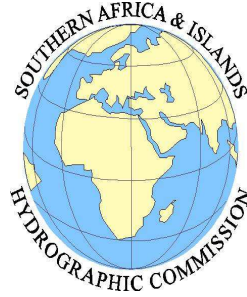


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REPUBLIC OF SOUTH AFRICA
01 August 2014

File ref: FOF/HYD/R/320/19/1

**SOUTHERN AFRICA AND ISLANDS HYDROGRAPHIC COMMISSION (SAIHC)
AND INTERNATIONAL MARITIME ORGANISATION (IMO) CAPACITY
BUILDING WORK PROGRAM: INTRODUCTION TO HYDROGRAPHIC SURVEY
TRAINING COURSE, MAPUTO, MOZAMBIQUE, 29 SEPTEMBER TO 10
OCTOBER 2014**

The 2014 IHO Capacity Building Work Programme allows for the provision of support for the delivery of, and attendance at an Introduction to Hydrographic Survey training course with the objective of giving participants an understanding of the requirements, principals and conduct of hydrographic surveying for national purposes. The course will be primarily theoretical with practical demonstrations of surveying techniques.

On this occasion the SAIHC is delighted to welcome the IMO as a partner in this capacity building activity.

The training course will be held in Maputo, Mozambique from 29 September to 10 October 2014. Details of the course are provided at Annex A. Please note that the course is given in English.

The IHO Capacity Building Fund/IMO Technical Cooperation Committee fund will provide full support (flights, transfers and a daily subsistence allowance) for **ONE** participant per country. **Please note that any other associated expenses (e.g. travel insurance, pocket money, etc...) should be covered by the candidate's organization.**

You are kindly requested to send, by email, the accompanying Application Form (Annex B), to Steve Barnett, (Email address: steve.barnett@ukho.gov.uk), **no later than 18th August 2014**. It is important that the accompanying application form is completed electronically and returned as an Excel file or on an Excel-compatible format.

In order to facilitate the provision of e-tickets to selected participants, you are strongly encouraged to include with the application form a copy of the applicant's passport and a reliable e-mail address where the ticket can be sent to. Please note that if trainees require a visa in order to attend the course they should apply as soon as they are accepted on the course. If trainees fail to attend due to their own oversights or errors then costs incurred by the IHO on their behalf may be recovered from their employing authority. There is every likelihood that this training opportunity is over subscribed, so it is imperative that applicants respond promptly and Part 1 of the Application Form at Annex B is completed accurately and candidly as this information might be used in a selection process (if required).

Should you need more information or have any special request, please contact me directly at hydrosan@iafrica.com.

Chairman Southern Africa & Islands Hydrographic Commission (SAIHC)

Distribution List:

- 1.- Angola
- 2.- Comoros
- 3.- Kenya
- 4.- Madagascar
- 5.- Malawi
- 6.- Mauritius
- 7.- Mozambique
- 8.- Namibia
- 9.- Seychelles
- 10.- Tanzania

Copy to:

- 11.- Captain Alberto Costa Neves (IHB)
- 12:- Mr Jeff Bryant (CB Coordinator SAIHC)

Attachments:

- Annex A: Course Outline
Annex B: Application Form

NOTE: To improve efficiency this letter is being sent only by e-mail.

**SOUHERN AFRICA & ISLANDS HYDROGRAPHIC COMMISSION
(SAIHC)
Introduction to Hydrographic Survey Course
Monday 29th September to Friday 10th October 2014
COURSE OUTLINE**

Day 1 – Classroom

1. Introduction to Basics of Hydrographic Surveying Course

- History of hydrography
- Hydrography today
- International hydrography
- Essential elements of a hydrographic survey
- Multibeam introductory video

2. Errors and Uncertainty [Trainer 1]

- Types of errors
- Precision and accuracy
- Normal distribution
- Standard deviation
- Confidence levels
- Uncertainty
- Practical exercise

3. Geodesy [Trainer 2]

- What is geodesy
- Coordinate systems
- Shape of the Earth
- Spheroids/ellipsoids
- Reference frames
- WGS84
- Datum shifts
- Projections
- UTM

4. Horizontal positioning and GNSS [Trainer 1]

- Determination of position
- Types of GNSS
- GPS basics
- GNSS augmentation (DGPS)
- Carrier phase techniques
- Vertical datum separation models

5. Tidal Theory [Trainer 2]

- What are tides
- Fundamental Principles
- Newtonian laws of gravity and motion
- Equilibrium tide
- Lunar tides
- Solar tides
- Spring/neap tides
- Tidal regimes
- Real tides
- Amphidromic points
- Met effects

6. Measuring Tides and Vertical Datums [Trainer 2]

- Why measure tides
- Predicting tides
- Types of tide gauge
- GPS tides
- Considerations for tide gauge location
- Sources of error in measuring tides
- Reducing soundings
- Vertical datums
- Admiralty Chart Datum
- Vertical control networks
- Transfer of datum using co-tidal charts

7. Survey Control and Tide Gauge Calibration [Trainer 1]

- 3D Control
- The need for survey control
- Establishing Control Points
- Extending the Vertical
- Calibration of Tide Gauge
- Levelling

Day 2 - Practical Exercise, Field work

- Calibration of tide gauge and levelling

Day 3 – Classroom

8. Acoustic Theory [Trainer 2]

- Physics of underwater acoustics
- Using acoustics to measure distance
- Sound velocity/celerity
- Measuring sound speed
- Frequencies

9. SBES Surveying Principles [Trainer 2]

- SBES transducers
- Beam Characteristics
- SBES limitations
- Operational considerations

10. SBES Calibration [Trainer 2]

- Calibrating for sound speed
- Performing a 'bar check'

11. MBES Basic Principles [Trainer 1]

- Types of Swath systems
- Beam forming and steering
- Amplitude and phase bottom detection
- MBES requirements and characteristics
- MBES Common Errors

12. Vessel Motion [Trainer 1]

- Inertial Navigation Technology
- Heave
- Timing Integration with sonar
- Operational considerations and errors
- Conclusions from motion sensor comparison experiment

13. MBES Calibration [Trainer 1]

- Dimensional Control
- Patch Test Procedure
- Post Calibration

14. Standards and Specifications [Trainer 1]

- The need for standards and specifications
- IHO S-44
- Case study – UK CHP Survey specification
- Planning to meet the specification
- Communicating the uncertainty to the user
- Survey error model

15. Survey Planning

- Reconnaissance
- Environmental considerations
- Safety and disaster planning
- Tidal data
- Mobilisation and
- Calibration site location
- Data quality
- Line planning
- Data management and quality assurance

Day 4 – Boat based field work

- SBES and MBES surveying

Day 5 – Boat based field work

- SBES and MBES surveying

Day 6 – Boat based field work

- SBES and MBES surveying

Day 7 – Classroom

- processing, SBES

Day 8 – Classroom

- processing, MBES

Day 9 – Classroom

- processing, MBES + QC

Day 10 – Classroom

- (AM) processing, MBES + QC
- (PM) Exam