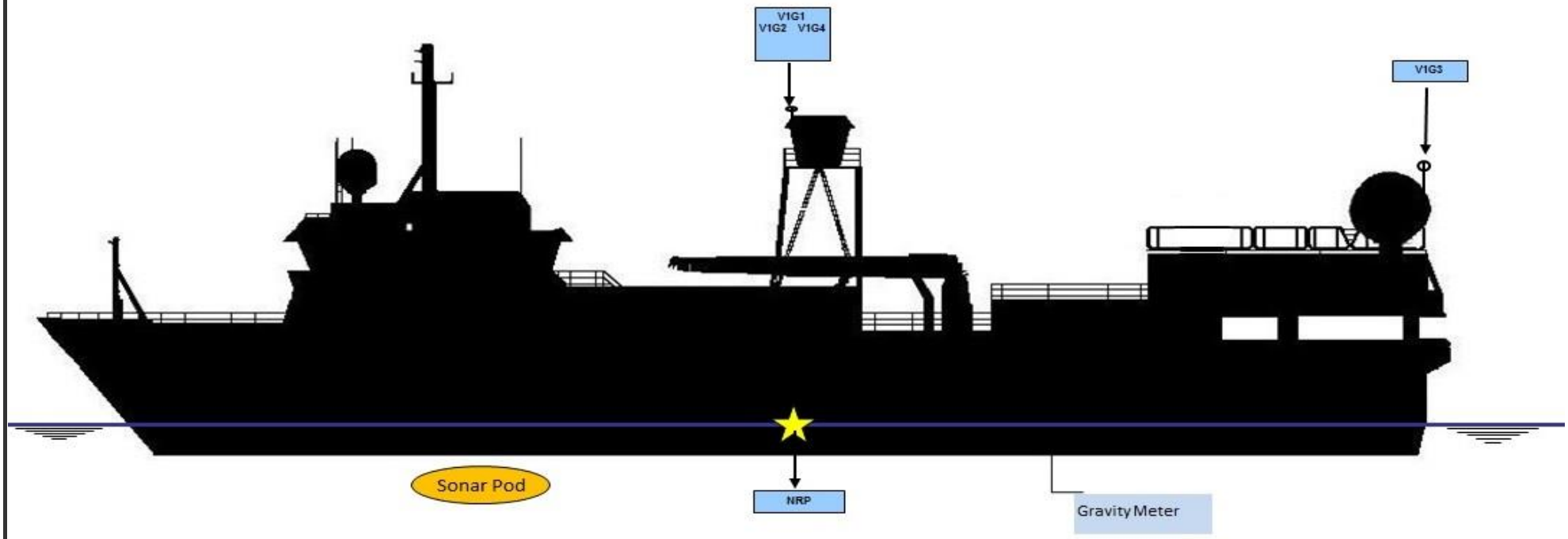
Company: L-DEO - Lamont - Doherty Earth Observatory
Vessel: Marcus G. Langseth
Client: Carbotte/NSF

Project: MGL2104
Area: Cascadia
Start Date: 1-Jun-21

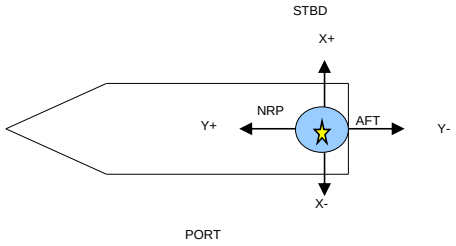
R/V Marcus G. Langseth - Vessel Sensor Offsets



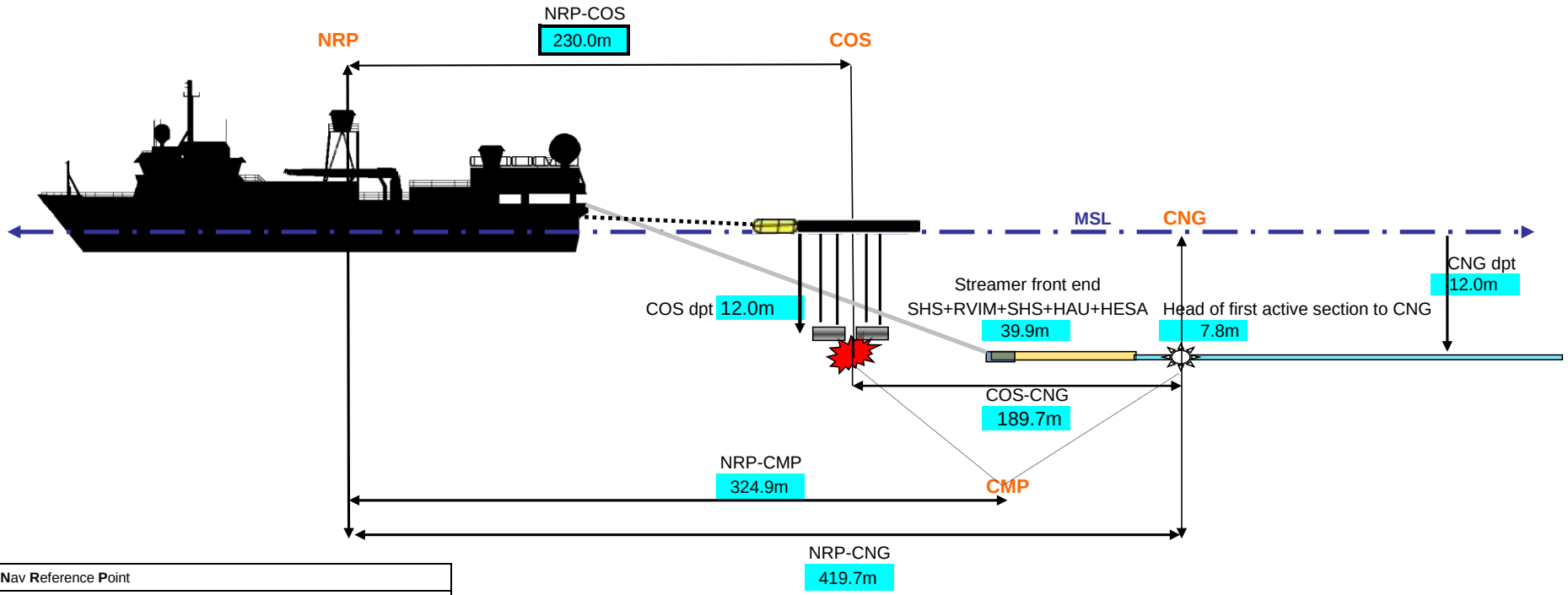
Negative values are above water line

All measurements in meters

		STBD/PORT (X)	FORE/AFT (Y)	UP/DOWN (Z)
NRP	NAVIGATION REFERENCE POINT	0.00	0.00	0.00
V1G1	C-Nav 3050	0.00	0.00	-16.90
V1G2	SeaPath 200	0.00	1.50	-16.90
V1G3	C-Nav 2000	-2.10	-29.20	-14.50
V1G4	Pos MV	-1.30	1.20	-16.90
V1R1	PosNet	-1.30	0.00	-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	2.30	14.16	-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-Sterr	**29.5m**			
NRP-COS	**230.0m**			

