Project Title: SPAWAR Velocity Float *(Fall-Winter Project Nov '16 – Mar '17)*

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Availability for Kickoff and Weekly Meetings: Yes

Company website: http://www.public.navy.mil/SPAWAR/PACIFIC/PAGES/DEFAULT.ASPX

Project Description

Background:

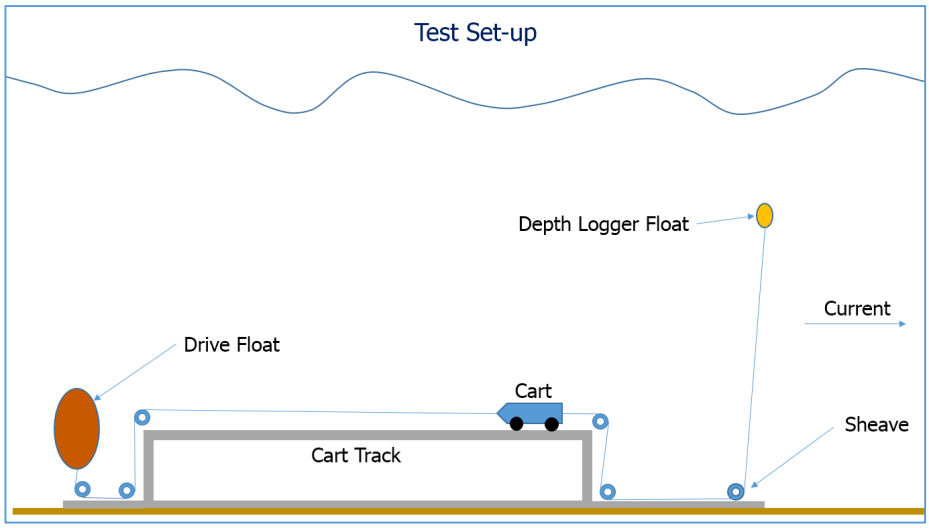

Figure 1. Cart Experimental Set-up

SPAWAR engineers will be conducting a series of underwater experiments in the open ocean that require a test cart to travel horizontally down a seabed-supported track, as illustrated in Figure 1. The prime mover in this experiment is the drive float. The drive float buoyancy is adjusted from test to test to achieve a range of cart speeds. Cart speed is verified post-test by analyzing the position versus time record of the depth logger float that is connected by a string (via a series of pulleys) to the tail of the cart. The objective of this MAE156 effort is to have the student team design, build and test the depth logger float and provide a method for converting the depth versus time data to speed versus time. Corrections for environmental effects such as surface swell and current must be incorporated in the speed conversion algorithm.

The float design is not a trivial task. The float body needs to be streamlined to minimize the influence of current. The float must be designed to assume a minimum drag attitude both prior to cart motion and during cart motion. Prior to cart motion, the flow relative to the float is due primarily to the horizontal velocity of the local ocean current. During cart motion, the flow relative to the float is the vector sum of the float velocity and the ocean current; thus the float needs to pitch nose down during descent.

Summary of MAE156 Project Objective:
Design, build and test a robust, reliable, "low-tech", low cost depth logger float with minimal moving parts and provide a method for converting depth versus time data to speed versus time.

Skills & Knowledge Used in the Project:
(1) Mechanical design, fabrication and assembly
(2) Rapid prototyping
(3) Material science

(4) Statics of mooring cables
(5) Hydrostatics and hydrodynamics of streamlined bodies
(6) Dynamic stability of streamlined bodies
(7) Influence of surface waves on hydrostatic pressure
(8) Design of engineering experiments
(9) In-water test and evaluation
(10) Statistical analysis of experimental data
(11) Technical writing

Are there any citizenship or confidentiality issues required of the student team?
Yes, students must be US Citizens and sign a confidentiality agreement.

Budget
The budget for each project is a not-to-exceed amount, which will be billed to the sponsor at completion of the project.

Equipment and Parts	GFE *
Shared Shop Expenses	$1500
Total	

* GFE = Government Furnished Equipment & Materials

Sponsor's Fiscal Contact Person:

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