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SAQA
SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 Mathematical, Computer and Life Sciences, publishes the following Qualification and Unit Standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the Qualification and Unit Standards. The full 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, SAQA House, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the Qualification and Unit Standards should reach SAQA at the address below and *no later than 9 February 2009* All correspondence should be marked **Standards Setting – SGB for Aerospace Operations** and addressed to

The Director: Standards Setting and Development SAQA *Attention: Mr. E. Brown* Postnet Suite 248 Private Bag X06 Waterkloof 0145 or faxed to 012 – 431-5144 e-mail: ebrown@saqa.org.za

D. MPHUTHING
ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SAQA

QUALIFICATION:

National Diploma: Aeronautical Surveillance Systems: Engineering Support

SAQA QUAL ID	QUALIFICATION TITLE		
64349	National Diploma: Aeronautical Surveillance Systems: Engineering Support		
ORIGINATOR		PROVIDER	
SGB Aerospace Operations			
QUALIFICATION TYPE	FIELD	SUBFIELD	
National Diploma	10 - Physical, Mathematical, Computer and Life Sciences	Physical Sciences	
ABET BAND	MINIMUM CREDITS	NQF LEVEL	QUAL CLASS
Undefined	250	Level 6	Regular-Unit Stds Based

This qualification does not replace any other qualification and is not replaced by another qualification.

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:

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 Engineering 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:

> Demonstrate a technical understanding of Aeronautical Radar Systems.
> Demonstrate a technical understanding of Aeronautical Display Systems.
> Provide engineering support and maintenance of Surveillance Radar Systems used in aviation.
> Provide engineering support and maintenance of Surveillance Display Systems.

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

Rationale:

There is an urgent need to provide recognition to people who are able to conduct the essential operations associated with safe and efficient aviation surveillance systems.

The focus of this Qualification will be mainly on technical personnel who have been working within the Aviation Industry in Air Traffic Management (ATM) or for persons with relevant aviation skills, knowledge and experience who wish to pursue a career in ATM engineering support.

In the past many practitioners in the Air Traffic Management technical support area were denied career advancement and possible professional registration. The introduction of a unit standard based National Diploma in Aeronautical Surveillance Systems, 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 their related aviation fields.

This Qualification will facilitate the development of a professional community of Air Traffic Management. Technical Personnel will be 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 engineering support of Aeronautical Surveillance Systems used within the Air Traffic Management environment.

The combination of learning outcomes will provide the qualifying learner with applied competence in the provision of engineering support for Radar and Display Systems used in the Aviation Environment.

This qualification lays down the basis for further learning towards a proposed 1st Degree at NQF Level 7 in ATM Systems Engineering.

RECOGNIZE PREVIOUS LEARNING?
Y

LEARNING ASSUMED IN PLACE
It would be desirable for learners wishing to access this qualification to be competent in the following:

> ID 57229: The National Certificate in Communication, Navigation and Surveillance Support, NQF Level 5.

Recognition of Prior 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.

Access to the Qualification:

None.

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: 65 credits.
> All Core Unit Standards: 165 credits.
> Elective Unit Standards: Minimum 20 credits.

Total Credits: Minimum 250 credits.

EXIT LEVEL OUTCOMES

1. Demonstrate a technical understanding of Aeronautical Radar Systems.

2. Demonstrate a technical understanding of Aeronautical Display Systems.

3. Provide engineering support and maintenance of Aeronautical Surveillance Radar Systems.

4.Provide engineering support and maintenance of Aeronautical Surveillance Display Systems.
> Range of Surveillance Display Systems includes, but are not limited to:
 > Radar tracking data processing, flight and surface data processing, Recording and Playback data processing, Human Machine Interface data processing, Digital Airfield Information Display Systems data processing and Support Suite Surveillance data processing systems [air and ground systems].

ASSOCIATED ASSESSMENT CRITERIA
Associated Assessment Criteria for Exit Level Outcome 1:

1.1 Radar engineering detection and transmission theories are explained in terms of principles, characteristics and functional application.
Range of radar engineering detection and transmission theories includes, but is not limited to:
> Radar Range Prediction theory, Radar Cross Section theory, Radar Ground Echo theory, Radar Receiver theory, Radar Transmitter theory and Radar Antenna theory.

