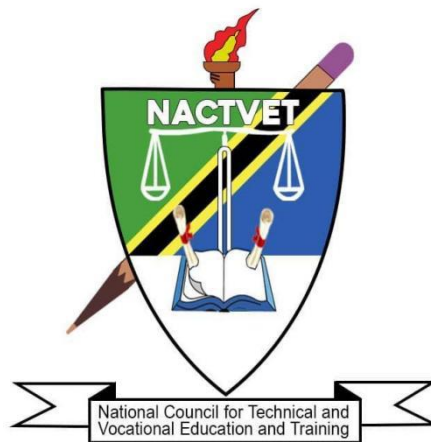


**THE NATIONAL COUNCIL FOR TECHNICAL AND VOCATIONAL EDUCATION AND
TRAINING**



OCCUPATIONAL STANDARDS

OCCUPATION: DRONE PILOT TECHNICIAN

LEVEL: NTA LEVEL 5

FEBRUARY 2024

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ABBREVIATIONS

API	Application Programming Interface
CBET	Competency Based Education and Training
DC	Direct Current
ESC	Electrical Speed Controller
FPV	First Person View
GPS	Global Positioning System
IMU	Inertial Measurement Unit
KV	Kilovolt
Li-po	Li-polymer Battery
MOPP	Maintenance Operation Processes and Procedures
NACTVET	National Council for Technical and Vocational Education and Training
Ni-Cd	Ni-Cd battery
Ni-Mh	Ni-Mh battery
NOS	National Occupational Standards
OS	Occupational Standards
PID	Proportional, Integral and Derivative Control
RC	Radio Control

RTK	Real-time Kinematic
TET	Technical Education and Training
TVET	Technical and Vocational Education and Training
UAV	Unmanned Aerial Vehicle

GLOSSARY OF TERMS

Circumstantial Knowledge:	Detailed knowledge, which allows the decision-making in regard to different circumstances and cross cutting issues.
Competence:	The ability to use knowledge, understanding, practical, and thinking skills to perform effectively to the workplace standards required in employment.
Competency:	A description of the ability one possesses when able to perform a given occupational task effectively and efficiently.
Competency-based Education:	An instructional programme that derives its content from validated tasks and bases assessment on the learner's performance.
Curriculum:	A description or composite of statements about "what is to be learned" by the trainee/student in a particular instructional programme; a product that states the "intended learning outcomes".
Educational/Training Programme:	The complete curriculum and instruction (what and how) that is designed to prepare a person for employment in a job or other particular performance situation.
Occupation:	A specific position requiring the performance of specific tasks – essentially the same tasks are performed by all employees having the same title. (Example: baker)
Occupational Area:	This is a broad grouping of related jobs. (Example: food service)
Occupational Competence:	The application of knowledge and skills that consistently meet the standards required by the work context.
Occupational Standards:	Specific requirements of competences people are expected to demonstrate in a particular occupational area, including knowledge and relevant attitudes. They also act as a performance tool of assessment of the prescribed outcomes.
Occupational/Job analysis:	A process used to identify the tasks that are important to employees in any given occupation.
Performance	Indicate expected end results or outcomes in the form of evaluative

Criteria:	statements.
Skills:	The ability to perform occupational tasks with a high degree of proficiency within a given occupation. Skill is conceived of as a composite of three completely interdependent components: cognitive, affective, and psychomotor.
Standards:	A set of statements, which if proved true under working conditions, means that an individual is meeting an expected level and type of performance.
Task Analysis:	The process of analysing each task to determine the steps, circumstantial knowledge, attitudes, performance standards, tools and materials needed, as well as safety concerns required for the employees performing it.
Task:	A work activity that has a definite beginning and ending, is observable or measurable, and consists of two or more definite steps that leads to a product, service, or decision.
Underpinning Knowledge:	Crucial knowledge that an individual must acquire in order to demonstrate competences that are associated in performing a given task.
Verification Process:	The process of having experts review and confirm the importance of the task (competency) statements identified through occupational analysis. Other questions, such as the degree of task learning difficulty are also frequently asked. This process is also sometimes referred to as validation.

1.0 INTRODUCTION

Technical Education and Training (TET) is one of the most important education sub-sectors in Tanzania, responsible for developing a skilled workforce to support the country's industrialization economic agenda. Tanzania's *Development Vision 2025* intends to raise the country's economy to a middle-income status, with a high level of human development. This requires a skilled workforce that is aligned with the needs of the public and private sectors of the economy. The National Council for Technical and Vocational Education and Training (NACTVET) has begun the job of drafting Occupational Standards (OS) that will eventually be adopted as National Occupational Standards (NOS) for use in the delivery of TET that meets the needs of the labour market and the country's economic agenda.

