



# Advisory Circular

**Subject: Changes to the Type Design of an Aeronautical Product**

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## 1.0 INTRODUCTION

- (1) This Advisory Circular (AC) is provided for information and guidance purposes. It describes an example of an acceptable means, but not the only means, of demonstrating compliance with regulations and standards. This AC on its own does not change, create, amend or permit deviations from regulatory requirements, nor does it establish minimum standards.

### 1.1 Purpose

- (1) The purpose of this document is to provide guidance and information to applicants for, and holders of Canadian design approval documents when they are applying for an approval associated with a change to the type design of an aeronautical product. This AC:
  - (a) Provides an overview of the activities that may occur throughout a design change certification project and the interactions between the applicant and Transport Canada Civil Aviation (TCCA); and
  - (b) Describes the requirements for the approval of:
    - (i) A change to the type design of an aeronautical product; or
    - (ii) Changes other than a change to the type design of an aeronautical product.

### 1.2 Applicability

- (1) This document applies to:
  - (a) applicants for an approval of a change to an aeronautical product and holders of design approval documents;
  - (b) TCCA personnel;
  - (c) delegates; and
  - (d) the aviation industry.
- (2) This document does not apply to products approved by a Canadian Technical Standard Order (CAN-TSO) design approval.

### 1.3 Description of Changes

- (1) Not applicable.

## 2.0 REFERENCES AND REQUIREMENTS

### 2.1 Reference Documents

- (1) It is intended that the following reference materials be used in conjunction with this document:
  - (a) *Aeronautics Act* (R.S., 1985, c. A-2);
  - (b) Part I, Subpart 1 of the *Canadian Aviation Regulations (CARs) — Interpretation*;
  - (c) Part I, Subpart 4 of the CARs — *Charges*;
  - (d) Part V, Subpart 21 of the CARs — *Approval of the Type Design or a Change to the Type Design of an Aeronautical Product*;
  - (e) Chapter 505 of the *Airworthiness Manual (AWM) – Delegation of Authority*;
  - (f) Staff Instruction (SI) 500-004—*Special Conditions-Airworthiness (SCA)*;
  - (g) Advisory Circular (AC) 500-015—*Certification Plans*
  - (h) AC 521-002— *Type Certification Requirements of Aircraft, Engines and Propellers*;
  - (i) AC 521-005—*Supplemental Type Certificates*;

- (j) AC 521-006—*Repair Design Approvals*;
- (k) AC 521-007—*Part Design Approvals*;
- (l) AC 500-016—*Establishing the Certification Basis of Changed Aeronautical Products*;
- (m) SI 500-003— *Aircraft Certification Level of Involvement*;
- (n) SI 500-018— *Design Approval Document Transfers Under CAR 521: Division VIII – Responsibilities of a Design Approval Document Holder*;
- (o) SI 500-019— *Issue Papers, Concern Papers and Certification Memoranda*;
- (p) SI 521-004,—*Changes to the Type Design of an Aeronautical Product*;
- (q) Notice of Proposed Amendment (NPA) 2010-021 – *Approval of the Type Design or Change to the Type Design of an Aeronautical Product*; and
- (r) Transport Canada form number 26-0469 — *Design Change Approval Application*.
- (s) Transport Canada form number 26-0654—*Notice of Refusal to Issue or Amend a Canadian Aviation Document*.

## 2.2 Cancelled Documents

- (1) As of the effective date of this document, the following document is cancelled:
  - (a) AC 513-004, Issue 01, 2004-12-01 — *Flight Manual Requirements Following Modifications*.
- (2) By default, it is understood that the publication of a new issue of a document automatically renders any earlier issues of the same document null and void.

## 2.3 Definitions

- (1) The following **definitions** are used in this document:
  - (a) **Aeronautical Product:** an aircraft, aircraft engine, aircraft propeller or aircraft appliance or part, or a component part of any of those things, including any computer system and software (Ref. *Aeronautics Act* and Section 521.01 of the CARs). .
  - (b) **Applicant:** means an individual or organization responsible for the design of an aeronautical product, or a representative of such an individual or organization, that makes an application for the issuance of or a change to a design approval document in respect of an aeronautical product (Ref: Section 521.01 of the CARs).
  - (c) **Certification Basis:** refers to the applicable standards as established in Section 521.157 of the CARs, as appropriate, including any special conditions—airworthiness (SCA), findings of equivalent level of safety, and exemptions applicable to the product to be certified.
  - (d) **Certification Plan:** a document that clearly identifies the means and methods by which an aeronautical product will be shown to comply with the applicable airworthiness requirements identified in the certification basis of the aeronautical product. It is a mandatory document requirement of Sections 521.28 and 521.155 of the CARs. Additional information on certification plans can be found in AC 500-015.
  - (e) **Conformity with the Certification Basis:** demonstrating compliance with all of the applicable standards and requirements of the certification basis.
  - (f) **Delegate:** any person or class of persons authorized under the authority of Subsection 4.3(1) of the *Aeronautics Act* to perform functions on behalf of the Minister, subject to the requirements in Chapter 505 of the *Airworthiness Manual* (AWM).
  - (g) **Finding of Compliance (FOC):** A Ministerial determination that the applicant's compliance demonstration satisfies a requirement specified in the certification basis.

- (h) **Level of Involvement (LOI):** the activities undertaken by TCCA personnel during a product certification activity in performing surveillance of the delegate when the delegate is exercising their delegated authority. Detailed information on LOI can be found in SI 500-003.
- (i) **Major Change to the type design:** an alteration to the type design of an aeronautical product in respect of which a type certificate has been issued that has other than a negligible effect on the weight and centre-of-gravity limits, structural strength, performance, power plant operation, flight characteristics or other qualities affecting its airworthiness or environmental characteristics. This refers to Section 521.152 of the CARs.
- (j) **Minor Change to the type design:** other than a major change (for the purpose of this SI). This refers Section 521.154 of the CARs.
- (k) **Significant Change:** a product level change to the type certificate to the extent that it changes one or more of the following: general configuration; principles of construction; or the assumptions used for the certification criteria, but not to the extent to be considered a substantial change. Not all product level changes are significant (Ref. AC 500-016).
- (l) **Standards of Airworthiness:** design requirements as defined in the AWM. For design changes, the standards of airworthiness may also be listed on the type certificate data sheet (TCDS).
- (m) **Substantial Change:** a product level design change that is so extensive that a substantially complete investigation of compliance with the applicable standards is required, and consequently a new type certificate is required in accordance with Subpart 521 of the CARs, Division II – *Type Certificates* (Ref. AC 500-016).
- (n) **Type Design:**
  - (i) the drawings and specifications, and a listing of those drawings and specifications that are necessary to define the design features of an aeronautical product in compliance with the standards applicable to the aeronautical product;
  - (ii) the information on dimensions, materials and manufacturing processes that is necessary to define the structural strength of an aeronautical product;
  - (iii) the approved sections of the aircraft flight manual, where required by the applicable standards of airworthiness;
  - (iv) the airworthiness limitations section of the instructions for continued airworthiness specified in the applicable chapters of the AWM; and
  - (v) any other data necessary to allow, by comparison, the determination of the airworthiness and, where applicable, the environmental characteristics of later aeronautical products of the same type or model.(Ref: Subsection 101.01(1) of the CARs).

### 3.0 BACKGROUND

- (1) With the implementation of Subpart 521 of the CARs, new documents have been created to support the regulations. All guidance material such as SIs, ACs and Policy Letters that supported the previous CARs and Chapters 511, 513, 591 and 593 of the AWM have been reviewed and the relevant material included in the 521 series ACs and SIs.
- (2) This AC is organized to mirror the Sections and Subsections of Subpart 521 of the CARs, Division IV so that it can be read in conjunction with Subpart 521 of the CARs.

- (3) Division IV was created to introduce a common set of requirements and a common process for the approval of changes to the type design of an aeronautical product. It forms the basis of how changes to a type certified product are made by the existing design approval document holder.
- (4) Division IV also provides the core requirements and process for persons other than the original design approval document holder to obtain their own design approvals under Divisions V, VI and VII of Subpart 521 of the CARs.
- (5) Although Subpart 521 of the CARs introduced a change in terminology in the English version from “compliance” to “conformity” this AC will be using the term “compliance” wherever possible to minimize confusion in this document.