1.2 Radar engineering processing theories are discussed in terms of principles, characteristics and functional application.
Range: Radar engineering processing theories includes, but are not limited to:
> Radar Automatic Detection, Tracking and Sensor Integration theory, Radar Pulse Compression theory, Radar Sea Clutter theory, CW and FM Radar theory, MTI Radar theory and Pulse Doppler Radar theory.

1.3 Radio engineering theories are described and explained in terms of principles, characteristics and functional application.
Range: Radio engineering theories includes, but is not limited to:
> Electromagnetic Wave theory, Transmission Line theory, Reception and Transmission theory and Digital Signal Processing theory.

Associated Assessment Criteria for Exit Level Outcome 2:

2.1 Data communication theory is examined and explained in terms of the principles, characteristics and functional application.
Range: Principles includes, but is not limited to:
> Data Transmission and Protocol Principles, Digital Communication Principles, Understanding Network Principles, Broadband, Wireless and Internet.

2.2 Surveillance Display Systems theory is discussed in terms of principles, characteristics and functional application.
Range: Surveillance Display Systems includes, but is not limited to:
> Air & Ground Surveillance Local Display System (Air-Traffic Control Centre [ATCC], Air Surveillance Remote Display System [Terminal Control Units], Air & Ground Surveillance Test and Evaluation Display System [Support Suite System] and Air & Ground Surveillance Fallback Display System.

Associated Assessment Criteria for Exit Level Outcome 3:

3.1 Corrective and preventative maintenance is performed on PSR and SSR transmitter and receiver systems according to manufacturer's specifications and organisational procedures.

3.2 Corrective and preventative maintenance is performed on PSR and SSR signal and data processors according to manufacturer's specifications and organisational procedures.
3.3 Corrective and preventative maintenance is performed on PSR and SSR antennae systems according to manufacturer's specifications and organisational procedures.
3.4 Performance of Surveillance Radar Systems are measured and analysed in accordance with technical manual procedures and specifications and technical reports are compiled according to organisational procedures.

Associated Assessment Criteria for Exit Level Outcome 4:

4.1 Corrective and preventive maintenance for Display Surveillance equipment is performed according to organisational standing instructions, equipment manufacturer's instructions and quality management system procedures.
4.2 Performance of Display Surveillance equipment is analysed and measured in accordance with technical manual procedures and specifications and technical reports are compiled according to organisational procedures.
4.3 Maintenance support is conducted for Display Surveillance equipment in accordance with organisational support service procedures.

Integrated Assessment:

Integrated assessment at the level of the qualification provides an opportunity for 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 6 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 general foundation to prepare them for further learning towards a specialised role in their chosen career path. 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 institutions responsible for the education and training of engineering personnel in the aviation industry of many countries contacted were unwilling to share information that would assist in making a comparison with this National Diploma in Surveillance Systems: Engineering Support.

Countries and institutions that were included in the search for similar qualifications are:

> United States (Federal Aviation Association).
> Canada (NAV Canada).
> Tanzania Civil Aviation Authority.
> Airports Authority of India.
> Air Services Australia.
> Airways New Zealand.
> Brazilian Airports.
> Egypt Ministry of Civil Aviation.
> Singapore Aviation Academy.
> Eurocontrol (European Union).
> International Federation of Air Traffic Safety Electronic Personnel.

Useful and usable information was obtained from "Eurocontrol" and "International Federation of Air Traffic Safety Electronic Personnel" (IFATSEA). The guidance material for technical training as obtained from these two institutions is described below.

Eurocontrol:

Eurocontrol is the European Organisation for the Safety of Air Navigation. Created in 1963 by six founding members, this civil and military intergovernmental organisation now counts 38 Member States from across Europe. It is based in Belgium with specialised offices in six other European countries. The member countries include: Austria, Belarus, Belgium, Denmark, France, Germany, Italy, Latvia, Lithuania, Malta, Netherlands, Norway, Poland, Russian Federation, Slovakia, Spain, Sweden, Switzerland, Ukraine, United Kingdom, Bosnia and Herzegovina, Serbia and Montenegro, Cyprus, Estonia and Romania.

It is widely accepted that this career pathway of Engineering Support in the aviation industry comprises four learning areas, namely: Communication Systems, Navigation Systems, Display Systems and Radar Systems.

