Vision and Scope Document

for

Theia

Version 1.0 approved

Prepared by Team Bagel: Arlo Roos, Aaron Howe, Joshua Evans, Grace Anderson, Nick Vendeland, and Jaeger Nelson

CptS 484 Software Requirements

11/26/25

Table of Contents

1. Business Requirements **1**
1.1. Background 1
1.2. Business Opportunity 1
1.3. Business Objectives 2
1.4. Success Metrics 2
1.5. Vision Statement 3
1.6. Business Risks 3
1.7. Business Assumptions and Dependencies 4
2. Scope and Limitations **4**
2.1. Major Features 4
2.2. Scope of Initial Release 5
2.3. Scope of Subsequent Releases 5
2.4. Limitations and Exclusions 5
3. Business Context **6**
3.1. Stakeholder Profiles 6
3.2. Project Priorities 7
3.3. Deployment Considerations 7

Revision History

Name	Date	Reason For Changes	Version
Initial Draft	11/26/25	Initial draft, sections 1-2 written	1.0 approved
Final Draft	12/04/25	Final draft, finish section 3 and final edits	1.0 approved

1. Business Requirements

1. Create an app that assists visually-impaired individuals with indoor navigation by providing a simple and concise user-interface with voice assistance in app interaction and live navigation.
2. Build functional capabilities to safely guide users on a path to a desired location with real-time obstacle detection.
3. Provide fallback emergency assistance when users are in distress and incapable of manually seeking help.

1.1. Background

The idea for Theia was sparked during an orientation seminar at a University for those with disabilities. The seminar had discussed the increased level of proficiency that those with visual impairments have using white canes or service animals in avoiding unseen obstructions in a path, but also discussed the struggles of navigating closed corridors to find a particular location. This brought about the realization that smartphone assisted navigation could be utilized to address this problem. Theia was then conceived to close the door on what should have always been an obvious edge case in software-assisted navigation by providing route pathing functionality driven by text-to-speech vocal guidance.

1.2. Business Opportunity

Indoor navigation for the visually impaired can be aided by the use of white canes and/or service animals, but these solutions are limited to immediate obstacle detection and do not extend to directional route planning. GPS navigation exists but is catered to outdoor navigation, being unreliable indoors and largely unavailable. Customers for Theia primarily need assistance with arriving at a specific location indoors without relying on visual interfaces. There are several different business markets in which Theia can be of assistance to the visually impaired, to name a few: Hospitals, universities, shopping centers, office buildings. Without a proper solution to this problem, individuals with visual impairment face the potential of being late to important events such as appointments, work, or class. More critically, emergency situations from collisions/falls could arise, with the added chance of being unable to seek help. Theia solves these problems by mapping a route to a desired location and guiding the user through TTS voice assistance technology with turn-by-turn alerts. Advancements in indoor location-tracking technology through WiFi triangulation and Bluetooth, along with a growing need for accessibility compliance pushes Theia into a favorable position in the software market.

1.3. Business Objectives

Theia's business objectives are intended to bring value to visually impaired users and to stakeholders making investments in navigation software. The project's timeline is geared towards demonstrating a functional prototype by the end of a 12 week development period focused primarily on software requirements engineering with a working user interface, route navigation, voice recognition, and text-to-speech technology. Users will be provided a user-interface designed to be simple and intuitive for the visually impaired, with a home screen showing three large buttons for microphone activation, deactivation, and a tools redirection, respectively. The tools menu is intended to be used by a primary caretaker/family member of a user to add emergency contact information and settings to customize Theia to cater to the impaired user's needs. These features aim to bring a potential launch rating of 4/5, and reduce indoor navigation time for users by up to 50% with a safety rating of 5/5. We intend to partner with educational institutions to promote Theia to students with visual impairment, with future partnerships extending to healthcare facilities by the first annual Q4.

