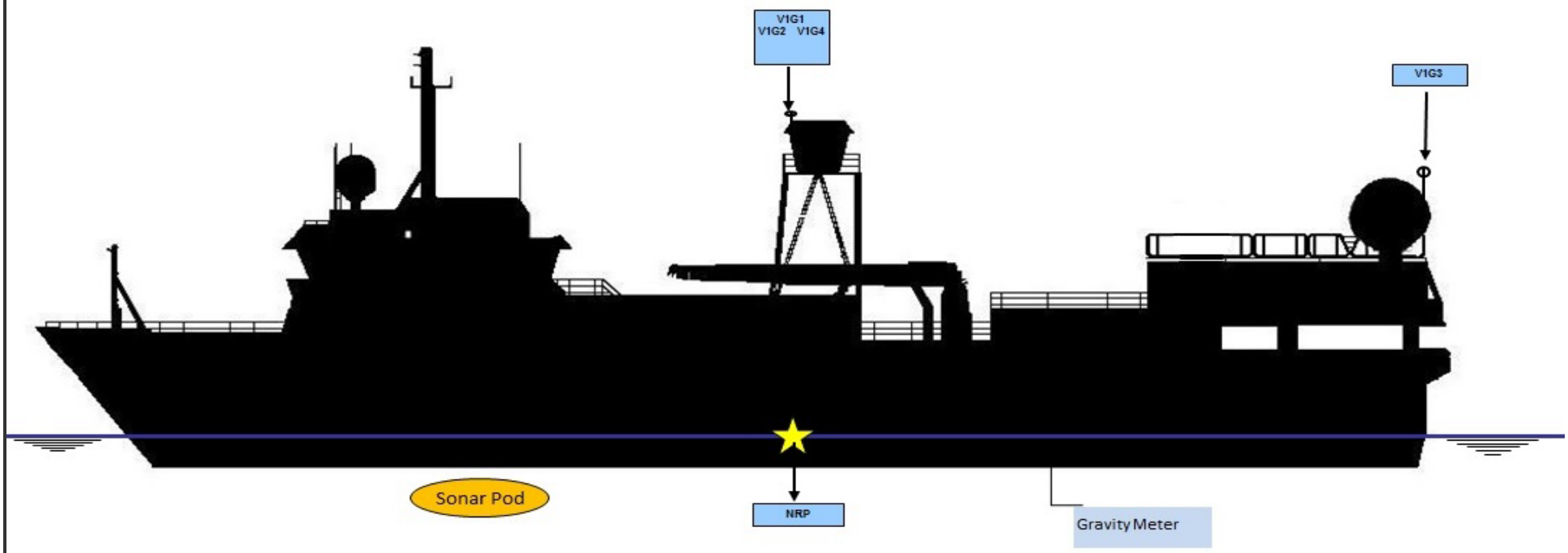
Company: L-DEO - Lamont - Doherty Earth Observatory
Vessel: Marcus G. Langseth
Client: USGS

Project: MGL2314
Area: Puerto Rico USGS Hi-Rez
Scope: Full Job
Start Date: 30-Oct-23

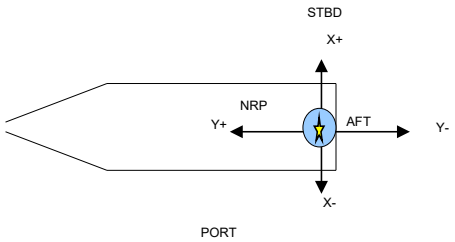
R/V Marcus G. Langseth - Vessel Sensor Offsets