Occupational Standards (OS) are performance criteria that are matched with labour market demands. Each of them describes the functions, performance standards, and understanding or knowledge underpinning a given occupation. They combine skills, knowledge, and attitudes to describe best practice. They are useful tools for establishing job roles, personnel recruitment, supervision, and appraisal, as well as TET Standards. They are also helpful for benchmarking and harmonizing job qualifications on a national and international level. Standards, in general, provide a solid framework for high-quality TET that is labour market-relevant, current, and consistent in application across all public and private institutions.

However, it must be noted that Occupational Standards are different from Training /Education Standards. Occupational standards are defined in terms of activities performed by a person in a selected occupation (e.g., an electrical engineer designs electrical circuits, performs troubleshooting in electrical circuits, etc.), and are usually defined by Employers following procedures as agreed upon by all the stakeholders. On the other hand, Training and Education Standards are developed from the activities defined in the occupational standards, and they specify learning objectives to ensure that the necessary skills and knowledge are developed by a person to enable him/her to function at an agreed level in an occupation. Training and Education Standards are used to define curricula in training institutions. It is critical, however, to establish a direct link between the occupational standards and the training standards for both of them to respond collaboratively to the demands of the labour market.

For the purpose of TET delivery, Tanzania has adopted the Competence Based Education and Training (CBET) approach. The CBET approach focuses on providing learners with the skills and knowledge required to meet the occupational standards. Occupational standards are thus the starting point for developing competency-based training (CBET) programmes. Therefore, it is quite pertinent for TET institutions to use the relevant occupational standards as a benchmark for formulating their curricula.

Occupational Standards are developed based on a given occupation's current and future demands. As a result, they serve as a means of bridging the gap between the worlds of employment and technical education and training. The document explains how the occupational standards were developed, as well as the scope, the occupational profile in the form of DACUM charts, and the Occupational Standards.

2.0 OCCUPATIONAL STANDARD DEVELOPMENT PROCESS

The process of developing these Occupational Standards involved both local and international expertise. The process began with an examination of major documents that guide Tanzanian skills development including the *10-year National Skills Development Strategy (2016-2026)*. NACTVET labour market reports were also used in the literature review to determine the skills demand in the Tanzanian labour market as a whole.

After the literature review, a team of experts in consultation with practitioners developed draft occupational standards. The draft document was used to develop an occupational profile for each occupation (DACUM Chart), which is attached as an **Appendix** to every Occupational Standard.

The occupational standards were validated during stakeholders' forum held on 22nd and 23rd February 2024 at Morogoro. The information from stakeholders' forum provide insight from the workplaces, professional bodies, regulatory bodies and sector ministries regarding trends and changes in the profession, including how well graduates are prepared for working in the occupation.

3.0 THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR DRONE PILOT TECHNICIANS

The standards cover a broad range of duties and tasks that can be performed by a Drone Pilot Technician. However, the occupational standards are not meant to replace individual job descriptions. Instead, they are to be used for guidance in defining skill levels and knowledge for the technician in

specific settings or positions. The Drone Pilot Technicians may perform tasks in a number of key areas of the occupational standards, but not necessarily in all areas. For example, in large operations, other individuals may be employed or designated to perform specific tasks.

The Drone Pilot Technicians shall work under the supervision of senior technicians, plan flight routes for aerial photography, inspection, as well as surveying and mapping, install and debug multi-rotor, fixed-wing and composite-wing UAVs, perform aerial photography, patrol inspection and surveying and mapping, and diagnose and eliminate faults of various unmanned aerial vehicles, power system parts and load equipment during task execution. Generally, the Drone Pilot Technician performs the following responsibilities:

- a) General services for aerial photography and inspection surveying and mapping
- b) Planning of flighting tasks of multi-rotor, fixed-wing and composite-wing UAVs
- c) Assembly, debugging and maintenance of multi-rotor, fixed-wing and composite-wing UAVs
- d) Assembly, debugging and maintenance of multi-rotor, fixed-wing and composite-wing UAV power system
- e) Assembly, debugging and maintenance of multi-rotor, fixed-wing and composite-wing UAV control system
- f) Assembly, debugging and maintenance of multi-rotor, fixed-wing and composite-wing UAV loading system
- g) Execution of tests in line-of-sight and flight tasks of all kinds of unmanned aerial vehicles
- i) Execution of over-the-horizon tests and flight tasks of all kinds of unmanned aerial vehicles
- j) Maintenance of the safety system of all kinds of unmanned aerial vehicles

The Occupational Standards have been clustered into NTA qualification levels, i.e. NTA level 4, 5 and 6.

4.0 VALIDITY PERIOD

Due to the rapid development of technology, the validity period of occupational standards is 3-5 years. The review will proceed in the same manner as the one before it, with new occupational standards

being developed based on current trends of the labour market.

