Process Specification

Version 1.0

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CPTS 484_THEIA

11/24/25

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Revision History

Name	Date	Reason for Changes	Version
Julia Lee	11/24/25	Initial draft	1.0

1. Introduction

This document specifies the Requirements Engineering (RE) process for the THEIA project. Using the IDEF0 methodology, it models the activities, data flows, controls, and mechanisms that evolve the project from Phase I to finalized requirements and design deliverables. The process also includes limited implementation to build a working prototype that demonstrates Phase I scenarios. Full production hardening and deployment are out of scope.

2. Model Definition

- **Context:** The model covers Phase II activities from Nov 1 to Dec 1. It starts with revising Phase I deliverables and ends with submitting WRS 2.0, prototype designs, and a reviewed working prototype build.
- **Viewpoint:** Technical Lead perspective, with emphasis on deliverable management, team coordination, prototype development, and course compliance.
- **Purpose:** To document the workflow that addresses Phase I deficiencies, refines domain understanding, and produces the final requirements specification and mockups, while validating requirements through an instrumented working prototype. Offline operation is excluded from the initial release, and fall detection remains a candidate for later releases.

3. Context Diagram (A-0) Description

The A-0 diagram represents the highest-level view of the team's work, treating the Phase II process as a single function.
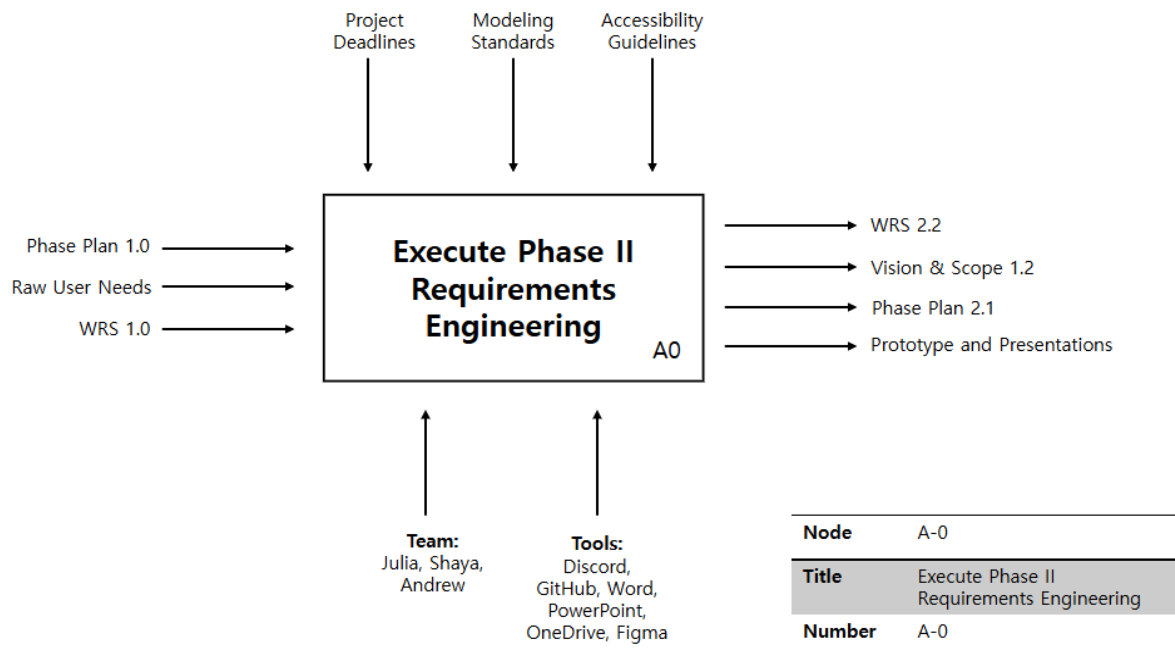
Figure 1: A-0 Context Diagram

Function Name: Execute Phase II Requirements Engineering

ICOM Definitions:

