# Dimensional Control Surveying for Professionals

Dates: Thursday 18th & Friday 19th January 2024
Location: GEOSIGHT HQ – Dean Hill Park, West Dean, Salisbury, UK.

**Course Aims**

This 2 day Vessel Dimensional Control Surveying for Professionals training course is aimed at individuals with a pre-existing knowledge of both land and hydrographic survey, who want to combine the two to understand the vessel dimensional control survey process.

The course aims to equip you with the theoretical and practical knowledge required to plan, undertake and report a vessel dimensional control survey. The course contents are aligned to guidance from professional surveying bodies and cover vessel dimensional control survey practices used on vessels engaged in nautical charting and the offshore energy industry. The course includes land and hydrographic surveying principles which underpin the conduct of a vessel dimensional control survey.

## The course assumes:

- Existing theoretical knowledge of hydrographic and geophysical surveying and the requirements for accurate vessel dimension data;
- Existing knowledge of accuracy standards used in hydrographic surveying and how the dimensional control survey contributes to reducing the error budget;
- Basic knowledge of land surveying;
- Knowledge of the range of survey sensors available for performing hydrographic surveys.

## The course will:

- Give a basic overview of the above
- Explain how land surveying practices are translated into the dimensional control survey
- Introduce the concepts of vessel design and how this is important when planning hydrographic survey sensor installation and the dimensional control survey;
- Explain how to deal with survey sensors when conducting a dimensional control survey;
- Train how to review a dimensional control specification and plan how the survey will be undertaken;
- Train how to utilise total station and GNSS technology to conduct the vessel dimension control survey including: setting up both a local and vessel reference frame on a static and floating vessel, observing offsets, and capturing data for the calibration of attitude and heading sensors;
- Train how to process dimensional control data using software packages such as Microsoft Excel, AutoCAD and GEOBASE;
- Introduce the expected formats for dimensional control survey reporting.

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## Intended Learning Outcomes of Course

On completing this course students will be able to:

- Explain the importance of dimensional control surveying on offshore survey vessels and other offshore survey platforms (e.g. ROV, Trenchers);
- Plan a dimensional control survey on both a floating and static vessel including the definition of vessel and local reference frames;
- Explain coordinate and rotation conventions and how these are used and applied during a dimensional control survey;
- Use total station technology to install a control network on a vessel and observe points within that network to millimetric accuracy;
- Use total station and GNSS technology to collect data for the calibration of vessel-based attitude and heading sensors;
- Use relevant software for the processing of total station data including network adjustments and least squares analysis;
- Process and present dimensional control data so it can be successfully applied and used within the vessel survey software;
- Conduct total station and GNSS verification procedures to confirm the accuracy of dimensional control data and that data is applied correctly within the vessel survey software;
- Prepare a comprehensive report of a survey containing relevant and easy to understand data.

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# Sample Programme - Day 1

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| Activity/Lesson | Classroom Theory | Practical Session |
|---|---|---|
| Refreshing the basics:<br>**Hydrography and meeting the error budget**<br>Accuracy requirements of hydrographic surveying, error budgets, the effects of inaccurate vessel dimension data and how accurate dimensional control data contributes to reducing the error budget and improves overall survey data quality and accuracy.<br>**Hydrographic survey equipment and software**<br>Types of vessel, their operations and the types of survey sensors, their function, accuracy and location on the vessel, and how we need to consider all of these factors when planning a dimensional control survey.<br>**Land survey equipment**<br>Total station technology, land survey theory including setting up coordinate grids, orientation, levelling and unlevelled setups, traversing, resections, and total station calibration. | ✓ | |
| **Total station operation**<br>During this session we will be using total stations to practice setting up, levelling, observing points and moving the total station within a control network whilst maintaining accuracy. | | ✓ |

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# Sample Programme - Day 1 Continued

| Activity/Lesson | Classroom Theory | Practical Session |
|---|---|---|
| **Planning a dimensional control survey**<br>Within this session we will review typical survey specifications and discuss how we plan a survey to meet the requirements. We will look at accuracy and precision requirements, establishing local and vessel reference frames, and how understanding vessel design contributes to the accuracy of a dimensional control survey. | ✓ | |
| **Dimensional control offset survey**<br>During this session students will complete a dimensional control offset survey on a mock up of a survey vessel, including establishing a control network, defining reference frames on the vessel, observing points of interest, preparing for attitude and heading calibrations | | ✓ |
| **Attitude and heading sensor calibration**<br>During this session we will discuss the fundamental principles of calibrating the vessels survey grade attitude (MRU/IMU/INS) and heading (gyro) sensors. We will focus on different types of sensor and the importance of understanding their coordinate and rotation conventions. | ✓ | |

