SEA-BIRD ELECTRONICS, INC.
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SERVICE REPORT

Service Request **1005500168**
Date 12-OCT-2016

PRODUCT INFORMATION

Item: SLOCUM.LEGACY
Item Description: (LEGACY) Slocum Glider
Serial: 9014

Special Notes
Services Requested:
Evaluate/Repair Instrumentation.
Perform Routine Calibration Service.
Replace Antifoulant Device(s).

Problems Found:
No problems found

Services Performed:
Perform initial diagnostic evaluation.
Performed "POST" cruise calibration.
Performed pressure calibration.
Performed complete system check and full diagnostic evaluation.
Installed NEW AF24173 Anti-foulant cylinder(s).

Item	Item Description	Qty
CAL_SLOCUM	CALIBRATE SLOCUM CONDUCTIVITY AND TEMPERATURE SENSORS (FRRF)	1
CNCRTSLOCUM	CONFIRM & RE-CERTIFY WEBB SLOCUM GLIDER CTD (FRRF)	1
REPLACEAF	EXTRA CHARGE TO INSTALL ONE ANTIFOULANT DEVICE, INCLUDES ONE 801542.1. (FRRF)	1
PCAL_SLOCUM	CALIBRATE SLOCUM PRESSURE SENSOR (FRRF)	1

Unbilled Items

Item	Item Description	Qty
801542.1	AF24173 ANTI-FOULANT, SINGLE CYLINDER, V2	1

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SENSOR SERIAL NUMBER: 9014
CALIBRATION DATE: 24-Sep-16

Slocum Payload CTD TEMPERATURE CALIBRATION DATA
ITS-90 TEMPERATURE SCALE

COEFFICIENTS:

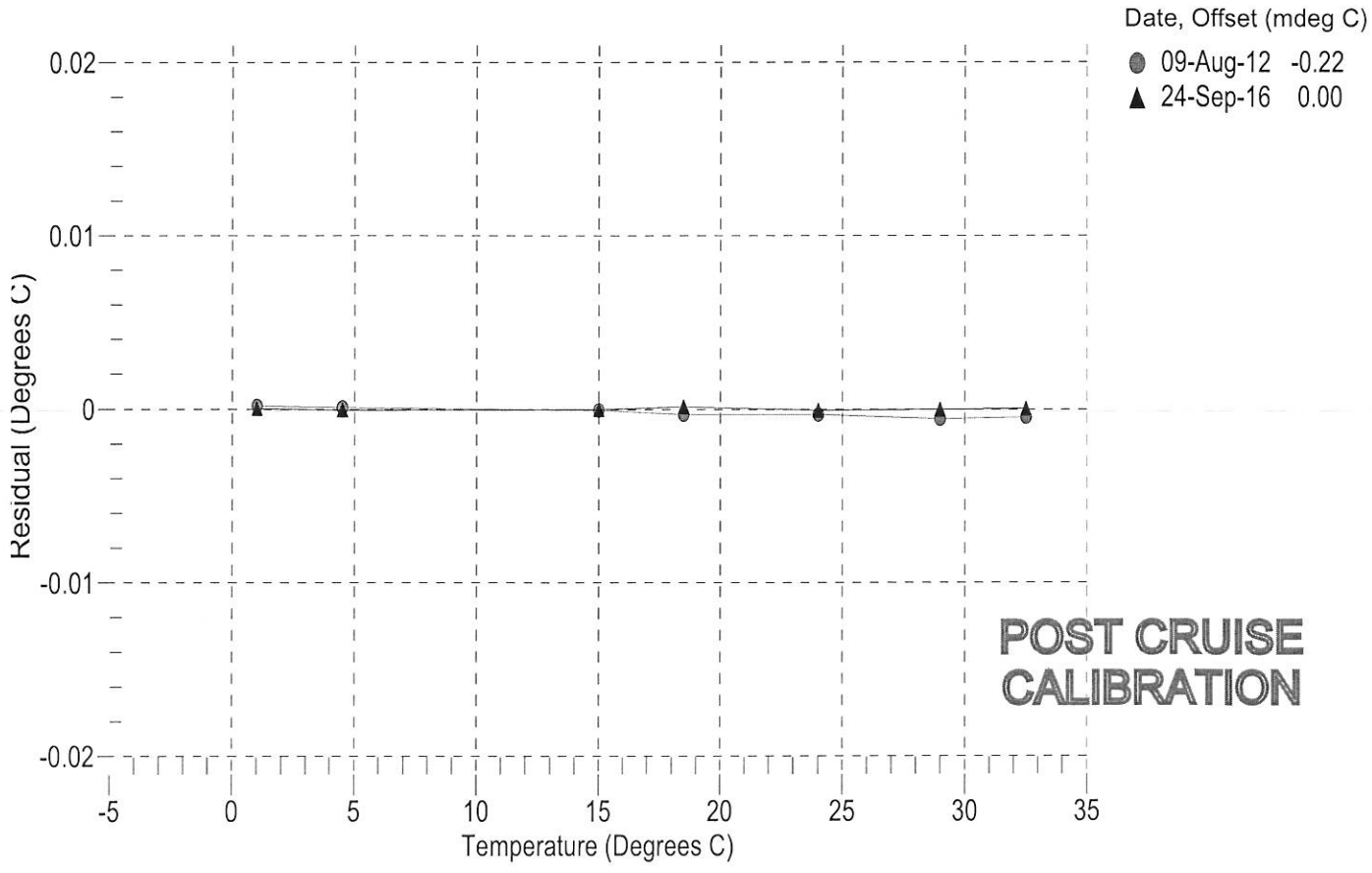
a0 = -1.114495e-004
a1 = 3.088078e-004
a2 = -4.634833e-006
a3 = 2.055138e-007