**Note:**

*In December 2010, a Notice of Proposed Amendment (NPA) to Subpart 521 of the CARs (NPA 2010-021) was introduced to revert the terminology “conform” and “conformity” back to “comply” and “compliance.”*

#### **4.0 OVERVIEW OF THE DESIGN CHANGE APPROVAL PROCESS**

- (1) Division IV in Subpart 521 of the CARs is a generic division that provides the requirements that must be fulfilled to obtain a design approval for a change to an aeronautical product's type design. It is equally applicable when making a major change to a type design by the type certificate holder from Division II – Type Certificates, or by a third party through Division V - *Supplemental Type Certificates* (STCs), or restoring an aeronautical product back to its original design - Division VI - *Repair Design Approvals* (RDAs) or providing a replacement part - Division VII - *Part Design Approvals* (PDAs).
- (2) Changing the type design of an aeronautical product can be a complex or simple process, therefore the scope of activities will depend on the complexity of the design change.
- (3) Once the applicant for the design approval has demonstrated that the changed aeronautical product complies with the applicable certification basis, the Minister will approve the change and issue the appropriate design approval document.
- (4) For ease of understanding and from a project management perspective, the requirements and process for obtaining an approval for a change to a type design can be broken down into six (6) phases as shown below:
  - (a) **Pre-application phase:**
    - (i) The applicant and TCCA determine which division within Subpart 521 of the CARs apply to the proposed design change and classify the change being considered.
  - (b) **Phase I: Application and Establishing Certification Basis**
    - (i) This phase identifies the certification approach, planning and strategy which will lead up to the approval of the design change. The primary output is the establishment of the certification basis.
    - (ii) The applicant submits an application for design approval and proposes a certification basis and certification plan. The applicant discusses the project to familiarize TCCA with the conceptual design and general arrangement of the product.
    - (iii) Once satisfied that all the necessary regulatory and design standard requirements for the product's type design are included, and a Changed Product Rule (CPR) decision record is completed per AC 500-016, the certification basis will be considered to be established by the Minister. This is the certification basis to which the applicant will be required to demonstrate compliance.

- (c) **Phase II: Establishing Means of Compliance and TCCA Level of Involvement**
  - (i) The applicant and TCCA agree on a certification plan. It should include a definition of the design change and the agreement on the proposed means and methods of compliance with each requirement of the certification basis, project schedule and the identification of the certification team members who will participate in the compliance demonstration activities throughout the project. As part of this phase TCCA defines its LOI in the design approval project where a delegate is involved in the activity.
- (d) **Phase III: Demonstrate and Record Compliance**
  - (i) In this phase the applicant demonstrates compliance of the product to the certification basis in accordance with the certification plan, and the Minister makes a Finding of Compliance (FOC). As part of this demonstration the aeronautical product is built/modified and tested, reports are written, compliance documentation is reviewed for acceptability, certification testing begins and the supporting approval documents such as the aircraft flight manual (AFM) and airworthiness limitation (AWL) section are drafted.
- (e) **Phase IV: Approval of a Change to the Type Design**
  - (i) During this phase, the applicant submits a declaration of demonstration of conformity as per Section 521.160 of the CARs and the AFM and AWL are approved by TCCA. In addition, TCCA declares their LOI complete.
  - (ii) The Minister approves the change to the type design and issues the design approval document.
- (f) **Phase V: Post Certification Activities**
  - (i) This phase introduces the responsibilities of the design approval document holder for maintaining continuing airworthiness and post-certification design changes.

## 5.0 PRE-APPLICATION PHASE

### 5.1 General

- (1) The pre-application phase corresponds to four (4) regulatory sections as illustrated in figure 1 below:
  - (a) Determining applicability (Section 521.151 of the CARs); and
  - (b) Classifying the design change being considered (Sections 521.152 through 521.154)

## Pre-application Phase

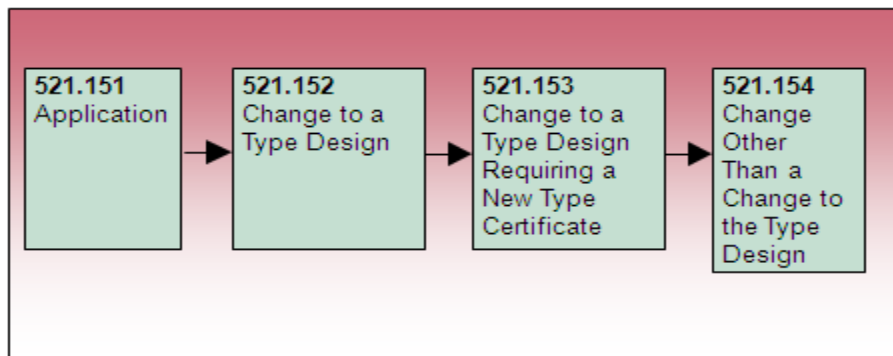


Figure 1 – Pre-application Phase

### 5.2 Application - Determining to Whom and What this Division Applies – Section 521.151

- (1) Division IV is applicable to:
  - (a) Design changes for domestic aeronautical products which may be considered major or minor;
  - (b) Design changes for foreign aeronautical products which may be considered major or minor and which are directed to Division IV from Division XI of Subpart 521 of the CARs;
  - (c) Existing holders of design approval documents who intend to make a change to the type design of their aeronautical product; and
  - (d) Applicants for an approval of a change to the type design of an aeronautical product when they are directed to Division IV from another Division of Subpart 521 of the CARs, i.e.: Division II for Type Certificates, Division V for STCs, Division VI for RDAs, and Division VII for PDAs.
- (2) A person acting as the applicant's representative may undertake actions and requirements on behalf of the applicant. However, such arrangement in no way relieves the applicant of their responsibilities and obligations to comply with the CARs.
- (3) It should be noted that Division IV does not specify eligibility requirements for applicants. Rather, eligibility requirements are specified as follows:
  - (a) In the case of existing holders of design approval documents, such as a type certificate,, they have already committed to carry out their responsibilities as a design approval document holder under Division VIII of the CARs. One of these responsibilities refers to maintaining technical capability, which is the same as eligibility requirements.
  - (b) In the case of persons other than the original design approval document holder, they must meet the same eligibility requirements described in the respective Divisions II, V, VI and VII.



### 5.3 Classifying the Design Change

- (1) The classification of the change is determined in accordance with Sections 521.152 through 521.154 of the CARs. These can be viewed as a roadmap guiding the applicant to the requirements that apply for the design changes being considered.
- (2) The following figures may be helpful in understanding how to determine which Section applies in each individual case. Use them in conjunction with paragraphs 5.4 through 5.6 of this AC.

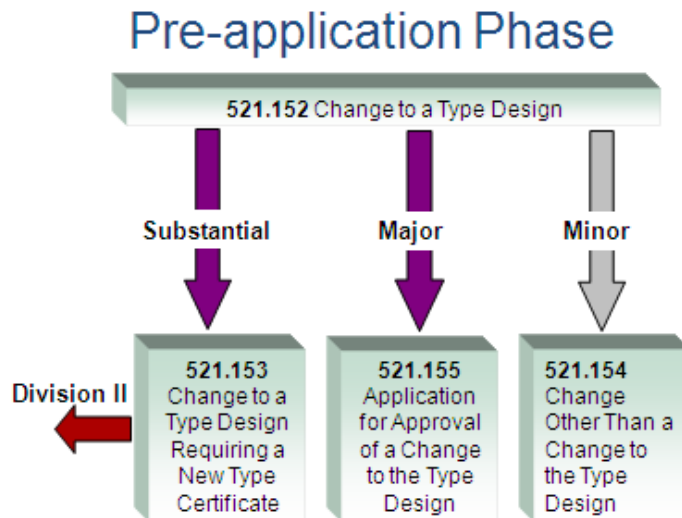


Figure 2 - Overview of Section 521.152 of the CARs – Changes to a Type Design

### 5.4 Change to a Type Design – Classifying the Design Change – Section 521.152

- (1) A change to a type design can be processed in one of the following three (3) ways:
  - (a) If the proposed change is determined to be a substantial change, the change is processed in accordance with Section 521.153 of the CARs requiring the applicant to apply for a new type certificate under Division II. Refer to section 5.5 of this AC.
  - (b) If the proposed change is determined to be a minor change to a design approved under an existing approval document, the design approval document holder processes the change in accordance with Section 521.154 of the CARs. Refer to section 5.6 of this AC.

