

# Glider Prep and Deployment Checklists

Glider -  
deployment

R136 - 2022 1102T1157  
R136 - 2023 0525T1748  
R136 - 2023 0611T2254

Project

Passengers I + II

Deployment  
dates

11/2/22 - 11/11/22  
5/25/23 - 6/11/23  
6/11/23 - 6/14/23

Location/notes

North Atlantic,  
Atlantic II Semounts

2 deployments - glider remained  
in Bermuda between  
Passengers I + Passengers II

- |   | Extant                              | Notes                    |
|---|-------------------------------------|--------------------------|
| 1) Glider check-out sheet                         | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2) Ballasting/dunk sheets                         | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3) Deployment checklists<br>(on boat, shore side) | <input type="checkbox"/>            | <input type="checkbox"/> |
| 4) Glider check-in sheet                          | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

- |                          |   |                                 |
|--------------------------|---|---------------------------------|
| 5) Misc. (science, etc.) | <input type="checkbox"/>                | <input type="checkbox"/>        |
|                          | <input checked="" type="checkbox"/> CTD | <input type="checkbox"/> Optode |
|                          |   | <input type="checkbox"/> LISST  |
| 6) Other                 | <input type="checkbox"/>                | <input type="checkbox"/>        |

GLIDER	RU36
PREPARER	David
PREP DATE	9/21/2022
LOCATION / MISSION	Passengers - North Atlantic
DENSITY @ TEMP	
INSURED?	

		Calibration Date (user/factory)
SCIENCE BAY SERIAL NUMBERS	1) CTD - RBR 207519	
	2) LS1 - 4371366	
	3) DVL 673159	
	4)	
	5)	
	6)	

**PRE-SEAL** TAKE PICTURES OF CONNECTORS AT EACH SEALING JOINT

**FORE CHECK**

Check pump & pitch threaded rods (clean and grease)	<u>✓</u>	Leak detect in place, batteries secure, grab & wiggle pitch battery to check secure, white guides free, no metal shavings, bottles installed	<u>✓</u>
Worn or missing?	<u>✓</u>		
Resistant Exposed?	<u>✓</u>		

**PAYLOAD CHECK**

Special Sensors / Additional Sensors?	<u>1</u>	CTD cable clear, no leak at CTD joint, no leak at pucks	<u>—</u>
Grounded?	Fore Sci Ring	<u>—</u> CTD	
Corrosion?	Aft Sci Ring	<u>—</u> Other? <u>—</u>	

**AFT CHECK**

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

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) ✓

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 11.1A

Pitch Pack Voltage .9A

Nose Packs Voltage 12.52

Emer (if possible) Voltage —

Cabling/connectors lithium vs. alkaline circuit correct? —

**POST-SEAL, pre-ballast**

**GENERAL**

Pick Point Present?	<u>Fail</u>	Special Cargo?	<u>Logger head</u>
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**HARDWARE**

Nose cone and pump bladder inspection	<u>✓</u>	Anode size / remainder	<u>70g</u>
Anode grounded?	<u>✓</u>	Payload sensor	<u>couldn't check</u>
Pressure Sensor Check (corrosion, clear)	<u>2.0</u>		<u>✓</u>
Aft sensor	<u>2.0</u>		
Ejection weight assembly ok/not seized?	<u>✓</u>		

\* 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

NA

**OPTODE**

Check in completed?  
Saturation reading in air

|

**OPTICS**

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

|

**LIST**

Clean LISST and perform ZSCAT

|

**OTHER**

ADCP PA ✓ ~~PPD~~ PPO ✓

|

**OUTSIDE**

GPS Almanac/firmware updated?  
GPS check Latitude 4028.75 Longitude 4.40  
Indium connect  
Water pressure  
Water temp (time)?  
Compass calibration  
For deep gliders, put c\_de\_oil\_vol -1000 to fully retract oil inside reservoir