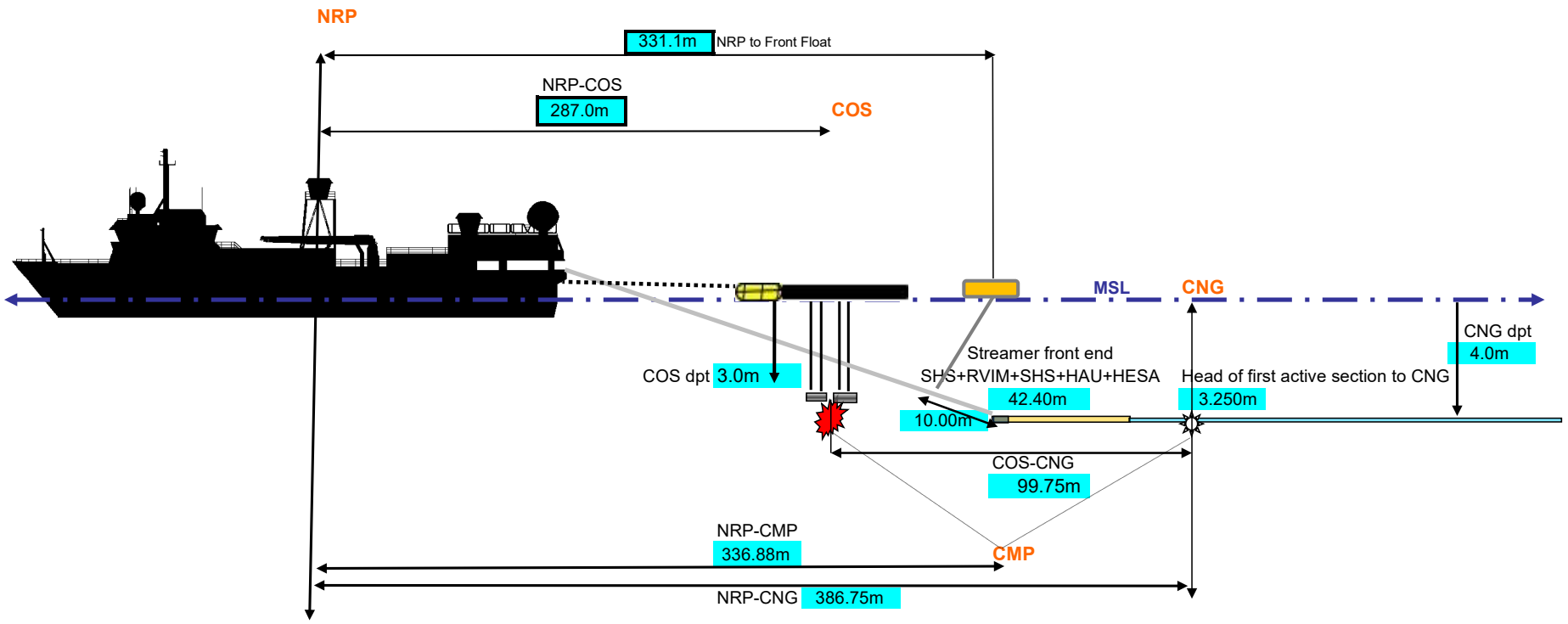
Negative values are above water line

All measurements in meters

			STBD/PORT (X)	FORE/AFT (Y)	UP/DOWN (Z)
NRP	NAVIGATION REFERENCE POINT		0.00	0.00	0.00
V1G1	SeaPath 330	Orca	-1.24	-1.25	-16.78
V1G2	C-Nav3050 MMO Tower	Orca	0.00	0.00	-16.90
V1G3	C-Nav3050 Stern	Orca	-1.95	-31.83	-14.50
V1G4	Pos MV	Orca	2.39	12.75	-16.90
	PosMV Output position is IMU mounted in stbd drylab				
V1R1	PosNet		-1.92	-0.02	-16.90
Sonar Pod	EM122 Knudsen ADCP		0.00	20.20	7.49
	EM122 Center Beam offset (in Spectra)		0.00	13.4	7.49
MRU	Seapath MRU		2.39	12.75	-4.30
BGM	Bell Gravity Meter		0.00	-13.10	1.10



R/V Marcus G. Langseth - Towing Offsets



NRP	**N**av **R**eference **P**oint			
COS	**C**entre of **S**ource			
CNG	**C**entre of **N**ear **G**roup	**Trace #**	**1**	**Of S1**
CMP	**C**ommon **M**id-**P**oint			
MSL	**Mean Sea Level**			
NRP-Stern	**29.2m**			
NRP-COS	**287.0m**			

