

Singapore Airworthiness Requirements Part 21

Certification of Products and Articles and
of Design and Production Organisations

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SINGAPORE AIRWORTHINESS REQUIREMENTS

PART 21

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PART 21

SECTION 1 – REQUIREMENTS

SUBSECTION I - GENERAL

SAR-21.1 Applicability

This Part specifies the requirements referred to in paragraphs 8 and 17A of the Air Navigation Order (ANO):

- (a) for the application for and grant of the following certificates and other forms of written approval (each hereinafter called “an Approval”):
 - (1) a letter of acceptance of a type certificate, including of a change to a type certificate, for a product;
 - (2) a supplemental type certificate for a product;
 - (3) a design Approval for a modification or a repair to a product or article;
 - (4) a STSO Certificate of Approval for an article;
 - (5) a Design Organisation Approval (DOA) for a design organisation;
 - (6) a Production Organisation Approval (POA) for a production organisation;
 - (7) a letter of agreement for production without a POA; and
 - (8) any form of approval given to an appliance or activity in support of any of the above Approvals.
- (b) governing the privileges of a holder of an Approval; and
- (c) for the maintenance of an Approval.

SAR-21.5 Effectivity

- (a) This Part was first issued on and became effective on 15 June 2005.
- (b) Amendment 1 was issued on and became effective on 15 November 2005.
- (c) Amendment 2 was issued on and became effective on 1 September 2006.

- (d) Amendment 3 is issued on and became effective on 1 December 2009.
- (e) Amendment 4 is issued on and became effective on 21 July 2010.
- (f) Amendment 5 is issued on and became effective on 4 February 2014.
- (g) Amendment 6 is issued on and became effective on 17 August 2016.
- (h) Amendment 7 is issued on and became effective on 16 January 2018.
- (i) Amendment 8 is issued on and became effective on 26 December 2018.

SAR-21.10 Definitions

In this Part:

- (a) “*Accountable Manager*” means the manager of a holder of an Approval who has corporate authority for ensuring that activities within the scope of an Approval are carried out to the requirements of the DGCA.
- (b) “*Article*” means, where applicable, a material, process, part, or appliance used on a product.
- (c) “*Appliance*” means an instrument, mechanism, equipment, apparatus or accessory that is used in operating an aircraft and is not a part of the airframe or engine.
- (d) **Reserved**
- (e) “*Certifying Staff*” means personnel of a production organisation holding a POA, accepted by the DGCA, to certify on CAAS(AW)95 Authorised Release Certificate for the release of new articles produced by that production organisation.
- (f) “*Chicago Convention*” means the Convention on International Civil Aviation concluded at Chicago on 7 December 1944.
- (g) “*Contracting State*” means any country (including Singapore) which is a party to the Chicago Convention.

- (h) “*Design Signatory*” means personnel of a design organisation holding a DOA, accepted by the DGCA, to certify that design data generated by the organisation are in compliance with applicable airworthiness design standards.
- (ha) “*EASA*” means the European Aviation Safety Agency (EASA) of the European Union.
- (i) “*FAA*” means the Federal Aviation Administration of the United States of America.
- (j) “*Maintenance*” means the performance of tasks required to ensure the continued airworthiness of an aircraft, and includes the overhaul, inspection, replacement, defect rectification and the embodiment of a modification or repair.
- (k) “*Major modification*” in respect of a product or article means a change in the type design that has an appreciable effect, or other than a negligible effect, on the mass and balance limits, structural strength, engine operation, flight characteristics, reliability, operational characteristics or other qualities affecting airworthiness or environmental characteristics.
- (ka) “*Major repair*” in respect of a product or article means a repair which might appreciably affect mass, balance, structural strength, performance, engine operation, flight characteristics or other qualities affecting airworthiness or environmental characteristics.
- (l) “*Minor*” in relation to a modification or repair to a product or article means that which is not major.
- (m) “*Modification*” means a design change or alteration of a product or article in compliance with an approved design standard under Subpart I.
- (n) “*Organisation*” means any person and includes any company or association or body of persons, corporate or unincorporated.
- (o) “*Product*” means an aircraft, engine or propeller.
- (p) “*Repair*” means the restoration of a product or article to an airworthy condition to ensure that the product or article continues to comply with the appropriate airworthiness design standards used during its certification, after it has been damaged or subject to wear.
- (q) “*Singapore Technical Standard Order (STSO)*” means a minimum performance standard issued by the DGCA for specified articles.

- (r) “*Technical Standard Order (TSO)*” means a minimum performance standard issued by the United States Federal Aviation Administration (FAA) for specified articles.

SUBSECTION II - DESIGN APPROVAL

Subpart A TYPE CERTIFICATES

SAR-21.100 Applicability

(a) *Reserved*

- (b) This Subpart specifies the procedural and airworthiness requirements for the grant of a letter of acceptance of type certificate detailing the acceptance by the DGCA of a foreign type certificate.

Note : CAAS does not grant type certificates.

SAR-21.105 Acceptability of foreign type certificates

The following foreign type certificates may be accepted by the DGCA for the grant of a letter of acceptance of type certificate:

- (a) a type certificate issued by the FAA where the United States of America is the State of Design;
- (aa) a type certificate issued by the EASA on behalf of a State that is a member of the European Union and a State of Design; or
- (b) a type certificate issued in accordance with Annex 8 to the Chicago Convention by the Competent Authority of a Contracting State or such other Competent Authority as the DGCA may determine.

SAR-21.110 Application

An application for a letter of acceptance of type certificate shall be made in a form and manner acceptable to the DGCA and must identify the following:

- (a) the applicable type certification basis including the applicable airworthiness design standards specified in SAR-21.755 that the product is designed to comply with;
- (b) the applicable aircraft noise and engine emission standards specified in SAR-21.755 that the aircraft is designed to comply with.

SAR-21.115 Grant of a letter of acceptance of type certificate

When an applicant has demonstrated to the satisfaction of the DGCA that:

- (a) the product meets the applicable type certification basis;
- (b) the aircraft meets the applicable noise and engine emission standards;
- (c) no feature or characteristic of the aircraft type makes it unsafe for the intended use;

the DGCA may, subject to such conditions that the DGCA deems necessary, grant to the applicant a letter of acceptance of type certificate.

SAR-21.117 Acceptability of data under a mutual recognition agreement or arrangement

- (a) A person may use data:-
 - (1) approved by the FAA under the scope of an agreement between CAAS and FAA;
 - (2) approved by the EASA under the scope of an arrangement between CAAS and EASA;
 - (3) issued by a holder of a FAA's type certificate and CAAS' letter of type acceptance; or
 - (4) approved by a holder of an EASA's type certificate and CAAS' letter of type acceptance

in support of the repair or design change on a product or article.

Subpart B CHANGES TO TYPE CERTIFICATES**SAR-21.200 Applicability**

- (a) *Reserved*
- (b) This Subpart specifies the procedural and airworthiness requirements for the acceptance by the DGCA of a change to a foreign type certificate.

Note: As CAAS does not grant type certificates, it does not approve changes to type certificates.

SAR-21.205 Application

- (a) An application for a letter of acceptance of type certificate for a new variant of a product previously accepted by the DGCA must be made under Subpart A.
- (b) An application for the approval of a major change to a Singapore product in accordance with a change to a foreign type certificate must be made under Subpart C unless the procedures for the approval are specified in an agreement between the Authority and the Competent Authority that issued the type certificate.

Subpart C SUPPLEMENTAL TYPE CERTIFICATES**SAR-21.300 Applicability**

- (a) This Subpart specifies:
 - (1) the requirements for the application for and grant of a supplemental type certificate; and
 - (2) the privileges of the holder of a supplemental type certificate.
- (b) In this Part, a supplemental type certificate signifies a design approval for a major change to the type design of a product in accordance with the airworthiness design standards specified in SAR-21.755.
- (c) The DGCA will not grant a supplemental type certificate if it has not accepted the foreign type certificate issued by the relevant authority of the State of Design of the product in accordance with SAR-21 Subpart A.
- (d) The DGCA will not grant a supplemental type certificate if the applicant is located outside of Singapore unless the DGCA determines that the location places no undue burden on it in fulfilling its certificate management responsibilities.

SAR-21.305 Application

- (a) An application for a supplemental type certificate shall be made in a form and manner acceptable to the DGCA and must include the following:
 - (1) a description of the change identifying:

- (i) all parts of the type design and the approved manuals affected by the change; and
 - (ii) the applicable airworthiness design standards which the change has been designed to comply with, as specified in SAR-21.315.
- (2) identification of any investigations necessary to show compliance of the changed product with the applicable airworthiness design standards.
- (3) indication as to whether the information on which the supplemental type certificate is based is to be provided from the applicant's own resources or through an arrangement with the type certificate holder.
- (aa) The change to the product which is the subject of the application must be completed to the satisfaction of the DGCA within 3 years from the date of the application, or such period as the DGCA may allow (referred to as the "completion period").
- (ab) An application for a supplemental type certificate will lapse if the supplemental type certificate is not obtained within the completion period. In such circumstances, a new application must be submitted.
- (b) A person may only use data for a major change to a product when such data is approved by the DGCA under this Subpart, or in accordance with SAR-21.117.
- (c) A person may use data for a minor change to a product when such data is:-
- (1) approved by the DGCA;
 - (2) approved by the holder of a Design Organisation Approval under Subpart H; or
 - (3) accepted by the DGCA under SAR-21.117.

(c) SAR-21.310 Design configuration control

An applicant for the grant of a supplemental type certificate shall:

- (a) hold a Design Organisation Approval under Subpart H; or
- (b) have an arrangement for the design configuration control of changes to the type design and demonstrate a design capability to the satisfaction of the DGCA.

SAR-21.315 Designation of applicable airworthiness design standards

- (a) An applicant for the grant of a supplemental type certificate for a product must show that the changed product complies with the applicable airworthiness design standards specified in SAR-21.755.
- (aa) The applicable airworthiness design standards referred to in paragraph (a) must be standards that are in effect as at the date of application for the supplemental type certificate.
- (b) Despite paragraph (aa), the DGCA may accept the airworthiness design standards in respect of a changed product in effect as at the date of application for the type certificate if the DGCA is satisfied that compliance with the airworthiness design standards in effect on the date of application for the supplemental type certificate would not materially contribute to the safety of the changed product or would be impractical.
- (c) If the DGCA finds that the airworthiness design standards in effect as at the date of the application for the supplemental type certificate do not provide adequate standards with respect to the proposed change for which a supplemental type certificate is applied, the DGCA may specify special conditions under the provisions of SAR-21.770.

SAR-21.320 Showing of compliance

An applicant for the grant of a supplemental type certificate shall:

- (a) show that the changed product complies with the applicable airworthiness design standards specified in SAR-21.315 and submit all substantiating data to the DGCA.
- (b) submit to the DGCA a statement of compliance against the applicable airworthiness design standards specified in SAR-21.315.

SAR-21.325 Manuals

An applicant for the grant of a supplemental type certificate shall produce, maintain and update variations to manuals required by the applicable airworthiness design standards specified in SAR-21.315, necessary to cover the changes introduced by the supplemental type certificate.

SAR-21.330 Instructions for continued airworthiness

- (a) An applicant for the grant of a supplemental type certificate shall prepare variations to the instructions for continued airworthiness in accordance with the applicable airworthiness design standards specified in SAR-21.315.
- (b) An applicant for the grant of a supplemental type certificate shall make those variations to the instructions for continued airworthiness available to all known operators of a product incorporating the supplemental type certificate.

SAR-21.335 Grant of a supplemental type certificate

- (a) When an applicant has demonstrated to the satisfaction of the DGCA that:
 - (1) the changed product complies with the applicable airworthiness design standards specified in SAR-21.315;
 - (2) any airworthiness requirements not complied with are compensated for by factors that provide an equivalent level of safety;
 - (3) no feature or characteristic makes it unsafe for the uses for which certification is requested;

the DGCA may, subject to such conditions that the DGCA deems necessary, grant to the applicant a supplemental type certificate.
- (b) In addition to complying with the requirements of this Subpart, a holder of a supplemental type certificate shall comply with Subsection VI of this Part.

SAR-21.340 Record keeping

- (a) A holder of a supplemental type certificate shall keep a complete and current technical data file for each supplemental type certificate including all relevant design information, drawings and reports.
- (b) Records required by paragraph (a) shall be retained for the life of any product incorporating the supplemental type certificate.

SAR-21.345 Changes to that part of a product covered by a supplemental type certificate

- (a) A major change to that part of a product covered by a supplemental type certificate must not be made without the DGCA's approval and application for such approval can only be made by the supplemental type certificate holder.
- (b) A minor change to that part of a product covered by a supplemental type certificate may be made by the supplemental type certificate holder without first obtaining the approval of the DGCA.

SAR-21.350 Transferability

A supplemental type certificate may be transferred to an organisation which complies with SAR-21.310 and is able to undertake the requirements of Subsection VI of this Part if the transfer is agreed to by the DGCA.

SAR-21.355 Privileges of a holder of a supplemental type certificate

A holder of a supplemental type certificate may:

- (a) approve minor design changes;
- (b) enter into arrangements for production as specified in Subsection III of this Part; and
- (c) enter into arrangements for the embodiment of the change on a product.

Subpart D RESERVED

Subpart E SINGAPORE TECHNICAL STANDARD ORDER (STSO) CERTIFICATE OF APPROVAL

SAR-21.450 Applicability

- (a) This Subpart specifies the:
 - (1) requirements for the application for and grant of a STSO Certificate of Approval; and
 - (2) privileges of the holder of a STSO Certificate of Approval.
- (b) In this Part, a STSO Certificate of Approval means a design approval for a STSO article that meets the airworthiness design standards specified in SAR-21.760.

- (c) The DGCA will not grant a STSO Certificate of Approval for an article if the applicant is located outside of Singapore unless the DGCA determines that the location places no undue burden on it in fulfilling its certificate management responsibilities.

SAR-21.455 Application

- (a) An application for a STSO Certificate of Approval shall be made in a form and manner acceptable to the DGCA and must include:
- (1) identification of the applicable airworthiness design standards in SAR-21.760 that the article is designed to comply with;
 - (2) a copy of the technical data required by the airworthiness standards identified in subparagraph (1);
 - (3) a statement certifying that the article meets the airworthiness standards identified in subparagraph (1);
 - (4) the basic model number of the article and the part numbers of the components;
 - (5) Instructions for Continued Airworthiness if applicable; and
 - (6) procedures to ensure design configuration control.
- (b) Any request to deviate from the airworthiness standards identified in paragraph (a)(1) shall be accompanied by evidence that the deviation is compensated for by design features providing an equivalent level of safety.
- (c) If the DGCA determines that a STSO includes significant airworthiness implications, the applicant shall also apply for and hold a DOA under Subpart H.

