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CIVIL AVIATION AUTHORITY

OF SRI LANKA

Unmanned Aircraft Training Organization Manual

1st Edition -2022

Issued under the authority of the Director General of Civil Aviation and Chief Executive Officer

Unmanned Aircraft Training Organization Manual

Control Number: 00

Record of Revision

Rev. No	Rev. Date	Entered by	Rev. No:	Rev Date	Entered by

List of Effective Pages

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History of Revision

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Abbreviations

UA	Unmanned Aircraft
UAS	Unmanned Aircraft Systems
UABTO	Unmanned Aircraft Basic Training Organization
UATO	Unmanned Aircraft Training and Assessment Organization
DFE	Designated Flight Examiner
AM	Accountable Manager
CAASL	Civil Aviation Authority of Sri Lanka
HT	Head of Training
QSM	Quality and Safety Manager
DGCA	Director General of Civil Aviation

Foreword

Pursuant to the Section 80 of Civil Aviation Act No.10 of 2014 and Section 02 of Implementing Standard 053 issued by DGCA, this manual is issued to provide guidance to organizations seeking permit for Unmanned Aircraft Basic Training (UABT) and Unmanned Aircraft Training and Assessment (UAT) to conduct unmanned aircraft pilot competency trainings and practical assessments / proficiency checks.

P.A. Jayakantha
Director General of Civil Aviation &
Chief Executive Officer

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1   Chapter I – General

1. Purpose

Pursuant to the Implementing Standard 053, Section 02, this manual is issued to provide guidance relating to an organization seeking permits to conduct unmanned aircraft (UA) basic training, UA pilot competency training or practical assessments / proficiency checks.

2. Applicability

This manual is applicable to an organization seeking permit or have been permitted to conduct UA basic training, UA pilot competency training or practical assessments / proficiency checks pursuant to Implementing Standard 053.

3. Introduction

a) Pursuant to the Implementing Standard 053 issued by DGCA, a person must not provide UA basic training (UABT) unless that person holds a UABT approval. A person must also not provide any UA pilot training (UAPT) or conduct any practical assessment or proficiency check, unless that person holds an Unmanned Aircraft Training and Assessment Organization (UATO) permit.

b) The UABT is for UA users operating a UA in the 'open' category of operation. UABT provides the UA user with the relevant knowledge to obtain the competency certificate by CAASL after completing the online exam, and to operate their UA safely and responsibly.

c) The UAPT is recommended for UA users operating a UA in 'specific' or 'certified' category of operation. UAPT ensures that users have the necessary competency to operate the UAs safely and to obtain the CAASL competency certificate after completing the exams.

d) Any of these trainings are not mandatory for any user in any category. If user wants to complete the exams without taking the training, that option will be available.

2   Chapter II – UA Basic Training Organization (UABTO)

1.   **Components of UA Basic Training (UABT)**

(1)   The UABT can be administered as both online or classroom course. The UABTO should ensure that online UABT include, but not limited to, the following components:

(a)   Syllabus (Refer to **Appendix 1**);
(b)   UABT can use parts form any study material published by CAASL, only to conduct the training.
(c)   Means to provide trainees with a Certificate of Completion after successful completion of the training. The certificate should include the trainee's full name as per the NIC or Passport, course title, date of completion of the UABT, name of UABTO, UABTO's Accountable Manager's signature and reference/serial number.

2.   **Application for UABTO Approval**

(1)   An applicant should make an application for a UABT approval via email (drone@caa.lk) at least 2 months before the intended date of commencement of the applicant's training operations.

(2)   The applicant is required to submit the following information as part of the application:

(a)   Organization details
 I.   Name of the organization
 II.   Address of the organization
 III.   Copy of Business Registration
(b)   CV of Accountable Manager (AM)
(c)   Description of the overall system architecture for the online system (if available)
(d)   Details of courseware
(e)   Template of Certificate of Completion
(f)   Details on means to retain records of trainees

(3)   The AM is normally the Chief Executive Officer (CEO) who by virtue of position has overall (including in particular financial) responsibility to run the organization. If the AM is not the CEO, he/she should have the overall responsibility to run the organization and have direct access to the CEO.

(4)   The AM is responsible to ensure that the UABTO complies with the regulatory requirements set by CAASL.

3. Records

(1) The UABTO should maintain detailed records of the following for the specified retention period:

Records	Minimum Retention period
• Trainee's name, date of birth, contact address, contact number, email address and unique identifier. • Time and date of which trainee completed the training	Five years after the trainee has completed the UABT

(2) The UABTO should ensure that;
    (a) the integrity of records is maintained;
    (b) the records are not deleted or altered; and
    (c) there is a backup system of the records to provide continuity.

(3) The UABTO should provide CAASL with records when required by CAASL.

3 Chapter III - UA Training and Assessment Organization (UATO)

1. Application for UATO Approval

(1) An applicant should make an application for a UATO approval via email (drone@caa.lk) at least 2 months before the intended date of commencement of the applicant's training operations and accompanied by the prescribed application fee.

(2) The applicant is required to submit the following information as part of the application:

    (a) Organization details
        I. Name of the organization
        II. Address of the organization
        III. Copy of the Business Registration

    (b) Key personnel
        I. CV of Accountable Manager
        II. CV of Head of Training
        III. CV of Quality Manager

    (c) List of instructors with their ratings/ qualifications.

    (d) List of nominated designated flight examiners (UA) ("DFE(UA)")

    (e) All the personal mentioned in point (b), (c) and (d) need to submit security clearances (SIS).

    (f) Description of facilities and equipment to conduct UAPL training.

    (g) Organizational manuals
        I. Operations Manual
        II. Training Manual (Training syllabus for each type specific)
        III. Quality & Safety Manual

    (h) Description of the quality assurance & safety management system

    (i) Description of the document control and distribution system

    (j) Insurance to cover 3rd party liability

(k) Records-keeping system for:
  I. Trainees
  II. Staff

(3) The UATO is required to demonstrate to CAASL that it has adequate staff, equipment, and infrastructure (sufficient classrooms, open area for flying and UA) to conduct UA flight training, practical assessment and proficiency checks. CAASL may conduct on-site inspections of the UATO's facilities to ascertain these aspects.

(4) The UATO is required to obtain an UA Operator Permit to conduct practical training, assessments and proficiency checks which involves the flying of a UA.

2. Key Personnel

(1) The UATO should employ fit and proper individuals for the following key roles: (one person can hold more than one role)
  (a) Accountable Manager (AM)
  (b) Head of Training (HT)
  (c) Quality & Safety Manager (QSM)

(2) The AM is normally the chief executive officer (CEO) who by virtue of position has overall (including in particular financial) responsibility to run the organization. If the AM is not the CEO, he/she should have the overall responsibility to run the organization and have direct access to the CEO.

(3) The AM is responsible to:
  (a) ensure that the UATO complies with the regulatory requirements set by CAASL;
  (b) ensure that sufficient funding is available to conduct activities to the approved standard; and
  (c) nominating the other key personnel and DFE(UA).

(4) The HT must have direct access to the AM and meet the following requirements:
  (a) Hold a valid competency relevant to the scope of approval; and
  (b) Is an instructor within the UATO.

(5) The HT is responsible to:
  (a) ensure satisfactory training as well as supervising the progress of individual trainees;
  (b) ensure instructors meet the required standards and performance;
  (c) ensure DFE(UA) maintains recency and adheres to the assessment standards required by CAASL ; and

(d) ensure sufficient resources are available to perform the activities under the scope of permit granted to the UATO.

(6) The QSM must have direct access to the AM.

(7) The QSM is responsible for ensuring that the quality assurance & safety management system is properly implemented, maintained, continuously reviewed and improved.

3. Instructors

(1) Instructors employed by the UATO have to meet the following requirements;
   (a) Holds a valid competency relevant to the scope of permit;
   (b) Competent to instruct; and
   (c) Passed competency check conducted by CAASL or the DFE (UA).

4. Designated Flight Examiner (UA)

(1) The UATO will nominate a person to be authorized by CAASL as a DFE(UA). Upon authorization by CAASL, the DFE(UA) will be responsible for the administration of practical assessment and proficiency checks on behalf of CAASL. The period of DFE(UA) authorization is up to 24 months.

(2) To qualify for initial authorization, the DFE(UA) nominee has to meet the following requirements;
   (a) At least 1 year of experience as an instructor;
   (b) Holds a valid competency relevant to the scope of approval;
   (c) At least 18 years old;
   (d) Attended induction briefing by CAASL; and
   (e) Passed practical evaluation by CAASL.

(3) To qualify for authorization renewal, the DFE(UA) has to meet the following requirements;

   (a) Holds a valid UAPC relevant to the scope of approval;
   (b) Maintains recency with:
      I.   at least 12 practical assessments or proficiency checks during the validity of the existing authorization; and
      II. at least 2 practical assessments or proficiency checks within each 6month period during the validity of the existing authorization;
   (c) Successfully completed an internal refresher training programme approved by CAASL, not earlier than 6 months before the date of expiry of the existing DFE(UA) authorization; and
   (d) Passed practical evaluation by CAASL.

5. **Facilities and Equipment**

(1) The UATO should be sufficiently equipped to enable adequate conduct of theory and practical training that is appropriate to the size and scope of the intended operations. These include the following:
  (a) Classroom(s) for theory training;
  (b) Adequate location(s) for practical training and assessment;
  (c) Sufficient UA types for practical training relevant to the approval with varying stability augmentation for purpose of training;
  (d) Course materials;
  (e) Instructor / DFE(UA) guides;
  (f) Flight simulators (if any); and
  (g) Facilities to enable the following to be carried out adequately:
    I. Administrative functions;
    II. Course development;
    III. Maintenance of equipment; and
    IV. Records-keeping.

6. **Organizational Manuals**

(1) The UATO must provide and maintain the manuals containing guidance on the policies, processes and procedures for the personnel concerned, to enable them to adequately discharge their duties in providing training and assessment.

(2) The manuals must include, but not limited to the following:
  (a) Operations Manual;
  (b) Training Manual; and
  (c) Quality & Safety Manual.

(3) The Training Manual should define the detailed course syllabus to achieve the competency required. It should also state the learning objectives and standards to be met for each phase of training before the trainee progress to the next phase of training. Refer to **Appendix 2** for learning outcomes.

(4) The UATO should review and validate the manuals at least once a year. The review and validation should include the critical aspects of the information contained in the manuals to verify its clarity, implementations, effectiveness, accuracy and relevance. The review should minimally take into account the following:
  (a) Changes in the organization's policies, procedures and practices;
  (b) Changes to the content of training programmes;
  (c) Changes resulting from new facilities and equipment;
  (d) Changes to an approval document; and

(e) Changes to relevant regulations.

(5) Details on the contents of Operations Manual and Training Manual can be found on **Appendix 3 & 4.**

7. Quality Assurance System

(1) The UATO should establish a quality assurance system that includes:
   (a) an independent audit function to monitor training and evaluation standards, the integrity of practical assessments and proficiency checks, and compliance with the procedures; and
   (b) a feedback system of audit findings to the person(s) and ultimately to the accountable manager to ensure, as necessary, timely implementation of effective corrective and preventive action.

(2) The quality assurance system should ensure conformance to standards and procedures, adequacy of training and assessment activities conducted as described in the respective manuals. Every process that assists the UATO to achieve its results shall be identified and the activities and procedures documented. The UATO should specify the basic structure of the quality assurance system applicable to all training and assessment activities conducted.

(3) The quality assurance system should be documented in a Quality Manual that is regularly kept updated which includes, as a minimum, the following elements:
   (a) Responsibilities of personnel;
   (b) System to ensure conformance of training with the training standards;
   (c) System for identifying deviations from policy and standards and taking corrective actions; and
   (d) Evaluation and analysis of experiences and trends concerning training standards, in order to provide feedback into the system for the continual improvement of the quality of training.

8. Document Control and Distribution System

(1) The UATO should have a system in place for the review and endorsement of changes and revision control to the respective manuals. In addition, the system must ensure effective distribution of the revised manuals to all its personnel so that the latest versions are used at all times.

(2) Amendments made to the manuals have to be submitted via email (drone@caa.lk) for acceptance. The UATO should only implement the provisions contained within the revised manuals only after the amendments have been accepted by CAASL.

9. Records

(1) The UATO must maintain detailed records of the following for the specified retention period:

Records	Minimum Retention period
Trainee training, evaluation, practical assessment, medical test reports, SIS clearance and proficiency check	Five years after the training or assessment has been completed
Qualifications, training and evaluation of instructors and DFE(UA)	Five years after instructor or DFE(UA) has relinquished his role in UATO
Changes to key personnel	Five years after the change

(2) The UATO has to ensure that:
   (a) the records are complete such that there will be sufficient documentary evidence of each training action and for the reconstruction of the training history of each trainee, instructor or DFE(UA) in the organization;
   (b) the integrity of records is maintained by ensuring that the records are not removed or altered without authorization; and
   (c) there is a backup system of the records to provide continuity.