- **Inputs (Left):**
    - Phase Plan 1.0: The preliminary documents that were created (never submitted by the previous team lead).
    - Raw User Needs: Data regarding visually impaired user constraints (e.g., need for hands-free operation).
    - WRS 1.0 Document: Requirements specification draft.
- **Controls (Top):**
    - Project Deadlines: Phase II Final Submission (Dec 1).
    - Modeling Standards: IDEF0 and KAOS syntax rules.
    - Accessibility Guidelines: WCAG 2.1 and Apple/Android Human Interface Guidelines.
- **Outputs (Right):**

      o   WRS 2.0 Document: Refined requirements specification.

      o   Vision & Scope 1.0: Business requirements document.

      o   Phase Plan 2.1: Revised preliminary documents.

      o   Prototype and Presentation Slides

- **Mechanisms (Bottom):**

      o   Team: Julia Lee, Shaya Arya, Andrew Neal.

      o   Tools: Discord, GitHub, Microsoft Word, PowerPoint, OneDrive, Figma.

4.   Decomposition Diagram (A0) Description

This section decomposes the main process into four sequential activities to ensure data consistency and detailed analysis.
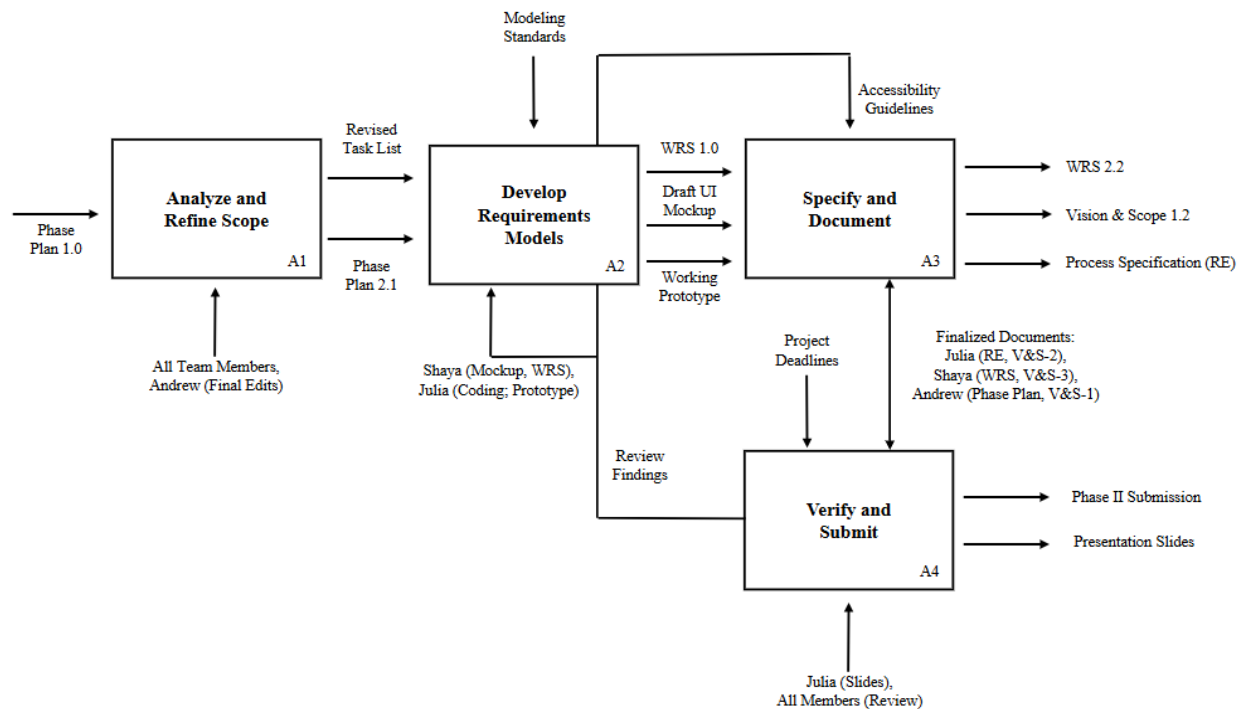

Figure 2: A0 Decomposition Diagram

Activity 1: Analyze and Refine Scope

- **Description:** Since the previous team lead did not submit a Phase I plan, there is no external feedback. The team reviews the unsubmitted drafts internally, identifies missing

components, and revises the project plan. All members update the Phase Plan and review other general documents to derive a specific task list.

