Post Mission Report

‘Shallow dives with two seagliders’

Team Leaders

Technical: Simó Cusí (SC)
Operations: Carlos Castilla (CC)

Additional Team Members

David Roque (DR)
Marc Torner (MT)
Miguel Martínez (MM)
Cayetana Casas (CCA)

Launch date	14/02/2012, 16/02/2012
Launch location	Andratx
Glider	538-sdeep02, 541-sdeep03 iRobot Seaglider 1KA
Duration of mission	2 days
Recovery location	Andratx

1.0 Plan

1.1 Operations

CC and DR will carry and launch the gliders from the Valiant boat. The gliders will be launched one by one so that while one is at sea the other is at port in the van. During the dives, the gliders will be attached to a string for security. Before loading the glider onto the Valiant and sail to the launch point, the selftest and the sealaunch procedures will be performed at port. SC and CCA will sail on the Rodman piloting the glider via GSM but at the same time having visual contact with the glider. MM and MT stay at IMEDEA as backup pilots.

Distance from port to Launch is 1,4nm, about 15 min sail (Fig 1). The area is transited but the glider will surface only 70m away to the west of the boat when the dive is 30m in depth.

A Castaway CTD profile will be taken.

Will check the new cradle improvements (wheels) ease the glider transportation.

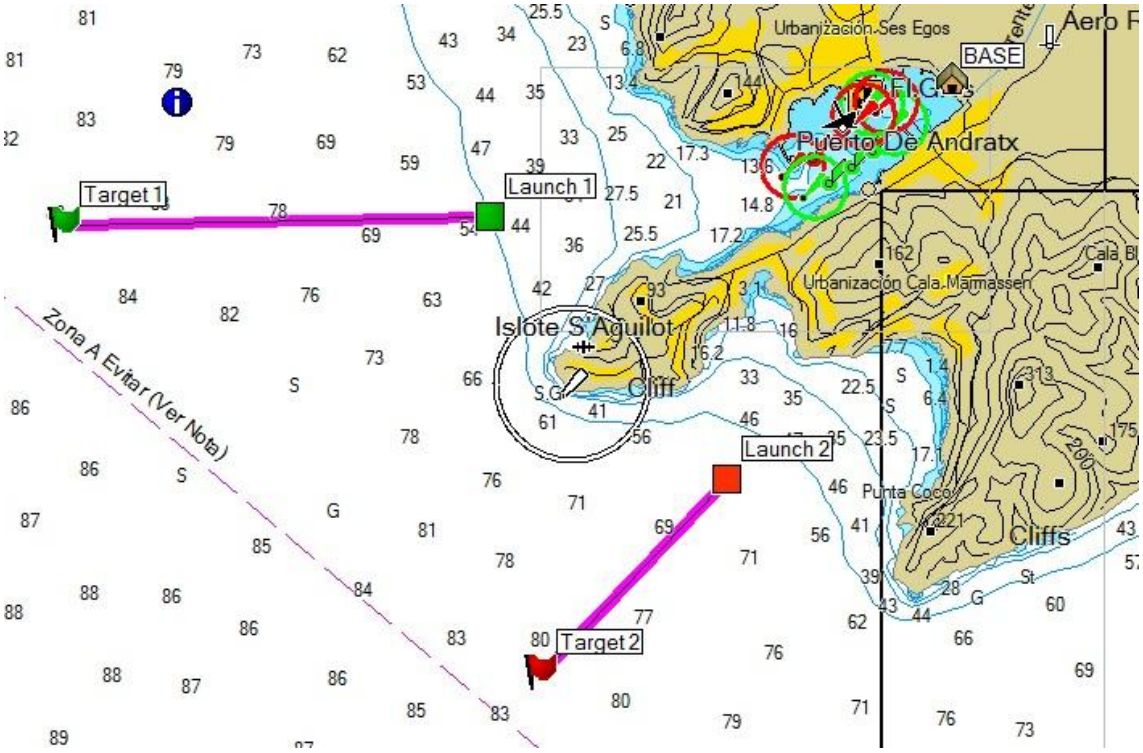

Fig 1: In green, the planned working area and the actual working area for 14 Feb. In red, the working area for 16 Feb.

1.2 Piloting and Technical

Check the new ballastings are right (20120210_IS_538_a and 20120210_IS_541_a).

Each glider will perform 3 dives. One to 15m depth, one to 30m depth and one to 70m depth forcing the pinger to find the soil and make the glider come up. All of them with the same target point. iRobot's basestation will be used for this mission.

