



Australian Government

NWPHYS001 Identify and analyse information technology for hydrographic surveys

Release: 1

NWPHYS001 Identify and analyse information technology for hydrographic surveys

Modification History

Release 1. This is the first release of this unit of competency in the NWP National Water Training Package.

Application

This unit involves the skills and knowledge required to identify and analyse information technology for hydrographic surveys.

It includes identifying computer system components, utilising information technology for surveying activities and conducting data processing. It also includes analysing and organising data and producing deliverables.

This unit supports the attainment of skills and knowledge required for leaders with responsibility for performing hydrographic surveying and may lead to certification as a hydrographic surveyor.

Pre-requisite Unit

Not applicable.

Competency Field

Hydrographic Surveyor

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Utilise information technology for surveying activities

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Identify hardware components in surveying information technology

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|----------|---|--|
| | 1.2 | Identify memory storage components within surveying information technology |
| | 1.3 | Use software to produce and manage administrative documentation |
| | 1.4 | Create and manage a database to store information according to relevant workplace procedures and industry standards |
| | 1.5 | Convert survey data from one format to another using software programs |
| | 1.6 | Define web and network communication requirements |
| 2 | Conduct data processing and analysis | |
| | 2.1 | Maintain data transfer and storage using information technology |
| | 2.2 | Perform spatial data cleaning, identify anomalies and provide solutions |
| | 2.3 | Perform spatial data cleaning using quality control criteria |
| | 2.4 | Conduct survey measurements and computations and analyse results |
| 3 | Organise data and produce deliverables | |
| | 3.1 | Select appropriate file types to support transfer of hydrographic data acquisition, database and Geographical Information Systems (GIS) between environments |
| | 3.2 | Use GIS within the marine environment according to manufacturer specifications |
| | 3.3 | Produce survey deliverables according to international hydrographic survey and cartographic standards |

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Unit Mapping Information

This is a new unit. No equivalent unit.

Links

Companion Volume Implementation Guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=26336bc0-04e5-49d9-8c31-46c49b6a0037>

Assessment Requirements for NWPHY001 Identify and analyse information technology for hydrographic surveys

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all the requirements of the elements and performance criteria on at least one occasion and includes:

- applying correct symbology and meta data
- applying estimation procedures to survey measurements and volume computations
- applying procedures used to assess, accept and reject data
- applying spatial data cleaning techniques using appropriate software and distinguish between anomalies and real data
- applying spatial data processing methods to create digital terrain models or gridded surfaces and contouring
- assessing the total propagated uncertainty of survey data relative to the survey specification
- configuring elements of a viewing package to highlight features of interest within a hydrographic data set
- configuring systems for secure storage, transfer and backup of survey data
- converting survey data from one format to another
- creating a database, populating records and writing a query to extract information including fields for:
 - geographical information
 - marine floor sediment types
 - obstructions
 - rocks
 - wrecks
- creating a Geographical Information Systems (GIS) project using marine spatial data including merging and mashing up data sets of different origin by applying datum and projection transformations
- creating a template document using the appropriate software
- creating the required data types as part of standard exchange formats
- locating, identifying and explaining function of computer components used for hydrographic surveying including:
 - central processing unit
 - communication devices
 - data storage

- device drivers
- hardware
- input and output interfaces
- interfaces
- memory storage types
- motherboard
- operating systems
- software
- producing both paper and digital products complying with specifications and standards
- producing a hydrographic survey report
- writing a program for data format conversion or basic algorithm computation

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all the requirements of the elements and performance criteria and includes knowledge of:

- communication protocols
- components contributing to uncertainty in observations
- content of files in different formats and file types used to record data in survey planning, data acquisition and products
- contouring to international charting standards
- database characteristics and functions
- data cleaning techniques including manual and automated methods within industry standard hydrographic processing software
- data conversion principles including:
 - algorithms including loops and conditional instructions
 - application to data exchange
 - file conversion
 - scientific computation environments
- data interpolation techniques
- data storage and backup systems
- definitions of the following:
 - communication protocols
 - internet
 - LAN
 - network integrity
- digital and paper products derived from source data for various survey types and usage including GIS and CAD files and geo-referenced images
- effects of time on data relating to:
 - clocks
 - synchronisation of data

- time drift
- time tagging
- GIS and hydrographic software presentation considerations including:
 - base maps and images
 - coordinate reference system
 - detail and quantify components contributing to uncertainty in derived ranges
 - features and feature types of point, line and polygon with marine examples
 - marine and coastal data bases
 - resolution
 - shading and illumination
 - survey metadata
 - symbology
 - use of colour schemes
 - vertical datums
 - vertical scale and exaggeration
- grids and TINs including:
 - appropriate usage
 - data analysis
 - differences between grids and TINs
 - resolution
 - visualisation affects
- identification of outliers and real features
- network communication protocols used in remote data exchange applications
- organisation of survey databases
- products provided directly from source data including sounding data files and metadata
- properties of computer components including:
 - buffers
 - communication board
 - communication ports
 - data transmission rates
 - ethernet links
 - serial links
- quality control criteria including:
 - comparing crossing and adjacent data between survey lines
 - comparing overlapping data between survey platforms
 - identification of systematic errors
 - total propagated uncertainty including horizontal and vertical
- raster and vector data models and commonly used file types
- relevant international and Australian hydrographic standards including nautical charting products

- relevant standard reports on quality control, procedures, results and conclusions detailing processes adopted within survey operations and data processing
- role of software including:
 - graphic and image software
 - spreadsheets
 - storage and data exchange
 - word processing
- spatial data infrastructures including GIS
- types of databases including:
 - file types (binary, text and XML)
 - geospatial databases
 - relational databases
- type of information gathered for:
 - anomalies in survey area
 - light lists
 - notices to mariners
 - offshore hazards
 - port guides
 - sailing directions
- types of geospatial data and their representation
- vertical scale and exaggeration and the application of quality assurance and data representation
- volume computations

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must occur in suitable workplace operational situations. Where this is not appropriate, assessment must occur in suitable simulated workplace operational situations reflecting actual workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- relevant and appropriate materials, tools, facilities, equipment and personal protective equipment currently used in industry
- applicable relevant documentation including workplace procedures, industry standards, equipment specifications, regulations, codes of practice, international standards and operation

manuals.

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