

Executive Summary

The purpose of this project is to create a system to allow the Slocum G3 Glider to detect wave conditions while on the ocean surface, perform calculations on that data, and to make it available to the communications modules inside the glider so that it may also be transmitted back to shore. The wave sensor needs to be compact yet rugged, accurate, reliable, and consume a minimum amount of power.

We approached the problem with vigor; first we researched components that could work for our system, balancing meeting the needs of our power consumption requirements, the relatively high amount of processing ability necessitated by our requirements, and what could be obtained despite the ongoing semiconductor shortage. Once we had components selected, we ordered them and began the process of designing a printed circuit board to mount the components upon, and then we began the arduous task of assembling the board. The design we decided to employ made use of an accelerometer chip to gather acceleration data from the movement of the waves which was then processed by our microcontroller to determine various pieces of information about the waves, and the data was then saved to an SD card and sent back up to the main science computer of the glider via RS232. With components in hand and a circuit board ready, we began to assemble the board. Section by section, we assembled the board, testing as we went. Several times we encountered unexpected errors in the design of the system that would have spelled disaster to the system had we not caught them early. And then Finally- all of the blocks were assembled and we were ready for system testing. With the board in hand, we put it through such trials as the drop test, the system longevity test, and the power usage test; and our system made it through satisfactorily.

As a team, we learned many important lessons. We learned the hard way to order PCBs early, because sometimes they will be delivered to the wrong address and you will have to work around that. We learned how important it is to be resourceful, especially when necessary components are difficult to obtain. And of course, we learned about the power of friendship, without which the project would never have been completed.

			Fall Term												Winter Term												Spring Term											
			1	2	3	4	5	6	7	8	9	10	F	1	2	3	4	5	6	7	8	9	10	F	1	2	3	4	5	6	7	8	9	10	F			
Tasks:	Task / Responsible Party																																		REQUIRED RESOURCE			
Design	1) Specification of Requirements	GL																																NONE				
	2) Component Selection	MD																																SYSTEM REQUIREMENTS				
	3) PCB Schematic	MF																																WORKING DESIGN				
	4) Windows App for Testing	SB																																NONE				
	5) PCB Layout	GL																																FINISHED SCHEM, SIZE REQ.				
	6) PCB Fabrication and Construction	MD																																PCB DESIGN AND LAYOUT				
	7) Firmware	MF																																SYSTEM REQUIREMENTS				
	8) Creation of Test Glider	MF																																WORKING PCB				
Testing	9) Benchtop Testing	SB																																WORKING PCB				
	10) Document Wiki	MD																																NEAR FINISHED SYSTEM				
And	11) Buoyancy Tank Testing	GL																																WORKING TEST GLIDER				
Revision	12) Wave Lab Testing	MD																																WORKING TEST GLIDER				
	13) Small Wave Marine Enviroment Testing	MF																																WORKING TEST GLIDER				
	14) Near Shore Ocean Enviroment Testing	SB																																NEAR FINISHED SYSTEM				
	15) Near Buoy Ocean Enviroment Testing	GL																																NEAR FINISHED SYSTEM				