**Modeling the Trajectory of a Downed Plane in 3-Dimensional Weather and Current Systems:**

**Project Proposal**

**Purpose:**

To create a model which generates a probability spread for the location of a plane lost at sea.

**Methods:**

Building from a previous computational model developed in January, we seek to improve the model by adding 3-Dimensionality to it. The model will incorporate a dynamic vector field, meaning the vectors change as time goes on. The plane crash will be divided into 3 sections for the computation: (i) the initial crash using physics for objects free falling in the air, (ii) travel of debris on surface of the ocean, and (iii) the fall of debris to the ocean floor, following the flow of 3D ocean vectors.

**Goal:**

The present model is lacking in the following areas:

* 2D, static vector fields that are nearly uniform
* No ability to “map” probabilities of plane location with color on graph output
* No incorporation of real world data

The proposed model would have:

* 3D, dynamic vector fields
* Ability to do “probability mapping” with color densities for different time sets and differing initial crash spread
* Incorporation of real world data in the form of a vector field mapping an actual body of water or some actual ocean current data from some time period

**References:**

“The Nature of Code,” – Daniel Shiffman (Reference for vector fields and OOP)

Ocean Current Model: <http://www.opc.ncep.noaa.gov/newNCOM/NCOM_currents.shtml>

“Using Aircraft Trajectory and Ocean Surface Vectors to Assist in Locating Lost Vessels,” Lauren DeVore, Alex Ogle, and James Knox [source: http://nums.math.oregonstate.edu/node/263 ]

Previously written MATLAB code from January 2015 COMAP Competition will be attached in a separate email.