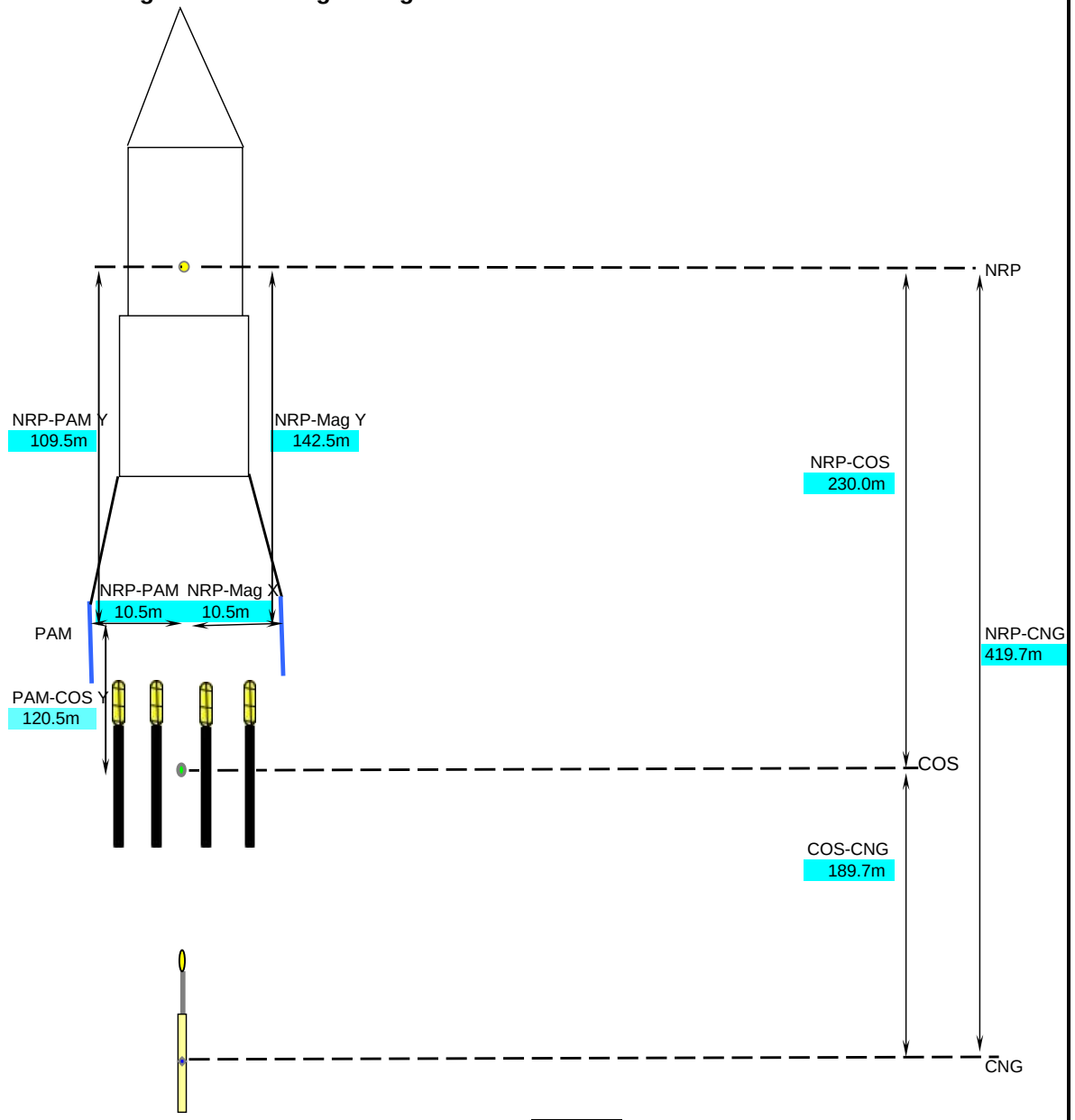
All measurements in meters

Cell contents referenced from Config_offsets tab

R/V Marcus G. Langseth - Towing Configuration

	# Streamers	Length	Channels	Spacing
SEAL	1	12000	960	12.5m

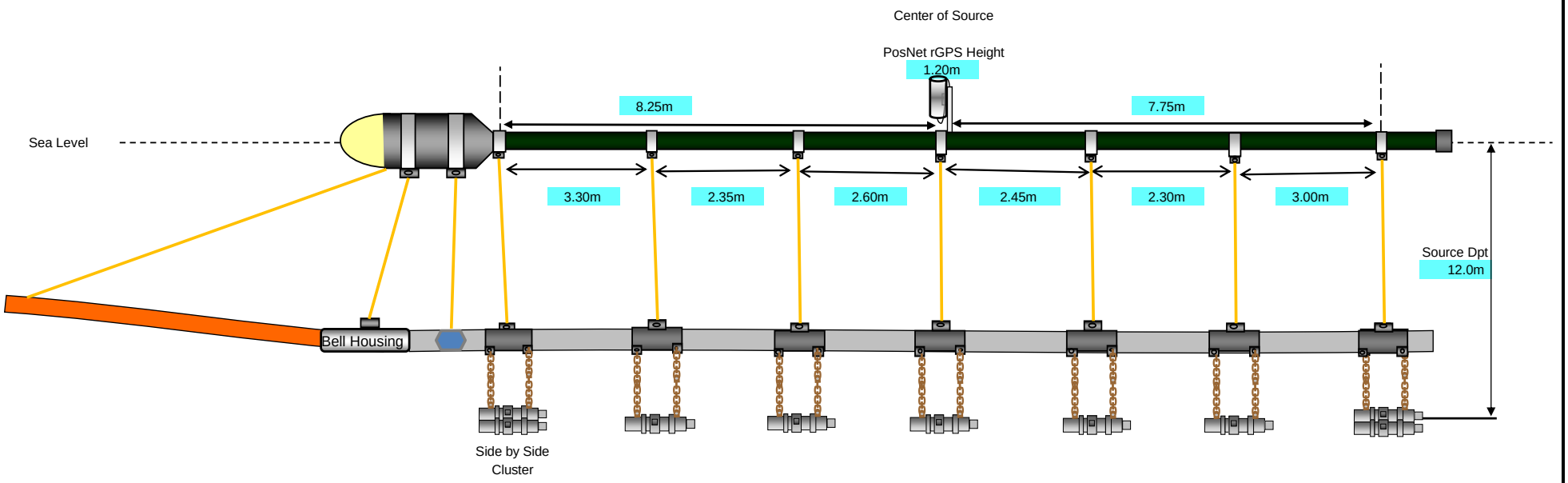
# Gun Strings Used	4	Vol (in^3)	6600



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	360 cu. in.	Primary
Gun 2	360 cu. in.	Primary
Gun 3	40 cu. in.	Primary & Mitigation
Gun 4	180 cu. in.	Primary
Gun 5	90 cu. in.	Primary
Gun 6	120 cu. in.	Primary
Gun 7	60 cu. in.	Primary
Gun 8	220 cu. in.	Primary
Gun 9	220 cu. in.	Primary

Center of Source

Air Manifold

Array total volume (without spares) is 6600 cu. in.