4.40

742622  
0.00

**ADDITIONAL**

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

Check burn wire - disconnect, then put c\_weight\_drop 1, confirm 12 V

Fore leakdetect 2.0V Science not sensitive Aft leakdetect 2.0

**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

5 TROBT ✓

✓  
✓  
✓  
✓

**POWERED**

Put m\_coulomb\_amphr\_total accordingly ( 0 = new batteries)  
Put f\_coulomb\_battery\_capacity (Alk=155, Lilon=200, li=450,625)  
Vacuum @ T @ ballast 7.1 @ kello 26.39 Stabilized m\_battery  
Get m\_tot\_num\_inflections. Verify relative < 20000 or sufficient  
Get m\_leakdetect\_voltage, science, forward (>2.3)  
Get m\_digifin\_leakdetect\_reading (less than 1019 requires service)  
Altimeter test - put c\_alt\_time 0, verify chirp. note m\_altimeter\_voltage  
Verify Argos ping

0  
14.4  
838  
1022  
✓

**SOFTWARE**

**GENERAL**

Backup Glider and Science  
COOL/gliderData  
number and card cards -  
Apply new copy of latest  
For Glider: COOL  
For Science: COOL  
Copy/overwrite STATE  
F.V Transfer latest RU  
COOL/Glidrs/Glid  
Software Version  
Date OK?

intra.mi  
wrong r036  
error on 10.08  
 $\frac{a}{w} = n$   
 $\frac{n}{w} = d$

✓  
✓  
✓  
0

**CONFIG**

simul.sim deleted

**MAFILES**

goto\_110.ma (set x\_last...)  
vo\*.ma, surfac\*.ma pertinent for each glider and test missions

**MISSIONS**

u\_arg. undervolts: 10.75V alkaline, 9-10 V Li3S, 13.5V Li4S, 12.75V Lilon  
Remove unused sample behaviors in missions

**AUTOEXEC.MI**

irdium: Numbers may vary. Listed: Main - Rutgers Alternate - TWR  
Irid Main: 88160000592 Irid Alt: 17818711614  
u\_irdium\_failover\_retries = 10 Ver 7.15 u\_irdium\_idle -1?  
sci timestamp sensors (ctd41cp) Calibration coefficients  
Reset the glider, observe any errors get f\_max\_working\_depth

✓  
✓  
1050

**CACHE MANAGEMENT**

del ..\state\cache\\*. \*  
after \*bdlist.dat are set (exit reset):  
logging on; logging off  
send ..\state\cache\\*.cac  
send \*.mbd \*.sbd \*.tbd

**DOCKSERVER**

Version  
Check script

**TWR BACKUP**

Confirm to-glider folder clear  
Confirm correct script running

\* Software Burning Tips : if using Procomm or local folder, copy all the files from the software image locally. Then proceed to edit them for the glider and do a mass freewave transfer of the files. Save these files or prepare the to-glider with these files



**COMMENTS**

**MASS (g)**

<b>Deployment</b>	FORE STEM (minus FBB1,2)	NA
<b>PASSENGERS</b> I	FORE HULL	NA
	AFT STEM (red plug, card)	NA
<b>Glider</b>	AFT HULL	NA
RU36	COWLING	NA
	SCREWS (vacuum, cowling, aft battery)	NA
<b>Date</b>	PAYLOAD BAY	NA
10/30/2022	WINGS	NA
	OTHER	NA
<b>Preparer</b>	AFT BATTERY	NA
	PITCH BATTERY	NA
	FORE BATTERY 1, 2, EMER	NA
	AFT BOTTLE	NA
	FORE BOTTLE 1 (stbd) (FBB1)	NA
	FORE BOTTLE 2 (port) (FBB2)	NA
	OTHER	NA

<b>ENTIRE VEHICLE (Ohaus Scale)</b>	72100
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Tank Specifics	Glider Specifics	
Tank Density (kg/m <sup>3</sup> )	1020.94	Glider Volume (L)
Tank Temperature (C)	22.17	Total Mass (kg)
Weight in Tank (g)	174.00	Glider Density (in air)
<b>Target Specifics</b>	<b>Volume Change (temperature induced)</b>	
Target Density (kg/m <sup>3</sup> )	1023.25	Volume Change (target) (mL)
Target Temperature (C)	25.00	Coefficient of Thermal Expansion
		Carbon hulls
		Aluminum hulls
<b>Glider Volume (at lab temp) (L)</b>	<b>70.451</b>	