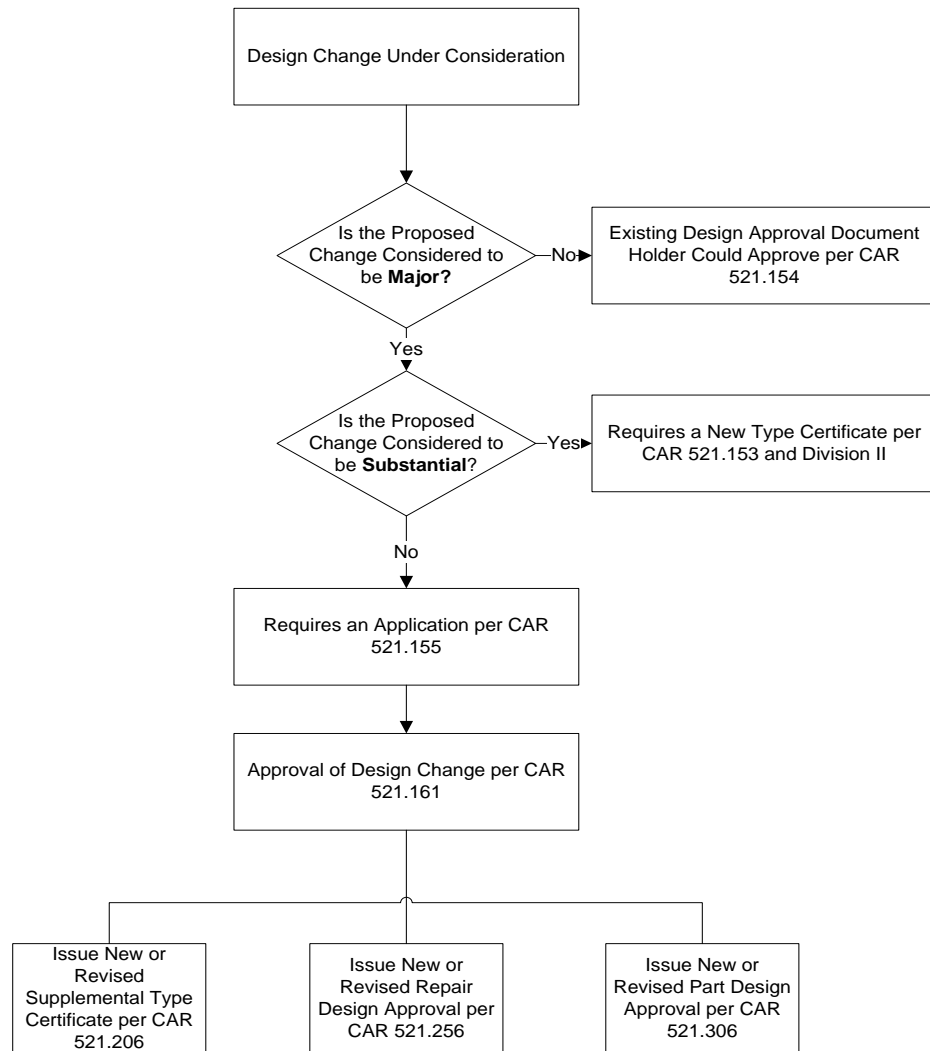


Figure 3 – Flowchart for identifying applicable CAR sections

- (c) All other changes are processed in accordance with Sections 521.155 through 521.160 of the CARs (refer to section 6.0 of this AC). This will result in the possible amendment of a type certificate, issuance of an STC (refer to AC 521-005), an RDA (refer to AC 521-006) or a PDA (refer to AC 521-007).

**5.5 “Substantial” Changes to a Type Design Requiring a New Type Certificate – Section 521.153**

- (1) Section 521.153 of the CARs requires that an applicant obtain a new type certificate if the scope and nature of the proposed change in design, configuration, power, power limitations (engine), or weight are such that the original assumptions, methods, means, and/or substantiation are no longer valid for the changed product. A new type certificate could be required for either a substantial change to a previously type certificated product or a new design derived through a series of design changes from a previously type certificated product. The question of whether a change is substantial must be addressed at the beginning of the process by applying the

principles of the CPR. However, if at any point while developing the certification basis, it becomes clear that the proposed change is a substantial change, the process becomes a new type certificate process under Section 521.28 of the CARs. When a new type certificate is required, Section 521.30 of the CARs specifies the applicable certification basis for the new product.

- (2) Additional guidance on the determination of the requirement for a new type certificate and the application of the CPR is provided in AC 500-016.

#### **5.6 Change other than a Change to the Type Design – Section 521.154**

- (1) This section applies to design changes that are classified as a minor change.
- (2) For the holder of an existing design approval document to exercise the privileges under Section 521.154 of the CARs, they shall have established procedures acceptable to the Minister to deal with such minor changes while ensuring that the product continues to comply with its certification basis. In order for such procedures to be acceptable, the following issues must be addressed to the Minister's satisfaction:
  - (a) The Holder must:
    - (i) Have and maintain access to the technical capability required to maintain the continued airworthiness of their product as required by Section 521.352 of the CARs, Division VIII.
    - (ii) Integrate the procedures into their company's Quality Assurance and/or Safety Management System procedures or existing Document Control Procedures.
  - (b) The procedures should include at a minimum:
    - (i) The identification, by name, of those individuals authorized to implement/make such changes by the design approval document holder.
    - (ii) A thoroughly defined document control system associated with the procedure.
    - (iii) A process that the persons authorized to approve these changes must use to assess the proposed change and the means by which the change is classified as minor.
    - (iv) Consideration for the cumulative effect of minor changes.
    - (v) Accommodate the identification and definition of each minor change.

### **6.0 PHASE I - APPLICATION AND ESTABLISHING CERTIFICATION BASIS**

#### **6.1 Application for Approval of a Change to the Type Design – Section 521.155**

- (1) The application process for a change to a type design approval is summarized in Figure 4, below and includes the associated sections of Subpart 521 of the CARs.

## Phase I - Application / Certification Basis

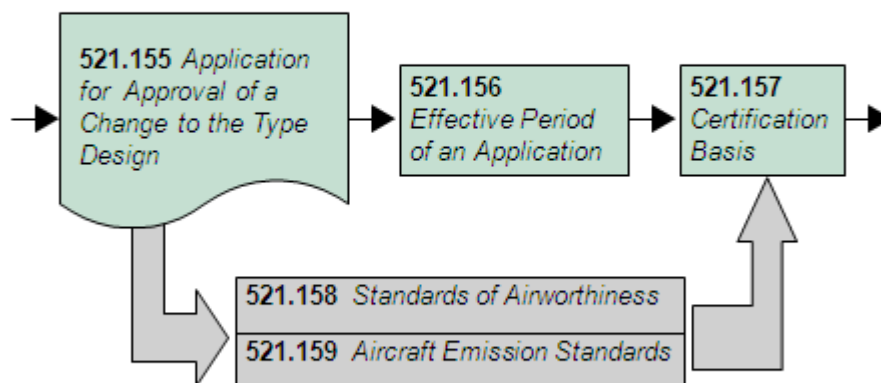


Figure 4 – Summary of the Application Process for a Change to a Type Design Approval

### 6.2 General

- (1) Phase I for Division IV generally consists of the following steps:
  - (a) Project initiation and familiarization between the applicant and TCCA;
  - (b) The applicant submits an application for the design approval consisting of the:
    - (i) Submission of application form (or alternate TCCA accepted form or process);
    - (ii) Description of the change to the type design;
    - (iii) Submission of a proposed certification basis; and
    - (iv) Submission of a certification plan.
  - (c) Establishment of the certification basis by the Minister.
- (2) While there may be some overlap, phase I generally covers Sections 521.155 through 521.159 of the CARs. Further information is provided in sections 6.3 through 6.7 of this AC.

### 6.3 Charges – Subpart 104

- (1) Once the application has been received, Section 104.05 of the CARs specifies that the charge is to be paid within 30 days of any invoice presented by the Minister.

#### 6.3.1 Submit Application – 521.155(a)

- (1) The applicant makes application for a design approval by completing TCCA Form 26-0469 - *Design Change Approval Application* or other form or process accepted by TCCA. Completed application forms or alternate procedures are submitted to the Regional Aircraft Certification Office that has jurisdiction over the applicant or through the National Aircraft Certification branch if applicable.
- (2) The applicable fees specified in Subpart 104 of the CARs are billed to the applicant.

- (3) Applicants should ensure that they are able to complete all certification activities within the time allotted in accordance with Section 521.156 of the CARs. See section 6.4 of this AC for more information.

### **6.3.2 Submit Description of a Change to the Type Design – 521.155(b)**

- (1) The applicant must identify and define the proposed change to the aeronautical product. The required description can be documented in the certification plan or other written form acceptable to the Minister. The description is intended to be an overview of the change, providing TCCA staff sufficient detail to conduct an appropriate assessment of the application and to assist in establishing the correct certification basis.
- (2) The description should include the nature of the change:
- (a) A single change or a collection of changes;
  - (b) Physical design changes;
  - (c) Changes to an operating envelope; and
  - (d) Performance changes.
- (3) The description should also address the impact of the change on:
- (a) Other systems, components, equipment, or appliances of the product;
  - (b) The limitations section of the type certificate data sheets (TCDS);
  - (c) The aircraft flight manual (including limitations);
  - (d) The maintenance manual or other instructions for continued airworthiness (ICA);
  - (e) For foreign design changes, any aspects of the certification basis unique to Canada;
  - (f) Special conditions-airworthiness, exemptions or findings of equivalent safety;
  - (g) Various configurations; and
  - (h) All previous related design changes to the aeronautical product.

