NO. SALINAN …….

MALAYSIAN STATE AIRWORTHINESS AUTHORITY

MALAYSIAN STATE TECHNICAL AIRWORTHINESS MANUAL

MSTAR UAS – UNMANNED AIRCRAFT SYSTEM

INTERIM

VOLUME 7

The Malaysian State Airworthiness Authority (MSAA) issued the Malaysian State Technical Airworthiness Manual (MSTAM) as a Technical Airworthiness Management System. Authority given by the Minister of Defence under Council of Ministers of Defence Meeting Series 02/06 *(Mesyuarat Lembaga Menteri Pertahanan Siri 02/06)* dated 05 September 2006, the State Airworthiness Authority (SAA) makes this MSTAM.

MSTAM contains Airworthiness Management System (AMS) information related to policies, regulatory frameworks, State Technical Airworthiness Regulations (STAR), Airworthiness Requirements, and Implementing Rules specific to the State Technical Airworthiness Program. The Implementing Rules describe the Technical Requirements, Acceptable Means of Compliance, and Guidance Material to give effect to the MSTAR provision applicable to state aircraft set out in the Malaysian State Technical Airworthiness Regulation (MSTAR) produced by the technical airworthiness regulator (TAR) MSTAM and its supplementary documents apply to every person, aircraft, aeronautical product, and maintenance training related to State aircraft.

Non-compliance with these Orders

Any organisation or person subject to and upon the terms and conditions of the agreement who contravenes any provision in this MSTAM shall be liable to the implication imposed under appropriate airworthiness instruments.

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LIST OF EFFECTIVE PAGES

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*No.	Date			
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GLOSSARY

Notes:

1. Definitions with no superscript have been sourced directly from the European Military Airworthiness Document (EMAD 1). Those definitions and terminologies with a superscript* are either DGTA-specific or derived from other sources.

Academic and Curriculum Manager*

A person who oversees the curriculum design, training media, lesson plan, and instructor guides to evaluate the effectiveness of basic and type training courses.

Acceptable Means of Compliance

This illustrates a means, but not the only means, by which regulation can be met, and a regulated entity may decide to show compliance by other means. Hence, only an Authority can agree on alternatives to the published Acceptable Means of Compliance. Acceptable Means of Compliance are strongly recommended practices, and justification will be required of the Authority if they are followed. The burden of proof that regulation is satisfied rests entirely with a regulated entity when alternatives are proposed to the Authority.

Accountable Manager*

A person designated by the Approved Organisation and named in the Exposition, who is accountable to the DGTA for maintaining safety standards required by relevant MSTAR and any additional standards specified in the respective Exposition. Also, a key figure who has influence within the organisation and the ability to make appropriate resource decisions to ensure compliance with airworthiness regulations.

Addition

The inclusion of further basic categories or sub-categories to a State Aircraft Maintenance Licence that is already held by an individual.

Adopt

To transcribe, with no deviation, the requirements (European Military Airworthiness Requirements) into national regulations using English or the National Language(s).

Advisory Material

Advisory Material provides interpretation of technical airworthiness requirements and standards to assist in understanding and implementation. It also provides guidance on methods and procedures that are in compliance with technical airworthiness requirements and standards. Advisory material, including the described methods and procedures, is not mandatory, and organisations may choose to follow other means of demonstrating compliance.

Aeronautical Product*

Any airframe, aircraft system (airframe, avionics, engine, armament, and egress and survival),

aircraft power train (including engines, auxiliary power units, and transmissions), propeller, rotor and or components/parts/materials, equipment parts including computer systems software/firmware which when connected has a direct effect on the structural and technical integrity of the aircraft.

Aircraft

Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

Aircraft Airborne Equipment*

Equipment that interfaces with and is borne by the aircraft or aircrew during flight. This includes role equipment but not items of cargo.

Aircraft Battle Damage Repair*

Aircraft Battle Damage Repair is the subset of Battle Damage Repair that uniquely applies to aircraft and is used to restore sufficient strength and serviceability to permit damaged aircraft to fly additional operational sorties or to enable those aircraft that are damaged beyond unit repair capability to make a one-time ferry flight to a major repair facility.

Aircraft Flight Manual

An Aircraft Flight Manual is a manual, associated with the Malaysian State Type Certificate (MSTC), containing limitations within which the aircraft is to be considered airworthy, and instructions and information necessary to the flight crew members for the safe operation of the aircraft.

Aircraft Maintenance Documentation*

The aircraft's maintenance and operational certificate, maintenance forecast, and technical particulars record.

Aircraft Maintenance Program

A document that describes or incorporates by reference the specific schedule maintenance tasks and their frequency of completion, the associated maintenance procedures, and related standard maintenance practices necessary to preserve the airworthiness of those aircraft to which it applies.

Aircraft Non-Airborne Equipment*

Equipment that interfaces with the aircraft, aircrew, or aircraft equipment but which is not usually airborne itself. Such equipment may include but is not limited to aircraft ground servicing equipment, ground test equipment, and some mission planning systems that interface with the aircraft or aircraft equipment.

Aircraft-Related Equipment*

Aircraft-related equipment can be aircraft airborne equipment or aircraft non-airborne equipment whose performance could directly affect airworthiness.

Aircraft Technical Log*

The primary source for technical and operational data on each flight that occurs on an aircraft. A system for recording data that includes defects and malfunctions, block times, and fuel consumption during the aircraft operation and for recording details of all maintenance carried out on an aircraft between scheduled base maintenance visits. Also known as the journey logbook, it is used for recording flight safety and maintenance information the operating crew needs to know.

Airworthiness

The ability of an aircraft or other airborne equipment or system to operate in flight and on the ground without significant hazard to aircrew, ground crew, passengers (where relevant), or to other third parties.

Airworthiness Codes

Product airworthiness requirements, applicable to the design of a product that is approved by a competent airworthiness authority for the use with standardized aircraft categories (e.g. EASA CS, FAA FAR, STANAG, Def-STAN, etc).

Airworthiness Directive

A document issued or adopted by the Authority that mandates actions to be performed on an aircraft to restore an acceptable level of safety when evidence shows that the safety level of this aircraft may otherwise be compromised.

Airworthiness Limitation Item

This is an item arising from a system safety analysis that has been shown to have failure mode(s) associated with an unsafe condition.

Airworthiness Standards Representative*

A Head of Design Organisation with delegated authority from the Technical Airworthiness Regulator (TAR) to set and review airworthiness standards for the State Aircraft Operator (SAO).

Airworthy*

The status of an aircraft, engine, propeller, or part when it conforms to its approved design and is in condition for safe operation.

Approved Basic Training Course*

The Approved basic training course shall consist of knowledge training, knowledge examination, practical training, and a practical assessment.

Approved Maintenance Organisation*

An organisation that has been sponsored by Maintenance Authorising Office and certified (awarded a Maintenance Authority Certificate) by the TAR and authorized to conduct maintenance on state aircraft and aeronautical products.

Approved Maintenance Training Organisation*

An organisation that has been certified (awarded a Maintenance Training AuthorityCertificate (MTAC)) by the TAR and authorized by the relevant MAO to conduct training and/or examinations and issue certificates to students upon successful completion of the courses.

Approved Training Course*

This means a defined course of maintenance training designed to give a level of knowledge and some experience to a student.

Approved Type Training Course*

Aircraft type training can be divided into aircraft or helicopter type ratings for state aircraft maintenance licensing Category B1 aeromechanical and Category B2 avionics.

Artefact

An airworthiness-related document, either hard copy or electronic, can be used as evidence in making an airworthiness judgment.

Authorised Aircrew*

Nominated aircrew who have been formally authorized by the Senior Maintenance Manager (SMM) or delegate to perform a particular maintenance task.

Authorised Technical Data*

Data that has been reviewed, approved, and released by the TAR or a DOA responsible for the technical equipment to which the technical data applies.

Authorised Tradesperson*

An individual operating as part of an AMO, authorized by the SMM or delegate as competent to carry out a specific scope of maintenance activities.

Authority

Authority means a National Military Airworthiness Authority responsible for the airworthiness of military aircraft.

Aviation Ground Support Equipment*

AGSE is the equipment used to support maintenance and aeronautical equipment directly.

Aviation Software*

Aviation Software is inclusive of:

a. On-aircraft software, off-aircraft software with aircraft interface, and off-aircraft software with no interface but with airworthiness or safety implications.

b. Technologies that resemble software development.

Base Maintenance

Maintenance tasks falling outside the criteria for line Maintenance.

Board of State Technical Airworthiness*

BoSTA is convened at least four times a year or as and when required. It is a platform for recommending technical airworthiness management to the TAR and issuing Aircraft Certificates, Organisation Approval (DOA, AMO, AMTO, CAMO), and Personnel Licensing. BoSTA ensures that each aircraft type remains airworthy to fly by verifying the technical airworthiness requirements are met. Any issues related to technical airworthiness requirements and procedures shall be reviewed and approved by the BoSTA committee.

Continuing Airworthiness Management Organisation*

The State Aircraft Operator / State Registered Aircraft Operator (SAO/SRAO) responsible for Configuration Item (CI) management of the whole aircraft is required to have CAMO approval from TAA-DGTA.

Centre of Expertise*

SAO DOA in which the Senior Design Engineer (SDE) position is a designated Airworthiness Standard Representative appointment.

Certification

Recognition that a product, part or appliance, organisation or person complies with the applicable airworthiness requirement followed by the declaration of compliance.

Certification Basis*

The set of standards that define the criteria against which the design of aircraft or aircraft-related equipment, or changes to that design, are assessed to determine their airworthiness.

Certificate of Release to Service

This statement, signed by an appropriately authorised person, on behalf of an approved organisation, asserts that maintenance has been properly carried out. The Certificate of Release to Service contains the basic details of the maintenance carried out, the date it was completed, and the identification details (may include an authorisation stamp) of the person issuing the certificate.

Certification Review Item

A document recording Deviations, Special Conditions, new Means of Compliance, or any other certification issue that requires clarification and interpretation or represents major technical or administrative issues.

Certifying Staff

Personnel responsible for the release of an aircraft or a component after production and/or maintenance.

Chief Invigilator*

This means a person who is appointed to lead the Invigilators.

Chief Executive Officer

A person who is responsible for a civil company within which the Approved Organisation operates. The Chief Executive Officer may report to a board of directors and may appoint other managers, or he/she may be one of very few people in a small company. In relation to MSTAR M, the Chief Executive Officer is mentioned as he/she may be senior to the Accountable Manager.

Compliance Demonstration

Activities to demonstrate that the product, part, or appliance complies with the requirements in the Certification Basis.

Component

Any engine, propeller, part, or appliance.

Component Maintenance Manual

A formal document that details how off-aircraft maintenance instructions on the specified component shall be accomplished.

Configuration*

The functional and physical characteristics of existing or planned hardware, firmware, software or a combination thereof, as outlined in technical documentation (which includes specifications, standards, and drawings) and ultimately achieved in a product.

Configuration Control

A systematic process that ensures that changes to released configuration documentation are properly identified, documented, evaluated for impact, approved by an appropriate level of authority, incorporated, and verified.

Configuration Deviation List

A list, established by the Type Certificate Holder and approved by the National Military Airworthiness Authority, which identifies any external parts of an aircraft type that may be missing at the commencement of a flight and which contains, where necessary, any information on associated operating limitations and performance correction. Examples of Configuration Deviation List items will vary from aircraft type but typically may include external light covers, retractable landing lights, etc.

Configuration Item

Any component, module, subcomponent, equipment, technical manuals, software, or ground support equipment, that can be submitted to the configuration control process.

Configuration Management

A management process for establishing and maintaining consistency of a product's performance, functional, and physical attributes with its requirements, design, and operational information throughout its life.

Contingency Maintenance*

Those maintenance activities are performed during a declared contingency operation. CMaint involves revised servicing schedules, component lifting strategies (plans), and repair philosophies, including Battle Damage Repair, which will maximize operational availability while constraining and managing risk.

Continuing Airworthiness

All of the processes ensure that, at any time in its operating life, the aircraft complies with the airworthiness requirements in force and is in a condition for safe operation.

Continued (design) airworthiness

All tasks to be carried out to verify that the conditions under which a Type-Certificate or a Supplemental Type Certificate has been granted continue to be fulfilled at any time during its period of validity.

Crew/Aircrew

Include Pilot(s) and other personnel on board the aircraft and/or the Unmanned Aerial Vehicle control station with responsibilities to ensure the safe conduct of the flight.

Critical Design Configuration Control Limitations

Critical Design Configuration Control Limitations identify the critical design features such as proper wire separation, proper installation of a panel gasket, minimum bonding jumper resistance level, etc., that must be maintained in the same manner throughout the life of the aircraft to comply with the (Military) Type Certificate and maintain airworthiness. The purpose of the Critical Design Configuration Control Limitations is to provide instruction to ensure these critical features are present throughout the life of the airplane and are inspected and verified when changes, repairs, or maintenance actions occur in the area.

Declaration of Compliance

A statement, signed by the Head of Design or by an authorized representative, to show compliance with all applicable type certification basis and, where applicable, environmental protection requirements. It declares that the aircraft is airworthy within the specific design limitations.

Deeper Maintenance*

This level of maintenance includes tasks that are more complex than operational maintenance and normally require specialized equipment and technical skills and which rely on access to extensive support equipment and workshop facilities for successful conduct.

Delegated Airworthiness Representative*

An individual within the CAMO whom the TAR has authorized to perform design acceptance functions to make compliance findings and/o r provide airworthiness approval in the configuration item management system.

Design*

The process or act of creating or changing a product and related technical process descriptions through the application of scientific and engineering effort (verb), or the outcome of that process (noun). The design, therefore, encompasses not only the configuration of the product, but also the:

a. Testing and evaluation a r e needed to validate that the design meets performance and safety requirements.

b. Manufacturing processes (including production test requirements) that require special control to ensure the product meets requirements.

c. In-service monitoring requirements, maintenance processes, and authorized repairs.

d. Maintenance lives and intervals and fatigue life.

e. Operating procedures and limits.

Design Acceptance*

The process whereby a design or design change (i.e. an output of the design process) involving aircraft or aircraft-related equipment is determined to be technically acceptable for SAO use based on a determination that the specified requirements and design standards are sufficient and applicable (to the SAO authorised configuration, maintenance policy and procedures, and operations) and that the quality of the design has been proven to the satisfaction of the responsible CAMO – Continuing Airworthiness Manager. Generally, design quality is assured through approval of the design by a DOA against the approved design requirements and standards plus an acceptable basis of design verification.

Design Acceptance Certification*

The final act of the Design Acceptance process whereby a CAMO – Continuing Airworthiness Manager provides a certified record of the technical acceptability of a change to aircraft or aircraft-related equipment Type Design.

Design Approval Certification*

The act of approval of design output resulting from a process that formally examines and documents compliance of a design (or design change) with specified requirements and design

standards.

Design Change*

A design change is a change in Type Design as defined in MSTAR 21.A.91.

Design Engineer*

A professional engineer within a DOA with assigned authority from the SDE to perform certain engineering activities, including judging the significance of design changes and undertaking a design review of significant design changes.

Design Organisation Approval*

An organisation that has been sponsored by the Maintenance Authorising Office and certified (awarded an Engineering Authority Certificate (EAC)) by the TAR to provide design or engineering management services to the SAO.

Design Organisation Exposition*

A controlled quality document containing the details of an organisation's Engineering Management System (EMS). The DOE describes all of the requirements that are satisfied by an organisation to become and remain a DOA.

Design Review*

The act whereby a design (or design change) is independently checked by an authorized person (other than the person who developed the design) to verify the validity of the assumptions, conditions, data, and methods used in design development and to verify that the design output meets the specified design input requirements.

Design Support Network*

A collective term describes a group of agencies that provide design support to a DOA.

Deviation*

A specific written authorisation to depart from an item's current approved configuration documentation. A deviation differs from an engineering change in that an approved engineering change requires revision of documentation defining the affected item. In contrast, a deviation does not revise the applicable document or drawing.

Engineering Authority*

The authority is assigned expressly to an organisation (DOA) or an individual within an organisation to undertake specific engineering activities.

Engineering Authority Certificate*

The certificate awarded by the TAR to an organisation to operate as a DOA.

Engineering Change*

A change to the currently approved configuration documentation of a Configuration Item (CI) at any point in the life cycle of the CI.

Engineering Change Proposal*

An Engineering Change Proposal is defined as a proposed change to the current approved configuration of a CI and the supporting design documentation via which the change is described, justified, and submitted to the Configuration Control Board (CCB).

Examination*

A written or practical examination or combination of both is conducted at the end of every subject.

Examination Department*

Means a department in the training organisation for the management of all examinations conducted.

Examination Manager*

A person who oversees the design of question papers, standards of examinations, and invigilation. Such person(s) may also be an Instructor and/or Assessor.

Examiner*

This means a person approved by DGTA or an approved training organisation to conduct and administer the examination.

Exemption*

The TAR grants written authorisation to either a DOA, AMO, CAMO, AMTO, or licensing to depart from a particular technical airworthiness regulation for a specified period of time.

Exposition

The document or documents that contain the material specifying the scope of work deemed to constitute approval and showing how the organisation complies with an MSTAR.

Extension

Inclusion of additional topics to Categories A, B1, and B2 Military Aircraft Maintenance Licences as detailed in MSTAR 66 Appendix I (which includes Modules 50-55) that are not part of the applicable modules for that category of Military Aircraft Maintenance Licence.

Flight Safety Critical Item*

Any part, assembly, or installation containing a critical characteristic whose failure, malfunction, or absence could cause a catastrophic failure or an uncommon engine shutdown, resulting in loss or serious damage to the aircraft or an unsafe condition.

Fit for Flight

Condition of a type design being certified as compliant with applicable airworthiness requirements as well as of an aircraft having been serviced and inspected as meeting the certified design and prepared for the intended flight.

Guidance Material

This is typically developed to provide additional explanation to assist the application of the requirement and/or explain the Acceptable Means of Compliance.

Human Factors

Principles apply to design, certification, production, training, operation, and maintenance and seek a safe interface between the human and other system components by properly considering human performance.

Human Performance

Human capabilities and limitations have an impact on the safety and efficiency of operations.

Implement*

To introduce MSTAR requirements into regulations by either adoption or compliance.

Instructions for Continuing Airworthiness

Instructions for Continuing Airworthiness detail the methods, inspections, processes, and procedures necessary to keep aircraft and/or products airworthy.

Instructor*

This means a person appointed to carry out instructional duties, compile questions for examinations, and undertake duties as invigilator and examiner.

Invigilator*

This means a person who is responsible for overseeing the conduct of the examinations.

Letter of Engineering Authority*

An attachment to an EAC that defines the scope of activity and any caveats and limitations under which the EAC is issued.

Letter of Maintenance Authority*

An attachment to the MAC defines the scope of activity and any caveats and limitations under which the MAC is issued.

Letter of Maintenance Training Authority*

An attachment to the MTAC defines the scope of activity and any caveats and limitations under which the MTAC is issued.

Life Limited Parts

Parts that, as a condition of their type certificate, may not exceed specified operating time, calendar time, number of operating cycles, or any other approved service life consumption units.

Limited Certification Authorisation

This is issued by the Approved Maintenance Organisation, in accordance with a procedure approved by the DGTA, for flight crew, flight engineer, or crew chief to carry out specific tasks (usually away from their home base or station). The authorisation permits the holder to issue certificates of release to service following specific tasks within the limits of the tasks specifically endorsed on the authorisation.

Line Maintenance

Carried out before flight to ensure that the aircraft is fit for the intended flight.

Maintenance

Any one or combination of overhaul, repair, inspection, replacement, modification, or defect/fault rectification of an aircraft or component, with the exception of pre-flight inspection.

Maintenance Authority*

The authority to undertake specific maintenance activities.

Maintenance Authority Certificate*

The certificate awarded by the TAR to an organisation to operate as an AMO.

Maintenance Authorising Office*

The MAO is the Head of the SAO Aviation Engineering Organisation and is responsiblefor controlling the resources that enable the maintenance organisation to conduct maintenance.

Maintenance Document*

The orders, instructions, publications, and forms utilised by technical personnel when conducting maintenance include Defence Instructions, Standing Instructions, maintenance forms, Special Technical Instructions, specifications, and worksheets. Maintenance documents may be provided in paper-based and/or electronic formats.

Maintenance Inspector/Supervisor*

A person authorised to conduct compulsory maintenance inspections and/or supervise maintenance activities on nominated aircraft type and aeronautical product. The term applies to all personnel with direct maintenance task supervision or inspection responsibilities and, as such, may include, but is not limited to, trade supervisors, independent/final inspectors, and progressive/mandatory inspectors.

Maintenance Manager*

An authorised person responsible for managing maintenance activities on nominated aircraft type or aeronautical product within an AMO.

Maintenance Manual*

That part of the Instruction for Continuing Airworthiness. Those instructions are required to keep aircraft and aircraft-related equipment in an airworthy condition.

Maintenance Organisation Exposition*

A controlled quality document containing the details of an organisation's maintenance management system. The MOE describes all of the requirements that are satisfied by an organisation to become and remain an AMO.

Maintenance Records*

This is an important document that demonstrates compliance with the airworthiness requirements has been met. It is completed and signed by an authorized person to certify that the maintenance work performed has been completed satisfactorily under approved data. Maintenance records information includes:

a. The total time in service (hours, calendar time, and cycles, as appropriate) of the aeroplane and all life-limited components.

b. The status of compliance with all mandatory continuing airworthiness information.

c. Appropriate details of modifications and repairs.

d. The time in service (hours, calendar time, and cycles, as appropriate) since the last overhaul of the aeroplane or its components subject to a mandatory overhaul life.

e. The status of the aeroplane's compliance with the maintenance program.

f. The detailed maintenance records show that all requirements for signing a maintenance release have been met.

Maintenance Training Authority Certificate*

The certificate awarded by the TAR to an organisation to operate as an AMTO.

Maintenance Training Management Plan*

A controlled quality document containing the details of an organisation's training management system. The MTMP describes all of the requirements that are satisfied by an organisation to become and remain an AMTO.

Maintenance Personnel*

Maintenance personnel, including aircrew and Non-Trade Personnel (NTP), are authorised to perform maintenance tasks.

Maintenance Support Network*

A collective term describes a group of agencies that provide maintenance support to an AMO.

Maintenance Test Flight*

It is a flight to ensure that an aircraft meets specifications concerning performance and handling characteristics and to establish, on prescribed occasions, that no deterioration of that standard has occurred in service.

Malaysia State Airworthiness Authority*

The Competent Authority consists of the State Airworthiness Authority and includes any officer empowered by him to perform all or any of the functions.

Malaysian State Type Certificate*

A certificate issued by the State Airworthiness Authority (SAA), for an aircraft type entered on the register of state aircraft. The MSTC signifies that the SAO has assessed the particular aircraft type (undergone type certification) as airworthy and supportable in its intended SAO role/s.

Master Minimum Equipment List*

The Master Minimum Equipment List is a list established for a particular aircraft type by the organisation responsible for the Type Design with the approval of the Malaysian State Airworthiness Authority that identifies items that individually may be unserviceable at the commencement of a flight. The Master Minimum Equipment List may be associated with special operating conditions, limitations, or procedures.

Material*

Products used in the manufacture of components and in the maintenance and operation of aircraft, including fuels, oils, and lubricants.

Mean of Compliance

The techniques will be used to demonstrate the compliance of the type design against each certification requirement identified on the Certification basis. Examples include tests, analyses, and inspections.

Military Aircraft*

Aircraft (including Unmanned Aircraft Systems) in the military service of the Armed Forces include any aircraft commanded by a member of the Armed Forces in the course of his duties as such a member.

Minor Amendment*

Those changes to the Organisation’s Exposition(s) do not affect the Malaysian State Airworthiness Regulation-related approval.

Minor Maintenance

Includes repetitive tasks and simple defect/fault rectification.

Mission Critical Item*

An item whose failure will seriously degrade an aircraft's ability to complete an assigned mission or lead to a mission being aborted.

Modification

A modification is a change of the design to the authorized configuration of the approved type design of a product, part, or appliance. Typical examples are component changes, equipment additions, or software changes and often involve a revision to the drawings and support documentation.

Non-Conformance*

The failure of a product, process or system to meet its regulatory, specification, drawing, or quality requirements.

Non-installed equipment

This means any instrument, equipment, mechanism, apparatus, appurtenance, software, or accessory carried on board an aircraft by the aircraft operator, which is not a part, and which is used or intended to be used in operating or controlling an aircraft, support the occupants' survivability, or which could impact the safe operation of the aircraft.

Non-Technical Personnel*

A collective term covering personnel that have not completed formal SAO-recognised technical trade training.

Occurrence Reporting

The reporting to the relevant Authorities, to the Malaysian State Type Certificate Holder, or Restricted Type Certificate Holder, and/or the Supplemental Type Certificate Holder as appropriate, of any failure, malfunction, defect, or other occurrence which has resulted in or may result in an unsafe condition. The Type Certificate Holder can also make an Occurrence Report to the Authority.

Organisation*

This means an organisation is registered as a legal entity. Such an organisation may conduct business from multiple addresses and hold more than one approval.

Original Equipment Manufacturer*

The OEM is the manufacturer listed as the approved source of manufacture for components in the type certificate data sheet. The OEM owns and controls the source drawings, i.e., the design of the component.

Operational Maintenance*

Tasks directly related to equipment preparation for immediate use, recovery, and minor repair of the equipment after use. OM tasks require a limited range of support equipment and may involve the limited use of workshop facilities.

Parts and Appliances

Parts and appliances are lower-level components for which a Technical Standard Order may exist.

Period of Operation*

It is the time from the captains' acceptance of an aircraft until it's released back to maintenance. For rotary wing aircraft, the period of operation includes when the aircraft is released to aircrew for ground running of engines with the rotor engaged.

Permit to Fly*

A permit issued under State Technical Airworthiness Regulations.

Practical Assessor*

This means a person approved by the training organisation to conduct the practical assessment

Procedure*

A documented course of action is to be followed to ensure a consistent outcome.

Product

An aircraft, an engine, or a propeller.

Quality Management System*

All activities of the overall management function determine the quality policy, objectives, and responsibilities and implement them by means such as quality planning, quality controls, quality assurance, and quality improvement within the quality system.

Registration

Registration is a formal recording by the National Military Airworthiness Authority (or national equivalent) of individual aircraft on the military aircraft register and the assignment of a tail number.

Repair

A repair means the elimination of damage and/or restoration to an airworthy condition following initial release into service by the manufacturer of any product, part, or appliance.

Shall

Used to express mandatory requirements.

Should

Used to express a preferred, but not mandatory, method of accomplishment. An alternative method of accomplishment shall be agreed upon by the relevant authority.

Sign-Off*

A ‘sign-off’ is a statement issued by the ‘authorised person’ that indicates that the task or group of tasks has been correctly performed. A ‘sign-off’ relates to one step in the maintenance process and is, therefore, different from a certificate of release to service.

Special Conditions

Special conditions are included in the Certification Basis of the aircraft when the design features of a particular product or the experience in operation render any of the airworthiness code provisions inadequate or inappropriate to ensure conformity with essential requirements.

Specification*

A document defines a product's essential function and performance requirements and identifies the relevant standards for the acquisition process. In contrast to standards, specifications provide a more complete description of requirements and includethe basis for establishing conformance (particularly during test and evaluation), and hence validation for the acceptance of material.

Standard*

A description of a material, product, doctrine, or process meant for repeated applications by many users.

Standard Parts

A standard part is a part designated as such by the design approval holder responsible for the product, part or appliance in which it is intended to be used and manufactured in complete compliance with an established specification, which includes design, manufacturing, testing, and acceptance criteria, an uniform identification requirements. Examples of standard parts are aircraft general spares as defined by the design approval holder, such as nuts, bolts, washers, split pins, etc. All design, manufacturing, inspection data, and marking requirements necessary to demonstrate the conformity of the part will be in the public domain or established as part of recognised specifications.

State Airworthiness Authority*

The Chief of Air Force appointed by the Minister of Defence under Section 7 to take accountable for the State Airworthiness.

Statement of Operating Intent*

A document that sufficiently details the intended roles, missions, tasks, and in-service usage of the proposed Aeronautical Product Type Design permits an engineering analysis and assessment to determine and apply the appropriate Airworthiness Standards.

Statement of Operational Requirement*

A document or document defining the complete set of DAR requirements on a design agency to allow DAR acceptance of an aircraft or aircraft-related equipment design or design change. The SOR includes or references a *Specification,* which is the document defining the specific essential function and performance requirements for the product design or design change.

State Aircraft Maintenance Licence*

A categorized license which, dependent upon completion of all relevant approved training and examinations and the requisite levels of practical experience, permits an authorized individual to issue certificates of release to service or act as support staff for scheduled and/or unscheduled maintenance performed on an aircraft or aircraft systems as defined by MSTAR 66.

State Aircraft Operator*

The SAO are the military organisations or Government of Malaysia enforcement agencies that operate and maintain state-registered aircraft. SAOs that are currently under the ambit of the SAA are as follows:

a. Royal Malaysian Air Force (RMAF).

b. Malaysian Army Air Wing.

c. Royal Malaysian Navy (RMN) Air Wing.

d. Malaysian Fire and Rescue Department (Air Wing).

e. Malaysian Maritime Enforcement Agency (MMEA) Air Wing.

f. Malaysian Armed Forces Headquarters.

g. Malaysian Joint Forces Headquarters.

State Registered Aircraft*

State aircraft that are registered with MSAA through DGTA shall be known as state-registered aircraft.

Student*

This means a person who has been enrolled in the training organisation.

Supplemental Type Certificate*

A certificate issued by the Chief of Air Force for an aircraft that undergoes a major design change or role change that is beyond the type design defined in the original MSTC but is not substantial enough to require a complete re-investigation of compliance of the aircraft with the applicable airworthiness standards (ie does not require a new MSTC).

Support Staff*

Those staff holding MSTAR 66 SAML in category B1 and/or B2 with the appropriate extension and Military Aircraft Type Ratings are working in a base maintenance environment while not necessarily holding certification privileges.

Task Authorisation*

The legal authority allows a person to perform a specified maintenance task, recognising that the person has completed the prerequisite training relevant to the task and has demonstrated competency in the performance of the task. Task authorisations are recorded in the person's logbook (RMAF License Without Type Rating- RMAF LWTR) or equivalent document.

Technical Airworthiness*

A concept that defines the condition of an aircraft and supplies the basis for the judgment of its sustainability for flight in that it has been designed, constructed, and maintained to approved standards by competent and approved individuals who are acting as members of an approved organisation and whose work is certified as correct and accepted on behalf of the SAO.

Technical Airworthiness Regulator*

The person with delegated responsibility from the State Airworthiness Authority for technical airworthiness management of state aircraft and aircraft-related equipment.

Technical Data*

All recorded scientific, technical, and engineering nature relating to a weapon system. Includes specifications, standards, engineering drawings, instructions, reports, manuals, tabular data, test results, and software documentation used in the development, production, in-service operation, and logistics support (such as maintenance, provisioning, codification, testing, and modification), and disposal of a weapon system.

Technical Integrity*

Refers to the state of airworthiness of a platform, combat system, or ancillary item to fulfill its intended mission safely and effectively throughout its planned life. This requires evidenceto demonstrate that the material has been designed, constructed, and maintained to approved standards by competent and formally approved personnel acting as members of an approved organisation and whose work is certified as correct and accepted on behalf of the SAO.

Technical Record*

A set of documents describing the airworthiness of a particular aeronautical product must be maintained throughout its life cycle. The documents in a technical record generally fall into one of the following sub-categories:

a. In-service product certification documentation, including Maintenance Release records, aircraft release records, Flight Authority records, and Certificates of Conformance; and

b. Product status documentation, including operating records, maintenance records, configuration status data, airworthiness directive records, and product-related deviations/waivers.

Terms of Reference*

This means the scope of work that a person is responsible for and authorised to carry out on behalf of the approved maintenance training organisation.

Tool Control*

A systematic means of controlling tool usage that intends to eliminate the risk of tools being inadvertently left in an aircraft or aircraft components/equipment.

Training Manager*

A person who leads and manages the training management team and is responsible for all training functions in the AMTO.

Training Support Manager*

A person shall be appointed to plan and administer training resources to fulfill the knowledge and practical training.

Training Support Network*

A collective term used to describe a group of agencies that provide training support to an AMTO.

Type Certification*

The process of:

a. Prescribing and revising minimum standards governing the design of aircraft, engines, propellers, and other aircraft equipment as may be required in the interests of safety.

b. Administering a program to determine compliance with those prescribed standards and maintain certification integrity with a higher level of oversight, specification, and compliance than the normal Design Acceptance process requires. Successful type certification activity leads to the issue of an MSTC.

Type Certification Basis

An agreed set of airworthiness requirements (including code, special condition, etc.) that a product must be compliant with in order to obtain a Type Certificate.

Type Certificate Holder

The organisation is responsible for the relevant Type Design and applying for, and then holding, the Type Certificate and accepting the rights and obligations for the product.

Type Design

The set of approved design information necessary to define the product type, as detailed in MSTAR 21.A.31.

Type Record*

A set of documents that describes the state of Airworthiness for a particular Aeronautical Product Approved Type Design and must be maintained throughout the life of the Type Design. It consists of a summary document that defines the (aircraft) type design at the time of acceptance by Malaysia by providing an index to the issue status of all type design data.

Unapproved Aeronautical Product*

Any part, component or material that has not been manufactured and certified as conforming with the technical data against which type certification is provided.

MALAYSIAN STATE TECHNICAL AIRWORTHINESS MANUAL

LIST OF ABBREVIATIONS

Notes:

2. Definitions with no superscript have been sourced directly from the European Military Airworthiness Document (EMAD 1). Those definitions and terminologies with a superscript* are either DGTA specific or derived from other sources.

AA*	Airworthiness Authority
AAC*	Airworthiness Advisory Circular
ABDR*	Aircraft Battle Damage Repair
AD	Airworthiness Directive
AO*	Airworthiness Order
AMS*	Airworthiness Management System
AM*	Accountable Manager
AMC	Acceptable Means Compliance
AMO*	Approved Maintenance Organisation
AMTO*	Approved Maintenance Training Organisation
AB*	Airworthiness Board
ASR*	Airworthiness Standards Representative
ARC	Airworthiness Review Certificate
BoSTA*	Board of State Technical Airworthiness
CAA*	Civil Aviation Authority
CAAM*	Civil Aviation Authority of Malaysia
CAD*	Civil Airworthiness Directive
CAESE*	Centre for Aerospace and Engineering Services Establishment
CAP*	Competent Authority Procedures
CAME	Continuing Airworthiness Management Exposition
CAMO	Continuing Airworthiness Management Organisation
CAR*	Corrective Action Request
CARs*	Canadian Aviation Regulations
CDCCL	Critical Design Configuration Control Limitations
CDL	Configuration Deviation List
CI	Configuration Item
Cmaint*	Contingency Maintenance
CMM	Component Maintenance Manual
CRS	Certificate of Release to Service
CoA*	Certificate of Airworthiness
CS	Certification Specification
DAR*	Delegated Airworthiness Representative
DCA*	Department Civil Aviation
DGTA*	Directorate General Technical Airworthiness
DOE	Design Organisation Exposition
DoD*	U.S. Department of Defence
DOA	Design Organisation Approval
EAC*	Engineering Authority Certificate
EASA	European Aviation Safety Agency
EDA	European Defence Agency
EDP	Electronic Data Processing
EMACC	Europen Military Airworthiness Certification Criteria
EMAD	Europen Military Airworthiness Document
EMAD R	Europen Military Airworthiness Document Recognition

EMAR	European Military Airworthiness Requirement
EMPA	European Military Part Approval
EMTSO	European Military Technical Standard Order
ESF	Equivalent level of Safety Finding
EWIS	Electrical Wiring Interconnect System
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FTS	Fuel Tank Safety or Flight Test Schedule
GFE	Government Furnished Equipment
GM	Guidance Materials
GoM*	Government of Malaysia
HF	Human Factor
ICA*	Instructions for Continuing Airworthiness
ICAO	International Civil Aviation Organisation
IQA*	Internal Quality Audit
LEA*	Letter of Engineering Authority
LEP*	List of Effective Pages
LMA*	Letter of Maintenance Authority
LMS	Learning Management System
LMTA*	Letter of Maintenance Training Authority
MA*	Maintenance Authority
MAA*	Military Airworthiness Authority
MAC*	Maintenance Authority Certificate
MAF*	Malaysian Armed Forces
MAO*	Maintenance Authorising Office
MCAI*	Mandatory Continuing Airworthiness Information
MCAR*	Malaysian Civil Aviation Regulations
MCOQ*	Multiple Choice Objective Question
MM	Maintenance Manager
MEL	Minimum Equipment List
MSTC*	Malaysian State Type Certificate
MTAC	Maintenance Training Authority Certificate
MTC	Military Type Certificate
MTCH	Military Type Certificate Holder
MoD*	Ministry of Defence
MoT*	Ministry of Transport
MI/S*	Maintenance Inspector/Supervisor
MMI*	Maintenance Managed Item
MMP*	Maintenance Management Plan
MMS*	Maintenance Management System
MRM*	Management Review Meeting
MSTA*	Malaysian State Technical Airworthiness
MSTAR*	Malaysian State Technical Airworthiness Regulation
MSTC*	Malaysian State Type Certification
MTF*	Maintenance Test Flight
MTMP*	Maintenance Training Management Plan
NAA*	National Airworthiness Authority
NDT	Non-Destructive Test
OAA*	Operational Airworthiness Authority
OAR	Operational Airworthiness Regulator
OEM	Original Equipment Manufacturer
OJT*	On-Job Training
OM*	Operational Maintenance
OPPDMEF*	Organisation, People, Procedure, Data, Material, Equipment and Facilities
OSH*	Occupational Safety and Health

POA*	Production Organisation Approval
POE	Product Organisation Exposition
PTF	Permit To Fly
QM*	Quality Manager
QMS*	Quality Management System
RMAF*	Royal Malaysian Air Force
RMSTC*	Restricted Malaysian State Type Certificate
SAA*	State Airworthiness Authority
SARPs*	Standards and Recommended Practices
SAO*	State Aircraft Operator
SB	Service Bulletin
SMM*	Senior Maintenance Manager
SMS*	Safety Management Systems
SOI*	Statement of Operating Intent
SOR*	Statement of Operating Requirements
SRAO*	State Registered Aircraft Operator
SSP*	State Safety Programme
STANAG	Standardisation Agreement (in NATO)
STAP*	State Technical Airworthiness Policies
STAR*	State Technical Airworthiness Regulations
STC*	Supplemental Type Certificate
STI*	Special Technical Instruction
TAA*	Technical Airworthiness Authority
TAAC*	Technical Airworthiness Advisory Circular
TAC*	Technical Airworthiness Clearance
TAD*	Technical Airworthiness Directive
TAMM*	Technical Airworthiness Management Manual
TC	Type Certificate
TCCA*	Transport Canada Civil Aviation
TIR*	Technical Information Review
TM*	Training Manager
TSN*	Training Support Network
UAS	Unmanned Aircraft System

CHAPTER DIRECTORY

MALAYSIAN STATE TECHNICAL AIRWORTHINESS MANUAL

PART 1 **CHAPTER 7**

MSTAR UAS UNMANNED AIRCRAT SYSTEM

PART 1: TECHNICAL REQUIREMENT

UAS.10 – GENERAL GM1 GM2

(a) State UAS are categorized into 3 categories as below:

1. Certified category
2. Restricted category
3. Open category

(b) Applicability: AMC

1. MSTAR UAS are applicable to Certified category and Restricted category UAS only.
2. MSTAR UAS are applicable to State Registered UAS only.

UAS.20 - CERTIFIED CATEGORY UAS (MY)

(a) UAS shall only be eligible for operation under Certified category if they: GM

1. are State Registered in accordance with STAP.
2. have a Statement of Operating Intent and Usage (SOIU).
3. Type Certified in accordance with MSTAR.21. AMC
4. comply with all MSTAR initial airworthiness and continuing airworthiness regulations.
5. Certificate of Airworthiness (CoA) has been issued by Airworthiness Board (AB)
6. are controlled by a RP who is a qualified military pilot, or qualified in accordance with requirements mandated by SAO OAA.

UAS.30 - RESTRICTED CATEGORY UAS (MY)

(a) UAS shall only be eligible for operation under Restricted category if they are operated under either: GM

1. Restricted Certificate of Airworthiness (RCoA). Or,
2. UAS Permit to Fly (PTF).

(b) Restricted category UAS to be operated under a RCoA must: GM

1. be registered in accordance with STAP.
2. have its role and operating environment documented in a SOIU. AMC
3. comply with MSTAR initial and continuing airworthiness regulation, any deviation from MSTAR shall be approved by DG. AMC
4. comply with the SAO OAA requirements, to the extent directed by the AB.
5. be controlled by a RP who is qualified in accordance with requirements mandated by SAO OAA.
6. operate within the requirements and limitations included on the RCoA. AMC

(c) Restricted category UAS to be operated under a UAS PTF must: GM

1. be registered in accordance with STAP.
2. have its role and operating environment documented in a SOIU.
3. comply with the SAO OAA requirements, to the extent directed by the AB.
4. be controlled by a RP who is qualified in accordance with requirements mandated by SAO OAA.
5. operate within the requirements and limitations included on the UAS PTF.

UAS.40 - OPEN CATEGORY UAS (MY) GM

(a) UAS with Maximum Take Off Weight (MTOW) 20 kilograms or below are Open category UAS.

(b) Open category UAS shall only be eligible for operation if they comply with the requirements and limitations mandated by SAO OAA.

(c) Airworthiness of Open category UAS are managed by SAO.

UAS.50 – REGISTRATION GM AMC

(a) Certified Category and Restricted Category UAS are required to register as State Registered UAS.

(b) SAO is required to nominate a Delegated Airworthiness Representative (DAR) to manage the UAS registration and MSTAR compliance.

(c) Airworthiness Board (AB) is the approving authority for the registration of Certified and Restricted Category UAS.

(d) Prior to the registration, DGTA shall perform type validation and physical inspection on the UAS.

(e) The UAS registration requirements are equivalent to manned aircraft. Any request for deviation or exemption shall be granted by AB.

UAS.60 - UAS APPROVAL AND AUTHORISATION (MY) GM

(a) State Registered UAS must only be operated if authorised by the SAO Operational Airworthiness Authority (OAA). AMC

(b) Persons authorising and operators of a UAS must: GM

1. eliminate risk to other air users, and to people and critical infrastructure on the ground or water, and

2. if it is not reasonably practicable to eliminate risk to health and safety, minimise those risks As Low As Reasonably Practicable (ALARP).

(c) All State Registered UAS must operate in accordance with the requirements and limitations of Certified or Restricted category. GM

(d) UAS operated by Malaysian Armed Forces (MAF) must be State Registered when directed by the SAO OAA.

(e) UAS operated by SAO other than MAF may opts to be State Registered when directed by the SAO OAA.

(f) All State Registered UAS must operate in accordance with the apparatus assignment confers by Malaysian Communications and Multimedia Commission (MCMC).

UAS.70 - WEAPONISATION AND CARRIAGE OF PASSENGERS (MY)

(a) Integration of weapons onto State Registered UAS must require approval by the AB. GM

(b) Carriage of persons on State Registered UAS shall require approval by the AB. GM

UAS.80 - INCIDENT AND ACCIDENT REPORTING (MY)

(a) The SAO must report any identified UAS aviation safety event. GM

(b) The SAO under any one of the following UAS categories must report any identified UAS aviation safety issue:

1. Certified.

2. Restricted. AB will define the minimum reporting requirements as part of the RCoA or UAS PTF approval process.

UAS.90 - SUPPORT OF MSAA COMPLIANCE ASSURANCE (MY) GM

(a) Upon request, all data and access to support initial and on-going compliance assurance of UAS operations must be made available to the MSAA.

PART 2: ACCEPTABLE MEANS OF COMPLIANCE / GUIDANCE MATERIAL

UAS.10 - UAS APPROVAL AND AUTHORISATION (MY)

GM1 UAS.10 - Definitions (MY)

1. MSTAR.UAS employs the following definitions:

   a. **Unmanned Aircraft System (UAS)**. The entire system consisting of the Unmanned Aircraft (UA), Remote Pilot Station (RPS), communications/data links, networks, launch and recovery systems, and personnel required to fly/control the UA.

   b. **Unmanned Aircraft (UA)**. An air vehicle that flies under RP control or autonomous programming without a human on board in control.

   c. **UAS Operator**. The organisation, e.g. SAO; or person with Operational Control (OPCON) or tasking authorisation for the UAS.

   d. **Remote Pilot (RP)**. The person in direct command/control of the UAS, including manipulating flight controls or programming waypoints during flight.

   e. **Remote Pilot Station (RPS)**. A station at which the RP manages the flight of a UA.

   f. **Mission Essential Personnel (MEP)** (UAS context). All persons directly associated with the operation of the UAS or briefed as part of the UAS mission.

      NOTE: MEP includes all persons directly associated with the operation of the UAS or briefed as part of the UAS mission. MEP is broader than personnel directly associated with the launch, recovery and control during flight of the UAS. MEP may, depending on the UAS mission, include civilians, MAF personnel, and/or foreign military personnel. MEP must be aware of the UAS operations, the associated hazards and be essential to the conduct of the UAS task. MEP may include ground troops within a MAF joint operation/ exercise area, troops on a MAF ship or civilian personnel operating as part of a counter terrorism tasking.

   g. **General Public (GP)** (UAS context). All persons not classed as MEP, including all persons not directly associated with the operation of the UAS or briefed as part of the UAS mission.

      NOTE: GP includes all persons not classed as MEP, including all persons not directly associated with the operation of the UAS or briefed as part of the UAS mission. GP may, depending on the UAS mission, include civilians, MAF personnel, and/or foreign military personnel.

h. **Segregated Airspace**. Airspace of specified dimensions allocated for exclusive use to a specific user(s).

i. **Populous area** (UAS context). An area in relation to the operation of a UA that has a sufficient density of population for some aspect of the operation, or some event that might happen during the operation (in particular, a fault in, or failure of, the UA) to pose an unreasonable risk to the life or safety of somebody who is in the area, but is not connected with the operation.

j. **Critical infrastructure** (UAS context). A facility that, if damaged by a UA, may have an immediate and adverse effect on MEP or GP health and safety.

k. **Reserved**.

l. **Restricted Certificate of Airworthiness (RCoA)**. Approval to operate a UAS that is not certified. Issued by the AB, based on a risk assessment and implementation of related mitigation measures.

m. **SAO Controlled Land** (UAS context). Land where SAO controls access by the GP, such that SAO can ensure UAS operations can be conducted which are not in the proximity of, or overhead, the GP.

2. To promote international harmonisation, definitions per ICAO Doc 1419—Manual on RPAS; are employed by MSAA where applicable. Consequently, the definitions for UAS, UA, UAS Operator, RP, RPS and segregated airspace are drawn from ICAO Doc 1419, with minor adaptation to suit the military context where necessary. Where additional UAS definitions are required, preference should be given to those in ICAO Doc 1419.

3. In the military aviation safety context ‘critical infrastructure’ is defined slightly differently to the civilian context as it relates only to facilities where UAS damage may have an ‘immediate and adverse’ affect. Examples may include chemical plants, armament storage and fuel storage facilities.

GM2 UAS.10 - Applicability (MY)

1. MSTAR.UAS is applicable to all UAS except Unmanned targets, decoys and simulated weapons with a programmed or remotely piloted flight path and which have a recoverable and reusable airframe. MSTAR.UAS is not applicable to disposable/ one-time use UA such as submarine launched or air dropped UA. It is not applicable to guided missiles/rockets designed for single flight, including guided weapons with a loiter capability, safety of those guided weapons is not assured via MSTAR.UAS. Where doubt exists as to regulation applicability, advice should be sought from DGTA.

2. For UAS operated by or on behalf of SAO, MSTAR.UAS is applicable in its entirety. Furthermore, MSTAR.UAS presents the complete set of initial

airworthiness and continuing airworthiness relevant to UAS. Notably, other MSTAR are only relevant to UAS if explicitly invoked through MSTAR.UAS.

NOTE: MSTAR.UAS necessarily presents an independent regulation to the remaining MSTAR. This is due to the provenance of the remaining MSTAR, which were created for the risk context of manned aircraft. Consequently, for the most part, MSTAR focuses on aircraft safe flight, since this is essential to preserving the safety of aircraft and the occupants. In achieving that aim, the safety of other airspace users, people and critical infrastructure on the ground or water, is inherently preserved. The absence of aircraft occupants in UAS changes that risk context. For example, from a safety perspective, an uncontrolled ground or water impact might be considered acceptable for a UA operating in a sufficiently remote area. This difference in risk context is often sufficient to preclude the direct adoption of extant MSTAR. Consequently, MSTAR.UAS presents the initial airworthiness and continuing airworthiness regulations relevant to UAS.

3. Even where an external party is providing the UAS as a service to SAO, the relevant SAO are to retain shared responsibility for ensuring the health and safety of SAO and non-SAO personnel and the GP. This statutory duty cannot be transferred in its entirety to the external party.

4. UAS regulated by another National Airworthiness Authority (NAA) or Military Airworthiness Authority (MAA). Where a UAS is being used for SAO purposes but is regulated by another NAA or MAA:

   a. Authorisation by the relevant SAO is required for UAS operations, under MSTAR.UAS.60.A

   b. The statutory obligations for persons authorising UAS operations and operating the UAS must be met, under MSTAR.UAS.60.B

   c. Where the SAO is not satisfied that compliance with another NAA or MAA regulations will promote an appropriate level of safety, the SAO is obliged to impose all additional controls necessary to manage that risk.

5. Where the role and extent of involvement of another NAA or MAA is unclear, or the NAA or MAA is not recognised by the MSAA, MSAA advice, through DGTA, must be sought.

AMC UAS.10.B - UAS Categorisation (MY)

1. UAS categories are defined by the intended UAS operations and technical specifications of the UAS. Each UAS category imposes particular requirements and limitations, and these requirements/limitations are to be met in their entirety if operations under a particular UAS category are to be pursued.

2. Where the UAS category is unclear or disputed, DGTA will make the determination.

UAS.20 - CERTIFIED CATEGORY UAS (MY)

GM UAS.20.A - Scope (MY)

1. **Purpose**. The purpose of this regulation is to require UAS operated in the Certified category to be airworthy and operated to equivalent standards of safety to that of manned aircraft.

2. UAS operated under the Certified category are intended to operate over both GP and MEP, and in all classes of civil and military administered airspace for which they are equipped, and demonstrate the ability to act and respond, similarly to manned aircraft.

AMC UAS.20.A(3) - Initial Airworthiness (MY)

The airworthiness of the UAS design (including through-life modifications) must be demonstrated to the satisfaction of DGTA under MSTAR.21. In addition to design requirements common to manned aircraft, it includes those systems and functions that are needed to address the UAS-unique hazards due to the RP being separated from the UA. This includes, for example, communications relay capability between the RP and ATC, timely reaction to ATC instructions, systems to maintain safe separation and collision avoidance with other air traffic, and the ability to recover the UA under abnormal emergency conditions

UAS.30 - RESTRICTED CATEGORY UAS (MY)

GM UAS.30.A - Eligibility Criteria (MY)

1. **Purpose**. The purpose of this regulation is to define the eligibility criteria for SAO UAS operations under Restricted category.

2. State Registered UAS operating under Restricted category employ a risk assessment as the primary basis for managing the safety risk to other airspace users, and persons/critical infrastructure on the ground or water. There are several means available to manage this safety risk:

    a. **Design mitigation**. Design mitigation concerns the application of rigour to the design and construction process such that system's likelihood of catastrophic failure is known and controlled. Through the application of more rigorous design standards, or inclusion of systems designed to support safe operation, the likelihood of failure can be reduced.

b. **Operational mitigation**. Operational mitigation concerns the application of restrictions and limitations to the operating environment of the system. This may include such measures as limiting operation to segregated airspace, over a designated ground or water safety area or restricting flight over the GP.

c. **Systemic mitigation**. Systemic mitigation concerns the application of regulatory standards to organisations involved in the design, construction, maintenance and operation of the system. Systemic mitigation is intended to reduce the occurrence of organisational and human errors which can contribute to failure of a system. Systemic mitigation supports design mitigation, operational mitigation, and continuing airworthiness of the system.

3. Commonly, UAS operating under Restricted category will exhibit deficiencies in their design (or in the available evidence to confirm the adequacy of the design) compared to Certified category UAS. Further, eliminating these design deficiencies is not always considered reasonably practicable, particularly for smaller UAS. Consequently, safety risk due to Restricted category UAS operations is managed through operational and systemic controls.

4. **Authority Approval**. Under Restricted category, a UAS operation may be explicitly approved by the AB via the issue of a RCoA or UAS PTF.

GM UAS.30.B - Eligibility for a RCoA (MY)

1. **Purpose**. The purpose of this regulation is to define the MSAA requirements for issue of a RCoA for UAS that are to be operated under Restricted category.

2. The RCoA is an instrument issued by the AB for certain Restricted category UAS operations. A RCoA would normally only be pursued where:

   a. the operating freedoms of Certified category are either not necessary or not achievable.

   b. the UAS design and/or its proposed operations do not meet the entirety of the requirements of Certified category UAS.

AMC UAS.30.B(2) - Defining the UAS Operating Environment (MY)

1. A Statement of Operating Intent and Usage (SOIU) presents a common tool for the relevant SAO to disclose their intended operating environment for an aircraft. If the SAO elects to employ an SOIU, it would benefit from expansion SOIU to account for UAS-unique hazards, and might include:

   a. the extent to which the UA is required to operate near or over people and critical infrastructure including the duration and expected population density, amplifying:

i. population distributions of MEP to whom the UA may present a hazard.

ii. population distributions of the GP to whom the UA may present a hazard.

b. airspace environments in which the UA may operate, including the extent to which the UAS will operate in shared airspace.

c. the extent to which the UA is required to operate in the proximity of aerodromes and ships.

d. the extent to which the UA is required to operate near critical infrastructure.

AMC UAS.30.B(3) - Initial Airworthiness, and Continuing Airworthiness Requirements (MY)

1. The MSAA will direct compliance with MSTAR initial and continuing airworthiness requirements only to the extent they make a tangible contribution to the safety of other airspace users, or persons/critical infrastructure on the ground or water. The extent of compliance directed by the MSAA ultimately depends on the complexity of the proposed operating environment and the robustness of the UAS design. While the level of compliance will be agreed with the MSAA, some upper and lower examples are illustrative:

   a. At the lower end of the scale would be a small UAS with only occasional fleeting proximity to the GP. In those cases, the MSAA may impose no requirements for initial and continuing airworthiness. This does not preclude the SAO from imposing UAS design and maintenance support requirements, in an effort to ensure health and safety, and improve capability through reduced attrition.

   b. At the higher end of the scale would be a large UAS that will loiter near/over the GP, or a UAS that will operate in shared airspace. In those cases, the MSAA would require compliance to initial and continuing airworthiness requirements, to the extent that it makes a direct and meaningful contribution to safety.

AMC UAS.30.B(6) - Requirements for Embarked UAS Operations (MY)

1. Where a RCoA allows for embarked UAS operations, the SAO should ensure that any potential requirements and limitations have been evaluated and documented within the RCoA where relevant, including:

   a. any impact to the Ship’s Aviation Facilities Certification (AFC).

   b. identified vessel operational restrictions.

   c. safety assessment of the ship and air operations interface.

GM UAS.30.C - Eligibility for a PTF (MY)

1. **Purpose**. The purpose of this regulation is to define the MSAA requirements for issue of a UAS PTF for UAS that are to be operated under Restricted category.

2. The UAS PTF is an instrument issued by the AB for certain Restricted category UAS operations. A UAS PTF would normally only be pursued where:

   a. the operating freedoms of Certified category are either not necessary or not achievable.

   b. the UAS design and/or its proposed operations do not meet the requirements of Certified category UAS.

   c. the UAS operations do not fully meet the MSTAR continuing airworthiness regulation.

UAS.40 - OPEN CATEGORY UAS (MY)

GM UAS.40.A - Open Category (MY)

1. **Purpose**. The purpose of this regulation is to permit the operation of Open category UAS without the need for MSAA approval.

2. Where ‘AGL’ is used, this can also be read as ‘Above Mean Sea Level (AMSL)’ for UAS operations over water.

3. The MTOW and limitations applied in MSTAR UAS.40. An intentionally mirror those of NATO categories which are adopted by MAF UAS Doctrine. In the meantime, the Open category UAS weight limitation is similar to CAAM small UAS (sUAS) which is 20 kg or below without fuel. This promotes a common approach to small UAS regulation across the civil and military aviation. Given MAF is increasing its use of civil designed UAS or engaging civil UAS Operators for aerial services, the use of common regulations promotes a seamless approach.

UAS.50 - REGISTRATION (MY)

GM UAS.50 - Registration of MAF UAS (MY)

The purpose of this regulation is to allow the SAO to best determine what type of registration is required for UAS.

AMC UAS.50 - Registration of MAF UAS (MY)

1. All MAF UAS should be registered on the State Register (where directed by the OAA) or a local register (Open category only) prior to first operation. For UAS

that require only local registration, a centralised register for each Service/Group is recommended. Local registers need be no more complex than an asset list.

