

Glider Prep and Deployment Checklists

Glider -
deployment

ru30-20230525T191P
ru30-20230612T0105

Project

Passengers II

Deployment
dates

5/25/23 - 6/11/23
6/12/23 - 6/14/23

Location/notes

Atlantic II seamounts,
North Atlantic

Extant

Notes

1) Glider check-out sheet



2) Ballasting/dunk sheets



3) Deployment checklists
(on boat, shore side)



4) Glider check-in sheet



5) Misc. (science, etc.)



CTD



Optode



LISST

6) Other



Compass



GLIDER	RU30
PREPARER	David A.
PREP DATE	5/2/2023
LOCATION / MISSION	North Atlantic / Passengers
DENSITY @ TEMP	
INSURED?	yes

PUMP RUZZD

		Calibration Date (user/factory)
SCIENCE BAY SERIAL NUMBERS	1) PBR 203789	2/23/2022
	2) FLBB CD 4662	8/31/2021
	3) LS1 4371361	6/10/2022
	4)	
	5)	
	6)	

PRE-SEAL TAKE PICTURES OF CONNECTORS AT EACH SEALING JOINT

FORE CHECK

Check pump & pitch threaded rods (clean and grease)	<input checked="" type="checkbox"/>	Leak detect in place, batteries secure, grab & wiggle pitch battery to	<input checked="" type="checkbox"/>
Grounded nose?	<input checked="" type="checkbox"/>	check secure, white guides free, no	<input checked="" type="checkbox"/>
Dessicant Exposed?	<input checked="" type="checkbox"/>	metal shavings, bottles installed	<input checked="" type="checkbox"/>

PAYLOAD CHECK

Special Sensors / Additional Sensors? <u>LS1 hydrophone - record & batteries in SB</u>		CTD cable clear, no leak at CTD joint, no leak at pucks	<input checked="" type="checkbox"/>
Grounded?	Fore Sci Ring	<input checked="" type="checkbox"/> CTD	<input checked="" type="checkbox"/>
Corrosion?	Aft Sci Ring	<input checked="" type="checkbox"/> Other?	<input checked="" type="checkbox"/>

AFT CHECK

Iridium Card Installed (SIM #) (if not standard) 8988169224001047134

Flash Card Check (remove old files, backed up? See **Software** section)

Inspect strain on connectors/worn connectors

Battery secured

Ballast bottle present

Aft cap clean/clear of leak

Ejection weight stem grounded? Should it be? (Version specific) NO

Thruster greased?

Ensure safety of ballast pump prior to powering glider

Battery check: G2/G1 turn glider on with only 1 battery connected; G3 use BMS current

Aft Pack Voltage	<input checked="" type="checkbox"/>
Pitch Pack Voltage	<input checked="" type="checkbox"/>
Nose Packs Voltage	<input checked="" type="checkbox"/>
Emer (if possible) Voltage	<input checked="" type="checkbox"/>
Cabling/connectors - <u>lithium</u> vs. alkaline circuit correct?	<input checked="" type="checkbox"/>

POST-SEAL, pre-ballast

GENERAL

Pick Point Present? Bail

Special Cargo? LS1 hydrophone

HARDWARE

Nose cone and pump bladder inspection

Anode grounded?

Pressure Sensor Check (corrosion, clear)

Aft sensor 1.75

Ejection weight assembly ok/not seized?

Anode size / remainder NEW

Payload sensor 3 bar

* Do a logging on for all these checks, take note of log and transfer before deployment

SENSOR RETURN

put c_science_send_all 1
 put c_science_all_on 8
 put c_science_on 3
 All sensors reporting values?

CTD

Tank static comparison OK?
 Pumped CTD operational?
 Plot ballast *BD log, sci_water_pressure non-noisy and near < .5 m

OPTODE

Check in completed?
 Saturation reading in air

OPTICS

Check max return using fluoro sticks
 Check dark counts with sensor covered
 Optics file name

LISST

Clean LISST and perform ZSCAT

OTHER

OUTSIDE

GPS Alamanc/firmware updated?		4.40	
GPS check	Latitude <u>4028.75</u>	Longitude	<u>7426.22</u>
Iridium connect	<u>/</u>	Alternate number	
zero_ocean_pressure	<u>/</u>	Get m_pressure_d	<u>0,0.01</u>
Air bladder shutoff (time)?	<u>/</u>	Sync_time (proper date?)	<u>/</u>
Compass calibration	<u>/</u>	Compass check	<u>/</u>
For deep gliders, put c_de_oil_vol -1000 to fully retract oil inside reservoir			