The European Organization for Safety in Air Navigation under its sub-division "European Air Traffic Management" has developed guidelines for a common qualification level for Technical Training for Air traffic Safety Electronics Personnel.

These guidelines refer to the following progression table for training of technical personnel:

> Basic Training.
> Qualification Training.
> Type Rating.
> Continuation Training or Refresher Training.
> Development Training.

The "basic training" level compares closely in terms of the learning areas with the registered National Certificate in Communication, Navigation and Surveillance Support, NQF Level 5 (SAQA ID: 57229).

The "qualification training" and "type rating" training compares closely with the two National Diplomas in Communication & Navigation Systems and Surveillance Systems. The difference is that the "Type Rating" training focuses on only one of the four disciplines while each of the South African diplomas provides for two disciplines namely Communication and Navigation Systems in the one diploma and Surveillance (Radar and Display) Systems in the other diploma.

Furthermore, "Data Processing" is treated as a separate discipline in the Eurocontrol approach, while the South African approach is that it is a common thread that features in both the diplomas because data processing is viewed as being embedded in all aviation equipment.

The credit value for the European training of aviation technicians was not available for a direct comparison with the South African qualifications comprising this career pathway. The duration of the contact component of the European training compares closely with the South African diplomas.

The following reflects the comparison described above:

South African National Diploma's; European Air Traffic Management/IFATSEA:

> Advanced Diploma in ATM Engineering (Proposed) Level 7; Continuation training and Development training.
> National Diploma in Surveillance, Level 6, 250 credits; Type Rate Training in only one discipline i.e. Surveillance or Data Processing(credits unknown), Qualification Training in Surveillance and Data Processing, 124 credits.
> National Certificate in CNS support, Level 5, 161 credits [SAQA ID: 57229]; Common Basic Level Training (approximately 150 to 170 credits).

International Federation of Air Traffic Safety Electronic Personnel (IFATSEA):

IFATSEA was founded in October 1972 by 11 countries; today member countries exceed 50 including: Canada, Greece, United Kingdom, Japan, Nigeria, Portugal, Belgium, Australia, Switzerland and Germany.

This institution has developed a Training Manual for Air Traffic Safety Electronic Personnel under supervision of the International Civil Aviation Organisation. This Training Manual follows very much the same profile as the Eurocontrol training progression model. The comparison is therefore similar to the comparison reflected in the table indicated above.

Zambia:

In 1999 a study of the National Airports Corporation Limited, Zambia, revealed that their Air Traffic Management Engineering Technicians are sent to the United Kingdom, Italy, United States of America and to South Africa for their ATM Engineering Technician training after having obtained an Electronic National Diploma Qualification in Zambia. Zambia does not present any qualification structure in place to give formal recognition to the ATM training received in these countries.

Conclusion:

This comparison reveals that there is a close similarity of the learning areas and duration of study between the eighty eight member states of Eurocontrol and IFATSEA programmes for training aviation technicians and this National Diploma in Surveillance. Students from other African States, following training courses in South Africa, will now be able to work toward being awarded this internationally benchmarked National Diploma qualification in Surveillance Systems.

ARTICULATION OPTIONS
The possibility exists for vertical articulation with this Qualification. The following qualifications serve as examples of vertical articulation (subject to institutional admission rules):

> Bachelor of Engineering: Electronic Engineering at NQF Level 7.
> Bachelor of Science: Engineering at NQF Level 7.

Examples of horizontal articulation with this Qualification:

> Bachelor of Engineering Sciences: Electronic at NQF Level 6.

> ID 64089: National Diploma: Communication and Navigation: Engineering Support at NQF
Level 6.