SAR-21.460 Design configuration control

An applicant for the grant of a STSO Certificate of Approval shall:

- (a) apply for and hold a Design Organisation Approval under Subpart H; or
- (b) have an arrangement acceptable to the DGCA for the design configuration control of STSO articles.

SAR-21.465 STSO Certificate of Approval

- (a) When an applicant has demonstrated compliance with the applicable requirements of this Subpart to the satisfaction of the DGCA, the DGCA may, subject to such conditions that the DGCA deems necessary, grant to the applicant a STSO Certificate of Approval.
- (b) In addition to complying with the requirements of this Subpart, a holder of a STSO Certificate of Approval shall comply with Subsection VI of this Part.

SAR-21.470 Record keeping

A holder of a STSO Certificate of Approval granted under this Subpart shall maintain and keep, until the expiry of a period of 2 years from the date of cessation of production of the STSO article, the following records:

- (a) a complete and current technical data file for each STSO article including design drawings, specifications and reports;
- (b) complete inspection records showing that all inspections and tests required for compliance have been properly completed.

SAR-21.475 Design changes to STSO articles

Any design change that is extensive enough to require a substantially complete investigation to determine compliance with a STSO shall require a new application under SAR-21.455.

SAR-21.480 Privileges of a holder of STSO Certificate of Approval

A holder of a STSO Certificate of Approval may:

- (a) approve minor design changes;
- (b) enter into arrangements for production as specified in Subsection III of this Part; and
- (c) indicate that it has the DGCA's approval by marking the STSO article specified on the Certificate in accordance with SAR-21.1020(j).

Subpart F REPAIRS

SAR-21.500 Applicability

- (a) This Subpart specifies the procedural and airworthiness requirements for the DGCA's grant of Approval of a repair design.

- (b) For the purposes of this Subpart:
- (1) a restoration without the need for design activity is considered to be a maintenance task; and
 - (2) a repair to a STSO article shall be treated as a design change under SAR-21.475.

SAR-21.505 Application

- (a) An application for a repair design Approval shall be made in a form and manner acceptable to the DGCA and must include the following:
- (1) identification of the applicable airworthiness design standards in SAR-21.755 that the repair is designed to comply with;
 - (2) all substantiation data needed to demonstrate that the repaired product or article will continue to comply with its certification basis;
 - (3) a statement of compliance against the airworthiness standards identified in subparagraph (1);
 - (4) all necessary instructions and limitations;
 - (5) instructions for Continued Airworthiness if applicable; and
 - (6) updates to required manuals if applicable.
- (b) No person shall use data for a major repair to a product or article unless such data is approved by the DGCA under this Subpart, or accepted by the DGCA under SAR-21.117.
- (c) A person may use data for a minor repair to a product or article when such data is:-
- (1) approved by the DGCA;
 - (2) approved by the holder of a Design Organisation Approval under Subpart H and is within the scope of approval as specified on the certification; or
 - (3) accepted by the DGCA under SAR-21.117.

(d) Reserved

(e) Reserved

(f) Reserved

SAR-21.510 Design configuration control

An applicant for the grant of a repair design Approval shall:

- (a) apply for and hold a Design Organisation Approval under Subpart H; or
- (b) have an arrangement for the design configuration control of repairs and demonstrate a design capability to the satisfaction of the DGCA.

SAR-21.515 Repair design Approval

- (a) When an applicant has demonstrated compliance with the applicable requirements of this Subpart to the satisfaction of the DGCA, the DGCA may, subject to such conditions that the DGCA deems necessary, grant to the applicant an approval for the repair design.
- (b) In addition to complying with the requirements of this Subpart, a holder of a repair design Approval shall comply with Subsection VI of this Part.

SAR-21.520 Record keeping

A holder of a repair design approval granted under this Subpart shall maintain and keep, for the life of the repair, the following records:

- (a) a complete and current technical data file for each repair including design drawings, specifications and reports;
- (b) complete inspection records showing that all inspections and tests required for compliance have been properly completed.

SAR-21.525 Design changes to approved repairs

A design change to a repair of a product or article covered by a repair design Approval shall require a new application under SAR-21.505.

Subpart G RESERVED

Subpart H DESIGN ORGANISATION APPROVAL (DOA)

SAR-21.650 Applicability

This Subpart specifies:

- (a) procedural requirements for the grant of a DOA;

- (b) requirements governing the holders of a DOA; and
- (c) privileges of a holder of a DOA.

SAR-21.655 Requirement to hold a DOA

A holder of any of the following Approvals shall obtain a DOA unless the DGCA determines otherwise:

- (a) type certificate;
- (b) supplemental type certificate;
- (c) Approval for a modification or repair;
- (d) STSO Certificate of Approval for an article.

SAR-21.660 Application

An application for a DOA shall be made in a form and manner acceptable to the DGCA.

SAR-21.665 Exposition Document

- (a) A holder of a DOA shall maintain an Exposition Document describing the organisation, key personnel, resources, types of design work, products and articles to be designed, and procedures to ensure compliance with this Subpart;
- (b) The Exposition Document shall describe in detail the design control system specified in SAR-21.670;
- (c) The Exposition Document shall be signed by the accountable manager before it is submitted to the DGCA for approval; and
- (d) The Exposition Document shall be kept updated to accurately reflect the current organisation of the holder of the DOA and all amendments to the Exposition Document shall be submitted to the DGCA for approval.

SAR-21.670 Design control system

A holder of a DOA shall establish a design control system that:

- (a) clearly and completely defines each approved design and design change;
- (b) documents compliance with the applicable airworthiness standards and ensures no unsafe design feature;

- (c) identifies staff (design signatory) authorised to certify design data
- (d) establishes a record keeping system which includes the date and person certifying each piece of design reference data;
- (e) includes procedures for corrective action to ensure that any design problems are corrected;
- (f) includes procedures for determining major and minor changes and for approving minor changes;
- (g) details quality assurance procedures and internal audit procedures;
- (h) includes procedures to verify its designs which are being used for production by a holder of a POA granted under Subpart J; and
- (i) is adhered to as prescribed in the Exposition Document specified in SAR-21.665.

SAR-21.675 Collaboration between design and production

A holder of a DOA shall maintain close collaboration between design and production to ensure integrity of the product or article.

SAR-21.685 Continued airworthiness

A holder of a DOA shall provide instructions for continued airworthiness, if applicable.

SAR-21.690 Grant of Approval

- (a) When an applicant has demonstrated compliance with the applicable requirements of this Subpart to the satisfaction of the Authority, the Authority may, subject to such conditions that the Authority deems necessary, grant to the applicant a DOA.
- (b) In addition to complying with the requirements of this Subpart, a holder of a DOA shall comply with Subsection VI of this Part.

SAR-21.695 Privileges of a holder of a DOA

A holder of a DOA may, within the scope of approval as specified on the DOA:

- (a) Reserved**
- (b) perform design activities including for the issuance of statements of compliance to airworthiness design standards;

- (c) approve minor design changes in modification and repair; and
- (d) enter into arrangements acceptable to the DGCA for the production of approved designs under Subsection III.

Subpart I AIRWORTHINESS DESIGN STANDARDS, AIRCRAFT NOISE AND ENGINE EMISSION STANDARDS

SAR-21.750 Applicability

This Subpart specifies standards for:

- (a) products;
- (b) certain parts, processes, and appliances under Singapore Technical Standard Order (STSO); and
- (c) standard parts, materials, and processes.

SAR-21.755 Products

- (a) The airworthiness design standards are:
 - (1) airworthiness design standards issued by the DGCA; or
 - (2) airworthiness design standards contained in regulations issued by the Federal Aviation Administration (FAA) of the United States of America, including Title 14 Code of Federal Regulations (CFR) Parts 23, 25, 27, 29, 33 and 35; or
 - (3) airworthiness design standards issued by the EASA, including EASA Certification Specifications (CS) 23, 25, 27, 29, -E and -P.
- (b) The aircraft noise standards are specified in the applicable chapter of ICAO Annex 16 Volume I or a set of equivalent airworthiness design standards acceptable to the DGCA.
- (c) The aircraft engine emission standards are specified in the applicable chapter of ICAO Annex 16 Volume II or a set of equivalent airworthiness design standards acceptable to the DGCA.

SAR-21.760 STSO articles

The minimum performance standards STSO articles are:

- (a) standards issued by the DGCA for STSO approval; or
- (b) standards established by the FAA for TSO approval; or
- (c) standards established by the EASA for ETSO authorisation.

SAR-21.765 Standard parts, materials, and processes

The airworthiness design standards for standard parts, materials and processes are any officially recognised industry specifications that are accepted by the DGCA.

SAR-21.770 Special conditions

The DGCA may specify special conditions for a product to establish a level of safety equivalent to the airworthiness design standards specified in SAR-21.755 if the DGCA determines that the airworthiness design standards do not contain adequate or appropriate safety levels for the product, because:

- (a) the product has novel or unusual design features relative to the design practices on which the applicable design standards are based; or
- (b) the intended use of the product is unconventional.

SUBSECTION III - PRODUCTION APPROVAL

Subpart J PRODUCTION ORGANISATION APPROVAL (POA)

SAR-21.1000 Applicability

This Subpart specifies:

- (a) procedural requirements for the grant of a POA;
- (b) requirements governing the holder of a POA; and
- (c) privileges of a holder of a POA.

SAR-21.1005 Requirement to hold a POA

No organisation shall produce products and articles unless it holds a POA or a letter of agreement for production without a POA under Subpart K.

SAR-21.1010 Application

An application for a POA shall be made in a form and manner acceptable to the DGCA.

SAR-21.1015 Exposition Document

- (a) A holder of a POA shall maintain an Exposition Document describing the organisation, key personnel, resources, types of production work, products and articles to be produced, method to ensure conformity of products and articles, and procedures to ensure compliance with this Part;
- (b) The Exposition Document shall describe in detail the production control system specified in SAR-21.1020;
- (c) The Exposition Document shall include details of any authorisations made by the holder of the POA to subsidiary manufacturers or subcontractors;
- (d) The Exposition Document shall be signed by the accountable manager before it is submitted to the DGCA for approval; and
- (e) The Exposition Document shall be kept updated to accurately reflect the current organisation of the holder of the POA and all amendments to the Exposition Document shall be submitted to the DGCA for approval.

SAR-21.1020 Production control system

A holder of a POA shall establish a production control system that:

- (a) clearly and completely identifies the approved design for each product or article being produced;
- (b) documents procedures for inspection of raw materials, parts and sub-assemblies entering the system;
- (c) documents procedures for inspections during production and means of dealing with nonconforming materials or parts;
- (d) identifies any special production processes and the means used to control the processes;
- (e) details quality assurance procedures and internal audit procedures;
- (f) identifies staff (certifying staff) authorised to issue an Authorised Release Certificate, Form CAAS(AW)95 (see **Appendix 1**) and statements of conformity;

- (g) establishes procedures to assure that each product or article, including parts manufactured by subcontractors, conforms to the approved design, has no unsafe feature and is in a condition for safe operation;
- (h) includes procedures for corrective action to ensure that production problems are corrected;
- (i) includes procedures for coordination with the design organisation responsible for the design of the product or article being produced;
- (j) ensures that where practicable each product or article is permanently marked with legible markings that includes the name and location of the manufacturer, the STSO reference if applicable, and the serial number and model or part number;
- (k) establishes a record keeping system which documents the date each item is produced and the person or persons certifying conformity to the approved design; and
- (l) is adhered to as prescribed in the Exposition Document specified in SAR-21.1015.

SAR-21.1025 Relationship between production and design

- (a) A holder of a POA must hold a design approval or must have an arrangement with the holder of a design approval which is acceptable to the DGCA; and
- (b) A holder of a POA shall maintain close collaboration between production and design to ensure integrity of the product or article.

SAR-21.1030 Record keeping

The production inspection records required in SAR-21.1020(k) shall be retained as follows:

- (a) the records of a product shall be retained until the product is permanently withdrawn from service;
- (b) the records of an article shall be retained for 2 years after production of the article.

SAR-21.1035 Grant of Approval

- (a) When an applicant has demonstrated compliance with the applicable requirements of this Subpart to the satisfaction of the Authority, the Authority may, subject to such conditions that the Authority deems necessary, grant to the applicant a POA.

- (b) In addition to complying with the requirements of this Subpart, a holder of a POA shall comply Subsection VI of this Part.

SAR-21.1040 Privileges of a holder of a POA

A holder of a POA may, within the scope of approval as specified on the POA:

- (a) produce products and articles; and
- (b) issue Authorised Release Certificates, Form CAAS(AW)95 (**Appendix 1**), for the articles it produces.

Subpart K PRODUCTION WITHOUT A POA

SAR-21.1100 Application for and grant of a letter of agreement

- (a) An applicant may apply for a letter of agreement for limited production without holding a POA as specified in Subpart J.
- (b) An applicant must be able to satisfy the DGCA that each product or article will be produced satisfactorily without a POA.
- (c) When an applicant has demonstrated compliance with the applicable requirements of this Subpart to the satisfaction of the Authority, the Authority may, subject to such conditions that the Authority deems necessary, grant to the applicant the letter of agreement.

SAR-21.1105 Reserved

SAR-21.1110 Production quality system, STSO articles

A holder of a letter of agreement for the production of STSO articles shall:

- (a) establish quality procedures to ensure that such articles are produced in conformity with the applicable approved design data, have no unsafe feature and are in condition for safe operation; and
- (b) comply with the STSO marking and record-keeping requirements of Subpart J.

SUBSECTION IV - RESERVED

SUBSECTION V - RESERVED

SUBSECTION VI – APPROVAL AND CERTIFICATE MANAGEMENT

SAR-21.1500 Applicability

This Subsection specifies:

- (a) requirements for maintaining the continued airworthiness of products and articles designed, produced, modified or repaired by a holder of an Approval granted under this Part; and
- (b) the duration of the Approval granted under this Part.

SAR-21.1505 Approval holder requirements

A holder of an Approval granted under this Part shall, where applicable:

- (a) maintain the currency of the applicable Exposition Document and operate in accordance with the Exposition Document to ensure design and production conformity;
- (b) establish a system for collecting, investigating and analysing information so as to provide support for the approved product or article, so that products in service can continue to meet all airworthiness requirements and can be maintained in condition for safe operation;
- (c) report any failures, malfunctions or defects to the DGCA;
- (d) provide proposals for corrective action to the DGCA in an expeditious manner;
- (e) take timely corrective action to remedy any unsafe feature; and
- (f) make provisions for the DGCA to conduct any investigation, test, inspection or audit to ensure compliance with the requirements of this Part.

SAR-21.1510 Reserved

SAR-21.1515 Duration of Approvals and Certificates

- (a) The duration of each Approval granted under this Part shall be as specified by the Authority in an Approval or Certificate.
- (b) If no duration is specified, an Approval remains valid until surrendered, superseded, suspended or revoked.

- (c) The continued validity of an Approval is subject to:
- (1) the DGCA's determination of the holder's continued compliance with this Part;
 - (2) unencumbered access by the DGCA to the holder's facilities and records, including subcontractors; and
 - (3) payment of costs incurred by the DGCA in granting the Approval (as the case may be) and in carrying out its Approval and certificate management responsibilities.

SINGAPORE AIRWORTHINESS REQUIREMENTS**PART 21****SECTION 2 – ACCEPTABLE MEANS OF COMPLIANCE (AMC) AND
INTERPRETATIVE/EXPLANATORY MATERIAL (IEM)****1 GENERAL**

- 1.1 Section 1 of this document contains the requirements that must be complied with for an applicant to obtain approval from the DGCA and for a holder of an Approval to continue holding it under this Part.
- 1.2 This Section 2 contains Acceptable Means of Compliance (AMC) and Interpretative/Explanatory Material (IEM) to assist applicants in meeting the requirements. It is intended to help applicants to understand and comply with the requirements and to facilitate the approval process. The AMC are advisory only and represent one means but not the only means of meeting the requirements.
- 1.3 In addition, Advisory Circulars (AC) issued by the DGCA may contain further AMC and/or IEM.
- 1.4 Where an AMC, IEM or AC has not been provided or issued for a particular SAR paragraph, it is considered that that paragraph does not require assisting supplementary material.

2 PRESENTATION

- 2.1 The acronyms AMC and IEM also indicate the nature of the material and for this purpose the two types of material are defined as follows:
 - (a) Acceptable Means of Compliance (AMC) illustrate a means, or several alternative means, but not the only possible means by which a requirement can be met. It should however, be noted that where a new AMC is developed, any such AMC (which may be additional to an existing AMC) may be incorporated into this document or issued as a separate Advisory Circular.
 - (b) Interpretative/Explanatory Material (IEM) helps to illustrate the meaning of a requirement.
- 2.2 The AMC and IEM are presented in full-page width on loose pages, each page being identified by the date of issue or the change number under which it is amended or re-issued.
- 2.3 A numbering system has been used in which the numbering for the AMC and IEM is the same as the paragraph in the SAR to which it refers. The number is preceded by the letters AMC or IEM to distinguish the material from the paragraphs in the SAR itself.
- 2.4 Explanatory notes not forming part of the AMC or IEM text appear in a smaller typeface.
- 2.5 Samples of application forms to submit to the DGCA to apply for an approval from the DGCA are provided as Appendices to this document. Applicant are to note that the CAAS updates these forms from time to time and hence, applicant are advised to use the latest edition of the forms that can either be obtained from the CAAS directly or from the CAAS' website at www.caas.gov.sg.

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SUBSECTION I - GENERAL**IEM 21.10 Definitions**

"Accountable manager" is normally intended to mean the chief executive officer (CEO) of the organisation, who by virtue of his/her position has overall responsibility for the running of the organisation. The accountable manager may be the accountable manager for more than one organisation and is not required to be necessarily knowledgeable on technical matters. When the accountable manager is not the CEO, the DGCA will need to be assured that such an accountable manager has direct access to the CEO and has sufficient authority and resources allocated to him to ensure compliance with this Part.

SUBSECTION II – DESIGN APPROVAL**Subpart A – TYPE CERTIFICATES****IEM 21.100 Applicability**

- 1 Any person or organisation may apply for a letter of acceptance of type certificate. It is preferable for the aircraft manufacturer or type certificate holder to apply since their support in the acceptance process will be required.
- 2 It is not necessary for an aircraft type to be registered in Singapore for the grant of a letter of acceptance of type certificate. However if the application is not related to registration of an aircraft, the applicant should provide evidence that there is a need for the DGCA's acceptance of the type certificate, such as a supplemental type certificate application on that aircraft type.
- 3 When the DGCA accepts applications for the acceptance of aircraft type certificates. The acceptance procedure will involve consideration of that aircraft's engines and/or propellers. Acceptance of the aircraft's type certificate will imply acceptance of the associated engine and/or propeller type certificate.
- 4 The manufacturer of an engine and/or propeller who submits an application for a type certificate to the State of Design on or after 10 November 2016 has to apply to the DGCA for a letter of acceptance of type certificate for such engine and/or propeller.

AMC 21.105(a) Acceptance of type certificates issued by the FAA

Singapore has a Bilateral Aviation Safety Agreement (BASA) with the USA. The DGCA will therefore accept a type certificate issued by the FAA where the USA is the State of Design. An applicant will need to submit an application for a letter of acceptance of type certificate under SAR-21.110. All the required data should be provided to the DGCA before a FAA type certificate can be accepted. The DGCA may carry out a familiarisation exercise prior to acceptance if required.

AMC 21.105(aa) Acceptance of type certificates issued by the EASA

Under the ambit of Working Arrangement on Airworthiness Certification (WA-AC) between CAAS and EASA, the DGCA will accept a type certificate issued by EASA on behalf of a European Union Member State where the European Union Member State is a State of Design. An applicant will need to submit an application for a letter of acceptance of type certificate under SAR-21.110. All the required data should be provided to the DGCA before an EASA type certificate can be accepted. The DGCA may carry out a familiarisation exercise prior to acceptance if required.

AMC 21.105(b) Acceptance of other foreign type certificates

For a Competent Authority of a Contracting State that does not have a bilateral agreement or working agreement with CAAS covering the acceptance of a type certificate, the DGCA will determine the extent of the validation programme. This will be decided on a case by case basis.

AMC 21.110 Application

- 1 An application for a letter of acceptance of type certificate should be made on Form CAAS(AW)204 which is available from CAAS.
- 2 The data should include, as applicable:
 - (a) a copy of the aircraft and engine type certificate and the type certificate data sheets or specifications for the aircraft, engine or propeller;
 - (b) the applicable airworthiness design standards and the effective date of the standards;
 - (c) any special conditions imposed under the foreign type certification;
 - (d) any requirements not complied with and any compensating factors providing an equivalent level of safety;
 - (e) any airworthiness limitations;
 - (f) a list identifying the data submitted for the issue of the foreign type certificate, showing compliance with the applicable airworthiness design standards;
 - (g) a copy of the approved Airplane Flight Manual;
 - (h) a copy of the instructions for continued airworthiness;
 - (i) the illustrated parts catalogue;
 - (j) all current service information issued by the manufacturers of the aircraft, aircraft engine and propeller including any Airworthiness Directives.
 - (k) a proposed schedule for aircraft and engine training, such as familiarisation training or type training, for Authority's officers;
 - (l) noise certificate;
 - (m) Maintenance Review Board Report;
 - (n) Maintenance Planning Data Document; and
 - (o) a list of accidents or major incidents that the aircraft had been involved in.
- 3 The applicant is required to bear the costs of inspections, testing or evaluations carried out by an authorised person as part of the process of granting a letter of type certificate acceptance in accordance with the Twelfth Schedule of the ANO. The initial review of the application is expected to take approximately 3 hours and this payment should be included with the application. Any additional costs incurred, including further man hour costs, will be invoiced to the applicant.

AMC 21.117(a) Acceptability of data under a mutual recognition agreement or arrangement

Refer to Revision 3 (or later revisions) of CAAS Advisory Circular (AC) 21-1 – “Approval requirements for modifications and repairs” for guidance on the acceptability of data.

Subpart B – CHANGES TO TYPE CERTIFICATES**IEM 21.205(b) Application**

- 1 A foreign Airworthiness Directive that is mandatory in accordance with SAR-39 may be incorporated without further approval by the DGCA.
- 2 Any other major change to a Singapore product may only be made with the approval of the DGCA through the supplemental type certificate procedures under Subpart C, unless the procedures are stated in an agreement between the Authority and the Competent Authority that issued the type certificate.
- 3 Refer to revision 3 (or later revisions) of AC 21-1 “Approval requirements for modifications and repairs” for post-certification design changes for EASA or FAA type certificated products that have been issued with a CAAS letter of type acceptance.
- 4 Notwithstanding item 3 above, CAAS may conduct conformity and compliance checks on the installation on a Singapore product. A Singapore product refers to a Singapore registered aircraft and includes the engine and/or propeller installed or going to be installed on the aircraft.

Subpart C – SUPPLEMENTAL TYPE CERTIFICATES**IEM 21.300 Applicability**

A supplemental type certificate is an approval for the design of a major change to a product. The DGCA will grant a supplemental type certificate when it is satisfied that the changed product will comply with the applicable airworthiness design standards and does not introduce any unsafe feature.

A supplemental type certificate issued under this Subpart does not certify that the changed product complies with any requirements or legislation relating to aircraft noise or aircraft engine emissions.

AMC 21.300(c) Applicability

A supplemental type certificate can only be granted if the DGCA has accepted the foreign type certificate issued by the relevant authority of the State of Design of the product. The type certificate provides the certification basis for the approval of the supplemental type certificate. An accepted type certificate ensures that the DGCA is familiar with the type design. The DGCA’s acceptance of a type certificate is identified by the issue of a letter of acceptance of type certificate in accordance with SAR-21 Subpart A. Prior to the promulgation of SAR-21 Subpart A, acceptance of an aircraft type certificate was indicated by the issuance of a Certificate of Airworthiness for the first of type of an aircraft to be registered in Singapore.

AMC 21.300(d) Applicability

- 1 An application for validation of a foreign supplemental type certificate in accordance with a bilateral agreement or other working arrangement will be accepted by the DGCA if it is to be incorporated onto a Singapore registered aircraft.
- 2 Any other application for a supplemental type certificate for a Singapore registered aircraft may be considered. In such cases the applicant will be required to show compliance with all the applicable requirements of SAR-21.

AMC 21.305(a) Application

- 1 The applicant is encouraged to discuss any proposed supplemental type certificate with the DGCA at the earliest opportunity. An application for a supplemental type certificate should be made on Form CAAS(AW)212 which is available from CAAS.
- 2 The application should be accompanied by a letter that includes a description of the project, the type of product involved, where the design and installation will be conducted, and a schedule for completion of the project.

- 2A An applicant who requires a period of more than 3 years to complete a change to the satisfaction of the DGCA should, at the time of the application, demonstrate to the DGCA that the product requires a longer period of time for design, development, and testing.
- 3 The applicant should submit a Certification Plan to the DGCA for the DGCA's agreement. The Certification Plan will assist both the applicant and the DGCA in the identification and planning of the certification activities necessary for the grant of the supplemental type certificate. The Certification Plan should include the following:
- (a) general information identifying the applicant, application date, model designation, etc.;
 - (b) a description of the change, the area affected, manuals to be updated, etc.;
 - (c) the certification basis of the applicable airworthiness design standards, exemptions, and special conditions;
 - (d) how compliance will be shown (tests, analysis, similarity, etc.) and what will be submitted to show compliance;
 - (e) a project schedule identifying dates of major milestones; when data and test plan submittals will be made; when conformity inspections, installation, and testing are required; and when the project will be completed.

The Certification Plan should be updated throughout the project and any changes should be agreed with the DGCA. A sample Certification Plan is provided in **Appendix 12**.

- 4 An application for validation of a foreign supplemental type certificate should include the Certification Plan that has been approved by the relevant authority of the State of Design.
- 5 The ANO specifies that an aircraft shall not be flown if its Certificate of Airworthiness (CoA) is invalid except in accordance with a Permit to Fly issued to the aircraft. When an aircraft's CoA has been invalidated due to a modification and requires a flight test as part of the STC approval, a Permit to Fly will need to be obtained from CAAS before the conduct of that flight. (Refer to Chapter 2.5 of the Singapore Airworthiness Requirement.)
- 6 The applicant is required to bear the costs of inspections, testing or evaluations carried out by an authorised person as part of the process of granting a supplemental type certificate in accordance with the Twelfth Schedule of the ANO. The initial review of the application is expected to take approximately 3 hours and this payment should be included with the application. Any additional costs incurred, including further man hour costs, will be invoiced to the applicant.

AMC 21.305(c) Minor changes

- 1 Minor modifications may be approved by the DGCA using Form CAAS(AW)47. It should be submitted together with the required technical data. In addition to the information required on the application form, the applicant should also supply a list of parts and assemblies affected by the modification and, where necessary, drawings or sketches giving particulars of parts before and after modification.
- 2 The applicant is required to bear the costs of inspections, testing or evaluations carried out by an authorised person as part of the process of granting a modification design Approval in accordance with the Twelfth Schedule of the ANO. The initial review of the application is expected to take approximately 3 hours and this payment should be included with the application. Any additional costs incurred, including further man hour costs, will be invoiced to the applicant.

IEM 21.310 Design configuration control

- 1 An applicant for the grant of a supplemental type certificate is expected to hold a DOA under Subpart H. The Approval reference should be identified on the application form. The proposed supplemental type certificate should be within the scope of approval specified on the Certificate.

- 2 For a 'one off' supplemental type certificate which has no significant airworthiness implication, an applicant need not hold a DOA. An applicant would need to supply a justification to explain why obtaining a DOA would be inappropriate and submit the procedures to be used for design control. An applicant must be able to demonstrate a level of design competency appropriate to the design task being undertaken.
- 3 An applicant should be able to demonstrate that the design data on which the supplemental type certificate is to be based is adequate either from the applicant's own resources or through an arrangement with the type certificate holder.
- 4 An applicant for validation of a foreign supplemental type certificate which is made under the applicable Singapore legislation in accordance with a bilateral agreement or other working arrangement does not need to hold a DOA. It will normally be assumed that the applicant's design capability and design configuration control is satisfactory based on the grant of the foreign supplemental type certificate. However, further investigation of the applicant's design organisation may be carried out if deemed necessary by the DGCA.

AMC 21.315 Designation of applicable airworthiness design standards

- 1 The applicable airworthiness design standards should be based on the type certificate of the product accepted under Subpart A unless otherwise agreed with the DGCA.
- 2 An applicant for the grant of a supplemental type certificate is expected to comply with the applicable airworthiness design standards in effect at the date of application. However, it is possible to revert to airworthiness design standards in effect at the date of type certification where the applicant can justify a reversion to the original type certification basis. A justification should be made for each requirement as to why it would not contribute materially to the level of safety of the changed product or would be impractical.
- 3 If the change introduces novel or unusual design features which are not adequately addressed by the applicable airworthiness design standards, the DGCA may prescribe special conditions to establish an appropriate level of safety for those features. These special conditions will be documented in an Issue Paper.

AMC 21.320 Showing of compliance

- 1 The applicant should submit all data to the DGCA for review and approval. If the data is modified or updated during the course of the project, the applicant should immediately contact the DGCA and establish a time frame within when the change(s) will be submitted to the DGCA.
- 2 Test plans need approval by the DGCA prior to any tests being carried out. They should include all necessary information including details of test fixtures, test equipment and test articles (parts, components, or subassemblies), as well as the final assembly or installation tests.
- 3 The applicant should arrange for the DGCA's participation in conformity and compliance inspections and witnessing of all certification testing to the approved test plans. It may be necessary to carry out inspections to verify that the descriptive data conforms and complies with the applicable airworthiness design standards. The applicant should ensure that suitable access is provided for these inspections at appropriate points during the project.
- 4 The applicant should submit test reports and substantiating data for all certification testing, as well as any further data necessary to demonstrate compliance with the applicable airworthiness design standards.
- 5 Ground tests such as Electromagnetic Interference (EMI), fuel flow, structural, etc. may be necessary when the installation is complete.
- 6 The DGCA may require flight tests for changes which could affect the aircraft's performance, flight characteristics, powerplant operation, and/or overall handling qualities. Changes to systems, equipment, instrumentation, and flight manuals may also require flight tests. Any change which may affect the navigation of the aircraft (including performance changes) will usually require flight testing.

- 7 If flight testing is required, it may be carried out when the DGCA's review of the technical data required for the supplemental type certificate is completed or has reached a point where the DGCA is satisfied that the aircraft will meet the applicable airworthiness design standards.
- 8 The applicant should submit all final data to the DGCA upon completion of the final compliance inspections and testing (ground and flight). This should include the statement of compliance required by SAR-21.320(b).
- 9 For validation of a foreign supplemental type certificate, the DGCA will review the Certification Plan and may participate in the aircraft conformity inspection. The DGCA may request further data or further involvement if the project is complex or it introduces novel or unusual design features.

IEM 21.335(a) Grant of a supplemental type certificate

The DGCA may grant to the applicant a supplemental type certificate when it is satisfied that in respect of the design:

- (a) the design drawings and other documents which define the installation are of a satisfactory standard and are comprehensive enough to ensure that the change can be carried out by a maintenance organisation without additional instructions;
- (b) the compliance data is complete and any tests or inspections required by the DGCA to demonstrate compliance have been completed satisfactorily;
- (c) the change to the product has been completed in accordance with the design data and any conformity inspection required by the DGCA has been carried out.

AMC 21.335(b) Compliance with Subsection VI

A holder of a supplemental type certificate is obliged to comply with Subsection VI of this Part. The DGCA may require evidence of the applicant's ability to comply before granting the Approval.

AMC 21.340(a) Record keeping

- 1 The technical data file for each supplemental type certificate should include both descriptive and compliance data. Descriptive data defines the design of the change to the product, while compliance data substantiates that the design meets the applicable airworthiness design standards.
- 2 The descriptive data should completely define, or describe, a given design. The descriptive data should completely and accurately describe the process, fabrication, assembly, and installation of all portions of the change. The technical information should include, as applicable:
 - (a) identification of the change including title, drawing number, aircraft applicability, revision level, date, as recorded on the application form;
 - (b) a drawing package providing all data necessary for the production of parts and assemblies; and installation drawings and/or instructions;
 - (c) manufacturer, part number and serial number of purchased parts and equipment;
 - (d) electrical load analysis for the installation;
 - (e) a complete list of parts added and/or removed including weight and balance data of assemblies and equipment to be installed, and/or the complete change;
- 3 The compliance data should include, as applicable:
 - (a) a compliance checklist specifying each applicable certification requirement and the method by which compliance has been shown (e.g., analysis, structural test, ground test, flight test, etc.). A sample compliance checklist is provided in **Appendix 13**;

- (b) analysis reports including a structural and/or loads analysis if the structure is modified or structural loads are changed;
- (c) safety assessments evaluating the effects of foreseeable failures of the aircraft structure and/or systems;
- (d) test plans and reports for each required structural, component, ground test, and flight test;
- (e) EMI test report;
- (f) software evaluation;
- (g) instructions for continued airworthiness describing any maintenance requirements necessary to maintain aircraft airworthiness, and prepared in accordance with the applicable airworthiness design standards;
- (h) for changes to aircraft, supplements to the weight and balance manual, or Flight Manual if the change affects the aircraft weight and balance and/or the operating limitations, procedures, performance, or loading instructions;
- (i) statement of compliance.

AMC 21.345 Changes to that part of a product covered by a supplemental type certificate

- 1 A holder of a supplemental type certificate may apply to the DGCA for a major change to that part of a product covered by a supplemental type certificate. The application should be made in writing identifying the supplemental type certificate number and describing the change. A certification programme/plan for the change should be proposed and agreed with the DGCA.
- 2 A minor change to that part of a product covered by a supplemental type certificate may be made by the supplemental type certificate holder without obtaining further approval from the DGCA provided that the minor change is carried out in accordance with the supplemental type certificate holder's design procedures which have been accepted by the DGCA under SAR-21.310.
- 3 Minor changes made after the grant of the supplemental type certificate should be notified to the DGCA within 3 months of making the minor change by the supplemental type certificate holder.

AMC 21.350 Transferability

- 1 Transfers within Singapore.
A supplemental type certificate may be transferred subject to the agreement of the DGCA. The supplemental type certificate holder should inform the DGCA in writing in advance of the intended transfer to allow the DGCA to carry out any necessary investigation of the proposed new holder. When the DGCA is satisfied that the proposed new holder will be able to comply with the requirements of this Part the existing supplemental type certificate holder should surrender its certificate to the DGCA and transfer the technical data file to the new holder. The DGCA will issue an amended supplemental type certificate to reflect the details of the new holder.
- 2 Transfer from a foreign holder to a Singapore applicant.
When a supplemental type certificate issued by another authority is transferred from a foreign holder to a Singapore applicant, the DGCA assumes the State of Design responsibilities. The Singapore applicant must be able to comply with the requirements of this Part and the supplemental type certificate must comply with the applicability requirements of SAR-21.300. A complete copy of the technical data file should be part of the transfer package and a copy submitted to the DGCA. The DGCA will review the transfer package and, if it is found acceptable to the DGCA, the DGCA will issue a supplemental type certificate to the Singapore applicant.

- 3 Transfer from a Singapore holder to a foreign applicant.
When a supplemental type certificate issued by the authority is transferred from a Singapore holder to a foreign applicant, the DGCA's State of Design responsibilities are transferred as well. The DGCA will suspend the supplemental type certificate at the same time as the foreign Authority issues a new certificate. The DGCA may reissue an amended supplemental type certificate to reflect the new details if required.
- 4 The applicant is required to bear the costs of inspections, testing and evaluations carried out by an authorised person as part of the process of transferring a supplemental type certificate in accordance with the Twelfth Schedule of the ANO. The proposed new holder will be responsible for the transfer costs. The transfer investigation is expected to take approximately 3 hours and this payment should be included with the application. Any additional costs incurred, including further man hour costs, will be invoiced to the applicant.

Subpart E - SINGAPORE TECHNICAL STANDARD ORDER (STSO) CERTIFICATE OF APPROVAL

IEM 21.450(b) STSO Certificate of Approval

A STSO Certificate of Approval is granted to an applicant by the DGCA when the applicant has demonstrated that the applicable airworthiness design requirements have been met to the satisfaction of the DGCA. The grant of the Certificate permits an article produced to the approved design to be used on a Singapore registered aircraft when released in accordance with Subsection III of Section 1, provided its installation is approved. A STSO Certificate of Approval is also the basis for obtaining overseas recognition of the Singapore approval (e.g. FAA letter of TSO design approval) to enable the export of articles to countries which have bilateral agreements with Singapore.

IEM 21.455(a) Application for FAA letter of TSO design approval

Singapore has a Bilateral Aviation Safety Agreement (BASA) with the USA. The BASA Implementation Procedures includes procedures for FAA validation of a STSO Certificate of Approval leading to the issue of a FAA letter of TSO design approval under 14 CFR Part 21.621. This letter gives FAA authorisation to identify the approved article with TSO marking. Applications to the FAA for a letter of TSO design approval are made through the DGCA.

AMC 21.455(a) Application

- 1 Application Form CAAS(AW)205 is available from CAAS. It should be submitted together with the required technical data as stated in the applicable airworthiness design standard. The applicant is required to bear the costs of inspections, testing, evaluations carried out by an authorised person as part of the process of granting a STSO Certificate of Approval in accordance with the Twelfth Schedule of the ANO. The initial review of the application is expected to take approximately 3 hours and this payment should be included with the application. Any additional costs incurred, including further man hour costs, will be invoiced to the applicant.
- 2 Applicants wishing to apply for a FAA letter of TSO design approval should provide a letter addressed to the FAA, a second copy of the technical data required by the TSO and a Statement of Conformity, all of which will be forwarded to the FAA by the DGCA. Applications for a FAA letter of TSO design approval may be submitted with the application for a STSO Certificate of Approval or at any time after.
- 3 The technical data should include a Declaration of Design Performance (DDP). The DDP should provide a summary of all the technical aspects pertaining to certification. It will enable the DGCA to readily assess compliance with the relevant STSO and so expedite the approval process. It also provides the party installing the article with necessary data and references for ensuring a safe installation and continued airworthiness. To achieve these aims, the DDP should contain at least the following information:
 - (a) information identifying the article and its design and testing standard;
 - (b) the rated performance of the article;

- (c) a statement of compliance certifying that the article has met the appropriate STSO;
- (d) reference to relevant analysis and test reports;
- (e) reference to the appropriate Maintenance, Overhaul and Repair Manuals;
- (f) the levels of compliance, where various levels of compliance are allowed by the STSO;
- (g) list of deviations accepted in accordance with SAR-21.455(b).

The DDP should be endorsed with the date and signature of an approved design signatory of the applicant.

An example of the type of content to be contained within the DDP is shown in **Appendix 6**. The format may be modified as required to suit the article being submitted for approval.

AMC 21.455(a)(4) Part numbers

When a series of minor changes that do not require approval under SAR-21.475 is anticipated, the applicant may set forth in its application the basic model number of the article and the part number of the components with open brackets after it to denote that suffix change letters or numbers (or combinations of them) will be added from time to time.

AMC 21.455(b) Deviations

Deviations from any performance standard within a STSO may be acceptable provided there are compensating features which provide an equivalent level of safety. Applicants are advised to discuss any proposed deviations with the DGCA before making an application to obtain agreement that the deviation is acceptable and on an AMC for the compensating feature(s). The deviation should be identified in the application and a justification should be formally provided.

AMC 21.460 Design configuration control

- 1 If the applicant is the holder of a DOA, the approval reference should be identified on the application form. A DOA is not mandatory for STSO design approval but may expedite the approval process. Large design organisations or organisations producing articles which are complex or have significant safety implications may be required to obtain a DOA to ensure that there is adequate control and expertise within the organisation.
- 2 Where the applicant does not hold a DOA, the applicant should submit its procedures for design control. The applicant may refer to current control data already filed with the DGCA as part of a previous STSO Certificate of Approval application. Applicants anticipating repeated applications are advised to apply for a DOA to obviate the need for the DGCA to evaluate the design control system for each application.

AMC 21.475 Design Changes

- 1 A holder of a STSO Certificate of Approval for an article may make minor design changes to the article without obtaining further approval from the DGCA provided the holder:
 - (a) retains the basic model number of the article;
 - (b) identifies any design change by a model number suffix or part number change;
 - (c) forwards to the DGCA any revised data that is necessary to identify the design change and show continued compliance with the applicable STSO.

- 2 The extent of minor design changes which can be covered by the use of suffix change letters or numbers within the open brackets after the model or part number may be accepted by the DGCA at the time of application (see AMC 21.455(a)(4)). Minor changes made after the grant of the STSO Certificate of Approval should be notified to the DGCA within 6 months of making the minor change and preferably before shipment of the articles.
- 3 Major design changes should not be made to an article without obtaining a new STSO Certificate of Approval from the DGCA. A change in test condition for the same article may require investigations to establish compliance with the new test condition. Such a change may not require a new STSO Certificate of Approval if the DGCA deems that the change can be reviewed by a written request for technical approval. When the DGCA is satisfied that the applicant has demonstrated compliance with new test condition, a letter of Technical Approval will be granted.

IEM 21.480(c) Privilege to identify with STSO marking

It is both a privilege and an obligation to identify an article produced under a STSO Certificate of Approval with the STSO marking. An article identified with the STSO marking is recognised as meeting a minimum performance standard, is approved by the DGCA and may be offered for installation on an aircraft. The STSO marking does not signify that the installation on an aircraft is approved. The installation must be approved separately.

Subpart F - REPAIRS

IEM 21.500(a) Repair design Approval

A repair design Approval (major or minor) is an Approval for the design of a repair to a product or article outside the limits of a Structural Repair Manual (SRM) or a maintenance manual. The DGCA will grant a repair design Approval when it is satisfied that the repaired product or article will continue to comply with its certification basis.

A repair design approval issued under this Subpart does not certify that the changed product complies with any requirements or legislation relating to aircraft noise or aircraft engine emissions.

IEM 21.500(b)(3) Repairs to STSO articles

An article produced under a STSO Certificate of Approval is subject to specific requirements under Subpart E, and a repair to such an article should be carried out in accordance with that Subpart. However, Subpart F may be used to carry out repairs to an aircraft that may affect a STSO article. In this case it is identified as a repair to an aircraft affecting an article and not a repair to an article.

AMC 21.505(a) Application

- 1 Application Form CAAS(AW)206 is available from CAAS. This form may be used for a repair to any product or article. It should be submitted together with the required technical data. In addition to the information required on the application form, the applicant should also supply a list of parts and assemblies affected by the repair and, where necessary, drawings or sketches giving particulars of parts before and after repair. All data submitted should be identified with the applicant's repair reference number.
- 2 All documents submitted must establish that the design complies with the airworthiness requirements of Singapore and the certification basis of the aircraft. Where appropriate, data approved by the State of Design/Manufacture (e.g. FAA Form 8110-3 or equivalent acceptable to the DGCA) may form part of the substantiation package.
- 3 The ANO specifies that an aircraft shall not be flown if its Certificate of Airworthiness (CoA) is invalid except in accordance with a Permit to Fly issued to the aircraft. When an aircraft's CoA has been invalidated due to a repair and requires a flight test as part of the repair approval, a Permit to Fly will need to be obtained from CAAS before the conduct of the flight. (Refer to Chapter 2.5 of the Singapore Airworthiness Requirement).