Check the glider is located via Argos (20120209_IS_538_a and 20120209_IS_541_a).

Get confidence in the platform operation and piloting prior to depth tests to 1000m.

1.3 Scientific

Will gather CTD, FLNTU and Oxygen. Visually check the scientific data of both gliders are very similar. Compare to Castaway CTD.

2.0 Events

2.1 Operations

The mission was done in 2 days, 14 and 16 February 2012.

14 February:

Only sg541 could be deployed. CC, DR and MT sailed on the Valiant with the glider and SC and CCA on the Rodman piloting the glider while MM was at IMEDEA as a backup pilot.
Internet was not very reliable and made piloting a bit difficult.
Vessel VHF radios were used for communications between the two teams.
2 Castaway CTD profiles were taken.

16 February:

First, sg538 was deployed from the Valiant by CC and DR. SC was at port piloting the glider with better coverage than the previous day but still not reliable. MM was the backup pilot at IMEDEA. Later, sg538 was recovered, taken to port and swapped for sg541.
Launch point was changed to avoid disturbing port traffic and having better sea (Fig 1).
VHF walkie talkies where used providing a very good communication system. GSM phones were used as a backup.
3 Castaway CTD profiles were taken.

2.2 Piloting and Technical

14 February:

sg541 and sg538 were updated with new parameter values, during selftest, due to the new ballasting.
sg541 had a hard time to sink as the waves and wind were acting on the buoy. MAX_BUOY was set to 5 while its nominal value is 150. This low thrust added to the string effect spoiled most of the dives. Only dive 3 could make it to 30m depth descending at -10cm/s.

16 February:

A smaller buoy was used.
sg538: In order to get more thrust, MAX_BUOY,150 was set. Descent vertical velocity reached -45 cm/s and had not even stabilized at this value. This high velocity made the apogee take 15m depth. Climbing, the glider went at about 15 cm/s and pitch and roll were out of control taking extreme values (Fig 2). The glider gave a ‘spurious interrupt’ error at the 3rd dive and was taken out of the water immediately.

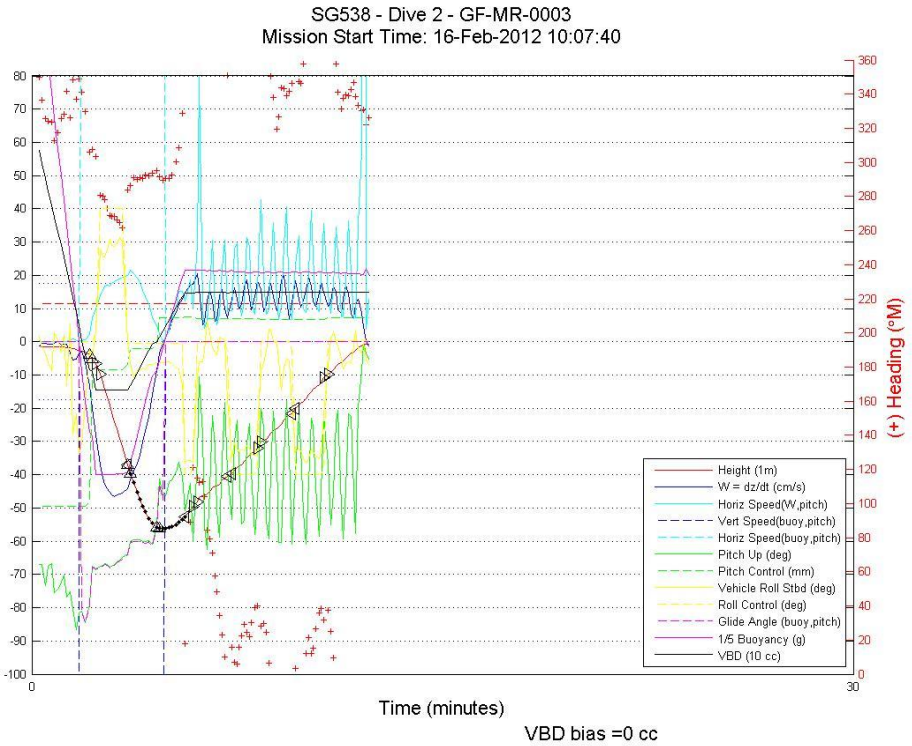

Fig 2: sg538 climb was extremely unstable

sg541: In order to test the altimeter, slower descent (MAX_BUOY,75: -26cm/s) and higher rate of glider control instructions (gcint 10) were set. ALTIM_PULSE,3 and ALTIM_SENSITIVITY,1 gave a false positive. 2nd dive had ALTIM_PULSE,2 and had the same false positive. $ALTIM_BOTTOM_PING was used to see the distance to the ground.

