No. 710 **21 July2006**

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

In accordance with regulation 24(c) of the National Standards Bodies Regulations of **28** March **1998,** the Standards Generating Body (SGB) for

Aerospace Operations

Registered by Organising Field **10,** Physical, Computer and **Life** Sciences, publishes the following qualification and unit standards for public comment.

This notice contains the titles, fields, subfields, NQF levels, credits, and purpose of the qualification and unit standards. The qualification and unit standards can be accessed via the **SAQA** web-site at **www.saqa.org.za**. Copies may also be obtained from the Directorate of Standards Setting and Development at the **SAQA offices, Hatfield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.**

Comment on the qualification and unit standards should reach **SAQA** at the address ***below*** and no ***later*** than ***17 August*** 2006. All correspondence should be marked **Standards Setting.–** SGB **for Aerospace Operations** and addressed **to**

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S BHIKHA
DIRECTOR STANDARDS SETTING AND DEVELOPMENT

SAQA QUAL ID	QUALIFICATION TITLE		
57229	National Certificate: Communications, Navigation and Surveillance Support		
SGB NAME		ORGANISING FIELD ID	PROVIDER NAME
SGB Aerospace Operations		10	
QUAL TYPE		ORGANISING FIELD DESCRIPTION	SUBFIELD
National Certificate		Physical, Mathematical, Computer and Life Sciences	Physical Sciences
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
Undefined	161	Level 5	Regular-Unit Stds Based

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:

This qualification is intended to assist all relevant Stakeholders and role-players:

> For those who have been in the workplace for a long time, this qualification can be used in the recognition of prior learning to assess and recognise workplace skills acquired without the benefit of formal education and training.
> For the new entrant, this qualification describes the learning outcomes required to participate effectively in a structured workplace.
> For education and training providers, this qualification provides guidance for the development of appropriate learning programmes and assessment documentation.
> For employers, this qualification enables skills gaps to be identified and addressed ensuring that productivity levels are increased and business objectives achieved.

The combination of learning outcomes that comprise this qualification will provide the qualifying learner with vocational knowledge and skills appropriate to the context of Air Traffic Management Technical Support Services. It will also equip learners with a foundation for further intellectual development, opportunities for gainful employment and reward for contributions to society.

The learner assessed as competent against this qualification will be able to:

> Identify and solve technical support problems related to Communications, Navigation and Surveillance systems used in the air traffic management environment.
> Work and communicate effectively with all stakeholders.
> Manage information and other technical support resources.
> Demonstrate scientific and technological competence in the provision of technical support for Communications, Navigation and Surveillance systems.
> Understand and review the impact of air traffic management technical support on stakeholders in air traffic management and the flying community as a whole.

This qualification will provide the Air Traffic Management profession with qualified Air Traffic Management Technical Personnel, thereby facilitating social and economic transformation, empowerment, and upliftment in the Industry and country in general.

Rationale:

This qualification has been developed for the Communications, Navigation and Surveillance Systems technical support area of Air Traffic Management. There is an urgent need to provide recognition to people who are able to conduct the essential operations associated with safe and efficient aviation communication,

navigation and surveillance.

The focus of this qualification will be mainly people who have been working within the Aviation industry in Air Traffic Management The competencies gained could also be used in the Air Force by the Navigators or other related personnel.

In the past many practitioners in the Air Traffic Management technical support area were denied career advancement and professional registration. The introduction of a unit standards based qualification will allow learners, mainly employed in the field for a long time, recognition for their knowledge and acquired competencies through the process of RPL. It will also allow them advancement in their professional careers through transfer of credits gained, to whatever further learning they wish to carry out in the related aviation fields.

This qualification will facilitate the development of a professional community of Air Traffic Management Technical Personnel who are able to contribute towards a safe and productive technical support environment through the application of enhanced knowledge and skills relating to the installation, operation, maintenance and technical support of Communications, Navigation and Surveillance Systems used within the Air Traffic Management environment.

The competencies contained in this qualification are essential for social and economic transformation, empowerment and upliftment within the Air Traffic Management environment, whilst simultaneously improving the skills base of the country.

The combination of learning outcomes will provide the qualifying learner with applied competence in the provision of technical support for Voice Communications Systems, Radio Navigation Aids used in the Aviation Environment and Surveillance Systems comprising Primary and Secondary radar sensors.

This qualification lays the basis for further learning towards the proposed National Diploma in CNS Systems NQF Level 5 and the National Diploma in CNS Data Processing NQF Level 5 qualifications.