1.4. Success Metrics

We have defined a list of metrics with target values to define the success of Theia. We have placed the software's core functional features at highest value (1-4), as they will largely determine a user's overall satisfaction with the system. Software component reaction time and success rates are followed, justified as they fall under optimizations. Navigation time reduction and market exposure can be impacted by external factors such as a user's own capabilities and stakeholder-stakeholder communication.

No.	Metrics	Target
1	Rate of Completion for Indoor Navigation	$\geq$ 95%
2	Obstacle Detection Success Rate	$\geq$ 90%
3	Fall/Collision Detection Rate	99%
4	Emergency Alert Time	$\leq$ 10 seconds
5	Input Response Time	$\leq$ 3 seconds
6	Voice Recognition Failure Rate	$\leq$ 5%
7	Navigation Time Reduction	50%
8	Market Exposure	Used in 10 institutions by Q4

1.5. Vision Statement

The Theia application intends to aid those with visual disabilities, to make finding indoor locations an easier task, as well as a safer one through the use of a simple and intuitive interface with voice recognition and text-to-speech technology.

1.6. Business Risks

Risk	Severity	Mitigation Strategy
Indoor Position Accuracy	High	Test Theia in controlled environments to meet specified accuracy metrics.
Building Mapping Scope	High	Utilize floorplans of buildings through institutional partnerships.
Market Exposure	Medium	Communicate frequently with individuals with visual impairment in project design and promote the software through seminars for individuals with disabilities.
Complex Interface	Medium	Include a tutorial to be followed by a caretaker; frequently test with the target audience.
Infrastructure	High	Only target institutions that invest in smart technology infrastructure.
Injury Liability	High	Hire attorneys to draft risk and liability disclaimers and become insured.

1.7. Business Assumptions and Dependencies

Assumptions:

- Visually impaired individuals have access to smartphones.
- Visually impaired individuals have access to a mobile network through an ISP.
- Visually impaired individuals are comfortable using voice recognition software.
- Visually impaired individuals are comfortable allowing an application to track their geo-location.
- Institutions partnered with Theia put accessibility compliance for those with disabilities at high importance.
- Institutions possess floor plans for owned buildings.
- Theia will be financially supported through partnership funding.
- Frequent pressure for accessibility compliance will drive demand for indoor voice-driven navigation software.

Dependencies:

- Supported WiFi coverage or smart bluetooth infrastructure.
- Cloud infrastructure (Azure).
- Text-to-speech technology.
- Compliance with ADA accessibility standards and guidelines.
- GDPR and CCPA data privacy compliance.

2. Scope and Limitations

2.1. Major Features

1. Voice Recognition: Theia listens for voice commands from a user to perform a task.
2. Text-to-Speech Guidance: Theia provides directional instructions and emergency alerts to a user through text-to-speech technology.
3. Route Navigation: Through a voice command from the user and access to a user's geo-location, a route is generated to an end destination from a path-finding algorithm.
4. Obstacle Detection: Obstructions along a user's path tracked by WiFi triangulation or a bluetooth beacon are detected by Theia and alert the user.
5. App Customization: A tools menu for a caretaker/guardian to change application accessibility catered to the primary user's needs.
6. Emergency Alert: Theia detects when a user has had a fall or collision and requests vocal confirmation that they are okay. If the user fails to comply, Theia will alert an emergency contact.

2.2. Scope of Initial Release

The included features in the initial release of Theia will be voice recognition, route navigation, and emergency alert. These three features have the largest impact of potential value that Theia can bring to the software-driven navigation market. Obstacle detection isn't considered a high priority, since that problem is already solved by white canes and/or service animals, and is thus a low-impact, high-cost feature. In its default state, the app is already highly intuitive for visually impaired individuals, proven through frequent prototype testing, so accessibility settings will be limited to entering information for an emergency contact to support the high priority emergency alert feature.