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
The following criteria are specified for assessors of this qualification:

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

NOTES
N/A

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	259508	Demonstrate a technical understanding of Data Communication Theory	Level 6	15
Fundamental	260059	Demonstrate a technical understanding of Radar Engineering Detection and Transmission Theory	Level 6	10
Fundamental	260065	Demonstrate a technical understanding of Radar Engineering Processing Theory	Level 6	10
Fundamental	259501	Demonstrate a technical understanding of Radio Engineering Theory	Level 6	10
Fundamental	260062	Demonstrate a technical understanding of Surveillance Display Systems theory	Level 6	20
Core	15096	Demonstrate an understanding of stress in order to apply strategies to achieve optimal stress levels in personal and work situations	Level 5	5
Core	252038	Prepare and manage a budget	Level 5	5
Core	260061	Apply technical knowledge of Digital Airfield Information Display Systems data processing	Level 6	10
Core	260067	Apply technical knowledge of Primary Surveillance Radar (PSR) and Secondary Surveillance Radar (SSR) antenna systems	Level 6	15
Core	260068	Apply technical knowledge of Primary Surveillance Radar (PSR) signal and data processors	Level 6	15
Core	260058	Apply technical knowledge of Primary Surveillance Radar (PSR) transmitters and receivers equipment	Level 6	15
Core	259502	Apply technical knowledge of Recording and Playback Systems used in ground-based aviation environment	Level 6	10
Core	260069	Apply technical knowledge of Secondary Surveillance Radar (SSR) signal and data processors	Level 6	15
Core	260071	Apply technical knowledge of Secondary Surveillance Radar (SSR) transmitter and receiver equipment	Level 6	15
Core	260063	Apply technical knowledge of Support Suite Surveillance data processing systems (Air and Ground Systems)	Level 6	15

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Core	260072	Apply technical knowledge of Surveillance Display Systems Information Human Machine Interface data processing	Level 6	10
Core	260066	Apply technical knowledge of Surveillance Display Systems flight and surface data processing	Level 6	15
Core	260073	Apply technical knowledge of Surveillance Display Systems radar tracking data processing	Level 6	20
Elective	260060	Apply technical knowledge of Air-traffic Flow Management data processing	Level 6	10
Elective	260070	Apply technical knowledge of Display Systems Communication Interface data processing	Level 6	10
Elective	260057	Demonstrate and apply technical knowledge of Air-Ground data processing	Level 6	10

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION
None

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SAQA

UNIT STANDARD:

Demonstrate and apply technical knowledge of Air-Ground data processing

SAQA US ID	UNIT STANDARD TITLE		
260057	Demonstrate and apply technical knowledge of Air-Ground data processing		
ORIGINATOR		PROVIDER	
SGB Aerospace Operations			
FIELD		SUBFIELD	
10 - Physical, Mathematical, Computer and Life Sciences		Physical Sciences	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 6	10

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate technical knowledge of Air-Ground data processing systems.

SPECIFIC OUTCOME 2
Perform routine preventive maintenance.

SPECIFIC OUTCOME 3
Perform corrective maintenance.

SPECIFIC OUTCOME 4
Analyse and monitor Air-Ground Data Processing performance.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64349	National Diploma: Aeronautical Surveillance Systems: Engineering Support	Level 6

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SAQA

UNIT STANDARD:

Apply technical knowledge of Primary Surveillance Radar (PSR) transmitters and receivers equipment

SAQA US ID	UNIT STANDARD TITLE			
260058	Apply technical knowledge of Primary Surveillance Radar (PSR) transmitters and receivers equipment			
ORIGINATOR		PROVIDER		
SGB Aerospace Operations				
FIELD		SUBFIELD		
10 - Physical, Mathematical, Computer and Life Sciences		Physical Sciences		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL		CREDITS
Undefined	Regular	Level 6		15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate technical knowledge of PSR transmitter equipment.

SPECIFIC OUTCOME 2
Demonstrate technical knowledge of PSR receiver equipment.

SPECIFIC OUTCOME 3
Perform routine preventive maintenance on PSR transmitter and receiver equipment.

SPECIFIC OUTCOME 4
Perform corrective maintenance on PSR transmitter and receiver equipment.

SPECIFIC OUTCOME 5
Analyse and measure PSR transmitter and receiver performance.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64349	National Diploma: Aeronautical Surveillance Systems: Engineering Support	Level 6

SAQA

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Demonstrate a technical understanding of Radar Engineering Detection and Transmission Theory

SAQA US ID	UNIT STANDARD TITLE		
260059	Demonstrate a technical understanding of Radar Engineering Detection and Transmission Theory		
ORIGINATOR		PROVIDER	
SGB Aerospace Operations			
FIELD		SUBFIELD	
10 - Physical, Mathematical, Computer and Life Sciences		Physical Sciences	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 6	10

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Understand Radar Range Prediction theory.

SPECIFIC OUTCOME 2
Understand Radar Cross Section (RCS) theory.

SPECIFIC OUTCOME 3
Understand Radar Ground Echo theory.

SPECIFIC OUTCOME 4
Understand Radar Receiver theory.

SPECIFIC OUTCOME 5
Understand Radar Transmitter theory.

SPECIFIC OUTCOME 6
Understand Radar Antenna theory.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Fundamental	64349	National Diploma: Aeronautical Surveillance Systems: Engineering Support	Level 6

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SAQA

UNIT STANDARD:

Apply technical knowledge of Air-traffic Flow Management data processing

SAQA US ID	UNIT STANDARD TITLE		
260060	Apply technical knowledge of Air-traffic Flow Management data processing		
ORIGINATOR		*PROVIDER*	
SGB Aerospace Operations			
FIELD		*SUBFIELD*	
10 - Physical, Mathematical, Computer and Life Sciences		Physical Sciences	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 6	10

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate technical knowledge of Air-Traffic Flow Management data processing.

SPECIFIC OUTCOME 2
Perform routine preventive maintenance.

SPECIFIC OUTCOME 3
Perform corrective maintenance.

SPECIFIC OUTCOME 4
Analyse and monitor Air-Traffic Flow Management data processing performance.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64349	National Diploma: Aeronautical Surveillance Systems: Engineering Support	Level 6

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Apply technical knowledge of Digital Airfield Information Display Systems data processing

SAQA US ID	UNIT STANDARD TITLE		
260061	Apply technical knowledge of Digital Airfield Information Display Systems data processing		
ORIGINATOR		PROVIDER	
SGB Aerospace Operations			
FIELD		SUBFIELD	
10 - Physical, Mathematical, Computer and Life Sciences		Physical Sciences	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 6	10

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate technical knowledge of Airfield Information Display Systems.

SPECIFIC OUTCOME 2
Perform routine preventive maintenance.

SPECIFIC OUTCOME 3
Perform corrective maintenance.

SPECIFIC OUTCOME 4
Analyse and monitor Airfield Information Display Systems processing performance.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64349	National Diploma: Aeronautical Surveillance Systems: Engineering Support	Level 6

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SAQA

UNIT STANDARD:

Demonstrate a technical understanding of Surveillance Display Systems theory

SAQA US ID	UNIT STANDARD TITLE		
260062	Demonstrate a technical understanding of Surveillance Display Systems theory		
ORIGINATOR		PROVIDER	
SGB Aerospace Operations			
FIELD		SUBFIELD	
10 - Physical, Mathematical, Computer and Life Sciences		Physical Sciences	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 6	20

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Understand Air and Ground Surveillance Main Control Centre Display Systems.

SPECIFIC OUTCOME 2
Understand Air Surveillance Remote Terminal Control Display Systems.

SPECIFIC OUTCOME 3
Understand Air and Ground Surveillance Test and Evaluation Display Systems.

SPECIFIC OUTCOME 4
Demonstrate an understanding of Air and Ground Surveillance Fallback Display Systems.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Fundamental	64349	National Diploma: Aeronautical Surveillance Systems: Engineering Support	Level 6

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SAQA

UNIT STANDARD:

Apply technical knowledge of Support Suite Surveillance data processing systems (Air and Ground Systems)

SAQA US ID	UNIT STANDARD TITLE		
260063	Apply technical knowledge of Support Suite Surveillance data processing systems (Air and Ground Systems)		
ORIGINATOR		PROVIDER	
SGB Aerospace Operations			
FIELD		SUBFIELD	
10 - Physical, Mathematical, Computer and Life Sciences		Physical Sciences	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 6	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate technical knowledge of System Support Suite Surveillance data processing.

SPECIFIC OUTCOME 2
Perform routine preventive maintenance.

SPECIFIC OUTCOME 3
Perform corrective maintenance.

SPECIFIC OUTCOME 4
Analyse and monitor System Support Suite Surveillance Data Processing performance.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64349	National Diploma: Aeronautical Surveillance Systems: Engineering Support	Level 6

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SAQA

UNIT STANDARD:

Demonstrate a technical understanding of Radar Engineering Processing Theory

SAQA US ID	UNIT STANDARD TITLE		
260065	Demonstrate a technical understanding of Radar Engineering Processing Theory		
ORIGINATOR		PROVIDER	
SGB Aerospace Operations			
FIELD		SUBFIELD	
10 - Physical, Mathematical, Computer and Life Sciences		Physical Sciences	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 6	10

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Understand Radar Automatic Detection, Tracking and Sensor Integration theory.