2.3 Scientific

14 February:

2 Castaway CTD (SCB-CAST001, S/N – 10H102151) profiles were taken.

16 February:

3 Castaway CTD (SCB-CAST001, S/N – 10H102151) profiles were taken at approximately N39º31'31.58" E2º22'17.49" (same position as glider was diving), 11:00 UTC (Fig 3).

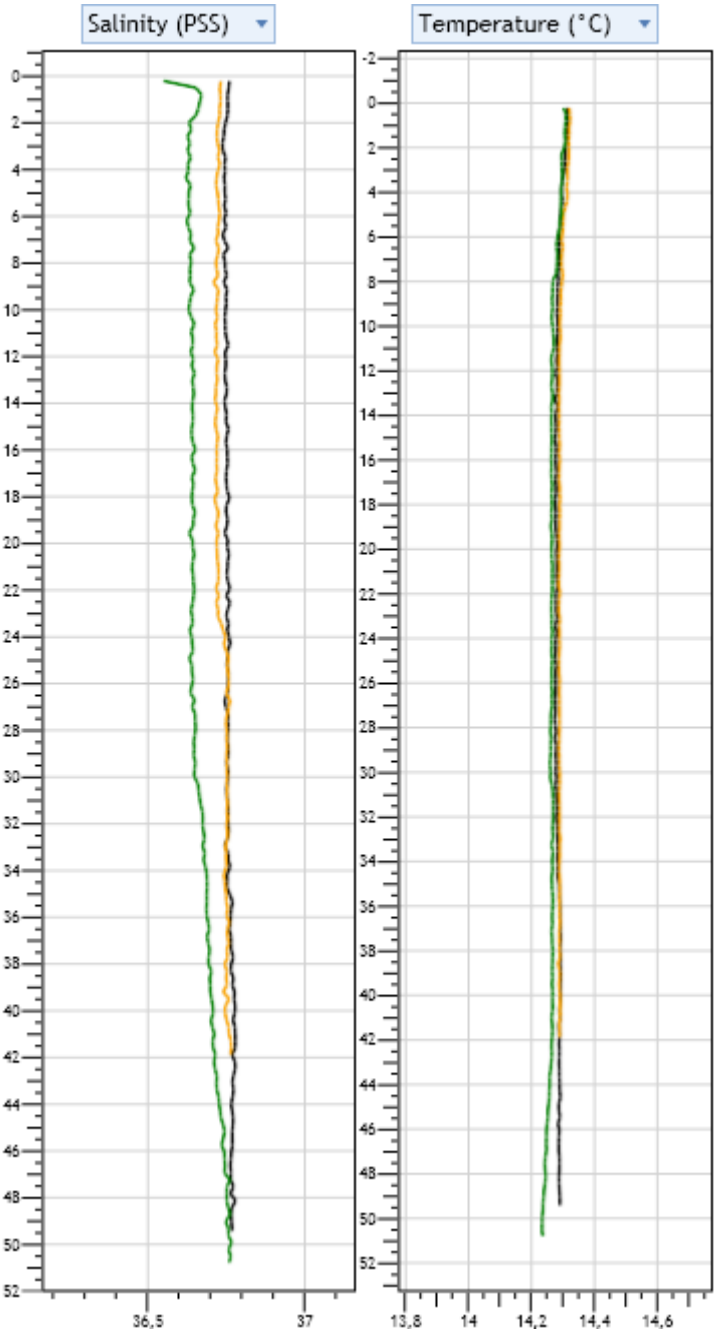

Fig 3: SCB-CAST001 plots for 16 February at 11:00UTC.

