

UNIVERSITY OF PUERTO RICO AT MAYAGÜEZ

MAYAGÜEZ, PUERTO RICO

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING



WaveSphere

A PROJECT PROPOSAL SUBMITTED AS A PARTIAL REQUIREMENT OF THE
MICROPROCESSOR INTERFACING COURSE ICOM-5217

by

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Course: ICOM 5217, Section 096

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1. Preliminary Components and Pin Count

Table 1 shows a list of the essential components in the system along with their interface to the microcontroller, pin count, specifications and price. This table is not meant to be exhaustive nor is it meant to be taken as a cost analysis. It is simply a preliminary list to facilitate counting the pins required on the microcontroller.

Table 1: List of essential components

Part	Model	Vcc	Interface	Pins Required
Accelerometer	ADXL377	3.3V	Analog	3 analog
Gyroscope	L3GD20	3.3V	SPI	3 SPI, 1 GPIO (Chip Select)
Magnetometer	511-LSM303DLM	3.3V	I2C	2 I2C, 1 GPIO
GPS	IT520	3.3V	UART	2 UART, 3 GPIO
XBee	XBee-PRO ZB SMT	3.3V	SPI	3 SPI, 3 GPIO
SD Module		3.3V	SPI	3 SPI, 1 GPIO (Chip Select)
RF Wakeup	AS3930	1.8V	SPI	1 INT, 1 GPIO, 3 SPI

2. Operating Charts

A. Work Distribution Table

Table 2: A work distribution table showing a list of tasks to be performed for this project and the resources assigned to them

Task Title	Adrian	Daniel	Nelian	Samuel
Topic Research	✓	✓	✓	✓
Define System Requirements and Specifications	✓	✓	✓	✓
Define Essential Hardware and Software	✓	✓	✓	✓
Create System Block Diagram			✓	
Set up Project Website		✓		
Cover Page, Table of Contents, Report Format	✓			
Specifications: Requirements and Features	✓	✓	✓	✓
Specifications: Limitations				✓
Market Description		✓		
Specifications: Essential HW/SW			✓	
Block Diagram			✓	
System Conception: Global System View	✓			
System Conception: UI Level			✓	
Design Criteria		✓		✓
Expert Opinion			✓	
Introduction		✓		
Abstract				✓
Proof Reading	✓	✓	✓	✓
Project Journal				✓
Project and Work Distribution Table	✓			
MCU Research	✓	✓	✓	✓
Other Components Research	✓	✓	✓	✓
Brainstorm: Discussion and Selection of MCU	✓	✓	✓	✓
Design Team Logo and Poster			✓	
Set up Git Repository		✓		
Component Selection	✓	✓	✓	✓
Update Block Diagram	✓			
Brainstorm: Software Plan (Operating Chart)	✓	✓	✓	✓

Task Title	Adrian	Daniel	Nelian	Samuel
Build System Schematics				✓
Cost Analysis				✓
Timing Analysis and Diagrams			✓	
Power Analysis	✓			
Software Brainstorm Requirement Definition and Verification	✓	✓	✓	✓
Use Case Diagrams			✓	
Design User Interface		✓		
Flow Charts, Module and Interface Design for MCU Software			✓	
Connect and Work with Accelerometer and Gyroscope	✓			
Connect and Work with Magnetic Field and Light Sensor			✓	
Connect and Work with GPS Software and Hardware Module		✓		
Connect and Work with SD Card Software and Hardware Module				✓
Connect and Work with Power Supply and Management	✓			
Connect and Work with Xbees		✓		
Implement Sampling Mode Software Module	✓			✓
Implement Transfer Mode Software Module		✓		
Implement Diagnostic Mode Software Module				✓
Implement LED Controller Module			✓	
Software and Hardware Testing and Debugging	✓	✓	✓	✓
Implement Out of Memory Alert Software Module				✓
Implement Low Power State Software Module	✓			
Implement User Interface			✓	
Design and Make PCBs		✓		
Connect, Solder, Test	✓			
Field Testing (Water Tank)	✓	✓	✓	✓
Software Testing and Debugging	✓	✓	✓	✓
Hardware Testing and Debugging	✓	✓	✓	✓