Ballasting Using Volume		Ballasting Using Mass	
Should Hang (in tank) (g)	170.1	Adjust Glider Mass (entered volume) (g)	-4.7
Adjust by (g)	-3.9	Glider Density (target water, using mass)	<b>1023.3</b>
Weight Change (no dunk) (g)	52.9	change of ball	
Glider Density (target)	<b>1024.1</b>	1 1/2 am +3 wrw requested	

H MOMENT (rad)	(deg)
Angle of Rotation (before)	-0
Angle of Rotation (after)	0.0
Angle of Rotation	-0
Weight on Spring (after)	
Weight added	290
Radius of Hull	107
<b>H-distance</b>	<b>-88.1</b>

125 for G2+, deeps

**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 0.437209

2022-09-21 16:06:03  
 Plastic Wing Air -> Water ratio 0.487603  
 Ballast Sheet (3)  
 2k syntactic foam 100 g gives you 155 buoyancy

GLIDER: R036

Iteration 1 Log File 067000.mlg Date / Location RUCool 9/21/22

Iteration				Log File	Date / Location	Ballast	Notes
FORE	EB	SB	AFT			FBB1 stbd <u>69.2</u>	<u>not = 44g</u>
Front Scale		Aft Scale		FBB2 Port		<u>103.0</u>	<u>pic = 172g</u>
<u>320</u>		<u>202</u>		Aft BB		<u>60.0</u>	
Instrument: <u>1581</u>		Instrument: <u>R036</u>		Roll		<u>0.054105 (no wings)</u>	
T = <u>22.05380</u>		T = <u>22.0527</u>		Ballast		<u>-6.577603</u>	
C = <u>4.446992</u>		C = <u>4.45008</u>		Battery		<u>-0.036927</u>	
D = <u>1020.922</u>		D =					
$\Delta T = 0.0011$		$\Delta C = -0.00388$					

Iteration 2 Log File 068000.mlg Date / Location 9/22/2022

Iteration				Log File	Date / Location	Ballast	Notes
FORE	EB	SB	AFT			FBB1 stbd <u>9.1</u>	<u>Want -134g</u>
Front Scale		Aft Scale		FBB2 Port		<u>92.3</u>	<u>F A</u>
<u>132</u>		<u>42</u>		Aft BB		<u>127g</u>	<u>276 30</u>
Instrument: <u>1581</u>		Instrument: <u>R036</u>				<u>+39g out tail</u>	<u>-123 +123 trim</u>
T = <u>22.17488</u>		T = <u>22.1781</u>		Roll		<u>-0.005235</u>	<u>-67 -67 ballast</u>
C = <u>4.46598</u>		C = <u>4.46859</u>		Ballast		<u>-7.423589</u>	<u>-190 +56 total = -134</u>
D = <u>1020.9396</u>		D =		Battery		<u>-0.035407</u>	<u>see attached</u>
$\Delta T = -0.00322$		$\Delta C = -0.00261$					<u>OHAUS = 85.55 - 13.45</u>

Iteration \_\_\_\_\_ Log File \_\_\_\_\_ Date / Location \_\_\_\_\_

Iteration				Log File	Date / Location	Ballast	Notes
FORE	EB	SB	AFT			FBB1 stbd _____	
Front Scale		Aft Scale		FBB2 Port		_____	
_____		_____		Aft BB		_____	
Instrument: _____		Instrument: _____		Roll		_____	
T = _____		T = _____		Ballast		_____	
C = _____		C = _____		Battery		_____	
D = _____		D = _____					

new bail size:

old double bail = 132g

$$\frac{1}{2}'' \times \frac{1}{4}'' \Rightarrow V = 48.7 \text{ cc} = L \cdot .5 \cdot .25 \Rightarrow L = 23.8''$$