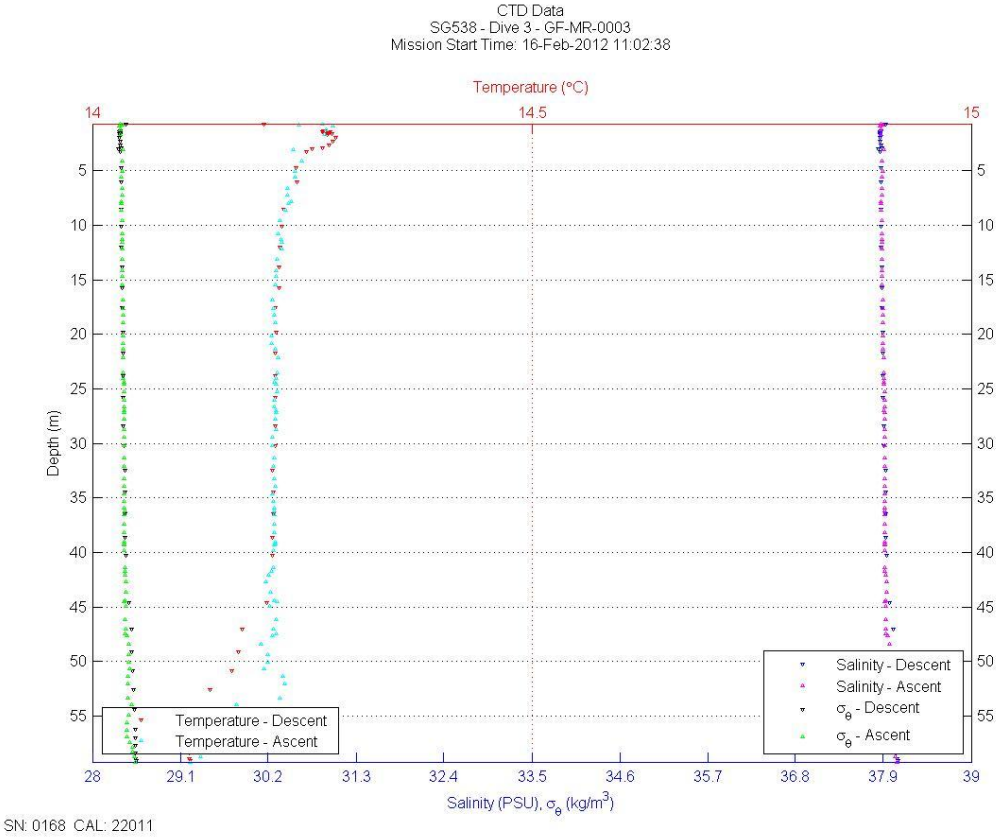

Fig 4: sg538 CTD for 16 February at 11:02 UTC

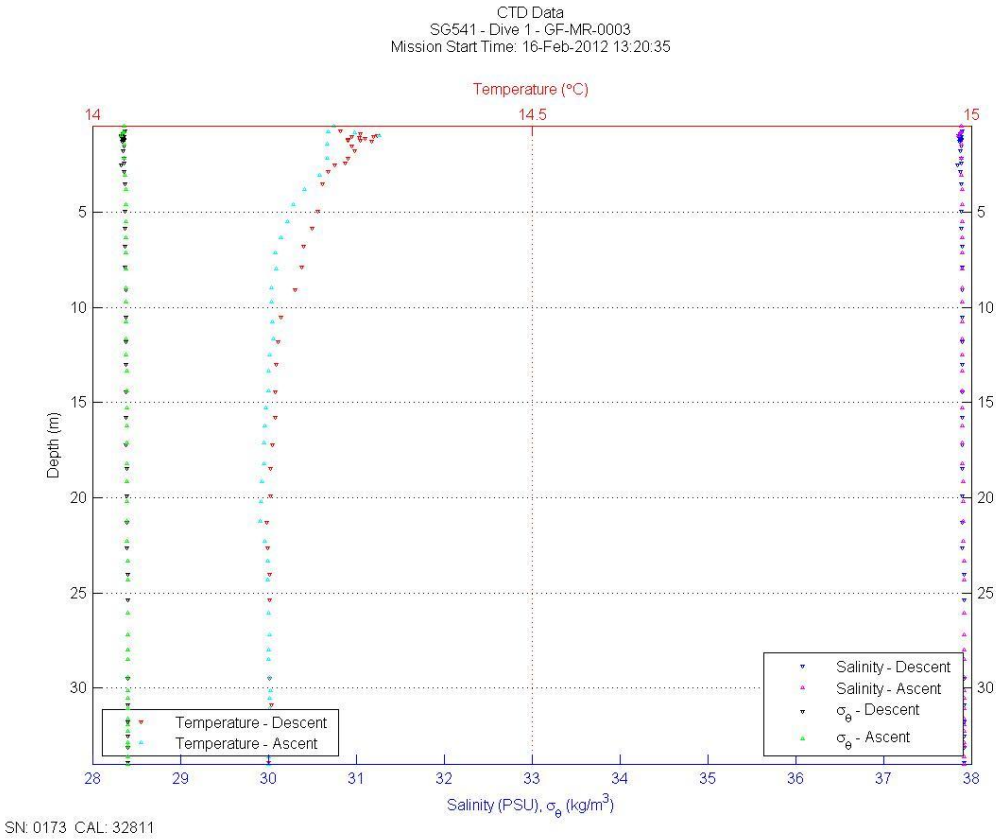

Fig 5: sg541 CTD for 16 February at 13:20 UTC

3.0 Results

3.1 Operations

The Valiant is a very suitable boat for Seaglider deployment (Fig 6).
Two people can perform a deployment.
GSM internet is not very reliable. Operations team need to learn to perform a self-test so that the pilot can stay at IMEDEA or elsewhere with reliable internet.
The wheels installed on the cradles proved to be very practical. Now handles will be installed so that the cradle can be pulled with just one hand allowing to walk looking forward.

Fig 6: Valiant boat in Andratx's port

3.2 Piloting and Technical

Both gliders are correctly ballasted.
sg538 needs a lot of trimming to avoid instability.
A buoy attached to the glider can have strong effects on the dive, especially if wind blows.
Errors listed in the .log file require glider recovery only if the description (Fig 7) is an actual 'error'. 'Retries' don't require glider recovery. If a dangerous situation for the glider happens, it will go to Recovery Mode by its own.