5.0 OCCUPATIONAL STANDARDS

5.1 OCCUPATIONAL STANDARDS FOR DRONE PILOT TECHNICIAN - NTA 5

OCCUPATION	DRONE PILOT TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	PERFORM TASK ANALYSIS OF FIXED-WING AERIAL VEHICLES	DUTY NO.	501
TASK TITLE	CONDUCT ANALYSIS OF THE IMPACT OF WEATHER AND TERRAIN ON OPERATION AND THAT OF OPERATION ON THE ENVIRONMENT.	TASK NO.	5011
PERFORMANCE CRITERIA	The person performing this task must be able to analyze the impact of weather and terrain on the operation and that of the operation on the environment in accordance with flight safety and requirements. Also, they must observe health, occupational and environmental safety rules and regulations.		
RANGE STATEMENT	The task can be performed indoors or at the flight site under the supervision of senior drone pilot technicians. The tools and equipment to be used include: 1. Computers. 2. Safety gear		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Analyze the contents of inspection task planning books; 2. Abide by the laws and regulations on low-altitude management; 3. Check the flying weather; 4. Check whether the take-off and landing sites meet the range requirements for the gliding and flying sites and whether there are any obstacles at the cruising altitude; 5. Select the fixed-wing aerial vehicle to perform the task; 6. Plan flight operations; 		<p>Detailed knowledge about:</p> <p>1.0 Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Fill in the flight schedule; 1.2 Investigate the flight environmental conditions of the fixed-wing aerial vehicle; 1.3 Plan the flight route of the fixed-wing aerial vehicle. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 The weather and terrain requirements for 	

<p>7. Fill in the flight schedule.</p>	<p>fixed-wing aerial vehicles;</p> <p>2.2 The laws and regulations on low-altitude management.</p> <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 Factors affecting the flight operation of the fixed-wing aerial vehicle.</p> <p>4.0 Essential Skills</p> <p>4.1 Reading comprehension skills;</p> <p>4.2 Communication skills;</p> <p>4.3 Computer skills;</p> <p>4.4 Customer service skills;</p> <p>4.5 Teamwork and coordination skills;</p> <p>4.6 Writing skills.</p>
<p>DESCRIPTION OF THE END PRODUCT / SERVICE</p>	<p>The impact of weather and terrain on operation and that of operation on the environment are analyzed in accordance with flight safety and requirements.</p>
<p>CIRCUMSTANTIAL KNOWLEDGE</p>	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Analysis of meteorological and geographical conditions; 2. Flight safety of fixed-wing aerial vehicles.

OCCUPATION	DRONE PILOT TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	PERFORM TASK ANALYSIS OF FIXED-WING AERIAL VEHICLES	DUTY NO.	501
TASK TITLE	CARRY OUT FLIGHT PLAN REPORTING ACCORDING TO THE TASK FLOWS	TASK NO.	5012
PERFORMANCE CRITERIA	The person performing this task must be able to conduct flight plan reporting according to the laws and regulations of the low-altitude management and the task flows.		
RANGE STATEMENT	<p>The task can be performed indoors or at the flight site under the supervision of senior drone pilot technicians.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Computers; 2. Internet; 3. Safety gear. 		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Login to the website to make platform registration and flight application; 2. Observe the laws and regulations on low-altitude management; 3. Check the flying weather and topography; 4. Choose the aerial vehicles to perform tasks; 5. Report the information about flight dynamic. 5. Observe health, occupational and environmental safety rules and regulations. 		<p>Detailed knowledge about:</p> <p>1.0 Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Conduct the flight plan reporting. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 The laws and regulations on low-altitude management; 2.2 The weather and terrain requirements for fixed-wing aerial vehicles; 2.3 Procedures of flight reporting. <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <ol style="list-style-type: none"> 3.1 The weather and terrain conditions affecting the UAV flight. 	

	<p>4.0 Essential Skills</p> <p>4.1 Reading comprehension skills;</p> <p>4.2 Communication skills;</p> <p>4.3 Computer skills;</p> <p>4.4 Customer service skills;</p> <p>4.5 Writing skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Flight reporting is conducted according to the content of the flight schedule.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Analysis of meteorological and geographical conditions; 2. Flight safety of fixed-wing aerial vehicles.

OCCUPATION	DRONE PILOT TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	PERFORM TASK ANALYSIS OF FIXED-WING AERIAL VEHICLES	DUTY NO.	501
TASK TITLE	CONDUCT ROUTE PLANNING OF FLIGHT INSPECTION TASKS	TASK NO.	5013
PERFORMANCE CRITERIA	The person performing this task must be able to complete the route planning of inspection tasks according to the laws and regulations of the low-altitude management and the task flows.		
RANGE STATEMENT	<p>The task can be performed indoors or at the flight site under the supervision of senior drone pilot technicians.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Ground control stations. 		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Analyze the inspection tasks and the content of flight task books; 2. Observe the laws and regulations on low-altitude management; 3. Check the flying weather and topography; 4. Analyse the take-off and landing points, task areas and geographic space, and determine the route planning space; 5. Fill in the flight schedule. 		<p>Detailed knowledge about:</p> <p>1. Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Plan the flight route; 1.2 Set the flight movements. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 The laws and regulations on low-altitude management; 2.2 The weather and terrain requirements for fixed-wing aerial vehicles. <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <ol style="list-style-type: none"> 3.1 Factors affecting route planning; 3.2 Safety operations of ground stations. <p>4.0 Essential Skills</p> <ol style="list-style-type: none"> 4.1 Reading comprehension skills; 	

	<p>4.2 Communication skills;</p> <p>4.3 Computer skills;</p> <p>4.4 Customer service skills;</p> <p>4.5 Teamwork skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	Route planning of flight inspection tasks is conducted based on merit-based selections and movement setting operations.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Analysis of meteorological and geographical conditions; 2. Flight safety of fixed-wing aerial vehicles.

OCCUPATION	DRONE PILOT TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	CARRY OUT INSTALLATION AND DEBUGGING OF FIXED-WING AERIAL VEHICLES	DUTY NO.	502
TASK TITLE	PERFORM INSTALLATION OF FIXED-WING AERIAL VEHICLES	TASK NO.	5021
PERFORMANCE CRITERIA	The person performing this task must be able to install fixed wing aerial vehicles in accordance with technical requirements and manufacturers' installation manuals.		
RANGE STATEMENT	<p>The task can be performed in the installation and debugging workshop under the supervision of senior technicians of the manufacturers of fixed-wing aerial vehicles.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Balancing tools; 2. Weighing tools; 3. Testing instruments; 4. Full set of UAV installation and debugging toolboxes; 5. Electric welding equipment and heat guns; 6. Different kinds of glue and connecting rods; 7. Accessories of fixed-wing aerial vehicles; 8. Electronic accessories such as steering engines, motors, electric adjusters, batteries and receivers; 9. Load equipment of surveying and mapping; 10. Transmission systems. 		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Observe the safety operations and precautions when performing tasks; 2. Read the requirements of the installation manual for fixed-wing aerial vehicles; 3. Select appropriate tools and equipment; 4. Install the fuselage section of the fixed-wing aerial vehicle; 5. Fix the engine on the nose position of the aerial vehicle; 6. Install the landing gear; 		<p>Detailed knowledge about:</p> <p>1.0 Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Install the wing, fuselage and tail fin; 1.2 Connect the circuits of aerial vehicles. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 Flight principles of fixed-wing aerial vehicles; 	

<ol style="list-style-type: none"> 7. Install the wing section of the fixed-wing aerial vehicle; 8. Install the tail fin of the fixed-wing aerial vehicle; 9. Install the servo steering gear; 10. Connect the fuselage, wing and tail fin; 11. Fix the load equipment; 12. Connect all circuits; 13. Perform functional tests 14. Clean the tools, equipment and workplaces; 15. Arrange and store the tools and equipment; 16. Fill in the installation manual. 	<ol style="list-style-type: none"> 2.2 Working principles of UAV steering gears; 2.3 The laws and regulations on low-altitude management. <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <ol style="list-style-type: none"> 3.1 The functions of various parts of fixed-wing aerial vehicles; 3.2 Installation procedures of fixed-wing aerial vehicles; 3.3 Usage of tools and equipment. <p>4.0 Essential Skills</p> <ol style="list-style-type: none"> 4.1 Reading comprehension skills; 4.2 Communication skills; 4.3 Teamwork skills; 4.4 Writing skills.
<p>DESCRIPTION OF THE END PRODUCT / SERVICE</p>	<p>The installation of aerial vehicles is performed in accordance with installation manuals and technical requirements of fixed-wing aerial vehicles.</p>
<p>CIRCUMSTANTIAL KNOWLEDGE</p>	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Occupational health and safety; 2. Waste disposal methods.

OCCUPATION	DRONE PILOT TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	CARRY OUT INSTALLATION AND DEBUGGING OF FIXED-WING AERIAL VEHICLES	DUTY NO.	502
TASK TITLE	PERFORM DEBUGGING OF FIXED-WING AERIAL VEHICLES	TASK NO.	5022
PERFORMANCE CRITERIA	The person performing this task must be able to debug the fixed-wing aerial vehicle in accordance with technical requirements and manufacturers' debugging manuals.		
RANGE STATEMENT	<p>The task can be performed in the installation and debugging workshop or at the flight site under the supervision of Senior Technicians of the manufacturers of fixed-wing aerial vehicles.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Balancing tools; 2. Weighing tools; 3. Testing instruments; 4. Full set of UAV installation and debugging toolboxes; 5. Electric welding equipment and heat guns; 6. Different kinds of glue and connecting rods; 7. Charging equipment. 		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Observe the precautions of safety operation; 2. Read the requirements of the debugging manual of fixed-wing aerial vehicles; 3. Select appropriate tools and equipment; 4. Adjust the center position of fixed-wing aerial vehicles; 5. Adjust the steering gear angle; 6. Test the engine; 7. Run in the engine; 8. Troubleshoot the engine faults; 9. Adjust the parameters of flight controllers; 10. Debug the load equipment; 11. Clean the tools, equipment and workplaces; 		<p>Detailed knowledge about:</p> <p>1.0 Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Adjust the servo steering gear angle; 1.2 Adjust the state of the engine; 1.3 Adjust the parameters of flight controllers. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 Flight principles of fixed-wing aerial vehicles; 2.2 Working principles of UAV steering gears. 	

<p>12. Arrange and store the tools and equipment; 13. Fill in the debugging manual.</p>	<p>3.0 Theories The person performing this task must be able to explain the following:</p> <p>3.1 The debugging content of fixed-wing aerial vehicles; 3.2 Operating and using methods of the engine; 3.3 Usage of tools and equipment; 3.4 Usage of flight control debugging software.</p> <p>4.0 Essential Skills 4.1 Reading comprehension skills; 4.2 Communication skills; 4.3 Teamwork skills; 4.4 Computer skills; 4.5 Writing skills.</p>
<p>DESCRIPTION OF THE END PRODUCT / SERVICE</p>	<p>The debugging of aerial vehicles is performed in accordance with debugging manuals and technical requirements of fixed-wing aerial vehicles.</p>
<p>CIRCUMSTANTIAL KNOWLEDGE</p>	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Occupational health and safety; 2. Waste disposal methods.

OCCUPATION	DRONE PILOT TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	CONDUCT FIXED-WING FLIGHT OPERATION	DUTY NO.	503
TASK TITLE	PERFORM PREPARATION OF FIXED-WING FLIGHT OPERATION	TASK NO.	5031
PERFORMANCE CRITERIA	The person performing this task must be able to conduct pre-operation preparation in accordance with the task requirements and fixed-wing aerial vehicle manufacturer's manual.		
RANGE STATEMENT	<p>The task can be performed at the flight site under the supervision of the instructors or captains of the fixed-wing aerial vehicles.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Balancing tools; 2. Weighing tools; 3. Testing instruments; 4. Full set of UAV installation and debugging toolboxes; 5. Electric welding equipment and heat guns; 6. Different kinds of glue and connecting rods; 7. Charging equipment. 		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Analyse the contents of task planning books; 2. Abide by the laws and regulations on low-altitude management; 3. Check the flying weather and topography; 4. Plan flight operations; 5. Complete the inspection of fixed-wing aerial vehicles; 6. Complete the inspection of load equipment for fixed-wing flight; 7. Complete the inspection of remote controllers of fixed-wing flight; 8. Complete the environmental inspection of fixed-wing flight; 9. Fill in the flight task table. 		<p>Detailed knowledge about:</p> <p>1.0 Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Determine no-fly zones and restricted flight zones; 1.2 Check the safety of take-off and landing zones; 1.3 Inspect airspace safety visually; 1.4 Fill in the pre-flight checklist. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 Working principles of load equipment; 2.2 Flight principles of fixed-wing aerial vehicles; 	

	<p>2.3 Flying weather and topography for UAVs; 2.4 The laws and regulations on low-altitude management.</p> <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <p>3.1 System structure of fixed-wing aerial vehicles.</p> <p>4.0 Essential Skills</p> <p>4.1 Reading comprehension skills; 4.2 Communication skills; 4.3 Teamwork skills; 4.4 Computer skills; 4.5 Writing skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	The pre-operation preparation for fixed-wing aerial vehicles is conducted in accordance with the content of flight schedules.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Electrical safety; 2. Occupational health and safety; 3. Analysis of meteorological and geographical conditions.

