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?	

SCIENCE BAY SERIAL NUMBERS		Calibration Date (**u**ser/**f**actory)
	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) _____
Grounded nose? _____
Dessicant Exposed? _____

Leak detect in place, batteries secure, grab & wiggle pitch battery to check secure, white guides free, 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 turn glider on with only 1 battery connected

Aft Pack - J13 Voltage _____
Pitch Pack - J13 Voltage _____
Nose Packs - J13 Voltage _____
Emer (if possible) - J31 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 < 20000 or sufficient _____
Get m_leakdetect_voltage & m_leakdetect_voltage_forward (>2.3) _____
Get m_digifin_leakdetect_reading (less than 1019 requires service) _____
Altimeter test - put c_alt_time 0, verify chirp _____
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_...) _____

\MISSIONS

b_arg: undervolts: 10.5V alkaline, 10.25V Li3S, 13.5V Li4S, 12V LiIon _____

AUTOEXEC.MI

Iridium: Numbers may vary. Listed: Main - Rutgers Alternate - TWR
Irid Main: 88160000592 _____ Irid Alt: 17818711051 _____
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 _____

*** 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

TWR BACKUP

Confirm to-glider folder clear _____
Confirm correct script running _____

DOCKSERVER

Version _____
"In-house" or "cloud"? _____
Check script _____

SCIENCE

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

Check that software versions match - instrumentation and glider!

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? _____

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? _____ 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 **Version 1.3 17Dec2019** _____

NOTES

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

Tank Specifics	
Tank Density (kg/m^3)	
Tank Temperature (C)	
Weight in Tank (g)	
Target Specifics	
Target Density (kg/m^3)	
Target Temperature (C)	
Glider Volume (at lab temp) (L)	**#DIV/0!**

Glider Specifics	
Glider Volume (L)	
Total Mass (kg)	0.000
Glider Density (in air)	#DIV/0!
Volume Change (temperature induced)	
Volume Change (target) (mL)	0.0
Coeffcient of Thermal Expansion	7.00E-05
Carbon hulls	2.35E-05
Aluminum hulls	7.00E-05

H MOMENT (rad)		(deg)
Angle of Rotation (before)		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	####	

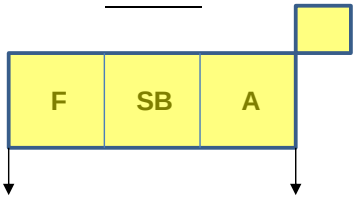
Ballasting Using Volume	
Should Hang (in tank) (g)	0.0
Adjust by (g)	0.0
Weight Change (no dunk) (g)	
Glider Density (target)	**#DIV/0!**

Ballasting Using Mass	
Adjust Glider Mass (entered volume) (g)	0.0
Glider Density (target water, using mass)	**#DIV/0!**

MISC MASSES & VOLUMES
Pick point - 40 mL - 107 g air - 66 g 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)

NOTES

ITERATION:



Ballast Bottles

FORE 1	
FORE 2	
AFT	

TANK: T =

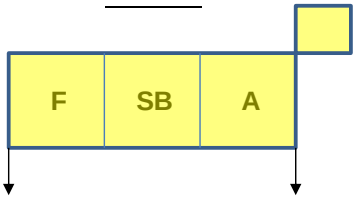
(SB19) C =

D =

TANK: T =

(Glider) C =

ITERATION:



Ballast Bottles

FORE 1	
FORE 2	
AFT	

TANK: T =

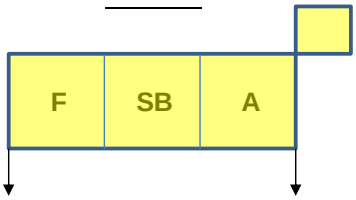
(SB19) C =

D =

TANK: T =

(Glider) C =

ITERATION:



Ballast Bottles

FORE 1	
FORE 2	
AFT	

TANK: T =

(SB19) C =

D =

TANK: T =

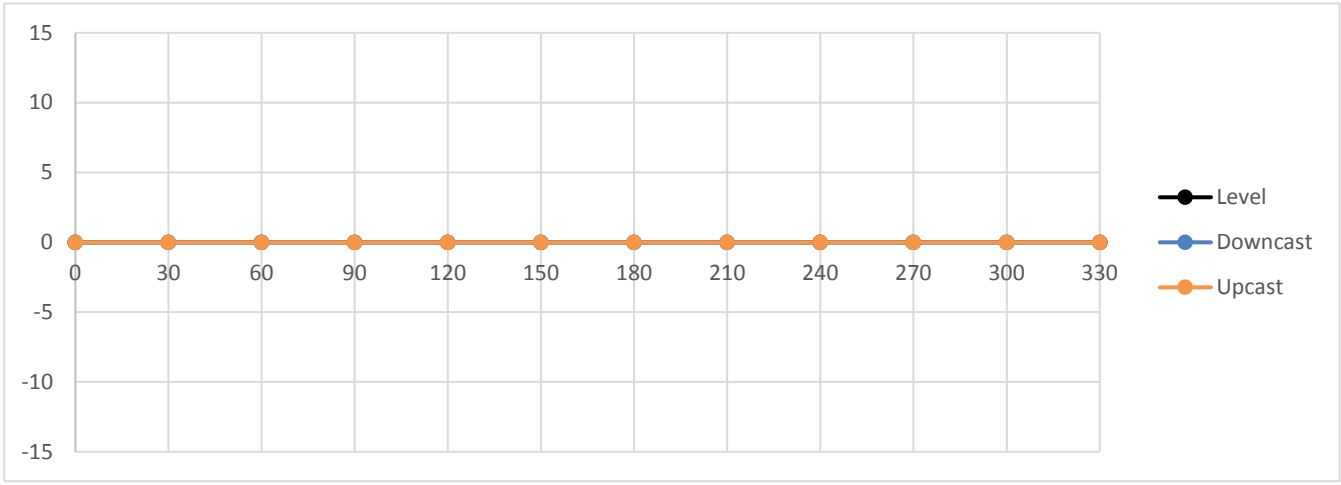
(Glider) C =

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 Check List - On Boat

Glider _____ Date _____ Where _____

Pilots _____ Boat Crew _____

Laptop _____ Vehicle Powerup: CTRL ^ C (until you get to prompt)!!!

On boat **(Remember after 10 min glider will go into mission, as well as on powerup!)**	Battery Voltage		get m_battery
	Vacuum Pressure		get m_vacuum, should be > 7 for bladder inflation
	Iridium Connection		look for connect dialog & surface dialog, let it dial at prompt
	boot app		boot app
	boot (should report application)		reports boot application
	run status.mi		mission completed normally?
In Water	zero_ocean_pressure		while glider in water
	run od.mi (with or without float, ask RU)		glider should dive and surface, type why? Should say overdepth, if not call
	send *.dbd *.mlg *.sbd		(FW) "send *.sbd" is most important
	(do nothing)		(IRID)
	run shallow.mi		(glider should dive, report to Rutgers and wait for ok from pilot to head home)
	or deep.mi		
	Verify dive; **disconnect freewave**		
	Report to Rutgers		
	send xxxxxx.mbd (from test mission)		(IRID)
	Perform CTD Comparison CAST		typically done with RU provided SBE19 or Cast Away CTD
	LAT: **LON**		

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

Science Checks

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 ☐

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 ☐

Post Dive

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.

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Slocum CTD Comparison Check

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

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		0%

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***

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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 **Date:**	**Check-In, Post-Deployment** **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: