



RETURN BIDS TO:

RETOURNER LES SOUMISSIONS À:

Bid Receiving - PWGSC / Réception des
soumissions - TPSGC
11 Laurier St. / 11, rue Laurier
Place du Portage, Phase III
Core 0B2 / Noyau 0B2
Gatineau
Québec
K1A 0S5
Bid Fax: (819) 997-9776

**LETTER OF INTEREST
LETTRE D'INTÉRÊT**

Comments - Commentaires

Vendor/Firm Name and Address
Raison sociale et adresse du
fournisseur/de l'entrepreneur

Issuing Office - Bureau de distribution
Electronics, Simulators and Defence Systems Div.
/Division des systèmes électroniques et des systèmes de
simulation et de défense
11 Laurier St. / 11, rue Laurier
8C2, Place du Portage
Gatineau
Québec
K1A 0S5

Title - Sujet Letter of Interest - VMT & PTT Syst	
Solicitation No. - N° de l'invitation W8475-16VMT2/C	Date 2018-07-03
Client Reference No. - N° de référence du client W8475-16VMT2	GETS Ref. No. - N° de réf. de SEAG PW-\$\$QF-106-26891
File No. - N° de dossier 106qf.W8475-16VMT2	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2018-08-03	
Time Zone Fuseau horaire Eastern Daylight Saving Time EDT	
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Mastantuono, Ricardo	Buyer Id - Id de l'acheteur 106qf
Telephone No. - N° de téléphone (819) 420-1744 ()	FAX No. - N° de FAX (819) 956-5650
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: Specified Herein Précisé dans les présentes	

Instructions: See Herein

Instructions: Voir aux présentes

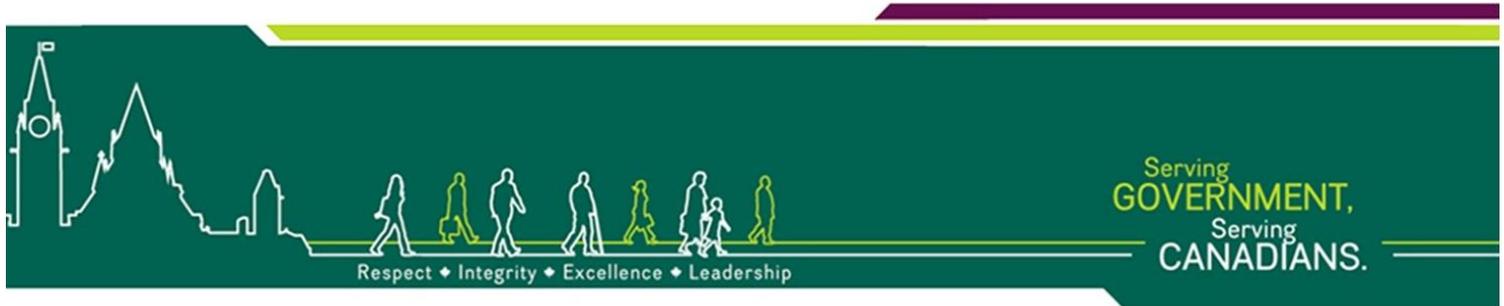
Delivery Required - Livraison exigée See Herein	Delivery Offered - Livraison proposée
Vendor/Firm Name and Address Raison sociale et adresse du fournisseur/de l'entrepreneur	
Telephone No. - N° de téléphone Facsimile No. - N° de télécopieur	
Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)	
Signature	Date



Destination Code - Code destinataire	Destination Address - Adresse de la destination	Invoice Code - Code bur.-comptable	Invoice Address - Adresse de facturation
D - 1	Canadian Forces School of Aerospace Technology and Engineering (CFSATE) 83 Argus Crest., Bldg A-171 CFB Borden, Borden ON L0M 1C0	W8475	DEPARTMENT OF NATIONAL DEFENCE 101 COLONEL BY DR. OTTAWA Ontario K1A0K2 Canada



Item Article	Description	Dest. Code Dest.	Inv. Code Fact.	Qty Qté	U. of I. U. de D.	Destination	Unit Price/Prix unitaire FOB/FAM	Plant/Usine	Del. Offered Liv. offerte
3	<p>LOI - CFSATE virtual maint. and part task trainers</p> <p>This no cost requisition is raised to release a Letter of Interest (LOI) in order to determine industry interest, and to solicit comments on draft Statement of Work and Technical Requirements Document, cost estimates, and delivery estimates. Responses fr</p>	D-1	W8475	1	Each	\$	\$	See Herein	



CANADIAN ADVANCED SYNTHETIC ENVIRONMENT (CASE) Phase 2 Project

Letter of Interest

N° W8475-16VMT2/B

1. Purpose and Nature of the Letter of Interest (LOI)

Public Services and Procurement Canada (PSPC) is requesting Industry feedback regarding the development of an In-Service Support requirement for Virtual Maintenance Trainers (VMTs) and Part-Task Trainers (PTTs) which may be acquired during an upcoming competitive bid process for the Department of National Defence.

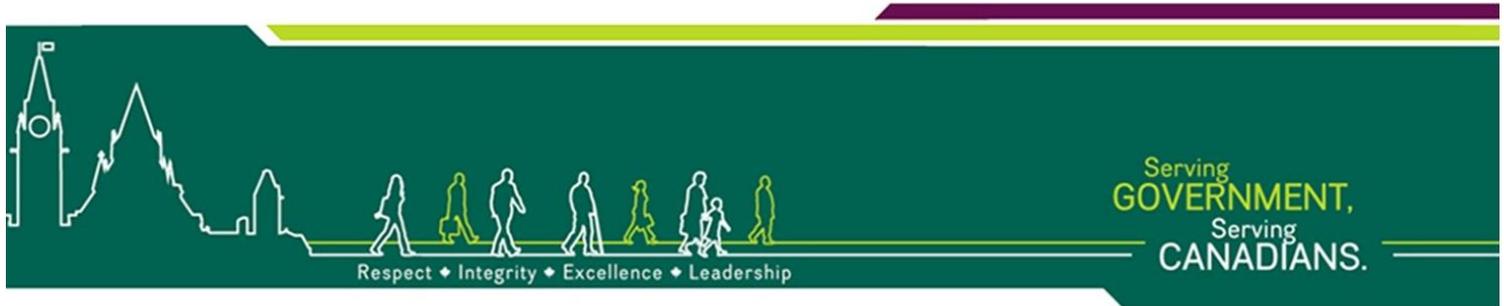
The objective of this LOI are to:

- a) provide industry with background information on the CASE Phase 2 Project, including the VMT and PTT requirements thereof;
- b) solicit relevant input from Industry on Best Practices that could contribute to the Government of Canada (GoC) establishing a sustainment program for the VMTs and PTTs that will align with and optimize both Canada and Industry's ability to deliver Performance, Value for Money and Flexibility; and
- c) provide Industry with draft documentation for which constructive and innovative feedback may be provided.

The GoC plans to engage Industry through an Industry Engagement. Canada will consider the information gathered during the Industry Engagement and decide on a course of action that may include all or some of the Industry feedback.

The Industry Engagement will take the form of one-on-one telecommunication sessions with interested parties from Industry. The requirements, proposed process, and specifications currently under consideration are provided in Annex D, and its appendices. Annex E contains the Training Availability Requirement (TAR) for the equipment being acquired through an impending RFP process. The TAR shows the





expected equipment usage and required availability. It is expected that Industry will develop their sustainment concept based on this TAR. The type of Industry feedback being sought for the Industry Engagement will focus on the activities required to develop an In-Service Support Program that supports the TAR, and the optimal division of responsibilities between Government and Industry.

Interested firms are encouraged to review the documents attached to the LOI and provide comments and/or questions, in writing to the PSPC Contracting Authority identified herein at Part 6.

Further details concerning the Industry Engagement Process will be communicated on the Government Electronic Tendering System (GETS), <https://buyandsell.gc.ca/>, as they become available throughout the period of this LOI.

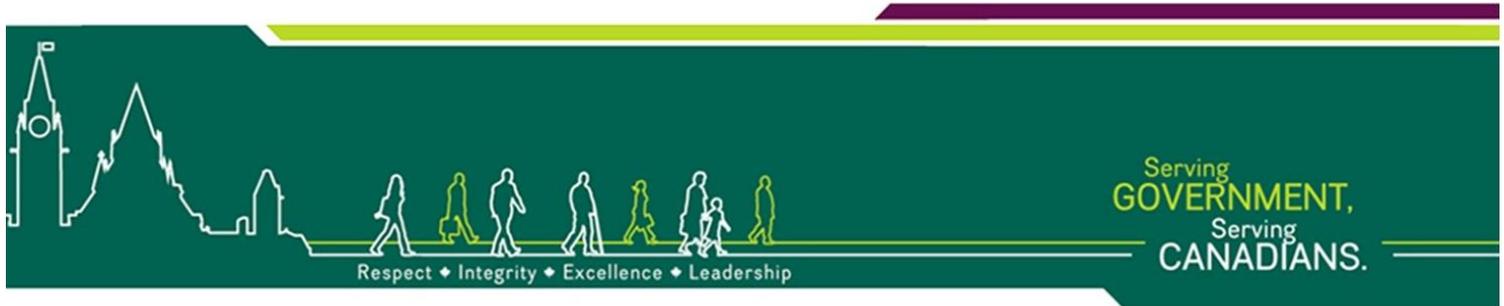
If a Respondent is unwilling or unable to directly participate in the Industry Engagement, Canada encourages written replies to the questions posed in Annex C, Section 2 of this LOI. These replies may be submitted to the PSPC Contracting Authority identified herein at Part 6.

This LOI is neither a call for tender nor a Request for Proposal (RFP). No agreement or contract will be entered into based on this LOI. The issuance of this LOI is not to be considered in any way a commitment by the Government of Canada, nor as authority to potential Respondents to undertake any work that could be charged to Canada. This LOI is not to be considered as a commitment to issue a subsequent solicitation or award contract(s) for the work described herein.

Although the information collected may be provided as commercial-in-confidence (and, if identified as such, will be treated accordingly by Canada), Canada may use the information to assist in drafting performance specifications (which are subject to change) and for budgetary purposes.

Respondents are encouraged to identify, in the information they share with Canada, any information that they feel is proprietary, third party or personal information. Please note that Canada may be obligated by law (e.g. in response to a request under the Access of





Information and Privacy Act) to disclose proprietary or commercially-sensitive information concerning a Respondent (for more information: <http://laws-lois.justice.gc.ca/eng/acts/a-1/>).

Respondents are asked to identify if their response, or any part of their response, is subject to the Controlled Goods Regulations.

Participation in this LOI is encouraged, but is not mandatory. There will be no short-listing of potential suppliers for the purposes of undertaking any future work as a result of this LOI. Similarly, participation in this LOI is not a condition or prerequisite for the participation in any potential subsequent solicitation.

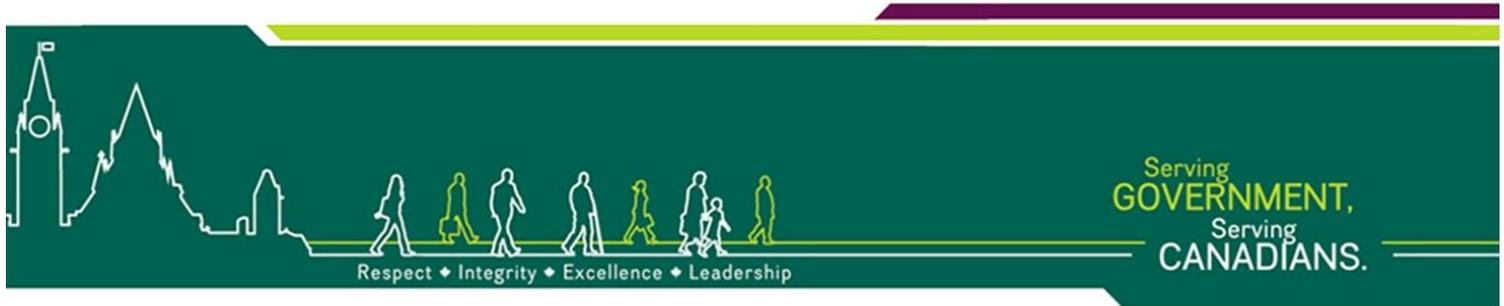
Respondents will not be reimbursed for any cost incurred by participating in this LOI.

The LOI closing date published herein is not the deadline for comments or input. Comments and input will be accepted any time up to the time when/if a follow-on solicitation is published.

2. Background Information:

The Canadian Forces School of Aerospace Technology and Engineering (CFSATE) provides technical training to meet the needs of the Royal Canadian Air Force (RCAF) aircraft maintenance community. In addition to keeping pace with new technologies and fluctuations in production requirements, CFSATE has been given mandates over the past decade to design, develop and implement new or revised programs. These include increased practical components to reduce the training burden at operational units and fleet training establishments. With the recent Air Occupational Enhancement (AOE) initiative and the introduction of Electrical Wiring Interconnect Systems (EWIS) principles, all foundational apprentice courses instructed at CFSATE have, or will be, modified and modernized to ensure that the maintenance tasks associated with modern military aircraft systems are taught to the levels identified in the relevant occupational Job Task Analysis Reports (JTARs). These courses consist of the Aircraft Technician Common Core and basic occupational training courses for the Aviation Systems Technician (AVN), Avionic Systems Technician (AVS), Air Weapons Systems Technician (AWS), and Aircraft Structures Technician (ACS) occupations. In approving





the JTARs, 1 Canadian Air Division Headquarters, A4 Maintenance, has confirmed that the training requirements are critical to RCAF force generation and force employment capabilities.

The objective of the CASE Phase 2 Project is to replace and enhance some of the current capabilities provided by the aging CT-114 Tutor part task trainers by acquiring:

- a) Three (3) VMT suites, with an option for four more, based on modern aircraft design which will be used to teach and assess theory and operation of systems in a virtual environment to include system function and diagnosing system malfunctions; and
- b) Modern aircraft maintenance PTTs with fault insertion capabilities that support psychomotor instruction including system inspection, functional checks, diagnosing and troubleshooting, component removal/installation, and system repair. The PTT acquisition will potentially consist of six (6) Integrated Avionics Part-Task Trainers, three (3) Power Generation and Distribution Part-Task Trainers, eight (8) Flight Control Trainers and eight (8) Landing Gear Trainers.

3. Potential ISS Scope and Constraints:

The estimated scope of activities required to sustain the PTTs and VMTs are:

- a) Fifteen plus (15+) years of support with a three year initial period, plus optional extension periods;
- b) Maintenance Support including First, Second, Third Line and Field Support;
- c) Engineering Support including Publications and Configuration Management;
- d) Material Support;
- e) Training Support;
- f) Technical Data Package and Publications Management Support; and
- g) Information Management / Technology Support.

Foreseen constraints related to the acquisition and/or sustainment of the PTTs and VMTs are:

- a) VMTs may or may not have access to the internet (for software patches/ updates);
- b) Classroom size may not be sufficient for VMTs; and
- c) HVAC may not be adequate for anticipated heat generation of VMT equipment.

4. Legislation, Trade Agreements, and Government Policies:

The following is indicative of some of the legislation, trade agreements and government policies that could impact any follow-on solicitation(s):

- a) World Trade Organization – Agreements on Government Procurement (WTO-AGP);
- b) North American Free Trade Agreement (NAFTA);
- c) Agreement on Internal Trade (AIT);
- d) Defence Production Act;
- e) Federal Contractors Program for Employment Equity (FCP-EE); etc.

5. Schedule:

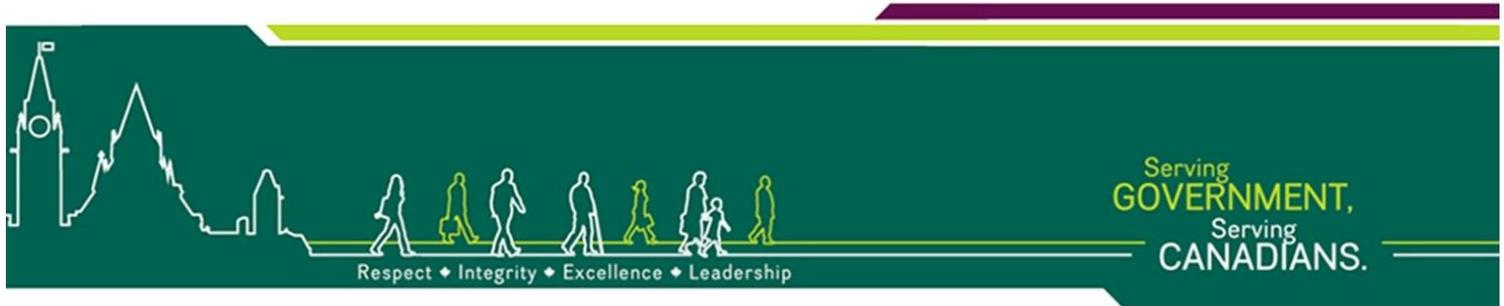
In providing responses, the following schedule should be utilized as a baseline:

- Issuance of Request for Information (RFI)/Draft RFP (August 2018)
- Issuance of RFP (September 2018)
- Evaluation of Proposals (Dec 2018)
- Award of Acquisition and ISS Contracts (August 2019)

6. Important Notes to Respondents:

Interested Respondents may submit their responses to the PSPC Contracting Authority, identified below, preferably via email:

Ricardo N. Mastantuono, MPPPA
Supply Team Leader



PSPC, LAEPS Sector, Electronics, Simulators and Defence Systems Division –
QF
Portage III 8C2 - 11 Laurier Street
Gatineau, QC., Canada, K1A 0S5
Tel.: (819) 420-1744
Email: Ricardo.Mastantuono@tpsgc-pwgsc.gc.ca

A point of contact for the Respondent should be included in the package.

Changes to this LOI may occur and will be advertised on the Government Electronic Tendering System. Canada asks Respondents to visit GETS, Buyandsell.gc.ca, regularly to check for changes, if any.

7. Upcoming Engagement Session:

The one-on-one sessions will be conducted via telecommunications on July 23th, 2018. Respondents will have the opportunity to ask Canada any questions and to put forth suggestions.

Respondents wishing to participate in the Industry Engagement are requested to complete the forms at Annex A, Appendix 1 – Rules of Engagement Agreement and Annex B – Non-Disclosure Agreement, and return them to the PSPC Contracting Authority identified herein at Part 6, on or before July 18th, 2018.

All Questions and Answers will be recorded and posted on GETS, <https://buyandsell.gc.ca/>.

Non-participation in the sessions will not preclude a supplier from bidding on the eventual RFP.

All submitted information, comments and/or questions must be based solely on the documentation herein and Industry should not reference any other past procurement process.





8. Closing date for the LOI/RFI:

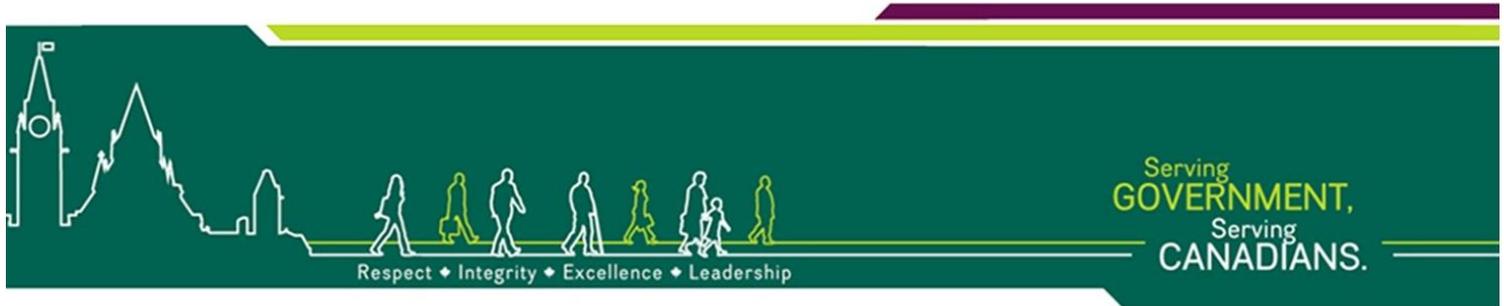
Responses to this LOI are to be submitted to the PSPC Contracting Authority identified herein at Part 6, on or before July 31st, 2018.



Public Works and
Government Services
Canada

Travaux publics et
Services gouvernementaux
Canada

Canada



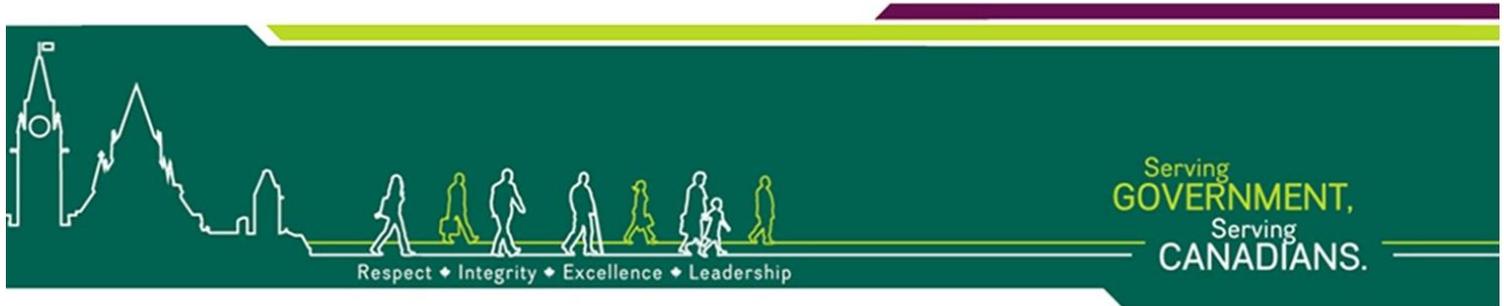
Industry Engagement Process

Annex A – Rules of Engagement

RULES OF ENGAGEMENT (ROE):

1. This process will be conducted with the utmost fairness and equity between all Parties. No individual or organization must receive nor be perceived to have received any unusual, preferential or unfair advantage over the others during this consultation.
2. Participation requires attendees to sign and return the Rules of Engagement Agreement attached at Annex A, Appendix 1 and the Non-Disclosure Agreement attached at Annex B. By signing Annex A, Appendix 1, Respondents agree to abide by the ROE contained herein. By signing Annex B, Respondents agree to abide by the terms set out therein. Engagement will apply beginning with the signing of the Engagement Agreement and concluding with the release of the RFP on GETS, <https://buyandsell.gc.ca/>.
3. All documentation provided by Canada throughout the LOI will be provided to all Respondents who have agreed to and signed the Rules of Engagement Agreement.
4. The LOI may also consist of any other events deemed necessary by Canada.
5. The sessions will be hosted by Canada (including PSPC, DND and ISEDC).
6. The Rules of Engagement Agreement must be signed by each Company Representative that does participate.
7. In order to maximize the benefits, Canada will endeavor to solicit relevant feedback and comments from Respondents on various issues raised relating to the definition of requirements and the procurement process. Any solutions, ideas or issues raised during the sessions will be analyzed for further consideration by Canada.





8. Canada will perform a review of Industry feedback submitted and may incorporate it as it deems appropriate in the development of any subsequent RFP that will be posted on the GETS, <https://buyandsell.gc.ca/>.
9. Canada intends to communicate the content of the sessions (i.e. Questions and Answers) via GETS, <https://buyandsell.gc.ca/>, in the form of an LOI amendment.
10. Questions, clarifications and information of a proprietary nature must be clearly identified as "proprietary" or "Commercial-in-Confidence" by Respondents.
11. Canada will not disclose proprietary or commercially sensitive information concerning a Respondent to other Respondent or third parties, except and only to the extent required by law.
12. Canada intends to distribute the names and coordinates of all Respondents to all those that participated at the end of the one-on-one sessions. Should a Respondent not want their name and coordinates distributed, please indicate so in Annex A, Appendix 1 – Rules of Engagement Agreement.

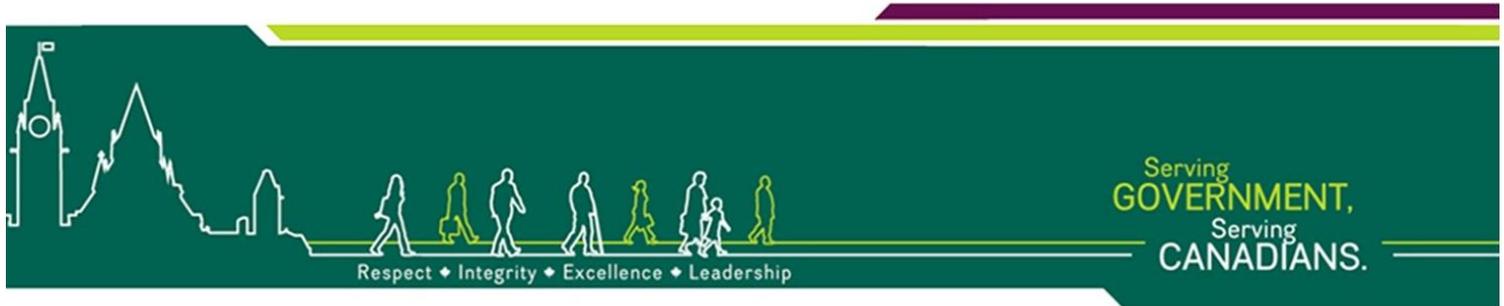
Terms and Conditions:

1. The following terms and conditions apply to this LOI. In order to encourage open dialogue and a fair and transparent process, Respondents agree to the following:
 - a. Respondents must register for the LOI one-on-one sessions by signing and returning the Rules of Engagement Agreement, no later than July 18th, 2018. Respondents can indicate their preferred time slot in their request for registration by filling out Annex A, Appendix 1 – Rules of Engagement Agreement. The time slots are indicated in Annex A, Appendix 2 – One-on-One Sessions Sign-Up Sheet. A maximum of five (5) Company Representatives will be permitted per session;
 - b. All registrations must be submitted by e-mail to the PSPC Contracting Authority identified herein at Part 6;



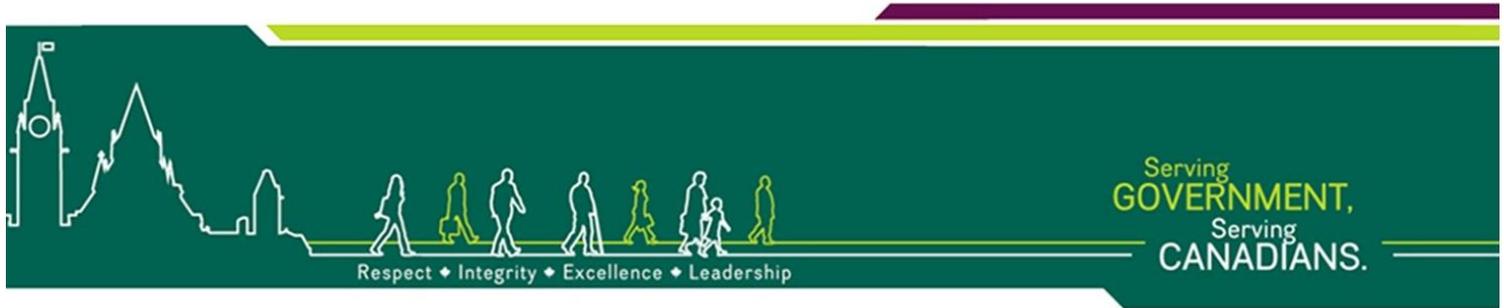
- c. All inquiries and comments must be directed to authorized representatives of Canada, as directed in notices given by Canada;
- d. Respondents **MUST NOT** reveal or discuss any information or documentation to the Media regarding the CASE Phase 2 Project, other than what is already publically available. If Respondents receive a question from the Media, they are to direct them to the PSPC Media Relations Office at 819-420-5501 or by e-mail at media@pwgsc-tpsgc.gc.ca;
- e. Media are not permitted to participate in the LOI sessions;
- f. Canada is not obligated to issue any RFP, nor to negotiate any contract for the CASE Phase 2 Project as a result of this LOI;
- g. If Canada does release an RFP, the terms and conditions of the RFP will be at the sole discretion of Canada;
- h. Canada will not reimburse any person or entity for any cost incurred in participating in this LOI;
- i. Respondents are encouraged to provide feedback concerning the CASE Phase 2 Project and to provide constructive resolutions to the issues in question. All Respondents will have equal opportunity to share their ideas and suggestions;
- j. Participation is not a mandatory requirement. Not participating in this LOI will not preclude a Bidder from submitting a proposal(s) on an upcoming competitive procurement process; and
- k. It is requested that the contact information (name, phone number, e-mail address) for the Company Representative be provided with this signed agreement.





2. Respondents must respect the terms and conditions outlined above in order to ensure a fair consultation process and generate a discussion that will be beneficial to both Canada and Industry. Failure to comply with any of those may result in the company becoming ineligible to continue as a participant in the CASE Phase 2 Project LOI.
3. By signing this document, the Respondent (otherwise known as the Company Representative) represents that he/she has full authority to bind the company listed below and that the individual and the company agree to be bound by all the terms and conditions contained herein.