ADDITIONAL

I *****WARNING: Advanced knowledge required to avoid damage/injury**

Check burn wire - disconnect, then put c_weight_drop 1, confirm 12 V

Fore leakdetect _____ Science _____ Aft leakdetect _____

THRUSTER

Report ++ m_thruster_current
 Put c_thruster_on 20
 Verify thruster spins clockwise and current value updates regularly
 Put c_thruster_on 0 to turn off

0519
 ~ 330mA
 50%

NOTES

PASS Battery
10081.5 A
8992.9 P

Pass lith pri based off exact SS ballast :	ballasting battery (RU)
Aft = 10081.5	10088.4
Pitch = 8992.9	9039.0
8 cell Alk emer: 587.9 g	

98.0g = Salt cell

Batt diff

RU → Bermuda Aft -7g
Pitch -46g

<u>Deployment</u>		MASS (g)		COMMENTS	
PASSENGERS					
<u>Glider</u>		GLIDER			
ru30 with ru26 pump		FORE STEM (minus FBB1,2)			
		FORE HULL			
		AFT STEM (red plug, card)			
		AFT HULL			
		COWLING			
		SCREWS (vacuum, cowling, aft battery)			
<u>Date</u>		PAYLOAD BAY			
5/25/2023		WINGS			
		OTHER			
<u>Preparer</u>		AFT BATTERY			
David A		PITCH BATTERY			
		FORE BATTERY 1, 2, EMER			
		AFT BOTTLE			
		FORE BOTTLE 1 (stbd) (FBB1)			
		FORE BOTTLE 2 (port) (FBB2)			
		OTHER			
		WEIGHT BOTTLES			

FINAL

ENTIRE VEHICLE (Ohaus Scale)	

Tank Specifics		Glider Specifics	
Tank Density (kg/m ³)	1021.09	Glider Volume (L)	58.060
Tank Temperature (C)	21.91	Total Mass (kg)	
Weight in Tank (g)	198.00	Glider Density (in air)	0.00
Target Specifics		Volume Change (temperature induced)	
Target Density (kg/m ³)	1024.25	Volume Change (target) (mL)	-5.0
Target Temperature (C)	20.00	Coefficient of Thermal Expansion	4.50E-05
		Carbon hulls	4.50E-05
		Aluminum hulls	7.50E-05
Glider Volume (at lab temp) (L)	-0.194		

H MOMENT (rad)		(deg)
Angle of Rotation (before)	0	0.0
Angle of Rotation (after)		0.0
Angle of Rotation	0	0.0
Weight on Spring (after)		
Weight added	290	
Radius of Hull	107	
H-distance	####	

125 for G2+, deeps

Ballasting Using Volume		Ballasting Using Mass	
Should Hang (in tank) (g)	178.4	Adjust Glider Mass (entered volume) (g)	59462.9
Adjust by (g)	-19.6	Glider Density (target water, using mass)	0.0
Weight Change (no dunk) (g)	-38.0		
Glider Density (target)	1023.9		

MISC MASSES & VOLUMES

Pick point - 40 mL - 107 g air - 66 g water
 Wing Rail Weights - 1.8 mL @ 15.4 g each ~ 13.5 g in water
 VMT Transceiver - 173 mL - 162 g water
 FIRE Shroud SN02 (ru01) - 266 mL - 112 g water
 Optode - 130 mL - 92 or 190 g (plastic or titanium)
 LISST Bay - roughly 6.55 L
 Carbon Fiber wing Air -> Water Ratio 0.43721
 Plastic Wing Air --> Water ratio 0.4876
 Passengers for ru26 pump ballasting Final xls - Buoyancy
 ZK syntactic foam 100 g gives you 1.55 buoyancy (6)

2023_04_28 ru30

GLIDER: RU30

Iteration 1 Log File Yes Date / Location 4/28/23

FORE	EB	SB	AFT
------	----	----	-----

Front Scale 96 Aft Scale 134

Instrument: 1581 Instrument: _____
T = 22.014 T = 22.019
C = 4.448 C = 4.447
D = 1020.95 D = _____

