



Australian Government

RIIARO202 Use data and technology to complete work in autonomous operations

Release: 1

RIIARO202 Use data and technology to complete work in autonomous operations

Modification History

Release 1	This version first released with RII Resources and Infrastructure Industry Training Package Version 9.0. Newly created unit.
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Application

This unit describes the skills and knowledge required to use data and technology to complete work in an autonomous operation, including to interact with machine guidance and hardware system technologies to safely carry out work activities

The unit applies to those who use data and technology to ensure autonomous equipment and plant function safely, efficiently and effectively.

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

Unit Sector

Coal mining

Metalliferous mining

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes	Performance criteria describe the performance needed to demonstrate achievement of the element
1. Work with machine guidance technologies	1.1 Identify machine guidance technology and devices required by own work instructions 1.2 Identify interference/limitations of the machine guidance technology used 1.3 Source data from machine guidance technology and devices to inform decisions 1.4 Complete work task as per information from control centre and the work instructions provided
2. Work with hardware system technologies	2.1 Identify correct technology, device(s), and tool(s) to carry out work as per work instructions

ELEMENT	PERFORMANCE CRITERIA
	2.2 Confirm limitations of selected technology, device(s), and tool(s) with team members 2.3 Complete work task as per information from control centre and work instructions provided
3. Use data to inform control of automated equipment or system	3.1 Navigate technology to locate or transmit required data 3.2 Apply data security measures by following organisational procedures 3.3 Communicate data to control centre following organisational procedures and communication protocols
4. Identify levels of automation	4.1 Monitor various modes of operation when automated equipment is operating in the work environment 4.2 Identify and report on why autonomous equipment is operating in different operational states 4.3 React as required to signals and/or alarms associated with autonomous equipment and operational control systems in accordance with organisational and operational procedures

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.

SKILL	DESCRIPTION
Numeracy	Use the magnitude of numbers and scale of measurements to aid in the use and communication of data

Unit Mapping Information

No equivalent unit. Newly created unit.

Links

Companion Volume Implementation Guide is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=88a61002-9a21-4386-aaf8-69c76e675272>

Assessment Requirements for RIIARO202 Use data and technology to complete work in autonomous operations

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Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- identify at least 3 examples of process control units/systems on a piece of autonomous equipment
- on at least 3 occasions source data relevant to a process-control system used in own work role
- complete at least 2 work tasks generated by using data gathered from automated equipment according to provided work instructions.

Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- applications of process control systems in autonomous operations relevant to own work role
- vocabulary and terms used for technology in workplace procedures that apply to own work role, which will reflect the latest published version of relevant industry standards, including or equivalent to:
 - IEC 61511 Safety instrumented systems for the process industry sector
 - IEC 61508 / AS 61508 Functional safety of electrical/electronic/programmable electronic safety-related systems
 - ISO 17757:2017 Earth-moving machinery and mining – Autonomous and semi-autonomous machine system safety
 - National Highway Transport Safety Administration (NHTSA) Automation levels – levels 1-5
- types of hardware system technology and how they relate to the use of machine guidance systems in own role, including:
 - global navigation satellite system (GNSS)
 - global positioning system (GPS)

- perception systems, such as RADAR and LiDAR
- sensors, actuators, and encoders
- gyros - pitch and roll
- cameras
- drones
- operational procedures for communication devices used in own work role, including for radios, telephones, tablets, screens, and computers
- types of controllers encountered in own work role, including:
 - programmable logic controller (PLC)
 - electronic control unit or engine control unit (ECU)
 - personal computer
- procedures for interacting with types of software systems, including:
 - shutdown systems
 - distributed shutdown systems
- operating features of hardware equipment used in autonomous operations, including:
 - interlocks and related interfaces
 - actuators
 - sensors
 - motors
 - drives
 - pistons
 - valves
 - screens
- control loops and control systems, including:
 - physical components and control functions
 - inputs and outputs of a control system
 - expected behaviours of equipment due to changes of input to control system
- impact of emergency/safety measures on the process control system
- factors that influence GNSS and GPS signals
- impact/s of signal quality on performance
- procedures for interpreting and responding to signals and alarms in the process control system
- modes of operation and expected behaviours of autonomous equipment
- techniques to collect, interpret, and transmit different data types in own role, including at least 1 of the following:
 - payload
 - computer-aided earthmoving systems
 - product quality
 - production throughput
- intellectual property requirements relating to data, including awareness of privacy and protocols

- organisational data security measures and protocols
- communication protocols for:
 - radios
 - telephones
 - email
 - group instant messaging application.

Assessment Conditions

Mandatory conditions for assessment of this unit are stipulated below. The assessment must:

- include access to:
 - personal protective equipment
 - equipment and systems required for safely interacting with data in autonomous operations
- be conducted in a safe environment; and,
- be assessed in the context of this sector's work environment; and,
- be assessed in compliance with legislative and regulatory requirements and using policies, procedures and processes directly related to the industry sector for which the unit is being assessed; and,
- confirm consistent performance can be applied in a range of relevant workplace circumstances.

Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated work environment* provided it is realistic and sufficiently rigorous to cover all aspects of this sector's workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.

Assessor requirements

Assessors must be able to clearly demonstrate current and relevant industry knowledge and experience to satisfy the mandatory regulatory standards as set out in the Standards for Registered Training Organisations 2015/Australian Quality Training Framework mandatory requirements for assessors current at the time of assessment and any relevant licensing and certification requirements.

This includes:

- the minimum years of current** work experience after competency has been obtained as specified below in an industry sector relevant to the outcomes of the unit.

It is also acceptable for the appropriately qualified assessor to work with an industry expert to conduct assessment together and for the industry expert to be involved in the assessment judgement. The industry expert must have current industry skills directly relevant to the training and assessment being provided. This means the industry subject matter expert must demonstrate skills and knowledge from the minimum years of current work experience after competency has been obtained as specified below, including time spent in roles related to the unit being assessed:

Industry sector/Unit sector	AQF indicator level	Required assessor or industry subject matter expert experience
Drilling, Metalliferous Mining, Coal Mining, Extractive (Quarrying) and Civil Infrastructure***	1	1 year
	2	2 years
Drilling, Coal Mining, Extractive (Quarrying), Metalliferous Mining and Civil Infrastructure***	3-6	3 years
Units coded 'RIIARO' (Autonomous and Remote Operations)	Given that this is an emerging industry area, assessors are required to demonstrate vocational competencies at least to the level being assessed, and current industry skills directly relevant to the assessment being provided.	
Other sectors	Where this unit is being assessed outside of the resources and infrastructure sectors assessor and/or industry subject matter expert experience should be in line with industry standards for the sector in which it is being assessed and where no industry standard is specified should comply with any relevant regulation.	

*Guidance on simulated environments has been stipulated in the Companion Volume Implementation Guide located on VETNet.

**Assessors can demonstrate current work experience through employment within industry in a role relevant to the outcomes of the unit; or, for external assessors this can be demonstrated through exposure to industry by conducting a minimum number of site assessments as determined by the relevant industry sector, across various locations.

***Excluding units coded 'RIIARO' (Autonomous and Remote Operations).

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