CANADIAN ADVANCED SYNTHETIC ENVIRONMENT (CASE) PROJECT
Letter of Interest
N° W8475-16VMT2/B

Industry Engagement Process

Annex A, Appendix 1 – Rules of Engagement Agreement

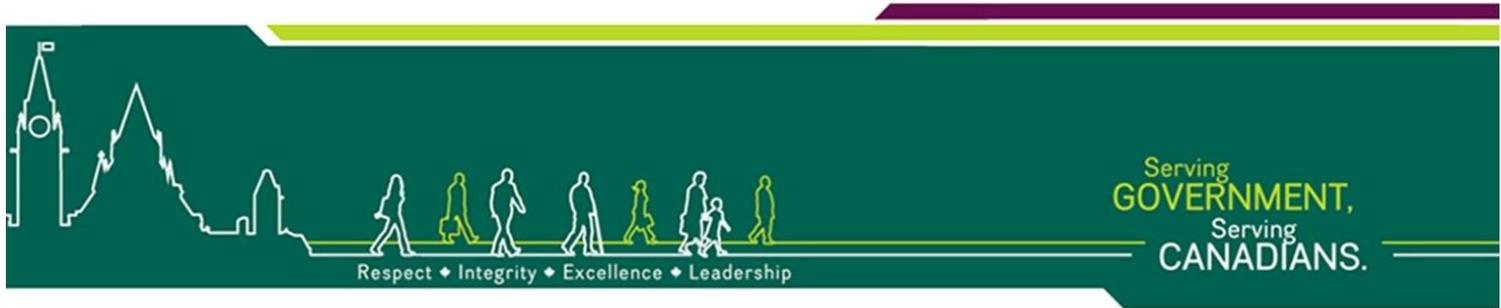
Participation in the LOI one-on-one sessions for the CASE Phase 2 Project is open to all interested Respondents and is conditional on the formal acceptance of this Industry Rules of Engagement Agreement.

Due to the nature of the information sought by Canada in the LOI Industry Engagement Process, one-on-one sessions will be scheduled on a priority basis. Respondents interested in attending the sessions are required to identify their preferred choices. The available time slots for the sessions are attached at Annex A, Appendix 2 – One-on-One Session Sign-Up Sheet.

In addition, should a Respondent wish to take part in a one-on-one session, the Respondent is expected to attach and return a brief explanation of the nature of its business, in writing, to the PSPC Contracting Authority, identified herein at Part 6, on or before July 18th, 2018.

A duly authorized officer of the company shall sign this Industry Rules of Engagement Agreement in this regard.





Signature

Title

Date

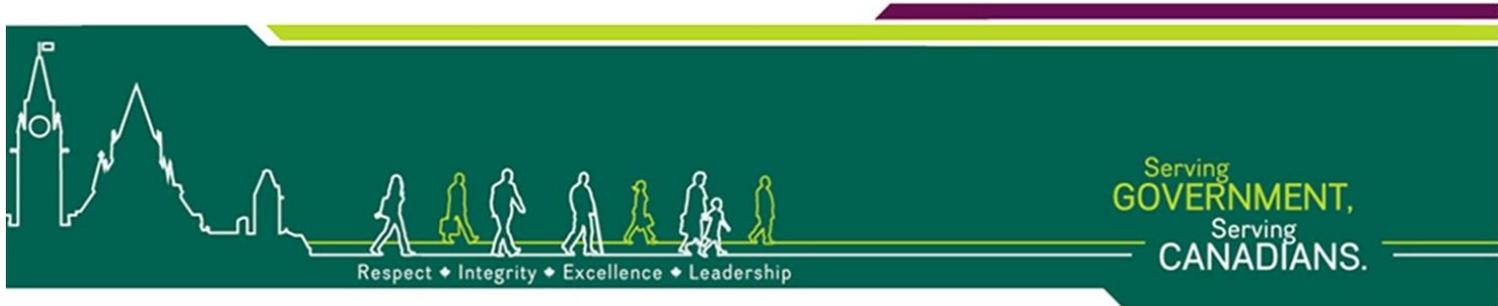
Please indicate if the Company's Distribution Coordinates, as per table above, may be shared with other industry Respondents: Yes No



Public Works and
Government Services
Canada

Travaux publics et
Services gouvernementaux
Canada

Canada



**CANADIAN ADVANCED SYNTHETIC ENVIRONMENT (CASE) PROJECT
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N° W8475-16VMT2/B**

Industry Engagement Process

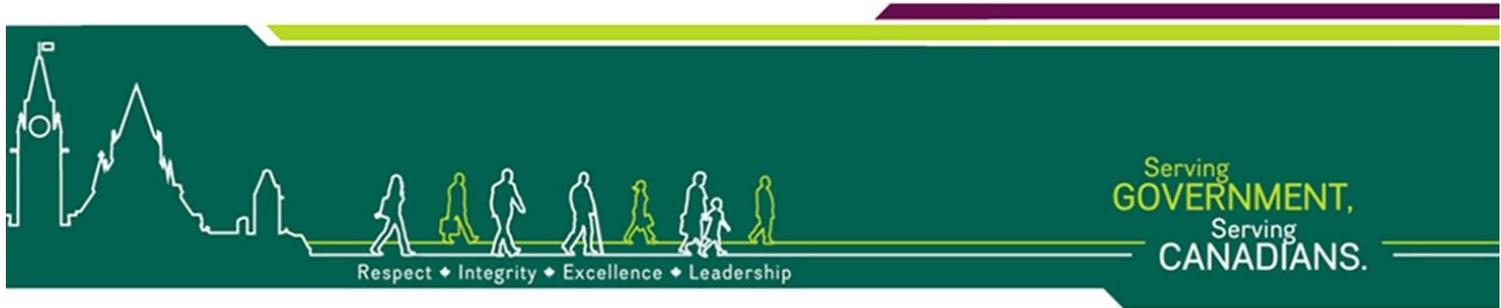
Annex A, Appendix 2 – One-on-One Session Sign-Up Sheet

Date: July 23rd, 2018

Canadian Government Participants of the One-on-One Session:

PSPC	DND
Ricardo Mastantuono Contracting Authority	Major Annette Cunningham - CASE Project Director (PD)
	Captain Sarah Ramratan - CASE Deputy Project Director (D/PD)
	Captain Joe Huntley - CASE Acting Project Manager (A/PM)
	Pierre Laperriere - Procurement Authority (PA)





Times will be assigned on a first-come, first-served basis:

Time Slot (Monday July 23 rd , 2018 - all times EST)	Choice #: (Indicate preference 1 – 6)
9am - 9:45am	
10am - 10:45am	
11 am - 11:45am	
1pm - 1:45pm	
2pm - 2:45pm	
3pm – 3: 45pm	

Name of Participant Company (please print):

Language of Preference: English French

List of Company’s Respondents: Please provide the required information as per table below (up to a maximum of 5 participants per company):

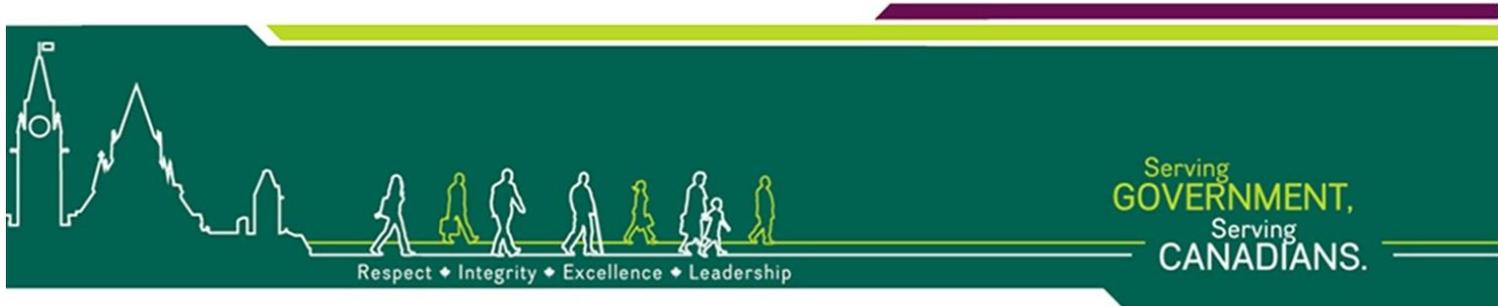


1.	Name and Title of Individual:	
	Telephone Number:	
	E-mail:	
	Signature:	
	Date:	
2.	Name and Title of Individual:	
	Telephone Number:	
	E-mail:	
	Signature:	
	Date:	
3.	Name and Title of Individual:	
	Telephone Number:	
	E-mail:	



	Signature:	
	Date:	
4.	Name and Title of Individual:	
	Telephone Number:	
	E-mail:	
	Signature:	
	Date:	
5.	Name and Title of Individual:	
	Telephone Number:	
	E-mail:	
	Signature:	
	Date:	





CANADIAN ADVANCED SYNTHETIC ENVIRONMENT (CASE) PROJECT
Letter of Interest
N° W8475-16VMT2/B

Industry Engagement Process

Annex B – Non-Disclosure Agreement

NON-DISCLOSURE AGREEMENT

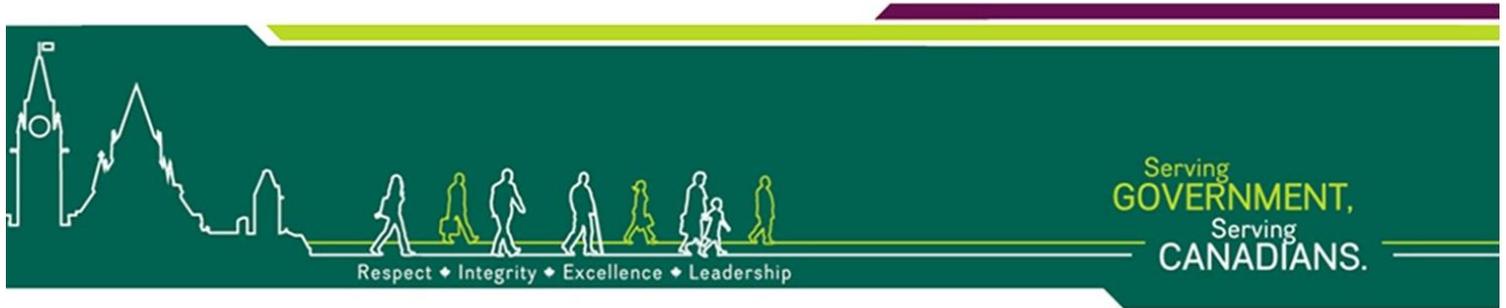
Distribution of the information package for the CASE Phase 2 Project is conditional on the signature of this Non-Disclosure Agreement. Each Participant must sign the Non-Disclosure Agreement in order to receive the information package.

I, _____ (name, please print), recognize that in the course of my work as an employee of

_____ (please print), I may be given access to information by or on behalf of Canada, pursuant to the LOI W8475-16VMT2/B. For the purposes of this agreement, information includes but is not limited to: any documents, instructions, guidelines, data, material, advice or any other information whether received orally, in printed form, recorded electronically, or otherwise and whether or not labeled as proprietary or sensitive, that is disclosed to a person or that a person becomes aware of during the Letter of Interest process.

I agree that I will not reproduce, copy, use, divulge, release or disclose, in whole or in part, in whatever way or form any information described above to any person other than a person employed by Canada. I undertake to safeguard the same and take all necessary and appropriate measures, including those set out in any written or oral instructions issued by Canada, to prevent the disclosure of or access to such information in contravention of this agreement.





I also acknowledge that any information provided to the Company Participant by or on behalf of Canada must be used solely for the purpose of responding to the LOI and must remain the property of Canada or a third party, as the case may be.

I agree to remain bound by this agreement after the completion of the LOI W8475-16VMT2/B.

Signature

Title

Date





CANADIAN ADVANCED SYNTHETIC ENVIRONMENT (CASE) PROJECT
Letter of Interest
N° W8475-16VMT2/B
Industry Engagement Process

Annex C – One-on-One Sessions – Response Template

*Note: Header Information to be provided in Company's format

CANADIAN ADVANCED SYNTHETIC ENVIRONMENT (CASE) PROJECT

Industry Engagement
Proposed Discussion Topics
DATE
Company (Company Name) Response

*Note: This template is being provided to assist Canada to prepare for the One-on-One Sessions and to facilitate the consultative process.

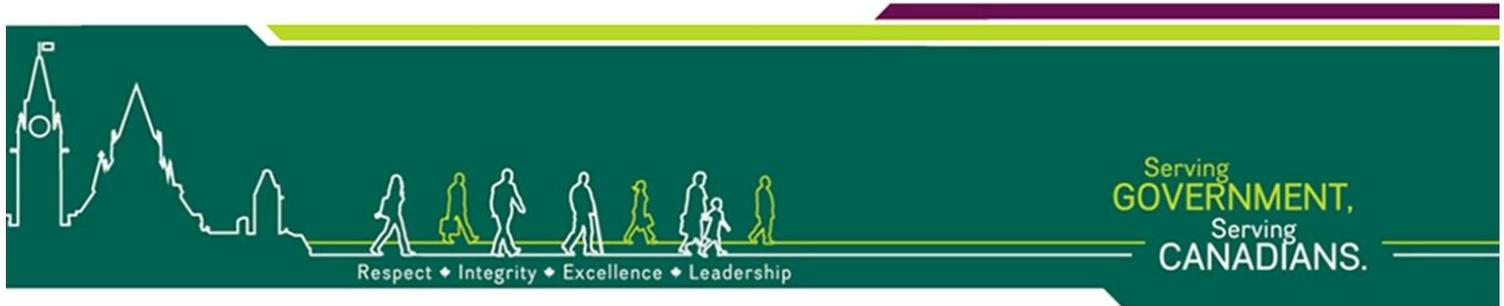
On this title page, please provide:

Company Information (Company Name, Address, Web address, etc.)
Contact Information (Name, Title, Phone, E-mail Address)
Document Protection Level (Optional)
Header Information in Company's format

Footer Information in Company's format Page X of X

The intent of this document is to present possible topics for discussion to promote open dialogue while working in consultation and collaboration with Industry in identifying how





they propose to meet Canada's CASE Phase 2 Project requirements. This collection of topics is by no means exhaustive and Canada encourages participants to bring forward any other key issues that they consider to be relevant.

Consideration of and responses to this document will play an important role in this consultative process by fostering open discussion.

INSTRUCTIONS:

1. This document template is intended to provide guidance to Industry in preparing for the CASE Phase 2 Project LOI and its one-on-one telecommunication sessions. It is not expected that all questions will elicit a response; neither should submissions be constrained by the questions or topics of discussion.
2. Use the written format of your choice, but keep the same section numbering to facilitate Canada's analysis of all responses.
3. The number of pages of your response is not limited. However, it is requested responses not exceed 20 pages, single-sided, standard business format.
4. Written responses are to be provided electronically in MS Word or PDF format.

Section 1: Executive Summary

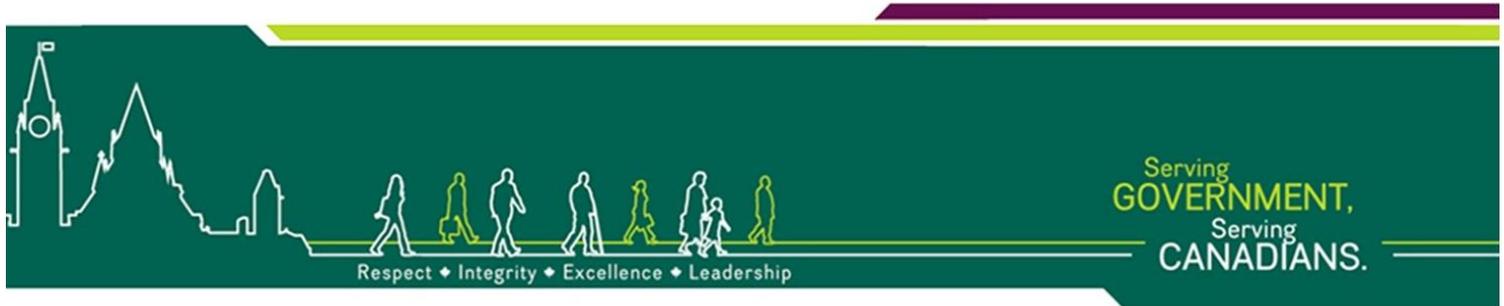
- 1.1 Describe if you are an Original Equipment Manufacturer (OEM) or a potential supplier/distributor.
- 1.2 Does your company currently have operations in Canada?

Section 2: DND Specific Questions:

- 2.1 How does your company propose to best sustain the VMTs and PTTs described in the LOI documentation, in terms of the following:

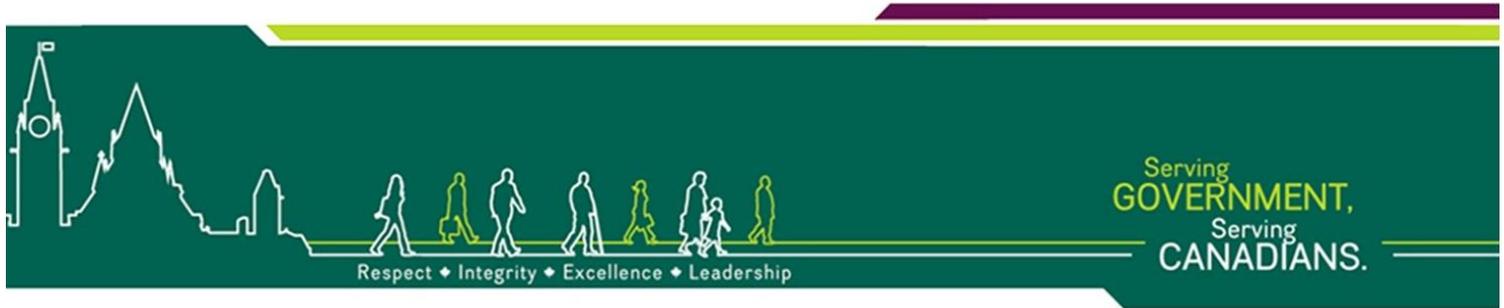
- a) the most economical means;
 - b) the employment, or not, of a Field Service Representative;
 - c) maintaining the availability depicted in the Training Availability Requirement (TAR) provided in the LOI documentation; and
 - d) spare parts availability and storage.
- 2.2 Does your Company have the capability to perform all required preventive and corrective maintenance for the VMTs and PTTs?
- 2.3 Does your Company's intellectual property rights policies preclude third parties from maintaining the VMTs and PTTs?
- 2.4 What is the maximum initial Warranty period for VMTs and PTTs that your company offers? Is there an option to extend this period?
- 2.5 How quickly does your company respond to a notification of VMT and PTT failure by your customers?
- 2.6 Would your company provide the entire solution to Canada's requirement, or would you use multiple Vendors?
- 2.7 How long do you expect your equipment to last before it is no longer practical to sustain economically, or due to obsolescence?
- 2.8 How frequently do the VMTs and PTTs require OEM inspections?
- 2.9 How frequently do the VMTs and PTTs require a software refresh?
- 2.10 How does your Company classify (or rank) VMT and PTT unserviceable conditions (i.e. critical, routine etc.)?
- 2.11 Does your Company anticipate any major upgrades in the next ten to fifteen years?
- 2.12 Do your Company's VMTs require an internet connection for updates or fixes?





- 2.13 How would you describe the ease with which fault scenarios may be introduced to your Company's VMTs and PTTs?
- 2.14 Given the anticipated number of VMTs and PTTs potentially being acquired by Canada, what would your Company recommend for infrastructure in terms of space, power, HVAC, etc.?
- 2.15 Would your Company be proposing a Commercial Off-the-Shelf (COTS) solution, or engineering a tailored solution?
- 2.16 How complex is the installation and setup of your Company's VMTs and PTTs?
- 2.17 Your Company's VMTs and PTTs will require what type of server infrastructure?
- 2.18 Your Company's VMTs and PTTs will require what type of network?
- 2.19 Using Industry's Best Practices and given that the Government of Canada (GoC) will establish a sustainment program for the VMTs and PTTs that will align with and optimize both Canada and Industry's ability to deliver Performance, Value for Money and Flexibility, how could the Contractor's performance be assessed based on the requirements stipulated in Annex D and its Appendices?





CANADIAN ADVANCED SYNTHETIC ENVIRONMENT (CASE) PROJECT
Letter of Interest
N° W8475-16VMT2/B

Annex D – PTT and VMT Acquisition Statement of Work

DEPARTMENT OF NATIONAL DEFENCE (DND)

REQUISITION NO. W8475-16VMT2/B

STATEMENT OF WORK

ACQUISITION OF

CANADIAN ADVANCE SYNTHETIC ENVIRONMENT (CASE) PHASE 2

AIR TECHNICIAN APPRENTICE TRAINERS



Public Works and
Government Services
Canada

Travaux publics et
Services gouvernementaux
Canada

Canada

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Appendix 1 – VMT Technical and Performance Requirements

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1.0 SCOPE

1.1 Purpose

1.1.1 The purpose of this Statement of Work (SOW) is to define the work required to deliver Virtual Maintenance Trainer (VMT) suites and series of Part Task Trainer (PTT) devices to train aircraft maintenance technicians at the Canadian Forces School of Aerospace Technology and Engineering (CFSATE).

1.1.2 This SOW defines the work to be done by the Contractor to plan, design, develop, construct, integrate, test and deliver the VMT suites and PTT devices.

1.1.3 This SOW defines the material and data to be delivered by the Contractor to enable the operation of the VMT suites and PTT devices.

1.2 Objectives

1.2.1 To deliver VMT suites and PTT devices that will be used to teach and assess theory and maintenance of aircraft systems and to diagnose system malfunctions in a virtual and physical environment.

1.2.2 The VMT is intended to provide a continuous learning experience that leads into PTT devices to provide the student learner with continuity in core skills development and system theory re-enforcement. The VMT provides the student with the ability to perform system functional checks and to diagnose faults within aircraft systems in a simulated virtual environment. With this information in hand, the student would then move to the applicable PTT device to carry out system inspection, troubleshooting, component removal and installation and repair of this system.

1.3 Background

1.3.1 CFSATE is responsible for the technical training of apprentice aircraft technicians for the RCAF. Advances in technology and the evolution of aircraft maintenance practices in industry have led to increased obsolescence in the training aids used by CFSATE.

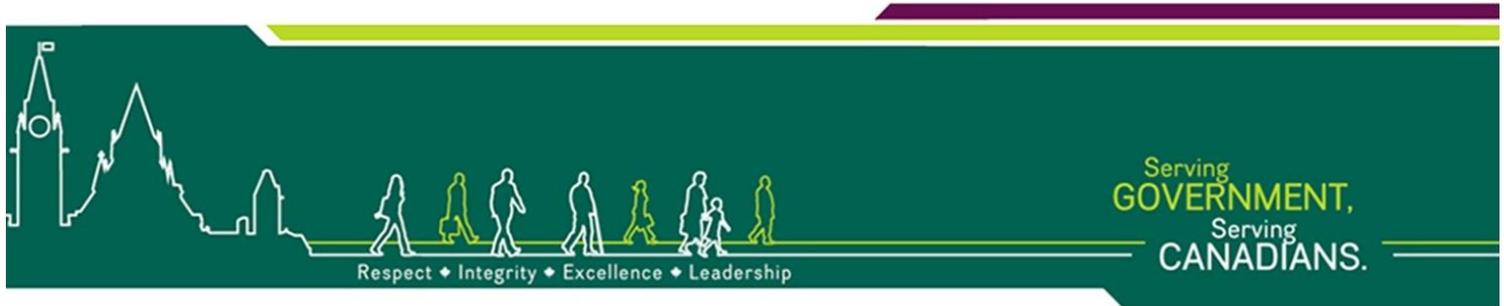
1.3.2 All foundational apprentice courses (Common Core, QL3 for Aviation Systems Technician (AVN), Avionics Systems Technician (AVS), Air Weapons Technician (AWS), and Aircraft Structures Technician (ACS)) provided by CFSATE for aircraft technicians require modernization to align with relevant Job Task Analysis Reports (JTAR).



1.4 List of Acronyms / Terminology

AC	Alternating Current
ACS	Aircraft Structures Technician
AP	Acceptance Plan
AVN	Aviation Systems Technician
AVS	Avionics Systems Technician
ATP	Acceptance Test Plan
AWS	Aircraft Weapons Technician
CDR	Critical Design Review
CFSATE	Canadian Forces School of Aerospace Technology and Engineering
CMP	Configuration Management Plan
DC	Direct Current
DND	Department of National Defence
FMS	Flight Management System
IAW	In Accordance With
ILS	Integrated Logistical Support
JTAR	Job Task Analysis Report
LRU	Line Replaceable Unit
MTP	Maintenance Training Plan
PM	Project Manager
PRM	Progress Review Meetings
PTT	Part Task Trainer
QA	Quality Assurance
RCAF	Royal Canadian Air Force
SE	Systems Engineering
SEMP	Systems Engineering Management Plan
SOR	Statement of Requirements
STP	Student Training Package
TA	Technical Authority
TDMP	Technical Data Management Plan
TIM	Technical Interchange Meetings
TP	Training Plan





VMT Virtual Maintenance Trainer

2.0 APPLICABLE DOCUMENTS

2.1 General

2.1.1 The following documents are applicable to the extent that they are referenced in this SOW. Otherwise, referenced documents must be considered to be supplemental information.

2.1.2 In the event of a conflict between the text of this SOW and the references cited herein, this SOW must take precedence.

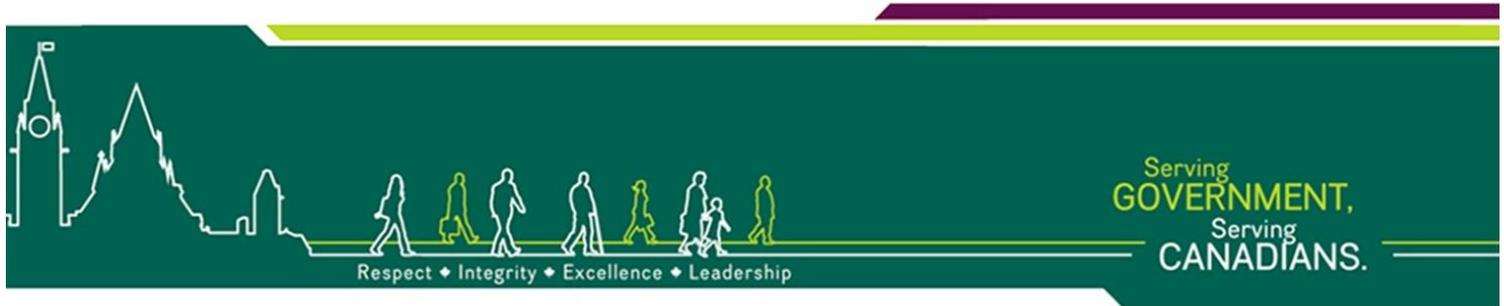
2.2 List of Applicable Documents

2.2.1 The following documents and standards are listed to help understand the SOW, and may be required to carry out the work:

2.2.2 Table 1.0: Applicable Documents

Document Number	Issuing Organisation	Document Name
D-02-006-008/SG-001	Department of National Defence	Design Change, Deviation and Waiver Procedure
D-01-100-214/SF-000	Department of National Defence	Specification for Preparation of Provisioning Documentation for Canadian Forces Equipment
C-01-100-100/AG-006	Department of National Defence	Writing, Format, and Production of Technical Documentation
ISO 9001:2008		Quality Management Systems Requirements
ISO 10005:2005		Quality Management Systems – Guidelines for Quality Plans





3.0 PROJECT MANAGEMENT

3.1 General

3.1.1 The Contractor must provide all aspects of project management necessary for planning, designing, developing, constructing, integrating, testing, and delivering the VMT suites and the PTT devices, as well as for providing the material, services, and data detailed in this SOW.

3.1.2 The Contractor must deliver the VMT suites in accordance with Appendix 1, the VMT Technical and Performance Requirements.

3.1.3 The Contractor must deliver the PTT devices in accordance with Appendix 2, the PTT Technical and Performance Requirements.

3.1.4 The Contractor must deliver the data in accordance with Appendix 3, Contract Data Requirements List (CDRLs) and Data Item Descriptions (DIDs).

3.2 Project Schedule

3.2.1 The Contractor must submit and maintain a project schedule in accordance with (IAW) CDRL-001/PM-001.

3.3 Progress Reports

3.3.1 The Contractor must submit progress reports IAW CDRL-002/PM-002.

3.3.2 Progress Reports must include minutes of all Project Review Meetings (PRMs) and Technical Interchange Meetings (TIMs) held during the reporting period.

3.4 Reviews and Meetings

3.4.1 The Contractor must conduct reviews and meetings identified in paragraphs 3.5 through 3.10 with the appropriate DND authorities as approved by the DND Technical Authority (TA).



3.4.2 All meetings will be chaired by the DND TA or designated personnel.

3.4.3 The Contractor must ensure that the required data, personnel, and facilities are available for each review.

3.4.4 The Contractor must submit an agenda to the DND TA for review at least five working days in advance of each meeting.

3.4.5 The Contractor must be responsible for taking and providing to the DND TA minutes from every review or meeting.

3.5 Kickoff Meeting

3.5.1 The Contractor must hold a Kick-off meeting with DND representatives within five weeks after contract award, at the Contractor's or DND's facility, as determined by the TA.

3.6 Project Review Meetings and Technical Interchange Meetings

3.6.1 The Contractor must hold monthly Project Review Meetings (PRMs).

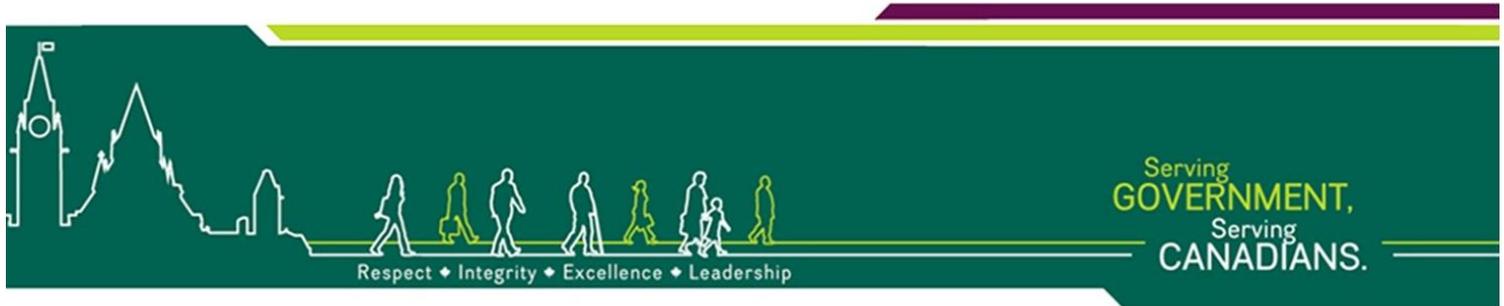
3.6.2 PRMs must encompass total project status as of the review date and must present a summary of project progress, known problems, proposed resolutions, and impact on the schedule.