### **6.3.3 Applicant Proposed Certification Basis – 521.155(c)**

- (1) The applicant has to propose a certification basis for the design change under consideration, in accordance with Section 521.155 of the CARs. In developing the proposal, the applicant should refer to the requirements of Section 521.158 of the CARs (*Standards of Airworthiness*) and Section 521.159 of the CARs (*Aircraft Emissions Standards*). The required proposal can be documented in a letter or any other written form acceptable to the Minister. Further guidance may be found in AC 500-016.
- (2) The Minister has the final responsibility to establish the certification basis for the design change, in accordance with Section 521.157 of the CARs to which the applicant must demonstrate their product's compliance as a condition for the eventual issuance of the design approval.

### **6.3.4 Submit Certification Plan – 521.155(d)**

- (1) The certification plan breaks down the proposed certification basis into its individual design paragraph requirements and shows the intended process of demonstrating compliance. It provides a systematic approach for applicants to communicate this detailed certification information to TCCA in a way that facilitates efficient assessment of each proposed change to a type design.
- (2) Per Subsection 521.155(d) of the CARs, the elements of the certification plan are the:
- (a) Means to be used to demonstrate compliance, which is to say that for each design requirement the method for the showing of compliance is to be described;
  - (b) Documentation that demonstrates compliance, meaning that a reference is to be given to the intended form of documentation for each design requirement;

- (c) Resources necessary for completing the demonstration, meaning a specification of the authorized individual who is required to demonstrate compliance for each requirement; and
  - (d) Proposed schedule for completing the demonstrations, including proposals for specific demonstrations that would involve TCCA employees, for purposes of resource planning by the Minister.
- (3) The amount of detail and level of complexity of the certification plan are to be commensurate with the complexity of the proposed change. Additional guidance on the development of a certification plan and a sample certification plan can be found in AC 500-015.

#### **6.4 Effective Period of an Application – Section 521.156**

- (1) Section 521.156 of the CARs establishes time limitations for completing applications for the approval of a change. The limits are five (5) years for transport category aircraft and three (3) years for all other applications. These limits give applicants a reasonable amount of time to demonstrate compliance and subsequently obtain the design approval. Should the time limit expire, the certification basis would be re-established.
- (2) Certain projects however may take longer to complete than the specified periods. An applicant may ask for an extension of the time period at the time of application, but this should only be granted if the applicant can show something novel about the product that warrants the additional time. Extensions of this type should be rare, and the need for them must be demonstrated at the time of application.
- (3) For example, an applicant knows that they will be unable to complete the requirements to get a modification for an aircraft engine within three (3) years, because they are using a new type of exotic material, and the design, development and testing of this material is not scheduled to be completed for four (4) years. They may, at the time of application, request an extension to four (4) years.
- (4) If however an applicant is not able to complete the work during the effective period, they have two (2) choices:
- (a) They can reapply, meeting all the requirements at the new date of application; or
  - (b) They can apply for an extension from the original effective period of application. The applicant will provide an intended date of issue for the design approval document, and should calculate back from that new date to determine what the standards of airworthiness should be on the new theoretical application date.

#### **6.5 Certification Basis – The Minister Establishes the Certification Basis – Section 521.157**

- (1) The certification basis consists of the applicable standards as established in Sections 521.158 and 521.159 of the CARs and additionally includes any appropriate SCAs, findings of equivalent safety, and exemptions applicable to the product to be certified.
- (2) The applicant proposes the certification basis; however it is the responsibility of the Minister to establish the certification basis for a change to a type design.

#### **6.6 Standards of Airworthiness – Section 521.158**

- (1) Standards of Airworthiness are the design requirements as defined in the AWM, Part V – Airworthiness. For design changes the standards of airworthiness may also be listed on the TCDS. Revisions to each design requirement are individually managed and identified by regulatory change / amendment levels. Therefore, to properly identify the applicable airworthiness applicable design requirement in the certification basis, it is necessary to refer the design requirement reference number and the related change / amendment level, e.g. AWM 525.1305 Amendment / Change 11. A best practice would be to indicate the amendment level to each requirement in the certification plan.
- (2) Section 521.158 of the CARs indicates that the applicant for approval of a change to the type design of an aeronautical product shall demonstrate that the product meets the standards of

airworthiness in force on the date of the application for the change. Section 521.158 of the CARs both establishes this requirement and provides several exceptions to this rule, which allow the applicant to propose amendment levels earlier than those effective on the date of application. In only a few cases does the regulation automatically allow the use of the amendment levels at the time of the original type certification. The process of determining the appropriate amendment levels should be done in conjunction with the guidance provided in AC 500-016.

- (3) Figure 5 provides a summary of the regulation in terms of the amendment level of the standards of airworthiness.

<b>Regulation</b>	<b>Amendment/Change Level</b>
521.158 (1) – Latest standards	Date of application
521.158 (2) – RDA / PDA	As recorded in the TCDS
521.158 (3) – Not Significant change	Date of application or an earlier date, but not earlier than what is recorded on the TCDS
521.158 (4) – Specific area or item	Date of application or an earlier date, but not earlier than what is recorded on the TCDS
521.158 (5) – No basis earlier than TCDS for areas or items	As recorded in the TCDS
521.158 (6) – Small aircraft	As recorded in the TCDS
521.158 (7) – Novel / unusual design	Special conditions-airworthiness
521.158 (8) – Changes to restricted category	Date of application or an earlier date, but not earlier than what is recorded on the TCDS
521.158 (9) – Elect for “later” standards	Date of application or an earlier date, but not earlier than what is recorded on the TCDS

Figure 5 – Summary of the sections of CAR 521.158 and associated amendment levels

### **6.6.1 Standards Applicable on Date of Application – 521.158(1)**

- (1) Subsection 521.158(1) of the CARs requires the applicant to demonstrate that the change meets the requirements of the standards of airworthiness in effect on the date of application, unless the change meets the criteria for one of the exceptions identified in Subsections 521.158(2) through 521.158(9) of the CARs.
- (2) Further guidance on determining the applicable standards of airworthiness and amendment level is provided in AC 500-016.

### **6.6.2 Standards of Airworthiness for Repair Design Approval/Part Design Approval - 521.158(2)**

- (1) The applicable standards of airworthiness for the approval of a repair design to an aircraft are those recorded on the TCDS. The repair should not incorporate a feature that enhances utility of the aeronautical product as this would constitute a modification subject to Division V of Subpart 521 of the CARs.

- (2) The applicable standards of airworthiness for the approval of a replacement part design to an aircraft are those recorded on the TCDS. This exception is granted to replacement parts on the basis that replacement parts do not change the existing level of safety (airworthiness) in the aircraft. A replacement part shall not incorporate improved utility.

#### **6.6.3 Earlier Standards for “Not Significant” Change - 521.158(3)**

- (1) Standards of airworthiness earlier than the standards applicable on the date of application may be used, provided that the design change can be shown to be “not significant”. A design change is deemed to be “not significant” if the configuration, general principles of construction are retained, and the assumptions used to obtain the type certificate remain valid. It is the applicant’s responsibility to justify a proposed design change as “not significant.”
- (2) Further guidance on determining the “significance” of a change to a type design is provided in AC 500-016.

#### **6.6.4 Earlier Standards for Specific Areas or Items - 521.158(4)**

- (1) Areas or Items Not Affected - 521.158(4)(a)
  - (a) For “significant” changes, the standards applicable to a particular area or item are those listed in Subsection 521.158(1) of the CARs unless the area is not affected by the change. In this instance, “not affected” refers to areas of the aeronautical product that remain unchanged by the proposed change with respect to any and all certification requirements. The intent is to define all aspects of the proposed change where there is a need for re-evaluation, that is, where the original substantiation presented for the product being changed should be reviewed, updated, or re-written. All other areas of the aircraft are considered to be unchanged or “not affected” by the change.
  - (b) Further guidance on determining “affected areas” of a change to a type design is provided in AC 500-016.
- (2) Areas or Items Affected – 521.158(4)(b)
  - (a) Similar to the paragraph explaining paragraph 521.158(4)(a) of the CARs, above, this paragraph deals with a change that has been classified as “significant”, but applies specifically in an affected area. An earlier amendment level than that of subsection (1) may be accepted in an affected area if the applicant can justify that compliance with the “latest” standards would not contribute materially to the level of safety or is not practical:
    - (i) “Not contribute materially to the level of safety” — Compliance with the latest standards in an affected area could be considered “not to contribute materially to the level of safety” if the change to type design and/or the relevant experience demonstrates a level of safety comparable to that provided by the latest standards, or if compliance may compromise the existing level of safety for that particular changed product. The applicant must provide sufficient justification to allow the Minister to make this determination.
    - (ii) “Not practical” — Compliance with the latest standards in an affected area may be considered not practical (or impractical) if the applicant can substantiate that it would result in additional resource requirements that are not commensurate with the safety benefits. The additional resource requirements could include those arising from design changes required for compliance, and the effort required to demonstrate compliance, but would not include resource expenditures for prior product changes. The applicant must provide sufficient justification to allow the Minister to make this determination.
  - (b) Further guidance on this subject is provided in Advisory Circular AC 500-016.

#### **6.6.5 No Basis Earlier than the Type Certificate Data Sheet – 521.158(5)**

- (1) With respect to the areas considered under Subsections 521.158(3) and 521.158(4) of the CARs, Subsection 521.158(5) of the CARs sets limitations to the extent that earlier amendment levels



can be accepted. In no case will amendment levels be accepted that are prior to those recorded on the applicable type certificate. In addition, where the change affects compliance to the requirements of the “Special Retroactive Requirements” of Subparts 523.2, 525.2, 527.2, or 529.2 of the AWM, as applicable, these Subpart requirements must also be met.

#### **6.6.6 Type Certificate Basis for Small Aircraft – 521.158(6)**

- (1) This Subsection applies to excepted products – which are products consisting of aircraft other than a rotorcraft of a maximum weight of 2 720 kg (6,000 lbs) or less, or of a non-turbine rotorcraft of a maximum weight of 1 360 kg (3,000 lbs) or less – for changes to a type design which are “not significant”. For these cases, the standards of airworthiness for the change may be those recorded on the TCDS. However, if the Minister determines the change to be significant, compliance with later standards will be required.
- (2) Changes to a type design under this provision are limited to changes to the aircraft. Changes to the engines or propellers, of the aircraft that are covered by separate type certificates are not eligible.

#### **6.6.7 Certification Basis for Novel or Unusual Designs (Special Conditions - Airworthiness) – 521.158(7)**

- (1) SCA are issued by TCCA to address novel and unusual design features that are not considered by the existing regulation. Special Conditions can be applied to both “significant” and “not significant” design changes. An SCA forms part of the certification basis for the change to the type design.
- (2) Additional guidance on SCA is provided in SI 500-004.

#### **6.6.8 Standards of Airworthiness for Changes to Restricted Category Aircraft – 521.158(8)**

- (1) An applicant may request a change to the type design in the restricted category or if a change to the type design of an aircraft results in the aircraft being reclassified as a restricted category aircraft for the following types of aerial work which are defined as special purpose operations:
  - (a) Agricultural, consisting of spraying, dusting, seeding and livestock and predatory animal control;
  - (b) Fire prevention and suppression;
  - (c) Aerial surveying, consisting of photography, mapping, oil and mineral exploration;
  - (d) Patrolling pipelines, power lines, and waterways;
  - (e) Weather control, consisting of cloud seeding;
  - (f) Aerial advertising, consisting of skywriting, banner towing, and airborne signs;
  - (g) Wildlife conservation; and
  - (h) Any other specialised role.

**Note:**

*It is the modification to the aircraft design, not the type of operation that determines if the aircraft has to be classified in the restricted category, i.e. the intended use or operation of the product does not determine whether the product is in the restricted category or not; it is the product design and certification that does this.*

- (2) The standards of airworthiness for design changes to a restricted category aircraft (or that result in the aircraft being reclassified in the restricted category) can range from the standards in force on the date of application all the way back to the standards recorded in the TCDS.
- (3) It is recognized that certain standards of airworthiness applied on an aircraft may be deemed unnecessary or prohibitive relative to the intended role of a restricted category aircraft. In addition, most restricted category aircraft will have operational limitations on their flight authority

during operation, such as no flights over populated areas or day time Visual Flight Rules (VFR) flights only, as another means of ensuring public safety. There is also usually a restriction against the carriage of passengers (non-operationally related persons).

- (4) The standards of airworthiness for a change to an aircraft in the restricted category must be established under Subsection 521.158(8) of the CARs
- (5) For aircraft that have been issued a type certificate in the restricted category (or special purpose) based solely on its military service record, an appropriate equivalent civil certification basis should be established for the proposed design change. The applicable airworthiness standards should be determined with the recognition that the aircraft has not been type certificated to civil aircraft standards of airworthiness.

#### **6.6.9 Election for Later Standards of Airworthiness – 521.158(9)**

- (1) The applicant may voluntarily elect to comply with standards of airworthiness later than those specified in Subsection 521.158 of the CARs. Where this election is made against a particular standard, all directly related standards must also be complied with. The Minister will approve the elected standards as part of the certification basis.

#### **6.7 Aircraft Emissions Standards – Section 521.159**

- (1) In establishing the certification basis for a change to a type design, aircraft emissions must be considered in addition to the standards of airworthiness. Aircraft emissions requirements are contained in Chapter 516 of the AWM. .

##### **6.7.1 Change Affecting the Noise Level of the Aircraft – 521.159(1)**

- (1) Unless the proposed change is the subject of one of the exempting conditions of Subsection 521.159(2) of the CARs, a change to the type design, which affects the noise level of the aircraft, must demonstrate compliance with the requirements of Chapter 516 of the AWM, or be shown to continue to be within the already established and accepted limits for the aircraft.

##### **6.7.2 Changes for Which Noise Requirements Do Not Apply – 521.159(2)**

- (1) Subsection 521.159(2) of the CARs defines a number of instances where the noise requirements described in Subsection 521.159(1) of the CARs do not apply. These exceptions are only from the noise requirements (Chapter 516, Subchapter A of the AWM). The proposed change to the type design may still be required to comply with Subsections 521.159(3) or 521.159(4) of the CARs.

##### **6.7.3 Fuel Venting Requirements for Turbine-Powered Aircraft – 521.159(3)**

- (1) A change to the type design to a turbine-powered aircraft must be demonstrated to comply with the requirements of Chapter 516 Subchapter B of the AWM.

##### **6.7.4 Smoke and Gaseous Requirements for an Aircraft Engine – 521.159(4)**

- (1) A change to the type design of an aircraft engine must be demonstrated to comply with the smoke and gaseous requirements of Chapter 516 Subchapter B of the AWM.

#### **7.0 PHASE II – ESTABLISHING MEANS OF COMPLIANCE AND TRANSPORT CANADA CIVIL AVIATION LEVEL OF INVOLVEMENT**

##### **7.1 Establish Means of Compliance**

- (1) Once the Minister has the established certification basis in phase I, a series of reviews and meetings are held as needed between the Minister and the applicant. The goal is to obtain concurrence on the proposed means and methods that will be used to demonstrate compliance for each of the requirements identified in the established certification basis.

- (2) To achieve this goal, TCCA and the applicant may exchange various technical issue papers to clarify and document concerns identified during this step, and how the two parties arrived at a conclusion. Further information on the use of issue papers can be found in SI 500-019.
- (3) The applicant uses this information to update their certification plan that they previously submitted per Paragraph 521.155(d) of the CARs and section 6.3.4 of this AC.

**7.2 Establish Transport Canada Civil Aviation Level of Involvement**

- (1) Throughout this process, TCCA works to define how, when and to what level of involvement (LOI) they will participate in the compliance demonstration activities whenever delegates are involved. Further information on LOI is described in SI 500-003.
- (2) As part of TCCA’s overall responsibility for design approval, TCCA defines its LOI in the oversight of findings of compliance made by Ministerial Delegates – Aircraft Certification where applicable.
- (3) Documenting the LOI in this way provides a clear definition of where TCCA will be conducting surveillance of the delegate finding compliance with the applicant’s demonstration.
- (4) It should be noted that although the LOI is established at the end of phase II, it is subject to change throughout the certification process for various reasons such as changes in design, failed tests, changes in means and methods of compliance and changes in scope of delegation. It is also emphasized that concerns identified by the TCCA specialists during the certification program must be addressed as early as possible, whether they are related to LOI or not, in order not to impact the approval of the type design or change to the type design in phase IV. The output of phase II is the agreed certification plan that defines the applicant’s responsibility and participation of the TCCA specialists throughout the compliance demonstration.
- (5) Figure 6 shows how Phase I feeds into Phase II and that Phase II is primarily about using the certification plan to establish means of compliance and LOI.

