



Australian Government

RIIARO402 Optimise performance of complex control systems in autonomous operations

Release: 1

RIIARO402 Optimise performance of complex control systems 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 optimise the performance of complex control systems in autonomous operations in order to meet production and performance targets relating to safety, efficiency, and quality. It includes monitoring complex systems and processes, and responding to abnormal situations.

The unit applies to those who manage multiple complex tasks in a dynamic, high consequence autonomous environment to control complex production systems.

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. Operate complex systems and processes in autonomous operations	1.1 Operate within defined parameters to monitor processes and systems and the interfaces between them 1.2 Monitor data and information sources to build a comprehensive picture of continuing status and dynamic interactions occurring within area of own responsibility 1.3 Monitor ongoing status in relation to safety, work priorities, progress against targets, equipment, people, systems and processes, environmental factors and constraints that impact planned work outcomes

ELEMENT	PERFORMANCE CRITERIA
	1.4 Monitor quality and quantity of product and wastes generated to assure continuing production 1.5 Use information sources to identify patterns and trends to confirm current status or anticipate developing situations
2. Respond to abnormal situations	2.1 Develop and implement options and contingency plans based on validation of information 2.2 Prioritise and resolve alarms and/or warning system alerts in accordance with organisational procedures 2.3 Respond to changed conditions in a timely manner or follow escalation protocols according to the situation 2.4 Minimise impact of mechanical and product factors and environmental conditions affecting production 2.5 Ensure waste and environmental exceedances are treated in accordance with procedures and waste disposed is within environmental and licence limit
3. Identify and implement optimisation activities	3.1 Identify and communicate actual performance targets according to daily plans and schedules 3.2 Analyse data to determine possible causes or factors involved in suboptimal performance and determine most probable cause 3.3 Determine preferred actions required and possible limitations and/or constraints 3.4 Determine impact of possible upstream and downstream effects and confirm feasibility of preferred action 3.5 Plan and communicate optimisation activities in consultation and close cooperation with stakeholders 3.6 Evaluate, record and communicate optimisation outcomes in accordance with organisational requirements

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	Interprets a range of mathematical information embedded in a range of familiar and less familiar documents
Writing	Prepares clear, sequenced information to support performance of control systems
Initiative and	Generates options to address abnormal situations

SKILL	DESCRIPTION
enterprise	

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 RIIARO402 Optimise performance of complex control systems 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:

- optimise complex control systems, or aspects thereof, on at least 2 different occasions.

During the above, the candidate must:

- interpret, prioritise, and resolve alarms and warning system alerts
- respond to changed conditions in a timely manner
- follow escalation protocols
- determine the impact of possible upstream and downstream effects
- determine the feasibility of, and communicate, planned actions to achieve optimal performance.

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:

- fundamentals of automation and machine learning technologies, including:
 - control systems functionality and limitations
- role and functions of the operations controller
- process control operating system, including:
 - system architecture, operating parameters and integrity limits
 - human-machine interface (HMI)
 - how control systems make decisions and the influences that will dictate system setup
 - advanced control features
 - when to intervene: escalate or correct and/or report unsafe practices
 - decision rights with respect to the operational roles and responsibilities within the autonomous system
- effects of automation on process control

- impacts of changing controller settings, and limits within which changes can be made
- autonomous environment process schematics relating to own role
- actions that can impact upstream and downstream processes
- interfaces between value stream processes and systems
- machine guidance systems, including:
 - autonomous safety functions and categories that require escalation or are classified as incidents
- sensing and perception systems in an autonomous environment, including their effect on:
 - safety
 - production
 - system performance
- environmental impact management procedures
- protocols for responding to abnormal situations, including:
 - instrument, mechanical, and electrical failures and malfunctions
 - control system malfunction
 - utility disruption: power, communications, water
 - trending/ early warning signs
 - signals and alarms
 - delays
 - unplanned requirements, including maintenance.

Assessment Conditions

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

- include access to:
 - personal protective equipment
 - control system/s and communications technology
 - equipment required for monitoring, and working with, autonomous operations control systems
- 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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