

MBARI Memorandum

Dorado-009

TO:	Dorado/Altex Team	DATE: May 29, 2001
FROM:	Rob McEwen	
SUBJECT:	Dynamics Test Plan for 4 June 01 Sea Trials	
REVISION:	1.0	

Static Measurements After Ballasting

1. Log enough CTD data to determine the salinity. *Objective:* Measure the density of the water in the ballasting test area.
2. Buoyancy Measurement:
 - (a) Tie bow and aft tag lines to the vehicle without carabiners.
 - (b) Attach cord loops to both front and back lifing rings while the vehicle is still in the water. Place the aft cord on the opposite side of the vehicle from the one forward.
 - (c) Clip on pairs of small, numbered, lead weights, one forward, one aft, until the vehicle has slightly negative buoyancy, while remaining approximately level. Record which weights were used.
3. CB/CG Separation Measurement:
 - (a) Remove a pair of the smallest weights, so that the vehicle is slightly buoyant.
 - (b) Flip one of the cords, with weights, over to the other side of the vehicle so that both forward and aft weight loops hang on the same side, causing the vehicle to roll.
 - (c) Start the AHRS and log data. Allow the vehicle to come to rest as nearly as possible.
 - (d) Remove the weight-measurement apparatus (cords and sinkers) from both forward and aft. Allow the vehicle to come to rest as nearly as possible. Log AHRS data.

Measurements of Dynamic Behavior

The following tests must be performed over a flat bottom, in about 100 meters of water, where the DVL can record velocity.

1. Execute the Rudder-Step mission (Rob will provide the .cfg). This will take about 10 minutes. It will consist of a series of open-loop rudder steps, while the depth loop is closed as normal, and the vehicle is maintaining a constant depth. The vehicle will travel in circles. Log DVL data. The objective is to determine the rudder step-response time constants, steady-state turn rate, and velocity, with particular attention to the sway component.
2. Execute the Elevator-Step mission (Rob will provide the .cfg). This will take about 10 minutes. The vehicle will dive to 70 meters, establish straight-and-level flight, then begin a series of negative elevator steps (vehicle pitches up). The objective is to measure the steady-state pitch angle, rate-of-climb, and speed for various fixed elevator angles. Log DVL data.