- 4 The applicant is required to bear the costs of inspections, testing or evaluations carried out by an authorised person as part of the process of granting a repair design Approval in accordance with the Twelfth Schedule of the ANO. The initial review of the application is expected to take approximately 3 hours and this payment should be included with the application. Any additional costs incurred, including further man hour costs, will be invoiced to the applicant.

IEM 21.505(c) RESERVED

IEM 21.510 Design configuration control

- 1 An applicant for the grant of a repair design Approval is expected to hold a DOA under Subpart H. The Certificate reference should be identified on the application form. The proposed repair should be within the scope of approval specified on the Approval.
- 2 In exceptional circumstances, and only if the repair has no significant airworthiness implication, an applicant not holding a DOA may obtain a grant of repair design Approval. An applicant would need to supply a justification to explain why obtaining a DOA would be inappropriate and submit the procedures to be used for design control. The applicant must also be able to demonstrate a level of design competence appropriate to the repair design task being undertaken.
- 3 An applicant may obtain the assistance of the type certificate holder to determine that the repair does not introduce any unsafe feature.

IEM 21.515(a) Repair design Approval

- 1 The DGCA will grant a repair design Approval when it is satisfied that in respect of the design:
- (a) the design drawings, specifications, reports, analysis, etc. are adequate to establish that the design complies with the applicable airworthiness requirements.
 - (b) any tests or inspections required by the DGCA have been completed satisfactorily.
 - (c) the drawings and other documents which define the installation are of a satisfactory standard and are comprehensive enough to ensure that the repair can be installed by a maintenance organisation without additional instructions.
- 2 The DGCA may carry out a conformity check on the installed repair before final approval. The applicant should ensure that suitable access to the repaired area is provided for such checks.
- 3 A repair design Approval is deemed to be granted when Form CAAS(AW)206 has been signed by the DGCA. The form will be signed when all required testing and conformity checks have been carried out.

AMC 21.515(b) Compliance with Subsection VI

A repair design Approval must be maintained in compliance with Subsection VI of this Part. The DGCA may require evidence of the applicant's ability to comply before granting the Approval.

IEM 21.520 Record keeping

The 'life of the repair' means the length of time that the repaired product or article remains in service.

AMC 21.520(a) Record keeping

The technical records associated with a repair design Approval should include, as applicable:

- (a) a signed copy of the completed repair approval application form, CAAS(AW)206;
- (b) a description of the damage;

- (c) identification of the applicable airworthiness requirements;
- (d) a repair drawing and/or instructions;
- (e) correspondence with the type certificate or design approval holder if its advice on the design has been sought;
- (f) structural justification (static strength, fatigue, damage tolerance, flutter etc.);
- (g) effect on the aircraft, engines and/or systems (performance, flight handling etc.);
- (h) effect on maintenance programme, including instructions for continued airworthiness as necessary;
- (i) effect on airworthiness limitations, the Flight Manual and the Operating Manual;
- (j) weight and moment change;
- (k) special test requirements;
- (l) time limitations for a temporary repair.

Subpart H - DESIGN ORGANISATION APPROVAL (DOA)

AMC 21.660 Application

- 1 Applicants are invited to seek a preliminary discussion with the DGCA to discuss the approval process and application requirements prior to the application submission.
- 2 The formal application package for a grant of a DOA should consist of the following:
 - (a) letter of application;
 - (b) letter of intent;
 - (c) CAAS(AW)21B – application form;
 - (d) CAAS(AW)22 – resumes for accountable manager, senior person responsible for design control, senior person responsible for quality assurance, and design signatories;
 - (e) CAAS(AW)102A – application for approval of design signatory/certifying staff;
 - (f) proposed Exposition Document – two copies;
 - (g) documentation evidencing that the applicant has and can obtain the use of appropriate facilities for the scope of work (e.g. lease agreement);
 - (h) company registration or equivalent;
 - (i) any proposed manual, as applicable;
 - (j) personnel training programmes, as applicable;
 - (k) Statement of Compliance against the applicable paragraphs of SAR-21;
 - (l) a Schedule of Events detailing the anticipated timescales for the approval process.
- 3 Applications to the DGCA for a variation to an existing DOA should be made in the same manner as an application for a new DOA with the exception that unchanged documentation need not be resubmitted.

- 4 The applicant is required to bear the costs of inspections, testing or evaluations carried out by an authorised person as part of the process of granting a DOA in accordance with the Twelfth Schedule of the ANO. The initial review of the application is expected to take approximately 3 hours and this payment should be included with the application. Any additional costs incurred, including further man hour costs, will be invoiced to the applicant.
- 5 In addition to the fees and charges contained in paragraph 4, an approval fee is applicable for the issuance of the DOA certificate or other form of written approval. Such approval fee will be required for each branch of the organisation in a different geographical location. A 'different geographical location' is intended to cover a separate or satellite facility at a different location with a different address to the principal site.
- 6 The DGCA will not accept an application from an organisation located outside of Singapore unless the DGCA determines that the location places no undue burden on it for fulfilling its certificate management responsibilities.

AMC 21.665(a) Description of organisation and procedures

- 1 The purpose of the Exposition Document is to provide a document that is useful to both the applicant and the DGCA in organising and describing the details of how the organisation actually functions. A recommended format is provided in **Appendix 7**.
- 2 The description of the organisation and procedures should include at least the following information:
 - (a) the titles and names of the senior person or persons responsible for design control and quality assurance, including their duties and responsibilities, and a list of approved signatories;
 - (b) an organisation chart showing lines of responsibility of the senior persons;
 - (c) details of all locations where the applicant conducts design activities and testing, and the facilities at those locations;
 - (d) a detailed description of the scope of work to be undertaken;
 - (e) details of any authorisations made by the applicant to other persons for design work and testing;
 - (f) details of the organisation's procedures relating to:
 - (i) determining the competence of personnel;
 - (ii) the on-going training of personnel;
 - (iii) the control and calibration of tools and test equipment;
 - (iv) the approval of design data;
 - (v) the operation of the design control system;
 - (vi) the collection, investigation, analysis, and distribution of information relating to defects and occurrences;
 - (vii) instructions for continued airworthiness;
 - (viii) record keeping;
 - (ix) the internal quality assurance of the applicant;
 - (x) the internal/external interfaces between internal departments and external organisations;

- (xi) control, amendment and distribution of the Exposition Document.

AMC 21.665(c) Approval of the Exposition Document

The Exposition Document should contain a statement signed by the accountable manager, on behalf of the applicant, confirming that the Exposition Document and any included manuals define the design organisation and demonstrate its means and methods for ensuring ongoing compliance and that it will be complied with at all times. The following statement may be used:

“This exposition and any associated referenced manuals define the organisation and procedures upon which the SAR-21 Design Organisation Approval is based as required by SAR-21.665. These procedures are approved by the undersigned and must be complied with, as applicable, when undertaking design activities under the terms of the SAR-21 Design Organisation Approval.

It is accepted that these procedures do not override the necessity of complying with any new or amended regulation published by the DGCA from time to time where these new or amended regulations are in conflict with these procedures.

It is understood that the DGCA’s approval of this organisation will be given and maintained if the DGCA is satisfied that the procedures are being followed and design standards maintained. It is further understood that the DGCA reserves the right to suspend, limit or revoke the SAR-21 approval of the organisation if the DGCA has evidence that procedures are not followed or standards not upheld.

Signed.....

Dated.....

Accountable Manager and.....(quote position)

For and on behalf of.....(quote organisation’s name)”

AMC 21.665(d) Updating of the Exposition Document

- 1 It is intended that the Exposition Document be a ‘living’ document that is useful to the applicant in fulfilling its obligations to maintain the DOA, as well as to the DGCA for its continued safety oversight. It is therefore essential that it is regularly reviewed and changes are incorporated at the earliest opportunity to ensure that it remains current.
- 2 Any proposed amendment to the Exposition Document must be submitted to the DGCA for approval before the amendment is issued and incorporated.

AMC 21.670(a) Design definition

- 1 The applicant should establish procedures to:
 - (a) control its proposed design and drawing system;
 - (b) produce, check and control drawings and data for production, ensuring that all calculations and drawings are subject to independent checking by a suitably qualified person.
- 2 The applicant should hold copies of design control manuals, facility manuals, airworthiness design standards, specifications, technical standards and practices, reference material, and any other documentation that is necessary for the provision of the design control system as described in its exposition. These documents should be subject to a documentation control system to ensure that:
 - (a) the documentation is reviewed and authorised by appropriate personnel before issue;
 - (b) current issues of relevant documentation are available to personnel at all locations where they need access to such documentation for the provision of the design activities listed in the exposition;

- (c) obsolete documentation is promptly removed from the system;
- (d) amendments to documentation are reviewed and authorised by appropriate personnel; and
- (e) each item of documentation can be identified to ensure that only documentation relevant to the design is issued.

AMC 21.670(b) Compliance with airworthiness design standards

An applicant may need to submit design data to the DGCA for approval. When making submissions, an applicant should identify and make compliance statements against the applicable airworthiness design requirements. To facilitate this process, the applicant should have procedures to:

- (a) test and inspect specimens to the approved design to show compliance with airworthiness design standards, including stress analysis and flight test reports when appropriate. Test procedures should include provisions for test witnessing by the DGCA;
- (b) issue statements of compliance and maintain the list of staff with authority to sign the statements.

AMC 21.670(c) Design signatory

- 1 An applicant should provide the DGCA with the credentials of staff who are to be given the authority to certify design data on behalf of the applicant by completing forms CAAS(AW)22 & 102A (**Appendices 3 and 4**) and submitting them to the DGCA.
- 2 The DGCA applies the following criteria when considering the approval of design signatories:
 - (a) possession of professional and technical qualifications and knowledge appropriate for the activity and at least 5 years of recent engineering experience (one year of this experience should be on engineering work on civil aircraft and in a field similar to that for which the approval is held);
 - (b) possession of knowledge of the appropriate Singapore aviation legislation and airworthiness design standards as listed in Subpart I. Knowledge of aviation legislation may be demonstrated by passing the CAAS' examination papers on Airworthiness Administration (L11), or Aviation Legislation (M10) or by attending a course on Singapore Airworthiness Requirements (SAR) Part 21 or L11 or M10 courses conducted by an approved maintenance training organisation;
 - (c) holding a position in the organisation of sufficient authority to ensure adequate control over designs within the relevant area of responsibility.

AMC 21.670(e) Corrective action

- 1 A procedure should be established to identify existing problems or potential causes of problems within the design control system. This should include identifying and monitoring quality indicators, including defect and incident reports, and personnel and customer feedback.
- 2 A procedure for corrective action should be established to ensure that existing problems that have been identified within the system are corrected.
- 3 A procedure should also be established for preventive action to ensure that potential causes of problems that have been identified within the system are remedied.

AMC 21.670(f) Modifications

Modification procedures should be established to control design changes. These procedures should lead to the determination of whether a change is major or minor, the issue of minor design change approvals, and the maintenance of the list of senior persons with authority to certify such approvals.

AMC 21.670(g) Quality assurance

- 1 A quality assurance system consisting of two essential elements, internal audit and management review, is a tool that is extremely useful in terms of managing the activities authorised by the DGCA. It has been shown that organisations who develop effective internal audit programs “sail through” audits by the regulatory authority.
- (a) The internal audit program should:
- (i) specify the frequency and location of the audits taking into account the nature of the activity to be audited;
 - (ii) ensure that audits are performed by trained auditing personnel who are independent of those having direct responsibility for the activity being audited;
 - (iii) ensure that the results of audits are recorded, and reported to the personnel responsible for the activity being audited and the manager responsible for internal audits;
 - (iv) require preventive or corrective action to be taken by the personnel responsible for the activity being audited if problems are found through the audit;
 - (v) ensure that follow up audits are conducted to review the effectiveness of any preventive or corrective action taken.
- (b) Management review procedures to ensure the continuing suitability and effectiveness of the internal quality assurance system should:
- (i) specify the frequency of management reviews;
 - (ii) identify the manager responsible for reviewing the quality assurance system;
 - (iii) ensure that the results of the review are evaluated and recorded;
 - (iv) ensure that the findings of the internal audit are fed back to the accountable manager of the organisation.
- 2 The senior person who has the responsibility for internal quality assurance (usually called the Quality Manager) should have direct access to the accountable manager on matters affecting safety. This person should possess knowledge of appropriate Singapore aviation legislation, which may be demonstrated by passing CAAS’ examination papers on Airworthiness Administration (L11) or Aviation Legislation (M10) or by attending a course on Singapore Airworthiness Requirements (SAR) Part 21 or L11 or M10 courses conducted by an approved maintenance training organisation.

IEM 21.675 Collaboration between design and production

- 1 It is the responsibility of a holder of a DOA to assure correct and timely transfer to a holder of a POA of up-to-date airworthiness data (e.g. drawings, material specifications, dimensional data, processes, surface treatments, shipping conditions, quality requirements, etc.), and to provide a visible statement that the data is approved by the DGCA.
- 2 A holder of a DOA should take joint responsibility with a holder of a POA to deal adequately with production deviations and non-conforming parts and to achieve adequate configuration control of production parts.

AMC 21.685 Continued airworthiness

A holder of a DOA shall establish procedures appropriate to the designs being used for production for the provision of instructions for continued airworthiness (which should include maintenance information, inclusive of information on standard repairs). The instructions and any changes to the instructions should be available to any person required to comply with those instructions. They should be comprehensive enough to assure that required maintenance actions can be completed by maintenance organisations without additional instructions.

AMC 21.690(b) Compliance with Subsection VI

A DOA must be maintained in compliance with Subsection VI of this Part. The DGCA may require evidence of the applicant's ability to comply before granting the DOA.

Subpart I - AIRWORTHINESS DESIGN STANDARDS**IEM 21.755 Products**

1 Where no specific Authority design standards exist, the design standards will be those listed under 21.755 (a)(2) or 21.755(a)(3).

2 Where no specific minimum performance standards are issued by the Authority, the minimum performance standards will be those listed under 21.760(b) or 21.760(c).

IEM 21.765 Standard parts

1 A standard part is an article which:

- (a) does not in itself require a specific airworthiness approval; and
- (b) is made to a national or international aeronautical specification; and
- (c) is identified as such by the manufacturer.

2 'Officially recognised industry standards' are those standards which:

- (a) are widely recognised by the international aerospace industry for the manufacture of standard parts; and
- (b) are published in the public domain; and
- (c) contain all the design, manufacturing, inspection data and marking requirements necessary for the demonstration of conformity.

3 National specifications may include military specifications, e.g. Mil Specs.

4 Standard parts may be released on a Certificate of Conformity. An Authorised Release Certificate is not mandatory.

SUBSECTION III – PRODUCTION APPROVAL**Subpart J - PRODUCTION ORGANISATION APPROVAL (POA)****IEM 21.1005 Requirement to hold a POA**

Organisations producing articles in Singapore which are subject to oversight by CAAS through a technical arrangement with a foreign aviation authority under a Bilateral Aviation Safety Agreement or a Memorandum of Understanding must hold a POA.