$$\rightarrow \frac{3}{4}'' : .75 \cdot .25 \cdot 23.8 = 4.46 \text{ in}^3 = 73.1 \text{ cc}$$

$$\Rightarrow 73.1 \text{ cc} \rightarrow 198 \text{ g}$$

+66g for new bail

$\frac{1}{2} \times \frac{1}{4}$  stainless = 389g

~~$23.8 \times \frac{1}{4} \times \text{height} = 5.95 \text{ in dial} = 97.5 \text{ cc}$~~

$$\text{mass} = \frac{97.5}{\text{height} \times 7.99} \Rightarrow H = \frac{97.5 \times 7.99}{M}$$

$$60.5 \text{ cm} \times .635 \text{ cm} \times H = V$$

$$M = V \cdot \rho$$

dunk 1 canceled

vant:

-190	+56
------	-----

$$\rightarrow -134$$

<del>-56</del>	<del>+56</del>
-56	-56
	+112

batt from scie bay  $\rightarrow$  aff

change aff batt plate to batt mount

so far

	-164
-56	-108

$$-134 \quad +164$$

$$+30 (-134 + 164)$$

$$\# -134$$

$$+164$$

$$\begin{array}{r} -132 \\ -68 \end{array}$$

$$\begin{array}{r} -68 \\ +132 \end{array}$$

pic SBF  $\rightarrow$  SBA

$$-64$$

$$+64$$

$$-70$$

$$+100$$

$$\rightarrow +30$$



**COMMENTS**

**MASS (g)**

<b>Deployment</b>	FORE STEM (minus FBB1,2)	NA
<b>PASSENGERS</b> II	FORE HULL	NA
	AFT STEM (red plug, card)	NA
<b>Glider</b>	AFT HULL	NA
RU36	COWLING	NA
	SCREWS (vacuum, cowling, aft battery)	NA
<b>Date</b>	PAYLOAD BAY	NA
<del>10/30/2022</del>	WINGS	NA
	OTHER	NA
<b>Preparer</b>	AFT BATTERY	NA
	PITCH BATTERY	NA
	FORE BATTERY 1, 2, EMER	NA
	AFT BOTTLE	NA
	FORE BOTTLE 1 (stbd) (FBB1)	NA
	FORE BOTTLE 2 (port) (FBB2)	NA
	OTHER	NA

<b>H MOMENT (rad)</b>		<b>(deg)</b>
Angle of Rotation (before)	-0	-0.3
Angle of Rotation (after)		0.0
Angle of Rotation	-0	-0.3
Weight on Spring (after)		
Weight added	290	
Radius of Hull	107	
<b>H-distance</b>		<b>-87.6</b>

125 for G2+, deeps

<b>MISC MASSES &amp; VOLUMES</b>	
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
2k syntactic foam 100 g gives you 155 buoyancy	

ENTIRE VEHICLE (Ohaus Scale) 72022

Vehicle mass reduced by 78 due to dvl swapped with ad2cp

<b>Tank Specifics</b>		<b>Glider Specifics</b>	
Tank Density (kg/m <sup>3</sup> )	1025.71	Glider Volume (L)	70.830
Tank Temperature (C)	20.36	Total Mass (kg)	72.022
Weight in Tank (g)	-92.00	Glider Density (in air)	1016.83
<b>Target Specifics</b>		<b>Volume Change (temperature induced)</b>	
Target Density (kg/m <sup>3</sup> )	1025.00	Volume Change (target) (mL)	6.7
Target Temperature (C)	23.00	Coefficient of Thermal Expansion	3.60E-05
		Carbon hulls	4.50E-05
		Aluminum hulls	7.50E-05
<b>Glider Volume (at lab temp) (L)</b>	<b>70.307</b>		

<b>Ballasting Using Volume</b>		<b>Ballasting Using Mass</b>	
Should Hang (in tank) (g)	-43.2	Adjust Glider Mass (entered volume) (g)	585.6
Adjust by (g)	48.8	Glider Density (target water, using mass)	1016.7
Weight Change (no dunk) (g)	52.9		
<b>Glider Density (target)</b>	<b>1025.1</b>		