Ballast
FBB1 stbd 378.5
FBB2 Port 195
Aft BB ~~980~~
Roll <.18 rad
Ballast -1cc
Battery 0.0
+02

Notes
A = 498g
B = 172g

Iteration 2 Log File Yes 0517 Date / Location 5/1 12GMT

FORE	EB	SB	AFT
------	----	----	-----

Front Scale 110 Aft Scale 68

Instrument: 1581 Instrument: _____
T = 22.215 T = _____
C = 4.472 C = _____
D = 1020.94 D = _____

Ballast 155.0
FBB1 stbd ~~115.4~~
FBB2 Port 375.7
Aft BB 9.8
Roll +0.02
Ballast -10
Battery 0.0

Notes need +625
+200 pic SBF
+486 rad fore port
+686
F A
96 134 need ~ 50g from B
+20 -20
+20 -20 OTHAUS = 71.6
+40 -40 cart = 12.2

Iteration 3 Log File _____ Date / Location _____

FORE	EB	SB	AFT
------	----	----	-----

Front Scale _____ Aft Scale _____

Instrument: _____ Instrument: _____
T = _____ T = _____
C = _____ C = _____
D = _____ D = _____

Ballast
FBB1 stbd _____
FBB2 Port _____
Aft BB _____
Roll _____
Ballast _____
Battery _____

Notes forget battery differences!
Virtual scales w/ batt diff
F A
110 68
-7 aft B -7
-34 -12 pick B -46
76 49 virtual scales

GLIDER: _____

Iteration 3 Log File _____ Date / Location _____

A

FORE	EB	SB	AFT
------	----	----	-----

Front Scale 106 Aft Scale 92

Instrument: 1345 Instrument: _____

T = 21.906 T = _____

C = 4.87454 C = _____

D = 1021.09 D = _____

Ballast

FBB1 stbd 174

FBB2 Port 395.3

Aft BB 31.8

Roll 0.00

Ballast -0.71

Battery .02

Notes

F A need +60g

76 49

-13.5 +13.5

+30 +30

+20 -20

31.5 +23.5

A = 126 - 172 = -46

Iteration Final Log File _____ Date / Location _____

FORE	EB	SB	AFT
------	----	----	-----

Front Scale _____ Aft Scale _____

Instrument: _____ Instrument: _____

T = _____ T = _____

C = _____ C = _____

D = _____ D = _____

Ballast

FBB1 stbd 213.5

FBB2 Port NC

Aft BB NC

Roll _____

Ballast _____

Battery _____

Notes

F A need +20

106 92

+20

MISTAKE!!!

REMEDY remove 20F

remove 20A

Iteration _____ Log File _____ Date / Location _____

FORE	EB	SB	AFT
------	----	----	-----

Front Scale _____ Aft Scale _____

Instrument: _____ Instrument: _____

T = _____ T = _____

C = _____ C = _____

D = _____ D = _____

Ballast

FBB1 stbd _____

FBB2 Port _____

Aft BB _____

Roll _____

Ballast _____

Battery _____

Notes

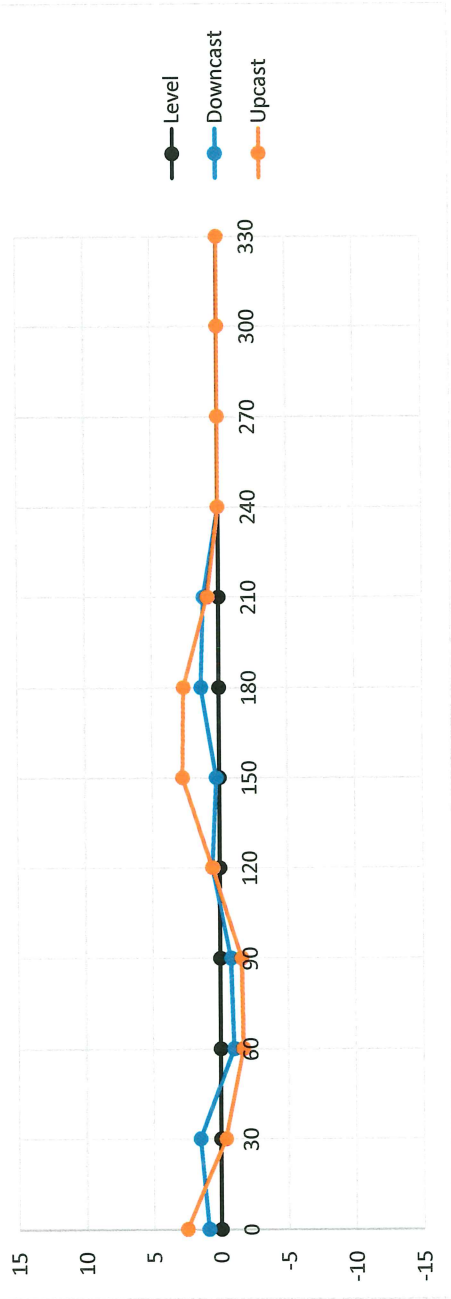
Glider / Mission: RU30 / PASSENGERS **Cal Location** DMCS Gantry **Date** 5/1/2023 **Operator** vid, Nicole, Brian, Kayc