UAS.60 - UAS APPROVAL AND AUTHORISATION (MY)

GM UAS.60 - Concept of Authority Approval and SAO Authorisation (MY)

1. This GM defines the respective roles of the MSAA and the relevant SAO with respect to UAS operations.

2. For certain combinations of UAS and operating environments, the AB will issue a discrete approval, through either:

   a. the issue of a Malaysian State Type Certificate (MTC), (for the UAS)

   b. the issue of a Restricted CoA or Permit to Fly (covering both the UAS and the UAS Operator).

3. For Open Category UAS operations, AB approval is not required. Rather, the SAO may authorise a UAS operation provided certain Authority-defined risk controls have been implemented.

4. Irrespective of whether the AB issues a discrete approval, the relevant SAO always maintains responsibility for ensuring the safe operation of UAS under their control. Consequently, the SAO OAA must authorise all UAS operations.

AMC UAS.60.A - Responsibility for UAS Authorisation (MY)

1. **Purpose**. The purpose of this regulation is to emphasise the primacy of SAO OAA and commanders in ensuring the safety of UAS under their control.

2. Authorisation is required by the relevant SAO OAA for all SAO UAS operations, irrespective of whether the UAS is operated by or on behalf of SAO, and whether the UAS operation is regulated by another NAA or MAA. The level and the mechanism to issue such authorisations is determined by the SAO OAA.

3. **Authorisations by SAO**. Where a MAF UAS is being operated by a Service (Navy, Army or Air Force), the responsibility for authorising UAS operations falls on SAO OAA. Where a MAF UAS is being operated by a MAF organisation, eg Malaysian Defence Intelligence Organisation (MDIO), Royal Malaysian Army - Malaysian Intelligence Battalion (MIB); the responsibility for authorising UAS operations falls on the OAA. The OAA is responsible for determining who within their organisation has the authority to make UAS safety risk decisions for their personnel and for external parties. Where no such determination has been made, the SAO OAA should be approached to authorise the UAS operation.

GM UAS.60.B - Responsibilities (MY)

1. **Purpose**. The purpose of this regulation is to emphasise the statutory responsibilities held by persons who authorise and/or operate UAS, to eliminate or minimise risks As Low As Reasonably Practicable (ALARP).

2. While adherence to the risk controls inherent in MSTAR UAS will assist in executing this responsibility, it is up to SAO to assess the risks and decide on the controls they need to put in place to meet their statutory responsibilities to the persons potentially affected by the activity. Also, in authorising UAS operations by a RP who may be less familiar with the broader concepts of flight operations safety management, the relevant SAO may need to apply additional risk controls.

3. While RP are not explicitly included in this regulation, they still have a statutory duty to take reasonable care that their acts or omissions do not adversely affect the health and safety of other persons.

GM UAS.60.C - Operation under UAS Categories (MY)

1. **Purpose**. The purpose of this regulation is to allow the SAO to authorise UAS operations with the risk treatment and MSAA oversight applicable to that operation.

2. A central tenet of MSTAR is to provide the SAO with a defensible safety framework, tailored to the hazards peculiar to aviation and based on contemporary global practice. UAS operations are to be permitted within recognised categories of operation while still allowing the SAO freedom to conduct missions/tasking.

3. MSTAR.UAS does not require UAS to operate within a fixed category from acquisition. Rather, any UAS that meets all the requirements of a given category may be operated in that category under SAO authorisation. Three categories of UAS operation are:

    a. **Certified Category**. Intended for UAS operations where the UAS Operator expects to operate in all airspaces and over all populous areas. Consequently, robust initial and continuing airworthiness regulation and MSAA oversight is required to manage the safety risk to other parties. AB approvals for initial and continuing airworthiness are analogous to manned aircraft.

    b. **Restricted Category**. Intended for UAS operations where the UAS is not certified to robust airworthiness standards. Consequently, increased operational constraints and risk assessment provide justification for safe operation. UAS may operate either:

        i. under a Restricted Certificate of Airworthiness (RCoA), or

        ii. UAS Permit to Fly.

c. **Open Category**. Intended for UA weighing less than 20 kg, and UAS operations within SAO-defined requirements and limitations. UAS operations could proceed without a discrete AB approval, under SAO OAA authorisation.

4. The above approach was adopted and adapted from DASA Australia DASR.UAS which shares its genesis with the extant and proposed European Aviation Safety Agency (EASA) approaches to UAS regulation. The three category names and underlying regulatory approach are drawn from EASA, thus promoting commonality with an emerging global convention and future compatibility with European Military Airworthiness Requirements (EMAR). Certified and Restricted categories have been aligned with CAAM Special UAS Project category, to promote commonality in Malaysian civil and military UAS regulation.

UAS.70 - WEAPONISATION AND CARRIAGE OF PASSENGERS (MY)

GM UAS.70.A - Weaponised UAS (MY)

1. The MSAA has determined that any form of ordnance adopted/ included/ attached to a MAF owned or operated UAS for the purposes of applying a kinetic effect to personnel and/or equipment, is to be classified as ‘Weaponization’ under MSTAR.

2. **Purpose**. The purpose of this regulation is to provide additional safety assurance as to the Airworthiness and Operational considerations of a UAS determined to be classified as Weaponised. It does not aim to prescribe any limitations on a SAO OAA decision of when or how to employ those weapons once approved by the MSAA.

3. A weaponised UAS may only operate under a Certified or Restricted category, after gaining specific AB approval. The mitigation of risks in support of any application for the weaponization of a UAS should consider:

   a. Any undue exposure of MEP or the GP to hazards.

   b. Possible impacts to Airworthiness of the platform as a consequence of subsequent weapon release and/or separation.

   c. Hazards identified during launch/recovery and/or flight loads of the UAS/Weapon combination.

   d. Accuracy, integrity, availability and continuity of service of targeting applications upon the deploying of the weapon system, including any latency of the command and control link.

   e. Sufficient coverage within orders, instructions and publications (OIP) of the likely risk profiles associated with the application and/or intended mission of the UAS to aid the RP.

f. Safety requirements with the use of any laser technology.

NOTE 1: Any safety risks applicable with the adoption of laser technology to the UAS will require alternative assessment and SAO OAA authorisation to operate safely.

NOTE 2: The use of smoke, flares, and methods of illumination utilised for Search and Rescue purposes should not be classified as weapons. The SAO remains responsible for ensuring that anything dropped or discharged from a UAS does not pose any undue risk. This includes ensuring the adequate safe carriage of stores to prevent unintentional release and/or discharge of those stores.

GM UAS.70.B - Carriage of Persons (MY)

1. **Purpose**. The purpose of this regulation is to provide additional safety assurance through MSAA oversight of the airworthiness and operations elements of UAS that are intended for carriage of persons.

2. Airworthiness and operations requirements for a UAS that will also carry persons will be determined on a case-by-case basis. For discretionary UAS operations, the level of safety presented by crewed aircraft airworthiness and operations regulations would normally be used by the MSAA as a benchmark. For UAS operations where the carriage of personnel on a UAS reduces total mission risk, for example SAR or battlefield medical evacuation, airworthiness and operations requirements would be derived through MSAA and the SAO consultation.

UAS.80 - OCCURRENCE REPORTING (MY)

GM UAS.80.A - Occurrence Reporting (MY)

1. **Purpose**. Enhanced UAS safety and accident prevention will only be possible if information related to UAS aviation safety events and issues is available in sufficient quantity and quality, from a broad range of UAS settings in a protected and comparable format. Full, open, timely and accurate reporting of information related to UAS aviation safety events and issues allows MSAA to respond to information received and apply corrections to prevent future reoccurrence of such events and issues. This regulation requires the operators of UAS to ensure reporting requirements are completed pertaining to UAS related aviation safety events and issues.

UAS.90 - SUPPORT OF MSAA COMPLIANCE ASSURANCE (MY)

GM UAS.90.A - Support for MSAA Compliance Assurance (MY)

1. **Purpose.** The purpose of this regulation is to provide the MSAA with access to data and facilities, required for safety assurance activities.

2. The regulated community must regularly, and at any time on request from the MSAA, provide to the MSAA all data and access that will support the MSAA undertaking, reviewing, monitoring and updating its Assurance functions. The MSAA may from time to time request data as part of its safety assurance compliance and audit roles and in its administration of independent reviews such as Airworthiness Boards. The notification period for requesting data will be similar to that for safety assurance of manned aircraft; however, the data required will be commensurate to the complexity of relevant UAS operations.

3. The UAS Operator shall ensure arrangements are in place to allow the MSAA to carry out any investigation, including investigation of partners or subcontractors, considered necessary to determine compliance and continued compliance with the applicable requirements of MSTAR.UAS.