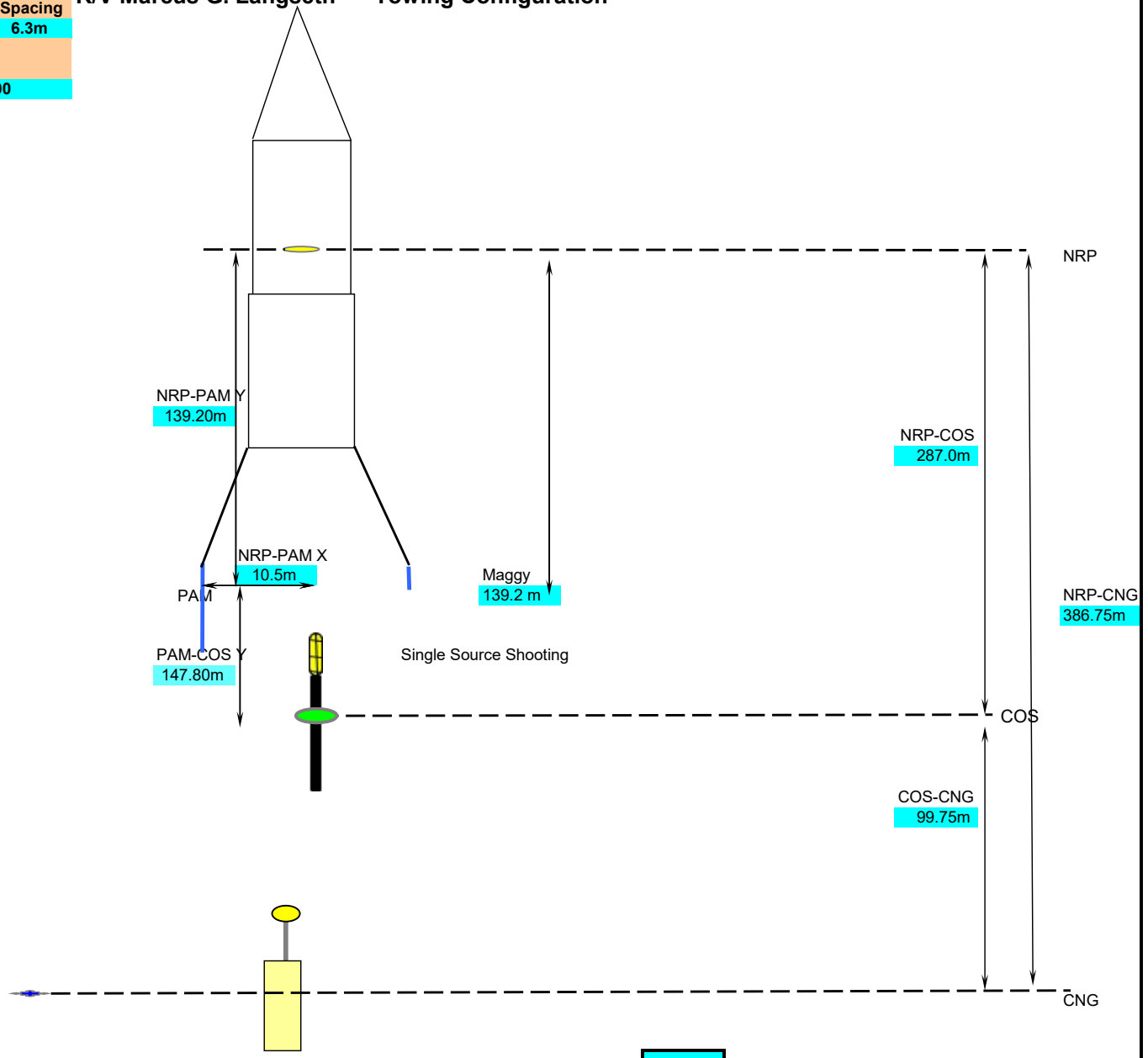
All measurements in meters

Cell contents referenced from Config_offsets tab

R/V Marcus G. Langseth - Towing Configuration

	# Streamers	Length	Channels	Spacing
SEAL	1	900	144	6.3m

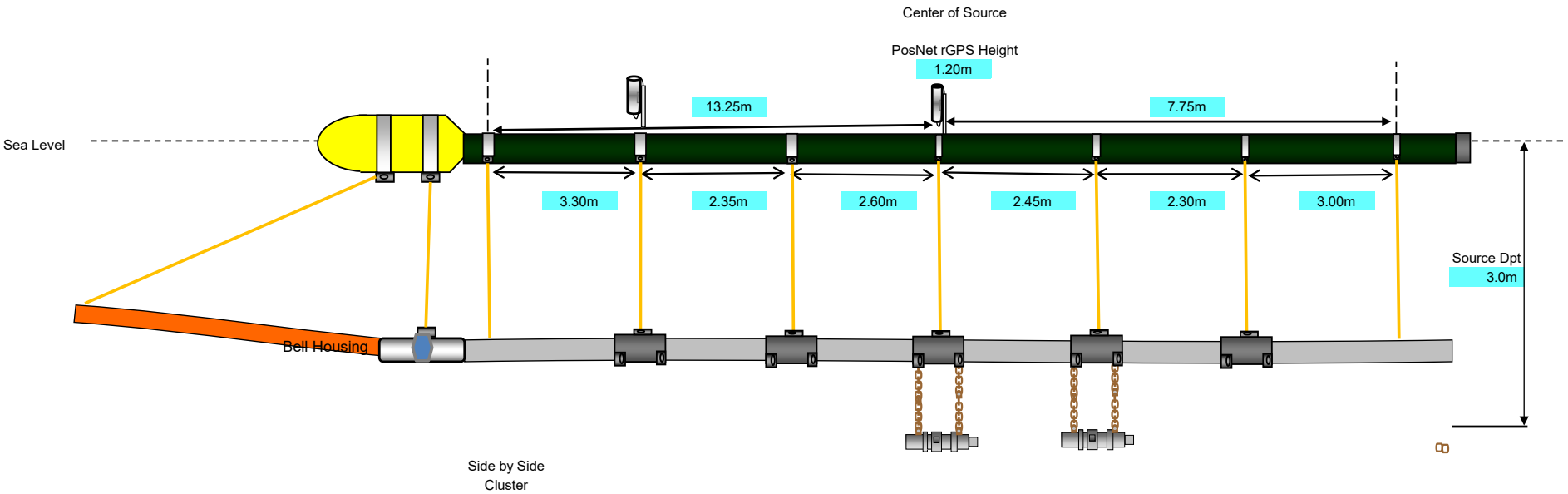
# Gun Strings Used	1	Vol (in^3)	90



NOT to Scale

Cell contents referenced from Config_offsets tab

R/V Marcus G. Langseth - Gun Array Offsets



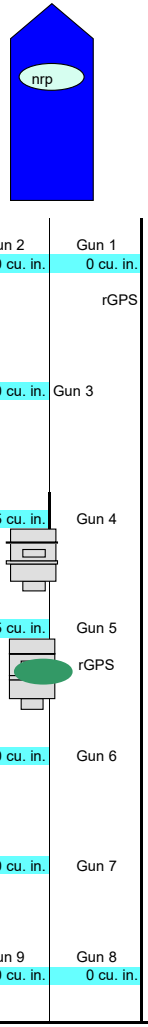
Gun volumes by number		
Gun	Volume	Status
Gun 1	0 cu. in.	Primary
Gun 2	0 cu. in.	Primary
Gun 3	0 cu. in.	Primary & Mitigation
Gun 4	45 cu. in.	Primary
Gun 5	45 cu. in.	Primary
Gun 6	0 cu. in.	Primary
Gun 7	0 cu. in.	Primary
Gun 8	0 cu. in.	Primary
Gun 9	0 cu. in.	Primary

Array total volume (without spares) is 90 cu. in.
Total volume/string (without spare) 90 cu. in.