**Phase II - Establish Means of Compliance and TCCA Level of Involvement**

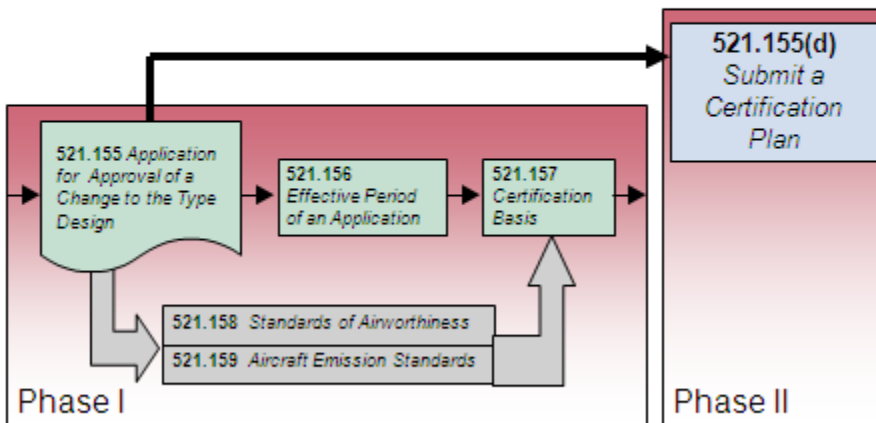


Figure 6 – Establish Means of Compliance and TCCA LOI

## **8.0 PHASE III – DEMONSTRATE AND RECORD COMPLIANCE**

### **8.1 General**

- (1) Phase III generally consists of the following major activities:
  - (a) The applicant must demonstrate that the changed product complies with the established certification basis. This is done by conducting all the necessary inspections, tests, etc. according to the agreed certification plan. The compliance demonstration must be completed within the time period established under Section 521.156 of the CARs;
  - (b) The applicant makes available the compliance records, which are the means by which compliance is demonstrated, e.g.: test results, reports, etc.;
  - (c) Once all of the requirements for demonstrating compliance have been satisfactorily completed, the applicant signs a declaration attesting to the “*Demonstration Of Conformity*” of the product to the established certification basis;
  - (d) The intended holder submits a signed undertaking to carry out the responsibilities of a design approval document holder per Paragraph 521.160(1)(e) and Subpart 521 Division VIII of the CARs;
  - (e) TCCA concludes their LOI and declares LOI complete. Refer to SI 521-004 and SI 500-003 for further information;
  - (f) The Minister (TCCA specialists and / or a ministerial delegate) makes the findings of compliance stating that the applicant has demonstrated compliance with the certification basis as a prerequisite for the issuance of the design approval under phase IV.

### **8.2 Compliance with the Certification Basis – Section 521.160**

- (1) Having established the applicable standards that make up the certification basis for the proposed change to a type design (Sections 521.157 to 521.159 of the CARs), Section 521.160 of the CARs addresses the compliance demonstration to those standards. When all required demonstrations have been found to comply, the design is said to “comply with the certification basis”.

#### **8.2.1 Demonstration of Conformity – Subsection 521.160(1)**

- (1) An applicant for a change to a type design is required to demonstrate compliance to the applicable standards and submit to the Minister a documented record of this compliance. Determining compliance with a regulatory standard is a delegated function of the Minister. Within the certification plan, the individual and their authorization need to be referenced against each of the applicable standards. Commonly, the certification plan, developed under Paragraph 521.155(d) of the CARs, is converted into a record, by adding the authorized individual's signature and the references to the demonstrations of compliance.

#### **8.2.2 Inspection and Test – 521.160(1)(a)**

- (1) Where the applicant is to demonstrate compliance by test, the applicant must ensure that the item to be tested conforms to the drawings, specifications and manufacturing processes proposed for the type design and that the measuring device and test equipment to be used are appropriate and calibrated for the test. Applicants are cautioned that if proposed testing is not accepted in advance by TCCA or if TCCA's test witnessing requirements are not satisfied before a test is conducted, the test results will not be accepted.
- (2) The holder will require a flight test operations manual (FTOM) under Section 521.46 of the CARs where the proposed change to the type design requires flight testing. In this case, Section 521.160 of the CARs refers the applicant to Sections 521.44 and 521.45 of the CARs and will result in the revision of a type certificate.

- (3) Additional guidance on inspections and tests is provided in AC 521-002.

### **8.2.3 Declaration of Demonstration of Conformity – 521.160(1)(b)**

- (1) The applicant is required to submit a signed declaration attesting that the changed product has been demonstrated to comply with the certification basis. The declaration is required before the Minister issues the design approval.
- (2) A Ministerial delegate shall not sign a declaration of demonstration of conformity on behalf of the applicant. However they could sign as an individual or organization representing the applicant, but not use their delegate number for this purpose.
- (3) An example of a Declaration is provided in Appendix A of this AC.

### **8.2.4 Make Means Available – 521.160(1)(c)**

- (1) Where the applicant proposed a means of demonstrating compliance with a particular standard, the Minister reserves the right to have access to the means of compliance such as, but not limited to, any test, test article, test apparatus for the purpose of verifying the appropriateness of such means. If such access cannot or will not be granted, the Minister is not obligated to accept the means or the resulting demonstration of compliance and subsequently may not issue the design approval document.

### **8.2.5 Noise Levels – 521.160(1)(d)**

- (1) Where applicable, if the change to the type design results in a change to the noise limitations of the aircraft, the new noise limitation must be recorded in the Aircraft Flight Manual or a Supplement to the Flight Manual. Such amendment requires approval by the Minister.

### **8.2.6 Signed Undertaking of Responsibilities – 521.160(1)(e)**

- (1) At this stage, the applicant acknowledges his eventual role as the “holder of the design approval document” by submitting a signed undertaking of responsibilities. The undertaking is a commitment by the approval holder to fulfill the responsibilities set out in Subpart 521 of the CARs, Division VIII – *Responsibilities of a Design Approval Document Holder*.
- (2) An example of an Undertaking of Responsibilities form is provided in Appendix B of this AC.

### **8.2.7 Submit Manuals, Instructions and Limitations for Approval – 521.160(1)(f)**

- (1) It is common that a change to a type design introduces new instructions and/or limitations to the aeronautical product. In these cases, such instructions and limitations require the revision or introduction of manuals, other forms of instruction and limitations to ensure the continued safety of the aeronautical product. Such manuals, instructions, and limitations must be submitted to the Minister for approval as part of the data submitted in support of the change to the type design.
- (2) If a Flight Manual Supplement (FMS) is required, the content is to be compatible with the existing aircraft flight manual and contain information in each of the “approved” sections or state “No Change” as appropriate. FMS approved sections usually include the following:
- (a) Limitations;
  - (b) Normal procedures;
  - (c) Abnormal procedures (alternatively, this information may be included in normal procedures);
  - (d) Emergency procedures;
  - (e) Performance; and
  - (f) Weight and balance.

**Note:** *Weight and Balance data may be in another document referenced in the limitations section.*

- (3) Approved information shall be identified and clearly distinguished from unapproved information. There shall be no conflict between the data required by the regulations and any unapproved

additional information included. Additional guidance on the content of an FMS can be found in Appendix C of this AC.

- (4) Additional guidance on manuals, instructions and limitations is provided in AC 521-002.

### **8.3 Demonstrated Level of Safety – Subsection 521.160(2)**

#### **8.3.1 Safety of Features or Characteristics – 521.160(2)(a)**

- (1) The applicant must demonstrate that no feature or characteristic of the proposed design makes the aircraft unsafe. This demonstration can, most likely be accomplished within the demonstrations of compliance to individual design standards. However, this level of safety requirement supersedes that of the level established by compliance with the individual design standards. If the applicant fails to demonstrate this, the Minister will refuse to issue the design approval document.

#### **8.3.2 Product Continues to Provide Equivalent Level of Safety – 521.160(2)(b)**

- (1) The applicant must demonstrate that the change to the type design of the product provides a level of safety at least equivalent (same or better) to that provided by the certification basis that applied before the change was undertaken. This demonstration can most likely be accomplished within the demonstrations of compliance to individual design standards. However, this level of safety requirement supersedes that of the level established by compliance with the individual design standards.

### **8.4 Demonstrated Level of Safety – Restricted Category –Subsection 521.160(3)**

#### **8.4.1 Safety of Features or Characteristics – 521.160(3)(a) and (b)**

- (1) The applicant must demonstrate that no feature or characteristic of the proposed design makes the aircraft unsafe, while operating within the limitations of its restricted category role. This demonstration can most likely be accomplished within the demonstrations of compliance to individual design standards. However, this level of safety requirement supersedes that of the level established by compliance with the individual design standards. The applicant must also demonstrate that the “changed” type design of the restricted category aircraft complies with its certification basis.

**9.0 PHASE IV – APPROVAL OF A CHANGE TO THE TYPE DESIGN**

**9.1 General**

(1) Figure 7 provides a graphical description of the steps leading to the approval of the design change in Section 521.161 of the CARs. However if an aircraft is deemed to have an unsafe feature after compliance with the design standards, under the “Refusal to Issue” clause in 6.71 of the *Aeronautics Act* the Minister may refuse to issue the design approval document.

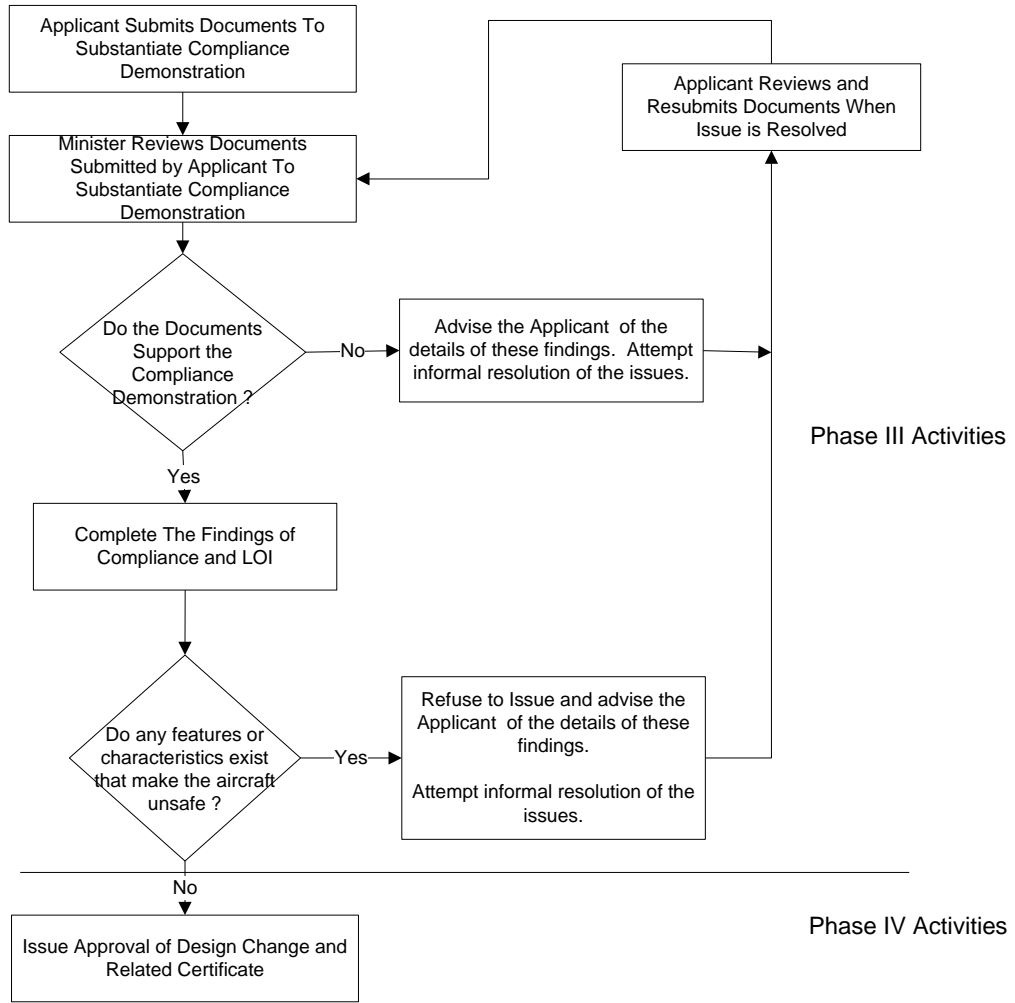


Figure 7 – Illustration of Approval Process per Section 521.161 of the CARs Regulation and Associated Topics

**9.2 Issuance of Approval of a Change to the Type Design – Section 521.161**

- (1) Once the applicant has completed all of the requirements of Section 521.160 of the CARs, the Minister shall:
- (a) Review the information and substantiating documents submitted by the applicant attesting to the completion of compliance demonstration. The objective of this step is to verify that the applicant has in fact met the requirements set out in Sections 521.160, 521.205, 521.255 and 521.305 of the CARs.;
  - (b) Conclude their Level of Involvement (LOI) and declare LOI completed. Refer to SI 521-004 and SI 500-003 for further information;

- (c) Make findings of compliance that the changed product does comply with its established certification basis; and
  - (d) Make a determination that, even though the product has been demonstrated to meet the requirements established in the certification basis, no feature or characteristic makes the aircraft unsafe taking into account the category in which the certification is requested. This requirement is detailed in Subsection 521.160(2) of the CARs for other than restricted category aircraft and Subsection 521.160(3) of the CARs for restricted category aircraft.
- (2) If the Minister finds that the applicant has not satisfactorily demonstrated that their product complies with the established certification basis the Minister shall withhold approval of the design change. In an attempt to informally resolve the issue, the Minister will advise the applicant in writing of the details of such findings so that the applicant can take action to address the issue.

### **9.3 Minister May Refuse to Issue the Design Approval Document**

- (1) In the event that the finding cannot be resolved the Minister shall issue a formal notice in accordance with Subsection 103.06(4) of the CARs, to the applicant notifying them of the Minister's "Refusal to Issue" the approval in accordance with Subsection 6.71 (1) of the *Aeronautics Act*. See section 2.1(1)(s) of this document for the form reference.
- (2) As noted on the form, the applicant may request that the Minister's refusal to issue the approval be reviewed by the Transportation Appeal Tribunal of Canada.

### **9.4 Minister Issues the Design Approval Document**

- (1) Once all the requirements of Section 521.160 of the CARs have been met to the Minister's satisfaction, TCCA or its delegate shall approve the design change, repair or replacement part by issuing the appropriate approval / certificate document based on the Division through which the applicant made their application, as follows:
- (a) Amended type certificate issued under Section 521.57 of the CARs;
  - (b) New or amended STC issued under Section 521.206 of the CARs;
  - (c) New or amended RDA issued under Section 521.256 of the CARs; or
  - (d) New or amended PDA issued under Section 521.306 of the CARs.
- (2) Additional guidance on the specific approval document is provided in AC 521-002, AC 521-005, AC 521-006 and AC 521-007.
- (3) The original signed and sealed certificate will be provided to the holder, using the mailing address provided by the applicant. The certificate will be accompanied by any associated original TCCA approved/accepted documents, such as FMS and ICA.

## **10.0 PHASE V - POST CERTIFICATION ACTIVITIES**

### **10.1 General**

- (1) Once the Minister has issued the applicable design approval document, the applicant now becomes the design approval document holder and assumes the responsibilities for the continued airworthiness of the product's design as described in Division VIII of Subpart 521 of the CARs.
- (2) If the holder wishes to effect minor changes to the approved type design of their product per Section 521.154 of the CARs, they must submit their procedures for acceptance by their TCCA contact office in their region or through the National Aircraft Certification branch as applicable.
- (3) Design approval documents are considered under the *Aeronautics Act to be* "Canadian Aviation Documents". As such, they remain the property of the Minister. The holder must surrender them to TCCA upon request by the Minister.



**10.2 Designated Provisions and Penalties for Non-Compliance – Subpart 103**

- (1) All design approval documents carry with them holder responsibilities. These responsibilities are identified in the regulations and are therefore the holder's responsibility to become familiar with. Design approval document holders must be aware that their failure to fulfill their responsibilities under Division VIII of Subpart 521 of the CARs, they will be subject to penalties for non-compliance found in Subpart 103 of the CARs.

**10.3 Transfer of Design Approval Documents to a New Holder**

- (1) Provisions have been made to allow the transfer of design approval documents for a change to a type design from one holder to another. The original certificate must be returned to the Minister who will issue a new certificate to the new design approval document holder once the Minister is satisfied that the proposed holder meets the requirements in Section 521.357 of the CARs. As the responsibilities associated with the approval apply to the holder, holder responsibilities also transfer under such an arrangement. Certificate transfers are subject to approval by the Minister.
- (2) Additional guidance on certificate transfers is provided in SI 500-018.

**10.4 Retention of Design Approval Documents and Supporting Data – Section 521.365**

- (1) The retention of the design change approval documents and supporting data is the responsibility of the holder. The objective is to maintain the continued airworthiness of the aeronautical product..

**11.0 INFORMATION MANAGEMENT**

- (1) Not applicable.

**12.0 DOCUMENT HISTORY**

- (1) Not applicable.

**13.0 CONTACT OFFICE**

Suggestions for amendment to this document are invited, and should be submitted to:

Chief, Aircraft Certification Standards (AARTC) via the following e-mail address:

[AARTInfoDoc@tc.gc.ca](mailto:AARTInfoDoc@tc.gc.ca)

[original signed by]

Jacqueline Booth  
A/Director, Standards Branch  
Civil Aviation  
Transport Canada

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*Transport Canada documents or intranet pages mentioned in this document are available upon request.*

**APPENDIX A—SAMPLE DECLARATION OF DEMONSTRATION OF CONFORMITY**

- (1) The following is one example of how the declaration can be made, however, applicants may choose a variant of this:

**Declaration of Demonstration of Conformity**

In accordance with Section 521.160 of the CARs, I hereby declare to the best of my knowledge that the type design of (*name of product*) as changed below, has been demonstrated to conform with the certification basis established by the Minister.

Details of change:

Per certification basis / certification plan / document number 1243696 version 34 dated 2010-10-06.

