

Glider Prep and Deployment Checklists

Glider -
deployment

R440-20240215T1642

Project

Rm1
Winter 2024

Deployment
dates

2/15/24 - 3/14/24

Location/notes

Coastal NJ

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



Other Advanced Sensor

6) Other



compass

↳ not
done.



GLIDER	RV40
PREPARER	Jess
PREP DATE	02/05/2024
MISSION	RMI winter duo
LOCATION	NJ coast
DENSITY @ TEMP	1024 @ 6.5°C
Pump ID	Assy 157 100M w/ 246 motor (RV40)
Battery Set	1061's L10n
Starting Pump Cycles	33369

SCIENCE BAY SERIAL NUMBERS		Calibration Date (user/factory)
1)	SB CTD 9989	9/17/2023
2)	FLBB CD 8632	12/13/2023
3)	DMON 51	N/A
4)	Oxy4 1037	6/15/2022 / 12/16/2024
5)	VEMCO RX-LIVE 457140	N/A
6)		

INSURED?	Yes
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PRE-SEAL TAKE PICTURES OF CONNECTORS AT EACH SEALING JOINT

FORE CHECK		
Check pump & pitch threaded rods (clean and grease)	☒	Leak detect in place, batteries secure, grab & wiggle pitch battery
Grounded nose?	☒	to check secure, white guides free,
Dessicant Exposed?	☒	no metal shavings, bottles installed
PAYLOAD CHECK		
Special Sensors / Additional Sensors?	☒	CTD cable clear, no leak at CTD joint, no leak at pucks
Grounded?	Fore Sci Ring ☒	CTD ☒
Corrosion?	Aft Sci Ring ☒	Other? ☒
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		0.062A
Pitch Pack Voltage		0.052A
Nose Packs Voltage		
Emer (if possible) Voltage		12.62
Cabling/connectors - lithium vs. alkaline circuit correct?	☒	

POST-SEAL, pre-ballast

GENERAL		
Pick Point Present?	☒	Special Cargo? Rx-Live ☒
HARDWARE		
Nose cone and pump bladder inspection	☒	Anode size / remainder ☒
Anode grounded?	☒	Payload sensor ☒
Pressure Sensor Check (corrosion, clear)	☒	
Aft sensor	☒	
Ejection weight assembly ok/not seized?	☒	

POWERED

Put m_coulomb_ampr_total accordingly (0 = new batteries)
Put f_coulomb_battery_capacity (Alk=155, Lilon=225, li=450,625)
Vacuum @ T @ ballast 6.011 @ 25.636°C 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  Wiggle for 5 minutes

✓
225 ✓
14.708 ✓
33369
2.5
1023
✓
✓

SOFTWARE

(paths are RU specific)

GENERAL

Backup Glider and Science Cards
COOL//gliderData/glider_OS_backups/"glider name"

Format both CF cards - FAT Format

Apply new copy of latest TWR Software Image
For Glider: COOL//gliderData/gliderDos_releases/archived/"version"/target-glider
For Science: COOL//gliderData/gliderDos_releases/archived/"version"/target-science

Copy/overwrite STATE and CONFIG Folders

FW Transfer latest RU Software Image
COOL/Gliders/Glider Software Image/"use most recent image"

Software Version 10.9 Configure TBDlist
Date OK? ✓ Configure NBDlist

✓

✓

✓

e

✓

✓

✓

✓

\CONFIG

simul.sim deleted

✓

\MAFILES

goto_l10.ma (set x_last_...)
yo*.ma, surfac*.ma pertinent for each glider and test missions

✓

✓

MISSIONS

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

✓

AUTOEXEC.MI

Iridium: Numbers may vary. Listed: Main - Rutgers Alternate - TWR

Irid Main: 88160000592

Irid Alt: 17818711614

u iridium failover retries = 10

u sequence start delay 240

sci timestamp sensors (ctd41cp)

Calibration coefficients

Reset the glider, observe any errors

get f max working depth

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

* 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?

✓
✓
✓
all but Rx-Live

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

✓
102.63%

OPTICS

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

✓
✓
01280000.0.mtg

LISST

Clean LISST and perform ZSCAT

OTHER

DMON / RX-LIVE

01290000.mtg Rx-LIVE

DMON files offloaded / charged
Song test ✓

OUTSIDE

GPS Alamanc/firmware updated?

