teh web-map. The key interests would include:

1. **System Integration**

Connect the web map with your university’s systems. The IT department wants the map to work well with databases, scheduling, campus security, and other platforms.

1. **Technical Feasibility**

With the infrastructure, software and development tools available, the IT department wants to make sure that the web map is technically feasible and that the solution proposed is compatible with the IT capabilities of the university.

1. **Data Security**

Data protection is at the top of the list. The IT department focuses on protecting user data, secure data transfer, and preventing data breaches or cyber attacks.

1. **User Authentication and Authorization**

User authentication and authorization is a key component of controlling access to your web map. Your IT department wants to make sure that only authorised users have access to specific features or data.

1. **Software development and maintenance**

IT teams may develop and maintain the web map’s software components. IT teams want to make sure that coding practices are in line with industry standards for security, dependability, and maintainability.

1. **Mobile Responsiveness**

With so many people using their phones all the time, IT teams need to make sure the web map responds to mobile devices and works properly on their phones and tablets.

1. **Technical Support**

Technical support for users facing problems with web map is crucial. IT teams can be responsible for fixing and resolving technical issues quickly.

1. **Performance Management**

Load testing and on-going performance monitoring help make sure the web map is able to cope with heavy traffic without causing performance issues.

1. **Compliance with IT Regulations and Policies**

IT stakeholders want to make sure the web map project adheres to the university's IT guidelines as well as any applicable local or national IT guidelines and requirements.

1. **Compatibility and Cross-Browser Support**

The web map should work across browsers and devices. Information technology (IT) stakeholders want cross-browser support for a unified user experience.

The IT Department is a crucial stakeholder in this project in order to ensure long-term success of the project. Thus, meeting the requirements of their interests is essential for the success of the implementation of the project.

### Project Team Members

The project team consisting of all the project members, managers, developers, designers and team members all have key interests and objectives. Their interests are crucial for the success of the project in terms of planning, development and implementation of this project.

1. **Project Planning and Timeline**

Develop a comprehensive project roadmap with milestones, time frames, and dependencies that will help keep the project on track and on schedule.

1. **Resource Allocation**

Develop a comprehensive project roadmap with milestones, time frames, and dependencies that will help keep the project on track and on schedule.

1. **Stakeholder Communication**

Communicating effectively with all stakeholders, such as university leaders, faculty, staff and students, to collect needs, update information and address issues.

1. **Team Roles and Responsibilities**

Defining the roles and responsibilities of team members so that everyone has a clear understanding of their roles and responsibilities and can work effectively.

1. **User Experience and Design**

Developing an easy-to-use web map interface to meet the requirements and preferences of end users, providing a great user experience.

1. **Project Documentation**

Documentation of Project Requirements, Design Decisions, Code, and Development Processes for Reference and Future Updates.

1. **User Training and Support**

Developing user education and support tools to help end users navigate and use the web map efficiently.

1. **Quality Assurance and Testing**

Rigorous testing to detect and fix bugs, mistakes, and usability issues to provide a robust and error-proof web map.

1. **Development and Programming**

Coding and development of the technical elements of the web map including backend database, front-end interface, and any mobile application.

1. **Data Security and Privacy**

Protecting user data, adhering to data privacy laws, and resolving cybersecurity threats.

1. **Management of Project Budget**

Project cost management and budgeting and resource efficiency.

1. **Client Satisfaction**

Ensuring the project fulfils or surpasses the University’s and stakeholders’ expectations, leading to client satisfaction.

1. **Risk Management**

Risk Identification and Mitigation Risk identification and mitigation of project risks and issues.

1. **Project Closure and Handover**

Closing the project properly, documenting project results, and transferring the finished product to the college for future upkeep and use.

Effective collaboration and communication among team members is vital to meeting the other stakeholders’ interests and delivering a high quality end-product (web-map). Thus, ensuring that the project team members’ interests are met is an integral part of ensuring the overall success of the project.

# User Stories





# Requirements

| Functional Requirements | | | | |
| --- | --- | --- | --- | --- |
| **ID** | **Stakeholder** | **Requirement** | **Priority** | **Acceptance criteria** |
| 01 | Third-year student  (Students) | Functional: Improve campus navigation to reduce congestion. | High | Clear and efficient routes should be available to traverse campus. These routes should aim to reduce congestion during peak periods. |
| 02 | Economics lecturer  (Staff and Faculty) | Functional: Find efficient routes to lecture venues. | High | Provide multiple route choices between buildings. |
| 03 | First-year student  (Students) | Functional: Easily locate specific buildings | High | Clearly show where relevant buildings are located. |
| 04 | First-year student  (Students) | Functional: Easily locate eating spots on campus | Medium | Clearly show where specific eateries are located. |
| 05 | First-year student  (Students) | Functional: Locate entrances close to relevant lecture venues. | High | Show where entrances are located with necessary labels. |
| 06 | First-year student  (Students) | Functional: Locate specific services and show relevant information. | Medium | Show where specific services are located; this should aim to assist students in finding help that they need. |
| 07 | Students | Functional: Locate communal areas that are not congested; as well as identify areas that are regularly congested. | Medium | Highlight areas on the interactive map that show congested areas. |
| 08 | Guests  (Other) | Functional: Navigate to specific locations around campus. | High | Show where relevant buildings are located so that guests can navigate to where they need to be. |
| 09 | Maintenance and cleaning staff  (Staff and Faculty) | Functional: Locate specific buildings | High | Show where specific buildings are located so that staff members can perform their work efficiently - this can also be beneficial when training new staff who do not yet know their way around. |
| 10 | New students  (Students) | Functional: Locate specific buildings | High | Show where relevant lecture venues and offices are located, as well as paths to get there, to assist new students (including post-graduates from other universities) who do not know their way around. |