BATH TEMP (° C)	INSTRUMENT OUTPUT (counts)	INST TEMP (° C)	RESIDUAL (° C)
0.9999	573932.1	0.9999	0.0000
4.4999	490773.7	4.4998	-0.0001
15.0000	312952.3	15.0000	-0.0000
18.4999	271057.1	18.5000	0.0001
23.9999	217562.7	23.9998	-0.0001
28.9999	179243.8	28.9999	-0.0000
32.4999	157035.9	32.4999	0.0000

n = Instrument Output (counts)

Temperature ITS-90 (°C) = $1/\{a0 + a1[ln(n)] + a2[ln^2(n)] + a3[ln^3(n)]\} - 273.15$

Residual (°C) = instrument temperature - bath temperature



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SENSOR SERIAL NUMBER: 9014
CALIBRATION DATE: 24-Sep-16

Slocum Payload CTD CONDUCTIVITY CALIBRATION DATA
PSS 1978: C(35,15,0) = 4.2914 Siemens/meter

COEFFICIENTS:

```
g = -9.798646e-001
h =  1.332112e-001
i = -1.672542e-004
j =  2.906931e-005

CPcor = -9.5700e-008
CTcor =  3.2500e-006
WBOTC = -3.6836e-007
```

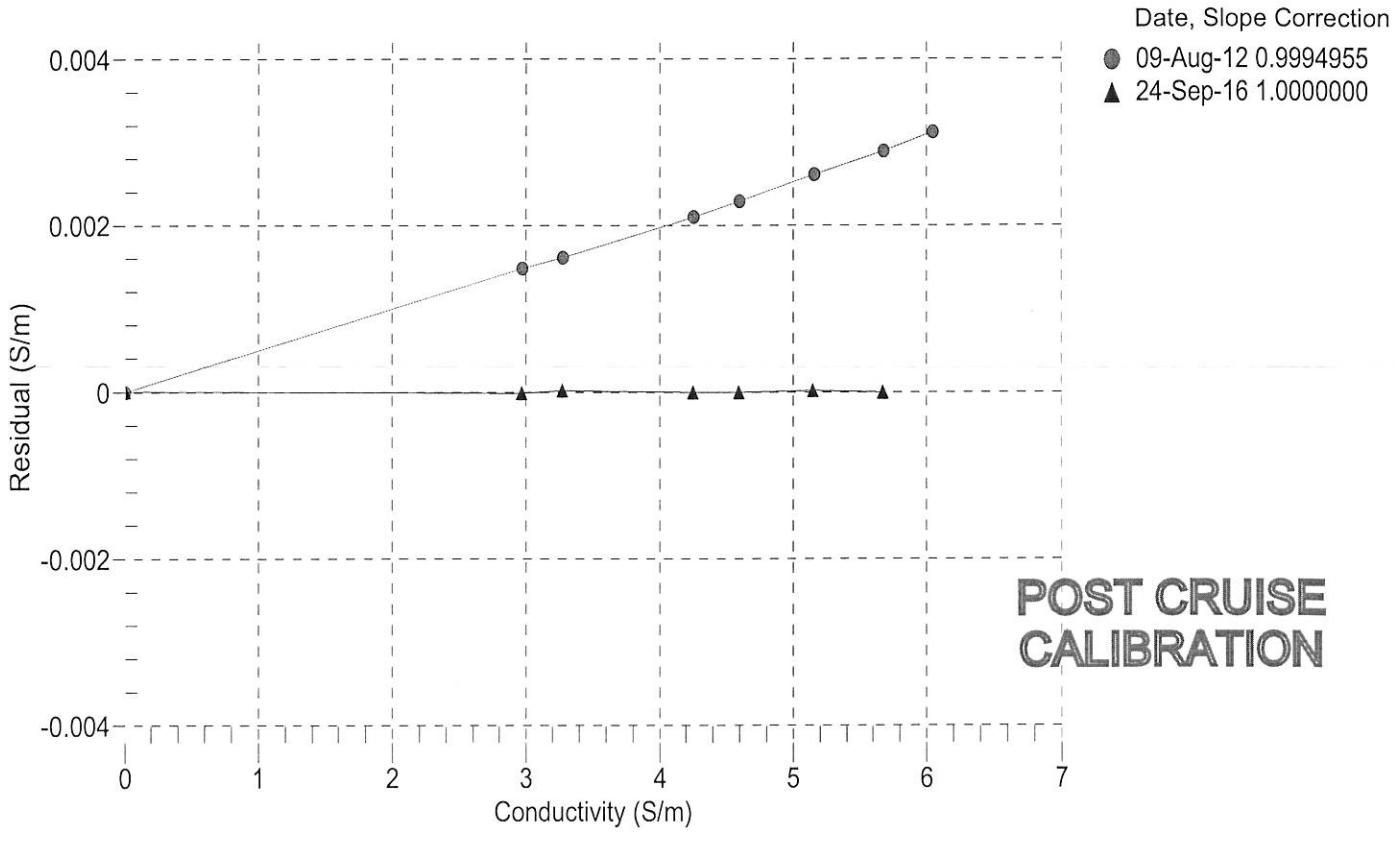
BATH TEMP (° C)	BATH SAL (PSU)	BATH COND (S/m)	INSTRUMENT OUTPUT (Hz)	INSTRUMENT COND (S/m)	RESIDUAL (S/m)
22.0000	0.0000	0.00000	2714.60	0.00000	0.00000
0.9999	34.6723	2.96482	5442.72	2.96481	-0.00001
4.4999	34.6519	3.27073	5649.19	3.27075	0.00002
15.0000	34.6088	4.24884	6263.04	4.24883	-0.00001
18.4999	34.5997	4.59272	6464.75	4.59271	-0.00001
23.9999	34.5903	5.14870	6777.93	5.14872	0.00002
28.9999	34.5858	5.66879	7057.98	5.66878	-0.00001
32.4999	34.5839	6.04002	7251.04	6.03993	-0.00009