GPS check Latitude 4028.747N

Longitude 7426.225 E

Iridium connect ✓

Alternate number ✓

zero_ocean_pressure ✓

Get m_pressure -0.010 bar

Air bladder shutoff (time)? 2.5 min

Sync_time (proper date?) ✓

Compass calibration

Compass check

Sidewalk compass check Towards DMCS (18°)

19.2 Left DMCS (107°) 106.5

Away from DMCS (198°)

199 Right DMCS (287°) 288.6

For deep gliders, put c_de_oil_vol -1000 to fully retract oil inside reservoir

196

File transfer: ✓

ADDITIONAL

***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

✓

NOTES

02/05: changed pump calibrations in autoexec, switching sci payload from 0133 to 1156

MASS (g) COMMENTS

Deployment	FORE STEM (minus FBB1,2)	NA	switched to ru43's sci bay
RMI winter duo 2024	FORE HULL	NA	
	AFT STEM (red plug, card)	NA	
Glider	AFT HULL	NA	
RU40	COWLING	NA	
	SCREWS (vacuum, cowling, aft battery)	NA	
Date	PAYLOAD BAY	NA	
2/7/2024	WINGS	NA	
	OTHER	NA	
Preparer	AFT BATTERY	NA	
Jess	PITCH BATTERY	NA	
	FORE BATTERY 1, 2, EMER	NA	
FINAL	AFT BOTTLE	NA	
	FORE BOTTLE 1 (stbd) (FBB1)	NA	
	FORE BOTTLE 2 (port) (FBB2)	NA	
	OTHER	NA	

ENTIRE VEHICLE (Ohaus Scale)	64650
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Tank Specifics	Glider Specifics	
Tank Density (kg/m^3)	1018.80	Glider Volume (L)
Tank Temperature (C)	23.07	Total Mass (kg)
Weight in Tank (g)	288.00	Glider Density (in air)
Target Specifics	Volume Change (temperature induced)	
Target Density (kg/m^3)	1024.00	Volume Change (target) (mL)
Target Temperature (C)	6.50	Coefficient of Thermal Expansion
		Carbon hulls
		Aluminum hulls
Glider Volume (at lab temp) (L)	63.174	

Ballasting Using Volume		Ballasting Using Mass	
Should Hang (in tank) (g)	280.3	Adjust Glider Mass (entered volume) (g)	-8.1
Adjust by (g)	-7.7	Glider Density (target water, using mass)	1024.1
Weight Change (no dunk) (g)			
Glider Density (target)	1024.1		

H MOMENT (rad)	(deg)
Angle of Rotation (before)	-0
Angle of Rotation (after)	-0.4
Angle of Rotation	0.38
Weight on Spring (after)	588
Weight added	294
Radius of Hull	125
H-distance	4.4

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
Plastic Air -> Water Ratio	0.437209

P2024-02-01 by AftQ-BW winter duo.xlsx - Ballast Sheet (4)

COMMENTS

MASS (g)

<u>Deployment</u>		FORE STEM (minus FBB1,2)			
<i>RMT winter duo</i>		FORE HULL			
<u>Glider</u>		AFT STEM (red plug, card)			
<i>RV40</i>		AFT HULL			
		COWLING			
		SCREWS (vacuum, cowling, aft battery)			
<u>Date</u>		PAYLOAD BAY	12526	(RV43) (from 11323 RV40) (-131 upside point)	
<i>12/5/24</i>		WINGS			
		OTHER			
<u>Preparer</u>		AFT BATTERY			
<i>Jess</i>		PITCH BATTERY			
		FORE BATTERY 1, 2, EMER			
		AFT BOTTLE			
		FORE BOTTLE 1 (stbd) (FBB1)			
		FORE BOTTLE 2 (port) (FBB2)			
		OTHER			

ENTIRE VEHICLE (Ohaus Scale)

64650

Tank Specifics		Glider Specifics	
Tank Density (kg/m ³)	1023.00	Glider Volume (L)	57.000
Tank Temperature (C)	23.00	Total Mass (kg)	0.000
Weight in Tank (g)	0.00	Glider Density (in air)	0.00
Target Specifics		Volume Change (temperature induced)	
Target Density (kg/m ³)	1023.00	Volume Change (target) (mL)	0.0
Target Temperature (C)	23.00	Coefficient of Thermal Expansion	4.50E-05
		Carbon hulls	4.50E-05
		Aluminum hulls	7.50E-05
Glider Volume (at lab temp) (L)		0.000	

Ballasting Using Volume		Ballasting Using Mass	
Should Hang (in tank) (g)	0.0	Adjust Glider Mass (entered volume) (g)	58311.0
Adjust by (g)	0.0	Glider Density (target water, using mass)	0.0
Weight Change (no dunk) (g)			
Glider Density (target)	1023.0		