RECOGNIZE PREVIOUS LEARNING?

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LEARNING ASSUMED TO BE IN PLACE

It would be desirable for learners wishing to access this qualification to be competent at NQF level 4 or equivalent in the following:

> Language and Communication.
> Mathematics.
> Electronics.
> Physical Science.
> Data Processing.
> Digital techniques.
> Analogue techniques.
> End User Computing.

Recognition of Prioir Learning:

This qualification and all the fundamental, core and elective unit standards associated with it, as described in the rules of combination, can be achieved by any learner through the recognition of prior learning, which includes learning outcomes achieved through formal, informal and non-formal learning and work experience. The exit-level outcomes and the related unit standards may also be achieved through the recognition of prior learning.

Acces to the Qualification:

There are no access limitations on any learners or classes of learners for this qualification.

QUALIFICATION RULES

The qualifying learner will achieve this Qualification by complying with the following rules of combination for the accumulation of credits:

Learning Component; Credits:

> All fundamental Unit Standards: 38 Credits.

> All Core Unit Standards: 103 Credits.
> Elective Unit Standards: 20 Credits.
> Total: 161 Credits.

EXIT LEVEL OUTCOMES

1. Demonstrate knowledge of air traffic management operations.
2. Demonstrate knowledge of Communications, Navigation and Surveillance principles in air traffic management.
3. Monitor and operate air traffic management Communications, Navigation and Surveillance systems.
4. Maintain Communications, Navigation and Surveillance support equipment.
5. Provide support on Communications, Navigation and Surveillance equipment installation projects.

ASSOCIATED ASSESSMENT CRITERIA

1.

> Air traffic control functions are explained in terms of the overall purpose, airspace organisation and use, services provided and air traffic operational procedures.
> Air traffic management operations are explained in terms of CNS concepts, ATM procedures, particular problems confronting ATM, and the operational importance of equipment and facilities.
> Air traffic management environment is explained in terms of location, purpose, function and role of facilities and equipment according to organisational requirements.
> The role of air traffic control is demonstrated through practical exercises on air traffic control simulators according to organisational procedures.

2.

> Principles of Communications Systems are explained in terms of their use.

> Range: Communications Systems include but are not limited to:
  > Voice air-ground.
  > Voice ground-ground.
  > Data.

> Range: Principles include but are not limited to:
  > Air Traffic Management.
  > Typical systems.
  > System architecture, types, function and performance.
  > Air Traffic Control requirements.
  > Human-machine interface requirements.

> Principles of Navigation Systems are explained in terms of their use.

> Range: Navigation Systems include but are not limited to:
  > Very high frequency omni-range (VOR).
  > Distance measuring equipment (DME).
  > Very high frequency direction finding (VDF).
  > Instrument landing systems (ILS).
  > Global positioning systems (GPS).

> Range: Principles include but are not limited to:
  > Radiated signal in space.
  > Systems functionality.
  > GPS position determining concepts.
  > Flight calibration requirements.

> Concepts of Surveillance systems are explained in terms of their use.

> Range: Surveillance Systems include but are not limited to:
  > Primary radar.
  > Secondary radar.
  > Surface movement control radar.
  > Automatic dependent surveillance.

> Range: Concepts include but are not limited to:
  > Theory of operation.

> Use in air traffic control.
> Typical elements of a basic system.
> Functionality and performance of sy.

3.

> Communication reception, transmission, control and switching systems are operated, monitored, restored and re-configured according to technical instructions:

> Range: Technical instructions include but are not limited to:
> Manufacturer's technical manual.
> Quality management system procedures.
> ICAO recommendations.
> Organisational operational requirements.

> Surveillance sensor, processing and display systems are operated, monitored, reanfigured and restored in accordance with technical instructions.
> Navigation aid systems are operated, monitored, reanfigured and restored in accordance with technical instructions.
> Instrument landing systems are operated, monitored, re-configured and restored in accordance with technical instructions.
> The impact of communication, navigation and surveillance equipment failures is evaluated according to utilization by Air Traffic Controllers and Pilots, organisational requirements and operational procedures.

4.

> Corrective maintenance for Communications, Navigation and Surveillance support equipment is performed according to:

> Organisational standing instructions.
> Equipment manufacturer's instructions.
> Qualii management system procedures.
> Organisational corrective maintenance procedures.