Guns (1 & 2) & (8 & 9) in a horizontal cluster.
Gun clusters have 0.75m between guns and hang 0.95m from center of hanger
Horizontal Clusters are 1m from gun port to gun port
Single guns hang from hanger 1.15m
All gun volumes, numbering, locations, and offsets were inspected and verified by Chief Source Mechanic.

All measurements in meters
NOTE: drawing not to scale

Cell contents referenced from Config_offsets tab

R/V Marcus G. Langseth - Gun Configuration



Center of Source

Gun Clusters

Guns 1 & 2 horizontal array

Guns 8 & 9 horizontal array

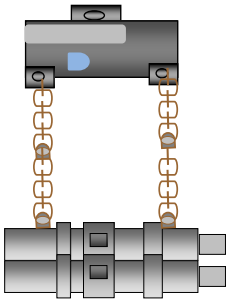
Gun Offsets relative to Center of String

	X	Y
Gun 1	0.50m	8.23m
Gun 2	-0.50m	8.23m
Gun 3	0.00m	5.00m
Gun 4	0.00m	2.60m
Gun 5	0.00m	-2.46m
Gun 6	0.00m	-4.77m
Gun 7	0.50m	-7.77m
Gun 8	-0.50m	-7.77m
Gun 9	0.50m	8.23m