2.3. Scope of Subsequent Releases

Incremental Releases Projected Features

1. Obstacle detection and accessibility customization.
2. Optimized route plotting to improve destination and shortest path accuracy.
3. Improved location-based user positioning through WiFi triangulation/bluetooth beacon.
4. Accuracy improvements on voice recognition software to account for accent/slang.

2.4. Limitations and Exclusions

There are limitations on particular features caused by time and scope constraints. The features affected are as follows:

- Pre-determined knowledge of paths being closed/unavailable (Alternative routes can be generated upon command).
- Outdoor navigation from building to building.
- Visual interface of route navigation for non-impaired users.

3. Business Context

3.1. Stakeholder Profiles

Stakeholder	Major Value	Attitudes	Major Interests	Constraints
Visually Impaired Users	*Define high priority requirements, measure success, increased revenue.*	*Optimistic about the product, cautious towards data privacy.*	*Safer navigation, faster navigation, intuitive interface, receptive voice recognition, responsive voice instructions.*	*Smaller testing pool, unpredictable proficiency with smart technology, potential for additional impairments (deaf, mute).*
Caregiver	*Feedback on primary user requirements, handle app accessibility configurations, emergency contact.*	*Excited for product potential, but cautious for primary user, concern for safety and data privacy.*	*Intuitive user interface, intuitive application setup, functional emergency alert push notifications.*	*Possible technical deficiency, unpredictable availability for emergency response.*
Facility Management	*Access to building blueprints/floor plans, partnership coordination.*	*Concern for costs, concern for facility confidentiality, concern for liability.*	*Low-cost partnerships, advertisement, reputation boost, accessibility benefits.*	*Low-cost partnerships or unreceptive to partnerships, building renovations, untrusting nature, bureaucratic drama.*
Emergency Services	*Emergency Response*	*Concern for applications' emergency response reliability.*	*Accurate location data, building layout, emergency detection accuracy, false positives, EMS alert integration.*	*Secondary emergency alert priority, liability, functionality must be near-perfect.*
Developer	*Requirements engineering, code construction, documentation.*	*Motivated, excited, ambitious, tired.*	*Requirements, reasonable scope, positive reception, high quality feedback.*	*Limited access to primary users for testing, low budget, limited software tools, unknowns.*
Regulation Agencies (ADA, WCAG,	*Compliance and standards guidelines,*	*Concern for law abidance.*	*WCAG compliance, ADA compliance,*	*Strict legal requirements,*

Privacy Consultants)	*legal guidelines, privacy laws, accessibility requirements .*		*privacy compliance, data transparency.*	*possible legal consequences.*
Sponsorships	*Financial assistance, networking, business practices.*	*Ambitious and cautious towards investment.*	*Marketing opportunities, social reputation, financial success.*	*Proof of concept, need for a meticulously detailed plan, frequent reporting, advertising, loan repayments.*

3.2. Project Priorities

Dimension	*Driver (state objective)*	*Constraint (state limits)*	*Degree of Freedom (state allowable range)*
Schedule	*release 1.0 to be available by 12/01, release 1.1 by 12/07*	*Technologies, costs, outages*	*0*
Features	*Implement Software Requirements*	*Lawful compliance, staffing*	*80-90% of high priority features must be included in release 1.0*
Quality	*Requirements are met, user interface is intuitive, QA verification*	*Failing test suites, changing requirements*	*90-95% of user acceptance tests must pass for release 1.0, 96-99% for release 1.1*
Staff		*maximum team size is 1 PM, 1 BA, 4 developers + 3 testers*	
Cost			

3.3. Deployment Considerations

The Theia platform is built for cross-platform mobile use, thus it will not be supported for the web or desktop. The current user-interface built for the prototype reveal is sufficient, but additional features will be added before official deployment. Strict requirements implemented to the satisfaction of agencies such as ADA and WCAG require long-term maintenance to ensure we are following regulation policy. Theia will be deployed into the mobile marketplace, hosted by Azure. Users in locations such as University campuses, hospital sites, office buildings, etc. will need to access the system.