Name/Signature: \_\_\_\_\_  
On behalf of: \_\_\_\_\_  
Position title: \_\_\_\_\_  
Company/Organization: \_\_\_\_\_  
Date: \_\_\_\_\_

**APPENDIX B—EXAMPLE OF SIGNED UNDERTAKING OF DIVISION VIII RESPONSIBILITIES**

Example of the signed undertaking:

- (1) This example is provided as one way the signed undertaking can be presented to the Minister. However, it is up to the intended holder to decide how they meet this regulatory requirement, subject to approval/acceptance by the Minister.

<p>I, <b>[NAME OF INTENDED HOLDER]</b> hereby undertake to carry out the responsibilities of a design approval document holder, as set out in Division VIII of Subpart 521 of the CARs, including:</p>	
<ul style="list-style-type: none"><li>(a) Technical capability;</li><li>(b) Service difficulty reporting;</li><li>(c) Establishing a service difficulty reporting system;</li><li>(d) Investigation of service difficulty reports;</li><li>(e) Mandatory changes;</li><li>(f) Transfers;</li><li>(g) Record keeping and loss or disposal of records;</li><li>(h) Manuals;</li><li>(i) Instructions for continued airworthiness; and</li><li>(j) Supplemental integrity instructions.</li></ul>	
_____	_____
Name/Signature of Intended Holder	Date

- (2) The intended holder must make this signed undertaking as ultimately the design approval document holder, who will be responsible for these areas. If the holder does not have the technical capabilities, they can use an agent, however since the holder ultimately has responsibility for the design, there needs to be an agreement in place between the holder and the agent.
- (3) The design approval document will not be issued until the Minister has received this declaration.
- (4) More detailed information on these areas can be found in Subpart 521 of the CARs Division VIII.

**APPENDIX C – FLIGHT MANUAL SUPPLEMENT EXAMPLE FORMAT**

\*Name and address of  
Certificate Holder

FLIGHT MANUAL SUPPLEMENT  
OR  
FLIGHT AND OPERATING MANUAL SUPPLEMENT  
(as appropriate to the Manual being supplemented)  
(TYPE OF AIRCRAFT)

\_\_\_\_\_  
(AIRCRAFT REGISTRATION (IF APPROPRIATE))

\_\_\_\_\_  
(REASON FOR THE SUPPLEMENT)  
(Serialized STC - STC)

\_\_\_\_\_  
STC - (NUMBER)

\_\_\_\_\_  
Type Certificate (Number)

Sections (a, b, c, etc.) of this document comprise the Approved Flight Manual Supplement. Compliance with Section (a), Limitations, is mandatory.

Section (s, - y, z, etc.) are Unapproved and are provided for information only.

"The information and data contained in this document supersede or supplement that contained in the basic Approved Flight Manual (for the.....or) (Identify the basic Manual) in those areas listed herein. For limitations, procedures and performance not contained in this document refer to the Approved Flight Manual and other applicable Approved Flight Manual Supplements".

"(This Supplement is to be attached to the Approved Flight Manual for the aircraft with the subject design change incorporated.)"

(APPROVAL STAMP)

\_\_\_\_\_  
(Name/Signature and Office of Approving Authority)

\*All information on this title page is mandatory

*Note: Format and page size are discretionary but it would be preferable if the Supplement was compatible with the basic Flight Manual and could be easily included in the same binder or cover.*

Table Of Contents  
(self explanatory)

(Only necessary where a table of contents is required because of the complexity of the Supplement.)

Log Of Amendments  
To  
Flight Manual Supplement No.  
(Type Of Aircraft)  
(Modification)

Amendment No.	Date Inserted	Signature	Effective Pages	D.O.T. Approval by/date

Approved: \_\_\_\_\_  
(Date)

(This is necessary only if complexity or conditions requiring the Supplement make it a reasonable requirement).

(The word "amendment" may be replaced by "revision").

**Section 1****Limitations**

The following items, where applicable, or any others deemed necessary, should be indicated in the Limitations Section of the Supplement if there has been a limitation change from the basic manual:

- (a) Airspeed Limitations - including, where applicable, how the airspeed indicator is marked; (include undercarriage and flap operating speeds as well as other applicable speed limits);
- (b) Powerplant - type, model and rating; operating limits - Manifold Pressure (MP), Revolutions Per Minute (RPM), temperatures and pressures (for maximum power and for maximum continuous operation); static RPM limits, where applicable; powerplant instrument markings and the significance of the markings;
- (c) Propeller - type and model including diameter limits where appropriate;
- (d) Maximum Weights - as applicable, e.g. ramp, take-off, landing, special purpose operations or configurations such as skis, floats, etc;
- (e) C of G Limits - including variations of weight / configuration. Also, the datum should be stated;
- (f) Load Factor - (G) limits including variations with different configurations, where applicable;
- (g) Kinds of Operation - such as day, night, Visual Flight Rules (VFR), Instrument Flight Rules (IFR), icing conditions, crew only, no passengers, and any special purpose operations such as "survey only", "agricultural purposes only" etc;
- (h) Minimum Crew - where more than one crew member (pilot) is required this should be specified. It may also be appropriate to identify the location of the pilot's seat;
- (i) Maximum Occupants - the maximum number of occupants should be specified and noted as to whether or not the number includes the pilot(s);
- (j) Fuel - approved fuel grades; total fuel capacity; usable fuel capacity;
- (k) Oil and Other Fluids - types approved and capacities;
- (l) Baggage Compartment - loading by weight, volume or floor loading;
- (m) Flight Restrictions - such as "No intentional sideslips with flap extended", restrictions with doors or window removed and other special restrictions. List prohibited manoeuvres, such as spins, or allowable 'aerobatic' manoeuvres;
- (n) Ambient Temperature - operating limits. Special considerations that may apply under extreme temperature conditions;
- (o) Altitude Limits - this should be addressed where modifications may result in changes to altitude limits;
- (p) Wind - crosswind or other wind limitations or maximum demonstrated wind speeds;
- (q) Systems Limitations - electrical loads, hydraulic pressures, prop feathering, prop reversal, drag devices, heaters, air conditioners, avionics, etc;
- (r) Placards - list the placards installed and their location where significant;
- (s) Approved Configurations - where appropriate, address other modifications, Supplement Type Certificate (STCs) that may conflict with the subject modification. Items such as wheels, floats, skis, survey equipment, equipment pods, door and window configurations should be considered;



- (t) In addition for Balloons - minimum and maximum number and type of fuel cylinders; envelope limits for temperature and pressure; allowable types of baskets and burners; maximum number of occupants for each approved basket;
- (u) In addition for Gliders - towing limits; ballast limitations;
- (v) External Cargo Limitations - sling load; hoist load; others.

Approved \_\_\_\_\_  
(Date)

## Section 2

### Normal Procedures

List the procedures required for a qualified crew to operate the aircraft safely. This can normally be done using a checklist format with suitable cautions and notes. Explanations of "how to fly" or "good advice" concerning operations should be omitted from the Approved Sections but can be included in the Supplement in a separate, identified, "Unapproved" Section. This is recommended particularly where this type of information is included in the basic Manual and is altered by the modification.

Only those procedures affected by the modification need to be addressed provided the basic procedures are clearly referenced.

### Abnormal Procedures

A separate section may be used, or this information can be included under Normal Procedures. This section would relate to unusual circumstances that would not constitute an emergency situation but would require that some special action be taken. Only those procedures affected by the modification need to be included.

Approved \_\_\_\_\_  
(Date)

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## Section 3

### Emergency Procedures

The Emergency Procedures affected by or resulting from the modification need to be described. Again the checklist format is preferred and where it is desirable to include operating advice or to amplify the procedures, this information can be presented in the separate "Unapproved" Section. In some Flight Manuals the Emergency Procedures section precedes the Normal Procedures.

Approved \_\_\_\_\_  
(Date)

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## Section 4

### Performance

To a large extent the performance information requirements are dictated by the certification basis and vary considerably. The basic approved Flight Manual performance information can be used as a guide as to what might be needed. Metric and Imperial Units will be required if both systems are provided in the basic manual.

As before, only those items of performance that are affected by the modification need to be addressed. This may be done by providing a factor that would be applied to the basic information,

such as, "with XXX installed the take-off distance is 10% greater than that stated in the basic approved Flight Manual".

### **Loading Information**

This section contains information needed to calculate the loading change caused by the modification or repair so that the pilot can calculate the weight and C of G of the aircraft at any time during flight.

Approved \_\_\_\_\_  
(Date)

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## **Section 5**

### **Unapproved Sections**

(Not to be marked "Approved")

These sections of the document must be separated from the "Approved" sections with dividers, use of coloured paper, or other suitable means. The information presented in the unapproved section must not conflict with the approved data and could include:

- (a) a description of the aircraft system or sub-system;
- (b) amplified procedures which would contain operating procedures and advice on systems operation or how to fly a specific profile;
- (c) additional performance information such as cruise power settings and fuel consumption;
- (d) special considerations for ground handling, security, servicing and maintenance; and
- (e) parts lists, where applicable.