AMC 21.1010 Application

- 1 Applicants are invited to seek a preliminary discussion with the DGCA to discuss the approval process and application requirements prior to the application submission.
- 2 The formal application package for a grant of a POA should consist of the following:
 - (a) letter of application;
 - (b) letter of intent;
 - (c) CAAS(AW)21B – application form;
 - (d) CAAS(AW)22 – resumes for accountable manager, senior person responsible for production control, senior person responsible for quality assurance, and certifying staff;
 - (e) CAAS(AW)102A – application for approval of design signatory/certifying staff;
 - (f) proposed Exposition Document – two copies;
 - (g) printer's copy of Authorised Release Certificate;
 - (h) documentation evidencing that the applicant has and can obtain the use of appropriate facilities for the scope of work (e.g. lease agreement);
 - (i) company registration;
 - (j) any proposed manual, as applicable;
 - (k) personnel training programmes, as applicable;
 - (l) Statement of Compliance against the applicable paragraphs of SAR-21;
 - (m) a Schedule of Events detailing the anticipated timescales for the approval process.
- 3 Applications to the DGCA for a variation to an existing POA should be made in the same manner as an application for a new POA with the exception that unchanged documentation need not be resubmitted.
- 4 The applicant is required to bear the costs of inspections, testing and evaluations carried out by an authorised person as part of the process in granting a POA in accordance with the Twelfth Schedule of the ANO. The initial review of the application is expected to take approximately 3 hours and this payment should be included with the application. Any additional costs incurred, including further man hour costs, will be invoiced to the applicant.
- 5 In addition to the fees and charges contained in paragraph 4, an approval fee is applicable for the issuance of the POA certificate or other form of written approval. Such approval fee will be required for each branch of the organisation in a different geographical location. A 'different geographical location' is intended to cover a separate or satellite facility at a different location with a different address to the principal site.
- 6 The DGCA will not accept an application from an organisation located outside of Singapore unless the DGCA determines that the location places no undue burden on it for fulfilling its certificate management responsibilities.

AMC 21.1015(a) Description of organisation and procedures

- 1 The purpose of the Exposition Document is to provide a document that is useful to both the applicant and the DGCA in organising and describing the details of how the organisation actually functions. A recommended format is provided in **Appendix 8**.

- 2 The description of the organisation and procedures should include at least the following information:
- (a) the titles and names of the senior person or persons responsible for production control and quality assurance, including their duties and responsibilities;
 - (b) an organisation chart showing lines of responsibility of the senior persons;
 - (c) details of all locations where the applicant carries out production activities, and the facilities at those locations;
 - (d) a detailed description of the scope of work to be undertaken;
 - (e) details of the organisation's procedures relating to:
 - (i) determining the competence of personnel;
 - (ii) the on-going training of personnel;
 - (iii) the provision of satisfactory storage and segregation of parts, including quarantine;
 - (iv) the provision of satisfactory environmental conditions;
 - (v) the control and calibration of tools, jigs, process equipment, and test equipment;
 - (vi) inspection of raw materials, parts, and assemblies;
 - (vii) inspection of individual parts and complete assemblies during production;
 - (viii) the subcontracting of production activities and the control of sub-contractors;
 - (ix) non-conforming materials and parts;
 - (x) final tests including, if applicable, flight testing;
 - (xi) identification, handling, storage, and packing of products;
 - (xii) airworthiness release documents;
 - (xiii) control and distribution of documentation;
 - (xiv) the continued airworthiness of the articles produced;
 - (xv) the identification, collection, indexing, storage, maintenance, and disposal of records;
 - (xvi) the internal quality assurance of the applicant;
 - (xvii) control, amendment and distribution of the Exposition Document.
 - (f) A CAAS approved list of articles that can be produced.
- 3 For the purpose of 2(f), an applicant may seek an approval from CAAS to maintain the approved list in a separate document other than the Exposition Document. In this case, the applicant is to make the necessary reference(s) between the Exposition Document and this separate document. The applicant should maintain a record of the revisions in this document containing the approved list of articles that can be produced and submit to the DGCA for approval.

AMC 21.1015(d) Approval of the Exposition Document

The Exposition Document should contain a statement signed by the accountable manager, on behalf of the applicant, confirming that the Exposition Document and any included manuals define the production organisation and demonstrate its means and methods for ensuring ongoing compliance and that it will be complied with at all times. The following statement may be used:

“This exposition and any associated referenced manuals define the organisation and procedures upon which the SAR-21 Production Organisation Approval is based as required by SAR-21.1015. These procedures are approved by the undersigned and must be complied with, as applicable, when undertaking production activities under the terms of the SAR-21 Production Organisation Approval.

It is accepted that these procedures do not override the necessity of complying with any new or amended regulation published by the DGCA from time to time where these new or amended regulations are in conflict with these procedures.

It is understood that the DGCA’s approval of this organisation will be given and maintained if the DGCA is satisfied that the procedures are being followed and production standards maintained. It is further understood that the DGCA reserves the right to suspend, limit or revoke the SAR-21 approval of the organisation if the DGCA has evidence that procedures are not followed or standards not upheld.

Signed.....

Dated.....

Accountable Manager and.....(quote position)

For and on behalf of.....(quote organisation’s name)”

AMC 21.1015(e) Updating of the Exposition Document

- 1 It is intended that the Exposition Document be a ‘living’ document that is useful to the applicant in fulfilling its obligations to maintain the POA, as well as to the DGCA for its continued safety oversight. It is therefore essential that it is regularly reviewed and changes are incorporated at the earliest opportunity to ensure that it remains current.
- 2 Any proposed amendment to the Exposition Document must be submitted to the DGCA for approval before the amendment is issued and incorporated.

AMC 21.1020(a) Identification of design data

- 1 An applicant should hold copies of engineering drawings, specifications, technical standards and practices, and any other documentation that is necessary for the identification of the article being produced.
- 2 Procedures should be established to control the design data being used for production to ensure:
 - (a) the design documentation is reviewed and authorised by appropriate personnel before it is incorporated into production data;
 - (b) current issues of relevant documentation are available to personnel at all locations where they need access to such documentation for the provision of the production activities listed in the exposition;
 - (c) obsolete documentation is promptly removed from the system;
 - (d) amendments to documentation are reviewed and authorised by appropriate personnel; and
 - (e) the current version of each item of documentation can be identified to ensure out-of-date documentation is not used.

AMC 21.1020(b) Incoming items

- 1 An applicant should establish a procedure for the inspection of raw materials, parts and sub-assemblies, purchased or produced by subsidiary production organisations, including methods to ensure the acceptable quality of parts and assemblies that cannot be completely inspected upon delivery to the organisation.
- 2 An applicant should ensure that production activities performed by a subcontractor are adequately controlled. The subcontractor should be working to the same systems and procedures detailed in the applicant's exposition. The activity can be considered as an extension of the applicant's activities and should be subject to an appropriate level of oversight by the applicant.

AMC 21.1020(c) Inspection and non-conforming parts

- 1 A holder of a POA should establish procedures for the inspection of individual parts and complete assemblies of articles during production
- 2 A materials review system should be established for dealing with materials, parts and sub-assemblies not conforming to the approved design or specification. The system normally consists of a Materials Review Board (MRB) with representatives from Production, Quality and Design units. The system should include the establishment of procedures for recording of the MRB decisions and the disposal of rejected materials, parts and assemblies. Such records should be retained for 2 years after the relevant action was taken.

AMC 21.1020(e) Quality assurance

- 1 A quality assurance system consisting of two essential elements, internal audit and management review, is a tool that is extremely useful in terms of managing the activities authorised by the DGCA. It has been shown that organisations who develop effective internal audit programs "sail through" audits by the regulatory authority.
 - (a) The internal audit program should:
 - (i) specify the frequency and location of the audits taking into account the nature of the activity to be audited;
 - (ii) ensure that audits are performed by trained auditing personnel who are independent of those having direct responsibility for the activity being audited;
 - (iii) ensure that the results of audits are reported to the personnel responsible for the activity being audited and the manager responsible for internal audits;
 - (iv) require preventive or corrective action to be taken by the personnel responsible for the activity being audited if problems are found through the audit;
 - (v) ensure that follow up audits are conducted to review the effectiveness of any preventive or corrective action taken.
 - (b) Management review procedures to ensure the continuing suitability and effectiveness of the internal quality assurance system should:
 - (i) specify the frequency of management reviews;
 - (ii) identify the manager responsible for reviewing the quality assurance system;
 - (iii) ensure that the results of the review are evaluated and recorded;
 - (iv) ensure that the findings of the internal audit are fed back to the accountable manager of the organisation.

- 2 The senior person who has the responsibility for internal quality assurance (usually called the Quality Manager) should have direct access to the accountable manager on matters affecting safety. This person should also meet the following additional requirements:
- (a) possess knowledge of appropriate Singapore aviation legislation, which may be demonstrated by passing the CAAS' examination papers on Airworthiness Administration (L11) or Aviation Legislation (M10) or by attending a course on Singapore Airworthiness Requirements (SAR) Part 21 or L11 or M10 courses conducted by an approved maintenance training organisation; and
 - (b) have a minimum of two years experience in quality assurance or equivalent; and
 - (c) have at least two years of relevant production experience.

Note: Details of the CAAS' exams can be found in SAR-66 Aircraft Maintenance Licensing.

AMC 21.1020(f) Certifying staff

- 1 An applicant should establish procedures for the issue of Authorised Release Certificates and statements of conformity, and the maintenance of the list of staff with authority to certify an Authorised Release Certificate or statement of conformity.
- 2 An applicant should provide the DGCA with the credentials of staff who are to be given the authority to sign Authorised Release Certificates on behalf of the applicant by completing forms CAAS(AW)22 & 102A (**Appendices 3 and 4**) and submitting them to the DGCA.
- 3 The DGCA applies the following criteria when considering the approval of certifying staff:
- (a) possession of appropriate qualifications and knowledge and at least one year of recent quality control experience in a related aviation field;
 - (b) possession of knowledge of the appropriate Singapore aviation legislation. Knowledge of aviation legislation may be demonstrated by passing the CAAS' examination on Airworthiness Administration (L11 or L12) or Aviation Legislation (M10) or by attending a course on Singapore Airworthiness Requirements (SAR) Part 21 or L11 or M10 courses conducted by an approved maintenance training organisation;
 - (c) holding a position in the quality department of the organisation.

AMC 21.1020(g) Conformity of articles

- 1 A holder of a POA should establish procedures to ensure that the articles it produces conform to their approved designs. The procedures should cover software quality assurance process if software is included in the approved designs. These procedures may include periodic repetitive checks of production items against design criteria or other methods appropriate for the items being produced. Requirements for final acceptance testing should be included.
- 2 To ensure each article remains in the conformed condition, procedures for the identification, handling, storage and packing of the articles should be established.

AMC 21.1020(h) Corrective action

- 1 A procedure should be established to identify existing problems or potential causes of problems within the production control system. This should include monitoring quality indicators, including defect and incident reports, and personnel and customer feedback.
- 2 A procedure for corrective action should be established to ensure that existing problems that have been identified within the system are corrected.

- 3 A procedure should also be established for preventive action to ensure that potential causes of problems that have been identified within the system are remedied.

AMC 21.1020(j) Identification of articles

If the article is too small or it is otherwise impractical to mark the article with any of the information required by SAR-21.1020(j), the Authorised Release Certificate accompanying the part or its container may include the information that could not be marked on the article.

AMC 21.1020(k) Record keeping system

The record keeping system will need to be able to identify, collect, index, store, maintain and dispose of the records that are necessary to ensure that each production item conforms to the approved design data and is in a condition for safe operation. The applicant should establish procedures to:

- (a) record the details of the experience, qualifications, training, and current authorisations of each person who exercises certification privileges on the certificate holder's behalf;
- (b) record all articles that are produced by the Approval holder including a description of the work performed;
- (c) record the date, and person certifying, that each product conforms to the applicable design data and is in a condition for safe operation;
- (d) record all calibrations on equipment, tools and materials and the standards used;
- (e) ensure that records are legible and of a permanent nature and are retained for the period required by SAR-21.1030.

IEM 21.1025(a) Relationship between production and design

A holder of a POA must hold the right to produce products or articles to the approved design data by either:

- (a) being the owner of the approved design; or
- (b) having an arrangement with the design approval holder that is current and satisfies the requirements of this Subpart. Acceptable arrangements include production under licence and produce to print.

IEM 21.1025(b) Collaboration between production and design

- 1 It is the responsibility of the holder of the POA to:
- (a) assist the organisation holding the design approval for the products or articles being produced in dealing with continuing airworthiness matters and for required actions in relation to those products or articles;
 - (b) in the case of products and articles that have not been granted a design approval, assist the organisation applying for the certification of a product or article in showing compliance with the applicable airworthiness requirements for that product or article intended to be produced by the POA holder;
 - (c) develop, where applicable, its own production data in compliance with the airworthiness data package.
- 2 A holder of a POA should take joint responsibility with the organisation holding the design approval for the product or article being produced to deal adequately with production deviations and non-conforming parts through the MRB process, and to achieve adequate configuration control of production parts to enable the POA holder to make the final determination and identification for conformity or airworthiness release and eligibility status.

Subpart K - PRODUCTION WITHOUT PRODUCTION ORGANISATION APPROVAL**AMC 21.1100 Application for and grant of a letter of agreement**

- 1 An application for a letter of agreement should be made in writing and contain at least the following:
 - (a) a letter of application;
 - (b) a description of the article proposed for production without a POA and the number that would be produced;
 - (c) a justification to explain why obtaining a POA under Subpart J would be inappropriate;
 - (d) a description of the production inspection system that is to ensure that each copy of the article produced conforms to the applicable design data and would be in a condition for safe operation;
 - (e) a description of the record keeping system for the production records that are to be retained by the applicant for ensuring the continued airworthiness of the articles produced.

- 2 The holder of a letter of agreement should ensure the following:
 - (a) Make each produced article available for inspection by the DGCA;
 - (b) Maintain all necessary technical data and drawings for conformity determination;
 - (c) Establish and maintain an approved production inspection system;
 - (d) Maintain a manual describing the production inspection system; and
 - (e) Where applicable, provide permanent and legible markings of the serial number and model or part number on each article.

- 3 The applicant is required to bear the costs of inspections, testing or evaluations carried out by an authorised person as part of the process of granting Approval for Production without POA in accordance with the Twelfth Schedule of the ANO. The initial review of the application is expected to take approximately 3 hours and this payment should be included with the application. Any additional costs incurred, including further man hour costs, will be invoiced to the applicant.

