CEBU INSTITUTE OF TECHNOLOGY
UNIVERSITY

IT317-G5

PROJECT PROPOSAL

Proponents:

Pangan, Arnnon Zevv – Product Owner

Policios, Andre – Business Analyst

Panugaling, Franklyn John – Scrum Master

Date: September 13, 2025

Project Proposal

Project Title: *SmartBus Web+: Campus & Community Bus Tracker with Crowd Updates*
Proponent(s): *Arnnon Zevv Pangan, Andre Policios, Franklyn John Panugaling*

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1. Executive Summary

SmartBus Web+ is a proposed web-based bus tracking system that aims to enhance the visibility, reliability, and overall efficiency of campus and community shuttle services. The system integrates Global Positioning System (GPS) data, obtained through driver-operated smartphones or simulated inputs, with crowdsourced passenger feedback to deliver accurate and real-time shuttle status updates. Through this dual-source approach, commuters are better informed of arrival times, delays, and route conditions, thereby improving their ability to plan travel efficiently.

The primary features of SmartBus Web+ include:

1. GPS-enabled shuttle tracking using readily available mobile devices.

2. A commuter validation and reporting mechanism that supplements automated GPS data with real-time passenger confirmation.

3. A responsive web interface accessible across desktop and mobile platforms.

The system will be developed using modern web technologies such as HTML, CSS, and JavaScript for the front-end, Node.js with Express for the back-end, Firebase or SQL for database management, and Google Maps API for geolocation and mapping functionalities.

The expected benefits of SmartBus Web+ extend beyond commuter convenience. The system will reduce uncertainty and idle waiting time for passengers, optimize shuttle utilization for operators, and introduce a cost-efficient alternative to proprietary transport management platforms. Moreover, it is designed to be scalable, with the potential for adoption by other educational institutions and local communities, thereby contributing to the broader advancement of smart mobility solutions.

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2. Background / Problem Statement

Campus and community shuttle services often experience delays, overcrowding, and lack of real-time visibility, leaving commuters uncertain about arrival times and reducing productivity.

Research shows that long and unpredictable commuting negatively affects satisfaction and efficiency (Han, Peng, & Xu, 2023). To address this, SmartBus Web+ proposes a web-based platform that combines GPS tracking with commuter feedback, providing a more reliable and accessible system for shuttle monitoring.

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3. Project Objectives

Primary Objective:

Develop and launch a campus and community bus tracking web app that combines GPS inputs and commuter crowd updates to provide reliable, real-time shuttle visibility.

Specific Objectives (SMART):

1. Specific – A specific objective clearly defines what needs to be achieved and avoids ambiguity.

- Define the essential features of the system, including GPS-enabled location tracking and commuter update functions.
- Add features such as seat availability indicators or route bookmarks to enhance usability.

2. Measurable – A measurable objective sets indicators to evaluate progress and determine success.

- Establish indicators such as update frequency, user engagement, and accuracy levels to guide evaluation.
- *Include commuter feedback ratings and system performance reports.*

3. Achievable – An achievable objective ensures the goal is realistic and attainable with available resources.

- Apply accessible and commonly used web technologies that are suitable for student project development.

- *Integrate APIs or additional tools if resources and time permit.*

4. Relevant – A relevant objective aligns the system with actual user needs and the project's purpose.

- Ensure the system concept directly addresses commuter concerns such as uncertainty, waiting times, and lack of visibility.
- Extend relevance by providing operators with reports and analytics for better decision-making.

5. Time-Bounded – A time-bounded objective specifies a clear deadline for accomplishment.

- Align development activities with the academic semester's project timeline for structured progress and completion.
- Break down milestones for incremental testing and feedback collection during the semester.

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4. Scope of Work

In-Scope:

- Development of a web application with commuter and operator interfaces.
- Integration of GPS inputs obtained through driver smartphones or simulated data.
- Inclusion of commuter feedback options, such as status confirmations or simple updates.
- Basic deployment of the system on a cloud platform for accessibility and demonstration purposes.

Out-of-Scope:

- Full-scale city-wide bus network integration.
- Advanced route optimization using artificial intelligence or predictive analytics.
- Payment, ticketing, or fare management features.