> Routine preventive maintenance is performed according to routine maintenance schedules, equipment manufacturer's instructions and organisational corrective maintenance procedures.
> Performance of Communications, Navigation and Surveillance support equipment is analysed and measured in accordance with technical manual procedures and specifications and technical reports are compiled according to organisational procedures.
> Maintenance support is conducted for Communications, Navigation and Surveillance Support equipment in accordance with organisational support service procedures.

5.

> Communications, Navigation and Surveillance equipment installation projects are explained in relation to the statement of work, work breakdown structure, scheduling, project budget resource and cost control and statutory regulations.
> Assistance with in-factory and on-site acceptance tests is provided on new installations in accordance with user requirement specifications, test procedures, equipment manufacturer's instructions and organisational procedures.
> Assistance with configuration, testing of components and final acceptance tests during installation activities is provided in accordance with organisational operational requirements and procedures.
> Communications, Navigation and Surveillance equipment performance during the warrantee period is analysed and measured according to manufacturer's specifications and organisational procedures.
> The logistic support programme for the installation project is analysed, monitored and evaluated in accordance with organisational procedures.

Integrated Assessment:

Integrated assessment at the level of the qualification provides an opportunity *fur* learners to show that they are able to integrate concepts, ideas and actions across unit standards to achieve competence that is grounded and coherent in relation to the purpose of the qualification. Integrated assessment should show how already demonstrated competence in individual areas can be linked and applied for the achievement of a holistic outcome as described in the exit level outcomes.

Integrated assessment must judge the quality of the observable performance, and also the quality of the

thinking that lies behind it. Assessment tools must encourage learners to give an account of the thinking and decision-making that underpin their demonstrated performance. Some assessment practices will demand practical evidence while others may be more theoretical, depending on the type of outcomes to be assessed. The ratio between action and interpretation is not fixed, but varies according to the demands of the particular exit level outcome of the qualification.

While the generic components of this qualification at NQF Level 5 can be assessed through occupational contexts and activities relating to Air Traffic Management, care must be taken in both the learning programme and the assessment to ensure that these foundational skills are portable. The primary aim of this qualification is to ensure that learners have a sound base of introductory education and training to prepare them for further learning, whatever career path they may choose. Learners must be able to transfer generic skills across a number of different contexts, and apply them within a number of learning areas.

A broad range of task-orientated and theoretical assessment tools may be used, with the distinction between practical knowledge and disciplinary knowledge maintained so that each takes its rightful place.

INTERNATIONAL COMPARABILITY

The European Air Traffic Control Harmonisation and Integration Programme (EATCHIP) is a cooperative programme of the 35 member states of the European Civil Aviation Conference (ECAC) coordinated and managed by EUROCONTROL.

Resulting from this programme, guidelines for a common qualification level for Electronics Technical Support Personnel, within the Air Traffic Management environment, have been developed in Europe. This National Certificate in Communications, Navigation and Surveillance Support at NQF level 5 meets the guidelines referred to above.

Europe, as a world leader in Air Traffic Management, supplier of systems, and the support thereof, was therefore chosen as the most appropriate international comparison. The qualifications work done by ECAC were chosen as these qualifications are a result of a coordinated effort by the 35 member states representing a very wide cross section of countries.

Below is a comparison of the South African draft qualifications and the ECAC common qualifications. The National Certificate in Communications, Navigation and Surveillance Support is highlighted.

1. South Africa AOSGB Draft Qualifications:

> Engineering Degree NQF Level 6.
> National Diploma in Communications, Navigation and Surveillance Systems NQF Level 5, 240 Credits.
> National Diploma in Communications, Navigation and Surveillance Data Processing NQF Level 5, 240 Credits.
> National Certificate in Communications, Navigation and Surveillance Support NQF Level 5, 160 Credits.

2. 35 Member states of the European Civil Aviation Conference (ECAC):

At NQF Level 6 they have a Continuation Training:

> At Diploma NQF Level 5, they have:

> Equipment Type Rating in Communications, 40 credits.
> Equipment Type Rating in Navigation, 90 credits.
> Equipment Type Rating in Surveillance, 50 credits.
> Equipment Type Rating in Data Processing, 150 credits.

> Between NQF Level 5 Diploma and NQF Level 5 Certificate, they have:

> Common Qualification Communications, 48 credits.
> Common Qualification Navigation, 73 credits.
> Common Qualification Surveillance, 67 credits.
> Common Qualification Data Processing, 57 credits.