at RU, not deployed batteries

LEVEL			
HAND	GLIDER	ERROR	
0		0	
30		0	
60		0	
90		0	
120		0	
150		0	
180		0	
210		0	
240		0	
270		0	
300		0	
330		0	

DOWNCAST			
HAND	GLIDER	ERROR	
0	356.5	0.9	
45	40.5	1.5	
90	92	-1	
135	140.5	-0.8	
180	181	0.5	
225	224	0.2	
270	275.5	1.3	
315	319	1.1	
		0	
		0	
		0	
		0	

UPCAST			
HAND	GLIDER	ERROR	
0	357.5	2.5	
45	42	-0.4	
90	87	-1.7	
135	134	-1.6	
180	179.5	0.5	
225	225	2.7	
270	270	2.6	
315	315.5	0.8	
		0	
		0	
		0	
		0	



Glider Deployment Checklist – Shore Side

Glider

RU30

Date

5/25/2023

Project/Location

Passengers / North Atlantic

Field Participants, Vessel

Brian Buckingham + Passengers field team
R/V Atlantic Explorer

Pilot

Nicole Waite

Pre-deployment

/to-glider folder populated & recent

Remove 2 WORW - 1 port, 1 starboard
1023.9 final ballast @ 20°C

del large/numerous SBD & TBD's

Glider Power Up - Pre-deploy

Confirm 'boot app' with 'boot'

~~longterm = put ϕ - clock source 1~~
set back to ϕ - after changing
clock source to 1,
wasn't able to
connect via
iridium

Battery Voltage

m_vacuum (> 7)

Coulomb AH total set

Digifin & glider leakdetect OK

sync_time (after GPS hit)

get autotrec

Not
sure if
related

Glider In Water - Deployed

zero_ocean_pressure

m_depth < 1 m

run od, od5.mi - confirm overdepth abort
0525.0000

run shallow, deep.mi

Download deep shallow.mi MBD and NBD file

Boat - perform CTD comparison cast CTD s/n: Laptop:

Test Mission Check

Vehicle Altimeter Works

Flies to commanded depth and to surface

Average vehicle roll

+ - 26 (or desired pitch) obtained, no overshoot or undershoot

-27 , +28

Average battery position on dives and climbs

0.14 in Dives, -0.32 in Climbs

Does vehicle track heading or m_heading cross c_heading

Fin not hardover entire time (avg fin)

-0.08

Avg Dive Rate

22

Avg Climb Rate

-20

Science Checks - RBR, FLBB CD, L31

Surface Water Density

1025.2

Bottom Water Density

1025.4 @ 60m

CTD and m_pressure agree

Average offset

0m @ surf, 0.5m @ 60m

CTD temp & salinity downcast = upcast (no lag)

- some sal lag - RBR on pumped CTD

Remaining Sensors reporting reasonable values

Prepare for Primary Mission

SBD/TBD's prior to od.mi deleted

Transfer SBD's and TBD's

Adjust yo to bottom if altimeter works

200m ✓
450m ✓
700m ✓ w/ thruster
900m ✓ w/ thruster

Post Dive

Verify SBD and TBD are in tact

Verify .cac availa for SBD/TBD

tried to sync time w/ glider didn't call back in for 20+ min. Not sure what is going on.