IEM 21.1110(a) Production of STSO articles

- 1 Production of STSO articles should be made by the holder of a POA.

- 2 However, production of a STSO article by a holder of a STSO Certificate of Approval not holding a POA may be permitted in exceptional cases when the number of articles to be produced is limited and the articles are extremely simple. As a guideline, the number of articles would be limited to less than 5. In these cases a holder of a STSO Certificate of Approval would have to obtain agreement from the DGCA that a POA is not appropriate and demonstrate that procedures are in place to ensure that the proposed small batch to be produced will conform with the design data, have no unsafe feature and would be in a condition for safe operation. Provisions for the issue of an Authorised Release Certificate for the articles would need to be agreed by the DGCA.

SUBSECTION VI – APPROVAL AND CERTIFICATE MANAGEMENT**AMC 21.1505(b) In service support**

- 1 A holder of an Approval granted under this Part should establish procedures to collect, investigate and analyse information relating to problems that develop when the designs it produces go into service.

- 2 Whenever service problems develop, one of the first steps is to assess whether the source of the problem is related to design, production, or maintenance. Internal procedures should be developed to help expedite this assessment. It is useful if these procedures require investigations to continue beyond determining the potential source or sources to uncover the cause or series of causes and potential remedies determined. Any remedies developed should address not only the individual failure but measures to assure the airworthiness of all items of that type in service. Internal quality systems and procedures should also be developed or modified to prevent the same or similar issues from developing in the future.
- 3 The procedures should include the distribution of information regarding the problem and its remedy to the DGCA all production organisations using that design and to the end users of the affected products or articles.

AMC 21.1505(c) Failure, malfunction and defect reporting

- 1 A holder of an Approval granted under this Part must report to the DGCA any failure, malfunction or defect in any article that has left its quality control system and could result in the safety level of aircraft operation being compromised.
- 2 The holder may make an initial notification by telephone, e-mail or other expedient means but a written report should be submitted to the DGCA within 72 hours. A report should include as much of the following data that is available at the time:
 - (a) a description of the failure, malfunction or defect;
 - (b) the identification of the article(s) involved, including the part number(s) and serial number(s);
 - (c) if there are any articles in service:
 - (i) aircraft type and registration marks;
 - (ii) name of the operator or owner;
 - (d) the apparent cause of the failure, malfunction or defect;
 - (e) the action taken to rectify the failure, malfunction or defect and any action to preclude its recurrence;
 - (f) other pertinent information necessary for a more complete identification and evaluation of the article and the issues involved.
- 3 Reportable occurrences are defined as failure, malfunction, defect, deviation or other occurrence which has resulted in or may result in an unsafe condition. This may include:
 - (a) Any incident where any feature or inadequacy of the design of the aircraft, aircraft part or design that could contribute to a hazardous or catastrophic effect on the aircraft, or result in endangering its occupants.
 - (b) Any incident where any deviation in the design control process or production control process that could contribute to a hazardous or catastrophic effect on the aircraft, or result in endangering its occupants. Some examples are:
 - (i) Falsification of technical test data during the certification process.
 - (ii) Falsification of technical competency of design or production signatory.
 - (iii) Inappropriate delegation of responsibility of the design or production signatory.
 - (iv) Improper release of the design drawings from DOA to the POA.
 - (v) Unauthorised amendment of approved data from POA without DOA approval.

- (vi) Manufacturing escape of articles that do not meet the requirements of the drawings.
- (vii) Inappropriate release of Authorised Release Certificate (ARC)
- (viii) OEM or TC holder technical instructions which cannot be implemented.

AMC 21.1505(d) Investigation of reported occurrences

When an occurrence reported in 21.1505(c) results from a deficiency in the design or a production deficiency, the holder of the Approval shall investigate the reason for the deficiency and report to the DGCA the results of its investigation and any action it is taking or proposes to take to correct that deficiency. The investigation should establish the full extent of the problem.

IEM 21.1505(e) Corrective action

The corrective action taken by the Approval holder may include the publication of a Service Bulletin or the recall of the deficient or defective article. If the DGCA finds it necessary to mandate the corrective action, it may do so by issuing an Airworthiness Directive under SAR 39.

IEM 21.1515(a) Duration of Approvals

- 1 An organisation Approval (DOA or POA) is usually valid for a period of one year from the date of issue unless the Authority determines there are special circumstances that dictate a shorter time. Approval holders need to reapply using form CAAS(AW)21B in advance of the expiry date to maintain continuity of approval. Applications should be made one month before the Approval expires. If applications are received by the DGCA less than one month before expiry, then continuity of approval cannot be guaranteed.
- 2 All other Approvals are valid until surrendered, superseded, suspended or revoked.

IEM 21.1515(b) Surrender or revocation of Approvals

Upon surrender or revocation, the Approval must be returned to the DGCA immediately.

IEM 21.1515(c) Continued Validity of Approvals

- 1 Approval holders can expect the CAAS to conduct continuous oversight of holders of Approvals granted under this Part to maintain the safety of the civil aviation system. They can expect a program of regular audits to ensure that safety standards and requirements stipulated in this Part are implemented and maintained. Audits may be carried out at any of the Approval holder's facilities including subcontractors. The audits should be seen as a tool to assist both Approval holders and CAAS in assuring the continued compliance with the airworthiness requirements of this Part.
- 2 To assist an Approval holder in understanding the implications of any non compliance found during an audit, the findings will be classified as follows:
 - (a) a **Level One** finding is any non-compliance with this Part 21 which could lead to uncontrolled non-compliances with applicable design data and which could affect the safety of aircraft operation;
 - (b) a **Level Two** finding is any other non-compliance;
 - (c) an **Observation** does not affect the safe operation of an aircraft and is normally derived from industry best practices.
- 3 Any findings found during an audit will need to be corrected to maintain the safety of the aviation system. Corrective action should be implemented as follows:

- (a) in the case of a **Level One** finding, the Approval holder should take immediate corrective action to address the finding to the satisfaction of the DGCA. The severe implications at an aircraft level of such a finding means that the Approval holder will be subject to an immediate partial or full limitation, suspension or revocation;
 - (b) in the case of a **Level Two** finding, the corrective action should be taken within 30 calendar days of within a stipulated time as specified by the DGCA;
 - (c) an **Observation** made by CAAS, if adopted, would enhance the operations of the organisation. However, should the affected organisation choose not to implement CAAS' suggestions, it is not required to provide reasons for not doing so but a reply is required.
- 4 Fees payable to the DGCA for Approval renewal are detailed in the Twelfth Schedule of the ANO.
- 5 The DGCA is required to recover the costs it incurs in renewing approvals in accordance with paragraph 8 of the ANO. All costs associated with the audit will be invoiced to the applicant.

**SINGAPORE AIRWORTHINESS REQUIREMENTS
PART 21**

SECTION 2 APPENDIX 1

THE AUTHORISED RELEASE CERTIFICATE – FORM CAAS(AW)95

1 INTRODUCTION

- 1.1 This Appendix relates only to the use of the Authorised Release Certificate (form CAAS(AW)95) for production purposes. Use of this Certificate (ARC) for maintenance purposes is covered in SAR-145.

2 PURPOSE AND SCOPE

- 2.1 The purpose of the ARC is to release products and articles (hereafter referred to as 'item(s)') and/or materials as identified in Blocks 7 through 11 as applicable after production, or to release maintenance work carried out on items under the approval of the DGCA.
- 2.2 The ARC is to be used for export or import purposes, as well as for domestic purposes, and serves as an official certificate for the delivery of items from the manufacturer to users. The ARC is not a delivery or shipping note.
- 2.3 The ARC may be used by the holder of a POA under Part 21 Section III Subpart J, within the scope of such an approval, or by organisations approved by the DGCA for limited production under Section III Subpart K, or by the DGCA itself.
- 2.4 A mixture of 'New' and 'Used' items is not permitted on the same ARC.
- 2.5 A mixture of items certified in conformity with 'approved data' and to 'non-approved data' is not permitted on the same ARC, and consequently only one box in Block 14 can be ticked.
- 2.6 Under no circumstances may an ARC be issued for any item when it is known that the item has a defect which is considered by the producer of the item to be a serious hazard to flight safety.

3 GENERAL

- 3.1 The ARC must comply with the format attached including block numbers and the location of each Block. The size of each Block may however be varied to suit the individual application, but not to the extent that would make the ARC unrecognisable. The overall size of the ARC may be significantly increased or decreased so long as the ARC remains recognisable and legible. If in doubt consult the DGCA.
- 3.2 The User responsibility statements are normally placed on the reverse of this ARC, but they may be added to the front of the ARC by reducing the depth of the form.
- 3.3 All printing must be clear and legible to permit easy reading.
- 3.4 The ARC may either be pre-printed or computer generated but in either case the printing of lines and characters must be clear and legible. Pre-printed wording is permitted in accordance with the attached model but no other certification statements are permitted.
- 3.5 The ARC must be completed in the English language.
- 3.6 The details to be entered on the ARC may be either machine or computer printed or handwritten using block letters and must permit easy reading.
- 3.7 Abbreviations should be restricted to a minimum.

- 3.8 The space remaining on the reverse side of the ARC may be used by the originator for any additional information but must not include any certification statement.
- 3.9 The original ARC must accompany the items and correlation must be established between the ARC and the items. A copy of the ARC must be retained by the organisation that produced the items. Where the ARC format and the data is entirely computer generated, subject to acceptance by the DGCA, it is permissible to retain the ARC format and data on a secure database.

Note: There is no restriction in the number of copies of the ARC sent to the customer or retained by the originator.

- 3.10 The ARC that accompanies the item may be attached to the item by being placed in an envelope for durability.

4 COMPLETION OF THE AUTHORISED RELEASE CERTIFICATE BY THE ORIGINATOR

Except as otherwise stated, there must be an entry in all Blocks to make the document a valid certificate.

- Block 1 Pre-printed 'Singapore'.
- Block 2 Pre-printed as shown in the attached model.
- Block 3 A unique number must be pre-printed in this Block for ARC control and traceability purposes except that in the case of a computer generated document, the unique number need not be pre-printed where the computer is programmed to produce the number.
- Block 4 The name entered in this box is that of the organisation approval holder who is responsible for making the final determination of conformity or airworthiness, and whose Approval Reference Number is quoted in Block 16. The name must be entered in exactly the same form as appears in the Approval held by the organisation.
- If the place of manufacture and release is one of the organisation addresses listed on the Approval, then that is the only address needed in this Block. If the place of manufacture and release is a location which is not listed on the Approval then a second address should be entered to identify the place of manufacture and release.
- Block 5 The purpose is to reference work order/contract/invoice or any other internal organisational process such that a fast traceability system can be established. The use of the Block for such traceability is strongly recommended in the absence of item Serial Numbers or batch numbers. When not used, state N/A.
- Block 6 This block is provided for the convenience of the organisation issuing the ARC to permit easy cross-reference to the 'Remarks' Block 13 by the use of line item numbers. Block 6 must be completed where there is more than one line item.
- Where a number of items are to be released on the ARC, it is permissible to use a separate listing, cross-referring ARC and list to each other.
- Block 7 The name or description of the item must be given. Preference should be given to use of the Illustrated Parts Catalogue (IPC) designation. The description is to include reference to any applicable STSO Certificate of Approval.
- Block 8 State the Part Number. Preference should be given to use of the IPC number designation.
- Block 9 Used to indicate the type-approved applications for which the released items are eligible for installation. The following entries are permitted:

- (a) At least one specific or series aircraft, propeller, or engine model as identified by the design approval holder. In the case of STSO article, state either the type-approved applications or 'STSO article'. In the case of items to be installed in an STSO article, state the STSO article part number;
- (b) 'None' to be used only when it is known that the items do not yet have a type-approved application, for example: pending type certification, for test only, pending approved data. If this category is used, then appropriate explanatory information must be provided in Block 13 and new items may only be released for conformity purposes;
- (c) 'Various' if known to be eligible for installation on multiple type approved products, unless the originator wishes to restrict usage to a particular model installation when it should so state.

Note: Any information in Block 9 does not constitute authority to fit the item to a particular aircraft, engine, or propeller. The User/Installer must confirm via documents such as the Parts Catalogue, Service Bulletins, etc., that the item is eligible for the particular installation.

Any information in Block 9 does not necessarily mean that the product, parts or appliances are only eligible for installation on the listed model(s). Nor does it guarantee that the product, parts or appliances are eligible for installation on all entries in Block 9. Eligibility may be affected by modification or configuration changes.

- Block 10 State the quantity of items being released.
- Block 11 State the items Serial Number or Batch Number if applicable. If neither is applicable, state 'N/A'.
- Block 12 Enter one or a combination of appropriate standard words from the following list. The list provides, in quotes, the standard words permitted for use when releasing new items prior to entry into service, i.e. the items have not been previously used in operational service. It also details the circumstances and conditions under which they may be used. In all cases the certification rules relating to Block 14 apply, the appropriate box is to be marked, and Block 15 is to be signed.

1 'MANUFACTURED'

- (a) The production of a new item in conformity with the applicable design data; or
- (b) Re-certification by the original manufacturer after rectification work on an item, previously released under 1(a), which has been found to be unserviceable prior to entry into service, e.g., defective, in need of inspection or test, or shelf life expired. Details of the original release and the rectification work are to be entered in Block 13, or re-certification of new items from conformity purpose to airworthiness purpose at the time of approval of the applicable design data, provided that the items conform to the approved design data. An explanation of the basis of release and details of the original release are to be entered in Block 13.

2 'INSPECTED'/'TESTED'

The examination of a previously released new item:

- (a) to establish conformity with the applicable design data; or
- (b) in accordance with a customer-specified standard or specification, details of which are to be entered in Block 13; or

- (c) to establish serviceability and condition for safe operation prior to re-release as a spare, where the item has been obtained with an ARC. An explanation of the basis of release and details of the original release are to be entered in Block 13.

3 'MODIFIED'

The alteration, by the original manufacturer, of a previously released item prior to entry into service. Details of the alteration and the original release are to be entered in Block 13.

The above statements must be supported by reference to the approved data/manual/specification. Such information shall be identified in either Block 12 or Block 13.

Block 13

It is necessary to state any information in this Block, either directly or by reference to supporting documentation, that identifies particular data or limitations relating to the item being released that are necessary for the User/Installer to make the final airworthiness determination of the item. The information must be clear, complete, and provided in a form and manner which is adequate for the purpose of making such a determination.

Each statement must be clearly identified as to which item it relates.

If there is no statement, state 'None'.

For the release of STSO articles that have also received a FAA Letter of Design Approval the following statement may be added:
'TSO ARTICLE CONFORMS TO FAA LETTER OF TSO DESIGN APPROVAL REF. xxxxx AND MANUFACTURED UNDER BASA WITH USA.'