(3) The UATO has to maintain a personal record for every trainee, instructor and DFE(UA). The records should include:
   (a) Personal particulars;
      I. A copy of UAPC if applicable; and
      II. Detailed records of
         a) Qualifications, training and evaluation for instructor and DFE(UA);
         b) Training and evaluation for trainees; and
         c) The results of practical assessment and proficiency checks as required by CAASL.

4 Chapter IV - General Requirements

1. **Validity of Approval**

   (1) The UABTO approval and UATO approval will be valid for up to 1 year.

2. **Renewal of Approval**

   (1) An application for renewal of the approval is to be made via email (drone@caa.lk) at least 2 months before expiry of the approval and accompanied by the prescribed application fee.

3. **Variation of Approval**

   (1) The approved training organization should notify CAASL of any variation that is significant to the operations of the UATO. These may include:
       (b) changes in key personnel;
       (c) changes in scope of training;
       (d) inclusion of new training courses; or
       (e) location of the facilities.

   (2) An application for variation of the approval is to be made email (drone@caa.lk) and accompanied by the prescribed application fee. Approval by CAASL is required before the organization can proceed with implementation of the change.

4. **Transferability**

   (1) A UABTO or UATO granted to an organization is not transferrable except as a result of a change in ownership. A change of ownership is considered a significant change and necessitates submission of a variation to CAASL.

Appendices

Appendix 1- UA Basic Training Learning Outcomes

The UA basic training for **OPEN** category of operation, consists of 04 modules;

1.   UAS Safety and Operating Principles (Q-13)
2.   Aviation Regulation (Q-12)
3.   Meteorology (Q-5)
4.   UAS Flight Performance (Q-10)

1. UAS Safety and Operating Principles		
Learning Objective		
Knowledge Areas	**1.1.**	**Operational Procedures** *pre-flight* I. assessment of the area of operation & surrounding area, terrain, potential obstacles and obstructions for keeping VLOS of the UA, potential overflight of uninvolved persons, and the potential overflight of critical infrastructure; II. identification of a safe area where the remote pilot can perform a practice flight; III. environmental and weather conditions (e.g. factors that can affect the performance of the UAS such as electromagnetic interference, wind, temperature, etc.); methods of obtaining weather forecasts; and checking the conditions of the UAS *in-flight:* I. normal procedures and procedures for abnormal situations (e.g. for lost-data-link connections) *post-flight*: II. Maintenance and logging of flight details.
	1.2.	**UAS operations** - Visual Line of Sight (VLOS)

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- Avoiding collisions – 'See and Avoid'
- Safe distances from people, animals, property, vehicles, and other airspace users
- Identification of assemblies of people
- A code of conduct in case the UA encounters other traffic
- Maintaining the height limitation
- The responsibilities and communication between the UA observer and the remote pilot.
- Non-reckless behavior
- Safety precautions for UAS operations
- Basic requirements regarding dangerous goods
- Starting or stopping the operations taking in to account environment factors, UAS conditions and limitations.
- Decision process

Congested area operations
- Planning and preparation
- Hazard identification
- Overflying of people
- Public/third parties (crowds and gatherings)

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<td>**1.3.**</td>
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Human Factors

Medical fitness
- Crew health precautions
- Influence of psychoactive substances or Alcohol or drugs
- medication and medical restrictions

Fatigue
- Flight duration/flight workload
- Outdoors and lone working

Human perception
   I.   Factors influencing VLOS;
   II.   The distance of obstacles and the distance between the UA and obstacles;
   III. Evaluation of the speed and height of the UA;
   IV. Situational awareness;
   V.   Night operations.