> Below the NQF Level 5 Certificate:

They have what they call Common Basic Level Training, which is partly equivalent to our NQF Level 5 Certificate but is offered as a short course of 40 credits or 450 nominal learning hours.

Their Technikon qualifications are at a slightly higher level than our South African equivalent.

The South African National Certificate in Communications, Navigation and Surveillance Support equates to the ECAC basic training, however, the structure is different. The South African certificate qualification, in addition to covering all the material contained in the ECAC basic qualification, also includes a portion of the material covered in the four common level ECAC qualifications of Communications, Navigation, Surveillance and Data processing.

The total nominal learning hours of the South African CNS Certificate Qualification is similar to the ECAC Basic level training together with that portion of the material covered in the four disciplines at the ECAC common qualification level.

The outcomes of both the South African certificate qualification and the ECAC basic level training are electronics personnel capable of performing first level, operation, monitoring and maintenance and capable of progressing on to further qualifications in systems and data processing in the fields of Communications, Navigations, Surveillance and Data Processing.

In designing this certificate qualification in Communications, Navigation and Surveillance Support, research was also done into what is currently taking place in Africa. One good source of information was the Air Traffic Management Training Academy at Johannesburg International Airport. This Academy provides training on many of the unit standards proposed in this qualification and other qualifications.

Apart from South Africa, Nigeria and Egypt provide some in-house training. African states lack Air Traffic Management training facilities and a related qualification structure and therefore, send students to the Air Traffic Management Training Academy at Johannesburg International Airport for this training. Nigeria is in fact at present also sending their students to South Africa as the Nigerian training facilities are not functioning.

Students from the following states were trained during the period **1/1/2003** to **31/12/2005:**

> Nigeria: 40 students.
> Namibia: **3** students.
> Mozambique: **15** students.
> Cape Verde: **7** students.
> Tanzania: 3 students.
> Ghana: 9 students.
> Uganda: 1 student.
> Rwanda: 4 students.
> Botswana: 9 students.
> Lesotho: **3** students.
> DRC: **11** students.

Courses followed by these students have been as follows:

> Advanced Networking.
> CNS/ ATM for Engineering.
> Antennas.
> Computer Skills.
> VOR Concepts.
> Data Communications.
> Digital Techniques.
> **DME** System Concepts.
> ILS Systems.
> Introduction to Air Traffic Communication Systems.
> Introduction to Air Traffic Navigation Systems.
> Introduction to Radar Systems.
> Primary Surveillance radar systems.
> Secondary Surveillance Radar Systems.
> Satellite Communications Systems.
> Telecommunications System Concepts.
> Voice Communication Systems concepts.

The content of all the above courses is covered in this Qualification.

The finding has been that students arriving from the above **states** generally possess the learning assumed to be in place and are successful in achieving the outcome requirements of the courses presented. In

future, these students will be eligible for being awarded the unit standards-based credits. There is also the future opportunity for them to obtain all unit standards required for this certificate qualification.

A study of the National Airports Corporation Limited Zambia in 1999 revealed that their Air Traffic Management Engineering Technical Personnel are sent to the United Kingdom, Italy, Egypt, the United States of America and starting at that time, to South Africa for their ATM Engineering Technical Personnel training, after having obtained an Electronic National Diploma Qualification in Zambia. Zambia does not, however, have any qualification structure in place to give formal recognition to the ATM training received in these various countries.

Students from other African States, following training courses in South Africa, will now be able to work toward being awarded this internationally benchmarked National Certificate qualification in CNS Support.

ARTICULATION OPTIONS

The possibility exists for vertical articulation with this Qualification. The following proposed qualifications serve as examples of vertical articulation:

> National Diploma in Communications, Navigation and Surveillance Data Processing at NQF level 6.
> National Diploma in Communications, Navigation and Surveillance Systems at NQF level 6.

Examples of horizontal articulation with this Qualification:
> Diploma: Electronics Technical Personnel at NQF level 5, ID 21118.

MODERATION OPTIONS

> Any institution offering learning that will enable achievement of this Qualification must be accredited by the relevant ETQA.
> External Moderation of assessment will be overseen by the relevant ETQA at its discretion.
> The accredited Training Provider will oversee internal Moderation of assessment.
> Moderation should encompass achievement of competence described in both individual Unit Standards as well as the integrated competence described in the qualification.
> Moderation must also encompass achievement of the competencies described in the exit level outcomes described above.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

> Assessors registered with the relevant ETQA must carry out the assessment of the candidates for any of the unit standards that make up this qualification.
> The following criteria are specified for assessors of this qualification:

> Be competent in the outcomes of this qualification or one in the same field at a higher level.
> Have a minimum of three or more years in the Air Traffic Management engineering field.