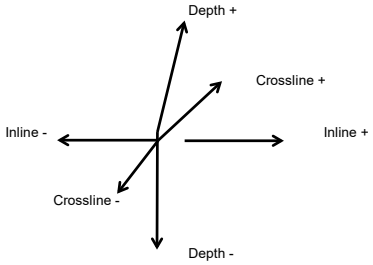
All measurements in meters

Distances in Meters

Gun Plate



Center of ports between guns 1 and 2 is the reference point



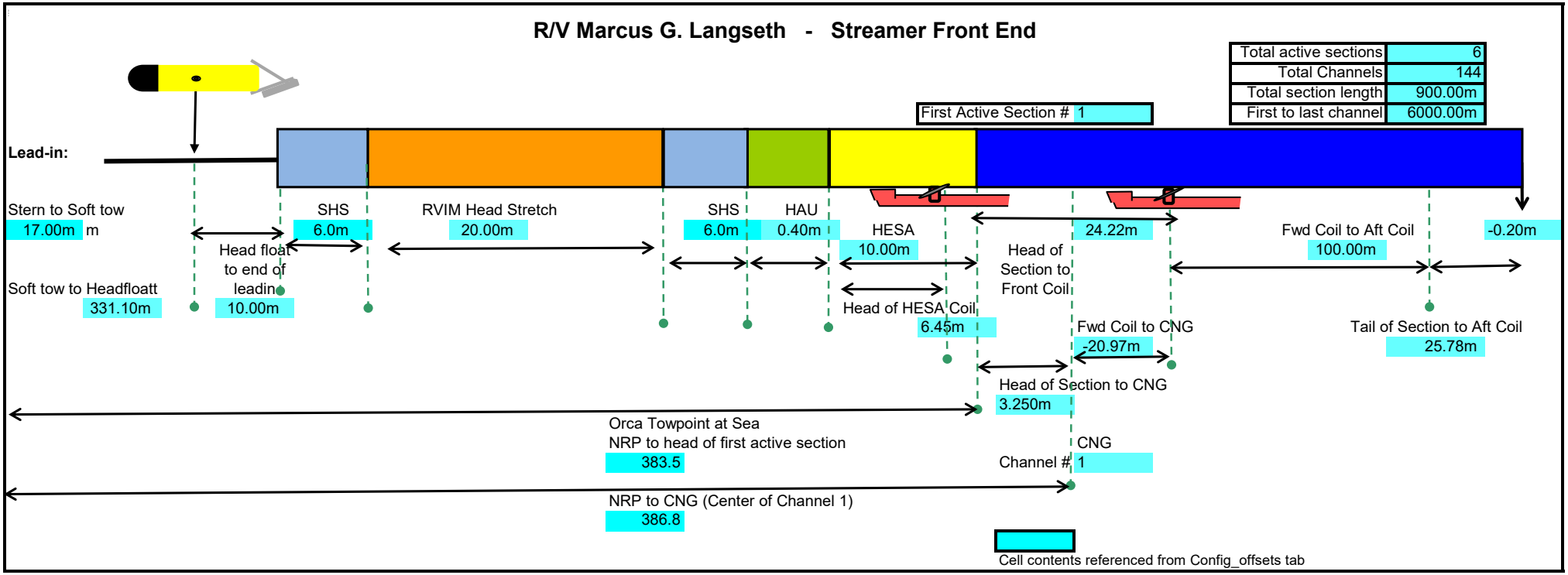
Hydrophone Offsets

Gun String 1				
Plate	Phone	Inline	Crossline	Depth
1				
2				
3				
4	1	8.25	0.00	1.10
5	2	10.68	0.00	1.10
6				
7				

Depth Transducer Offsets

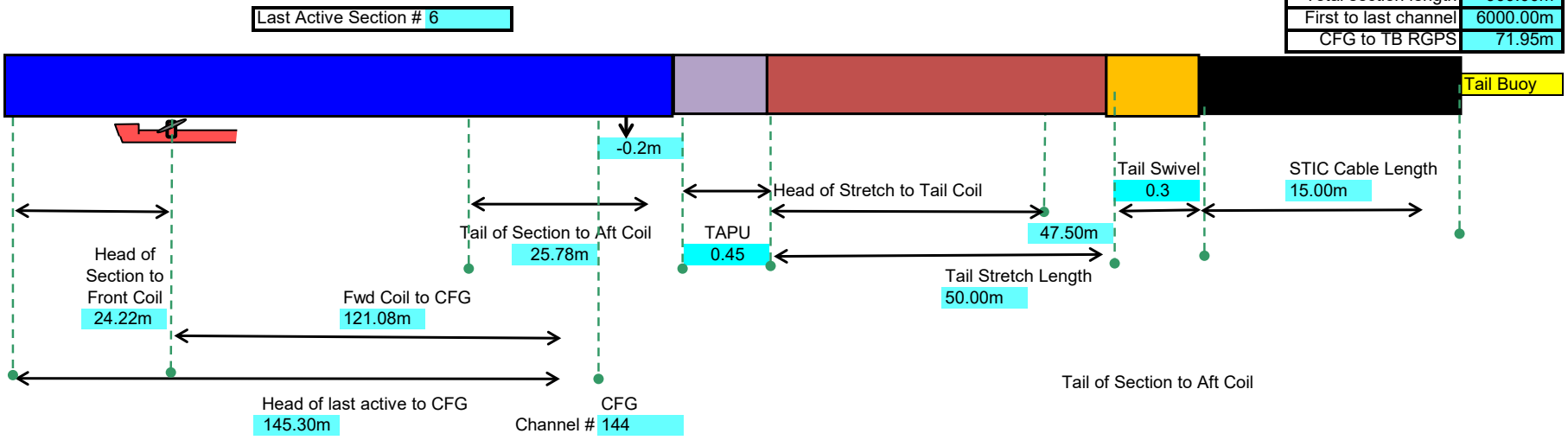
Gun String 1				
Plate	DT	Inline	Crossline	Depth
1				
2				
3				
4	1	8.25	0.00	1.10
5	2	10.68	0.00	1.10
6				
7				