- **Input:** Phase Plan 1.0.
- **Output:** Revised Task List, Updated Phase Plan.
- **Mechanism:** All Team Members (Phase Plan updates). Andrew (Final edits Phase Plan)

Activity 2: Develop Requirements Models

- **Description:** Structured models and prototypes are constructed. Shaya designs the UI mockups, and Julia performs development tasks (coding the prototype) to refine and validate functional requirements.
- **Input:** Revised Phase Plan 2.1, Task List.
- **Control:** Modeling Standards (IDEF0, KAOS).
- **Output:** Draft WRS, Draft UI Mockups, Working Prototype.
- **Mechanism:** Shaya Arya (UI Mockups, WRS), Julia Lee (Development/Coding).
- **Feedback:** Receives revision requests from A4 (Verify).

Activity 3: Specify and Document

- **Description:** The formal WRS 2.0, Vision & Scope, and RE Process documents are written. Team members divide responsibility for specific sections.
    - o **Vision & Scope:** Andrew (Section 1), Julia (Section 2), Shaya (Section 3).
    - o **WRS:** Shaya (Final edits).
    - o **RE:** Julia.
- **Input:** Draft WRS, Draft UI Mockups, Prototype Data.
- **Control:** Accessibility Guidelines.
- **Output:** Finalized Documents (WRS 2.0, Vision & Scope 1.0, Process Specification).
- **Mechanism:** All Team Members (Specific Roles: Julia - RE Process & Vision Sec 2; Shaya - WRS & Vision Sec 3; Andrew - Vision Sec 1 & Phase Plan).

Activity 4: Verify and Submit

- **Description:** A final peer review is conducted to ensure consistency. Julia creates presentation slides. All deliverables are integrated and submitted to Canvas/GitHub.

- **Input:** Finalized Documents.

- **Control:** Project Deadlines.

- **Output:** Phase II Submission, Presentation Slides.

- **Mechanism:** Julia Lee (Presentation Slides), All Team Members (Final Review).

- **Feedback Output:** "Review Findings" are routed back to A2 and A3 as controls/inputs for rework if errors are found.

5. Glossary of Terms

- **IDEF0:** A modeling method that represents functions with their inputs, controls, outputs, and mechanisms.

- **ICOM:** Acronym in IDEF0 for Inputs, Controls, Outputs, and Mechanisms.

- **Input:** Data or artifacts required to perform an activity.

- **Output:** Artifacts produced as the result of an activity.

- **Viewpoint:** The perspective adopted by the model, specifying stakeholder roles and concerns.

- **A-0 Context Diagram:** The top-level diagram that shows the entire process as a single function.

- **A0 Decomposition Diagram:** The diagram that decomposes A-0 into lower-level activities.

- **Phase Plan:** The document outlining roles, schedule, risks, and planned deliverables.

- **Vision & Scope:** The document defining business goals, stakeholder value, and initial release scope.

- **Working Prototype:** A functional build used to validate requirements and demonstrate Phase I scenarios, not production hardened.

- **Mockup:** A static design of the user interface without interactive behavior.

- **Traceability:** The ability to link Vision, goals, requirements, design, and prototype artifacts.

- **Accessibility Guidelines (WCAG 2.1):** Accessibility standards covering perceivable, operable, understandable, and robust principles.

- **Human Interface Guidelines (HIG):** Platform-specific design guidelines for Apple and Android.

- **KAOS:** A goal-oriented requirements engineering method for modeling goals, obstacles, and resolutions.

- **Candidate Feature:** A feature retained for future releases rather than the initial release.

- **Offline Operation:** The capability to function without network connectivity, excluded from the initial release.