Australian Government

CPPSIS5037A Maintain complex spatial data systems

Release 1

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

CPPSIS5037A Maintain complex spatial data systems

Modification History

Unit revised and not equivalent to CPPSIS5007A Maintain complex spatial data systems
Element structure, performance criteria, and critical aspects reviewed to reflect workplace requirements
Skills and knowledge requirements and the range statement updated

Unit Descriptor

This unit of competency specifies the outcomes required to work with the cycle of spatial data maintenance, including updating, backing up, recovering and archiving complex data. It requires the ability to apply theoretical spatial concepts to a range of situations in order to maintain complex spatial data systems, often in a supervisory capacity. Functions would be carried out within organisational guidelines.

Application of the Unit

This unit of competency supports the application of self-management and sound communication skills; planning and organising within data management and data manipulation; and the use of technology. The skills and knowledge acquired upon completion of this unit would support the needs of employees in surveying, cartography, town planning, mapping or geographic information systems.

Licensing/Regulatory Information

No licensing, legislative and regulatory requirements apply to this unit at the time of endorsement.

Pre-Requisites

Nil

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Determine data maintenance requirements.	1.1	***Objectives***, ***complex spatial data*** requirements and ***constraints*** are defined and documented according to written spatial specifications and ***client requirements***.
		1.2	Details of maintenance ***techniques*** to be used are considered and evaluated according to ***organisational guidelines***.
		1.3	Data ***design*** is interpreted to identify ***spatial data components*** to be maintained.
		1.4	***OHS*** and ***legislative requirements*** are adhered to.
		1.5	Pertinent ***legal and statutory standards*** are considered and adhered to.
		1.6	Work is allocated to appropriate personnel and ***supervisory processes***, checks and measures are implemented to ensure work is completed within ***time available***.
2	Confirm reliability of the spatial data.	2.1	Arrangements are put in place to access spatial data updates to ensure currency and relevance.
		2.2	Spatial data is checked and edited to ensure it is in ***acceptable format***.
		2.3	Spatial data is reviewed for compatibility and to ensure it meets specifications.
		2.4	***Updates*** are recorded according to organisational guidelines.

		2.5	Integrity and consistency of data is maintained.
3	Replace data.	3.1	Arrangements are put in place to amend spatial data and replace it as changes are identified and according to ***organisational requirements***.
		3.2	Existing data is adjusted to integrate with new data as appropriate.
		3.3	Spatial datasets are tested and ***validated*** to ensure integrity and quality.
		3.4	***Documentation*** is amended and updated according to organisational standards.
4	Carry out data backup and recovery.	4.1	Arrangements are made for data backups to be implemented to ensure copies of data are accessible in contingency situations.
		4.2	Backup system is tested to ensure it can be retrieved.
5	Archive data.	5.1	Spatial dataset to be archived is ***manipulated*** where necessary to ensure completeness.
		5.2	***Metadata*** is created according to accepted industry standards.
		5.3	New and existing spatial data is stored in a secure environment and according to organisational guidelines.
		5.4	Archival details are recorded according to organisational guidelines.

Required Skills and Knowledge

This section describes the essential skills and knowledge and their level, required for this unit.

Required skills

- ability to interpret technical manuals
- communication skills to:
  - consult effectively with clients and colleagues
  - impart knowledge and ideas through oral, written and visual means
- computer skills to complete business documentation and apply software and hardware
- literacy skills to:
  - assess and use workplace information
  - develop policy and guidelines
  - read and write technical reports
  - research and evaluate
  - translate requirements into data design
- numeracy skills to:
  - analyse errors
  - conduct image analysis
  - perform mental calculations
  - interpret and analyse statistics
  - record with accuracy and precision
  - undertake computations
  - verify reliability of datasets
- organisational skills to:
  - coordinate technical and human resource inputs to research activities
  - manage information
  - prioritise activities to meet contractual requirements
- project management skills to coordinate the maintenance of complex spatial data systems
- spatial skills to:
  - archive and retrieve spatial data
  - manage and manipulate spatial data
  - manage files

Required knowledge

- advanced spatial data reduction processes
- calibration of specialised surveying equipment to manipulate spatial data
- computer operating systems
- coordinating reference systems
- data formats
- industry metadata standards, including positional accuracy, currency, coordinate system, metric system, lineage and source
- map projections
- organisational policies and guidelines regarding spatial data maintenance
- relational database to store spatial data
- relevant spatial data to maintain complex data system
- spatial data input technologies, including digitising, scanning, remote sensing and satellite imagery
- spatial data maintenance systems
- spatial data output and distribution technologies, including scripting, query language, macro development, graphic interfaces, networks and remote access
- understanding of errors, accuracy and precision in data systems to ensure that complex spatial data systems are maintained accurately

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

Overview of assessment

This unit of competency could be assessed on its own or in combination with other units relevant to the job function, for example CPPSIS5031A Plan spatial data collection and validation, CPPSIS5032A Capture new spatial data, CPPSIS5035A Obtain and validate spatial data, CPPSIS5036A Integrate spatial datasets, CPPSIS5038A Develop a complex spatial and aspatial database, and CPPSIS5040A Collate and interpret spatial data.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of:

- making qualitative judgements about new and existing spatial data
- full cycle of complex spatial data maintenance, including archiving, backing up, recovery and updating
- spatial data input and output technology.