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

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
 Plastic Wing Air -> Water ratio 0.487603
 2k syntactic foam 100 g gives you 155 buoyancy

GLIDER: RU40Iteration 1 Log File 01240000.mlg Date / Location 2/5/24

				Ballast	Notes
FORE	EB	SB	AFT	FBB1 stbd <u>97</u>	<u>Switched sci bays w/ RU43</u>
Front Scale		Aft Scale		FBB2 Port <u>153</u>	<u>too back heavy for h-movers</u>
<u>150</u>		<u>412</u>		Aft BB <u>21/8</u>	
Instrument: <u>1645</u>		Instrument: _____			
T = <u>22.071</u>		T = _____		Roll <u>-0.04</u>	
C = <u>4.103</u>		C = _____		Ballast <u>2.81u</u>	
D = <u>1018.918</u>		D = _____		Battery <u>0.021"</u>	

Iteration 2 Log File 001240000.mlg Date / Location _____

				Ballast	Notes
FORE	EB	SB	AFT	FBB1 stbd <u>55</u>	<u>h = -0.375 rad, m = 294, 450 (4.2)</u>
Front Scale		Aft Scale		FBB2 Port <u>110</u>	
<u>132</u>		<u>136</u>		Aft BB <u>21/8</u>	
Instrument: <u>1645</u>		Instrument: _____			
T = <u>22.537</u>		T = _____		Roll <u>-0.04</u> <u>-2.3°</u>	
C = <u>4.168</u>		C = _____		Ballast <u>3.29u</u>	
D = <u>1018.89</u>		D = _____		Battery <u>0.01"</u>	

Iteration 3 Log File 001250000.mlg Date / Location _____

				Ballast	Notes
FORE	EB	SB	AFT	FBB1 stbd <u>740 57</u>	<u>h = 642, 294, -0.42 rad</u>
Front Scale		Aft Scale		FBB2 Port <u>440 97</u>	
<u>256</u>		<u>02</u>		Aft BB <u>8/8</u>	
Instrument: <u>1645</u>		Instrument: <u>9</u>			
T = <u>22.348</u>		T = <u>22.330</u>		Roll <u>-0.01</u>	
C = <u>4.1454</u>		C = <u>4.1463</u>		Ballast <u>3.29u</u>	
D = <u>1018.95</u>		D = <u>1018.96</u>		Battery <u>0.025"</u>	

Glider Deployment Checklist – Shore Side

Glider

RU40

Date

2/15/2024

Project/Location

RMI Winter 2024 / NJ

Field Participants, Vessel

Jess, Brian, Lori, Delphine
Towboat, Manasquan

Pilot

Nicole W.

Pre-deployment

/to-glider folder populated & recent



send tbdlist.



send goto + x-last



del large/numerous SBD & TBD's



check files on glider



Glider Power Up - Pre-deploy

Confirm 'boot app' with 'boot'



Battery Voltage

16.46

m_vacuum (> 7)

9.04

Coulomb AH total set



Digifin & glider leakdetect OK



sync_time (after GPS hit)



Glider In Water - Deployed

zero_ocean_pressure



loadmission ru40.ini.mi



m_depth < 1 m



run od, od5.mi - confirm overdepth
abort



run shallow, deep.mi



Download shallow.mi MBD and NBD file

segment #: 01310000

ru40-2024-046-1-0

Boat – perform CTD comparison cast



CTD s/n: RPR

Laptop: —

Test Mission Check

Vehicle Altimeter Works



Flies to commanded depth and to
surface



Average vehicle roll

0 degrees

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

☐

Dive: -30°, climb: 26°

Average battery position on dives
and climbs

Dives: 0.27, climbs 0

Does vehicle track heading or
m_heading cross c_heading

☒

Fin not hardover
entire time (avg fin)

1.17 deg.

Avg Dive Rate

20-22 cm/sec

Avg Climb Rate

14 cm/sec

Science Checks

Surface Water Density

1023.7

Bottom Water Density

1024.4

CTD and m_pressure agree

☒

Average offset

0

CTD temp & salinity downcast =
upcast (no lag)

☒

Remaining Sensors reporting
reasonable values

☒

oxy✓, FLBBED✓, Dmon✓
made ven files + dmon files

Prepare for Primary Mission

loadmission ru40.mi

☐

SBD/TBD's prior to od.mi deleted

☒

Transfer SBD's and TBD's

☒

Adjust yo to bottom if altimeter
works

☒

Post Dive

Verify SBD and TBD are in tact

☒

Verify .cac availa for SBD/TBD

☒

Slocum Glider Check-IN

DATE: 3/19 GLIDER: R040 SB: 9989

Pre-Check in Note Analysis

1. Note any critical deployment notes that need to be analyzed before checking in such as roll, trim, ballast, steering issues, etc.