3.6.3 Technical Interchange Meetings (TIMs) must deal strictly with technical requirements of the contract and must be scheduled at the DND TA's request.

3.6.4 The DND TA may cancel PRMs or TIMs by issuing written notice at least five working days prior to the meeting.

3.7 Preliminary Design Review





3.7.1 The Contractor must hold the Preliminary Design Review (PDR) meeting as per approved project schedule to review the VMT suite and PTT device preliminary designs and to resolve any outstanding issues.

3.8 Critical Design Review

3.8.1 The Contractor must hold the Critical Design Review (CDR) meeting to ensure that the detailed design will meet DND requirements within the identified cost and schedule constraints, and is appropriate to proceed with full-scale assembly, and integration.

3.8.2 The VMT suite and PTT device designs must be frozen upon DND TA approval of the design solution presented at CDR.

3.9 Government Furnished Data Requests

3.9.1 Any Government Furnished Data requested by the Contractor, which is not specifically provided for in this contract, must be requested in writing to the DND TA.

4.0 SYSTEMS ENGINEERING

4.1 Systems Engineering Management

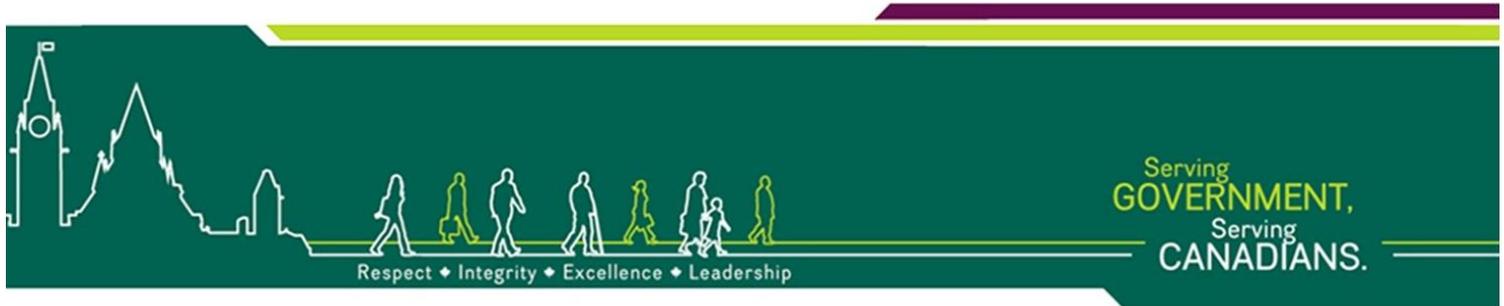
4.1.1 The Contractor must provide the system engineering required for installation and testing of the VMT suites and PTT devices.

4.1.2 The Contractor must prepare and submit a Systems Engineering Management Plan (SEMP) IAW CDRL-003/SE-001.

4.1.3 The Contractor must conduct hardware and software requirements analysis, and must conduct design IAW the approved SEMF.

4.1.4 Contractor must implement, maintain, and use the approved SEMF in the performance of the work.





4.2 Implementation, Integration and Installation

4.2.1 The Contractor must implement the VMT suite and PTT device design IAW the approved SEMP.

4.2.2 The Contractor must commence installation of the VMT suites and PTT devices at CFSATE in 16 Wing, CFB Borden upon written approval from DND TA, following execution of the Acceptance Test Procedures.

4.3 Acceptance Plan (AP)

4.3.1 The Contractor must submit an Acceptance Plan (AP) IAW CDRL-004/SE-002.

4.3.2 Execution of the AP at 16 Wing, CFB Borden must be co-ordinated with DND IAW the approved project schedule.

4.4 Testing

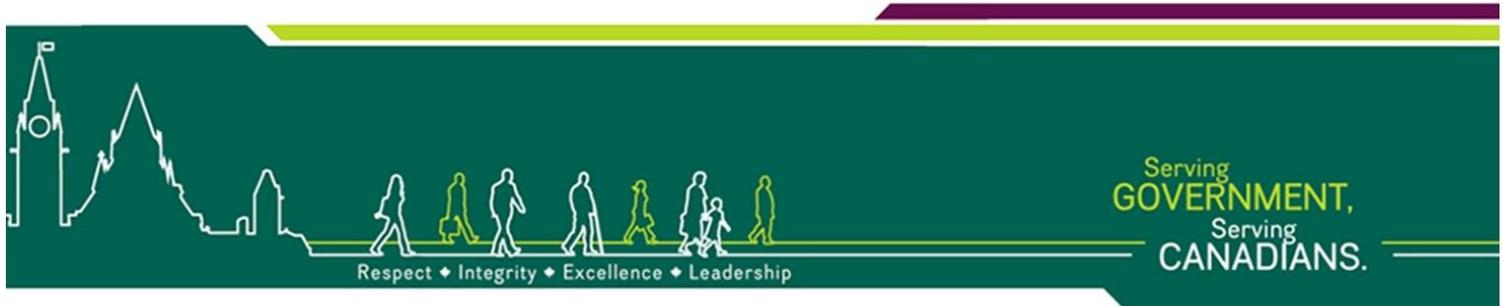
4.4.1 The Contractor must prepare and submit Acceptance Test Procedures (ATPs) in IAW CDRL-005/SE-003.

4.4.2 ATPs are part of the AP.

4.4.3 As per approved AP, execution of the ATPs must verify the serviceability, configuration and functionality of the VMT and PTTs before delivery.

4.4.4 Approved ATPs must be re-submitted after each testing phase to include the test results.

4.4.5 Upon delivery, DND will verify by execution of the ATPs, as per approved AP, that the VMT suites and PTT devices meet the specified system performance and technical requirements, specified in Appendix 1 and 2.



4.5 Configuration Management

4.5.1 The Contractor must prepare and submit a Configuration Management Plan (CMP) IAW CDRL-006/SE-004.

4.5.2 The Contractor must implement, maintain, and use the approved CMP for configuration management.

4.5.3 Prior to installation, the Contractor must certify the configuration and serviceability of the VMT suites and PTT devices, in the presence of the DND, through the execution of ATPs.

4.5.4 The project schedule must establish a Design Baseline Control Date upon DND approval of the Design Baseline Report.

4.5.5 Following the Design Baseline Control Date, discrepancies between the approved design baseline and the delivered product must be submitted by the Contractor for DND TA approval as a request for Design Change, Deviation or Waiver IAW CDRL 007/SE-005.

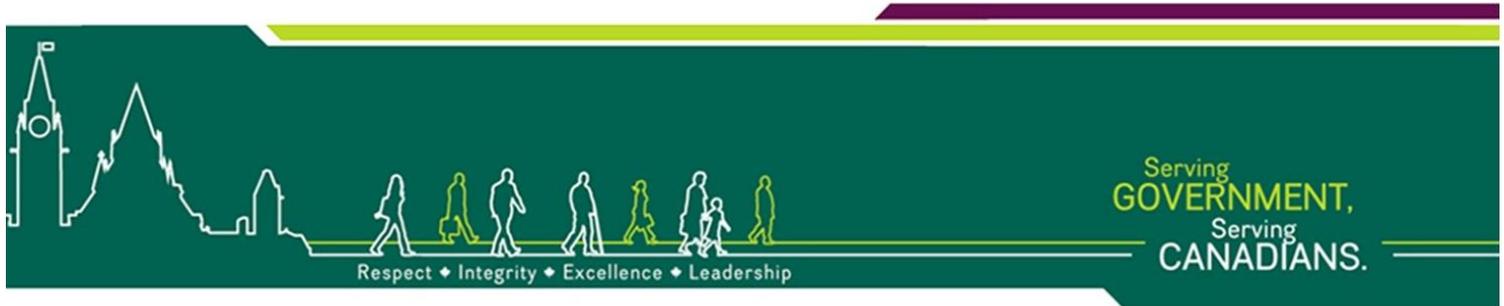
5.0 INTEGRATED LOGISTICS SUPPORT

5.1 Training for Instructors

5.1.1 The Contractor must provide initial cadre training (ICT) for VMT and PTT device operation for up to 64 of the instructional staff at CFSATE, in a “train the trainer” type scenario.

5.1.2 The Contractor must submit a Training Plan (TP) for DND approval IAW CDRL-008/ILS-001.

5.1.3 The Contractor must deliver the entire Instructor training package IAW CDRL-015/ILS-008, including course materials, documentation and training syllabus, as specified in the approved TP.



5.2 Student Training Package

5.2.1 The VMT and each type of PTT must have an accompanying Student Training Package (STP), delivered by the Contractor IAW CDRL -016/ILS-009. The STP must include the maintenance training procedures for the VMT and PTTs.

5.3 PTT and VMT Parts List

5.3.1 The contractor must submit an itemized parts list IAW CDRL-014/ILS-007.

5.4 Quality Management

5.4.1 In the performance of the work described herein, the Contractor must comply with the requirements of ISO 9001:2008, "Quality Management Systems Requirements".

5.4.2 The Contractor must submit a Quality Assurance (QA) Plan IAW CDRL-009/ILS-002.

5.4.3 The QA Plan must describe how the Contractor will meet the quality assurance requirements for the planning, design, development, construction, integration, testing, and delivery of the VMT and the PTT.

5.5 Documentation, Drawings and Publications

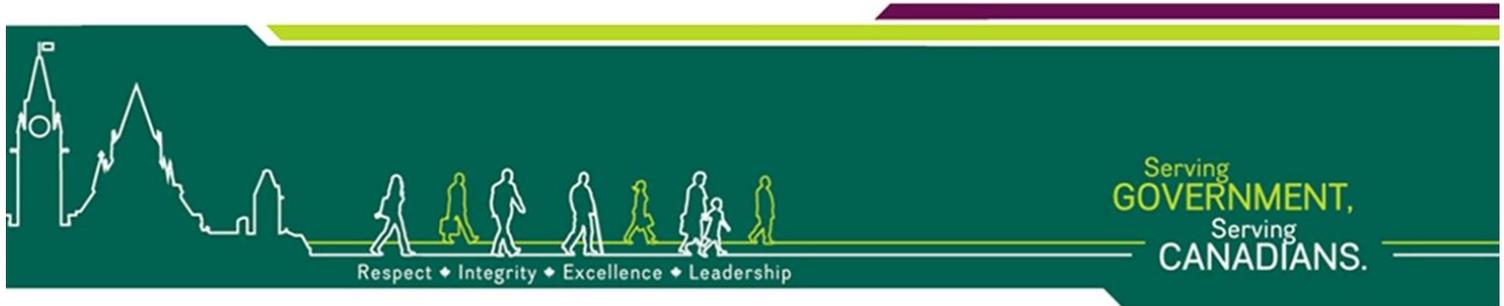
5.5.1 The Contractor must deliver:

5.5.1.1 VMT Operating Instructions IAW CDRL-010/ILS-003;

5.5.1.2 PTT Operating Instructions IAW CDRL-011/ILS-004;

5.5.1.3 Drawings and Maintenance Manuals IAW CDRL-012/ILS-005; and

5.5.1.4 Software Documentation IAW CDRL-013/ILS-006.



5.5.2 Following unconditional acceptance of the device, Operating Instructions, Drawings and Software Documentation must be validated and certified as complete by the Contractor, and final copies must be submitted to DND TA for acceptance.

5.6 Acceptance of Integrated Logistics Support Deliverables

5.6.1 Following conditional product acceptance, all Integrated Logistics Support (ILS) deliverables must be validated and certified as complete by the Contractor, and final copies must be submitted to DND for acceptance.

5.6.2 The Contractor must correct within 30 working days of DND notification any deficiencies, discrepancies or anomalies found during the 12 months following delivery to DND of the approved final copy.

6.0 DELIVERABLES

6.1 Virtual Maintenance Trainer

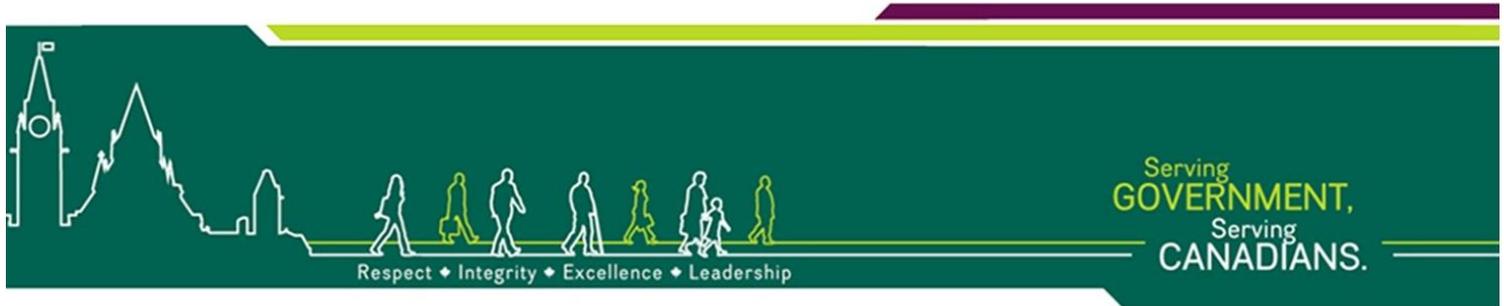
6.1.1 The Contractor must deliver a quantity of 7 VMT suites in accordance with the technical requirements found in Appendix 1 to this SOW. A VMT suite is defined as: 1 instructor station and 7 student stations. Each student station must be able to accommodate 2 students per station, for a total of 14 students per classroom.

6.2 Part Task Trainers

6.2.1 The Contractor must deliver the following PTTs IAW the technical requirements found in Appendix 2 to this SOW:

6.2.1.1 Quantity 6 of integrated avionics trainers;

6.2.1.2 Quantity 3 of power generation and distribution trainers;



6.2.1.3 Quantity 8 of flight control trainers; and

6.2.1.4 Quantity 8 of landing gear trainers.

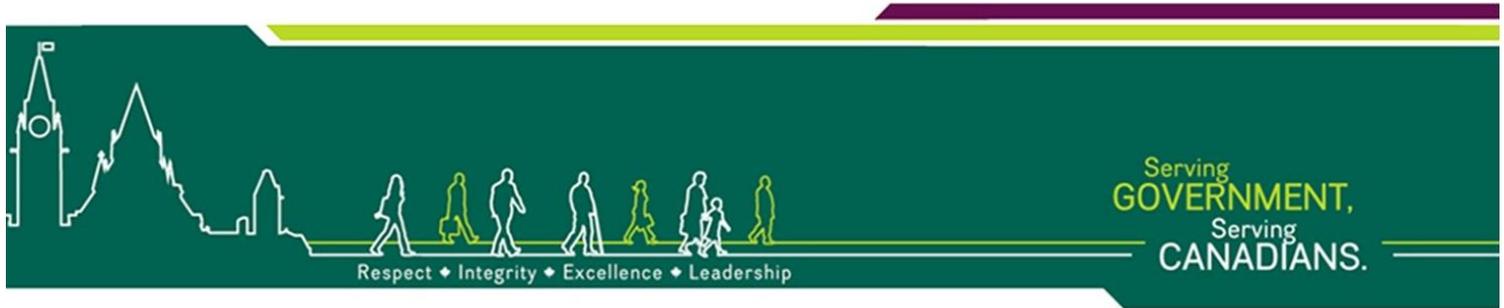
6.3 Instructor Training Package

6.3.1 The contractor must deliver the Instructor Training Package in accordance with para 5.1 of this SOW.

6.4 Student Training Package

6.4.1 The Contractor must deliver the Student Training Package in accordance with para 5.2 of this SOW.





CANADIAN ADVANCED SYNTHETIC ENVIRONMENT (CASE) PROJECT
Letter of Interest
N° W8475-16VMT2/B

**APPENDIX 1: VIRTUAL MAINTENANCE TRAINER (VMT) SUITE TECHNICAL
AND PERFORMANCE REQUIREMENTS**

DEPARTMENT OF NATIONAL DEFENCE (DND)

**APPENDIX 1 TO ANNEX A PART 1: STATEMENT OF WORK ACQUISITION
OF CANADIAN ADVANCED SYNTHETIC ENVIRONMENT (CASE) PHASE 2
AIR TECHNICIAN APPRENTICE TRAINERS**



Public Works and
Government Services
Canada

Travaux publics et
Services gouvernementaux
Canada

Canada

REFERENCES

- A. FAA Advisory Circular AC 43.13-1B, Chapters 9, 11 and 12.
- B. C-17-010-002/ME-000 to 010 Electrical Wire Interconnection System (EWIS)

1. Introduction

1.1 This document establishes the software and hardware requirements of the Virtual Maintenance Trainer (VMT) for use at the Canadian Forces School of Aerospace Technology and Engineering (CFSATE).

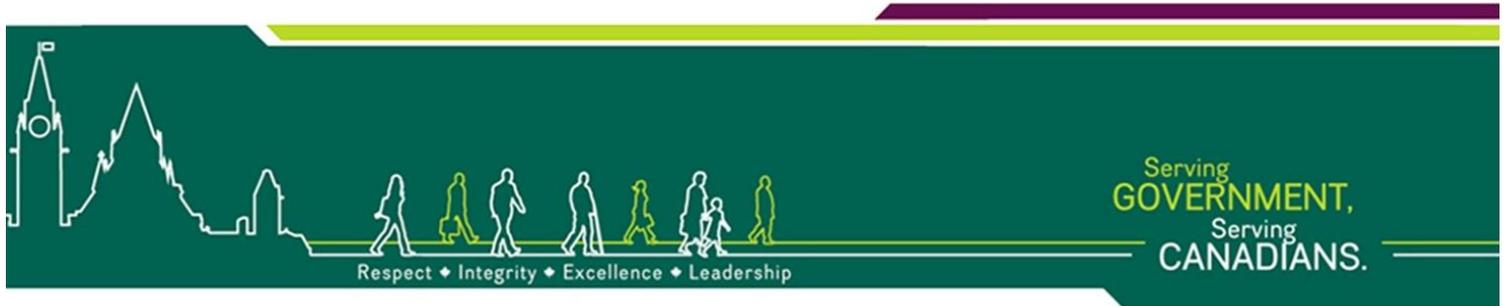
1.2 VMT – Concept of Operation

1.2.1 The VMT is a training device that operates in accordance with the theory of operation of an aircraft system, mimicking the functionality of that system to a sufficient degree to enable the student to carry out troubleshooting procedures and functional checks on the system in accordance with the maintenance manual. Input and output is to duplicate that of the aircraft system to the degree necessary for the instructional goal. Effects such as control surface movement may be displayed in virtual models on-screen. The VMT may include visualisation aids that illustrate aerodynamic forces, electrical, gas or heat flow to facilitate learning.

1.2.2 The CFSATE instructor cadre is comprised mainly of military aircraft technicians, who have been identified to instruct at the school based on their technical and leadership abilities. Though they receive some instructor training, they are not experts in Information Technology or adult education, and will be operating the VMT without this expertise.

1.2.3 The instructor would introduce the lesson, explain the system's purpose within the aircraft's mission profile, use the VMT to demonstrate its normal function and describe the principles by which it operates. The instructor would go on to present the applicable maintenance manuals and describe the type of maintenance activities that the student will be expected to carry out on the VMT.

1.2.4 The class would then be led through maintenance scenarios in which instructor-selected unserviceability are encountered. The instructor would encourage the students to identify possible causes of the unserviceability by



applying the principles of operation to the systems. This would serve to enhance a student's understanding and better prepare them for practical hands on training exercises and ultimately their jobs as journeymen technicians at tactical units.

1.2.5 Providing the ability to insert faults of varying degrees of difficulty, involving all integrated systems and cockpit indicating systems to which the students will detect and diagnose system malfunctions utilizing supporting technical documentation and instructor assistance.

2. VMT Performance Requirements

2.1 The VMT must be a platform-level computer-based maintenance training device, designed exclusively for training purposes and must enhance learning, facilitate the development of skills and permit the practice of proper procedures for the maintenance of integrated systems of the proposed aircraft. The VMT must use simulation to:

2.1.1 Reinforce theory lessons for systems and subsystems operation;

2.1.2 Perform system inspections;

2.1.3 Perform component removal/installation;

2.1.4 Perform functional checks;

2.1.5 Perform system diagnosis;

2.1.6 Perform troubleshooting; and

2.1.7 Perform system repair.

2.2 The VMT must be used as training aid in conjunction with CFSATE developed courses by CFSATE instructors.

2.3 The VMT must meet all requirements defined in this document and include simulation, at a minimum, of systems, subsystems and components described in Schedule 1: VMT Minimum Equipment List.

2.4 In addition to systems, subsystems and components listed in Schedule 1, the VMT should be based on an aircraft that has a Transport Canada (or equivalent) approved Master Minimum Equipment List (MMEL).

2.5 The VMT must, at a minimum, allow for insertion of faults, and allow trainees to conduct tasks, listed in Schedule 2.

2.6 The VMT must operate at an UNCLASSIFIED level.

2.7 The VMT must be used as a part of an integrated classroom suite that supports demonstrations and presentations with one instructor and 14 students.

Each classroom suite must be contained in a single classroom operating independently from other training devices.

2.8 Instructor configuration mode

2.8.1 The instructor configuration must provide the capability to control student accessibility and distribution of scenarios.

2.8.2 The Instructor configuration mode must be networkable to any select trainee device or any combination of trainee devices.

2.8.3 Prompts and aids in such form as help files, menus, and tables showing options and default values must be provided.

2.9 The trainee must be provided with full interactivity, minus the instructor configuration and monitoring method of controlling his station.

2.10 The VMT must graphically display all components and sub-components required to perform training listed in Schedule 2.

2.11 The VMT must store a trainee profile that tracks progress, tasks completed, and is accessible from the instructor station.

2.12 The performance of tasks listed in Schedule 2 must allow trainees to exercise the following skills:

2.12.1 Interpret aircraft wiring diagrams;

2.12.2 Interpret aircraft schematic diagrams;

2.12.3 Interpret aircraft components location diagrams;

2.12.4 Interpret aircraft part publications;

2.12.5 Locate physical aircraft components using diagrams;

2.12.6 Interpret auxiliary functions, if applicable;

2.12.7 Conduct functional and troubleshooting procedures;

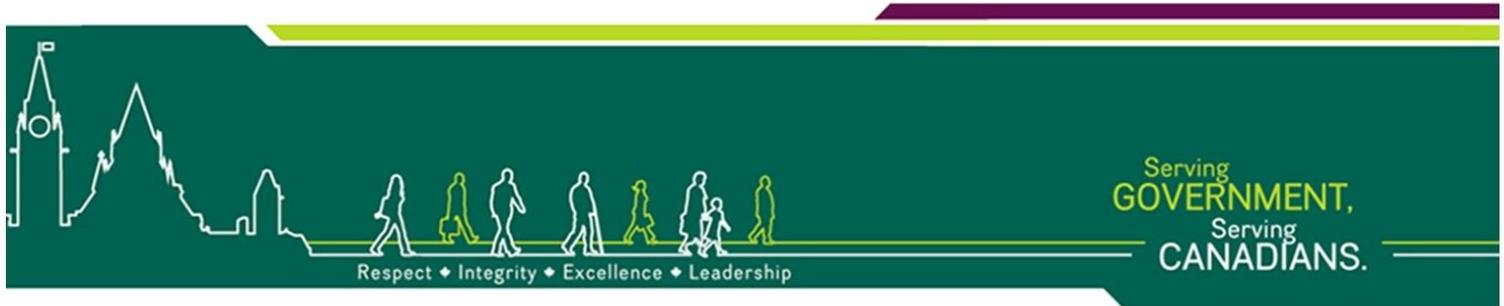
2.12.8 Repair system (remove/install) with part number; and

2.12.9 Conduct a system functional.

2.13 The VMT System must provide a generic simulation of the operation of the aircraft systems.

2.14 With the exception of where it is desirable from a training perspective to enhance or degrade performance under instructor control, performance of simulated or emulated aircraft equipment must replicate but not exceed the performance of the particular equipment under real world conditions.

2.15 All non-real-time interactions and displays must be provided within a representative time that must not exceed 0.5 second between user action and display update;



2.16 It must be possible to distort the impression of real time for training benefit. Actions that typically happen over a period of time longer than five minutes must be considered candidates for time acceleration, for example, curing of a sealing compound. Wait times described in technical orders must be accelerated.

2.17 Aircraft systems not specifically required for training must be modelled to the extent required to support the aircraft systems simulation or emulation.

3. Environmental Requirements

3.1 Materials, parts, and processes used in the design and construction of the VMT System must be chosen with due consideration given to the intended use, safety, durability, retention of appearance, and avoidance of corrosion or other chemical effects.

3.2 Ambient noise levels must be consistent with Canadian Labour Code standards as directed by CANFORGEN 122/07 VCDS 016/07 091720Z JUL 07.

3.3 The VMT must be designed to withstand the following climatic conditions without performance degradation:

3.3.1 Temperature: 15°C to 32°C;

3.3.2 Humidity: 20% to 80% non-condensing; and

3.3.3 Dust and lighting: standard office conditions.

4. Hardware Technical Requirements

4.1 The VMT must operate in a desktop environment and can use either laptops or desktop style computers for instructor and student workstations.

4.2 Each classroom suite must be equipped with the following components:

4.2.1 An instructor station;

4.2.2 Seven student stations (each station must accommodate two students); and

4.2.3 A classroom audio system.

4.3 Each instructor and student workstation must include at a minimum the following hardware:

4.3.1 Personal computer, either laptop or desktop;

4.3.2 Minimum of 2 spare USB ports (USB 2.0 or higher);

4.3.3 A dual screen display per student station, such that the required information can adequately be displayed;

4.3.4 Keyboard; and

4.3.5 Mouse.

4.4 Student workstation display

4.4.1 The average brightness and contrast must not differ visibly from one displayed object to another.

4.4.2 Displayed data must have no apparent flicker, positional jitter or X-Y crosstalk, and must not drift.

4.4.3 Displays must have appropriate operating and adjustment controls which are accessible to users and maintenance personnel.

4.4.4 For the duration of a trainee's login session, the instructor must have the capability to view the trainees monitor from his/her station.

4.5 Workstation computing system performance

4.5.1 The computer(s) must be based on a commercially available family of computers using a commercially supportable operating system.

4.5.2 The digital computer system design must provide for computational, logical, I/O, and memory access speeds that will satisfy the real time processing requirements of all simulation and control functions.

4.5.3 The computer system specifications and the programs must be designed and organized to sufficiently permit execution at speeds which eliminate perceptible stepping, jitter, oscillation, or erratic behaviour.

4.6 Classroom audio requirements

4.6.1 The classroom audio must be adequate to accommodate hearing from all student workstations.

4.6.2 The classroom audio must be able to play audio output of the instructor station.

4.6.3 The classroom audio system must include all the components and interfaces necessary to transmit audio from the instructor workstation.

4.7 Power supply and distribution requirements

4.7.1 Each classroom suite must include the necessary components to distribute power from the facility provided power source to the system components.

4.7.2 Each classroom suite must include an Uninterruptable Power Supply (UPS) that provides backup power sufficient to permit a controlled shutdown, and surge suppression to all system components.

4.8 All VMT hardware must be COTS.



- 4.9 All cables must be neatly bundled, tied and secured.
- 4.10 All hardware components necessary to install and operate the VMT classroom suites must be provided.
- 4.11 Electromagnetic compatibility: The design and manufacturing of the VMT System must be such that the susceptibility of the assembled system to conducted and radiated interference existing within the system and at the installation site is minimized to the extent that the system's performance is not degraded.
- 4.12 Transportability
 - 4.12.1 The VMT must be transportable as component parts.
 - 4.12.2 The VMT must be designed to allow for transportation to the installation site by standard commercial transportation.
 - 4.12.3 Major components must be designed to permit disassembly and reassembly without the use of special tools, and without unsoldering, crimping, welding or destruction of any material.

5. VMT Technical Requirements

- 5.1 The VMT must be designed from a conceptual model developed for aircraft maintenance purposes (i.e., not a flight simulator).
- 5.2 The VMT must be based on a Transport Canada, Federal Aviation Administration or European Aviation Safety Agency certified multi-engine, turbo prop, transport aircraft.
- 5.3 The system must consist of a software program to be loaded on individual instructor and student stations or run through a server in the classroom suite.
- 5.4 The interactive displays must be emulated or simulated; with aircraft systems graphically represented on the displays.
- 5.5 Aircraft cockpit panels required for the training and control inputs for all applicable switches and controls must graphically represent a real aircraft.
- 5.6 Replicated Controls
 - 5.6.1 Aircraft cockpit panels and control inputs for all applicable switches and controls must be replicated on video monitors.
 - 5.6.2 The trainee must interface with the aircraft simulation using the replicated controls and displays.
 - 5.6.3 Where a specific function is not supported by the VMT, a simulator-specific message must be displayed to advise the trainee.





5.7 Unless otherwise stated and approved by DND:

5.7.1 graphical replications must duplicate the appearance of actual aircraft equipment being replicated; and

5.7.2 the positioning of the graphical representations must duplicate the relative positioning of actual aircraft instruments.

5.8 For all systems, subsystems and components simulated in the VMT, where applicable, the VMT must include the following:

5.8.1 Aircraft Block diagrams

5.8.2 Aircraft wiring diagrams;

5.8.3 Aircraft component location diagrams;

5.8.4 Power requirements; and

5.8.5 Unique safety considerations.

5.9 Aircraft Electrical Wiring Interconnect System (EWIS)

5.9.1 The VMT must represent faults and associated symptoms by performing functional checks on the aircraft EWIS through troubleshooting, diagnosing and isolating faults in any wire, wiring device, or combination of these, including termination devices, installed in any area of the aircraft for the purpose of transmitting electrical energy, including data and signals, between two or more intended termination points.

5.9.2 The VMT must permit for rectification of EWIS faults by allowing the trainee to replace faulty EWIS components that are inside shelves, panels, racks, junction boxes, distribution panels, and back-planes of equipment racks, including, circuit board back-planes, wire integration units, and external wiring of equipment. The VMT must allow fault rectification to be verified by performing final functional checks on the EWIS.

5.9.3 The applicable aircraft wiring manuals must correspond to methods, techniques, and practices laid out in Ref A.

5.9.4 The VMT must allow the trainee to analyze aircraft systems and wiring diagrams using the applicable information in Ref A. The wiring diagram must depict all of the specific components, location, power, voltage, frequency, phase and test points. The wiring diagrams must also depict the power flow, signal flow, controls function and sequence of operation that are possible.

5.9.5 The VMT should represent systems RF Cable and RF Cable Termination on radio communication systems.



5.9.6 The VMT should represent the Electrical Connectors in Ref B, and permit disconnection, inspection, voltage reading, and continuity test during troubleshooting. The VMT must permit virtual quick repair of wires and electrical components during troubleshooting.

5.9.7 The VMT should represent a minimum of 3 types of connectors (RF, Data Bus and Generic Circular Connectors) with lockwire/witness-wire for applicable connectors. The VMT must permit virtual lockwire/witness-wire removal and installation during troubleshooting.

5.9.8 The VMT should have EWIS troubleshooting on various aircraft systems.

5.9.9 The VMT should represent EWIS installation and wire-marking standards in Ref B.

5.9.10 The VMT should allow the trainee to perform a Zonal Inspection Process (ZIP) in order to inspect EWIS for degradation caused by; vibration, moisture, maintenance, indirect damage, contamination, heat and cold.

5.10 Aircraft electrical power systems

5.10.1 The VMT should represent an aircraft with aircraft electrical power systems, to include at a minimum:

5.10.1.1 An aircraft electrical power generation and voltage regulation system;

5.10.1.2 An aircraft ground power system;

5.10.1.3 An aircraft electrical power conversion system; and

5.10.1.4 An aircraft electrical power distribution system.

5.10.2 The VMT must simulate system operations and allow for simulated completion of maintenance tasks on an aircraft electrical power system.

5.10.3 The VMT should simulate an aircraft electrical power generation and voltage regulation system with system functionals and operation during:

5.10.3.1 engine startup;

5.10.3.2 normal electrical power;

5.10.3.3 power transfer;

5.10.3.4 abnormal electric power;

5.10.3.5 power failure; and

5.10.3.6 emergency electrical power.

5.10.4 The VMT should represent an aircraft ground power system with system functionals and operation during ground power application.

5.10.5 The VMT should represent an aircraft electrical power conversion with system functionals and operation during power conversion.

5.10.6 The VMT should represent an aircraft Electrical Power Distribution System with system functionals and operation during power distribution.

5.11 Aircraft aviation instrument electrical systems

5.11.1 The VMT should represent the operation and maintenance of aircraft aviation instrument electrical systems to include maintaining of aircraft:

5.11.1.1 Engine electrical control and indication systems;

5.11.1.2 Propeller electrical control and indicating systems (if applicable);

5.11.1.3 Fuel management electrical control and indication systems;

5.11.1.4 Environmental control and indication systems;

5.11.1.5 Anti-Icing/De-Icing electrical control and indicating systems;

5.11.1.6 Flight control electrical and indicating systems; and

5.11.1.7 Landing gear and hydraulic power electrical control and indicating systems.

5.12 Engine electrical control and indication systems

5.12.1 The VMT should represent an aircraft engine control and indication system with:

5.12.1.1 system functionals and operation during main engine start, system operation of the ignition system during engine starting and during engine relight; and

5.12.1.2 representation of the use of the analog/digital multimeters, if required, during the functional and/or troubleshooting.

5.13 Aircraft propeller electrical control and indicating system (if applicable)

5.13.1 If applicable, the VMT must represent an aircraft propeller control and indicating system with:

5.13.1.1 a minimum of two operating engines with rotating propellers to carry out propeller control and indicating system functional check and troubleshooting; and

5.13.1.2 representation of the use of the analog/digital multimeters, if required, during the functional and/or troubleshooting.

5.14 Fuel management control and indication system

5.14.1 The VMT should represent the fuel management control and indication system with:



5.14.1.1 a minimum of three fuel tanks to carry out fuel management control and indicating system for functional check and troubleshooting during Refuel / De-Fuel systems operation and during fuel transfer between fuel storage tanks; and

5.14.1.2 representation of the use of the analog/digital multimeters, if required, during the functional and/or troubleshooting.

5.15 Aircraft environmental control and indication system

5.15.1 The VMT should simulate an aircraft environmental control system and allow students to analyze the operation of the system with:

5.15.1.1 a simulation of an operational environmental control and indication systems for the purpose of performing a functional check and troubleshooting; and

5.15.1.2 representation of the use of the analog/digital multimeters, if required, during the functional and/or troubleshooting.

5.16 Aircraft anti-icing and de-icing control and indicating

5.16.1 The VMT should represent the system operation and maintenance of the anti-icing and de-icing control and indicating system with:

5.16.1.1 a simulation of an operational anti-icing and de-icing control and indicating system for functional checks and troubleshooting; and

5.16.1.2 representation of the use of the analog/digital multimeters, if required, during the functional and/or troubleshooting.

5.17 Aircraft flight control and indicating system

5.17.1 The VMT should simulate, and allow students to analyze, an aircraft flight control and indicating system with:

5.17.1.1 simulation of aircraft flight control and indicating system for functional checks and troubleshooting; and

5.17.1.2 representation of the use of the analog/digital multimeters, if required, during the functional and/or troubleshooting.

5.18 Landing gear / brake control and indicating system

5.18.1 The VMT should simulate, and allow students to analyze, an aircraft landing gear / brake control and indicating system with:

5.18.1.1 simulation of aircraft landing gear / brake control and indication systems for functional checks and troubleshooting; and

5.18.1.2 representation of the use of analog/digital multimeters, if required, during the functional and/or troubleshooting.

5.19 Aircraft lighting systems

5.19.1 The VMT should simulate, and allow students to analyze, the aircraft lighting systems with:

5.19.1.1 simulation of an operational an aircraft lighting systems for purpose of performing a functional check of the interior and exterior lighting and to conduct functional checks and troubleshooting;

5.19.1.2 representation of the use of the analog/digital multimeters, if required, during the functional and/or troubleshooting;

5.20 Aircraft fire and overheat protection systems

5.20.1 The VMT should simulate, and allow students to analyze, an aircraft fire and overheat detection system and the aircraft fire suppression system with their indication system.

5.20.2 The VMT should simulate, and allow students to analyze, aircraft fire and overheat detection systems with:

5.20.2.1 simulation of an operational fire and overheat detection system for functional checks and troubleshooting; and

5.20.2.2 representation of the use of the analog/digital multimeters, if required, during the functional and/or troubleshooting.

5.20.3 The VMT should simulate, and allow students to analyze, an aircraft fire suppression system of a high-rate discharge (HRD) with:

5.20.3.1 simulation of an operational aircraft fire suppression systems of a high-rate discharge (HRD) system for functional checks and troubleshooting;

5.20.3.2 malfunctions, as defined in Schedule 2; and

5.20.3.3 representation of the use of the analog/digital multimeters, if required, during the functional and/or troubleshooting.

5.21 Aircraft intercommunication systems

5.21.1 The VMT should simulate, and allow students to analyze, an aircraft intercommunication system with:

5.21.1.1 simulation of an operational aircraft intercommunication systems for functional checks and troubleshooting; and

5.21.1.2 representation of the use of the analog/digital multimeters, if required, during the functional and/or troubleshooting.

5.22 Aircraft radio systems

5.22.1 The VMT should simulate, and allow students to analyze, an aircraft radio system with:



- 5.22.1.1 simulation of an operational aircraft radio system for functional checks and troubleshooting; and
- 5.22.1.2 representation of the use of TDR and the analog/digital multimeters, if required, during the functional and/or troubleshooting.
- 5.23 Aircraft satellite communication systems
 - 5.23.1 The VMT should represent the maintenance of the aircraft satellite communication systems.
 - 5.23.2 The VMT should simulate, and allow students to analyze, an aircraft satellite communication system with:
 - 5.23.2.1 simulation of an operational aircraft satellite communication systems for functional checks and troubleshooting; and
 - 5.23.2.2 representation of the use of the TDR and the analog/digital multimeters, if required, during the functional and/or troubleshooting.
- 5.24 Aircraft attitude and direction data systems
 - 5.24.1 The VMT should simulate, and allow students to analyze, an aircraft attitude and direction data system with:
 - 5.24.1.1 simulation of an operational aircraft attitude and direction data system for functional checks and troubleshooting; and
 - 5.24.1.2 representation of the use of the analog/digital multimeters, if required, during the functional and/or troubleshooting.
- 5.25 Aircraft flight environment data systems
 - 5.25.1 The VMT should simulate, and allow students to analyze, an aircraft flight environment data system with:
 - 5.25.1.1 simulation of an operational aircraft flight environment data system for functional checks and troubleshooting; and
 - 5.25.1.2 representation of the use of the pitot static tester and the analog/digital multimeters, if required, during the functional and/or troubleshooting.
- 5.26 Aircraft position determining systems
 - 5.26.1 The VMT should simulate, and allow students to analyze, an aircraft VOR/ILS system with:
 - 5.26.1.1 simulation of an operational VOR/ILS systems for functional checks and troubleshooting; and
 - 5.26.1.2 representation of the use pitot static tester and the analog/digital multimeters, if required, during the functional and/or troubleshooting.

5.26.2 The VMT should simulate, and allow students to analyze, an aircraft Inertial Navigation / Inertial Referencing System (INS/IRS Systems) with:

5.26.2.1 simulation of an operational INS/IRS System for functional checks and troubleshooting; and

5.26.2.2 representation of the use of the analog/digital multimeters, if required, during the functional and/or troubleshooting.

5.26.3 The VMT should simulate, and allow students to analyze, an aircraft Traffic Collision Avoidance System (TCAS) with:

5.26.3.1 simulation of an operational Traffic Collision Avoidance System (TCAS) for functional checks and troubleshooting; and

5.26.3.2 representation of the use of the analog/digital multimeters, if required, during the functional and/or troubleshooting;

5.26.4 The VMT should simulate, and allow students to analyze, an aircraft Ground Collision Avoidance Systems (GCAS) / Terrain Awareness and Warning System (TAWS) with:

5.26.4.1 simulation of an operational Ground Collision Avoidance Systems (GCAS) / Terrain Awareness and Warning System (TAWS) for functional checks and troubleshooting; and

5.26.4.2 representation of the use of the analog/digital multimeters, if required, during the functional and/or troubleshooting.

5.27 Aircraft auto-flight systems

5.27.1 The VMT should simulate, and allow students to analyze, an aircraft auto-flight system with:

5.27.1.1 simulation of an operational auto-flight systems for functional checks and troubleshooting; and

5.27.1.2 representation of the use of the analog/digital multimeters, if required, during the functional and/or troubleshooting.

5.27.2 The VMT should simulate, and allow students to analyze, a Flight Management Systems (FMS) with:

5.27.2.1 simulation of an operational Flight Management Systems (FMS) for functional checks and troubleshooting; and

5.27.2.2 representation of the use of the analog/digital multimeters, if required, during the functional and/or troubleshooting.

5.28 Aircraft integrated systems





5.28.1 The VMT should simulate, and allow students to analyze, an aircraft integrated system with:

5.28.1.1 simulation of an operational aircraft integrated systems for functional checks and troubleshooting; and

5.28.1.2 representation of the use of a bus analyser and the analog/digital multimeters, if required, during the functional and/or troubleshooting.

6. Functional Requirements

6.1 Task Plan Mode. In Task Plan mode the VMT device must be controlled and monitored by instructor selectable Task Plans containing rule-based events preselected to occur in a given sequence or at specified times during a training exercise.

6.1.1 A Task Plan must consist of a trainee briefing, instructor notes, the selected gaming area, the selected data set, aircraft and environment initialization parameters, an event list and the aircraft tail number to be used for the task.

6.1.2 In Task Plan mode, the VMT must identify and record errors in the trainee performance. The results of the trainee's performance must be storable.

6.1.3 The instructor must initialize the task mode for the trainee.

6.1.4 The trainee must have an array of simulator controls specific to the VMT available during training but "Reset Simulation" must be deactivated.

6.1.5 Each VMT device must have the capability of displaying at the instructor station, and recording for later debrief use, the following:

6.1.5.1 Time since login;

6.1.5.2 Time since Task Plan Mode selected;

6.1.5.3 Title of task selected;

6.1.5.4 List of components disconnected/removed;

6.1.5.5 List of trainee error;

6.1.5.6 List of components replaced/repared;

6.1.5.7 Safety infractions;

6.1.5.8 Area inspection, FOD check carried out; and

6.1.5.9 Malfunction rectified and functional carried out serviceable.

6.1.6 The instructor must have the capability to select the applicable task for the trainee.



6.1.7 The Task name must reflect the task description, for example, “Landing Gear – System Operation,” “Landing Gear – Removal and Installation,” and “Landing Gear – Trouble Shooting”. The task name must be editable.

6.1.8 The Instructor notes must describe the objective and content of the Task, must be editable, and must allow up to 2000 words.

6.2 Free-Play Mode. Free-Play mode is controlled by the trainee, and the VMT device must operate independent of automated monitoring.

6.2.1 The instructor must have the capability of monitoring the simulation of any student from the instructor station on the VMT network via the instructor station display.

6.2.2 The trainee must have an array of simulator controls specific to the VMT available during Free-Play. As a minimum the following controls must be provided:

6.2.2.1 Freeze/Unfreeze simulation;

6.2.2.2 Reset Simulation;

6.2.2.3 Accelerate simulation;

6.2.2.4 AHRS/INU Quick Align;

6.2.2.5 Aircraft Power On/Off;

6.2.2.6 Insert/Remove Data Cartridge from the Data Transfer Unit;

6.2.2.7 Access to functional and troubleshooting document;

6.2.2.8 Access test sets / tools;

6.2.2.9 Select desired power setting;

6.2.2.10 Navigate throughout the aircraft; and

6.2.2.11 The ability to use all simulated systems under normal condition and able to carry on serviceable functional checks

6.3 Training Management

6.3.1 The instructor must have the capability to monitor and control all appropriate aspects of the simulation to meet the required training objectives.

6.3.2 The instructor must have the capability to:

6.3.2.1 Record and later replay a previously recorded exercise or segment thereof, on one or more VMT Devices (either student or instructor display) for demonstration purposes.

6.3.2.2 Select the VMT Device mode of operation as either Free-Play mode or Task mode;



6.3.2.3 Control the training exercise through the use of software tools such as freezes time, accelerate time (x2, x5 and x10), and various maintenance shortcuts:

6.3.2.3.1 apply/remove power;

6.3.2.3.2 connect/disconnect hydraulic system;

6.3.2.3.3 apply hydraulics/power;

6.3.2.3.4 INS quick alignment;

6.3.2.3.5 fueling/defueling;

6.3.2.3.6 start/stop engine;

6.3.2.3.7 quick engine setting (selecting a % rpm);

6.3.2.3.8 APU start/stop;

6.3.2.3.9 install/remove ground safety devices (bonding wires);

6.3.2.3.10 apply air pressurization and air conditioning;

6.3.2.3.11 pitot static leak check;

6.3.2.3.12 final area closeout/visual inspection; and

6.3.2.3.13 EWIS zonal inspection.

6.3.2.4 Monitor and control individual or all VMT Devices within the network from any instructor station;

6.3.2.5 Malfunctions must be based on the troubleshooting procedures contained in the provided document for the equipment degraded modes of operation. All malfunctions must be modelled from aircraft data, and must affect the simulation in the same manner as they affect the design basis aircraft. The malfunctions must cause realistic indications and effects in both primary and related supporting systems. The capability must be provided for malfunctions to be selectable by the instructor during Task mode, or the trainee during Free-Play mode.

6.3.3 The VMT System must automate the following:

6.3.3.1 Management of the VMT System instruction and administration with a Computer Managed Instruction (CMI) system. The capability must be provided to:

6.3.3.1.1 Automatically record and evaluate trainee performance in Task mode. A record entry must be generated each time a trainee logs on to the VMT System and updated in accordance with trainee results. The entry must show date and time, names of Task run, and results such as fault activated, fault rectified, number of try of repair/replace;

6.3.3.1.2 Administer training including maintenance of trainee records, evaluation and tracking of trainee performance, and management of trainee progress.

6.3.3.2 Identification and recording of errors in trainee performance in the Task mode of training. The results of trainee performance must be linked to the VMT System CMI system. The Task provided with the VMT System must contain defined tolerances, parameters and conditions which must be used in rule based algorithms to detect trainee errors. When such an error is detected, the Instructor station must be updated in order to provide expert guidance/coaching to the trainee.

6.3.4 The instructor must have the capability to review the trainee's training history.

6.3.5 The history must indicate significant events in the training sequence including, but not limited to:

6.3.5.1 When the trainee logged in;

6.3.5.2 Which systems were manipulated during the trainees' session;

6.3.5.3 When the trainee stopped a training session and how it was terminated (completed, aborted, etc.); and

6.3.5.4 When the trainee logged out.

6.4 Scenario Recording

6.4.1 In both the Task mode and Free-Play mode of operation, the instructor must have the capability to record and later replay, on one or more VMT devices (either student or instructor display), the last scenario performed on the workstation for demonstration purposes.

6.4.2 The VMT should allow for recording and playback from external storage, media in MP4 format, with a resolution of 1280x720 pixels.

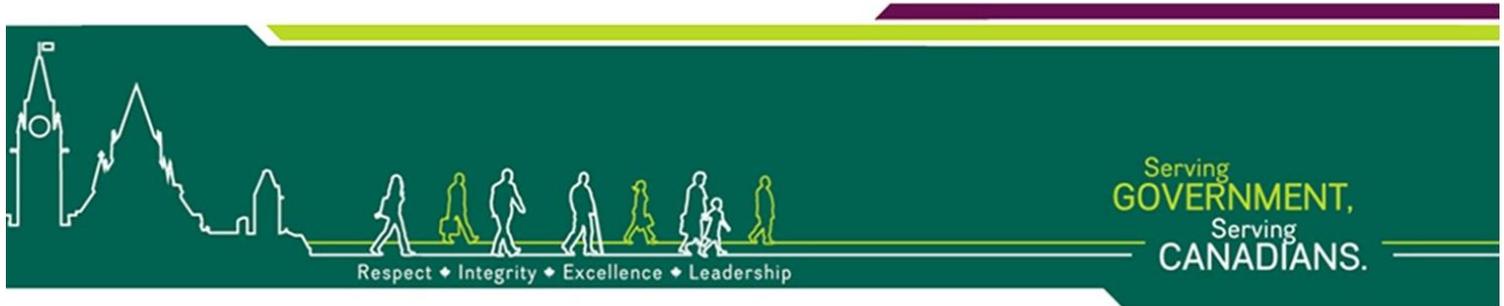
6.4.3 Controls required to start, stop, and accelerate through the recorded scenario must be provided.

6.4.4 The playback must be able to be displayed on one or both the trainee and instructor stations.

6.5 User Accounts

6.5.1 The following user types must be provided:

6.5.1.1 Trainees: Trainees must be able to operate the trainee station as required to run Task mode and to perform Free-Play mode training.



- 6.5.1.2 Instructors: Instructors must be able to operate the Instructor Station as required to manage Task mode, training operations, and trainee records;
- 6.5.1.3 Maintainers: Maintainers must be able to operate the Instructor Station as required to perform the provided maintenance functions, including station reconfiguration. Maintainers must have access to the operating system; and
- 6.5.1.4 Administrators: Administrators must be able to operate the Instructor Station as required to manage the VMT system user accounts. Administrators must also have access to all other VMT functions.
- 6.5.2 Administrators must have the ability to define and store the following data for each user:
 - 6.5.2.1 User ID;
 - 6.5.2.2 User Account Name;
 - 6.5.2.3 Password;
 - 6.5.2.4 User Types (trainee, instructor, Maintainer, and/or Administrator); and
 - 6.5.2.5 Instructor Name (chosen from a list of instructor users).
- 6.5.3 The User Name and User Account Name must be required to create a password-protected user account.
- 6.5.4 The password must not be echoed to the screen when typed.
- 6.5.5 Confirmation must be required when changing the password.
- 6.5.6 The Language must default to English.
- 6.5.7 VMT System users must be able to be assigned to more than one user type.
- 6.5.8 The User Type must be a selectable choice on start-up.
- 6.5.9 The instructor name field must be optional, with the intent of identifying a trainee's instructor.
- 6.5.10 The option to disable an account must be provided, allowing an account to be disabled without deleting the account information.
- 6.5.11 The capability to delete user accounts must be provided. When a user account is deleted, all user records for that account must also be deleted.
- 6.5.12 Users must be required to log in to be able to use an instructor station.
- 6.5.13 Users must be required to log in to be able to use a trainee station.
- 6.6 Configure VMT Device



- 6.6.1 Each trainee workstation must be uniquely identifiable by the instructor.
- 6.6.2 When a station is connected to the network, it must automatically become visible to all other stations on the network.
- 6.6.3 The network configuration must be designed with no limit on the number of VMT stations that can be added, with the caveat that the performance must be limited by the network traffic required.

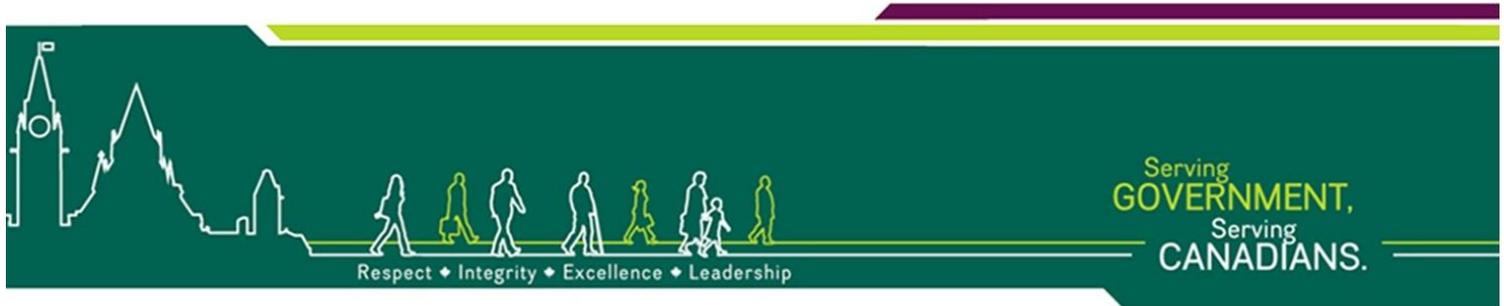
7. Maintenance

- 7.1 Test and Diagnostics must be provided for the following devices:
 - 7.1.1 Computer Displays (Test Pattern, used for adjustment);
 - 7.1.2 Local VMT network; and
 - 7.1.3 Operating System Diagnostics.
 - 7.1.4 The self-test capability must be achieved using a combination of hardware and software tests provided by the hardware/software OEM, along with custom software where necessary. Operation of the vendor-supplied self-tests may require access to, and use of, the Operating System.
- 7.2 Change Date/Time
 - 7.2.1 One VMT device must be used to set the date/time for the VMT System.
 - 7.2.2 Any other VMT devices on the network must synchronize with the selected Device.
 - 7.2.3 Only Maintainers and Administrators must be able to set the date and time.

SCHEDULE 1: VMT MINIMUM EQUIPMENT LIST

- 8. The VMT should simulate, at a minimum, the following systems, subsystems and components:
 - 8.1 Aircraft electrical wiring interconnect system, including:
 - 8.1.1 Wires and cables;
 - 8.1.2 Bus bars;
 - 8.1.3 Termination points on electrical devices, including on relays, interrupters, switches, connectors, termination blocks, circuit breakers and other circuit protection devices;
 - 8.1.4 Electrical connectors, including feed-through connectors and connector accessories;

- 8.1.5 Electrical grounding and bonding devices and associated connections;
- 8.1.6 Materials used to provide additional protection for wires, including wire insulation, wire sleeving and conduits that have electrical termination for the purpose of bonding;
- 8.1.7 Shields or braids;
- 8.1.8 Clamps and other devices used to route and support wire bundles;
- 8.1.9 Labels or other means of identification, to include laser wire marking;
- 8.1.10 Pressure seals; and
- 8.1.11 Fiber optics.
- 8.2 Aircraft electrical power generation and voltage regulation system, including:
 - 8.2.1 An aircraft primary electrical power sources represent a modern AC Electrical Power Generation Systems including at least two generators of the same type from the following list:
 - 8.2.1.1 Constant Frequency Generation, or
 - 8.2.1.2 Constant Speed Drive (CSD), or
 - 8.2.1.3 Integrated Drive Generator (IDG), or
 - 8.2.1.4 Variable speed constant frequency (VSCF); or
 - 8.2.1.5 Variable Frequency (VF).
 - 8.2.2 An aircraft secondary electrical power sources to include a minimum of one auxiliary power generator;
 - 8.2.3 An emergency electrical power source to include:
 - 8.2.3.1 Minimum of two batteries.
 - 8.2.4 An aircraft generator monitor;
 - 8.2.5 An aircraft current protection, fuses, power contactors, circuit breakers, solenoids, relays, reverse current relay, Solid State Power Controller, limiting resistors; and
 - 8.2.6 A control station or display.
- 8.3 Aircraft ground power system, to include:
 - 8.3.1 Connection with hangar power or ground power unit (GPU); and
 - 8.3.2 Aircraft power source selection controls.
- 8.4 One of the following three aircraft electrical power conversion systems:
 - 8.4.1 Components required to convert AC power to DC power;
 - 8.4.2 Components required to convert DC power to AC power; and
 - 8.4.3 Components required to convert AC power to AC power.