Specific resources for assessment

Resource implications for assessment include access to:

- assessment instruments, including personal planner and assessment record book
- assignment instructions, work plans and schedules, policy documents and duty statements
- registered training provider of assessment services
- relevant guidelines, regulations and codes of practice
- suitable venue and equipment.

Access must be provided to appropriate learning and assessment support when required.
Where applicable, physical resources should include equipment modified for people with disabilities.

Context of assessment

Holistic: based on the performance criteria, evidence guide, range statement, and required skills and knowledge.

Method of assessment

Demonstrated over a period of time and observed by the assessor (or assessment team working together to conduct the assessment).
Demonstrated competency in a range of situations, that may include customer/workplace interruptions and involvement in related activities normally experienced in the workplace.
Obtained by observing activities in the field and reviewing

induction information. If this is not practicable, observation in realistic simulated environments may be substituted.

Guidance information for assessment	Assessment requires that the clients' objectives and industry expectations are met. If the clients' objectives are narrowly defined or not representative of industry needs, it may be necessary to refer to portfolio case studies of a variety of surveying and spatial information services requirements to assess competency. Oral questioning or written assessment and hypothetical situations (scenarios) may be used to assess underpinning knowledge (in assessment situations where the candidate is offered a preference between oral questioning or written assessment, questions are to be identical). Supplementary evidence may be obtained from relevant authenticated correspondence from existing supervisors, team leaders or specialist training staff. All practical demonstration must adhere to the safety and environmental regulations relevant to each State or Territory. Where assessment is for the purpose of recognition (recognition of current competencies [RCC] or recognition of prior learning [RPL]), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time. In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge. Assessment processes will be appropriate to the language and literacy levels of the candidate and any cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording in the performance criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Objectives may include:	• agreed client requirements • written survey specifications.
Complex spatial data may:	• include data combinations from: • echo sounder

- global navigation satellite system (GNSS)
- level
- photogrammetry
- remote sensing
- total station

- relate to:
  - depth
  - dimension
  - direction
  - height
  - position
  - the manner in which data combinations and contingencies interact.

Constraints may include:	• coverage • datum • environmental factors • financial • industry requirements • legal and statutory.
Client requirements refer to description of outputs and may be contained in:	• contracts • memos • tender briefs • verbal instructions • written instructions.
Techniques may include:	• field • office procedures.
Organisational guidelines may include:	• appropriate timelines • code of ethics • company policy • final product formats • formal design parameters • legislation relevant to the work or service function • manuals • OHS policies and procedures • personnel practices and guidelines outlining teamwork, work roles and responsibilities • requirements for data processing.
Design may include:	• digital information • hard copy plans • maps • written instructions.
Spatial data components may include:	• depth • dimension • direction • flow rates • position • slope.
OHS may include:	• Australian standards • development of site safety plan • identification of potential hazards • inspection of work sites • training staff in OHS requirements • use of equipment and signage.
Legislative requirements	• Australian standards

may include:

- award and enterprise agreements
- certification requirements
- codes of practice
- copyright
- quality assurance requirements.

Legal and statutory standards may include:	• local government requirements • national standards • state statutes and regulations.
Supervisory processes may include:	• directing activity • implementing • meeting deadlines • monitoring • planning • overseeing practices • reviewing • targeting.
Time available may involve estimates for time duration of project, including:	• client instructions • consideration of contingencies • consideration of past project experiences • experience of project personnel • location of project • methods to be employed • resources and equipment to be used.
Acceptable format may include:	• consistent style • legibility.
Update may include:	• incremental or full updates • spatial or attribute or both • new information.
Organisational requirements:	• may be noted in organisational guidelines (see above).
Validated means reflecting the true state of a test result, including tests for systematic distortions such as:	• confounding bias • information/data bias • observational bias • recall bias • selection bias.
Documentation may include:	• metadata • organisational indexes • spatial data files.
Manipulation may include:	• addition • error tolerance testing • subtraction.

Metadata may include:	• summarised information about a spatial dataset that describes the characteristics of the dataset, including:
	  • availability
	  • conditions of use

- coordinate system
- currency
- date of acquisition
- quality
- source
- spatial data acquisition methodologies
- version control.

Unit Sector(s)

Surveying and spatial information services

Custom Content Section

Not applicable.