GLIDER: RU36

Iteration 1 Log File 01030000.mlg Date / Location 02/01/2023 PASSENGERS

3 pies (520g)				Ballast	Notes
FORE	EB	SB	AFT	FBB1 stbd	
Front Scale			Aft Scale	FBB2 Port	
30			194	Aft BB	
Instrument: <u>RU36</u>		Instrument: <u>Jonny ctd</u>			
T = <u>19.9346</u>	T = <u>19.9273</u>	Roll <u>-0.3999 deg</u>			
C = <u>4.94844</u>	C = <u>4.94488</u>	Ballast <u>-5.802116 cc</u>			
D =	D = <u>1025.7879</u>	Battery <u>-0.029330 in</u>			

Iteration 2 Log File 01040000.mlg Date / Location 02/03/2023

2 pies				Ballast	Notes
FORE	EB	SB	AFT	FBB1 stbd	<u>External Aft weight added:</u>
Front Scale			Aft Scale	FBB2 Port	<u>172g + 172g = 344g</u>
162			90	Aft BB	
Instrument: <u>RU36</u>		Instrument:			
T = <u>20.3616 degC</u>	T =	Roll <u>2.0999 deg</u>			
C = <u>4.99519 S/m</u>	C =	Ballast <u>-5.872614 cc</u>			
D = <u>1025.70720 kg/m-3</u>	D =	Battery <u>-0.030849 in</u>			

Iteration \_\_\_\_\_ Log File \_\_\_\_\_ Date / Location \_\_\_\_\_

				Ballast	Notes
FORE	EB	SB	AFT	FBB1 stbd	
Front Scale			Aft Scale	FBB2 Port	
				Aft BB	
Instrument: _____		Instrument: _____			
T =	T =	Roll _____			
C =	C =	Ballast _____			
D =	D =	Battery _____			

\* no batteries!

**RUTGERS**

Center for Ocean Observing Leadership

POST - PASSENGERS

### Slocum Glider Check-IN

DATE: 7/24/23 GLIDER: RU36 SB: RBR 207519

#### Vehicle Powered

1. Power on vehicle in order to fully retract pump, and/or to deflate air bladder. ✓
2. Wiggle vehicle for 5 minutes. ✓

#### 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 N/A

1. Record results on Optode Check Sheet

#### LISST Check/ZSCAT N/A

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**\*\*\*\*

2023-08-08 post RU36-D20230525T1748 D20230611T2254 card backup at RU

from-glider  
from-science  
from-pam

corrupt files:  
01280006.ebd  
01280006.nig

Cards also backed up at  
end of cruise  
CRUISES/PASSENGERS/  
PASSENGERS-CRUISE-1

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 N/A
5. Re-assemble glider with a vacuum \_\_\_\_\_

**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.

• PAM Battery holder removed from scene bag 8/8/23 new  
- PAM + board still on aft

CTD Check

	C	T	D		C	T	D
Seabird	4.252	23.607	1018.596		4.252	23.602	1018.602
RBR	4.250	23.589			4.2527	23.595	1018.611

06/18

vac: 12.303  
temp: 23.8813  
oil: -431.403

07/24

vac: 12.703  
temp: 23.964  
oil: 420.293

01280006.edb  
.nlg

## Slocum CTD Comparison Check

GLIDER: R036 SB: 207519 DEPLOYMENT: PASSENGERS

Date: 9/22/22 **Pre-Deployment**

SBE19 s/n: <u>1581</u>	Glider:
Temperature: <u>22.175</u>	Temperature: <u>22.178</u>
Conductivity: <u>4.466</u>	Conductivity: <u>4.469</u>

**Notes:**

Pre - Passengers II 2/1/23 glider Bios CTD  
 Post - Passengers I T 19.9346 19.9273  
 C 4.9484 4.9449

Date: 7/24/23 **Post-Deployment**

SBE19 s/n: <u>1645</u>	Glider:
Temperature: <u>23.682</u>	Temperature: <u>23.595</u>
Conductivity: <u>4.252</u>	Conductivity: <u>4.2527</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