8.5 Aircraft electrical power distribution system, capable of demonstrating the following classification of loads:

8.5.1 non-essential electrical loads;

8.5.2 essential electrical loads; and

8.5.3 Emergency electrical loads.

8.6 Aircraft Aviation Instrument Electrical Systems, to include the following:

8.6.1 Engine electrical control and indicating systems, to include the following:

8.6.1.1 Engine parameter indicating system;

8.6.1.2 Jet engine starter system including circuit components;

8.6.1.3 Jet engine ignition system, to include:

8.6.1.3.1 Ignition exciters; and

8.6.1.3.2 Igniter plugs.

8.6.1.4 Engine control, to include:

8.6.1.4.1 Full Authority Digital Engine Control (FADEC), with hydro-mechanical and digital portions including the following:

8.6.1.4.1.1 Electrical Control Unit (ECU);

8.6.1.4.1.2 Power link ignition system;

8.6.1.4.1.3 Booster coil;

- 8.6.1.4.1.4 Impulse coupling;
- 8.6.1.4.1.5 High-tension retard breaker vibrator;
- 8.6.1.4.1.6 Low-tension retard breaker vibrator; and
- 8.6.1.4.1.7 Components required to integrate with avionics system
- 8.6.1.4.2 Fuel control unit (FCU);
- 8.6.1.4.3 Fuel Management Unit (FMU);
- 8.6.1.4.4 Electronic fuel control, to include:
 - 8.6.1.4.4.1 Electronic engine controller.
 - 8.6.1.4.4.2 Control panel.
- 8.6.2 Propeller electrical control and indicating systems (if proposed VMT is a propeller aircraft), to include;
 - 8.6.2.1 constant speed propeller system (electrical) to include:
 - 8.6.2.1.1 Propeller rpm control and indication;
 - 8.6.2.1.2 Pitch angle control and indication; and
 - 8.6.2.1.3 Control and indication warning system.
 - 8.6.2.2 Propeller synchronization system to include:
 - 8.6.2.2.1 Magnetic pickup;
 - 8.6.2.2.2 Synchrophaser box;
 - 8.6.2.2.3 Propeller control mechanism;
 - 8.6.2.2.4 Synchrophaser controls;



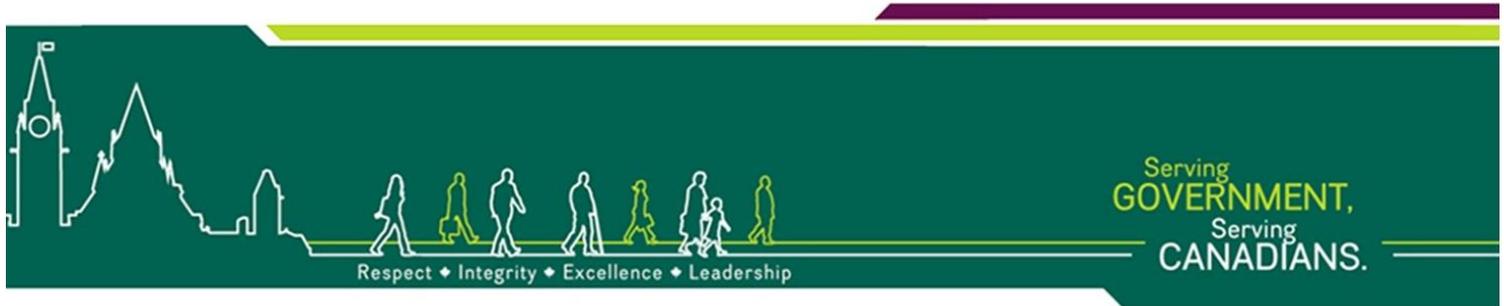
- 8.6.2.2.5 Feathering system (electrical and mechanical); and
- 8.6.2.2.6 Propeller reversing system (electrical and mechanical).
- 8.6.3 Fuel management electrical control and indicating systems, to include;
 - 8.6.3.1 Fuel boost pumps;
 - 8.6.3.2 Fuel selector valves;
 - 8.6.3.3 Fuel pressure gauges;
 - 8.6.3.4 Fuel storage tanks (minimum of 3 tanks);
 - 8.6.3.5 Fuel management computer to include;
 - 8.6.3.5.1 Components required to interface with other aircraft systems and the fuel storage tanks.
 - 8.6.3.5.2 Fuel quantity indicating systems to include;
 - 8.6.3.5.2.1 Capacitance probes; and
 - 8.6.3.5.2.2 Compensator probes.
 - 8.6.3.6 Fuel control indicating systems; and
 - 8.6.3.7 Flow indicating systems including;
 - 8.6.3.7.1 Fuel pressure indication system;
 - 8.6.3.7.2 Fuel quantity warning indication system;
 - 8.6.3.7.3 Fuel temperature; and

- 8.6.3.7.4 Fuel flow indicator/transmitter.
- 8.6.3.8 Vent system;
- 8.6.3.9 Close circuit high pressure refueling with cross feed;
- 8.6.3.10 Valves and controls
- 8.6.4 Environmental control and indication systems, to include;
 - 8.6.4.1 cabin pressurization temperature control systems to include:
 - 8.6.4.1.1 control panel;
 - 8.6.4.1.2 pressure regulator;
 - 8.6.4.1.3 outflow valve;
 - 8.6.4.1.4 negative relief valve or safety valve;
 - 8.6.4.1.5 cabin altimeter;
 - 8.6.4.1.6 pressure dump control; and
 - 8.6.4.1.7 differential pressure indicator.
 - 8.6.4.2 environmental control system (ECS) to include one or more of the following:
 - 8.6.4.2.1 bleed air;
 - 8.6.4.2.2 engine driven compressors;
 - 8.6.4.2.3 turbo compressors; and



- 8.6.4.2.4 external cart.
- 8.6.4.3 primary heat exchanger to include:
 - 8.6.4.3.1 primary heat exchanger;
 - 8.6.4.3.2 primary heat exchanger bypass valve;
 - 8.6.4.3.3 shut-off valve;
 - 8.6.4.3.4 refrigeration bypass valve;
 - 8.6.4.3.5 refrigeration unit;
 - 8.6.4.3.6 mixing valve;
 - 8.6.4.3.7 water separator(s); and
 - 8.6.4.3.8 ram air valve(s).
- 8.6.4.4 aircraft air distribution system to include:
 - 8.6.4.4.1 filters;
 - 8.6.4.4.2 temp sensors; and
 - 8.6.4.4.3 air ducts.
- 8.6.4.5 air cycle cooling system with a typical temp control system to include:
 - 8.6.4.5.1 cockpit air temperature selector;
 - 8.6.4.5.2 cockpit air temperature control regulator; and





8.6.4.5.3 air inlet overheat switch.

8.6.4.6 basic oxygen system to include indication.

8.6.5 Anti-Icing/De-Icing electrical control and indicating systems, to include:

8.6.5.1 engine anti-ice systems (electrical and mechanical actuation of the anti-icing valve);

8.6.5.2 wing or tail anti-ice/de-ice systems;

8.6.5.3 pitot tube anti-icing systems;

8.6.5.4 electric anti-ice/de-ice systems;

8.6.5.5 windshield anti-ice/defogging systems and rain protection system to include the following systems:

8.6.5.5.1 metallic film method of protection or wire elements method of protection; and

8.6.5.5.2 wiper blade method of protection.

8.6.5.6 ice detectors;

8.6.5.7 pneumatic / bleed air anti-icing/de-icing systems to include a temperature or overheat sensor;

8.6.6 Flight control electrical and indicating systems, to include:

8.6.6.1 Primary flight controls such as aileron, elevator and rudder;

8.6.6.2 flaps;

- 8.6.6.3 trim control systems;
- 8.6.6.4 flight control system to include:
 - 8.6.6.4.1 cables, with turnbuckles;
 - 8.6.6.4.2 pulleys;
 - 8.6.6.4.3 bellcranks or quadrants; and
 - 8.6.6.4.4 associated components of a hydro-mechanical system.
- 8.6.6.5 electrically controlled secondary flight control surfaces to include:
 - 8.6.6.5.1 flaps; and
 - 8.6.6.5.2 trim tabs.
- 8.6.6.6 surface position indicators and position transmitter's components to include:
 - 8.6.6.6.1 synchro systems;
 - 8.6.6.6.2 potentiometer transmitters;
 - 8.6.6.6.3 LVDT (linear variable differential transformer); and
 - 8.6.6.6.4 RVDT (rotary variable differential transformer).
- 8.6.7 Landing gear/Brake Control and indicating systems, to include:
 - 8.6.7.1 landing gear control and indicating systems to include:
 - 8.6.7.1.1 landing gear controls, including the electrical and mechanical/hydraulic



to include:

- 8.6.7.1.1.1 LG position selector;
- 8.6.7.1.1.2 LG position indicator;
- 8.6.7.1.1.3 actuating cylinder;
- 8.6.7.1.1.4 valves;
- 8.6.7.1.1.5 oleo pneumatic shock strut (includes strut and piston);
- 8.6.7.1.1.6 landing gear door;
- 8.6.7.1.1.7 ground safety devices;
 - 8.6.7.1.1.7.1 mechanical; and
 - 8.6.7.1.1.7.2 electrical.
- 8.6.7.1.1.8 Components associated with position indication and warning, to include at a minimum the following:
 - 8.6.7.1.1.9 gear up and locked indicator;
 - 8.6.7.1.1.10 Uplock;
 - 8.6.7.1.1.11 Uplock switch;
 - 8.6.7.1.1.12 Weight on wheel switch;
 - 8.6.7.1.1.13 in transit (or unlocked) indication; and
 - 8.6.7.1.1.14 Down and locked indication.



8.6.7.2 landing gear extension and retraction systems, capable of demonstrating:

8.6.7.2.1 normal operation;

8.6.7.2.2 emergency operation; and

8.6.7.2.3 door sequencing

8.6.7.3 brake control systems to include:

8.6.7.3.1 disk brake

8.6.7.3.2 brake assembly (caliper)

8.6.7.3.3 master cylinder

8.6.7.3.4 brake pedal

8.6.7.3.5 fluid reservoir

8.6.7.3.6 parking brake

8.6.7.4 Anti-skid system, to include:

8.6.7.4.1 control unit;

8.6.7.4.2 wheel speed sensors;

8.6.7.4.3 anti-skid control valves; and

8.6.7.4.4 auto brakes with touchdown and lock wheel protection with indicating/ warning system, to include hot brakes.

8.6.7.5 nose wheel steering control systems to include:

- 8.6.7.6 shimmy damper;
 - 8.6.7.7 command and feedback system;
 - 8.6.7.8 sensor potentiometers; and
 - 8.6.7.9 failure indication components.
- 8.6.8 hydraulic power control and indicating systems.
- 8.7 Aircraft Lighting Systems, to include:
- 8.7.1 Aircraft interior lighting systems, to include a minimum of three of the following eight systems:
- 8.7.1.1 instrument lighting systems;
 - 8.7.1.2 cockpit lighting systems;
 - 8.7.1.3 cabin and passageway lighting systems;
 - 8.7.1.4 boarding lighting systems;
 - 8.7.1.5 service lighting systems;
 - 8.7.1.6 emergency lighting systems;
 - 8.7.1.7 aircraft caution and warning systems lighting; and
 - 8.7.1.8 aircraft advisory lighting systems.
- 8.7.2 Aircraft External Lighting Systems to include:
- 8.7.2.1 navigation lighting systems;

8.7.2.2 anti-collision lighting systems;

8.7.2.3 formation lighting systems; and

8.7.2.4 taxi and landing lighting systems.

8.8 Fire and Overheat Detection Systems to include one of the following types:

8.8.1.1 spot-type fire detectors, to include:

8.8.1.1.1 thermal switch circuits or thermocouple fire warning circuits;

8.8.1.2 linear type fire sensing elements, to include;

8.8.1.2.1 Fenwal Fire and Overheat Detection System Sensing Element or Kidde Fire and Overheat Detection System Sensing Element or Systron Donner (Pneumatic) Fire and Overheat Detection System Sensing Element.

8.8.1.3 smoke and toxic gas detection system.

8.9 High-Rate Discharge (HRD) (Aircraft Fire Suppression Systems) to include:

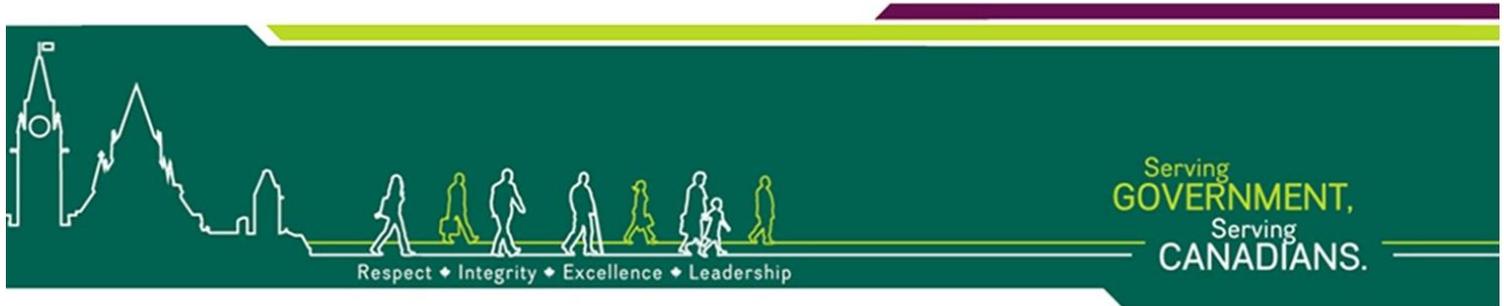
8.9.1 Extinguisher Agent and propellant;

8.9.2 Fire bottle;

8.9.3 Explosive cartridge (squib);

8.9.4 Indicator discs;

8.9.5 Check valves;



8.9.6 Directional control valve;

8.9.7 Fire handle; and

8.9.8 Distribution lines.

8.10 Aircraft Communication Systems to include:

8.10.1 Aircraft intercommunication system, to include;

8.10.1.1 intercom/interphone System;

8.10.1.2 aircraft public address system;

8.10.1.3 aircraft audio integrating; and

8.10.1.4 audio control panel.

8.10.2 Radio systems, to include one of the following:

8.10.2.1 Ultra High Frequency (UHF) radio systems to include:

8.10.2.1.1 control unit;

8.10.2.1.2 transceiver;

8.10.2.1.3 antennas; and

8.10.2.1.4 antenna logic units.

8.10.2.2 Very/Ultra High Frequency (V/UHF) multiband radio system to include:

8.10.2.2.1 control unit;



- 8.10.2.2.2 transceiver;
- 8.10.2.2.3 antennas; and
- 8.10.2.2.4 antenna logic units;
- 8.10.2.2.5 Very High Frequency (VHF) radio system to include:
 - 8.10.2.2.6 control unit;
 - 8.10.2.2.7 transceiver;
 - 8.10.2.2.8 antennas; and
 - 8.10.2.2.9 antenna logic units;
- 8.10.2.3 High Frequency (HF) system to include:
 - 8.10.2.3.1 HF control unit;
 - 8.10.2.3.2 HF transceiver;
 - 8.10.2.3.3 HF antennas;
 - 8.10.2.3.4 HF couplers; and
 - 8.10.2.3.5 SELCAL system.
- 8.10.3 Satellite communication systems.
- 8.11 Aircraft Navigation Systems to include:
 - 8.11.1 Attitude And Direction Data Systems, to include but not limited to:
 - 8.11.1.1 Aircraft clock;



- 8.11.1.2 Angle of Attack indicating systems;
 - 8.11.1.3 Rate of turn indicating systems;
 - 8.11.1.4 Standby attitude indicating systems;
 - 8.11.1.5 An Embedded GPS and INS system (EGI); and
 - 8.11.1.6 Optionally, an Attitude Heading Reference System (AHRS).
- 8.11.2 Flight Environment Data Systems, to include but not limited to:
- 8.11.2.1 Pitot static systems, to include;
 - 8.11.2.1.1 Pitot-static probes(s);
 - 8.11.2.1.2 Pitot-static moisture prevention system;
 - 8.11.2.2 Air data computer systems;
 - 8.11.2.3 Rate of climb indicating systems;
 - 8.11.2.4 Altitude indicating systems, to include;
 - 8.11.2.4.1 Barometric altitude with pressure adjustment;
 - 8.11.2.4.2 Standard altitude.
 - 8.11.2.5 Airspeed indicating systems;
 - 8.11.2.6 Mach indicating systems;
 - 8.11.2.7 Stall warning/protection and indication systems, to include;
 - 8.11.2.7.1 Angle of attack probe.

- 8.11.2.7.2 Vertical speed indicating system; and
- 8.11.2.7.3 Total air temperature probe.
- 8.11.3 Position Determining Systems, to include but not limited to:
 - 8.11.3.1.1 Display and usage of the Aircraft Radio Altimeter;
 - 8.11.3.1.2 Transceiver;
 - 8.11.3.1.3 Antennas; and
 - 8.11.3.1.4 Controls/Switches/Indicators.
 - 8.11.3.2 Doppler systems;
 - 8.11.3.3 DF / homing systems;
 - 8.11.3.3.1 a Direction Finder (DF)/Automatic Direction Finder (ADF) indication;
 - 8.11.3.3.2 a type of horizontal situation indication with two bearing indicators; and
 - 8.11.3.3.3 a Non-Directional Beacon (NDB) frequency input with Morse code and voice signal components;
 - 8.11.3.4 VOR/DME systems;
 - 8.11.3.4.1 VOR/DME frequency input;
 - 8.11.3.4.2 VOR/DME indication system;
 - 8.11.3.4.3 bearing indication system;

- 8.11.3.4.4 OFF flag indication system;
- 8.11.3.4.5 course deviation indication systems;
- 8.11.3.4.6 TO/FROM flag;
- 8.11.3.4.7 Omnibearing / Course select indication;
- 8.11.3.4.8 VOR antennas;
- 8.11.3.4.9 VOR receiver/transmitter;
- 8.11.3.4.10 VOR circuitry;
- 8.11.3.4.11 Ground-to-air voice communication and Automatic Terminal Information Service (ATIS) (data or weather broadcasts);
- 8.11.3.4.12 Instrument Landing System (ILS) frequency input;
- 8.11.3.4.13 localiser and glide slope circuitry;
- 8.11.3.4.14 ILS antennas; and
- 8.11.3.4.15 ILS indications.
- 8.11.3.5 INS/GPS systems;
 - 8.11.3.5.1 an Inertial Navigation / Inertial Referencing Systems (INS / IRS Systems) with the alignment procedure, error and integration. The INS must have an interface for data input and system control;
- 8.11.3.6 ATC Transponder System (IFF excluding mode 4); and
- 8.11.3.7 TCAS system, to include;

- 8.11.3.7.1 displays and usage of the Traffic Collision Avoidance System (TCAS);
- 8.11.3.7.2 ground proximity modes; and
- 8.11.3.7.3 warnings.
- 8.11.3.8 Air Traffic Control (ATC) transponder system to include:
 - 8.11.3.8.1 display and usage of the Air Traffic Control Transponder (ATC);
 - 8.11.3.8.2 proper control panel;
 - 8.11.3.8.3 one of the following modes of operation:
 - 8.11.3.8.3.1 mode S; or
 - 8.11.3.8.3.2 Automatic Dependant Surveillance Broadcast Node (Ads-B).
- 8.11.4 Auto Flight Systems, to include but not limited to:
 - 8.11.4.1 Flight director (FD) systems;
 - 8.11.4.1.1 flight director system interfacing;
 - 8.11.4.1.2 operation of a Primary Flight Display (PFD);
 - 8.11.4.2 flight director warning indications; and
 - 8.11.4.3 flight director modes to include:
 - 8.11.4.3.1 Off;
 - 8.11.4.3.2 HDG mode;
 - 8.11.4.3.3 VOR(NAV)/LOC mode;



- 8.11.4.3.4 GS mode;
- 8.11.4.3.5 ALT mode;
- 8.11.4.3.6 APPR I mode;
- 8.11.4.3.7 APPR II mode;
- 8.11.4.3.8 GA mode;
- 8.11.4.3.9 IAS mode;
- 8.11.4.3.10 V/S mode;
- 8.11.4.3.11 MACH mode;
- 8.11.4.3.12 L NAV; and
- 8.11.4.3.13 V NAV.
- 8.11.4.4 Auto Pilot systems for the rudder, ailerons and elevators to include:
 - 8.11.4.4.1 Sensing elements;
 - 8.11.4.4.2 Computer and amplifier;
 - 8.11.4.4.3 Output elements;
 - 8.11.4.4.4 Command elements;
 - 8.11.4.4.5 Feedback elements; and
 - 8.11.4.4.6 Operation of interlocks.



8.11.4.5 Stability augmentation systems (SAS) to include:

8.11.4.5.1 the limited authority SAS;

8.11.4.5.2 the full authority SAS;

8.11.4.5.3 the operation of a SAS; and

8.11.4.5.4 operation of a yaw damper;

8.11.4.6 Auto thrust systems to include:

8.11.4.6.1 the autothrottle system signal interfacing; and

8.11.4.6.2 the operating modes to include:

8.11.4.6.2.1 Take-off mode;

8.11.4.6.2.2 Speed control mode; and

8.11.4.6.2.3 Go-around mode;

8.11.5 Flight management systems, to include but not limited to:

8.11.5.1 Flight management guidance & envelope systems.

8.12 Aircraft Integrated Systems to include:

8.12.1 Data Management Systems to include but not limited to:

8.12.1.1 Data bus to include:

8.12.1.1.1 integrated avionics system architecture of a bidirectional Data Bus Control Architecture, preferable Mil-Stds-1553B;



8.12.1.1.2 Data bus must use a centrally controlled architecture containing redundant bus controllers, minimum of two

8.12.1.1.3 containing an unidirectional data bus, preferably the ARINC 429 Data Bus for at least one integrated system within the integrated avionics system;

8.12.1.1.4 data bus system components to include:

8.12.1.1.4.1 Coupler panels;

8.12.1.1.4.2 stub cables; and

8.12.1.1.4.3 Terminators;

8.12.1.1.5 use at least one bus monitor for recording and backup of the bus controller;

8.12.1.1.6 use the remote terminal for all the remaining of the integrated avionics system;

8.12.1.1.7 using the aircraft Field Loadable Software (FLS) to load various avionics software;

8.12.1.2 Mission computers

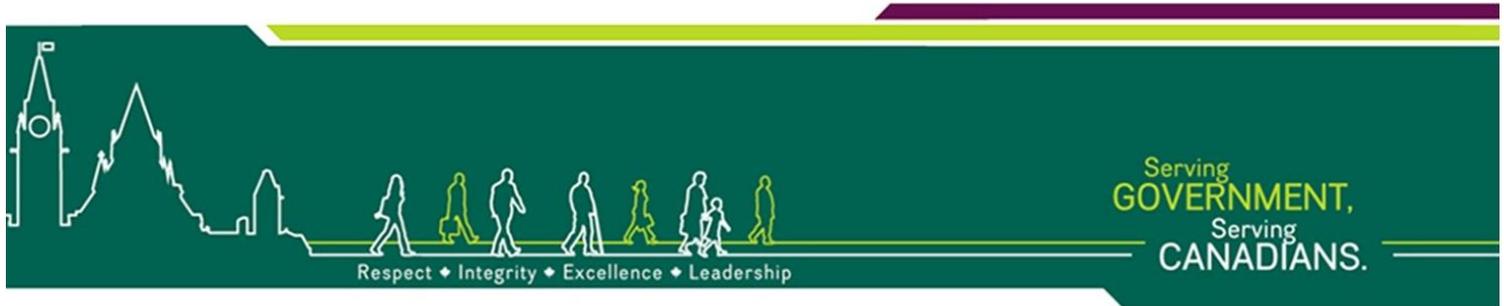
8.12.1.3 Routers and switches;

8.12.1.4 Centralized Maintenance System (CMS) to include:

8.12.1.4.1 Built-In Test Equipment (BITE); and

8.12.1.4.2 Functions to diagnostic programs and able of fault information displays.

8.12.1.5 Structural Data Recording System (SDRS) or Flight Data Recorder;



8.12.1.6 Strain gauge; and

8.12.1.7 All VMT simulated systems must be part of the integrated avionics system to represent a real aircraft.

8.12.2 EFIS System to include but not limited to:

8.12.2.1 Aircraft display system (e.g. HUD, HDD, and CDU);

8.12.2.2 glass cockpit and displays.

8.13 Airframe Structure, to include, but not limited to:

8.13.1 Structural components, to include:

8.13.1.1 Longerons / Spars;

8.13.1.2 Bulkheads;

8.13.1.3 Ribs;

8.13.1.4 Stringers; and

8.13.1.5 Stiffeners.

8.13.2 Access door with open/close mechanism operation

8.13.3 Cargo ramp with controls and components

8.13.4 Windshield and windows

8.14 Hydraulic closed-center system

8.14.1 Reservoirs

8.14.2 Pumps/motors

8.14.3 Filters

8.14.4 Oil cooler

8.14.5 Valves

8.14.6 Pressure indicator

8.14.7 Quantity indicator

8.14.8 Actuator

8.14.9 Accumulator

9. SCHEDULE 2: TRAINING FAULT AND TASK LIST

9.1 Tools and test equipment: The following tool and test equipment listed must be modelled and available.

9.1.1 frequency analyser (or similar test equipment);

9.1.2 phase rotation checker;

9.1.3 TDR/RFL Advanced System Tester; and

9.1.4 analog/digital multimeter.

9.2 Faults: The VMT should be capable of simulating the following faults;

Note: a number in brackets beside a fault denotes the minimum required number of occurrences of that type of fault in the VMT.

9.2.1 Aircraft electrical power generation and voltage regulation system;

9.2.1.1 Indication of wiring snag (x1 min);

9.2.1.2 Generator malfunction/failure to include;

9.2.1.2.1 one generator failure (x1 min);

- 9.2.1.2.2 two generators failure (x1 min); and
- 9.2.1.2.3 total power failure (x1 min).
- 9.2.1.3 Transformer Rectifier Unit failure (x1 min);
- 9.2.1.4 Battery failure (x1 min);
- 9.2.1.5 Bus fault/failure (x1 min);
- 9.2.1.6 Circuit breaker fault (x1 min);
- 9.2.1.7 Inverter failure (x1 min);
- 9.2.1.8 Relay failure (to include open coil or contacts) (x1 min);
- 9.2.1.9 Contactor failure (x1 min); and
- 9.2.1.10 Power Indicators failure (amperage and voltage) (x1 min);
- 9.2.2 Aircraft ground power system
 - 9.2.2.1 Indication of wiring snag (x1 min);
 - 9.2.2.2 Bus fault/failure (x1 min);
 - 9.2.2.3 Circuit breaker fault (x1 min);
 - 9.2.2.4 Inverter failure (x1 min);
 - 9.2.2.5 Relay failure (to include open coil or contacts) (x1 min);
 - 9.2.2.6 Contactor failure (x1 min); and
 - 9.2.2.7 Power Indicators failure (amperage and voltage) (x1 min);
- 9.2.3 Aircraft electrical power conversion
 - 9.2.3.1 Indication of wiring snag (x1 min);
 - 9.2.3.2 Bus fault/failure (x1 min);
 - 9.2.3.3 Circuit breaker fault (x1 min);
 - 9.2.3.4 Inverter failure (x1 min);
 - 9.2.3.5 Transformer failure (x1 min);
 - 9.2.3.6 Relay failure (to include open coil or contacts) (x1 min);
 - 9.2.3.7 Contactor failure (x1 min); and
 - 9.2.3.8 Power Indicators failure (amperage and voltage) (x1 min);
- 9.2.4 Aircraft Electrical Power Distribution System
 - 9.2.4.1 Indication of wiring snag (x1 min);
 - 9.2.4.2 Bus fault/failure (x1 min);
 - 9.2.4.3 Circuit breaker fault (x1 min);
 - 9.2.4.4 Inverter failure (x1 min);
 - 9.2.4.5 Transformer failure (x1 min);
 - 9.2.4.6 Relay failure (to include open coil or contacts) (x1 min);
 - 9.2.4.7 Contactor failure (x1 min); and



- 9.2.4.8 Power Indicators failure (amperage and voltage) (x1 min);
- 9.2.5 Engine electrical control and indicating systems
 - 9.2.5.1 Engine not starting (x2 min);
 - 9.2.5.2 Engine start but shut down (x2 min);
 - 9.2.5.3 Hung start (x2min);
 - 9.2.5.4 Fuel Flow failure (x2 min);
 - 9.2.5.5 Variation RPM (x2 min);
 - 9.2.5.6 Indicator Fail on N1 and/or N2 (x2 min); and
 - 9.2.5.7 Failure on Exhaust Gas Temp (x2 min);
- 9.2.6 Propeller electrical control and indicating systems (if applicable)
 - 9.2.6.1 Controllable pitch propeller system (x2 min);
 - 9.2.6.2 Propeller synchronization system (x2 min);
 - 9.2.6.3 Feathering system (x2 min); and
 - 9.2.6.4 Propeller Reversing system (x2 min).
- 9.2.7 Fuel management electrical control and indicating systems
 - 9.2.7.1 pressure gauge sensor fault (x2 min);
 - 9.2.7.2 boost electrical pump failure (x2 min);
 - 9.2.7.3 quantity sensor fail (x2 min);
 - 9.2.7.4 selector valve failure (x2 min); and
 - 9.2.7.5 indicator failure (x2 min);
 - 9.2.7.6 Fuel quantity indicator calibration using GTF6 test set.
- 9.2.8 Environmental control and indication systems
 - 9.2.8.1 cabin pressurization temperature control systems component malfunction (x2 min);
 - 9.2.8.2 cabin pressurization temperature control systems electrical malfunction (x2 min);
 - 9.2.8.3 environmental control system component malfunction (x2 min);
 - 9.2.8.4 environmental control system electrical malfunction (x2 min);
 - 9.2.8.5 primary/secondary heat exchangers components malfunction (x2 min);
 - 9.2.8.6 primary/secondary heat exchangers electrical malfunction (x2 min);
 - 9.2.8.7 aircraft air distribution system component malfunction (x2 min);
 - 9.2.8.8 aircraft air distribution system electrical malfunction (x2 min);
 - 9.2.8.9 air cycle cooling system component malfunction (x2 min);
 - 9.2.8.10 air cycle cooling system electrical malfunction (x2 min);



- 9.2.8.11 basic oxygen system component malfunction (x2 min); and
- 9.2.8.12 basic oxygen system electrical malfunction (x2 min);
- 9.2.9 Anti-Icing/De-Icing electrical control and indicating systems
 - 9.2.9.1 engine anti-ice systems component malfunction (x2 min);
 - 9.2.9.2 engine anti-ice systems electrical malfunction (x2 min);
 - 9.2.9.3 wing and tail anti-ice/de-ice systems component malfunction (x2 min);
 - 9.2.9.4 wing and tail anti-ice/de-ice systems electrical malfunction (x2 min);
 - 9.2.9.5 pitot tube anti-icing systems component malfunction (x2 min);
 - 9.2.9.6 pitot tube anti-icing systems electrical malfunction (x2 min);
 - 9.2.9.7 electric anti-ice/de-ice systems component malfunction (x2 min);
 - 9.2.9.8 electric anti-ice/de-ice systems electrical malfunction (x2 min);
 - 9.2.9.9 windshield anti-ice/defogging systems and rain protection system component malfunction (x2 min);
 - 9.2.9.10 windshield anti-ice/defogging systems and rain protection system electrical malfunction (x2 min);
 - 9.2.9.11 ice detectors component malfunction (x2 min);
 - 9.2.9.12 ice detectors electrical malfunction (x2 min);
 - 9.2.9.13 pneumatic / bleed air anti-icing/de-icing systems component malfunction (x2 min);
 - 9.2.9.14 pneumatic / bleed air anti-icing/de-icing systems electrical malfunction (x2 min);
 - 9.2.9.15 propeller anti-ice and de-icing systems component malfunction (x2 min); and
 - 9.2.9.16 propeller anti-ice and de-icing systems electrical malfunction (x2 min);
- 9.2.10 Flight control electrical and indicating systems
 - 9.2.10.1 electrically controlled secondary flight control surface regarding electrical system failure on the following;
 - 9.2.10.1.1 Flaps (x2 min); and
 - 9.2.10.1.2 Trim Tabs (x2 min).
 - 9.2.10.2 surface position indicator secondary flight control regarding position sensor failure on the following;
 - 9.2.10.2.1 flaps (x2 min); and
 - 9.2.1.2.2 trim Tabs (x2 min).