OCCUPATION	DRONE PILOT TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	CONDUCT FIXED-WING FLIGHT OPERATION	DUTY NO.	503
TASK TITLE	PERFORM IN LINE-OF-SIGHT FIXED-WING FLIGHT OPERATION	TASK NO.	5032
PERFORMANCE CRITERIA	The person performing this task must be able to conduct in line-of-sight flight operation in accordance with the task requirements.		
RANGE STATEMENT	<p>The task can be performed at the flight site under the supervision of the instructors or captains of the fixed-wing aerial vehicles.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Ground station radios; 2. Ground station computers and software; 3. Radio communication systems. 		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Analyze the contents of task planning books; 2. Observe the laws and regulations on low-altitude flight management; 3. Check the flying weather and topography; 4. Plan flight operations; 5. Conduct taking-off and landing of UAVs; 6. Follow the 8-shape flight route; 7. Fill in the flight task table. 		<p>Detailed knowledge about:</p> <p>1.0 Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Conduct remote control instructions; 1.2 Control the fixed-wing aerial vehicle to take off; 1.3 Follow the 8-shape flight route. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 Flight control principles of fixed-wing aerial vehicles; 2.2 Laws and regulations on airspace management. <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <ol style="list-style-type: none"> 3.1 Take-off and landing control methods of fixed-wing aerial vehicles; 3.2 Air-turning control methods of fixed-wing 	

	<p>aerial vehicles.</p> <p>4.0 Essential Skills</p> <p>4.1 Reading comprehension skills;</p> <p>4.2 Communication skills;</p> <p>4.3 Teamwork skills;</p> <p>4.4 Computer skills;</p> <p>4.5 Writing skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	The in line-of-sight flight operation of fixed-wing aerial vehicles is performed in accordance with flight schedules.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Occupational health and safety; 2. Analysis of meteorological and geographical conditions.

OCCUPATION	DRONE PILOT TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	CONDUCT FIXED-WING FLIGHT OPERATION	DUTY NO.	503
TASK TITLE	PERFORM COMPLETION OF THE OVER-THE-HORIZON FLIGHT ALONG THE INSPECTION TASK ROUTE	TASK NO.	5033
PERFORMANCE CRITERIA	The person performing this task must be able to conduct the over-the-horizon flight along the inspection task route in accordance with the task requirements.		
RANGE STATEMENT	<p>The task can be performed at the flight site under the supervision of the instructors or captains of the fixed-wing aerial vehicles.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Ground station radios; 2. Ground station computers; 3. Ground station software; 4. Radio communication systems. 		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Analyze the contents of task planning books; 2. Observe the laws and regulations on low-altitude management; 3. Check the flying weather and topography; 4. Plan flight operations; 5. Use the ground control system to transmit the picture to complete the waypoint setting of the UAV; 6. Monitor the flight status of the UAV; 7. Use the ground control system to control the flight of UAVs; 8. Fill in the flight task table. 		<p>Detailed knowledge about:</p> <p>1.0 Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Set the waypoints of aerial vehicles; 1.2 Use ground stations to control aerial vehicles; 1.3 Monitor the flight status. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 Principles of ground station controlling; 2.2 Principles of image transmission; 2.3 The laws and regulations on low-altitude management. <p>3.0 Theories</p> <p>The person performing this task must be able to</p>	

	<p>explain the following:</p> <p>3.1 Operations of load equipment;</p> <p>3.2 State analysis methods of fixed-wing aerial vehicles.</p> <p>4.0 Essential Skills</p> <p>4.1 Reading comprehension skills;</p> <p>4.2 Communication skills;</p> <p>4.3 Teamwork skills;</p> <p>4.4 Computer skills;</p> <p>4.5 Writing skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	The over-the-horizon flight along the inspection task route via fixed-wing aerial vehicles is completed in accordance with the contents of flight schedules.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Occupational health and safety; 2. Analysis of meteorological and geographical conditions.

OCCUPATION	DRONE PILOT TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	CARRY OUT EQUIPMENT MAINTENANCE	DUTY NO.	504
TASK TITLE	PERFORM EXAMINATION OF THE PARTS OF THE POWER SYSTEM	TASK NO.	5041
PERFORMANCE CRITERIA	The person performing this task must be able to detect the parts of the power system of the fixed-wing aerial vehicle according to the overhaul manual.		
RANGE STATEMENT	<p>The task can be performed in the installation and debugging workshop under the supervision of senior technicians of the manufacturers of fixed-wing aerial vehicles.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Overhaul manuals; 2. Full set of aerial vehicle equipment; 3. Full set of installation tools for the aerial vehicle; 4. Engine test benches; 5. Blade balancers. 		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Refer to instructions in the maintenance manual; 2. Choose operating tools and equipment; 3. Examine the servo steering gear; 4. Check the connecting rod; 5. Examine the fuel tank; 6. Check the engine; 7. Examine the paddle blade; 8. Fill in the component inspection list; 9. Clean the workplace; 10. Arrange and store the tools and equipment. 		<p>Detailed knowledge about:</p> <p>1.0 Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Check the steering gear; 1.2 Check the connecting rod and blade. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 Principles of component inspection. <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <ol style="list-style-type: none"> 3.1 Component inspection procedures; 3.2 Usage of appropriate tools and equipment; 3.2 Detecting procedures of power systems. 	