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	1.4.	**Technical and operational mitigations for ground risk** - Low speed mode function - Evaluating distance from people, terrain

2. Aviation Regulation		
Learning Objective		
Knowledge Areas	**2.1**	Introduction to CAASL and the aviation system
	2.2	Definitions/ Terminology Civil Aviation Act No 14 of 2010 – Section 80 and other relevant Sections. SLCAIS 053 –Implementing Standard on UAV operations - Overall principles - UAS categories - UAS registration - UAS operation categories - Specific requirements for each category - UAS geographical Zones (restricted, prohibited and security sensitive areas) - UAV Occurrence reporting - Insurance
	2.3	**General overview** - Responsibilities - UAS operator, remote pilot - UAS owner - UAS assembler/importer - Avoidance of collisions
	2.4	Illegal operations Third party privacy and data protection

3. Meteorology		
Learning Objective		
Knowledge Areas	**3.1.**	**Introduction to obtaining and interpreting weather information** - Weather reporting resources - Reports, forecasts and meteorological conventions appropriate for typical UAS flight operations

		- Local weather assessments
	3.2.	**Effects of weather on the unmanned aircraft** - Wind – urban effects, gradients, masking, turbulence - Temperature – precipitation, turbulence - Visibility factors - Clouds – Cumulonimbus (CB) hazards (including lightning)

4. UAS flight performance		
Learning Objective		

Knowledge Areas	**4.1.**	**Typical operational envelope of a rotorcraft, fixed wing and hybrid configurations**
		- Basic principles of flight
		- effect of environment conditions of the performance
		- Principles of command and control:
		  I. overview;
		  II. data link frequencies and spectrums; and
		automatic flight modes, override and manual intervention

	4.2.	**User's manual of a UAS;**
		  I. overview of the main elements of the UAS
		  II. Limitations (e.g. mass, speed, environmental, duration of battery, etc.
		  III. Controlling the UAS in all phases of flights (e.g. the take-off, hovering in mid-air, when applicable, flying basic patterns and landing)
		  IV. Features that affect the safety of flight
		  V. Setting the parameters of the lost link procedures
		  VI. Setting the maximum height
		  VII. Procedures to load geographical zone data into the geo-awareness system
		  VIII. Procedures to load the UAS operator registration number into the direct remote identification system
		  IX. safety considerations
		    a) instructions to secure the payload
		    b) precautions to avoid injuries from rotors and sharp edges; and
		    c) the safe handling of batteries

	4.3.	**Operating guides** - Flight procedures/basic drills - Emergencies
	4.4.	**Maintenance of system** - Scheduled and repairs - Manufacturer's recommendations - Assessment 'safe to be flown?'
	4.5.	**Mass and balance and center of gravity (CG)** - Consideration of the overall balance when attaching gimbals, payloads - Understand meaning of MTOM - Security of the payload - Payload characteristics – how differences can affect the stability of a flight - CG – differences between different types of UA

	4.6.	**Batteries**
		 - Understand the terminology used for batteries (e.g. memory effect, capacity, c-rate)
		 - Differences in battery types
		 - Understand how a battery functions (e.g. charging, usage, danger, storage)
		  - Battery safety - how to help prevent potential unsafe
		  conditions

Appendix 2 – UA Training and Assessment Organization Learning Outcomes

The UA training consists of 09 modules for the issuance of flyer ID for SPECIFIC/CERTIFIED categories of operation

1. UAS General Knowledge
2. Principals of flight
3. Aviation Regulation (UAS)
4. Meteorology
5. Human Factors
6. Operating Procedures
7. UAS Maintenance & Emergency Procedures
8. Airmanship and Aviation Safety
9. UAS Airspace Operating Principles & Navigation Charts

1. UAS General Knowledge		
Learning Objective		

Knowledge Areas	1.1	**Introduction to UAS**
		I. Define what is an Unmanned Aircraft System (UAS) and Unmanned Aircraft (UA)
		II. Describe the different categories of UA and its operating principles
		   a. Aeroplane
		   b. Rotorcraft
		      Multi-rotor
		      Helicopter
		   c. Powered-Lift (VTOL)
		   d. Airship
		III. Explain the limitations of UAS
		   a. Operational envelope
		   b. Stability
		   c. Mass and MTOM
		   d. Center of gravity
		   e. Effect of payload on flight
		IV. Explain the various applications of UAS (e.g. aerial photography/videography, surveillance, etc.)

