Glider Prep and Deployment Checklists

Glider - deployment

Project

Deployment dates

Location/notes

	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	☐	☐

GLIDER	
PREPARER	
PREP DATE	
LOCATION / MISSION	
DENSITY @ TEMP	
INSURED?	

			Calibration Date (**u**ser/**f**actory)
SCIENCE BAY SERIAL NUMBERS	1)		
	2)		
	3)		
	4)		
	5)		
	6)		

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 to check secure, white guides free, no metal shavings, bottles installed

Grounded nose?   _____

Dessicant Exposed?   _____   _____

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   _____

Pitch Pack Voltage   _____

Nose Packs Voltage   _____

Emer (if possible) Voltage   _____

Cabling/connectors - lithium vs. alkaline circuit correct?   _____

POST-SEAL, pre-ballast

GENERAL

Pick Point Present?   _____   Special Cargo?   _____

HARDWARE

Nose cone and pump bladder inspection

Anode grounded?   _____   Anode size / remainder   _____

Pressure Sensor Check (corrosion, clear)

Aft sensor   Payload sensor   _____

Ejection weight assembly ok/not seized?   _____

POWERED

Put m_coulomb_amphr_total accordingly (0 = new batteries) _____
Put f_coulomb_battery_capacity (Alk=155, LiIon=200, li=450,625) _____
Vacuum @ T @ ballast _____ 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 _____

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 _____ Configure TBDlist _____
Date OK? _____ Configure NBDlist _____

\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: 10.5V alkaline, 9-10 V Li3S, 12.5V Li4S, 12V LiIon _____
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 _____ Ver 7.15 u_iridium_idle -1? _____
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   TWR BACKUP

Version _____ Confirm to-glider folder clear _____
Check script _____ 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

Version 1.3   17Dec2019

* 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/firmeware updated? _____
        GPS check   Latitude _____   Longitude _____
        Iridium connect   _____   Alternate number _____
        zero_ocean_pressure   _____   Get m_pressure _____
        Air bladder shutoff (time)? _____   Sync_time (proper date?) _____
        Compass calibration   _____   Compass check _____
        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 _____

NOTES

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			MASS (g)	COMMENTS
Deployment	GLIDER	FORE STEM (minus FBB1,2)		
		FORE HULL		
		AFT STEM (red plug, card)		
Glider		AFT HULL		
		COWLING		
		SCREWS (vacuum, cowling, aft battery)		
Date	PAYLOAD	PAYLOAD BAY		
		WINGS		
		OTHER		
Preparer	BATTERIES	AFT BATTERY		
		PITCH BATTERY		
		FORE BATTERY 1, 2, EMER		
	WEIGHT BOTTLES	AFT BOTTLE		
		FORE BOTTLE 1 (stbd) (FBB1)		
		FORE BOTTLE 2 (port) (FBB2)		
		OTHER		

ENTIRE VEHICLE (Ohaus Scale)	

Tank Specifics		Glider Specifics		H MOMENT (rad)		(deg)
Tank Density (kg/m^3)	1023.00	Glider Volume (L)	57.000	Angle of Rotation (before)		0.0
Tank Temperature (C)	23.00	Total Mass (kg)	0.000	Angle of Rotation (after)		0.0
Weight in Tank (g)	0.00	Glider Density (in air)	0.00	Angle of Rotation	0	0.0
Target Specifics		**Volume Change (temperature induced)**		Weight on Spring (after)		
Target Density (kg/m^3)	1023.00	Volume Change (target) (mL)	0.0	Weight added	290	
Target Temperature (C)	23.00	Coeffcient of Thermal Expansion	2.35E-05	Radius of Hull	107	125 for G2+, deeps
		Carbon hulls	2.35E-05	**H-distance**	####	
Glider Volume (at lab temp) (L)	**0.000**	Aluminum hulls	7.00E-05			

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**		

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 g water (plastic or titanium)

Glider Ballasting Template or Ballast Sheet

LISST Bay - roughly 6.55 L

GLIDER: _____

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 _____

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 _____

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 _____

Glider / Mission: _____   **Cal Location** _____   **Date** _____   **Operator** _____

→ 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		0
30		0
60		0
90		0
120		0
150		0
180		0
210		0
240		0
270		0
300		0
330		0

↑ UPCAST ↑		
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
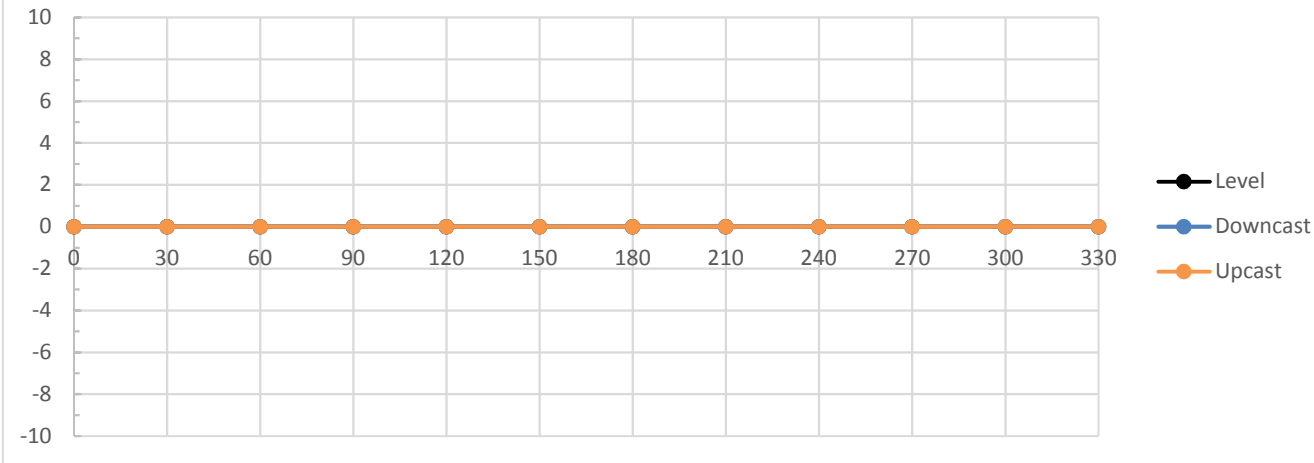
Glider Deployment Checklist – Shore Side