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5. Methodology / Approach

- **Requirements –** Identify and document user needs, focusing on commuter convenience and operator usability.
- **Design –** Create a system design that outlines the user interface, data flow, and integration of GPS and feedback features.
- **Development –** Develop the system gradually, prioritizing core functions first (such as shuttle tracking and commuter updates), followed by supporting features.
- **Testing –** Conduct functionality checks and usability reviews to ensure that features meet intended objectives.
- **Deployment –** Host the system on a cloud platform for accessibility and demonstration purposes.
- **Review –** Evaluate outcomes, gather feedback, and document lessons learned for future improvements.

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6. Deliverables

- Responsive Commuter Web Application – A platform that displays shuttle locations on a map and allows commuters to provide status updates.
- Operator Dashboard – A management interface that provides shuttle information, route visibility, and basic reporting functions.
- Backend and API – A supporting system that handles data exchange between the commuter interface, operator dashboard, and database.
- Cloud Deployment – Hosting of the system on a cloud platform to enable online accessibility and demonstration.
- Project Documentation – A comprehensive report detailing the system design, development process, and user guidelines.
- Presentation Materials – A formal presentation summarizing the project objectives, process, and outcomes.

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7. Timeline (Gantt Chart or Milestones)

Sprint	Duration	Inclusive Dates	Sprint Goals
Sprint 1	2 weeks	9/22/2025 – 10/5/2025	To establish connection between pages and build basic authentication (login, logout, and validation).
Sprint 2	2 weeks	10/6/2025 - 10/19/2025	To design and implement the commuter interface, including shuttle location display and crowd update features.
Sprint 3	2 weeks	10/20/2025 - 11/2/2025	To develop and refine the operator dashboard, including shuttle list and reporting functions.
Sprint 4	2 weeks	11/3/2025 - 11/16/2025	Integrate commuter and operator modules, ensure smooth data flow, and enhance system reliability.
Sprint 5	2 weeks	11/17/2025 - 12/1/2025	Improve UI/UX layouts and solve bugs and errors in the system.
Sprint 6	1 day	12/1/2025 - 12/2/2025	To conduct testing, deploy the system on a cloud platform, and prepare documentation and presentation materials.

8. Budget Estimate

Item/Category	Estimated Cost (PHP)
Product Owner	₱450,000
Business Analyst	₱405,000
Scrum Master	₱405,000
Developers (x3)	₱1,890,000
Equipment & Software Tools (laptops, licenses)	₱630,000
Deployment & Hosting (cloud services, APIs)	₱420,000
Testing & Quality Assurance	₱400,000
Benefits & Allowances (team support)	₱600,000
Contingency (10%)	₱520,000
Total	₱5,200,000

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9. Risk Assessment & Mitigation

Description of the Risk	Potential Impact	Mitigation Strategy
Low user engagement	High	Provide clear instructions and simple feedback options to encourage consistent use.
Hosting/Server downtime	High	Utilize reliable cloud hosting services and maintain scheduled monitoring.
Data loss	High	Implement routine backups and apply version control practices.
Minor software bugs	Medium	Conduct regular testing and apply corrective fixes promptly.
Delays in development	Medium	Focus on core functions first, and adjust scope as needed.

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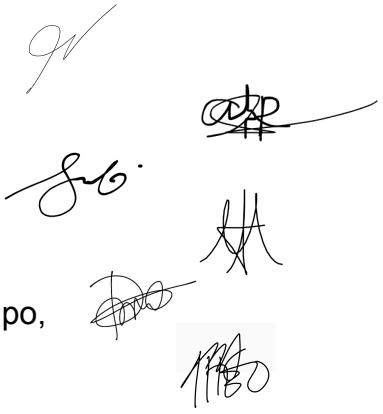
10. Stakeholders

- **Product Owner:** Arnnon Zevv C. Pangan
- **Business Analyst:** Andre Policios
- **Scrum Master:** Franklyn John Panugaling
- **Development Team:** Marc Louis Ortizano,
  Danielle Maxine Ocampo,
  Kinje Theo Pagay
- **End Users:** Students, families, community members, disaster response advocates



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11. Expected Benefits / ROI

Tangible Benefits:

1. Cost savings for schools or local organizations by reducing dependence on third-party transport applications.

2. Potential for scalability to other campuses or communities, which may create opportunities for future adoption and revenue.

Intangible Benefits:

1. Improved commuter experience through reduced uncertainty and more reliable shuttle visibility.

2. Enhancement of institutional reputation by adopting an innovative, technology-driven solution.

3. Practical experience for the project team, contributing to skill development and future employability.

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12. Approval

Name & Role	Signature	Date
Joemarie Amparo, IT317 Instructor		
Frederick Revilleza, CSIT327 Instructor		