* no batteries!

RUTGERS

Center for Ocean Observing Leadership

Slocum Glider Check-IN

DATE: 7/20/23 GLIDER: RU30 SB: RBR 203789

Vehicle Powered

1. Power on vehicle in order to fully retract pump, and/or to deflate air bladder. ✓ -260.60cc
2. Wiggle vehicle for 5 minutes. ✓ (no batteries)

Vehicle Cleaning (hose down with pressure)

Nose cone ✓

1. Remove nose cone
2. Loosen altimeter screws, and remove altimeter or leave temporarily attached
3. Retract pump
4. Remove altimeter and hose diaphragm removing all sand, sediment, bio oils
5. Clean nose cone and altimeter

Tail cone _____

1. Remove tail cone
2. Hose and clean anode and air bladder making sure air bladder is completely clean
3. Clean cowling

Wing rails ✓

1. Remove wing rails and hose down

Tail plug cleaning _____

1. Dip red plug in alcohol and clean plug if especially dirty
2. Re-dip red plug and repeatedly insert and remove to clean the glider plug
3. Compress air glider female connector
4. Lightly silicon red plug and replace in glider once silicon has been dispersed evenly in the plugs

CTD Comparison Check ✓

1. Inspect CTD sensor for any sediment buildup, take pictures of anything suspicious or make note.
2. Record results of Static Tank Test on CTD Check-in/out sheet

Optode Check/Calibration _____

1. Record results on Optode Check Sheet

LISST Check/ZSCAT _____

1. Record results on LISST Check Sheet

Vehicle Disassembled

1. Check leak points for water or salt buildup ✓
2. **BACKUP FLASH CARDS** in
/coolgroup/gliderData/glider_OS_backups/<glider>/<glider-deploymentID>/<from glider>,<from sb_0xxx> **** **DO NOT DELETE DATA OFF CARDS******

2023-07-20 ru30 checkin post bermuda

3. Change permissions on <glider-deploymentID> folder to read, write, execute for owner and group, and read, execute for everyone ✓
4. Remove used batteries and place in return crate ✓
5. Re-assemble glider with a vacuum ✓ 12.02 inHg

Update Glider/Sensor History/Notes/Inventory

1. If needed, add notes to deployment page, glider binder, payloads binder, etc.

Compile Deployment Checklist Packet Check

2. Print/fill out checklist packet title page
3. Make sure all pages are accounted for.
4. Scan entire packet and save to:
/coolgroup/gliderData/deployments/<YEAR>/<glider-missionID>/meta/<Glider-missionID_checklists>
5. Put packet into the appropriate year deployment binder.

CTD Check

RBR	Seabird	RBR	Seabird
4.066	4.163	4.164	4.162
22.720	22.714	22.716	22.700
4.066	4.162		Sal = 28.075
22.716	22.714		
4.164			
22.714			

06/16

m-vacuum = 9.250
 m-veh-temp = 24.130
 m-de-oil-vol = -260.587

07/20

m-vacuum = 9.447
 m-veh-temp = 23.979
 m-de-oil-vol = -18.647

m-vacuum = 9.326
 m-veh-temp = 23.364
 m-de-oil-vol = -259.656

Slocum CTD Comparison Check

GLIDER: RU30 SB: 203789 DEPLOYMENT: PASSENGERS

Pre-Deployment

Date: 4/28/23

SBE19 s/n: <u>1581</u>	Glider:
Temperature: <u>22.014</u>	Temperature: <u>22.019</u>
Conductivity: <u>4.448</u>	Conductivity: <u>4.447</u>

Notes:

Post-Deployment

Date: 7/20/23

SBE19 s/n: <u>1645</u>	Glider:
Temperature: <u>22.710</u>	Temperature: <u>22.716</u>
Conductivity: <u>4.162</u>	Conductivity: <u>4.164</u>

Notes:

*** CTD Maintenance if comparison is not acceptable (reference SeaBird Application Note 2D)

1. Perform CTD backward/forward flush with 1% Triton X-100 solution
2. Perform CTD backward/forward flush with 500 – 1000 ppm bleach solution
3. Perform the same on a pumped unit, just different approach
4. Repeat comparison test if above results not within $T < .01$ C, $C < .005$ S/m