Examples of conditions which would necessitate statements in Block 13 are:

- When the certificate is used for conformity purposes only the following statement must be entered at the beginning of Block 13:
'ONLY FOR CONFORMITY, NOT ELIGIBLE FOR INSTALLATION ON IN-SERVICE TYPE CERTIFICATED AIRCRAFT/ENGINE/PROPELLER'.
- Re-certification of new items from conformity purpose to airworthiness purpose at the time of approval of the applicable design data, provided that the items conform to the approved design data. The following wording must be used:
'RE-CERTIFICATION OF NEW PARTS FROM CONFORMITY TO AIRWORTHINESS: THIS DOCUMENT CERTIFIES THE APPROVAL OF THE DESIGN DATA TO WHICH THIS ITEM (THESE ITEMS) WERE MANUFACTURED, BUT DOES NOT COVER CONFORMITY/CONDITION AFTER RELEASE OF THE INITIAL AUTHORISED RELEASE CERTIFICATE REF'
- For STSO articles, state the applicable STSO Certificate of Approval number.
- Usage restriction for repaired items.
- Modification standard.
- Alternative approved items supplied.
- Concessions applicable.
- Non-compliance with airworthiness design standards.

- Details of repair work carried out or reference to a document where this is stated.
- Compliance with, or non-compliance with Airworthiness Directives or Service Bulletins.
- Information on life limited items.
- Condition of items or reference to a document detailing this information.
- Manufacturing date or cure date.
- Shelf life data.
- Shortages.
- Time Since New (TSN), Time Since Overhaul (TSO), etc.
- Exceptions to the notified special requirements of the importing country.
- Specially configured to meet the notified special requirements of the importing country.
- Re-certification of previously released 'new' items.

Block 14 This block may only be used to indicate the status of new items.

The main purpose of the ARC is to release items for airworthiness purposes, which means conformity with approved design data and in condition for safe operation.

The ARC may also be used as a Conformity Certificate when items conform to applicable design data which are not approved for a reason which is stated in Block 13 (e.g., pending type certificate, for test only, pending approved data).

In this case the following additional statement must be entered at the beginning of Block 13 itself and not in a separate document:

'ONLY FOR CONFORMITY, NOT ELIGIBLE FOR INSTALLATION ON IN-SERVICE TYPE-CERTIFICATED AIRCRAFT/ENGINE/PROPELLER'.

Mixtures of items released for Airworthiness and for Conformity purposes are not permitted in the same ARC.

Block 15 The hand-written normal signature of a person who has written authority from an approved production organisation to make certifications in respect of new items. Use of a stamp instead of a signature is not permitted, but the authorised person may add a stamp impression to his or her signature to aid recognition. Subject to the agreement of the DGCA, computer-generated signatures are permitted if it can be demonstrated that an equivalent level of control, traceability and accountability exists.

Block 16 State the full authorisation reference given by the DGCA to the organisation releasing the new items.

Block 17 The name of the person signing Block 15, printed, typed or written in a legible form.

Block 18 The date on which Block 15 is signed, in the format day/month/year.

Blocks 19-23 Not used and strike out for release of new items. These Blocks are specifically reserved for the release of items after maintenance by a SAR-145 approved maintenance organisation.

1. Country SINGAPORE		2. CIVIL AVIATION AUTHORITY OF SINGAPORE AUTHORISED RELEASE CERTIFICATE CAAS(AW)95				3. Form Tracking Number	
4. Approved Organisation Name and Address					5. Work Order/Contract/Invoice		
6. Item	7. Description	8. Part No.	9. Eligibility *	10. Quantity	11. Serial/Batch No.	12. Status/Work	
13. Remarks							
14. NEW PARTS Certifies that the items identified above were manufactured in conformity to: <input type="checkbox"/> Approved design data and are in condition for safe operation <input type="checkbox"/> Non-approved design data specified in Block 13			19. USED PARTS <input type="checkbox"/> SAR-145.50 Release to Service <input type="checkbox"/> Other regulation specified in Block 13 Certifies that unless specified in Block 13, the work identified in Block 12 and described in Block 13, was accomplished in accordance with SAR-145 and the Air Navigation Order and in respect to that work the items are considered ready for release to service.				
15. Authorised Signature		16. CAAS Approval No.		20. Authorised Signature		21. CAAS Approval No.	
17. Name		18. Date (d/m/y)		22. Name		23. Date (d/m/y)	

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* Installer must cross check eligibility with applicable technical data

(Front)

USER / INSTALLER RESPONSIBILITIES

1. It is important to understand that the existence of the Certificate alone does not automatically constitute authority to install the part/component/assembly.
2. Where the user/installer works in accordance with the national regulations of an Airworthiness Authority different from the Civil Aviation Authority of Singapore (CAAS), it is essential that the user/installer ensures that his/her Airworthiness Authority accepts parts/components/assemblies from the CAAS.
3. Statements 14 and 19 do not constitute installation certification. In all cases, the aircraft maintenance record must contain an installation certification issued in accordance with the national regulations by the user/installer before the aircraft may be flown.

(Reverse)

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SECTION 2 APPENDIX 6

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DECLARATION OF DESIGN AND PERFORMANCE

DDP No.

ISSUE No.

- 1 Name and address of designer and manufacturer.
- 2 Description and identification of article including:
Type No.
Modification Standard
Master drawing record
Weight and overall dimensions
- 3 Specification reference, i.e. STSO No. and design specification.
- 4 The rated performance of the article directly or by reference to other documents.
- 5 Particulars of approvals held for the equipment.
- 6 Reference to qualification test report.
- 7 Service and Instruction Manual reference number.
- 8 Statement of compliance with appropriate STSO and any deviations therefrom.
- 9 A statement of the level of compliance with the STSO in respect of the ability of the article to withstand various ambient conditions or to exhibit various properties.

The following are examples of information to be given under this heading depending on the nature of the article and the requirements of the STSO.

- a. Working and ultimate pressure or loads.
- b. Limitations of voltage and frequency.
- c. Time rating (e.g. continuous, intermittent) or duty cycle.
- d. Limits of accuracy of measuring instruments.
- e. Whether the equipment is "flameproof" (explosion-proof).
- f. Whether the equipment is "fire-resistant".
- g. The compass safe distance.
- h. Level of radio interference.
- i. Radio and audio frequency susceptibility.
- j. Degree of vibration which the equipment will withstand.

- k. Degree of acceleration and shock which the equipment will withstand.
- l. Degree of waterproofness or sealing of equipment.
- m. Ability to withstand sand and dust.
- n. Ability to resist salt spray and aircraft fluids.
- o. Fungus resistance.
- p. Temperature and altitude category.
- q. Humidity category.
- r. Any other known limitations which may limit the application in the aircraft, e.g. restrictions in mounting altitude.

(NOTE: The “categories” referred to are those listed in the current issue of RTCA document DO-160).

10 A statement of criticality of software.

(NOTE: Software levels are those defined in the current issue of RTCA document DO-178).

11 The declaration in this document is made under the authority of

.....(name of design organisation)

(Design organisation’s name) cannot accept responsibility for equipment used outside the limiting conditions stated above without their agreement.

Signed:(Design organisation’s authorised representative)

Date:

SINGAPORE AIRWORTHINESS REQUIREMENTS**PART 21****SECTION 2 APPENDIX 7****DESIGN ORGANISATION EXPOSITION DOCUMENT**

The exposition should contain the information, as applicable, specified in this Appendix. The information may be presented in any subject order or format so long as all applicable subjects are covered. Where an organisation uses a different format, for example, to allow the exposition to serve for more than one approval, then the exposition should contain a cross reference Annex using this list as an index with an explanation as to where in the exposition the subject matter can be found.

Small organisations may combine the various items to form a simple exposition more relevant to their needs.

To facilitate the tracking of changes, each page should be identified by the part number, page number, date of issue or date of last amendment, and amendment number (if applicable). The latest amendment on a page should be highlighted by marginal lines against the amended areas on the left hand side of the page.

The exposition should be in English or include an English translation.

PART 1 MANAGEMENT

- 1.1 Brief description and history of the company.
- 1.2 Corporate commitment by the accountable manager.
- 1.3 Senior personnel.
- 1.4 Duties and responsibilities of the senior personnel.
- 1.5 List of approved signatories.
- 1.6 Technical staff.
- 1.7 Organisation chart.
- 1.8 Internal and external interfaces between departments and organisations.
- 1.9 General description of the facilities at each address intended to be approved.
- 1.10 Organisation's scope of work.
- 1.11 Notification procedure to the DGCA regarding changes to the organisation's activities/approval/location/personnel.

PART 2 DESIGN CONTROL PROCEDURES

- 2.1 Design and drawing system control.
- 2.2 Approval of design data.
- 2.3 Control of design standards and reference data
- 2.4 Test and inspection of specimen articles.
- 2.5 Issuing of statements of compliance.

- 2.6 Classification of modifications.
- 2.7 Approval of modifications.
- 2.8 Instructions for Continued Airworthiness.
- 2.9 Record keeping.
- 2.10 Production deviations.
- 2.11 Reporting of failures, malfunctions or defects.

PART 3 QUALITY SYSTEM PROCEDURES

- 3.1 Quality audit of organisation.
- 3.2 Quality audit remedial action.
- 3.3 Quality monitoring.
- 3.4 Approving staff qualification and training.
- 3.5 Quality audit personnel.
- 3.6 Staff records.
- 3.7 Control and calibration of tools and test equipment.
- 3.8 Control of sub-contractors.

PART 4 APPENDICES

- 4.1 Sample documents.

SECTION 2 APPENDIX 8**PRODUCTION ORGANISATION EXPOSITION DOCUMENT**

The exposition should contain the information, as applicable, specified in this Appendix. The information may be presented in any subject order or format so long as all applicable subjects are covered. Where an organisation uses a different format, for example, to allow the exposition to serve for more than one approval, then the exposition should contain a cross reference Annex using this list as an index with an explanation as to where in the exposition the subject matter can be found.

Small organisations may combine the various items to form a simple exposition more relevant to their needs.

To facilitate the tracking of changes, each page should be identified by the part number, page number, date of issue or date of last amendment, and amendment number (if applicable). The latest amendment on a page should be highlighted by marginal lines against the amended areas on the left hand side of the page.

The exposition should be in English or include an English translation.

PART 1 MANAGEMENT

- 1.1 Brief description and history of the company.
- 1.2 Corporate commitment by the accountable manager.
- 1.3 Senior personnel.
- 1.4 Duties and responsibilities of the senior personnel.
- 1.5 List of certifying staff.
- 1.6 Production staff.
- 1.7 Organisation chart.
- 1.8 Internal and external interfaces between departments and organisations.
- 1.9 General description of the facilities at each address intended to be approved.
- 1.10 Organisation's scope of work.
- 1.11 Notification procedure to the DGCA regarding changes to the organisation's activities/approval/location/personnel.

PART 2 PRODUCTION CONTROL PROCEDURES

- 2.1 Identification of design data.
- 2.2 Control of manufacturing processes.
- 2.3 Storage and segregation of parts.
- 2.4 Environmental controls.
- 2.5 Inspection of incoming items.
- 2.6 Inspection during manufacture.
- 2.7 Non conforming materials and parts.

- 2.8 Final test and conformity check.
- 2.9 Identification and packing.
- 2.10 Airworthiness Release Certificates.
- 2.11 Record keeping.
- 2.12 Production deviations.
- 2.13 Reporting of failures, malfunctions or defects.

PART 3 QUALITY SYSTEM PROCEDURES

- 3.1 Quality audit of organisation.
- 3.2 Quality audit remedial action.
- 3.3 Quality monitoring.
- 3.4 Certifying staff qualification and training.
- 3.5 Quality audit personnel.
- 3.6 Staff records.
- 3.7 Control and calibration of tools and test equipment.
- 3.8 Control of sub-contractors.

PART 4 APPENDICES

- 4.1 Sample documents.
- 4.2 Capability List.

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SINGAPORE AIRWORTHINESS REQUIREMENTS**PART 21****SECTION 2 APPENDIX 12****SAMPLE CERTIFICATION PLAN****PART 1 INTRODUCTION****PART 2 DESCRIPTION****PART 3 CERTIFICATION REQUIREMENTS**

- 1.12 Applicable airworthiness design standards (SAR-21.315).
- 1.13 System special requirements, unique or novel aspects.
- 1.14 Compliance checklist.

PART 4 METHOD OF COMPLIANCE

- 4.1 Analyses - failure, safety, performance, etc.
- 4.2 Tests – qualification, flammability, laboratory, simulator, ground, flight, etc.
- 4.3 Software compliance.
- 4.4 Design.

PART 5 FUNCTIONAL HAZARD ASSESSMENT SUMMARY

- 5.1 System criticality.
- 5.2 Software criticality.
- 5.3 Functional failure conditions summary

PART 6 OPERATIONAL CONSIDERATIONS

- 6.1 Master Minimum Equipment List (MMEL).
- 6.2 Flight Crew Operating Manual (FCOM)
- 6.3 Instruction for Continued Airworthiness

PART 7 CERTIFICATION DOCUMENTATION

PART 8 CERTIFICATION SCHEDULE

- 8.1 Descriptive data submittal.
- 8.2 Compliance data submittal.
- 8.3 Test schedule.
- 8.4 Compliance inspection schedule
- 8.5 Conformity inspection schedule.
- 8.6 Final approval

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SECTION 2 APPENDIX 13

SAMPLE COMPLIANCE CHECKLIST

The purpose of the compliance checklist is to document the applicable airworthiness design standards for the supplemental type certificate project and how compliance with those design standards is shown.

Instructions for completing this sample compliance checklist are as follows:

Paragraph: List the applicable requirements by paragraph number.

Subject: The subject or title of the applicable paragraph.

Method of Compliance: The method of compliance may include design drawings (D), analyses (A), tests (T), or other methods (O). Some compliance checklists simply list the letter corresponding to the applicable method of compliance or a more specific reference may be used. There should be an explanation of the format used if required.

Documentation Reference: List the documentation (test report number, analysis report number, etc.) that demonstrates compliance with the applicable paragraph.

To illustrate how the compliance checklist may be completed, the example of the installation of new passenger seats on an aircraft where the USA is the State of Design is considered. In this case, one of the several requirements that may be applicable could be FAR 25.562, Emergency landing dynamic conditions. If compliance is to be demonstrated by a dynamic test and a report is to be submitted to the DGCA then the entry in the compliance checklist may be as follows:

Paragraph	Subject	Method of Compliance	Documentation Reference
FAR 25.562	Emergency landing dynamic conditions	Test	Test Report TR12345

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