	1.2	**UAS Components and Systems**
		I. Identify UAS components of different categories and describe its functions
		II. Describe major systems of UAS and how the systems are integrated with each other
		    a. Power and Electrical System
		    b. Propulsion System
		    c. Flight Control and Navigation System
		    d. Command and Control (C2) System
		    e. Ground Control System
		III. Describe how to recognize and/or identify failed/damaged components (e.g. failed servo, propeller damage, etc.)
		IV. Understand the importance of following original equipment manufacturer (OEM) guidelines when repairing UAS
		    a. Scheduled maintenance and repairs
		    b. Security of aircraft/attached items
		    c. Manufacture's recommendations

	1.3	**UAS C2**
		I. Describe the operation of the UAS C2 link
		    a. The transmitter module
		    b. The receiver module
		    c. Datalink frequencies/ spectrum
		    d. Manual intervention/ override
		    e. Flight control modes
		II. Understand the importance of radio-line-of-sigh
		III. Identify the causes of radio interference and loss link

2. Principles of Flight		
Learning Objective		

Knowledge Areas	**2.1**	**Aerodynamics**
		I. Identify the four forces of flight
		    a. Lift
		    b. Weight
		    c. Thrust
		    d. Drag
		II. Describe the aerofoil interaction with airflow

| | | a. Lift generation / aerodynamic force
b. Angle of attack (AOA)
c. Ground effect
III. Describe aerodynamic stall and spin
    a. Causes of stalls
    b. Symptoms of stalls
    c. Stages of spins
    d. Basic stall/spin recovery
IV. Describe Vertical lift limitations, autorotation, vortex ring states
V. Describe aerodynamic stability
    a. Static stability
    b. Dynamic stability |
| | **2.2** | **Control of Motion (Aeroplane / Rotorcraft / Powered-lift(VTOL) / Airship)**
I. List the axes of motion
    a. Lateral axis (pitch)
    b. Longitudinal axis (roll)
    c. Vertical axis (yaw)
II. Describe the function of the main control surfaces
    a. Ailerons
    b. Elevator
    c. Rudder
III. Understand the function of trim |

3. Aviation Regulation (Air Law)		
Learning Objective		

Knowledge Areas	**3.1**	**Civil Aviation Act No.14 of 2010**
		I. Know the provisions stated in the Act.
		Included but not limited to;
		    a. Dangerous activity involving aircraft
		    b. Flying without satisfying safety requirements
		    c. Trespassing at aerodromes
		    d. Penalty for dangerous flying

	3.2	**Implementing Standard 053:** I. their applicability to SLCAIS 053; II. subcategories in the 'open' category and the associated classes of UAS;

		III. registration of UAS operators; IV. the responsibilities of the UAS operator; V. the responsibilities of the remote pilot; and VI. incident – accident reporting;
	3.3	**Airspace** I. List "no-fly" zones II. List locations that require permits to fly III. State altitude restrictions for UAS operations
	3.4	**UA Registration** I. Understand the UA Registration process
	3.5	**Permits** I. State who requires an Operator Permit II. Know the UA Operator Permit conditions III. Understand the permit application process
	3.6	**Unmanned Aircraft Pilot Competency** I. State the requirements for the issuance and maintenance of an UAPC II. State the privileges of an UAPC
	3.7	**STS & PDRA** I. General overview
	3.8	**UA Basic Training** I. State who requires UA Basic Training
	3.9	**Penalties** I. State the penalties upon contravening provisions relating to UA operations of the Civil Aviation Act No.14 of 2010 and SLCAIS 053
	3.10	**Accident & Incident Reporting** I. How to report an accident or incident relating to UA operations as per the Civil Aviation Act. and SLCAIS 053

4. Meteorology		
Learning Objective		

Knowledge Areas	**4.1**	**General**
		I. State atmospheric properties and their effects on UA performance
		     a. Pressure
		     b. Temperature

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c. Density

d. Humidity

II. Define basic altimetry terms

    a. Height

    b. Elevation

    c. Altitude

    d. Mean Sea Level (MSL)

    e. Above Mean Sea Level (AMSL)

    f. Above Ground Level (AGL)

III. Identify cloud types and their impact on UAS operations

    a. Cumulus (CU)

    b. Cumulonimbus (CB)

IV. Identify different types of winds and their impact on UA during operations

    a. Headwind

    b. Tailwind

    c. Crosswind

V. Describe how to obtain and interpret reliable weather information

    a. Meteorological Services (non-aviation)

    b. METAR (aviation)

    c. Aeronautical weather charts/reports

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5. Human Factors

Learning Objective		

Knowledge Areas	**5.1**	**Physiology – Vision**
		I. Describe correct visual scanning techniques
		II. Identify visual illusions during UAS operations and how to overcome them
		    a. Disorientation
		    b. Spatial Disorientation