- 9.2.10.3 slow flap extension or retraction
- 9.2.10.5 improper travel of one or more of the primary flight controls
- 9.2.11 Landing gear and hydraulic power electrical control and indicating systems
 - 9.2.11.1 command feedback failure (x1 min);
 - 9.2.11.2 sensor potentiometer failure (x1 min);
 - 9.2.11.3 indicator failure (x1 min);
 - 9.2.11.4 warning Indication failure (x1 min);
 - 9.2.11.5 gear up and locked indication (x1 min);
 - 9.2.11.6 gear in transit indication (x1 min);
 - 9.2.11.7 gear down and locked indication (x1 min);
 - 9.2.11.8 landing gear door sequencing failure(x1 min);
 - 9.2.11.9 hot brake indicator failure (x1 min);
 - 9.2.11.10 wheel speed sensors failure (x1 min);
 - 9.2.11.11 nose wheel control failure (x1 min);
 - 9.2.11.12 anti-skid control valve failure (x1 min);
 - 9.2.11.13 auto brake failure (x1 min);and
 - 9.2.11.14 slow gear extension or retraction.
- 9.2.12 Aircraft Lighting Systems
 - 9.2.12.1 Interior lighting:
 - 9.2.12.1.1 Unserviceable light bulb (x2 min);
 - 9.2.12.1.2 Control Panel Failure, ie switch broken (x2 min);
 - 9.2.12.1.3 Electrical failure, open ground wire (x2 min); and
 - 9.2.12.1.4 Electrical failure, open power wire (x2min);
 - 9.2.12.2 Exterior lighting:
 - 9.2.12.2.1 Unserviceable light bulb (x2 min);
 - 9.2.12.2.2 Control Panel Failure, ie switch broken (x2 min);
 - 9.2.12.2.3 Electrical failure, open ground wire (x2 min); and
 - 9.2.12.2.4 Electrical failure, open power wire (x2min).
- 9.2.13 Aircraft Fire and Overheat Detection System
 - 9.2.13.1 detection failure (x2 min);
 - 9.2.13.2 detection out of range /tolerance (x2 min);
 - 9.2.13.3 fire detection system indicator failure; and
 - 9.2.13.4 caution light failure (x1 min)
- 9.2.14 Aircraft Fire Suppression Systems
 - 9.2.14.1 Fire suppression control failure (x2 min); and

- 9.2.14.2 Electrical wiring (control to squib) failure (x2 min)
- 9.2.15 Aircraft Intercommunication Systems
 - 9.2.15.1 Control panel failure (x2 min)
 - 9.2.15.2 Push to talk button failure (x2 min)
 - 9.2.15.3 Headset failure (x2 min)
 - 9.2.15.4 System integration failure (x2 min)
 - 9.2.15.5 Speaker failure (x2 min)
- 9.2.16 Aircraft Radio Systems
 - 9.2.16.1 Transceiver failure (internal) (x2 min);
 - 9.2.16.2 Power failure to transceiver (x2 min);
 - 9.2.16.3 Control Panel failure (x2 min);
 - 9.2.16.4 Antenna failure (x2 min);
 - 9.2.16.5 Coax cable failure from transceiver to antenna (x2 min)
 - 9.2.16.6 Integration Communication system failure (x3 min).
 - 9.2.16.7 Software malfunction (x2 min);
- 9.2.17 Aircraft Satellite Communication Systems
 - 9.2.17.1 Satellite Data Unit failure (x1 min);
 - 9.2.17.2 Radio Frequency Unit failure (x1 min);
 - 9.2.17.3 High Power Amplifier failure (x1 min);
 - 9.2.17.4 Diplexer/Low Noise Amp failure (x1 min); and
 - 9.2.17.5 Antennas failure (x1 min);
- 9.2.18 Aircraft Attitude and Direction Data Systems
 - 9.2.18.1 Angle of attack component failure (x1 min);
 - 9.2.18.2 Angle of attack electrical failure (x1 min);
 - 9.2.18.3 Rate of turn indicator failure (x1 min);
 - 9.2.18.4 Standby attitude indicator component failure (x1 min);
 - 9.2.18.5 Standby attitude indicator electrical failure (x1 min);
 - 9.2.18.6 aircraft direct reading standby compass component failure (x1 min);
 - 9.2.18.7 AHRS or EGI component failure (x2 min);
 - 9.2.18.8 AHRS or EGI electrical failure (x2 min);
 - 9.2.18.9 AHRS or EGI integrated communication failure (x2 min); and
 - 9.2.18.10 AHRS or EGI software malfunction (if applicable) (x2 min);
- 9.2.19 Aircraft Flight Environment Data Systems
 - 9.2.19.1 Total Air Temperature probe failure (x1 min);
 - 9.2.19.2 Total Air Temperature electrical failure (x1 min);

- 9.2.19.3 Angle of Attack probe failure (x1 min);
- 9.2.19.4 Angle of Attack electrical failure (x1 min);
- 9.2.19.5 Stall warning indicator failure (x1 min);
- 9.2.19.6 Air Data Computer system failure (x1 min);
- 9.2.19.7 Indicator failure (x1 min);
- 9.2.19.8 Mach failure (x1 min);
- 9.2.19.9 VMO failure (x1 min);
- 9.2.19.10 Barometric pressure failure (x1 min);
- 9.2.19.11 Vertical speed indicator failure (x1 min);
- 9.2.19.12 Pitot static leak failure to include:
 - 9.2.19.12.1 Leak in pitot system (x2 min); and
 - 9.2.19.12.2 Leak in static system (x2 min);
- 9.2.20 Aircraft Position Determining Systems
 - 9.2.20.1 Off flag failure (x1 min);
 - 9.2.20.2 Course Deviation indicator failure (x1 min);
 - 9.2.20.3 To from flag failure (x1 min);
 - 9.2.20.4 Course selector failure (x1 min);
 - 9.2.20.5 VOR Antenna Failure (x1 min);
 - 9.2.20.6 Faulty VOR antenna (x1 min);
 - 9.2.20.7 Faulty coaxial cable (x1 min);
 - 9.2.20.8 VOR Receiver/Transmitter failure (x1 min);
 - 9.2.20.9 No power to VOR receiver/transmitter (x1 min);
 - 9.2.20.10 VOR receiver/transmitter Internal failure (x1 min);
 - 9.2.20.11 VOR Electrical Wiring Failure (x3 min);
 - 9.2.20.12 Morse Code failure (x1 min);
 - 9.2.20.13 Automatic Terminal Information Service failure (x1 min);
 - 9.2.20.14 ILS Localizer failure (x2 min);
 - 9.2.20.15 ILS Control Failure (x1 min);
 - 9.2.20.16 ILS Electrical wiring failure (x1 min);
 - 9.2.20.17 ILS Antenna failure (x1 min);
 - 9.2.20.18 ILS Glide slope failure(x2 min);
 - 9.2.20.19 ILS Control Failure (x1 min);
 - 9.2.20.20 ILS Electrical wiring failure (x1 min); and
 - 9.2.20.21 ILS Antenna failure (x1 min);
- 9.2.21 Inertial Navigation / Inertial Referencing Systems (INS/IRS Systems)

- 9.2.21.1 No alignment (x1 min);
- 9.2.21.2 Too long to align (x1 min);
- 9.2.21.3 Restart (x1 min);
- 9.2.21.4 No data input or position entry (x1 min);
- 9.2.21.5 Discrepancy between the INS1 and INS2 (x1 min);
- 9.2.21.6 Figure of merit (FOM) too high (x1 min);
- 9.2.21.7 Error horizontal estimate (EHE) too high (x1 min); and
- 9.2.21.8 Not starting (x1 min);
- 9.2.22 Traffic Collision Avoidance System (TCAS)
 - 9.2.22.1 TCAS processor failure (x1 min);
 - 9.2.22.2 TCAS receiver transmitter failure (x1 min);
 - 9.2.22.3 Upper TCAS antenna (x1 min);
 - 9.2.22.4 Lower TCAS antenna (x1 min);
 - 9.2.22.5 EWIS failure to include TCAS system and applicable auxiliary system inputs:
 - 9.2.22.5.1 TCAS processor (x1 min);
 - 9.2.22.5.2 IFF Mode S (x1 min);
 - 9.2.22.5.3 Radalt (x1 min);
 - 9.2.22.5.4 AHRS/INU (x1 min);
 - 9.2.22.5.5 CDU (x1 min); and
 - 9.2.22.5.6 Display (TA/VSI and/or PFD) (x1 min).
- 9.2.23 Ground Collision Avoidance Systems (GCAS) / Terrain Awareness and Warning System (TAWS)
 - 9.2.23.1 Database failure (x1 min);
 - 9.2.23.2 GPWS computer failure (x1 min);
 - 9.2.23.3 ICS (Aural warnings) failure (x1 min);
 - 9.2.23.4 Antenna failure (x1 min);
 - 9.2.23.5 Radalt failure (x1 min);
 - 9.2.23.6 INS failure (x1 min);
 - 9.2.23.7 Air Data Computer failure (x1 min);
 - 9.2.23.8 Angle of Attack failure (x1 min); and
 - 9.2.23.9 GPS failure (x1 min);
- 9.2.24 Aircraft Auto-Flight Systems
 - 9.2.24.1 Flight director system malfunctions:
 - 9.2.24.1.1 Mode not engaging (x2 min);



- 9.2.24.1.2 Complete computer failure (x1 min);
- 9.2.24.1.3 No power to computer (x1 min); and
- 9.2.24.1.4 Computer Internal failure (x1 min);
- 9.2.24.2 Auto pilot system malfunctions:
- 9.2.24.2.1 Rudder, ailerons and elevators:
- 9.2.24.2.1.1 Sensing elements (x1 min for each control);
- 9.2.24.2.1.2 Computer and amplifier (x1 min for each control);
- 9.2.24.2.1.3 Output elements (x1 min for each control);
- 9.2.24.2.1.4 Command elements (x1 min for each control);
- 9.2.24.2.1.5 Feedback elements (x1 min for each control); and
- 9.2.24.2.1.6 interlocks (x1 min for each control).
- 9.2.24.2.2 Complete auto pilot computer failure (x1 min);
- 9.2.24.2.3 No power to auto pilot computer (x1 min);
- 9.2.24.2.4 Auto pilot control panel failure (x1 min);
- 9.2.24.2.5 Auto pilot single channel failure (x1 min); and
- 9.2.24.2.6 Auto pilot double channel failure (x1 min);
- 9.2.24.3 Stability augmentation system malfunctions:
- 9.2.24.3.1 Complete SAS computer failure (x1 min);
- 9.2.24.3.2 No power to SAS computer (x1 min);
- 9.2.24.3.3 SAS computer internal failure (x1 min);
- 9.2.24.3.4 SAS Not engaging (x1 min);
- 9.2.24.3.5 Single channel Yaw damper failure (x1 min);
- 9.2.24.3.6 Double channel Yaw damper failure (x1 min); and
- 9.2.24.3.7 SAS Input failure (x2 min);
- 9.2.24.4 Auto thrust systems malfunctions:
- 9.2.24.4.1 Take-off mode failure (x1 min);
- 9.2.24.4.2 Speed control mode failure (x1 min); and
- 9.2.24.4.3 Go-around mode failure (x1 min);
- 9.2.24.5 Stall warning protection systems malfunctions (if not part of Flight management guidance and envelope system in newest aircraft):
- 9.2.24.5.1 Complete computer failure (x1 min);
- 9.2.24.5.2 No power to computer (x1 min);
- 9.2.24.5.3 Internal failure (x1 min);
- 9.2.24.5.4 "G" switch failure (vertical accelerometer failure) (x1 min);
- 9.2.24.5.5 Steering wheel shaker failure (x1 min); and



- 9.2.24.5.6 Steering wheel pusher failure (x1 min);
- 9.2.25 Aircraft Flight Management Systems
 - 9.2.25.1 Complete failure of FMS computer (x1 min);
 - 9.2.25.2 No power to FMS computer (x1 min);
 - 9.2.25.3 Internal failure of FMS computer (x1 min);
 - 9.2.25.4 Control unit malfunction (x1 min);
 - 9.2.25.5 FMS software malfunction (x1 min); and
 - 9.2.25.6 Electrical wire failure (x1 min);
- 9.2.26 Data Management Systems malfunctions
 - 9.2.26.1 Bidirectional Data Bus single channel communication failure (x1 min);
 - 9.2.26.2 Bidirectional Data Bus both channels communication failure (x1 min);
 - 9.2.26.3 Bidirectional Data Bus coupler failure (x1 min);
 - 9.2.26.4 Bidirectional Data Bus stub cable failure (x1 min);
 - 9.2.26.5 Bidirectional Data Bus terminator failure (x1 min);
 - 9.2.26.6 Unidirectional Data Bus cable failure (x1 min);
 - 9.2.26.7 Bus controller failure (single controller failure) (x1 min);
 - 9.2.26.8 Bus controllers failure (all controllers failure) (x1 min);
 - 9.2.26.9 Bus remote terminal communication failure (x1 min);
 - 9.2.26.10 Bus remote terminal power failure (x1 min); and
 - 9.2.26.11 Bus remote terminal software failure (x1 min);
- 9.2.27 EFIS malfunctions
 - 9.2.27.1 Display internal failure (x1 min);
 - 9.2.27.2 No power to display (x1 min);
 - 9.2.27.3 EFIS control malfunction (x1 min);
 - 9.2.27.4 HUD projection failure (x1 min);
 - 9.2.27.5 HUD control malfunction (x1 min); and
 - 9.2.27.6 HUD integration malfunction (x1 min);
- 9.3 Tasks: A trainee should be able to conduct the following tasks in accordance with the applicable technical order;
 - 9.3.1 Fuel management electrical control and indicating systems
 - 9.3.1.1 Removal and Installation of the following components:
 - 9.3.1.1.1 Capacitance probe
 - 9.3.1.1.2 Compensator probe

- 9.3.1.1.3 Boost pump
- 9.3.1.1.4 Selector valve
- 9.3.1.1.5 Fuel quantity indicator
- 9.3.2 Environmental control and indication systems
 - 9.3.2.1 Removal and installation of the following pressurization components:
 - 9.3.2.2 Outflow valve
 - 9.3.2.3 Pressure regulator
 - 9.3.2.4 Cabin safety valve
 - 9.3.2.5 Negative pressure relief valve
 - 9.3.2.6 Removal and installation of the following air conditioning components
 - 9.3.2.7 Shutoff valve
 - 9.3.2.8 Water separator
 - 9.3.2.9 Refrigeration bypass valve
 - 9.3.2.10 Temperature controller
 - 9.3.2.11 Temperature sensor
 - 9.3.2.12 Refrigeration turbine
 - 9.3.2.13 Heat exchanger
 - 9.3.3 Anti-Icing/De-Icing electrical control and indicating systems
 - 9.3.3.1 Removal and Installation of the following components:
 - 9.3.3.2 Bleed air valve
 - 9.3.3.3 Electrically heated parting strip
 - 9.3.3.4 Heated windshield
 - 9.3.3.5 Windshield wiper arm or blade
 - 9.3.3.6 Windshield wiper motor
 - 9.3.4 Flight control electrical and indicating systems
 - 9.3.4.1 Removal/Installation of the following components:
 - 9.3.4.2 Aileron
 - 9.3.4.3 Elevator
 - 9.3.4.4 Rudder
 - 9.3.4.5 Flap
 - 9.3.4.6 Trim tab
 - 9.3.4.7 Torque tubes or Push-pull rods
 - 9.3.4.8 Primary flight control actuator



- 9.3.4.9 Rigging adjustment of the following components:
- 9.3.4.10 Control cables
- 9.3.4.11 Link rods
- 9.3.4.12 Turnbuckles
- 9.3.4.13 Note: Must allow the use of rigging pins and a travel measurement template.
- 9.3.5 Landing gear and hydraulic power electrical control and indicating systems
- 9.3.5.1 Removal/Installation of the following:
- 9.3.5.2 MLG
- 9.3.5.3 NLG
- 9.3.5.4 Uplock assembly
- 9.3.5.5 Brake assembly
- 9.3.5.6 Servicing of the following:
- 9.3.5.7 Oleo strut
- 9.3.5.8 Brake system
- 9.3.5.9 Rigging adjustment of the following:
- 9.3.5.10 Landing gear door
- 9.3.5.11 Nose wheel steering
- 9.3.5.12 Weight on wheel switch
- 9.3.5.13 Uplock switch





CANADIAN ADVANCED SYNTHETIC ENVIRONMENT (CASE) PROJECT
Letter of Interest
N° W8475-16VMT2/B

**APPENDIX 2: PART TASK TRAINER (PTT) DEVICE TECHNICAL AND
PERFORMANCE REQUIREMENTS**

DEPARTMENT OF NATIONAL DEFENCE (DND)

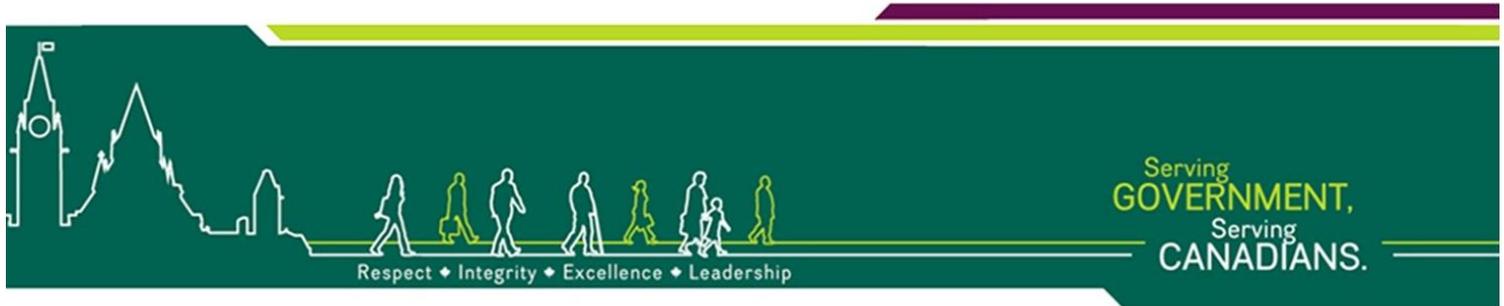
APPENDIX 2 TO ANNEX A PART 1: STATEMENT OF WORK ACQUISITION OF
CANADIAN ADVANCED SYNTHETIC ENVIRONMENT (CASE) PHASE 2



Public Works and
Government Services
Canada

Travaux publics et
Services gouvernementaux
Canada

Canada



REFERENCES

- A. Typical Troubleshooting Chart, CFSATE, 20 Feb 17.
- B. FAA Advisory Circular AC 43.13-1B, Chapters 9, 11 and 12.
- C. RCAF Common Tools, CFSATE, 20 Feb 17.
- D. CFSATE Floorplan, CFSATE, 21 Aug 17.

1. INTRODUCTION

1.1 This document establishes the performance and technical requirements of the following Part Task Trainers (PTT):

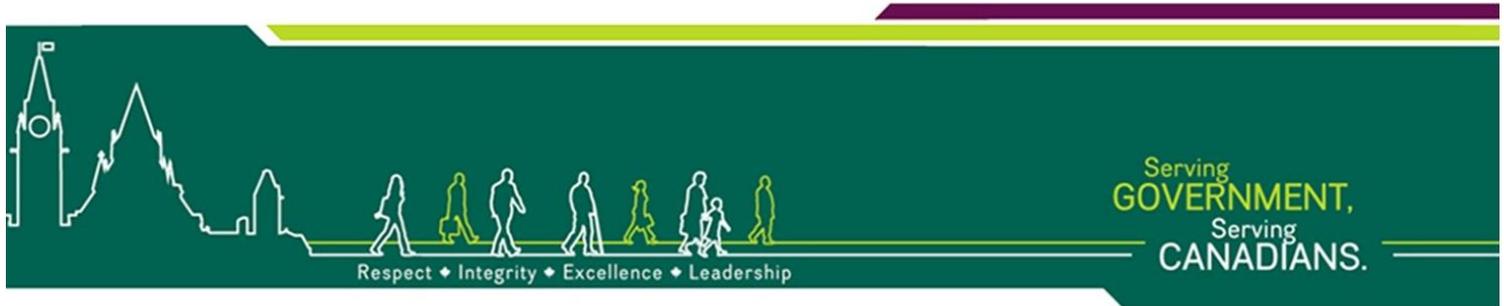
1.1.1 Power Generation/Distribution;

1.1.2 Integrated Avionics;

1.1.3 Landing Gear; and

1.1.4 Flight Control.





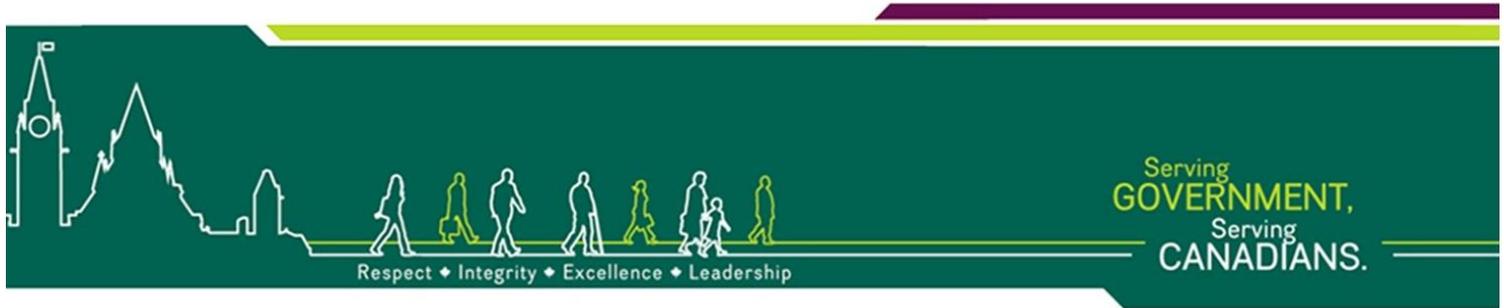
2. PTT PERFORMANCE REQUIREMENTS

2.1 General

- 2.1.1 The PTTs must be a systems level maintenance training device, designed exclusively for training purposes and must enhance learning, facilitate the development of skills and permit the practice of proper maintenance procedures.
- 2.1.2 The PTTs must provide fault insertion capabilities that support psychomotor instruction and hands on training of a physical platform.
- 2.1.3 The PTTs must allow students to perform system inspections.
- 2.1.4 The PTTs must allow students to perform component removal and installation.
- 2.1.5 The PTTs must allow students to perform functional checks.
- 2.1.6 The PTTs must allow students to perform system diagnosis.
- 2.1.7 The PTTs must allow students to perform troubleshooting on the systems.
- 2.1.8 The PTTs must allow students to repair the system.
- 2.1.9 The PTTs will be used as training aids in conjunction with CFSATE developed courses and delivered by CFSATE instructors.

2.2 Power Generation/Distribution PTT





2.2.1 The Power Generation/Distribution should allow students to carry out a variety of different faults of varying complexity, including at a minimum of at least one each of the following faults:

- 2.2.1.1 Indication of wiring snag;
- 2.2.1.2 Generation malfunction/failure;
- 2.2.1.3 Transformer rectifier unit failure;
- 2.2.1.4 Battery failure;
- 2.2.1.5 Bus fault/failure;
- 2.2.1.6 Circuit breaker faults;
- 2.2.1.7 Inverter failure;
- 2.2.1.8 Relay failure (to include open coil or contacts);
- 2.2.1.9 Contactor failure; and
- 2.2.1.10 Power indicators failure (amperage and voltage).

2.3 Integrated Avionics PTT

2.3.1 The Integrated Avionics PTT must aid in the instruction of aircraft integrated avionics systems.

2.3.2 The Integrated Avionics PTT should allow the instructor to insert faults of varying complexity, covering all included systems with indications of faults in major assemblies, Line Replaceable Units (LRU), and wiring snags.



2.3.3 The Integrated Avionics PTT should permit students to analyze and perform maintenance functions on the following systems:

2.3.3.1 Aircraft auto-flight systems;

2.3.3.2 Aircraft data management systems;

2.3.3.3 Aircraft electronic flight instrument system;

2.3.3.4 Aircraft air data system;

2.3.3.5 Traffic alert collision avoidance system;

2.3.3.6 Ground collision avoidance system;

2.3.3.7 Aircraft flight management systems;

2.3.3.8 Aircraft Aviation Electrical system, to include the following:

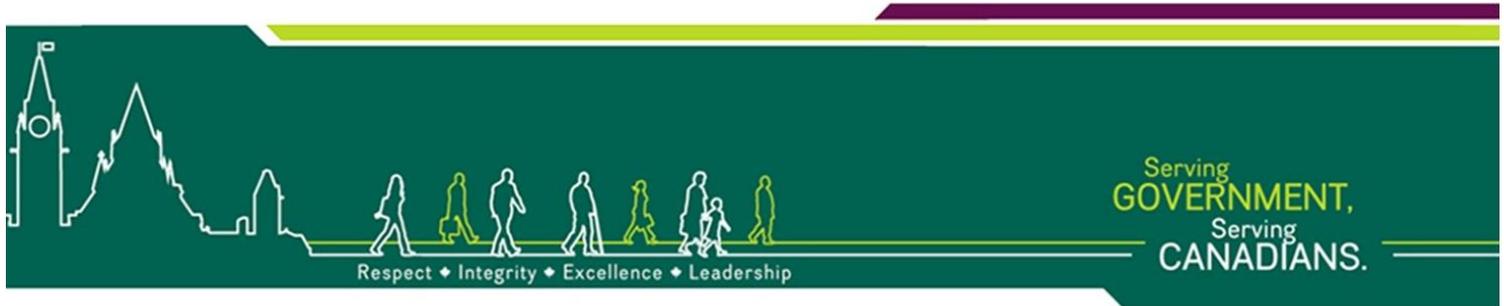
2.3.3.8.1 Engine Electrical Control And Indicating Systems;

2.3.3.8.2 Propeller Electrical Control And Indicating Systems;

2.3.3.8.3 Anti-Icing/De-Icing Electrical Control And Indicating Systems;

2.3.3.8.4 Fuel Management Electrical Control And Indicating Systems;





2.3.3.8.5 Flight Control Electrical And Indicating Systems;

2.3.3.8.6 Landing Gear And Hydraulic Power Electrical Control And Indicating Systems;

2.3.3.8.7 Aviation Life Support Equipment Control and Indicating Systems;

2.3.3.8.8 Aircraft interior lighting, to include;

2.3.3.8.8.1 Instrument lighting system;

2.3.3.8.8.2 Cockpit lighting system;

2.3.3.8.8.3 Cabin and passageway lighting systems;

2.3.3.8.8.4 Boarding lighting systems;

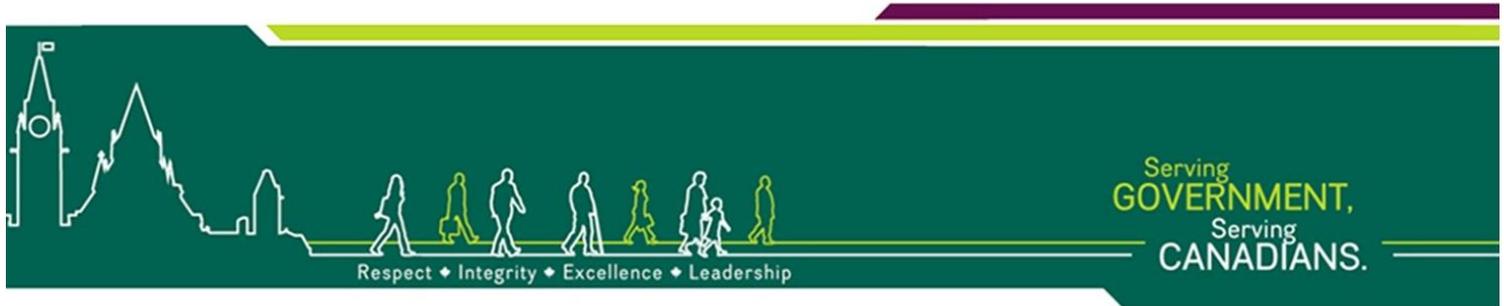
2.3.3.8.8.5 Service lighting systems;

2.3.3.8.8.6 Emergency lighting systems;

2.3.3.8.8.7 Aircraft caution and warning systems; and

2.3.3.8.8.8 Aircraft advisory lighting systems.





2.3.3.8.9 Aircraft External Lighting Systems, to include:

2.3.3.8.9.1 Navigation lighting systems;

2.3.3.8.9.2 Anti-collision lighting systems;

2.3.3.8.9.3 Formation lighting systems; and

2.3.3.8.9.4 Taxi and landing lighting systems.

2.3.3.8.10 Fire and overheat protection systems;

2.3.3.8.11 Heads-up display of aircraft EFIS.

2.4 Landing Gear PTT

2.4.1 The Landing Gear PTT must permit students to analyze and perform the following functions on included components and systems:

2.4.1.1 Remove and install;

2.4.1.2 Service;

2.4.1.3 Rigging; and

2.4.1.4 Confirm functionality.

2.4.2 The Landing Gear PTT must allow students to conduct the following maintenance tasks:



- 2.4.2.1 Retractable main Landing Gear oleo removal and installation;
- 2.4.2.2 Main Landing Gear oleo servicing;
- 2.4.2.3 Brake assembly removal and installation;
- 2.4.2.4 Brake assembly bleeding; and
- 2.4.2.5 Removal and installation of mechanical/electrical up-lock and down-lock

switches.

2.4.3 The Landing Gear PTT should allow the students to perform the following maintenance tasks:

- 2.4.3.1 Up-lock assembly removal and installation;
- 2.4.3.2 Up-lock assembly rigging; and
- 2.4.3.3 Landing gear door rigging.