R/V Marcus G. Langseth - Streamer Front End



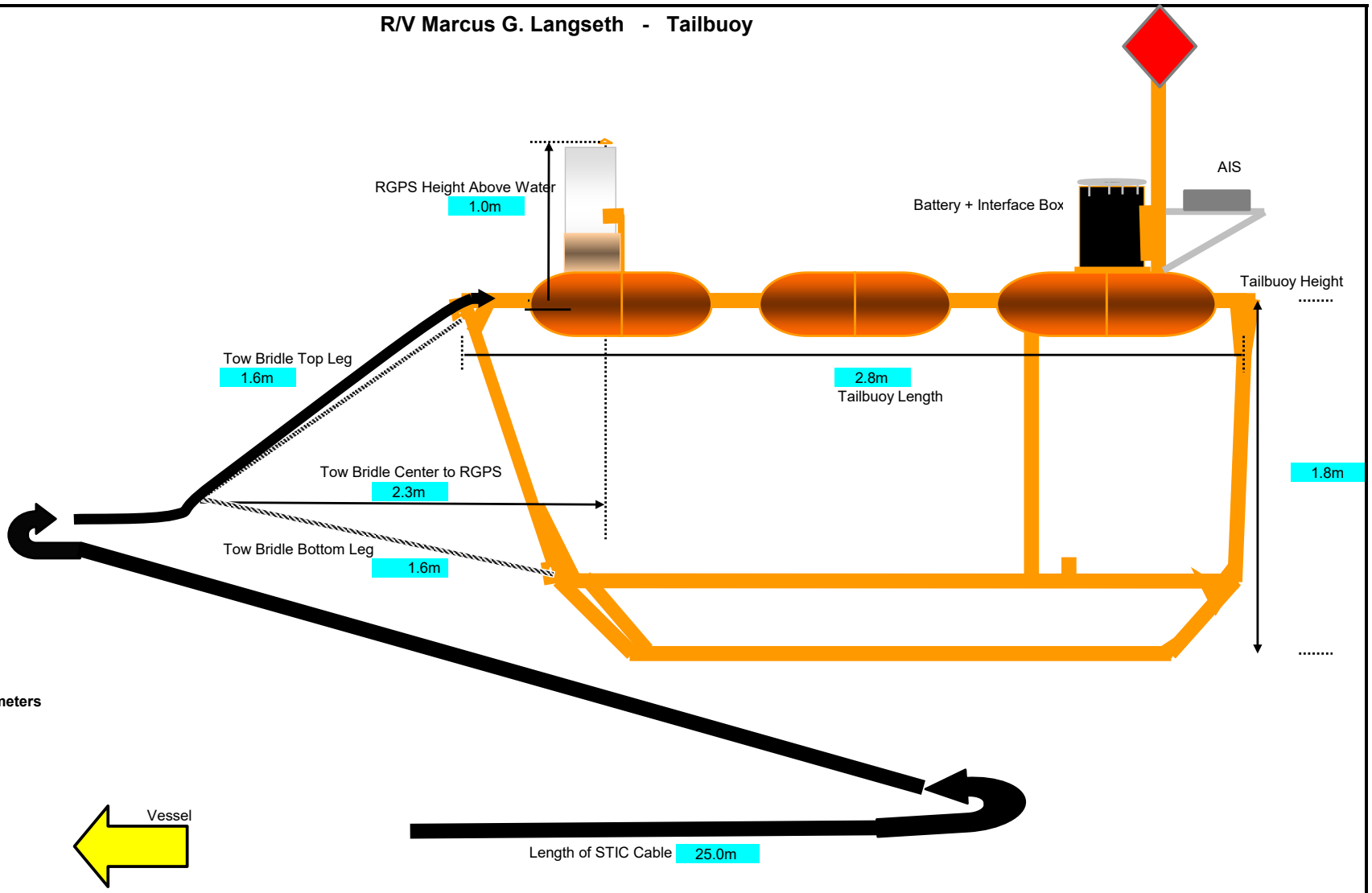
R/V Marcus G. Langseth - Streamer Tail End

Total active sections	6
Total Channels	144
Total section length	900.00m
First to last channel	6000.00m
CFG to TB RGPS	71.95m