Total volume/string (without spare) 1650 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

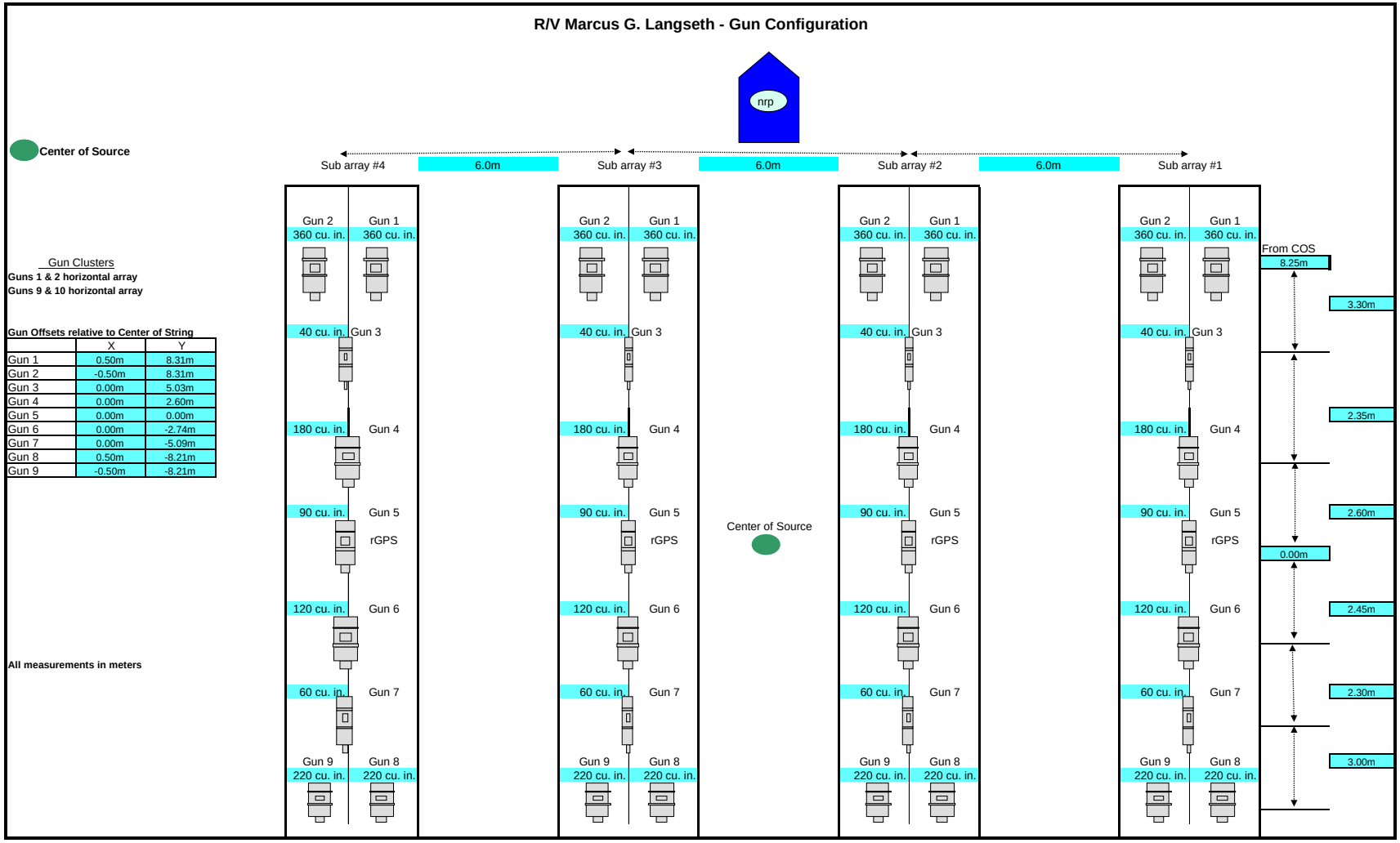
All gun volumes, numbering, locations, and offsets were inspected and verified by Chief Source Mechanic.