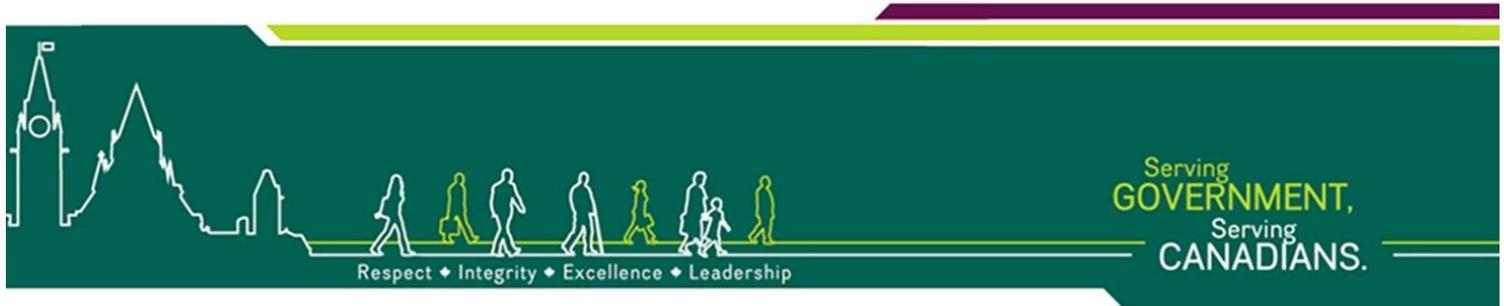
2.4.4 The Landing Gear PTT should allow insertion of the following faults:

- 2.4.4.1 Landing gear does not retract (electrical fault)
- 2.4.4.2 Landing gear does not retract (mechanical fault)
- 2.4.4.3 Anti-skid inoperative (electrical fault)

2.5 Flight Control PTT

2.5.1 The Flight Control PTT must permit students to analyze and perform the following functions on included components and systems:



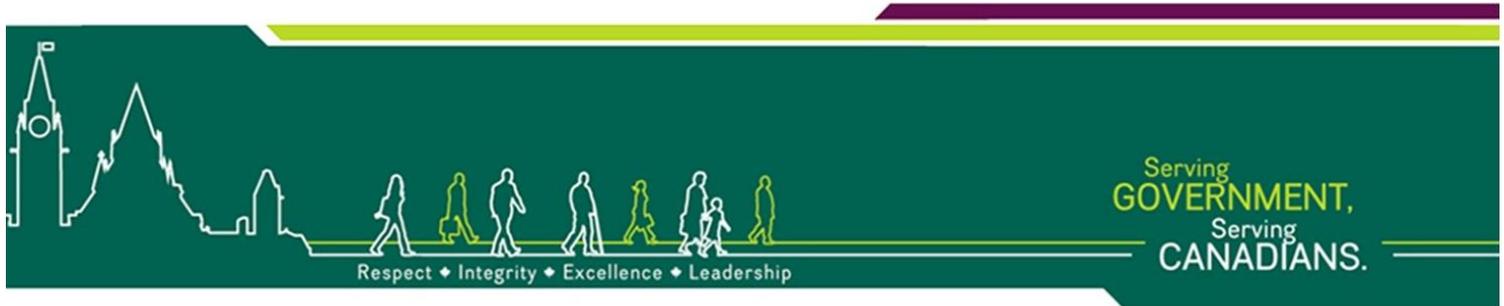


- 2.5.1.1 Remove and install;
 - 2.5.1.2 Service;
 - 2.5.1.3 Rigging; and
 - 2.5.1.4 Confirm functionality.
- 2.5.2 The Flight Control PTT must allow the students to perform the following maintenance tasks:
- 2.5.2.1 Removal/installation, rigging and functional check on a primary flight control; and
 - 2.5.2.2 Removal/installation, rigging and functional check on a secondary flight control.
- 2.5.3 The Flight Control PTT should allow the students to perform the following maintenance tasks:
- 2.5.3.1 Slow flap retraction;
 - 2.5.3.2 Flap indication discrepancy; and
 - 2.5.3.3 Removal, installation and rigging of an additional secondary flight control.

3. PTT TECHNICAL REQUIREMENTS

3.1 Environment Conditions

- 3.1.1 The PTTs must be installed according to the space provided as shown in Ref D.



3.1.2 The PTTs must operate in the following environmental conditions:

3.1.2.1 Temperature range of 5 degrees Celsius to 35 degrees Celsius; and

3.1.2.2 Humidity range of 20% to 85%.

3.2 Human Engineering

3.2.1.1 Noise level emitted from individual PTTs must not exceed 85 dB.

3.2.1.2 The PTTs must be ergonomically designed to accommodate the range of motion of the 5th percentile (%) female to the 95th percentile (%) male.

3.3 Power Generation/Distribution PTT

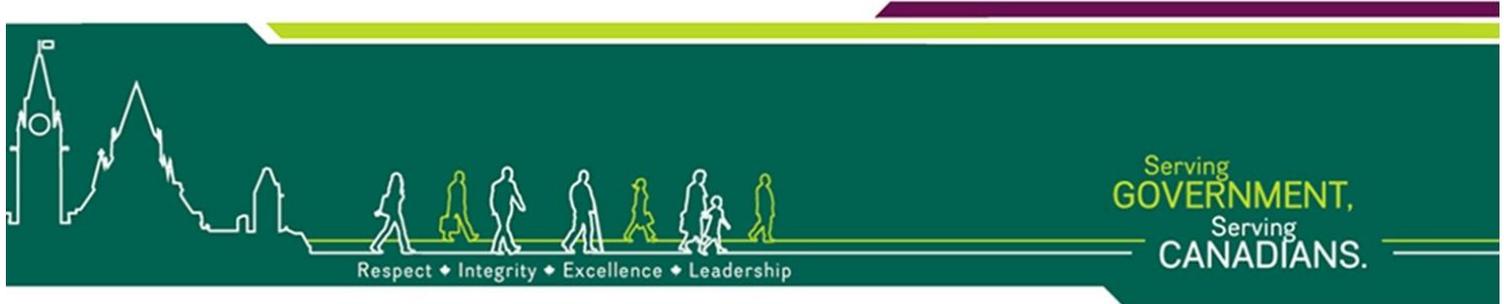
3.3.1 Wires, cables, bus bar, relays, interrupters, switches, contactors, terminal blocks, circuit breakers, reverse-current relay, connectors and the other electrical components, must resemble real aircraft components. The installation of electrical components must follow the EWIS directives IAW Ref. B.

3.3.2 The minimum dimensions of the trainer should be 24 inches wide, 36 inches long, 48 inches tall.

3.3.3 The overall dimensions of the PTT should not exceed 34 inches wide, 96 inches long and 80 inches tall to allow for relocation through doorway.

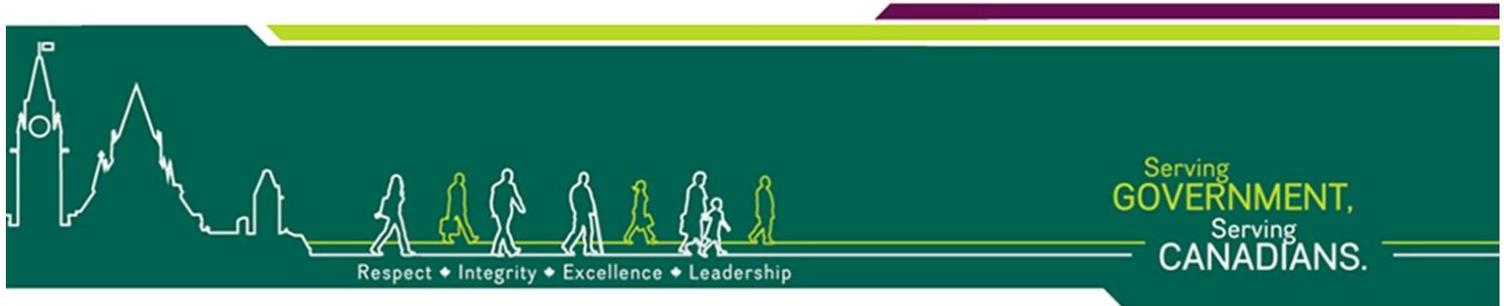
3.3.4 The Power Generation/Distribution PTT should be mounted on caster wheels of the required unit weight for ease of movement and relocation.





- 3.3.5 The Power Generation/Distribution PTT must replicate typical systems found on aircraft using modern (post-2000) technology with load sharing, alternating current (AC) and direct current conditioning and multi-bus distribution.
- 3.3.6 The Power Generation/Distribution PTT must allow for an input from a 28 V DC ground power unit.
- 3.3.7 The Power Generation/Distribution PTT should include an auxiliary power unit (APU) capable of providing 115VAC, 3 phase, 400hz. The APU can be simulated.
- 3.3.8 The Power Generation/Distribution PTT should include a ram air turbine (RAT) that provides 115VAC, 3 phase, 400hz for emergency power. The RAT can be simulated.
- 3.3.9 Transformer-Rectifier Units (TRUs) and static convertors must be used for the aircraft electrical conversion systems.
- 3.3.10 At least one transformer unit and one inverter unit must be installed on the PTT that allows for hands on maintenance and troubleshooting. The units must simulate realistic removal and installation procedures and test points for troubleshooting. The voltage must reflect the proper reading but the current can be reduced to a safe level.
- 3.3.11 The Power Generation/Distribution PTT must produce 115VAC, 3 phase, 400hz.
- 3.3.12 The Power Generation/Distribution PTT must convert power into all of the following forms:





3.3.12.1 28 VDC; and

3.3.12.2 115 VAC, single phase, 400 hz.

3.3.13 The Power Generation/Distribution PTT system should be capable of demonstrating load shedding of non-essential, essential and emergency loads during the following operating conditions:

3.3.13.1 Normal power distribution;

3.3.13.2 Power failure of one generator;

3.3.13.3 Power failure of both generators;

3.3.13.4 Battery failure – one battery;

3.3.13.5 Battery failure – both batteries; and

3.3.13.6 APU failure.

3.3.14 The Power Generation/Distribution PTT should include at least three of each of the following electrical loads:

3.3.14.1 Electrical mechanical;

3.3.14.2 External lighting; and

3.3.14.3 Internal lighting.

3.3.15 The Power Generation/Distribution PTT must include the following:

3.3.15.1 A generator control unit for AC control;



3.3.15.2 A TRU for secondary DC generation and conditioning;

3.3.15.3 An electrical panel, indicating system and basic electrical load;

3.3.15.4 Aircraft battery/emergency power system, to include:

3.3.15.4.1 The batteries do not need to be real aircraft batteries but must resemble a real aircraft battery in dimension and weight in order to better reflect the battery installation and removal.

3.3.15.4.2 The batteries must use a plug and socket style connector that shields the battery terminals and cable terminations. This style connector also provides quick connection and disconnection.

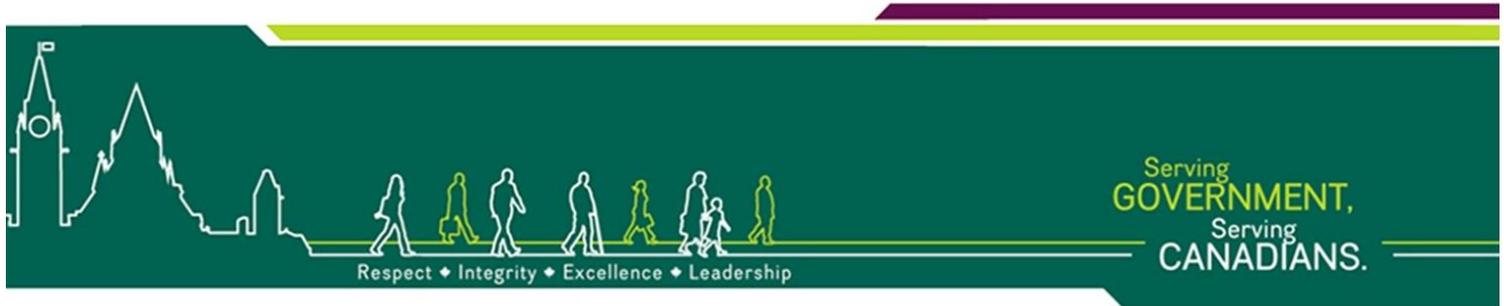
3.3.15.4.3 The battery connectors must have an electrically isolated storage arrangement for when they are not connected to the batteries.

3.3.15.5 Aircraft Power Generation System

3.3.15.5.1 Two generators. The generators do not need to rotate and the generator drive is not required;

3.3.15.5.2 Test points for voltage output and winding resistance of at least one generator.





3.3.15.6 Aircraft Power Protection, Control and Regulation System – Generator Control Unit (GCU);

3.3.15.7 Control panel located on the PTT. The control panel must have easy access to control switches for troubleshooting. The control panel must provide the following controls:

3.3.15.7.1 Selector switches for all loads listed in 3.3.14.

3.3.15.7.2 A GCU, that must provide:

3.3.15.7.3 Current limiting control;

3.3.15.7.4 Over voltage protection;

3.3.15.7.5 Voltage regulation; and

3.3.15.7.6 Reverse current protection.

3.3.15.7.7 Master power switch;

3.3.15.7.8 Master battery selector switch.

3.3.15.8 Aircraft Electrical Power distribution systems:

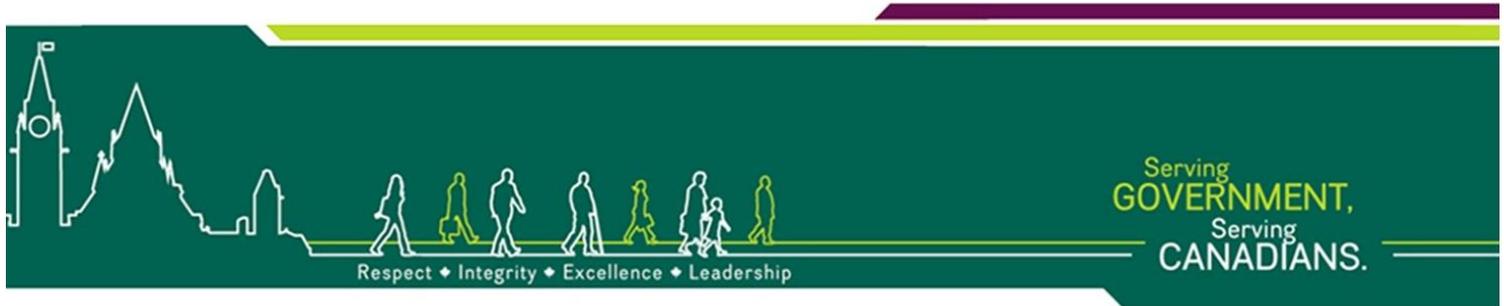
3.3.16 The Power Generation/Distribution PTT should include the following:

3.3.16.1 An inverter for secondary AC generation;

3.3.16.2 Aircraft battery/emergency power system, to include:

3.3.16.2.1 An aircraft battery charging system





3.3.16.2.2 An aircraft power source containing two aircraft batteries of 28 Volts direct current (VDC);

3.3.16.2.3 Self-charging circuit for the battery;

3.3.16.2.4 Individual compartments for each battery;

3.3.16.3 The control panel located on the PTT should include an APU control panel.

3.3.16.4 An indicating system to display as a minimum:

3.3.16.4.1 Generator voltage;

3.3.16.4.2 Generator amperage;

3.3.16.4.3 Generator status;

3.3.16.4.4 Inverter status;

3.3.16.4.5 Bus configuration; and

3.3.16.4.6 Battery voltage.

3.3.16.5 Power distribution systems, to include:

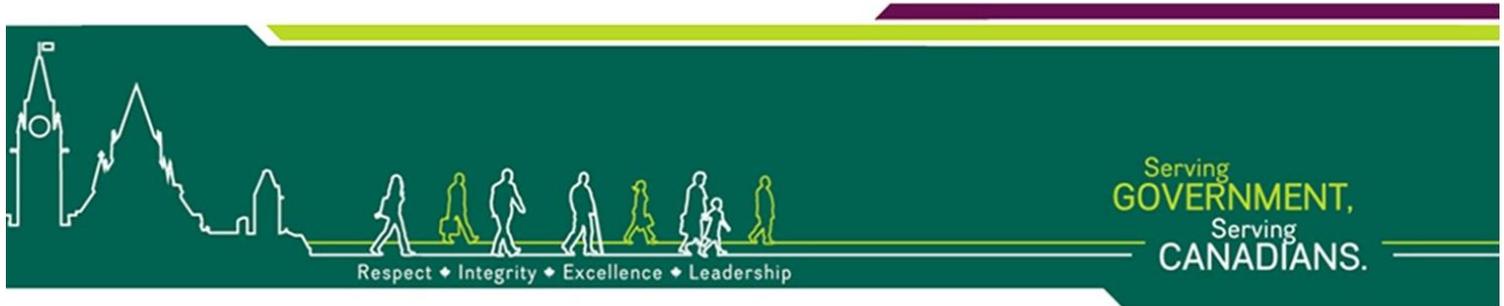
3.3.16.5.1 Two 115 VAC, 400 Hz busses;

3.3.16.5.2 Two 28 VDC busses;

3.3.16.5.3 One battery bus; and

3.3.16.5.4 One ground bus.





3.4 Integrated Avionics PTT

- 3.4.1 The Integrated Avionics PTT must replicate typical systems found on aircraft using modern (post-2000) technology with a central maintenance system.
- 3.4.2 All systems on the Integrated Avionics PTT must have the circuitry starting from the system circuit breaker (electrical distribution with the electrical generation).
- 3.4.3 The Integrated Avionics PTT must use real or emulated aircraft system line replaceable units (LRU) and interconnecting wiring for included systems.
- 3.4.4 The Integrated Avionics PTT must integrate realistic aircraft wiring and routing and must be IAW Ref B.
- 3.4.5 The Integrated Avionics PTT must include integrated components and the ability to physically remove and install components such as switches, breakers and terminal block pins (1st line replaceable components).
- 3.4.6 The Integrated Avionics PTT must facilitate the use of common test equipment used by AVS technicians in a first line environment including the following; digital multi meter, time domain reflectometer, data bus analyzer (Designs S2471 MIL-STD-1553 Databus Harness Tester).
- 3.4.7 The Integrated Avionics PTT must include a MIL-STD-1553 data bus.
- 3.4.8 The Integrated Avionics PTT must include sufficient EWIS to allow students to perform an EWIS inspection.



3.5 Landing Gear PTT

3.5.1 The Landing Gear PTT must represent a retractable aircraft landing gear system of modern (post-2000) technology.

3.5.2 The Landing Gear PTT must be compatible with common tools (Ref C) and fluids.

3.5.2.1 The Landing Gear PTT removable components must be ruggedized to withstand 33 Remove and Install cycles per year for 15 years.

3.5.3 The Landing Gear PTT should include the following systems and components:

3.5.3.1 Aircraft Hydraulic System, to include:

3.5.3.1.1 hydraulic reservoir;

3.5.3.1.2 Hydraulic pump;

3.5.3.1.3 Hydraulic accumulator;

3.5.3.1.4 Hydraulic actuator;

3.5.3.1.5 Aircraft hydraulic fittings and plumbing;

3.5.3.1.6 Hydraulic filters with bypass indicator; and

3.5.3.1.7 Valves.

3.5.3.2 Retractable Main Landing Gear Oleo.

3.5.3.3 Up-lock assembly, to include:

3.5.3.3.1 Side-stay;



3.5.3.3.2 Torque links; and

3.5.3.3.3 Landing gear door.

3.5.3.4 Ground safety devices, both mechanical and electrical;

3.5.3.5 The Landing Gear PTT must include an aircraft brake system, to include:

3.5.3.5.1 Brake assembly;

3.5.3.5.2 Disc;

3.5.3.5.3 Plumbing and fittings;

3.5.3.5.4 Master cylinder; and

3.5.3.5.5 Brake pedal.

3.5.3.6 The Landing Gear PTT must include a wheel and tire assembly, to include bearings;

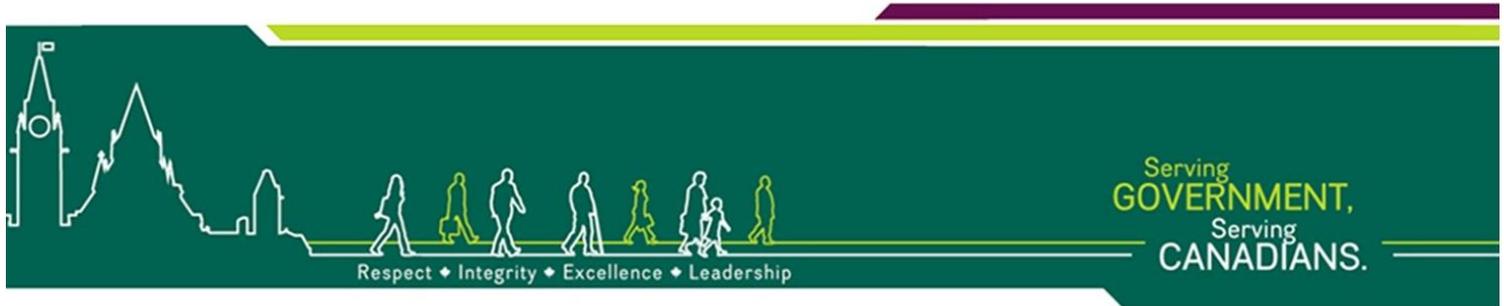
3.5.3.7 The Landing Gear PTT must include a control and indication system, to include:

3.5.3.7.1 Normal landing gear selector.

3.5.3.7.2 Landing gear position indicator;

3.5.3.7.3 Up-lock and down-lock switches;

3.5.3.8 The Landing Gear PTT should include a control and indication system, to include:



- 3.5.3.8.1 Emergency landing gear selector;
- 3.5.3.8.2 Hydraulic pump circuit breaker;
- 3.5.3.8.3 Landing gear indicator circuit breaker; and
- 3.5.3.8.4 Hydraulic pump control.

3.5.3.9 The Landing Gear PTT should include an anti-skid system, to include:

- 3.5.3.9.1 Wheel speed sensor; and
- 3.5.3.9.2 Control box.

3.6 Flight Control PTT

3.6.1 The Flight Control PTT must replicate typical systems found on aircraft using modern (post-2000) technology.

3.6.2 The Flight Control PTT must be compatible with common tools (Ref. C) and fluids.

3.6.3 The Flight Control PTT should include the following systems and components:

- 3.6.3.1 Primary flight controls, to include:
 - 3.6.3.1.1 Bell cranks;
 - 3.6.3.2 Secondary flight control, including flap and trim tab;
 - 3.6.3.3 Control and indication, to include:
 - 3.6.3.3.1 Control column;



3.6.3.3.2 Rudder pedals;

3.6.3.3.3 Flap position selector;

3.6.3.3.4 Flap position indicator with circuit breaker; and

3.6.3.3.5 Trim tab control.

3.6.3.4 The Flight Control PTT should include the following systems and components:

3.6.3.4.1 Additional flight controls, to include:

3.6.3.4.1.1 Rudder;

3.6.3.4.1.2 Elevator;

3.6.3.4.1.3 Speed brakes;

3.6.3.4.1.4 Slats;

3.6.3.4.1.5 Spoilers;

3.6.3.4.1.6 Spring tab; and

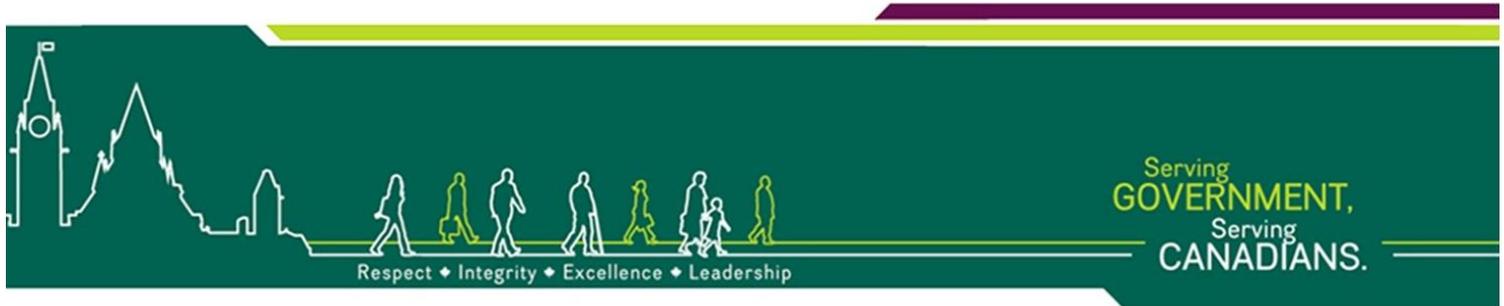
3.6.3.4.1.7 Gear tab.

3.6.3.4.2 Control and indication for speed brakes and spoilers if applicable.

4. TERMINOLOGY

4.1 Avionics System Technician (AVS) – Aircraft technician that maintains all aircraft electrical and electronic systems.





4.2 Canadian Forces School of Aerospace Technology and Engineering (CFSATE) - The role of CFSATE is to provide the RCAF apprentice level aircraft technicians by training students in accordance with approved doctrine and standards.

4.3 Electrical Wire Interconnection System (EWIS) - All materials used to form an electrical connection between two or more points including the associated termination devices and the necessary means for its installation and identification.

4.4 Fault(s) – A failure in an electrical or electronic system so that it does not operate as designed or intended.

4.5 Line Replaceable Unit (LRU) - A modular component of an aircraft that is designed to be replaced quickly at an operating location.

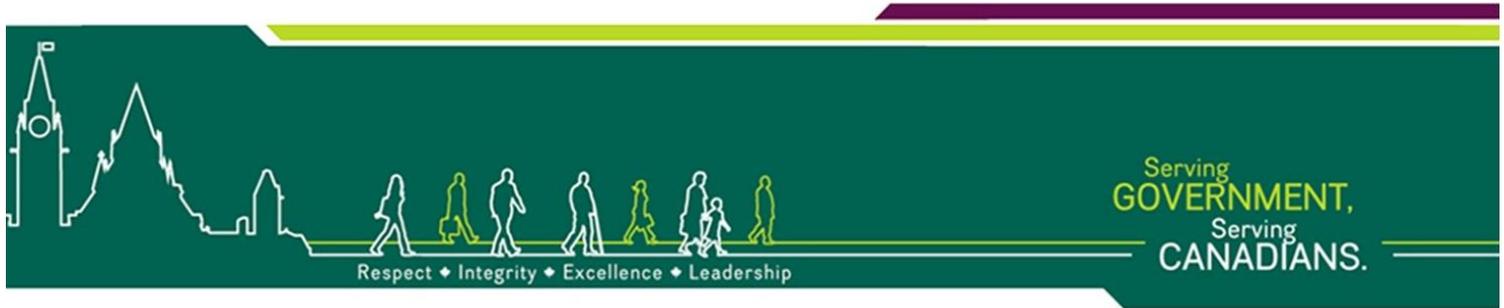
4.6 Part-Task Trainer (PTT) - A training device that is designed to train aircraft maintenance technicians with hands-on troubleshooting and repair procedures.

4.7 Real/Realistic – Representative actual aircraft standard parts in aesthetic appearance and functionality but not necessarily NATO aircraft standard.

4.8 Robust – Must be able to withstand repeated abuse from untrained students that will be continuously probing test points, and removing and installing components.

4.9 Simulated – A component that does not need to be a physically accurate representation of aircraft standard parts, but must include required test points for troubleshooting all fault scenarios.





CANADIAN ADVANCED SYNTHETIC ENVIRONMENT (CASE) PROJECT
Letter of Interest
N° W8475-16VMT2/B

APPENDIX 3: CDRLs and DIDs

DEPARTMENT OF NATIONAL DEFENCE (DND)

**APPENDIX 3 TO ANNEX A PART 1: STATEMENT OF WORK ACQUISITION OF
CANADIAN ADVANCED SYNTHETIC ENVIRONMENT (CASE) PHASE 2**

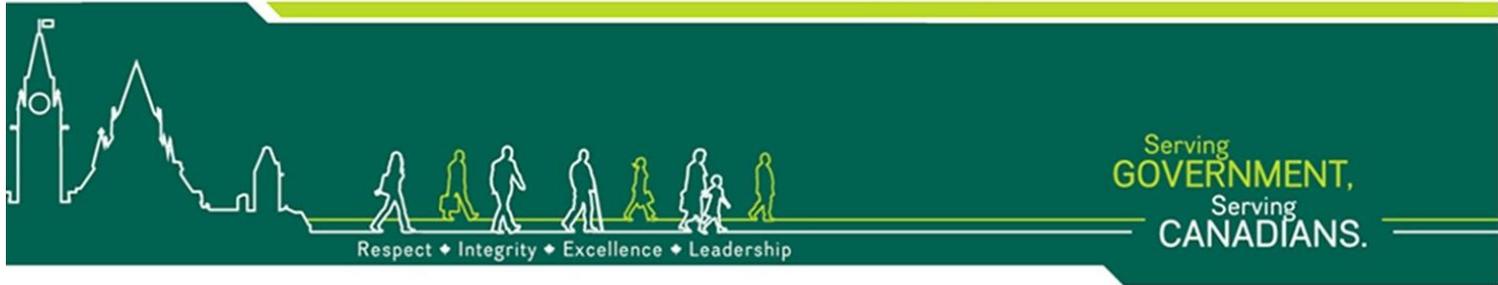
AIR TECHNICIAN APPRENTICE TRAINERS



Public Works and
Government Services
Canada

Travaux publics et
Services gouvernementaux
Canada

Canada



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1.0 Contract data requirements List (CDRLs)

1.1 CDRL Template

1.1.1 A description of each block of information used in the CDRL template follows:

1.1.1.1 *Block 1 – CDRL Item Number*

The CDRL Item Number is a sequential three-digit number commencing with 001 to uniquely identify the individual Data Item (DI).