Cell contents referenced from Config_offsets tab

R/V Marcus G. Langseth - Tailbuoy



All measurements in meters

Cell contents referenced from Config_offsets tab

Job Specific	
NRP to COS Y	287
NRP to COS X	0
Source Depth	3
Streamer Depth	4
# streamer sections	6
# channels	144
CNG Channel #	1
CFG Channel #	144
#MCS Streamers	1
lead-in: stern to head float	331.1
MCS Streamer Sep.	0
Gun volume total	90
Volume per string	90
# of guns used	2
# Gun Strings	1
gun string separation	0
PAM Y from stern	159
PAM X - (outside of stern rail) PORT	3
Stern to MAG Y	159
Stern to MAG X - (outside of stern rail) STBD	3

Derived Offsets (formula)	
NRP to CMP	336.675
COS-CNG	99.75
CNG-CFG	493.75
NRP-Mag Y	139.2
NRP-Mag X	10.5
NRP to tail buoy RGPS	1421.241
Total Length of Streamer sections	900
PAM-COS Y	147.8
PAM-COS X	10.5
NRP-PAM Y	139.2
NRP-PAM X	10.5
NRP-CNG	386.75
Soft to length, stern to bridle	17
Max RVM 17.5m-25m	20
LAUM 0.3386 x 14 modules	4.7404
SSCU 0.474 x (2 modules)	0.948
TAPU 0.4526	0.4526

Derived Offsets (formula)	
Towing Offsets Tab	
NRP-COS	287
NRP-CNG	386.75
COS-CNG	99.75
NRP-CMP	336.675
CNG Channel #	1
NRP-Stern	29.2
Distance from Head of first section to CNG	3.25
Source Depth	3
Streamer Depth	4
Front End Length	42.6
Head of lead-in to fixed float	19

Derived Offsets (formula)	
Towing Configuration TAB	
NRP-COS	287
NRP-CNG	386.75
COS-CNG	99.75
NRP-Pcable CNG	0
COS-Pcable CNG	4.7404
P-Cable Streamer Sep	0
NRP-PAM Y	139.2
NRP-PAM X	10.5
PAM-COS X	10.5
# Gun Strings	1
gun volume	90
Gun separation	0
# 3D Streamers	1
2D Streamer Ch Spacing	6.25
Number 2D Channels	144
2D Streamer Length	900
2D Streamer Sep	0
NRP-MAG X	10.5
NRP-MAG Y	139.2

Derived Offsets	
Acoustic Overhead TAB	
G1T1	0
G2T1	0
G3T1	0
G4T1	0
S1T1	0
S1T2	0
S1T3	0
S1T4	0
S1T5	0
S1T6	0
S1T7	0
S2T1	0
S2T2	0
S2T3	0
S2T4	0
S2T5	0
S2T6	0
S2T7	0
S3T1	0
S3T2	0
S3T3	0
S3T4	0
S3T5	0
S3T6	0
S3T7	0
S4T1	0
S4T2	0
S4T3	0
S4T4	0
S4T5	0
S4T6	0
S4T7	0
S1T1-S1T4	0
S1T3-S1T4	0
S1T4-S1T5	90.777

Derived Offsets (formula)	
Gun array offsets	
Bracket distance 1-2	5
Bracket distance 2-3	3.3
Bracket distance 3-4	2.35
Bracket distance 4-5	2.8
Bracket distance 5-6	2.45
Bracket distance 6-7	2.3
Bracket distance 7-8	3
SourceGPS-COS Y	6
COS - Acoustic Y	6
cGPS height above water	1.2
G1 Volume	
G2 Volume	
G3 Volume	
G4 Volume	45
G5 Volume	45
G6 Volume	
G7 Volume	
G8 Volume	
G9 Volume	
G10 Volume	0
G-Depth 1	0.95
G-Depth 2	0.95
G-Depth 3	1.15
G-Depth 4	0.95
G-Depth 5	0.75
G-Depth 6	1.15
G-Depth 7	1.15
G-Depth 8	1.15
G-Depth 9	0.95
G-Depth 10	0
G10 to Acx Z	0
Surface to Acx	3
Fwd bracket to COS	13.25
Aft bracket to COS	7.75

Derived Offsets	
Streamer Front End	
Stern-footprint at sea	331.1
footprint at sea to end of lead-in	10
SHS Length	6
n/m length	20
HAUI/STU length	0.4
HESA Lgth	10
Fwd Coil to Aft Coil	100
Head to First RX	3.25
Fwd Coil to CNG	-20.973
Head to Fwd Coil	24.223
Tail to Aft Coil	25.777
CNG Channel #	1
Center of streamer to Acx transducer	-0.2
First Section #	1
# channels	144
section length	900
# sections	6
channel spacing	6.25
First to last	6000
HESA Head to aft coil	6.45