SPECIFIC OUTCOME 2
Understand Radar Pulse Compression theory.

SPECIFIC OUTCOME 3
Understand Radar Sea Clutter theory.

SPECIFIC OUTCOME 4
Understand Coded Waveform (CW) and Frequency Modulation (FM) Radar theory.

SPECIFIC OUTCOME 5
Understand Moving Target Indication (MTI) Radar theory.

SPECIFIC OUTCOME 6
Understand Pulse Doppler radar theory.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Fundamental	64349	National Diploma: Aeronautical Surveillance Systems: Engineering Support	Level 6

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SAQA

UNIT STANDARD:

Apply technical knowledge of Surveillance Display Systems flight and surface data processing

SAQA US ID	UNIT STANDARD TITLE		
260066	Apply technical knowledge of Surveillance Display Systems flight and surface data processing		
ORIGINATOR		PROVIDER	
SGB Aerospace Operations			
FIELD		SUBFIELD	
10 - Physical, Mathematical, Computer and Life Sciences		Physical Sciences	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 6	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate technical knowledge of flight data processing.

SPECIFIC OUTCOME 2
Perform routine preventive maintenance.

SPECIFIC OUTCOME 3
Perform corrective maintenance.

SPECIFIC OUTCOME 4
Analyse and monitor Flight Data Processing performance.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64349	National Diploma: Aeronautical Surveillance Systems: Engineering Support	Level 6

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SAQA

UNIT STANDARD:

Apply technical knowledge of Primary Surveillance Radar (PSR) and Secondary Surveillance Radar (SSR) antenna systems

SAQA US ID	UNIT STANDARD TITLE		
260067	Apply technical knowledge of Primary Surveillance Radar (PSR) and Secondary Surveillance Radar (SSR) antenna systems		
ORIGINATOR		PROVIDER	
SGB Aerospace Operations			
FIELD		SUBFIELD	
10 - Physical, Mathematical, Computer and Life Sciences		Physical Sciences	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 6	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge of primary surveillance radar (PSR) Antenna systems.

SPECIFIC OUTCOME 2
Demonstrate knowledge of secondary surveillance radar (SSR) Antenna systems.

SPECIFIC OUTCOME 3
Perform routine preventive and corrective maintenance on primary surveillance radar (PSR) Antenna systems.

SPECIFIC OUTCOME 4
Perform routine preventive and corrective maintenance on secondary surveillance radar (SSR) Antenna systems.

SPECIFIC OUTCOME 5
Analyse and measure PSR and SSR antenna systems' performance.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64349	National Diploma: Aeronautical Surveillance Systems: Engineering Support	Level 6

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SAQA

UNIT STANDARD:

Apply technical knowledge of Primary Surveillance Radar (PSR) signal and data processors

SAQA US ID	*UNIT STANDARD TITLE*		
260068	Apply technical knowledge of Primary Surveillance Radar (PSR) signal and data processors		
ORIGINATOR		*PROVIDER*	
SGB Aerospace Operations			
FIELD		*SUBFIELD*	
10 - Physical, Mathematical, Computer and Life Sciences		Physical Sciences	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 6	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate technical knowledge of PSR signal and data processors.

SPECIFIC OUTCOME 2
Perform routine preventive maintenance on PSR signal and data processors.

SPECIFIC OUTCOME 3
Perform corrective maintenance on PSR signal and data processors.

SPECIFIC OUTCOME 4
Analyse and measure PSR signal and data processor performance.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64349	National Diploma: Aeronautical Surveillance Systems: Engineering Support	Level 6

SAQA

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Apply technical knowledge of Secondary Surveillance Radar (SSR) signal and data processors

SAQA US ID	*UNIT STANDARD TITLE*		
260069	Apply technical knowledge of Secondary Surveillance Radar (SSR) signal and data processors		
ORIGINATOR		*PROVIDER*	
SGB Aerospace Operations			
FIELD		*SUBFIELD*	
10 - Physical, Mathematical, Computer and Life Sciences		Physical Sciences	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 6	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate technical knowledge of SSR signal and data processors.