All measurements in meters

NOTE: drawing not to scale

Cell contents referenced from Config_offsets tab

R/V Marcus G. Langseth - Gun Configuration



Gun Clusters

Guns 1 & 2 horizontal array

Guns 9 & 10 horizontal array

Gun Offsets relative to Center of String

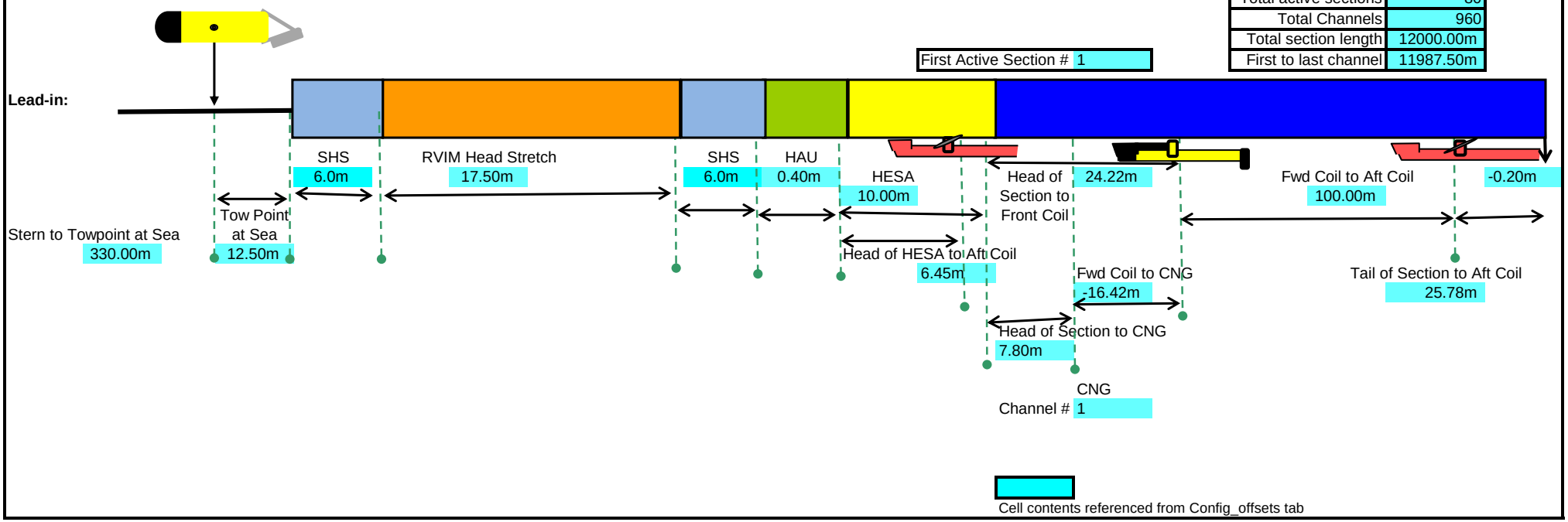
	X	Y
Gun 1	0.50m	8.31m
Gun 2	-0.50m	8.31m
Gun 3	0.00m	5.03m
Gun 4	0.00m	2.60m
Gun 5	0.00m	0.00m
Gun 6	0.00m	-2.74m
Gun 7	0.00m	-5.09m
Gun 8	0.50m	-8.21m
Gun 9	-0.50m	-8.21m

All measurements in meters

R/V Marcus G. Langseth - Streamer Front End

Total active sections	80
Total Channels	960
Total section length	12000.00m
First to last channel	11987.50m