Derived Offsets	
Streamer Tail End	
Head to Fwd Coil	24.223
Tail to Aft Coil	25.777
Head to CFG	145.3
Coil to Coil	100
TAPU Lnath	0.45
Tail Stretch Length	50
Twisted Lngth	0.3
STIC Length	15
Last active	6
# channels	144
# sections	6
total section length	900
First to last	6000
Stretch Coil	
Center of streamer to Acx transducer	-0.2
channel spacing	6.25
CFG #	144
Fwd coil to CFG	121.077
CFG to TB/RGPS	71.95
Stretch head to fwd coil	2.5
Stretch head to aft coil	47.5

Derived Offsets	
Streamer complete	
#Sections	6
# Channels	144
First to last	6099
Total section length	900

Derived Offsets	
Hydrophone Offsets	
Channel 1	7.825
2	20.325
3	32.825
4	45.325
5	57.825
6	70.325
7	82.825
8	95.325
9	107.825
10	120.325
11	132.825
12	145.325
# channels	24
# Active's	6
Total Channels	144

Derived Offsets	
Tailbuoy offsets	
RGPS height above water	1
TB length	2.6
TB height	1.83
RGPS-ACX	0
Bridle-RGPS	2.25
Top Leg	1.55
Bottom Leg	1.6
STIC	25
ACX below water line	0

Guns						
Source GPS Aft - COS Y	0				G1 X	0.3
Source GPS Fwd - COS Y	0				G1 Y	8.23
Bracket distance 2-3	3.3				G2 X	-0.3
Bracket distance 3-4	2.35				G2 Y	8.23
Bracket distance 4-5	2.8				G3 X	0
Bracket distance 5-6	2.45				G3 Y	0
Bracket distance 6-7	2.3				G4 X	0
Bracket distance 7-8	3				G4 Y	2.6
COS - Acoustic Y	0				G5 X	0
cGPS height above water line	1.2				G5 Y	0
G1 Volume	360	G-Depth 1	0.95		G6 X	0
G2 Volume	360	G-Depth 2	0.95		G6 Y	-2.46
G3 Volume	90	G-Depth 3	1.15		G7 X	0
G4 Volume	180	G-Depth 4	0.95		G7 Y	-4.77
G5 Volume	90	G-Depth 5	0.75		G8 X	0.5
G6 Volume	120	G-Depth 6	1.15		G8 Y	-7.77
G7 Volume	60	G-Depth 7	1.15		G9 X	-0.5
G8 Volume	240	G-Depth 8	1.15		G9 Y	-7.77
G9 Volume	220	G-Depth 9	0.95		G10 X	0.5
					G10 Y	8.23
					G11 X	-0.5
					G11 Y	8.23
					G12 X	0
					G12 Y	0
					G13 X	0
					G13 Y	2.6
					G14 X	0
					G14 Y	0
					G15 X	0
					G15 Y	-2.46
					G16 X	0
					G16 Y	-4.77
					G17 X	0.5
					G17 Y	-7.77
					G18 X	-0.5
					G18 Y	-7.77

Fixed Positions Streamer	
NRP to Stern	29.2
tow point at sea to end of lead-in	10
STU/Impulse length	0.4
Coil to coil	100
head of section to coil	24.223
tail of section to coil	25.777
channel spacing	6.25
NRP to Port/STBD Rail	7.5
Head to First RX	3.25
Head to Last RX	148.3
Channels per section	24
Center of section to Acx transducer	-0.2
First Section Number	1
HAUI/HAPU Length	0.4
SHS Length	6
RVM length	20
HESA Length	10
Active Section Length (SSAS)	150
TES tail stretch length	50
STIC	15
TES Fwd Coil	2.5
TES Aft Coil	47.5
HESA Aft Coil	6.45

Tailbuoy offsets	
RGPS height above water	1
TB length	2.6
TB height	1.83
RGPS-ACX	0
Bridle-RGPS	2.25
Top Leg	1.55
Bottom Leg	1.6
STIC	25
ACX below water line	0

Acoustics referenced to CNG or COS	
G1T1	0
G2T1	0
G3T1	0
G4T1	0
S1T1	0
S1T2	0
S1T3	0
S1T4	0
S1T5	0
S1T6	0
S1T7	0
S2T1	0
S2T2	0
S2T3	0
S2T4	0
S2T5	0
S2T6	0
S2T7	0
S3T1	0
S3T2	0
S3T3	0
S3T4	0
S3T5	0
S3T6	0
S3T7	0
S4T1	0
S4T2	0
S4T3	0
S4T4	0
S4T5	0
S4T6	0
S4T7	0