NOTES

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UNIT STANDARDS
(Note: A blank space after this line means that the qualification is not based on Unit Standards.)

	UNIT STANDARD ID AND TITLE	LEVEL	CREDITS	STATUS
core	230199 Monitor and operate a navigation aid systems	Level 5	12	Draft - Prep for P Comment
core	230201 Monitor and operate communication reception systems	Level 5	9	Draft - Prep for P Comment
core	230204 Monitor and operate communication transmission systems	Level 5	9	Draft - Prep for P Comment
core	230206 Monitor and operate communication control and switching systems	Level 5	6	Draft - Prep for P Comment
core	230207 Monitor and operate surveillance processing and display systems	Level 5	12	Draft - Prep for P Comment
core	230209 Monitor and operate Instrument Landing Systems (W)	Level 5	12	Draft - Prep for P Comment
core	230211 Monitor and operate surveillance sensor systems	Level 5	12	Draft - Prep for P Comment.
core	230215 Provide support on Communication, Navigation and Surveillance (CNS) equipment installation projects	Level 5	11	Draft - Prep for P Comment

Core	230198	Maintain Communications, Navigation and Surveillance (CNS) support equipment	Level 6	20	Draft - Prep for P Comment
Elective	230200	Support and maintain VHF voice communication reception equipment	Level 6	10	Draft - Prep for P Comment
Elective	230202	Support and maintain voice communication control systems (VCCS) equipment	Level 6	16	Draft - Prep for P Comment
Elective	230205	support and maintain VHF voice communication transmission equipment	Level 6	10	Draft - Prep for P Comment
Elective	230212	Support and maintain data communication equipment	Level 6	12	Draft - Prep for P Comment
Elective	230214	Support and maintain networking equipment	Level 6	12	Draft - Prep for P Comment
Elective	230216	Support and maintain Very High Frequency Omni Range (VOR) radio navigation equipment	Level 6	20	Draft - Prep for P Comment
Fundamental	12433	Use communication techniques effectively	Level 5	8	Registered
Fundamental	117701	Address safety, health and environmental requirements and hazards in a technical context	Level 5	8	Registered
Fundamental	230203	Demonstrate an understanding of air traffic management operations	Level 5	4	Draft - Prep for P Comment
Fundamental	230208	Demonstrate an understanding of the principles of air traffic management communications systems	Level 5	6	Draft - Prep for P Comment
Fundamental	230210	Demonstrate an understanding of the principles of air traffic management radio navigation aids	Level 5	6	Draft - Prep for P Comment
Fundamental	230213	Demonstrate an understanding of the principles of air traffic management radar surveillance systems	Level 5	6	Draft - Prep for P Comment

SAQA

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 1

Maintain Communications, Navigation and Surveillance (CNS) support equipment

SAQA US ID	*UNIT STANDARD TITLE*
230198	Maintain Communications, Navigation and Surveillance (CNS) support equipment

SGB NAME		*ORGANISING FIELD ID*	*PROVIDER NAME*
SGB Aerospace Operations		10	
UNIT STANDARD TYPE		*ORGANISING FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Physical Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	*20*	Level 6	Regular

SPECIFIC OUTCOME . 1

Perform corrective maintenance to support equipment.

SPECIFIC OUTCOME 2

Perform routine preventive maintenance to support equipment.

SPECIFIC OUTCOME 3

Analyse and measure equipment performance.

SPECIFIC OUTCOME 4

Carry out maintenance support

SAQA

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 2

SAQA US ID	*UNIT STANDARD TITLE*		
230199 ✓	Monitor and operate navigation aid systems		
SGB NAME		*ORGANISING FIELD ID*	*PROVIDER NAME*
SGB Aerospace Operations		10	
UNIT STANDARD TYPE		*ORGANISING FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Physical Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	12	Level 5	Regular

SPECIFIC OUTCOME 1

Operate the Navigation Aid System.

SPECIFIC OUTCOME 2

Monitor system performance.

SPECIFIC OUTCOME 3

Reconfigure and restore Navigation Aid Systems.