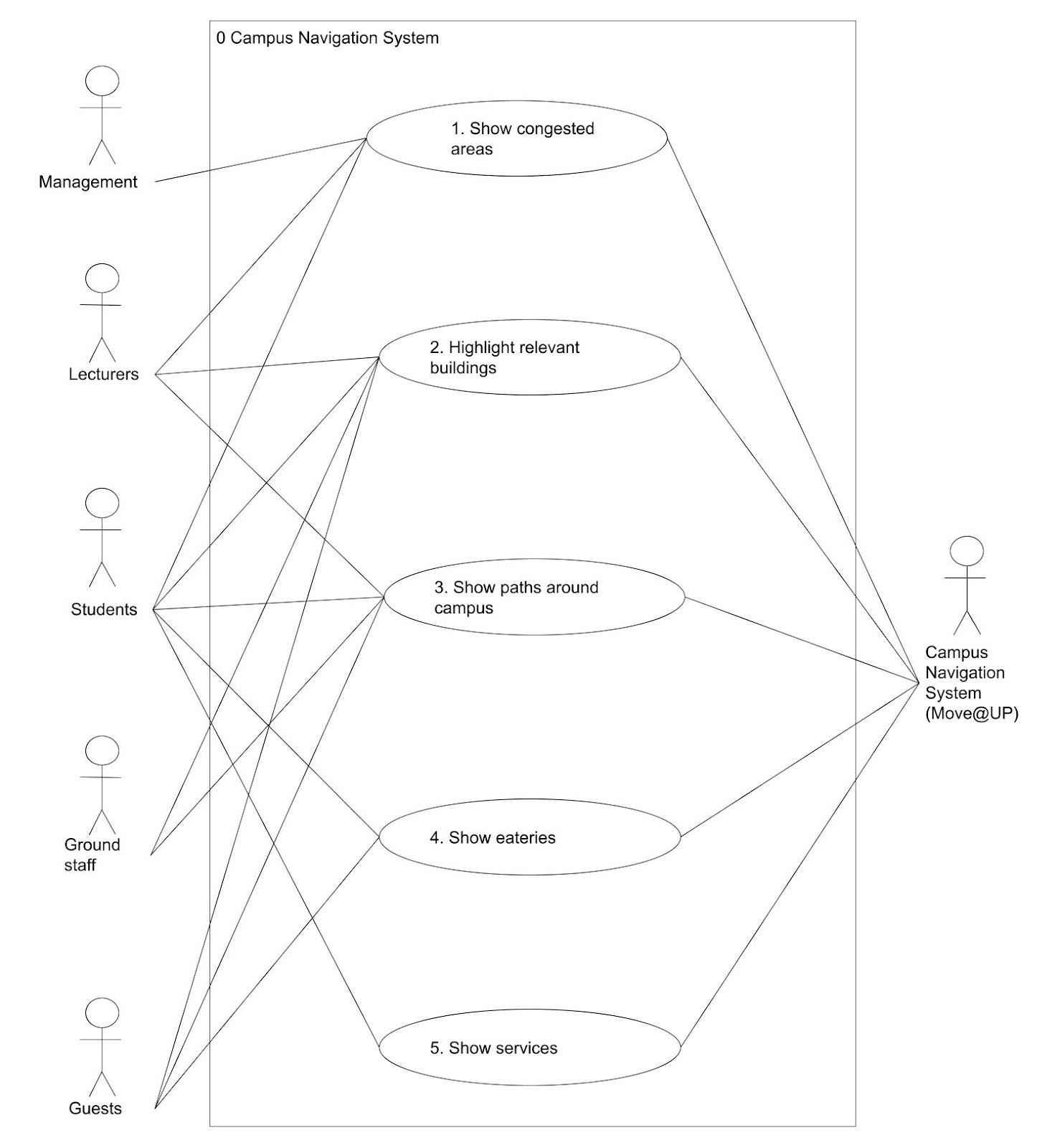
| Non - Functional Requirements | | | | |
| --- | --- | --- | --- | --- |
| **ID** | **Stakeholder** | **Requirement** | **Priority** | **Acceptance criteria** |
| 01 | Dean  (Staff and Faculty) | Non-functional: Gain insight into students’ navigation struggles | Low | Collect data from students about individual struggles. |
| 02 | Students  (Students) | Non-functional: Improve campus familiarity to assist students with reaching classes on time. | Medium | Provide an interactive map of campus that shows names and locations of buildings. |

## User-Story Map

A group of squares with text

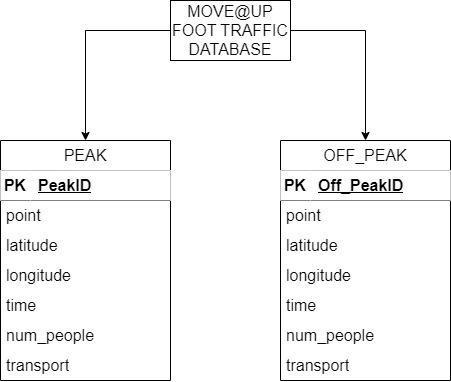
Description automatically generated

## Use-Case diagram



## Database UML Diagrams

### Foot Traffic Database



### Survey Database

# Contributions

| Student | Contribution |
| --- | --- |
| Keren Benjiman 21466379 | Project Scope, 3x User Stories, Database Diagrams, Final document compilation |
| Brett Harzon 21533114 | 3x User Stories, Requirements table, Use-case diagram, User-story map |
| Prudence Mcena 20474882 | Executive summary, 3x User Stories, cover page and logo |
| Suzanna Spooner 19043695 | Stakeholders, 3x User Stories |