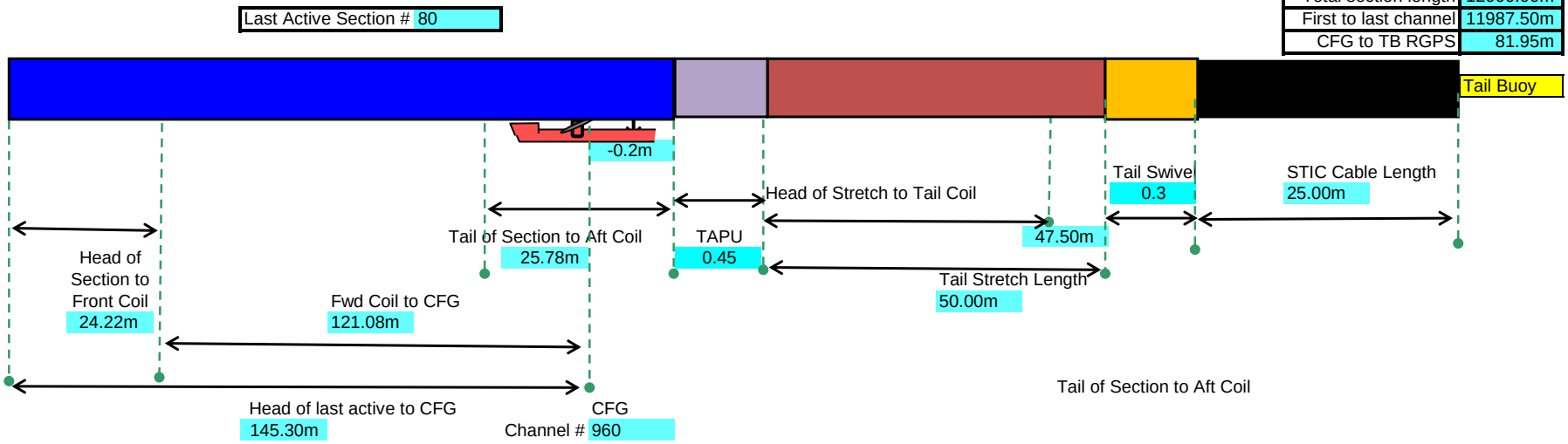
First Active Section # 1



Cell contents referenced from Config_offsets tab

R/V Marcus G. Langseth - Streamer Tail End

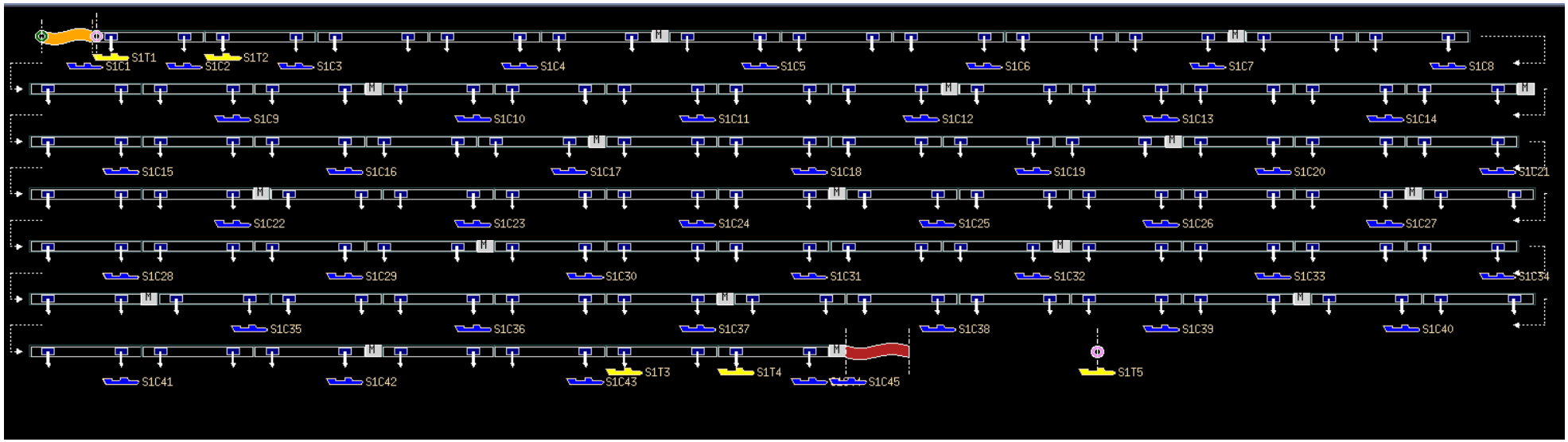
Total active sections	80
Total Channels	960
Total section length	12000.00m
First to last channel	11987.50m
CFG to TB RGPS	81.95m



Cell contents referenced from Config_offsets tab

R/V Marcus G. Langseth - Streamer Complete

Total active sections	80
Total Channels	960
Total section length	12000.00m
First to last channel	11987.50m