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# Sample Programme - Day 2

| Activity/Lesson | Classroom Theory | Practical Session |
|---|---|---|
| **Dimensional control calibration survey**<br>During this session students will complete a dimensional control calibration survey on a mock up of a survey vessel, including installing RTK GNSS shore control, datum transformations, scale factor, convergence, total station observations to vessel baselines and navigation checks. | | ✓ |
| **Data processing**<br>During this session students will utilise software packages such as Microsoft Excel, AutoCAD and GEOBASE to process dimensional control offset and calibration data. This will include network adjustments, the principles of Least Squares Adjustment and working in an environment where 6 degrees of freedom need to be considered. | ✓ | |
| **Verification procedures**<br>During this session students learn how to verify the results of their dimensional control offset and calibration data through field measurements. | | ✓ |
| **Data processing & reporting continued…**<br>During this session students will continue with data processing of dimensional control data and verifications, and will learn how to present data in a format that is easily understood by the end user. | ✓ | |

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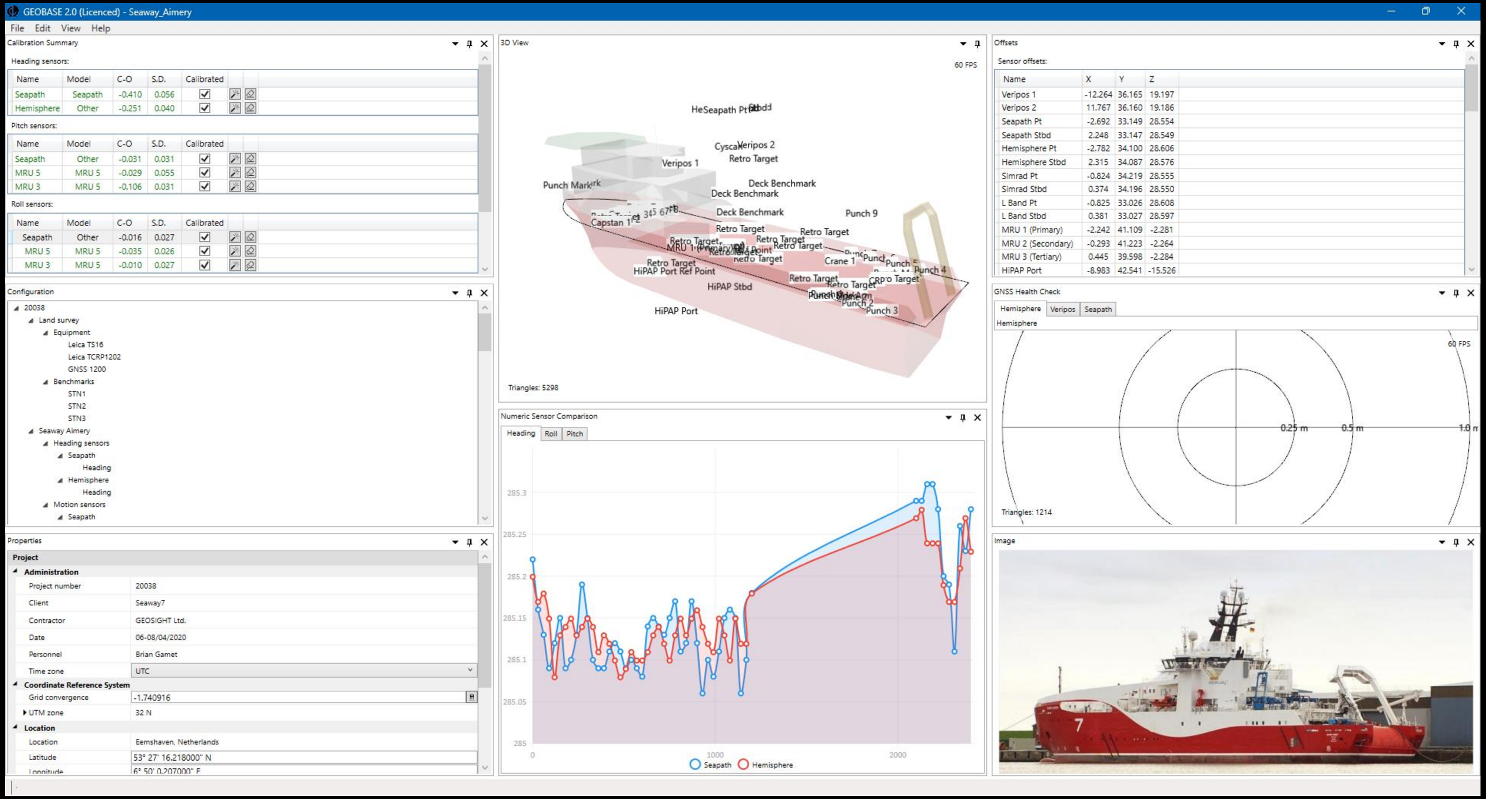
Registered Office: 1b The Meadows, Dean Hill Park, West Dean, Salisbury, SP5 1EZ, UK.

# Contact office@geosight3d.com for course fee’s and to register your interest.




Course fees include:

- All course training materials and equipment for the duration of the course
- Use of GEOBASE software (BETA Version) during course
- Lunch

Course fees **do not** include:

- Delegate travel to and from course location
- Accommodation

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