Vehicle Powered

1. Power on vehicle in order to fully retract pump, and/or to deflate air bladder. ✓
2. Wiggle vehicle for 2-3 minutes. ✓
3. Record final pump cycles. Get m_tot_num_inflections. 40651

Vehicle Cleaning (hose down with pressure)

Nose cone ✓ (coiled pump)

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
6. Re-Silicon coat G3 shallow pumps

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. Compress air glider female connector
2. If female connector is dirty can use some light alcohol and swabs to clean it out.
3. Note condition of power cable (G2, cracking, etc?)
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

	glider	SB1581
T	21.925	21.931
C	4.4069	4.4097

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******
2024-03-19-0040 - post-RMI - winter DVD
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 _____ ✓

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.

Slocum CTD Comparison Check

GLIDER: RU40 SB: 9589p DEPLOYMENT: RMI Winter 2024

Pre-Deployment

Date: 16th

SBE19 s/n: <u>1645</u>	Glider:
Temperature: <u>22.348</u>	Temperature: <u>22.338</u>
Conductivity: <u>4.1454</u>	Conductivity: <u>4.1463</u>

Notes:

Post-Deployment

Date: 3/19/24

SBE19 s/n: <u>1581</u>	Glider:
Temperature: <u>21.931</u>	Temperature: <u>21.925</u>
Conductivity: <u>4.4097</u>	Conductivity: <u>4.4069</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

Oxygen Optode Check & Calibration pre RMI winter 2024 RU40

OPTODE SN	1037	DATE	2/6/2024
FOIL ID	1824M	AIR PRESSURE (hPa)	30.15 in Hg = 1020.996 hPa
PRE SALINITY	32	CALIBRATED?	No

* REMEMBER TO ISSUE THE SAVE COMMAND AFTER CHANGING VALUES

100% SOLUBILITY	8.34 ppm = 260.625 μ M	TITRATION	8.0 ppm, 8.0 ppm
	* μ M = ppm * 1000 / 32	EPA Na2S2O3 Check	1.96 mL
		Sodium Sulfite / mL	15.0g in 550mL %

PRE-CHECK			
100%		0%	
Conc (μ M) =	262.125	Conc (μ M) =	-0.502
Saturation (%) =	101.493	Saturation (%) =	-0.189
Temp ($^{\circ}$ C) =	24.930	Temp ($^{\circ}$ C) =	23.500
Phase =	29.897	Phase =	59.591

POST-CAL			
100%		0%	
Conc (μ M) =		Conc (μ M) =	
Saturation (%) =		Saturation (%) =	
Temp ($^{\circ}$ C) =		Temp ($^{\circ}$ C) =	
Phase =		Phase =	

GLIDER CONFIG	
POST SALINITY	32
TEXT OUTPUT OFF	yes

* REMEMBER TO ISSUE THE SAVE COMMAND AFTER CHANGING VALUES

Oxygen Optode Check & Calibration post RW40 Wintu 2024 RM1

OPTODE SN	1037	DATE	4/10/2024
FOIL ID	1824m	AIR PRESSURE (hPa)	29.80 mHg = 1005.14 hPa
PRE SALINITY	32	CALIBRATED?	No

* REMEMBER TO ISSUE THE SAVE COMMAND AFTER CHANGING VALUES

100% SOLUBILITY	8.14 ppm = 254.375	TITRATION	7.6 ppm, 7.8 ppm
	* $\mu\text{M} = \text{ppm} * 1000 / 32$	EPA Na2S2O3 Check	1.96 mL
		Sodium Sulfite / mL	20.9 g / 650 mL %

PRE-CHECK	
100%	0%
Conc (μM) = 255.983	Conc (μM) = comp. -1.039
Saturation (%) = 100.076	Saturation (%) = -0.399
Temp ($^{\circ}\text{C}$) = 25.454	Temp ($^{\circ}\text{C}$) = 24.509
Phase = 29.954	Phase = 59.662

POST-CAL	
100%	0%
Conc (μM) =	Conc (μM) =
Saturation (%) =	Saturation (%) =
Temp ($^{\circ}\text{C}$) =	Temp ($^{\circ}\text{C}$) =
Phase =	Phase =

GLIDER CONFIG	
POST SALINITY	32
TEXT OUTPUT OFF	✓

* REMEMBER TO ISSUE THE SAVE COMMAND AFTER CHANGING VALUES