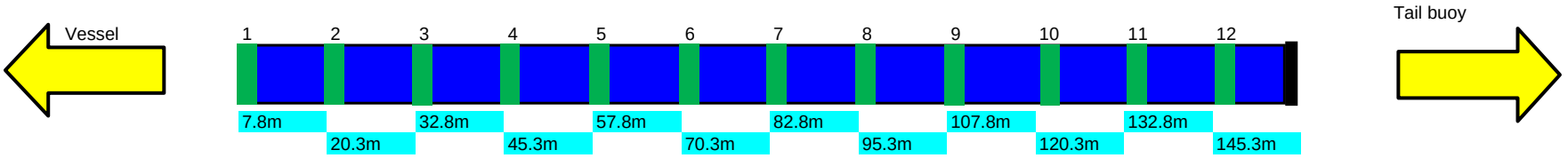


Cell contents referenced from Config_offsets tab

R/V Marcus G. Langseth - Hydrophone Offsets

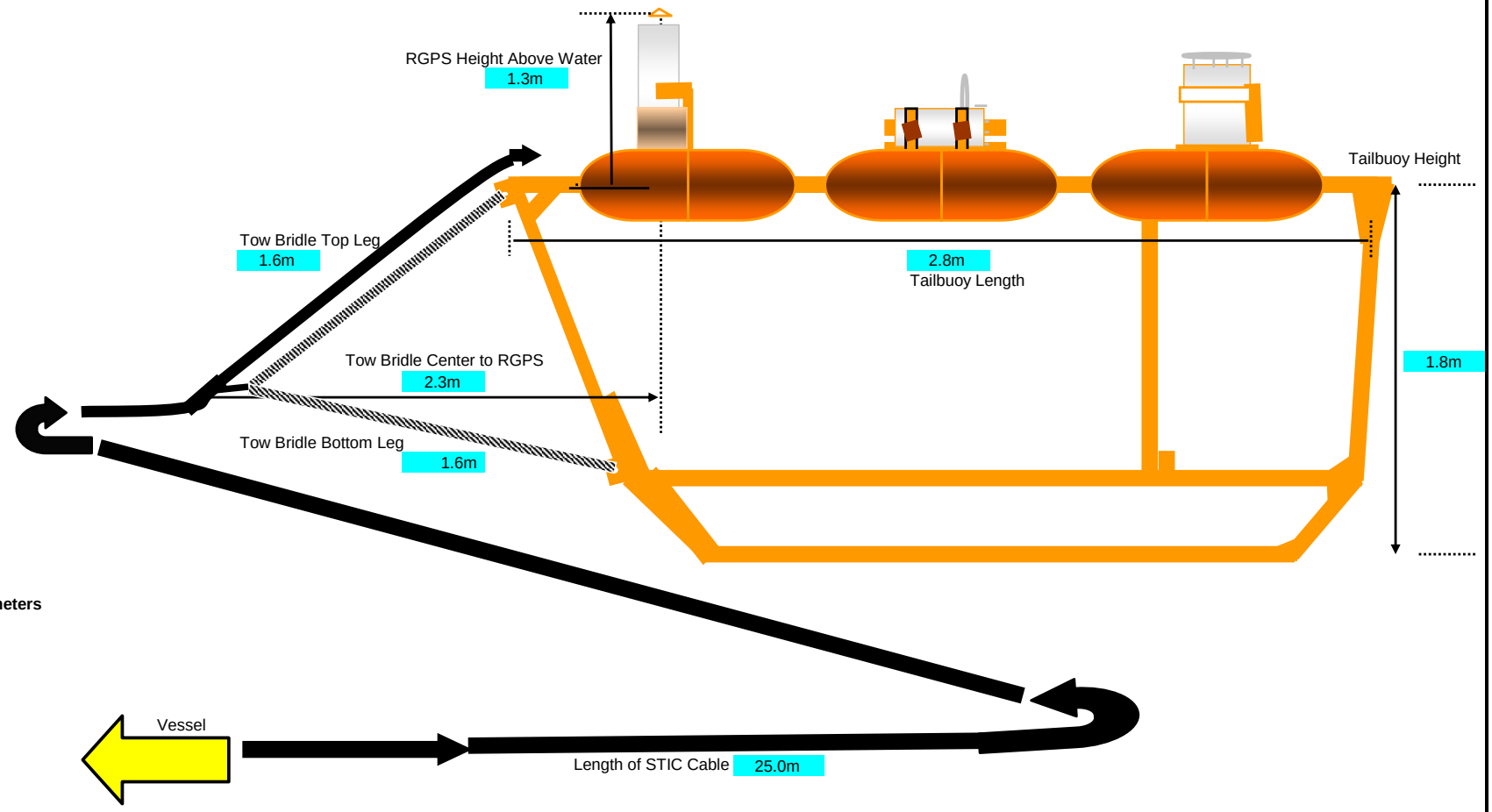
Sercel 150meter SSAS

Number of SSAS Sections	80
Channels per active section	12
Total channels	960



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	230
NRP to COS X	0
Source Depth	12
Streamer Depth	12
# streamer sections	80
# channels	960
CNG Channel #	1
CFG Channel #	960
#MCS Streamers	1
lead-in: stern to tow point at sea	330
MCS Streamer Sep.	0
Gun volume total	6600
Volume per string	1650
# of guns used	36
# Gun Strings	4
gun string separation	6
PAM Y from stern	80
PAM X - (outside of stern rail)	3
Stern to MAG Y	153
Stern to MAG X - (outside of stern rail)	3

Derived Offsets (formula)	
NRP to CMP	324.85
COS-CNG	189.7
CNG-CFG	-11987.5
NRP-Mag Y	142.5
NRP-Mag X	10.5
NRP to tail buoy RGPS	12464.8
Total Length of Streamer sections	12000
PAM-COS Y	120.5
PAM-COS X	10.5
NRP-PAM Y	109.5
NRP-PAM X	10.5
NRP-CNG	419.7

Derived Offsets (formula)	
Towing Offsets Tab	
NRP-COS	230
NRP-CNG	419.7
NRP-CMP	324.85
COS-CNG	189.7
CNG Channel #	1
NRP-Stern	29.5
Distance from Head of first section to CNG	7.8
Source Depth	12
Streamer Depth	12
Front End Length	39.8

Derived Offsets (formula)	
Towing Configuration TAB	
NRP-COS	230
NRP-CNG	419.7
COS-CNG	189.7
NRP-Pcable CNG	0
COS-Pcable CNG	0
P-Cable Streamer Sep	0
NRP-PAM Y	109.5
NRP-PAM X	10.5
PAM-COS Y	120.5
PAM-COS X	10.5
# Gun Strings	4
gun volume	6600
Gun separation	6
# 2D Streamers	1
2D Streamer Ch Spacing	12.5
Number 2D Channels	960
2D Streamer Length	12000
2D Streamer Sep.	0
NRP-MAG X	10.5
NRP-MAG Y	142.5

Derived Offsets	
Acoustic Overhead TAB	
G1T1	-9.15
G2T1	-9.15
G3T1	-9.15
G4T1	-9.15
S1T1	-16.95
S1T2	-167.35
S1T3	-12322.92
S1T4	-12472.5
S1T5	1
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-S1T2	150.2
S1T2-S1T4	149.64
S1T4-S1T5	100.77