SPECIFIC OUTCOME 4

Evaluate the impact of equipment failures.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: **3**

Support and maintain VHF voice communication reception equipment

SAQA US ID	*UNIT STANDARD TITLE*
230200	Support and maintain VHF voice communication reception equipment

SGB NAME		*ORGANISING FIELD ID*	*PROVIDER NAME*
SGB Aerospace Operations		10	
UNIT STANDARD N P E		*ORGANISING FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Physical Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD N P E*
Undefined	10	Level 6	Regular

SPECIFIC OUTCOME 1

Perform corrective maintenance.

SPECIFIC OUTCOME 2

Perform routine preventive maintenance,

SPECIFIC OUTCOME 3

Analyse and measure equipment performance.

SPECIFIC OUTCOME 4

Carry out maintenance support.

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 4

SAQA US ID	*UNIT STANDARD TITLE*
230201	Monitor and operate communication reception systems

SGB NAME		*ORGANISING FIELD ID*	*PROVIDER NAME*
SGB Aerospace Operations		10	
UNIT STANDARD TYPE		*ORGANISING FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Physical Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	9	Level 5	Regular

SPECIFIC OUTCOME 1

Operate the communication reception system.

SPECIFIC OUTCOME 2

Monitor system performance.

SPECIFIC OUTCOME 3

Reanfigure and restore communication reception systems.

SPECIFIC OUTCOME 4

Evaluate the impact of equipment failure.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 5

Support and maintain voice communication control systems (VCCS) equipment

SAQA US ID	*UNIT STANDARD TITLE*
230202	Support and maintain voice communication control systems (VCCS) equipment

SGB NAME	*ORGANISING FIELD ID*	*PROVIDER NAME*
SGB Aerospace Operations	10	
UNIT STANDARD TYPE	***ORGANISING FIELD DESCRIPTION***	***SUBFIELD DESCRIPTION***
(Regular	(Physical, Mathematical, Computer and Life Sciences	Physical Sciences

ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	16	Level 6	Regular

SPECIFIC OUTCOME 1

Perform corrective maintenance.

SPECIFIC OUTCOME 2

Perform routine preventive maintenance.

SPECIFIC OUTCOME 3

Analyse and measure equipment performance.

SPECIFIC OUTCOME 4

Carry out maintenance support.

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: **6**

SAQA US ID	*UNIT STANDARD TITLE*
230203	Demonstrate an understanding of air traffic management operations

SGB NAME	*ORGANISING FIELD ID*	*PROVIDER NAME*
SGB Aerospace Operations	**10**	

UNIT STANDARD TYPE	*ORGANISING FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular	Physical, Mathematical, Computer and Life Sciences	Physical Sciences

ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	4	Level 5	Regular

SPECIFIC OUTCOME 1

Demonstrate an understanding of Air Traffic Control functions.

SPECIFIC OUTCOME **2**

Demonstrate an understanding of Air Traffic Management Operations.

SPECIFIC OUTCOME **3**

Describe the Air Traffic Management Environment.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 7

Monitor and operate communication transmission systems

SAQA US ID	UNIT STANDARD TITLE
230204	Monitor and operate communication transmission systems

SGB NAME	ORGANISING FIELD ID	PROVIDER NAME
SGB Aerospace Operations	10	

UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION
Regular	Physical, Mathematical, Computer land Life Sciences	(Physical Sciences

ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	9	Level 5	Regular

SPECIFIC OUTCOME 1

Operate the communication transmission system.

SPECIFIC OUTCOME 2

Monitor system performance.

SPECIFIC OUTCOME 3

Reconfigure and restore communication transmission systems.

SPECIFIC OUTCOME 4

Evaluate the impact of equipment failure.

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: **8**

SAQA US ID	***UNIT STANDARD TITLE***
230205	Support and maintain VHF voice communication transmission equipment

SGB NAME	***ORGANISING FIELD ID***	***PROVIDER NAME***
SGB Aerospace Operations	**10**	
UNIT STANDARD TYPE	***ORGANISING FIELD DESCRIPTION***	***SUBFIELD DESCRIPTION***
Regular	Physical, Mathematical, Computer and Life Sciences	Physical Sciences

ABET BAND	***CREDITS***	***NQF LEVEL***	***UNIT STANDARD TYPE***
Undefined	10	Level 6	Regular

SPECIFIC OUTCOME 1

Perform corrective maintenance.

SPECIFIC OUTCOME 2

Perform routine preventive maintenance.

SPECIFIC OUTCOME 3

Analyse and measure equipment performance.