	5.2	**Physiology – Medications** I. Describe the effects of medications during UAS operations
	5.3	**Physiology – Psychoactive Substances** I. Know the prohibition of use of psychoactive substances during UAS operations

		II. Describe the effects of intoxication during UAS operations III. State the penalty on operating an UA under the influence of any psychoactive substances

	5.4	**Psychology – Fatigue**
		    I. Identify the causes of fatigue
		        a. Flight duration/ flight workload
		        b. Time of flight
		        c. Working hours
		        d. Effects of weather
		        e. Outdoor, remote and lone working
		        f. Crew/ colleague management
		        g. Depth perception
		        h. Blind spot
		        i. Scan technique
		        j. Decision process
		        k. Public/ third parties
		        l. Stress/ pressure from 'coustomers'
		    II. Describe the effects of fatigue on UAS operations
		    III. Describe fatigue management techniques

		Psychology – Stress
		    I. Identify the causes of stress
		    II. Describe the effects of stress on UAS operations
		    III. Describe stress management techniques

6. Operating Procedures		
Learning Objective		
Knowledge Areas	**6.1**	**Pre-planning** I. Consideration of intended task

	6.2	**Site assessment**
		    I. Establishing a safe operating environment
		    II. Hazard identification & risk assessment
		    III. Mitigating measures
		    IV. Site owner's permission

	6.3	**Situational awareness**
		    I. Describe the importance of situational awareness
		    II. Maintaining situational awareness

		a. Location
		    b. Airspace
		    c. Aerodromes
		    d. Obstructions
		    e. Public right of way
		  III. Assessing situations and making decisions
		  IV. Task prioritization and management

	6.4	**Communications**
		  I. Operating alone
		  II. Liaison with Air Traffic Control
		  III. Operating with other air users

	6.5	**Pre-flight**
		  I. Pre-flight checklist
		  II. Security of attachments/payload
		  III. Airworthiness
		  IV. Failsafe check
		  V. Battery condition
		  VI. Weather

		In Flight
		  I. In-flight monitoring - Fuel/battery status
		  II. Visual Line of Sight
		  III. Emergency actions: (Emergency Response Plan), loss of control/flyaway, malfunctions
		  IV. Deconfliction/separation
		  V. Designated landing area not clear

		Post-flight
		  I. Post-flight actions - debrief/logging of flight details
		  II. Post-flight maintenance

		Security
		  I. Public access to aircraft and control
		  II. Other security considerations

		Operator Responsibility i. Development of Operations Manual

7. UAS Maintenance & Emergency Procedures

Learning Objective		
Knowledge Areas	**7.1**	**Maintenance** I. Know the difference between maintenance and flight checks II. Explain the importance of maintenance III. Know the importance of keeping a maintenance log

	7.2	**Emergency Procedures**
		I. List the common emergencies and how these emergencies are identified
		    a. Loss of GPS
		    b. Low power
		    c. Loss of C2 link
		    d. Loss of orientation/control
		    e. Stall (aeroplane)
		    f. Fly-away
		II. Explain the importance of emergency procedures
		III. Development appropriate and adequate emergencies handling procedures

8. Airmanship and Aviation Safety

Learning Objective		
Knowledge Areas	**8.1**	**Good airmanship principles** I. Aircraft safe to operate II. Remote pilot fit to operate aircraft III. Proper planning and preparation IV. Hazard identification
	8.2	**Flight Safety** I. Avoiding collisions II. 'See and Avoid' with respect to manned aircraft and other air users
	8.3	**Perception** I. Distance, height and speed awareness II. Planning, go/no go decisions III. Overflight of people, crowds and gatherings

		IV. Congested area operations V. Flights at night
	8.4	**Operational mitigations** I. For ground and air risks
	8.5	**Remote pilot logbooks**
9. UAS Airspace Operating Principles & Navigation Charts		
Learning Objective		

