TSA SURVEY COURSE

INTRODUCTION TO HYDROGRAPHY FOR INLAND WATERS

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Issue	Date	Author/reviser	Details
1.1	11 Mar 18	EFSD	First draft amended

COURSE AIMS & STRUCTURE

Aims:

- To introduce hydrographic surveying - core values and basic principles - with the emphasis on inland waters and the Environment Agency specification
- To equip students with an introductory understanding of the underlying concepts and theory
- To develop an appreciation for the expected precision and accuracy of hydrographic measurements and outcomes
- To raise awareness of the most commonly used methods and equipment
- Develop an appreciation for the different environmental conditions encountered when surveying inland waters

Structure:

- Formal lectures augmented with PPT presentation and interjected with group discussion. All lecture notes will be provided together with handouts for private study and reference.

DAY 1 - Morning

LECTURE 1 - HYDROGRAPHIC SURVEYS

- Needs for Inland Water surveys
- What is a hydrographic Survey?

LECTURE 2 - INLAND WATERS

1. Rivers
   - Material transport and deposition
   - Rivers above the tidal limit
   - River control and management
   - Tidal rivers and estuaries
   - River surveying
   - Law, ownership and permits
2. Canals (narrow)
   - General form
   - Sedimentation
   - Engineering works
   - Surveying
3. Natural lakes / reservoirs / storage ponds
   - Natural lakes
   - Reservoirs and artificial lakes
   - Industrial ponds

DAY 1 – Afternoon

LECTURE 3 - CONTROL

- Need for Control
- Environment Agency specification
- Positioning solutions

LECTURE 4 - VERTICAL DATUMS

- Rivers
- River estuaries
- Lakes and reservoirs
- Canals

LECTURE 5 - TIDES [Non-presentational – notes only]

LECTURE 6 – INTRODUCTION TO ACOUSTICS

LECTURE 7 - SINGLE BEAM SOUNDING

- Principles, functions
- Sounding operations
- Wrecks and obstructions, side echoes, fluid muds

LECTURE 8 - SWATH BATHYMETRY

- Multibeam systems – Beamformers, Backscatter, Interferometric
- Calibration
- Sidescan sonar

DAY 2 – Morning

LECTURE 9 - SENSORS, IMAGING AND SAMPLING

- Vessel dynamics and monitoring
- Acoustic scanning sonars / laser scanning systems
- Cameras and sampling systems
- Hydrology

LECTURE 10 - SPECIFICATIONS, STANDARDS AND ERROR BUDGETS

- Environment Agency: National Standard Technical Specifications for Surveying Services
- Marine and Coastguard Agency: UK Civil Hydrography Program Survey Specification
- Standards: IHO S-44, S-44 definitions
- Navigation standards vs Engineering standards

- Uncertainty budgets, Sources of Error, Parameter errors

LECTURE 11 - SURVEY PLATFORMS & WATERWAYS GUIDANCE [with handouts]

- Survey platforms / craft
- Radio controlled and autonomous platforms
- Airborne hydrographic LiDAR
- Remote Operated Vehicles (ROVs)
- Waterways guidance and licensing

LECTURE 12 – PLANNING, PROCESSING, TRAINING

- Planning
- Data processing and presentation
- Contour or feature - getting it right
- Training

DAY 2 – Afternoon

LECTURE 13 - PRACTICAL SURVEYS [Group discussion, applying what has been learned]

DREDGING SURVEYS
ENGINEERING & CIVIL WORKS' SURVEYS
ENVIROMENTAL / HYDROLOGICAL

- Permits
- Planning / operational considerations

TREATMENT OF ERRORS [Non-presentational – notes only]