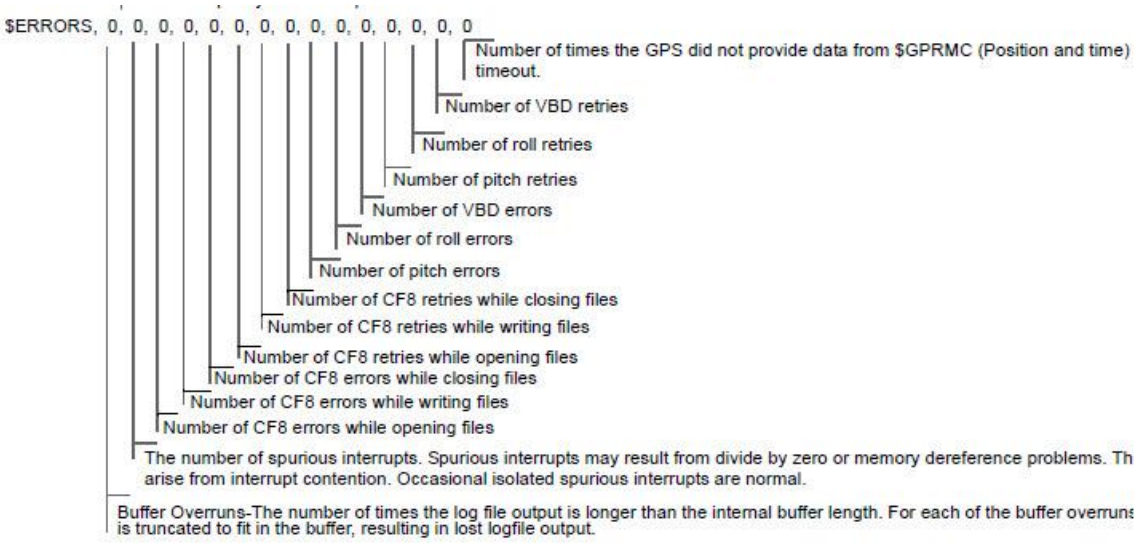

Fig 7: errors and retries counts as they appear in the .log file the glider sends after each dive

Altimeter gives false positives if $ALTIM_SENSITIVITY is set to 1. Higher $ALTIM_PULSE uses more energy but has more chances to find the ground. These two parameters need to be combined in order to save energy and properly locate the bottom.
sg541 was located via Argos on 14-Feb and its last message was on 16-Feb.
sg538 could not be located via Argos but a message was received on 16-Feb.

3.3 Scientific

CTD of both gliders look very similar (Fig 4, Fig 5).
SCB-CAST001 temperature (Fig 3) is similar to that of the Seagliders (14,4º).
SCB-CAST001 salinity (Fig 3) is far from what the Seagliders report (36,75 vs 37,9 PSU). SCB-CAST001 should be checked against a SBE. The water tank at IMEDEA could be a good spot. The other Castaway CTDs should be checked too.
Science team should discuss how to proceed with data coming from optical sensors.