

Draft 0.1

This is a draft update to CPPSIS6037 Conduct advanced remote sensing analysis:

<https://training.gov.au/Training/Details/CPPSIS6037>.

Changed code to CPPSUR6037

Changed PCs to active voice.

Changed 'person' to 'candidate' in PE for consistency

TAG please review and confirm equivalency: Supersedes and is equivalent to CPPSIS6037 Conduct advanced remote sensing analysis

Moved Range of Conditions items (see below) to KE. TAG to please review if this is okay.

Metadata must include at least eight of the following:

- availability
- conditions of use
- coordinate system
- currency
- custodian
- data accuracy
- data description
- date of acquisition
- licence
- quality
- source
- spatial data acquisition methodologies
- version control.

Characteristics and statistics must include at least two of the following:

- band selections
- hard copy outputs
- histogram plots
- look-up tables
- univariate and multivariate statistics.

Image calculations must include at least one of the following:

- greenness ratios
- greenness ratios plus dark value
- normalised difference vegetation index (NDVI).

Techniques for integrating GIS data must include at least one of the following:

- cartographic modelling
- environmental modelling
- land cover classification.

Unit of Competency

CPPSUR6037 Conduct advanced remote sensing analysis

Modification history

Release	Comments
1	Replaces superseded equivalent CPPSIS6037A Conduct advanced remote sensing analysis. This version first released with CPP Property Services Training Package Version 3.

Application

This unit specifies the skills and knowledge required to use computing platforms, software systems and image processing techniques to conduct advanced remote sensing analysis on hard copy and digital imagery. The unit covers preparing for work by analysing specifications and deciding appropriate techniques for collecting and analysing images, as well as appropriate hardware and software and image processing systems to perform the required image enhancements and manipulations.

The unit also covers accessing and assessing available and suitable spatial datasets to identify constraints on use. The unit requires the ability to perform supervised and unsupervised classifications on datasets using classification algorithms, and to conduct related error analysis. It also requires the ability to merge remote sensing data and prepare data for geographic information system (GIS) integration.

The unit supports those who work in a technical management role in a spatial information services team, in areas such as cartography, town planning, mapping and GIS.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Prerequisite Unit

None

Unit Sector

Surveying and spatial information services

Elements and Performance Criteria

1. Do the things.	<p>1.1 Identify and analyse project specifications to determine appropriate image, merger and modelling techniques according to organisational requirements.</p> <p>1.2 Determine appropriate data collection and analysis techniques in remote sensing process according to project specifications.</p> <p>1.3 Select suitable digital image processing techniques and digital image data formats according to project specifications.</p> <p>1.4 Identify additional characteristics of image and metadata according to project specifications.</p>
2. Select computing platforms and software systems for image processing	<p>2.1 Assess appropriate computing platforms and software systems for suitability according to project specifications.</p> <p>2.2 Verify availability of suitable data with potential suppliers according to project specifications.</p>

	<p>2.3 Assess constraints on use of spatial data against project specifications and contingencies are planned according to organisational requirements.</p> <p>2.4 Assess commercially available image processing systems to determine appropriate components, menu items, characteristics and statistics to meet project specifications.</p>
3. Enhance and manipulate images	<p>3.1 Conduct transformation routines using image calculations.</p> <p>3.2 Apply edge enhancements and smoothing filters using convolution matrices.</p> <p>3.3 Perform image transformation with channels of brightness, greenness and wetness.</p> <p>3.4 Determine imagery for distribution according to project specifications.</p>
4. Perform classifications on datasets	<p>4.1 Determine thematic classifications and relative differentiations between supervised and unsupervised classification algorithms.</p> <p>4.2 Apply supervised classification algorithms using training samples according to project specifications.</p> <p>4.3 Conduct error analysis to perform an approximate accuracy assessment of classifications.</p> <p>4.4 Produce hard copy outputs according to project specifications.</p>
5. Conduct data merger and GIS integration	<p>5.1 Identify and document integration and merging techniques.</p> <p>5.2 Identify and document techniques for integrating GIS data.</p> <p>5.3 Merge and integrate remote sensing data into GIS according to project specifications.</p>

Foundation Skills

Candidates require:

- learning skills to conduct research to source spatial data.
- planning and organising skills to plan and prioritise activities to meet contractual requirements.
- numeracy skills to analyse points, lines, curves and shapes in vector graphics and to apply and interpret algorithms to correctly classify images.
- oral communication skills to liaise with clients and end users to identify remote sensing requirements.
- reading skills to interpret graphical information in raster images.
- technology skills to use computers and software applications to manipulate and enhance images and to use printers and plotters to produce hard copy outputs.
- problem-solving skills to apply solutions to identified classification discrepancies.