SPECIFIC OUTCOME 4

Conduct maintenance support.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: ***9***

Monitor and operate communication control and switching systems

SAQA US ID	*UNIT STANDARD TITLE*
230206	'Monitor and operate communication control and switching systems

SGB NAME	*ORGANISING FIELD ID*	*PROVIDER NAME*
SGB Aerospace Operations	10	
UNIT STANDARD TYPE	***ORGANISING FIELD DESCRIPTION***	***SUBFIELD DESCRIPTION***
Regular	Physical, Mathematical, Computer and Life Sciences	Physical Sciences

ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	6	Level 5	Regular

SPECIFIC OUTCOME 1

Operate the communication control and switching system.

SPECIFIC OUTCOME 2

Monitor system performance.

SPECIFIC OUTCOME 3

Reconfigure and restore communication control and switching systems.

SPECIFIC OUTCOME 4

Evaluate the impact of equipment failure.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: **10**

SAQA US ID	*UNIT STANDARD TITLE*		
230207	Monitor and operate surveillance processing and display systems		
SGB NAME		*ORGANISING FIELD ID*	*PROVIDER NAME*
SGB Aerospace Operations		10	
UNIT STANDARD TYPE		*ORGANISING FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Physical Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	12	Level 5	Regular

SPECIFIC OUTCOME 1

Operate the Surveillance Processing and Display Systems.

SPECIFIC OUTCOME 2

Monitor system performance.

SPECIFIC OUTCOME 3

Re-configure and restore Surveillance Processing and Display Systems.

SPECIFIC OUTCOME 4

Evaluate the impact of equipment failures.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SAQA US ID	UNIT STANDARD TITLE
230208	Demonstrate an understanding of the principles of air traffic management communications systems

SGB NAME	ORGANISING FIELD ID	PROVIDER N
SGB Aerospace Operations	10	

UNIT STANDARD TYPE	ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION
Regular	Physical, Mathematical, Computer and Life Sciences	Physical Sciences

ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	6	Level 5	Regular

SPECIFIC OUTCOME 1

Explain Voice Air-Ground communication systems principles.

SPECIFIC OUTCOME 2

Explain Voice Ground-Ground communications system principles.

SPECIFIC OUTCOME 3

Explain Data Communications Network principles.

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 12

Monitor and operate Instrument Landing Systems (ILS)

SAQA US ID	*UNIT STANDARD TITLE*
230209	Monitor and operate Instrument Landing Systems (ILS)

SGB NAME		*ORGANISING FIELD ID*	*PROVIDER NAME*
SGB Aerospace Operations		10	
UNIT STANDARD TYPE		*ORGANISING FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Physical Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	12	Level 5	Regular

SPECIFIC OUTCOME 1

Operate the Instrument Landing System.

SPECIFIC OUTCOME 2

Monitor system performance.

SPECIFIC OUTCOME 3

Reanfigure and restore Instrument Landing System.

SPECIFIC OUTCOME 4

Evaluate the impact of equipment failures.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: **13**

SAQA US ID	*UNIT STANDARD TITLE*		
23021*0*	Demonstrate an understanding of the principles of air traffic management radio navigation aids		
SGB NAME		*ORGANISING FIELD ID*	*PROWDER NAME*
SGB Aerospace Operations		**10**	
UNIT STANDARD TYPE		*ORGANISING FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Physical Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	***6***	Level 5	Regular

***SPECIFIC OUTCOME* 1**

Explain Very High Frequency Omni-range (VOR) principles.

SPECIFIC OUTCOME 2

Explain Distance Measuring Equipment (DME) principles.

***SPECIFIC OUTCOME* 3**

Explain Very High Frequency Direction Finding Equipment (VDF) principles.

SPECIFIC OUTCOME 4

Explain Instrument Landing Systems **(ILS)** principles.

SPECIFIC OUTCOME 5

Explain Global Positioning Systems (GPS) principles.

SAQA

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: **14**

SAQA US ID	*UNIT STANDARD TITLE*		
230211	Monitor and operate surveillance sensor systems		
SGB NAME		*ORGANISING FIELD ID*	*PROVIDER NAME*
SGB Aerospace Operations		10	
UNIT STANDARD TYPE		*ORGANISING FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Physical Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	12	Level 5	Regular

SPECIFIC OUTCOME **1**

Operate the Surveillance System.

SPECIFIC OUTCOME **2**

Monitor system performance.

SPECIFIC OUTCOME ***3***

Reconfigure and restore Surveillance Systems.

SPECIFIC OUTCOME **4**

Evaluate the impact of equipment failures.