Glider

Date

Project/Location

Field Participants, Vessel

Pilot

Pre-deployment

/to-glider folder populated & recent ☐   del large/numerous SBD & TBD's ☐

Glider Power Up - Pre-deploy

Confirm 'boot app' with 'boot' ☐

Battery Voltage [____]   m_vacuum (> 7) [____]

Coulomb AH total set ☐   Digifin & glider leakdetect OK ☐

sync_time (after GPS hit) ☐

Glider In Water - Deployed

zero_ocean_pressure ☐   m_depth < 1 m ☐

run od, od5.mi - confirm overdepth abort ☐

run shallow, deep.mi ☐

Download shallow.mi MBD and NBD file   segment #: [____]

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 ☐ [   ]

Average battery position on dives and climbs [   ]

Does vehicle track heading or m_heading cross c_heading ☐   Fin not hardover entire time (avg fin) [   ]

Avg Dive Rate [   ]   Avg Climb Rate [   ]

<u>Science Checks</u>

Surface Water Density [   ]   Bottom Water Density [   ]

CTD and m_pressure agree ☐   Average offset [   ]

CTD temp & salinity downcast = upcast (no lag) ☐

Remaining Sensors reporting reasonable values ☐

<u>Prepare for Primary Mission</u>

SBD/TBD's prior to od.mi deleted ☐

Transfer SBD's and TBD's ☐

Adjust yo to bottom if altimeter works ☐

<u>Post Dive</u>

Verify SBD and TBD are in tact ☐

Verify .cac availa for SBD/TBD ☐

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Slocum Glider Check-IN

DATE: _____ GLIDER: _____ SB: _____

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 _____

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******

_____

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

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GLIDER: _____ **SB:** _____ **DEPLOYMENT:** _____

Pre-Deployment

Date: _____

SBE19 s/n:		Glider:	
Temperature:		Temperature:	
Conductivity:		Conductivity:	

Notes:

Post-Deployment

Date: _____

SBE19 s/n:		Glider:	
Temperature:		Temperature:	
Conductivity:		Conductivity:	

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

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Sequoia LISST Background Check-Out/Check-In

GLIDER: _____ **LISST:** _____ **DEPLOYMENT:** _____

How to Do a ZSCAT to collect background data

1. Obtain filtered Seawater and let sit out overnight to degas.
2. Cover LISST with black tape to create a chamber.
3. Slowly fill chamber with degassed FSW. Try not to create bubbles. Make sure chamber is not leaking.
4. Make sure there are no bubbles on the LISST sensor windows.
5. Cover the top of the chamber to make it dark.
6. Perform a zscat on the LISST to collect background data (u4stalk to LISST). Do 3 in a row that pass, and then save the zscat.
   > *consci, type proglets.dat,* look up uart and bit in proglets
   > *u4stalk uart 9600 bit*
   > *zs*
7. Turn on the LISST to collect an RBN file. (through glider)
   > *put c_science_on 1*
   > *put c_science_all_on_enabled 0*
   > *put c_science_send_all 1*
   > *put c_lisst_on 4*
   > *put c_science_on 3*
8. Wait a minute or two and then turn off the LISST
   > *put c_lisst_on -1*
9. Write down RBN file name displayed on screen (sci_lisst_rbn1_file)

Check-Out, Pre-Deployment	Check-In, Post-Deployment
Date:	Date:

Clean LISST windows
   use Lens Paper/Alcohol,   _____
   don't scratch windows.
	Do NOT clean LISST windows. _____

Perform ZSCAT (see above) _____	Perform ZSCAT (see above) _____
RBN file name _____	RBN file name _____
Once data saved off LISST, append to RBN filename: _____ *_preMission_zscat*	Once data saved off LISST, append to RBN filename: _____ *_postMission_preCleaning_zscat*

	Clean LISST windows
	   use Lens Paper/Alcohol, _____
	   don't scratch windows

Notes:	Notes:

Oxygen Optode Check & Calibration

OPTODE SN		**DATE**	
FOIL ID		**AIR PRESSURE (hPa)**	
PRE SALINITY		**CALIBRATED?**	

* REMEMBER TO ISSUE THE SAVE COMMAND AFTER CHANGING VALUES

100% SOLUBILITY		**TITRATION**	
	* µM = ppm * 1000 / 32	**EPA Na2S2O3 Check**	mL
		Sodium Sulfite / mL	%

PRE-CHECK	
100%	**0%**
Conc (µM) =	Conc (µM) =
Saturation (%) =	Saturation (%) =
Temp (°C) =	Temp (°C) =
Phase =	Phase =

POST-CAL	
100%	**0%**
Conc (µM) =	Conc (µM) =
Saturation (%) =	Saturation (%) =
Temp (°C) =	Temp (°C) =
Phase =	Phase =

GLIDER CONFIG	
POST SALINITY	
TEXT OUTPUT OFF	

* REMEMBER TO ISSUE THE SAVE COMMAND AFTER CHANGING VALUES