Unit Mapping Information

Supersedes and is equivalent to CPPSIS6037 Conduct advanced remote sensing analysis

Links

Companion Volume Implementation Guide:

<https://vetnet.education.gov.au/Pages/TrainingDocs.aspx?q=6f3f9672-30e8-4835-b348-205dfcf13d9b>

Assessment Requirements for CPPSUR6037 Conduct advanced remote sensing analysis

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Performance Evidence

To demonstrate competency, a candidate must meet the performance criteria of this unit by:

- using a computer and remote sensing software system to conduct advanced remote sensing analysis for two different projects.

While conducting this remote sensing analysis, the candidate must:

- analyse and define job specifications, constraints and main work activities
- analyse remote sensing data to identify and describe its characteristics, including:
 - metadata
 - soil
 - vegetation bodies
 - water
- select and set up appropriate hardware and software systems to meet remote sensing project specifications
- assess commercially available image processing systems to ensure their suitability in meeting project specifications
- use remote sensing techniques to acquire spatial data from:
 - airborne platforms
 - ground observation
 - satellites
- comply with organisational and legal requirements for accessing and using spatial data, including copyright, intellectual property and trade practices
- comply with organisational requirements and industry-accepted standards relating to:
 - applying classification algorithms
 - quality and risk management
 - working safely when using above equipment
- conduct web-based searches to identify available spatial data and verify its suitability to meet project specifications
- exercise precision and accuracy when analysing and classifying remote sensing data
- identify and assess constraints relating to use of remote sensing data
- perform classifications on datasets using supervised and unsupervised classification algorithms and training samples
- save digital images in a range of formats, including two of the following:
 - band interleaved by line (BIL)
 - band interleaved by pixel (BIP)
 - band sequential (BSQ)
 - run length encoding (RLE)
- use integration and merging techniques to allow remote sensing data to be integrated into GIS

- use digital image processing techniques to enhance and rectify images.

Knowledge Evidence

To be competent in this unit, a candidate must demonstrate knowledge of:

- metadata
 - availability
 - conditions of use
 - coordinate system
 - currency
 - custodian
 - data accuracy
 - data description
 - date of acquisition
 - licence
 - quality
 - source
 - spatial data acquisition methodologies
 - version control
- characteristics and statistics available in image processing systems
 - band selections
 - hard copy outputs
 - histogram plots
 - look-up tables
 - univariate and multivariate statistics
- image calculations
 - greenness ratios
 - greenness ratios plus dark value
 - normalised difference vegetation index (NDVI)
- techniques for integrating GIS data
 - cartographic modelling
 - environmental modelling
 - land cover classification
- industry-accepted techniques for applying supervised and unsupervised classification algorithms to remote sensing data
- computer platforms and software systems for advanced remote sensing analysis and GIS integration
- copyright and ownership constraints relating to spatial data
- digital image processing techniques
- digital image data formats, including BIL, BIP, BSQ and RLE
- existing spatial datasets and dataset sources
- image calculations required for transformation routines, including:
 - greenness ratios
 - greenness ratios plus dark value
 - normalised difference vegetation index (NDVI)
- image enhancement, manipulation and merger techniques
- methods for analysing metadata

- methods for assessing commercially available image processing systems, including characteristics and statistics
- methods for validating spatial data sources and constraints on use
- key features of spatial referencing and coordinate systems
- techniques for integrating GIS data, including:
 - cartographic modelling
 - environmental modelling
 - land cover classification.

Assessment Conditions

Assessors must meet the requirements for assessors contained in the Standards for Registered Training Organisations.

Assessment must be conducted in the workplace or a simulated workplace using realistic conditions, materials, activities, responsibilities, procedures, safety requirements and environmental considerations.

Candidates must have access to:

- an equipped work station
- computer, including computer-aided design (CAD) applications and software appropriate for developing two-dimensional (2-D) and three-dimensional (3-D) terrain visualisations
- hardware, including printer, scanner, plotter and multimedia devices and peripherals
- project and design specifications
- documentation of organisational policies and procedures and documentation relating to data privacy and information copyright.

Candidates must have a lead role in a team and must consult with clients.

Work is to be completed within time frames as specified by client and project requirements.

Links

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