Knowledge Areas	**9.1**	**UAS Airspace Operating Principles**
		   I. Airspace overview
		       a. Flight Information Region (FIR)
		   II. Airspace classifications
		       a. Differing considerations, controlled airspace
		   III. Specific airspace types
		       a. Flight Restriction Zone (FRZ), Aerodrome Traffic Zone (ATZ), gliding/parachuting/microlight sites etc
		   IV. Airspace reservations
		       a. Danger Areas, Prohibited Areas, Restricted Areas
		       b. Temporary Airspace Reservations
		   V. Obtaining information
		
		       a. Sri Lanka Aeronautical Information Publication (AIP)
		       b. Aeronautical Information Circulars (AICs)
		       c. Notices to Airmen (NOTAMs)
		       d. Whom to contact
		   VI. UAS Operations
		       a. Visual Line of Sight (VLOS)
		       b. Segregated Airspace

	9.2	**Navigation Charts**
		   I. Basic map reading (OS)
		       a. 1:50,000 and 1: 25,000
		   II. Aviation charts

		a. 1:500,000 and 1: 250,000 b. Interpretation c. Specialized charts (e.g. Sri Lankan helicopter routes) III. Understanding of basic terms a. Aeronautical units of measurement (Ft, km, Nm) b. Elevation c. Altitude IV. GPS principles a. How it works and limitations

Appendix 3 – Contents Of Operations Manual

1. **General**

    (a) Preamble relating to use and authority of the manual.

    (b) Description of the structure and layout of the manual, including:
    -   various parts, sections and their contents;
    -   the paragraph numbering system; and
    -   table of contents.

    (c) Amendment, revision and distribution of the manual, including:
    -   procedures for amendment;
    -   amendment record page; and
    -   distribution list.

    (d) Glossary of significant terms and definitions.

    (e) Description of the scope of training and assessment under the organization's terms of approval.

    (f) Organization details, including:
    -   Organization chart;
    -   Organization policy;
    -   General flight planning procedures; and
    -   Fatigue management system.

    (g) Qualifications, responsibilities and succession of command of management and key operational personnel, including but not limited to:
    -   Accountable Manager;
    -   Head of Training;
    -   Quality Manager;
    -   Instructors; and
    -   DFE(UA).

    (h) Description of the facilities and equipment available, including:
    -   Facilities for staff;
    -   Classrooms to conduct theory lessons;
    -   Suitable training equipment (e.g. list of UA models and/or flight simulators); and
    -   Flying area to conduct practical lessons and assessment.

2. **Unmanned Aircraft Operating Information**

    (a) UA user manual.

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(b) UA Preparation and handling, including:
- Performance limitations;
- Use of checklists;
- UA maintenance plan and procedures;
- Battery charging procedures; and
- Emergency procedures.

3. **Staff Training**

(a) Details of the procedures to determine competency of instructors and DFE(UA).
(b) Details of the training program for instructors and DFE(UA).
(c) Procedures for refresher and upgrade training.

4. **Overview of Training Programme for Trainees**

(a) Key components of training programme:
- Theory
- Practical

(b) Administration of key components.

5. **Conduct of Practical Assessment and Proficiency Check**

(a) UATO conducting practical assessment and proficiency check should demonstrate applicable requirements such as:

- procedures for demonstrating objectively that the practical assessment and proficiency check are conducted in an un-biased manner;
- internal feedback system for detecting training deficiencies; and
- proper handling of test records.

6. **Records**

Policy and procedures regarding:

(a) Attendance records;
(b) Trainee training records;
(c) Staff training and qualification records;
(d) Standardization of record entries; and
(e) Security of records and documents.

Appendix 4 – Contents Of Training Manual

1. **Training Plan**

   (a) Aim of the course in the form of a statement of what the trainee is expected to be able to do as a result of the training, the level of performance, and the training constraints observed.

   (b) Training curricula, including:
   - theoretical knowledge curriculum; and
   - flying curriculum.

   (c) The general arrangements of daily and weekly programmes for training.

   (d) Training policies in terms of:
   - maximum student/ trainee training flights, per day/ week/ month;
   - restrictions in respect of training periods for students/ trainees;
   - bad weather constraints; and
   - minimum rest periods.

   (e) Policy for the conduct of trainee evaluation, including:
   - procedures for progress checks;
   - procedures for readiness evaluation; and
   - procedures for refresher training.

   (f) Policy regarding training effectiveness, including:
   - individual trainee responsibilities;
   - liaison procedures between training departments;
   - procedures to correct unsatisfactory progress;
   - procedures for changing instructors;
   - internal feedback system for detecting training deficiencies; and
   - requirements for reporting and documentation.