	<p>4.0 Essential Skills</p> <p>4.1 Reading comprehension skills;</p> <p>4.2 Communication skills;</p> <p>4.3 Teamwork skills;</p> <p>4.4 Computer skills;</p> <p>4.5 Writing skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	The examination of the parts of fixed-wing aerial vehicles is performed in accordance with service manual instructions.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Occupational health and safety; 2. Waste disposal methods.

OCCUPATION	DRONE PILOT TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	CARRY OUT EQUIPMENT MAINTENANCE	DUTY NO.	504
TASK TITLE	PERFORM REPLACEMENT OF WORN-OUT PARTS OF THE POWER SYSTEM	TASK NO.	5042
PERFORMANCE CRITERIA	The person performing this task must be able to replace worn-out parts of the power system of the fixed-wing aerial vehicle according to the maintenance manual.		
RANGE STATEMENT	<p>The task can be performed in the installation and debugging workshop under the supervision of senior technicians of the manufacturers of fixed-wing aerial vehicles.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Overhaul manuals; 2. Full set of aerial vehicle equipment; 3. Full set of installation tools for the aerial vehicle. 		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Refer to instructions in the overhaul manual; 2. Choose operating tools and equipment; 3. Replace the servo steering gear; 4. Replace the connecting rod; 5. Replace the fuel tank; 6. Change the engine; 7. Replace the blade; 8. Fill in the component replacement list; 9. Clean the workplace; 10. Arrange and store the tools and equipment. 		<p>Detailed knowledge about:</p> <p>1.0 Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Replace the parts of the power system of UAVs. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 Principles of replacing parts and components. <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <ol style="list-style-type: none"> 3.1 Component replacement procedures; 3.2 Usage of appropriate tools and equipment. <p>4.0 Essential Skills</p>	

	<p>4.1 Reading comprehension skills;</p> <p>4.2 Communication skills;</p> <p>4.3 Teamwork skills;</p> <p>4.4 Computer skills;</p> <p>4.5 Writing skills.</p>
DESCRIPTION OF THE END PRODUCT / SERVICE	The replacement of worn-out parts of fixed-wing aerial vehicles is performed in accordance with maintenance manuals.
CIRCUMSTANTIAL KNOWLEDGE	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Occupational health and safety; 2. Waste disposal methods.

OCCUPATION	DRONE PILOT TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	CARRY OUT EQUIPMENT MAINTENANCE	DUTY NO.	504
TASK TITLE	PERFORM INSPECTION AND REPLACEMENT OF WORN-OUT FIXED-WING LOAD EQUIPMENT	TASK NO.	5043
PERFORMANCE CRITERIA	The person performing this task must be able to complete the inspection and replacement of worn-out load equipment on fixed-wing aerial vehicles in accordance with maintenance manuals.		
RANGE STATEMENT	<p>The task can be performed in the installation and debugging workshop site under the supervision of senior technicians of the manufacturers of fixed-wing aerial vehicles.</p> <p>The tools and equipment to be used include:</p> <ol style="list-style-type: none"> 1. Overhaul manuals; 2. Full set of aerial vehicle equipment; 3. Full set of installation tools for the aerial vehicle. 		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
<p>The person performing this task must be able to do the following:</p> <ol style="list-style-type: none"> 1. Refer to instructions in the overhaul manual; 2. Choose operating tools and equipment; 3. Check the appearance of the data transmission modules; 4. Verify the transmission of data transmission links and circuits; 5. Check the appearance of the image transmission modules; 6. Inspect the transmission of image transmission links; 7. Inspect the receiving equipment; 8. Examine the auxiliary equipment; 9. Replace data transmission modules and circuits; 10. Replace image transmission modules and circuits; 11. Replace other auxiliary equipment; 		<p>Detailed knowledge about:</p> <p>1.0 Methods</p> <p>The person performing this task must be able to explain how to:</p> <ol style="list-style-type: none"> 1.1 Detect and replace the image transmission modules; 1.2 Detect and replace the data transmission modules; 1.3 Test and replace the auxiliary equipment. <p>2.0 Principles</p> <p>The person performing this task must be able to explain the following principles:</p> <ol style="list-style-type: none"> 2.1 Detecting principles of load equipment; 2.2 Replacement processes of load equipment. <p>3.0 Theories</p> <p>The person performing this task must be able to explain the following:</p> <ol style="list-style-type: none"> 3.1 Detecting procedures for load equipment; 	

