

List of Contents

Title	Page
تجريدة.....	I
Abstract.....	II
Acknowledgement.....	IV
List of Contents.....	V
List of Figures.....	X
List of Table.....	XII
1 Introduction	1
2 The National Requirement of Hydrographic Data	3
2.1 Introduction to the National Requirement of Hydrographic Data	3
2.2 Marine Information System	9
3 Hydrographic Equipment.....	12
3.1 The Modern Methods of Position – Fixing	12
3.1.1 The Global Positioning System (GPS)	12
3.1.2 Satellite Constellation	12
3.1.3 Satellite Signals	13
3.1.4 Trimble MS 750 DGPS System	13
3.2 Methods of Positing of Measurement	15

3.2.1 Pseudo – Range Measurement	16
3.2.2 Principle of Relative Point Positioning	16
3.3 Determination of Position	17
3.4 The GPS Error	18
3.4.1 Clock Piece	18
3.4.2 Range Error	19
3.4.3 Multipath	19
3.4.4 Delusion of Precision (DOP).....	19
3.5 Depth Measurement Equipment	19
3.6 The Echo Sounder.....	19
3.6.1 General Principles	20
3.6.2 The Echo Beam	20
3.6.2.1 Single Beam Echo Sounder	21
3.6.2.2 Multi Beam Echo Sounder	21
3.6.2.2.1 Hydro Bat 300	21
3.6.2.2.2 Reson Sea Bat 8101.....	22
3.6.2.2.3 Reson Sea Bat 6042	23
3.6.2.2.4 TSS Motion Sensor	24
3.7 Air Borne laser Sounding	25
3.7.1 An Air Borne Laser limitations	25

3.8 Seabed Topography (Side Scan Sonar Sweep)	26
3.8.1 Appropriate Field Procedure	26
3.9 Acoustic Beacons	27
3.9.1 Acoustic Position Fixing Instrumentation	28
3.10 Sperry Gyro Compass	29
3.11 Sea Otter ROV (Remote Operating Vehicle)	30
3.12 Sound Velocity Probe	31
3.13 Hypack Software	31
3.14 Survey Vessel	31
4 Tide	33
4.1 Introduction of tide	33
4.2 Causes of Tide	33
4.3 Types of Tides	36
4.3.1 Sounding Datum	36
4.3.2 High Tide or High Water	36
4.3.3 Low Tide or Low Water	36
4.3.4 Range of Tide	37
4.3.5 Stand	37
4.4 Tidal Reference Planes	38
4.5 Tide Gauge System	40
4.6 Tidal and Current Measurements	41

5	Metrological data and Physical parameter affect on hydrographic measurement	43
5.1	Waves	43
5.2	The Relationship between Winds and Wave Motion	44
5.3	Wave Complications	45
5.4	The Power of Waves	45
5.5	Earthquakes Waves	46
5.6	Pressure	48
5.7	Weather	48
6	Measurements and Results.....	56
6.1	Measurements.....	56
6.1.1	Study Area	56
6.1.2	Data collected	57
6.1.2.1	Depth Observation	57
6.1.2.2	Salinity.....	58
6.1.2.3	Temperature	59
6.1.2.4	Density	60
6.1.2.5	Wind.....	61
6.1.2.6	Tidal Range.....	61
6.2	Results	67

6.2.1 Calibration of the Sound Velocity	67
7 Conclusion and Recommendations.....	73
7.1 Conclusion	73
7.2 Recommendations	74
Bibliography	76
Appendix (A) Observed Data	
Appendix (B) Observed Data With Staff	
Appendix (C) Tidal Range	