SPECIFIC OUTCOME 2
Perform routine preventive maintenance on SSR signal and data processors.

SPECIFIC OUTCOME 3
Perform corrective maintenance on SSR signal and data processors.

SPECIFIC OUTCOME 4
Analyse and measure SSR signal and data processor performance.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64349	National Diploma: Aeronautical Surveillance Systems: Engineering Support	Level 6

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SAQA

UNIT STANDARD:

Apply technical knowledge of Display Systems Communication Interface data processing

SAQA US ID	*UNIT STANDARD TITLE*		
260070	Apply technical knowledge of Display Systems Communication Interface data processing		
ORIGINATOR		*PROVIDER*	
SGB Aerospace Operations			
FIELD		*SUBFIELD*	
10 - Physical, Mathematical, Computer and Life Sciences		Physical Sciences	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 6	10

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge of Display Systems Communication Interface data processing.

SPECIFIC OUTCOME 2
Perform routine preventive maintenance.

SPECIFIC OUTCOME 3
Perform corrective maintenance.

SPECIFIC OUTCOME 4
Analyse and monitor Display Systems Communication Interface Data Processing performance.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64349	National Diploma: Aeronautical Surveillance Systems: Engineering Support	Level 6

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SAQA

UNIT STANDARD:

Apply technical knowledge of Secondary Surveillance Radar (SSR) transmitter and receiver equipment

SAQA US ID	UNIT STANDARD TITLE		
260071	Apply technical knowledge of Secondary Surveillance Radar (SSR) transmitter and receiver equipment		
ORIGINATOR		PROVIDER	
SGB Aerospace Operations			
FIELD		SUBFIELD	
10 - Physical, Mathematical, Computer and Life Sciences		Physical Sciences	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 6	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate technical knowledge of SSR transmitter equipment.

SPECIFIC OUTCOME 2
Demonstrate technical knowledge of SSR receiver equipment.

SPECIFIC OUTCOME 3
Perform routine preventive maintenance on SSR transmitter and receiver equipment.

SPECIFIC OUTCOME 4
Perform corrective maintenance on SSR transmitter and receiver equipment.

SPECIFIC OUTCOME 5
Analyse and measure SSR transmitter and receiver performance.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64349	National Diploma: Aeronautical Surveillance Systems: Engineering Support	Level 6

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SAQA

UNIT STANDARD:

Apply technical knowledge of Surveillance Display Systems Information Human Machine Interface data processing

SAQA US ID	UNIT STANDARD TITLE		
260072	Apply technical knowledge of Surveillance Display Systems Information Human Machine Interface data processing		
ORIGINATOR		*PROVIDER*	
SGB Aerospace Operations			
FIELD		*SUBFIELD*	
10 - Physical, Mathematical, Computer and Life Sciences		Physical Sciences	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 6	10

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate technical knowledge of Surveillance Information Human Machine Interface.

SPECIFIC OUTCOME 2
Perform routine preventive maintenance.

SPECIFIC OUTCOME 3
Perform corrective maintenance.

SPECIFIC OUTCOME 4
Analyse and monitor Surveillance Information Human Machine Interface performance.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64349	National Diploma: Aeronautical Surveillance Systems: Engineering Support	Level 6

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

SAQA

UNIT STANDARD:

Apply technical knowledge of Surveillance Display Systems radar tracking data processing

SAQA US ID	UNIT STANDARD TITLE			
260073	Apply technical knowledge of Surveillance Display Systems radar tracking data processing			
ORIGINATOR		PROVIDER		
SGB Aerospace Operations				
FIELD		SUBFIELD		
10 - Physical, Mathematical, Computer and Life Sciences		Physical Sciences		
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL		CREDITS
Undefined	Regular	Level 6		20

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge of radar tracking data processing.

SPECIFIC OUTCOME 2
Perform routine preventive maintenance.

SPECIFIC OUTCOME 3
Perform corrective maintenance.

SPECIFIC OUTCOME 4
Analyse and monitor Radar Data Processing performance.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64349	National Diploma: Aeronautical Surveillance Systems: Engineering Support	Level 6