<p>12. Fill in the maintenance lists of load equipment;</p> <p>13. Clean the workplace;</p> <p>14. Arrange and store the tools and equipment.</p>	<p>3.2 Replacing procedures for load equipment;</p> <p>3.3 Usage of appropriate tools and equipment.</p> <p>4.0 Essential Skills</p> <p>4.1 Reading comprehension skills;</p> <p>4.2 Communication skills;</p> <p>4.3 Teamwork skills;</p> <p>4.4 Computer skills;</p> <p>4.5 Writing skills.</p>
<p>DESCRIPTION OF THE END PRODUCT / SERVICE</p>	<p>The Inspection and replacement of the load equipment on fixed-wing aerial vehicles is performed in accordance with maintenance manuals.</p>
<p>CIRCUMSTANTIAL KNOWLEDGE</p>	<p>Detailed knowledge about:</p> <ol style="list-style-type: none"> 1. Occupational health and safety; 2. Waste disposal methods.

APPENDIX: DACUM CHARTS FOR DRONE PILOT TECHNICIAN - NTA LEVEL 5

DUTIES	TASKS	ENABLERS
<p>1.0 Perform Task analysis of fixed-wing aerial vehicles</p>	<p>1.1 Conduct analysis of the impact of weather and terrain on operation and that of operation on the environment.</p>	<p>General skills and knowledge</p> <ul style="list-style-type: none"> • Cooperation with others using communication skills and submission of reports to the superiors • Use of the manufacturer's manual • Environment and flight safety • Flight task flow • Operation of ground station software <p>Tools and equipment</p> <ul style="list-style-type: none"> • Ground control stations <p>Materials</p> <ul style="list-style-type: none"> • Documents and tables <p>Requirements for employees</p> <ul style="list-style-type: none"> • Teamwork spirit, integrity, time management and commitment
	<p>1.2 Carry out flight plan reporting according to the task flows.</p>	
	<p>1.3 Conduct route planning of inspection tasks.</p>	
<p>2.0 Carry out installation and debugging of fixed-wing aerial vehicles</p>	<p>2.1 Perform installation of fixed-wing aerial vehicles.</p>	<p>General skills and knowledge</p> <ul style="list-style-type: none"> • Cooperation with others using communication skills and submission of reports to the superiors • Use of the manufacturer's manual • Environment and flight safety • Skills in aerial vehicle installation and debugging • Interpretation of technical documents <p>Tools and equipment</p>
	<p>2.2 Perform debugging of fixed-wing aerial vehicles.</p>	

		<ul style="list-style-type: none"> • Full set of installation and debugging tools for the aerial vehicle • Engine installation table • Flight control software • Ground control stations <p>Materials</p> <ul style="list-style-type: none"> • Fixed-wing propellers • Fixed-wing landing gears • Fixed-wing reinforcing screws, straps, glue, etc. <p>Requirements for employees</p> <ul style="list-style-type: none"> • Teamwork spirit, integrity, time management and commitment
<p>3.0 Conduct fixed-wing flight operation</p>	<p>3.1 Perform preparation for fixed-wing flight operation.</p>	<p>General skills and knowledge</p> <ul style="list-style-type: none"> • Cooperation with others using communication skills and submission of reports to the superiors • Use of the manufacturer's manual • Environment and flight safety • Flight task flow • Operation of ground station software <p>Tools and equipment</p> <ul style="list-style-type: none"> • Ground control stations <p>Materials</p> <ul style="list-style-type: none"> • Fixed-wing propellers • Fixed-wing landing gears • Fixed-wing reinforcing screws, straps, glue, etc. <p>Requirements for employees</p> <ul style="list-style-type: none"> • Teamwork spirit, integrity, time management and commitment
	<p>3.2 Perform in-line-of-sight fixed-wing flight operation.</p>	
	<p>3.3 Perform completion of the over-the-horizon flight along the inspection task route.</p>	

4.0 Carry out equipment maintenance	4.1 Perform examination of the parts of the power system.	<p>General skills and knowledge</p> <ul style="list-style-type: none"> • Cooperation with others using communication skills and submission of reports to the superiors • Use of the manufacturer's manual • Environment and flight safety • Flight task flow • Skills in installation and debugging of the load equipment in the aerial vehicle • Interpretation of technical documents <p>Tools and equipment</p> <ul style="list-style-type: none"> • Full set of installation tools for the aerial vehicle • Ground control stations <p>Materials</p> <ul style="list-style-type: none"> • Motors, electric adjusters • Spare parts of engine and oil circuits • Fixed-wing reinforcing screws, straps, glue, etc. • Spare parts of load equipment <p>Requirements for employees</p> <ul style="list-style-type: none"> • Teamwork spirit, integrity, time management and commitment
	4.2 Perform replacement of the worn-out parts of the power system.	
	4.3 Perform inspection and replacement of worn-out fixed-wing load equipment.	