f = Instrument Output(Hz) * sqrt(1.0 + WBOTC * t) / 1000.0

t = temperature (°C); p = pressure (decibars); δ = CTcor; ε = CPcor;

Conductivity (S/m) = $(g + h * f^2 + i * f^3 + j * f^4) / 10 (1 + \delta * t + \varepsilon * p)$

Residual (Siemens/meter) = instrument conductivity - bath conductivity



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SENSOR SERIAL NUMBER: 9014
CALIBRATION DATE: 22-Sep-16

Slocum Payload CTD PRESSURE CALIBRATION DATA
1450 psia S/N 3626943

COEFFICIENTS:

PA0 =	1.736540e-001	PTCA0 =	5.249246e+005
PA1 =	4.801271e-003	PTCA1 =	3.776619e+000
PA2 =	-2.315191e-011	PTCA2 =	-9.908623e-002
PTEMPA0 =	-7.288047e+001	PTCB0 =	2.550800e+001
PTEMPA1 =	4.990629e-002	PTCB1 =	-2.000000e-004
PTEMPA2 =	-2.965973e-007	PTCB2 =	0.000000e+000

PRESSURE SPAN CALIBRATION

PRESSURE (PSIA)	INSTRUMENT OUTPUT (counts)	THERMISTOR OUTPUT (volts)	COMPUTED PRESSURE (PSIA)	RESIDUAL (%FSR)
14.62	527974.0	1939.0	14.65	0.00
314.88	590507.0	1951.0	314.85	-0.00
614.88	653025.0	1952.0	614.79	-0.01
914.88	715612.0	1952.0	914.88	-0.00
1214.79	778197.0	1953.0	1214.78	-0.00
1464.80	830389.0	1953.0	1464.74	-0.00
1214.82	778223.0	1953.0	1214.90	0.01
914.87	715625.0	1953.0	914.94	0.00
614.88	653051.0	1953.0	614.91	0.00
314.92	590517.0	1953.0	314.90	-0.00
14.63	527973.0	1953.0	14.65	0.00

THERMAL CORRECTION

TEMP (°C)	THERMISTOR OUTPUT (volts)	INSTRUMENT OUTPUT (counts)
32.50	2139	528036.40
29.00	2067	528033.40
24.00	1964	528035.70
18.50	1852	528047.60
15.00	1780	528053.50
4.50	1565	528030.10
1.00	1494	528010.70

TEMPERATURE (°C)	SPAN (mV)
-5.00	25.51
35.00	25.50

y = thermistor output (counts)

$t = PTEMPA0 + PTEMPA1 * y + PTEMPA2 * y^2$

$x = \text{instrument output} - PTCA0 - PTCA1 * t - PTCA2 * t^2$

$n = x * PTCB0 / (PTCB0 + PTCB1 * t + PTCB2 * t^2)$

$\text{pressure (PSIA)} = PA0 + PA1 * n + PA2 * n^2$

Residual (%FSR) = (computed pressure - true pressure) * 100 / Full Scale Range