Derived Offsets (formula)	
Gun array offsets	
Bracket distance 1-2	0
Bracket distance 2-3	3.3
Bracket distance 3-4	2.35
Bracket distance 4-5	2.6
Bracket distance 5-6	2.45
Bracket distance 6-7	2.2
Bracket distance 7-8	3
SourceGPS-COS Y	0
COS - Acoustic Y	-5.47
rGPS height above water	1.2
G1 Volume	360
G2 Volume	360
G3 Volume	40
G4 Volume	180
G5 Volume	180
G6 Volume	90
G7 Volume	120
G8 Volume	60
G9 Volume	220
G10 Volume	220
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	0.95
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	0.95
G10 to Acx Z	1.2
G10 to Acx X	-0.5
Surface to Acx	13.4
Fwd bracket to COS	8.25
Aft bracket to COS	7.75

Derived Offsets	
Streamer Front End	
Stern-towpoint at sea	330
towpoint at sea to end of lead-in	12.5
SHS Length	6
rvm length	17.5
HAUSTU length	0.4
HESA Lgth	10
Fwd Coil to Aft Coil	100
Head to First RX	7.8
Fwd Coil to CNG	-16.423
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	960
section length	12000
# sections	80
channel spacing	12.5
First to last	11987.5
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	145.2
Coil to Coil	100
TAPU Lngth	6.45
Tail Stretch Length	50
Tswivel Lngth	0.3
STIC Length	25
Last active	80
# channels	960
# sections	80
total section length	12000
First to last	11987.5
Stretch Coil	
Center of streamer to Acx transducer	-0.2
channel spacing	12.5
CFG #	960
Fwd coil to CFG	121.877
First to last	11987.5
HESA Head to aft coil	6.45
CFG to TBRGPS	81.95
Stretch head to fwd coil	2.5
Stretch head to aft coil	47.5

Derived Offsets	
Streamer complete	
#Sections	80
# Channels	960
First to last	11987.5
Total section length	12000

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	12
# Active's	80
Total Channels	960

Derived Offsets	
Tailbuoy offsets	
RGPS height above water	1.3
TB length	2.8
TB height	1.83
RGPS-ACX	-1
Bridle-RGPS	2.25
Top Leg	1.55
Bottom Leg	1.6
STIC	25
ACX below water line	1.3

Fixed Positions Streamer	
NRP to Stern	29.5
tow point at sea to end of lead-in	12.5
STU (module length	6.4
Coil to coil	100
head of section to coil	24.223
tail of section to coil	25.777
channel spacing	12.5
NRP to Pivot/STBD Rail	7.5
Head to First RX	7.8
Head to Last RX	145.2
Channels per section	12
Center of section to Acx transducer	-0.2
First Section Number	1
HAUS/WSU Length	6.4
SHS Length	6
RVM length	17.5
HESA Length	10
Active Section Length (SSAS)	150
TES tail stretch length	50
STIC	25
TES Fwd Coil	2.5
TES Aft Coil	47.5
HESA Aft Coil	6.45

Tailbuoy offsets	
RGPS height above water	1.3
TB length	2.8
TB height	1.83
RGPS-ACX	-1
Bridle-RGPS	2.25
Top Leg	1.55
Bottom Leg	1.6
STIC	25
ACX below water line	1.3

Guns					
Source GPS-COS Y	0			G1 X	0.5
				G1 Y	6.37
Bracket distance 2-3	3.3			G2 X	-9.1
Bracket distance 3-4	2.35			G2 Y	8.31
Bracket distance 4-5	2.6			G3 X	0
Bracket distance 5-6	2.45			G3 Y	5.65
Bracket distance 6-7	2.2			G4 X	0
Bracket distance 7-8	3			G4 Y	2.8
COS - Acoustic Y	-5.47	G10 to Acx Z	-0.5	G5 X	0
rGPS height above water line	1.2	G10 to Acx Y	1.4	G5 Y	2.8
G1 Volume	360	G-Depth 1	0.95	G6 X	0
G2 Volume	360	G-Depth 2	0.95	G6 Y	0
G3 Volume	40	G-Depth 3	1.15	G7 X	0
G4 Volume	180	G-Depth 4	0.95	G7 Y	-2.74
G5 Volume	180	G-Depth 5	0.75	G8 X	0
G6 Volume	90	G-Depth 6	1.15	G8 Y	-5.09
G7 Volume	120	G-Depth 7	1.15	G9 X	0.5
G8 Volume	60	G-Depth 8	1.15	G9 Y	-8.21
G9 Volume	220	G-Depth 9	0.95	G10 X	-0.5
G10 Volume	220	G-Depth 10	0.95	G10 Y	-8.21

Acoustics referenced to CNG or COS	
G1T1	-9.15
G2T1	-9.15
G3T1	-9.15
G4T1	-9.15
S1T1	-16.95
S1T2	-167.35
S1T3	-12322.92
S1T4	-12472.5
S1T5	1
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