SAQA

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 15

Support and maintain data communication equipment

SAQA US ID	UNIT STANDARD TITLE		
230212	Support and maintain data communication equipment		
SGB NAME		ORGANISING FIELD ID	PROVIDER NAME
SGB Aerospace Operations		10	
UNIT STANDARD TYPE		ORGANISING FIELD DESCRIPTION	SUBFIELD DESCRIPTION
Regular		Physical, Mathematical, Computer and Life Sciences	Physical Sciences
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	12	Level 6	Regular

SPECIFIC OUTCOME 1

Perform corrective maintenance on data communication equipment.

SPECIFIC OUTCOME 2

Perform routine preventive maintenance on data communication equipment.

SPECIFIC OUTCOME 3

Analyse and measure data communication equipment performance.

SPECIFIC OUTCOME 4

Carry out maintenance support for data communication equipment.

SAQA

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 16

Demonstrate an understanding of the principles of air traffic management radar surveillance systems

SAQA US ID	*UNIT STANDARD TITLE*		
230213	Demonstrate an understanding of the p c e of air traffic ε radar ν ν systems		
SGB NAME		*ORGANISING FIELD ID*	*PROVIDER NAME*
SGB Aerospace Operations		10	
UNIT STANDARD TYPE		*ORGANISING FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Physical Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	6	Level 5	Regular

SPECIFIC OUTCOME 1

Explain Primary Radar Concepts.

SPECIFIC OUTCOME 2

Explain Secondary Radar Concepts.

SPECIFIC OUTCOME 3

Explain Surface Movement Control Radar.

SPECIFIC OUTCOME 4

Explain Automatic Dependent Surveillance.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: **17**

Support and maintain networking equipment

SAQA US ID	*UNIT STANDARD TITLE*
230214	Support and maintain networking equipment

SGB NAME		*ORGANISING FIELD ID*	*PROVIDER NAME*
SGB Aerospace Operations		10	
UNIT STANDARD TYPE		*ORGANISING FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Physical Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	12	Level 6	Regular

SPECIFIC OUTCOME 1

Perform corrective maintenance on networking equipment.

SPECIFIC OUTCOME 2

Perform routine preventive maintenance on networking equipment.

SPECIFIC OUTCOME 3

Analyse and measure network equipment performance.

SPECIFIC OUTCOME 4

Carry out maintenance support for networking equipment.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: **18**

Provide support on Communication, Navigation and Surveillance (CNS) equipment installation projects

SAQA US ID	***UNIT STANDARD TITLE***		
230215	Provide support on Communication, Navigation and Surveillance (CNS) equipment installation projects		
SGB NAME		***ORGANISING FIELD ID***	***PROVIDER NAME***
SGB Aerospace Operations		10	
UNIT STANDARD TYPE		***ORGANISING FIELD DESCRIPTION***	***SUBFIELD DESCRIPTION***
Regular		Physical, Mathematical, Computer and Life Sciences	Physical Sciences
ABET BAND	***CREDITS***	***NQF LEVEL***	***UNIT STANDARD TYPE***
Undefined	11	Level 5	Regular

SPECIFIC OUTCOME 1

Understand Communication, Navigation and Surveillance installation project management.

SPECIFIC OUTCOME 2

Understand In-Factory and On-Site acceptance tests on new installations.

SPECIFIC OUTCOME 3

Assisting with installation of Communication, Navigation and Surveillance equipment.

SPECIFIC OUTCOME 4

Understand the principles of analysing and measuring Communication, Navigation and Surveillance equipment performance during the warrantee period.

SPECIFIC OUTCOME 5

Understanding the principles of analysing and monitoring the Logistic support program.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 19

Support and maintain Very High Frequency Omni Range (VOR) radio navigation equipment

SAQA US ID	*UNITSTANDARD TITLE*		
230216	Support and maintain Very High Frequency Omni Range (VOR) radio navigation equipment		
[illegible]			
SGB Aerospace Operations		10	
UNIT STANDARD TYPE		*ORGANISING FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Physical Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	*20*	Level 6	Regular

SPECIFIC OUTCOME 1

Perform corrective maintenance.

SPECIFIC OUTCOME 2

Perform routine preventive maintenance.

SPECIFIC OUTCOME 3

Analyse and measure equipment performance.

SPECIFIC OUTCOME 4

Assist in the certification of VOR systems.

SPECIFIC OUTCOME 5

Carry out maintenance support.