1.1.1.2 *Block 2 – Title*

The title of the DI.

1.1.1.3 *Block 3 – Subtitle*

Not used.

1.1.1.4 *Block 4 – Data Item Number*

If applicable, the Data Item Description (DID) number associated with the CDRL item.

1.1.1.5 *Block 5 – SOW Reference*

The Statement of Work (SOW) paragraph that references the CDRL.

1.1.1.6 *Block 6 – Technical Office*

Not used.

1.1.1.7 *Block 7 - Inspection*

Not Used.



1.1.1.8 *Block 8 – Approval Code*

An “A” in Block 8 means that draft approval is required before submission of the final document. If advance approval is not needed, Block 8 is left blank.

An “R” in Block 8 means that the DI will be reviewed by Canada for acceptability of format, clarity and completeness. Once accepted, the DI must be considered for information only; and

An “I” in Block 8 means that the DI is for information only.

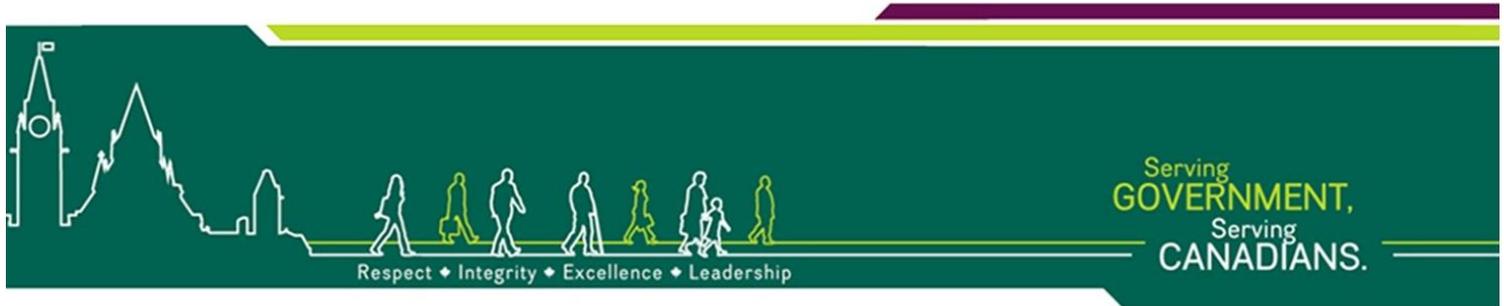
1.1.1.9 *Block 9 – Review Period*

Denotes the number of working days that are required for the TA to approve or review the DI.

1.1.1.10 *Block 10 - Frequency*

Indicates the submission frequency of the DI. A description of the submission codes used in Block 10 follows:

CODE	DESCRIPTION
ANNLY	Annually
ASREQ	As and when required
MACA	Months after contract award
MNTHY	Monthly
ONCE	One-time delivery
R/ASR	Revisions as required



1.1.1.11 *Block 11 – As of Date*

Not used.

1.1.1.12 *Block 12 – 1st Submission*

Specifies the date on which the DI must be submitted. See Block 10 for submission codes.

1.1.1.13 *Block 13 – Subsequent Submission*

Specifies the required submittal date(s) for any subsequent deliveries if the DI is submitted more than once.

1.1.1.14 *Block 14 – Distribution and Addressees*

Not used.

1.1.1.15 *Block 15 – Media and Quantity*

The media and, in the case of hard copy, the number of copies in which the data item is to be delivered. The following codes may be used:

- i. Hard Copy;
- ii. Email;
- iii. CD: electronic media stored on CD ROM.

1.1.1.16 *Block 16 - Remarks*

Provides additional or clarifying information. Where other blocks refer to Block 16 – Remarks, then the associated block number is indicated with the information, and a “See Block 16” note is entered in the referring block.



1.2 CDRL-001 Project Schedule

Block 1 – CDRL Item Number CDRL-001	Block 2 – Title Project Schedule	Block 3 – Subtitle	Block 4 – Data Item Number PM-001		
Block 5 – SOW Reference 3.2.1	Block 6 – Technical Office	Block 7 - Inspection	Block 8 – Approval Code A	Block 9 – Review Period 10	
Block 10 – Frequency Block 16	Block 11 – As Of Date	Block 12 – First Submission Block 16		Block 13 – Subsequent Submission	
Block 14 – Distribution and Addressees		Block 15 – Media and Quantity An electronic copy of the Project Schedule must be included with Contractor’s Proposal, either on CD/DVD or via an electronic transfer medium deemed acceptable by the TA. The			



	Project Schedule must be in Microsoft Project. No paper copy is required for the schedule.
Block 16 – Remarks Frequency First Submission & Subsequent Submissions – Project Schedule must be submitted within 1 MACA.	



1.3 CDRL-002 Progress Reports

Block 1 – CDRL Item Number CDRL-002	Block 2 – Title Progress Reports	Block 3 – Subtitle	Block 4 – Data Item Number PM-002	
Block 5 – SOW Reference 3.3.1	Block 6 – Technical Office	Block 7 - Inspection	Block 8 – Approval Code R	Block 9 – Review Period 5
Block 10 – Frequency Block 16	Block 11 – As Of Date	Block 12 – First Submission Block 16	Block 13 – Subsequent Submission Block 16	
Block 14 – Distribution and Addressees		Block 15 – Media and Quantity		



	<p>Email or any other electronic transfer media acceptable to TA. Progress Reports must be provided in a file type acceptable to the TA. No paper copy is required for the progress reports.</p>
<p>Block 16 – Remarks</p> <p>Frequency First Submission & Subsequent Submissions – Progress Reports must be submitted 5 working days before each PRM, which must occur IAW approved schedule and whenever the Contractor and the TA agree to meet to solve specific issues.</p>	



1.4 CDRL-003 System Engineering Management Plan

Block 1 – CDRL Item Number CDRL-003	Block 2 – Title System Engineering Management Plan (SEMP)	Block 3 – Subtitle	Block 4 – Data Item Number SE-001	
Block 5 – SOW Reference 4.1.2	Block 6 – Technical Office	Block 7 – Inspection	Block 8 – Approval Code A	Block 9 – Review Period 30
Block 10 – Frequency R/ASR	Block 11 – As Of Date	Block 12 – First Submission Block 16		Block 13 – Subsequent Submission <i>Block 16</i>
Block 14 – Distribution and Addressees		Block 15 – Media and Quantity		

	<p>An electronic Copy must be included with Contractor's Proposal, either on CD/DVD or via an electronic transfer medium deemed acceptable by the TA. The SEMP must be submitted in Microsoft Word format to the TA. No paper copy is required for the SEMP.</p>
<p>Block 16 – Remarks</p> <p>First Submission: Draft SEMP must be submitted with the Contractor's Proposal</p> <p>Subsequent Submission: As per Approved Schedule</p>	



1.5 CDRL-004 Acceptance Plan

Block 1 – CDRL Item Number CDRL-004	Block 2 – Title Acceptance Plan (AP)	Block 3 – Subtitle	Block 4 – Data Item Number SE-002	
Block 5 – SOW Reference 4.3.1	Block 6 – Technical Office	Block 7 – Inspection	Block 8 – Approval Code A	Block 9 – Review Period 30
Block 10 – Frequency R/ASR	Block 11 – As Of Date	Block 12 – First Submission Block 16	Block 13 – Subsequent Submission <i>Block 16</i>	



<p>Block 14 – Distribution and Addressees</p>	<p>Block 15 – Media and Quantity</p> <p>An electronic copy must be included with Contractor’s Proposal, either on CD/DVD or via an electronic transfer medium deemed acceptable by the TA. The AP must be submitted in MS Word format to the TA. No paper copy is required for the AP.</p>
<p>Block 16 – Remarks</p> <p>First Submission: Draft AP must be submitted with the Contractor’s proposal</p> <p>Subsequent Submission: IAW the approved schedule, the AP must be re-submitted after on-site testing, to reflect any changes in the plan arising from testing, as required, and to summarize and analyze test results.</p>	



1.6 CDRL-005 Acceptance Test Procedures

Block 1 – CDRL Item Number CDRL-005	Block 2 – Title Acceptance Test Procedures (ATP)	Block 3 – Subtitle	Block 4 – Data Item Number SE-003	
Block 5 – SOW Reference 4.4.1	Block 6 – Technical Office	Block 7 – Inspection	Block 8 – Approval Code A	Block 9 – Review Period Block 16



1.7 CDRL-006 Configuration Management Plan

Block 1 – CDRL Item Number CDRL-006	Block 2 – Title Configuration Management Plan (CMP)	Block 3 – Subtitle	Block 4 – Data Item Number SE-004		
Block 5 – SOW Reference 4.5.1	Block 6 – Technical Office	Block 7 – Inspection	Block 8 – Approval Code	Block 9 – Review Period 30	



			A	
Block 10 – Frequency R/ASR	Block 11 – As Of Date	Block 12 – First Submission Block 16	Block 13 – Subsequent Submission Block 16	
Block 14 – Distribution and Addressees	Block 15 – Media and Quantity An electronic Copy must be included with Contractor’s Proposal, either on CD/DVD or via an electronic transfer medium deemed acceptable by the TA. The CMP must be submitted in MS Word format to the TA. No paper copy is required for the CMP.			
Block 16 – Remarks First Submission: Draft CMP must be submitted with the Contractor's proposal				



Subsequent Submission: As per approved schedule

1.8 CDRL-007 Design Change, Deviations, and Waivers

Block 1 – CDRL Item Number CDRL-007	Block 2 – Title Design Changes, Deviations and Waivers	Block 3 – Subtitle	Block 4 – Data Item Number SE-005		
Block 5 – SOW Reference 4.5.5	Block 6 – Technical Office	Block 7 – Inspection	Block 8 – Approval Code A	Block 9 – Review Period 30	

<p>Block 10 – Frequency</p> <p style="text-align: center;">ASREQ</p>	<p>Block 11 – As Of Date</p>	<p>Block 12 – First Submission</p> <p style="text-align: center;">ASREQ</p>	<p>Block 13 – Subsequent Submission</p> <p style="text-align: center;"><i>ASREQ</i></p>
<p>Block 14 – Distribution and Addressees</p>	<p>Block 15 – Media and Quantity</p> <p>An electronic Copy must be delivered either on CD/DVD or via an electronic transfer medium deemed acceptable by the TA. The requests must use any file type acceptable to the TA. No paper copy is required for these requests.</p>		
<p>Block 16 – Remarks</p>			



1.9 CDRL-008 Training Plan

Block 1 – CDRL Item Number CDRL-008	Block 2 – Title Training Plan (TP)	Block 3 – Subtitle	Block 4 – Data Item Number ILS-001	
Block 5 – SOW Reference 5.1.2	Block 6 – Technical Office	Block 7 – Inspection	Block 8 – Approval Code A	Block 9 – Review Period 30
Block 10 – Frequency	Block 11 – As Of Date	Block 12 – First Submission Block 16	Block 13 – Subsequent Submission <i>Block 16</i>	



R/ASR			
Block 14 – Distribution and Addressees		Block 15 – Media and Quantity Hardcopy and electronic Copy, either on CD/DVD or flash drive, must be included with Contractor’s Proposal. File type used must be MS Word. No paper copy is required for subsequent submission(s) of the TP.	
Block 16 – Remarks First Submission- A draft must be submitted with the Contractor’s proposal. Draft submission need only be concerned with planning/process issues. Subsequent Submission- The final delivery must be IAW the approved schedule. 30 days must be allowed for DND review and comment.			



1.10 CDRL-009 Quality Assurance Plan

Block 1 – CDRL Item Number CDRL-009	Block 2 – Title Quality Assurance (QA) Plan	Block 3 – Subtitle	Block 4 – Data Item Number ILS-002		
Block 5 – SOW Reference 5.4.2	Block 6 – Technical Office	Block 7 – Inspection	Block 8 – Approval Code	Block 9 – Review Period	



			A	30
Block 10 – Frequency Once	Block 11 – As Of Date	Block 12 – First Submission Block 16	Block 13 – Subsequent Submission Block 16	
Block 14 – Distribution and Addressees		Block 15 – Media and Quantity Hardcopy and an electronic copy, either on CD/DVD or flash drive, must be included with Contractor’s Proposal. File type used must be MS Word. No paper copy is required for the final copy of the QA Plan.		
Block 16 – Remarks				



First & Subsequent Submission: A draft QA Plan must be submitted with the Contractor’s proposal. Following DND review and comment, the final must be submitted for DND approval by 1 MACA.

1.11 CDRL-010 VMT Operating Instructions

Block 1 – CDRL Item Number CDRL-010	Block 2 – Title VMT Operating Instructions	Block 3 – Subtitle	Block 4 – Data Item Number ILS-003	
Block 5 – SOW Reference	Block 6 – Technical Office	Block 7 – Inspection	Block 8 – Approval Code	Block 9 – Review Period

5.6.1.1			A	30
Block 10 – Frequency Once	Block 11 – As Of Date	Block 12 – First Submission Block 16	Block 13 – Subsequent Submission <i>Block 16</i>	
Block 14 – Distribution and Addressees		Block 15 – Media and Quantity A total of two hard copies must be provided by the contractor. The hard copy submissions must be in the form of a printed amendments package. DND will then remove superseded pages from the existing publications and insert the amendments. An electronic Copy must be delivered either on CD/DVD or via an electronic transfer medium deemed acceptable by the TA. The Operating Instructions must use any file type acceptable to the TA.		
Block 16 – Remarks				



First Submission: Draft: 30 working days prior to on-site acceptance testing.

Subsequent Submission: Final must be delivered no more than 3 calendar months after completion of on-site acceptance testing

1.12 CDRL-011 PTT Operating Instructions

Block 1 – CDRL Item Number <p style="text-align: center;">CDRL-011</p>	Block 2 – Title <p style="text-align: center;">PTT Operating Instructions</p>	Block 3 – Subtitle	Block 4 – Data Item Number <p style="text-align: center;">ILS-004</p>		
Block 5 – SOW Reference	Block 6 – Technical Office	Block 7 – Inspection	Block 8 – Approval Code	Block 9 – Review Period	



5.6.1.2			A	30
Block 10 – Frequency Once	Block 11 – As Of Date	Block 12 – First Submission Block 16	Block 13 – Subsequent Submission <i>Block 16</i>	
Block 14 – Distribution and Addressees		Block 15 – Media and Quantity A total of two hard copies must be provided by the contractor. The hard copy submissions must be in the form of a printed amendments package. DND will then remove superseded pages from the existing publications and insert the amendments. An electronic Copy must be delivered either on CD/DVD or via an electronic transfer medium deemed acceptable by the TA. The Operating Instructions must use any file type acceptable to the TA.		
Block 16 – Remarks				



First Submission: Draft: 30 working days prior to on-site acceptance testing.

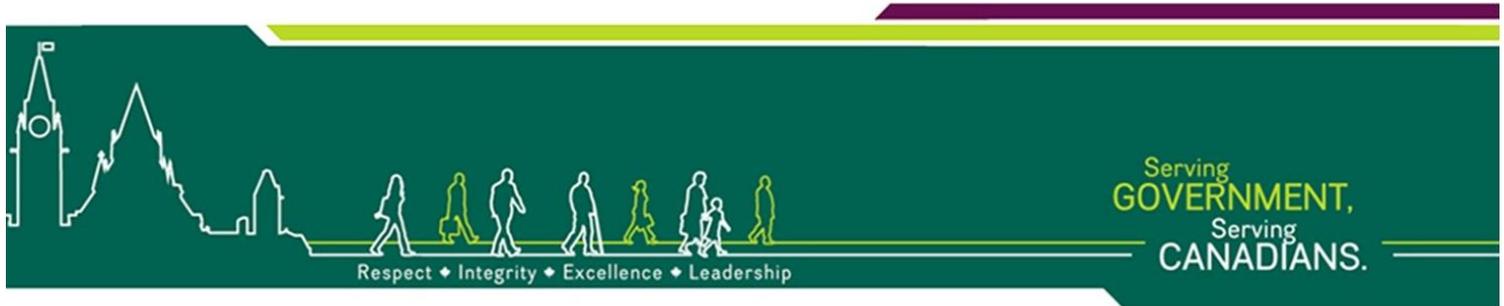
Subsequent Submission: Final must be delivered no more than 3 calendar months after completion of on-site acceptance testing

1.13 CDRL-012 Drawings and Maintenance Manuals

Block 1 – CDRL Item Number CDRL-012	Block 2 – Title Drawings and Maintenance Manuals	Block 3 – Subtitle	Block 4 – Data Item Number ILS-005	
Block 5 – SOW Reference	Block 6 – Technical Office	Block 7 – Inspection	Block 8 – Approval Code	Block 9 – Review Period

5.6.1.3			A	30
Block 10 – Frequency Once	Block 11 – As Of Date	Block 12 – First Submission Block 16	Block 13 – Subsequent Submission <i>Block 16</i>	
Block 14 – Distribution and Addressees		Block 15 – Media and Quantity A total of two hard copies must be provided by the contractor. The hard copy submissions must be in the form of a printed amendments package. DND will then remove superseded pages from the existing publications and insert the amendments. An electronic Copy must be delivered either on CD/DVD or via an electronic transfer medium deemed acceptable by the TA. The Operating Instructions must use any file type acceptable to the TA.		
Block 16 – Remarks				





First Submission: Drafts must be scheduled to allow DND 30 days to review and comment and sufficient time thereafter for the Contractor to take corrective action prior to on-site acceptance testing.

Subsequent Submission: Final: no more than 3 calendar months after completion of on-site acceptance testing

1. The Drawing Package hardcopies Qty (2) must be delivered as Size "D" IAW ANSI Standard US Engineering Drawing Sizes (width 22.0 inches) x (Length 34.0 inches).

It is desired of these drawings be delivered as follows:

- a. 1 set to the TA at DGAEPM (TA&S) 4-4 &
- b. 1 set delivered to CFSATE

1.14 CDRL-013 Software Documentation

Block 1 – CDRL Item Number CDRL-013	Block 2 – Title Software Documentation	Block 3 – Subtitle	Block 4 – Data Item Number ILS-006	
Block 5 – SOW Reference 5.6.1.4	Block 6 – Technical Office	Block 7 – Inspection	Block 8 – Approval Code R	Block 9 – Review Period 30
Block 10 – Frequency Block 16	Block 11 – As Of Date	Block 12 – First Submission Block 16	Block 13 – Subsequent Submission Block 16	



<p>Block 14 – Distribution and Addressees</p>	<p>Block 15 – Media and Quantity</p> <p>All documentation must be in electronic copy only, using a file type acceptable to the TA. File transfer may occur via disk in the mail, email or any other electronic transfer means acceptable to the TA.</p>
<p>Block 16 – Remarks</p> <p>Frequency, First & Subsequent Submission- Drafts must be scheduled to allow DND 30 days to review and comment and sufficient time thereafter for the Contractor to take corrective action prior to on-site acceptance testing. Finals must then be delivered within three months after on-site acceptance.</p>	



1.15 CDRL-014 Itemized Parts List

Block 1 – CDRL Item Number CDRL-014	Block 2 – Title Itemized Parts List	Block 3 – Subtitle	Block 4 – Data Item Number ILS-007	
Block 5 – SOW Reference 5.3.1	Block 6 – Technical Office	Block 7 – Inspection	Block 8 – Approval Code R	Block 9 – Review Period 30
Block 10 – Frequency Block 16	Block 11 – As Of Date	Block 12 – First Submission Block 16	Block 13 – Subsequent Submission Block 16	

<p>Block 14 – Distribution and Addressees</p>	<p>Block 15 – Media and Quantity</p> <p>All documentation must be in electronic copy only, using a file type acceptable to the TA. File transfer may occur via disk in the mail, email or any other electronic transfer means acceptable to the TA.</p>
<p>Block 16 – Remarks</p> <p>Frequency, First & Subsequent Submission- Drafts must be scheduled to allow DND 30 days to review and comment and sufficient time thereafter for the Contractor to take corrective action prior to on-site acceptance testing. Finals must then be delivered within three months after on-site acceptance.</p>	



1.16 CDRL-015 Instructor Operator Training Package

Block 1 – CDRL Item Number CDRL-015	Block 2 – Title Instructor Operator Training Package	Block 3 – Subtitle	Block 4 – Data Item Number ILS-008	
Block 5 – SOW Reference 5.1.3	Block 6 – Technical Office	Block 7 – Inspection	Block 8 – Approval Code R	Block 9 – Review Period 30
Block 10 – Frequency Block 16	Block 11 – As Of Date	Block 12 – First Submission Block 16	Block 13 – Subsequent Submission Block 16	



<p>Block 14 – Distribution and Addressees</p>	<p>Block 15 – Media and Quantity</p> <p>All documentation must be in electronic copy only, using a file type acceptable to the TA. File transfer may occur via disk in the mail, email or any other electronic transfer means acceptable to the TA.</p>
<p>Block 16 – Remarks</p> <p>First Submission- A draft must be submitted with the Contractor’s proposal.</p> <p>Subsequent Submission- The final delivery must be IAW the approved schedule. 30 days must be allowed for DND review and comment.</p>	



1.17 CDRL-016 Student Training Package

Block 1 – CDRL Item Number CDRL-016	Block 2 – Title Student Training Package	Block 3 – Subtitle	Block 4 – Data Item Number ILS-009	
Block 5 – SOW Reference 5.2.1	Block 6 – Technical Office	Block 7 – Inspection	Block 8 – Approval Code R	Block 9 – Review Period 30
Block 10 – Frequency Block 16	Block 11 – As Of Date	Block 12 – First Submission Block 16	Block 13 – Subsequent Submission Block 16	



<p>Block 14 – Distribution and Addressees</p>	<p>Block 15 – Media and Quantity</p> <p>All documentation must be in electronic copy only, using a file type acceptable to the TA. File transfer may occur via disk in the mail, email or any other electronic transfer means acceptable to the TA.</p>
<p>Block 16 – Remarks</p> <p>First Submission- A draft must be submitted with the Contractor’s proposal.</p> <p>Subsequent Submission- The final delivery must be IAW the approved schedule. 30 days must be allowed for DND review and comment.</p>	



2.0 DATA ITEM DESCRIPTIONS (DID)

2.1 DID Template

2.1.1 A description of each block of information used in the DID template follows:

2.1.1.1 *Block 1 – Title*

This is the title of the DID and corresponds to the associated CDRL item title.

2.1.1.2 *Block 2 – Identification Number*

This is the number assigned to the DID.

2.1.1.3 *Block 3 – Description/Purpose*

This provides general information on how the Data Item (DI) is to be used.

2.1.1.4 *Block 4 – Approval Date*

Not used.

2.1.1.5 *Block 5 – Office of Primary Interest*

Not used.

2.1.1.6 *Block 6 – Office of Collateral Interest*

Not used.

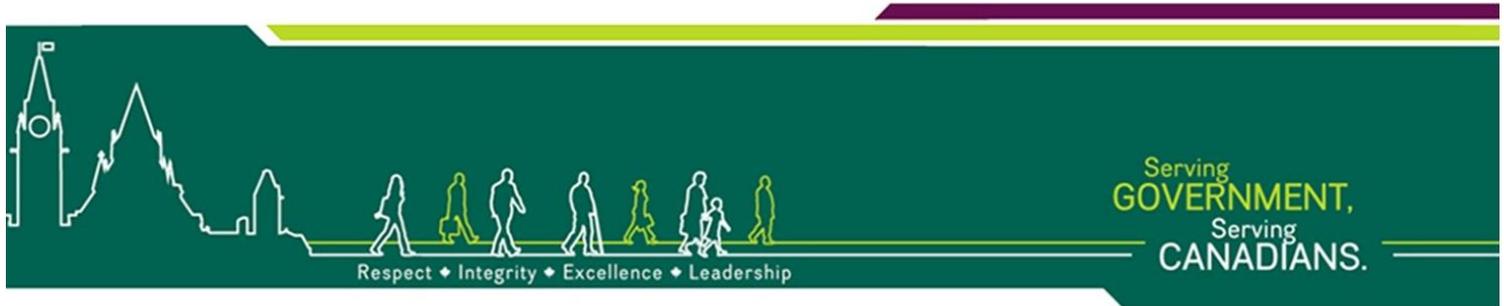
2.1.1.7 *Block 7 – Interrelationship*

The Statement of Work paragraph that references the DID.

2.1.1.8 *Block 8 – Originator*

Not used.





2.1.1.9 *Block 9 – References*

This points to the standard(s) to be used for completion of DI.

2.1.1.10 *Block 10 – Preparation Instructions*

This provides the preparation details for the format and for the content in the DID.



2.2 PM-001 Project Schedule

DATA ITEM DESCRIPTION (DID)		DND Form 1409
1. TITLE Project Schedule		2. IDENTIFICATION NUMBER CDRL-001/PM-001
3. DESCRIPTION/PURPOSE The schedule must include all project activities and must identify the major activities and milestones. The Project Schedule must reflect the time-phased sequence of the Contractor activities, deliverables and milestones for the Contractor's work on the VMT project. The Project Schedule must be used to depict the schedule status of the overall project.		
4. APPROVAL DATE	5. OFFICE OF PRIMARY INTEREST)	6. OFFICE OF COLLATERAL INTEREST
7. INTERRELATIONSHIP 3.2.1		
8. ORIGINATOR		9. REFERENCES
10. PREPARATION INSTRUCTIONS 10.1 The Project Schedule must include the Contractor's major and significant events, deliverables, milestones and summary activities. The information on the Project Schedule must be in sufficient detail to monitor the progress of the work, and to facilitate the coordination of Government Property and resources being provided by Canada. The Project Schedule must include: 10.1.1 a tracking Gantt chart showing the contract work elements;		



10.1.2 major contract milestones;

10.1.3 all meetings;

10.1.4 production start, completion and dates for each deliverable;

10.1.5 on-site Acceptance Test dates; and

10.1.6 update submissions must be in the form of a re-issuance of the complete Project Schedule. The Project Schedule status reporting requirements must include progress indications and planned or actual schedule slippage/accelerations of the current schedule must be clearly shown in relation to the baseline schedule.



2.3 PM-002 Progress Report

DATA ITEM DESCRIPTION (DID)		DND Form 1409
1. TITLE Progress Report		2. IDENTIFICATION NUMBER CDRL-002/PM-002
3. DESCRIPTION/PURPOSE The Progress Report summarizes the Contractor's progress in relation to the Contract.		
4. APPROVAL DATE	5. OFFICE OF PRIMARY INTEREST	6. OFFICE OF COLLATERAL INTEREST
7. INTERRELATIONSHIP 3.3.1		
8. ORIGINATOR		9. REFERENCES
10. PREPARATION INSTRUCTIONS		



10.1 The Progress Report must be submitted in Contractor format. The Progress Report must include the following information:

- 10.1.1 an update on risks and issues containing, as a minimum: description of issues and associated risks, their impact, their likelihood, proposed mitigation and response action;
- 10.1.2 a narrative detailing design changes, progress against milestones, expected date of completion of near milestones, problem areas, and work-around plans where required;
- 10.1.3 significant incidents including, as a minimum, significant technical, supply or quality problems, anticipation of a significant schedule slippage involving the work;
- 10.1.4 production status against each deliverable and the timing of significant stages of production, testing, and delivery;
- 10.1.5 all minutes of all meetings, in Contractor format, within the reporting period; and
- 10.1.6 outstanding action items.



2.4 SE-001 System Engineering Management Plan

DATA ITEM DESCRIPTION (DID)		DND Form 1409
1. TITLE Systems Engineering Management Plan (SEMP)		2. IDENTIFICATION NUMBER CDRL-003/SE-001
3. DESCRIPTION The SEMP describes the engineering processes, methods and designs used by the contractor to ensure system integration and product performance. The SEMP describes the Contractor's Plan for the conduct and management of a fully integrated engineering effort that satisfies the technical requirements of the Contract.		
4. APPROVAL DATE	5. OFFICE OF PRIMARY INTEREST	6. OFFICE OF COLLATERAL INTEREST
7. APPLICATION / INTERRELATIONSHIP 4.1.2		
8. ORIGINATOR		9. REFERENCES
10. PREPARATION INSTRUCTIONS 10.1 The SEMP must be in Contractor format. The SEMP must contain the following information:		



- 10.1.1 Introduction: defines the scope and purpose of the plan, together with applicable definitions, references and related documents;
- 10.1.2 Management: this section must explain the engineering management plan to deliver all technical deliverables, from design to acceptance;
- 10.1.3 Design: this section must overview the selection of systems (hardware and software), subsystems and determine their performance requirements and interfaces. The design must provide an overview of the plans and methods used to aggregate, interconnect, and test the hardware, software, and other components so as to deliver the specified functionality. The SEMP must reference the following associated plans and reports, as a minimum, for amplifying details:
 - 10.1.3.1 Configuration Management Plan;
 - 10.1.3.2 Acceptance Plan; and,
 - 10.1.3.3 Quality Assurance Plan.



2.5 SE-002 Acceptance Plan

DATA ITEM DESCRIPTION (DID)		DND Form 1409	
1. TITLE Acceptance Plan (AP)		2. IDENTIFICATION NUMBER CDRL-004/SE-002	
3. DESCRIPTION/PURPOSE The AP must describe the Contractor's overall plan to demonstrate product conformance to the Contract requirements. The AP must describe how the Contractor must verify the serviceability, functionality and configuration then verify product conformance to the approved Design Baseline. After testing, a new version of the AP must be submitted to analyze the test results noted down in the Acceptance Test Procedures (ATPs), to demonstrate product conformance.			
4. APPROVAL DATE	5. OFFICE OF PRIMARY INTEREST	6. OFFICE OF COLLATERAL INTEREST	
7. INTERRELATIONSHIP 4.3.1			
8. ORIGINATOR		9. REFERENCES	



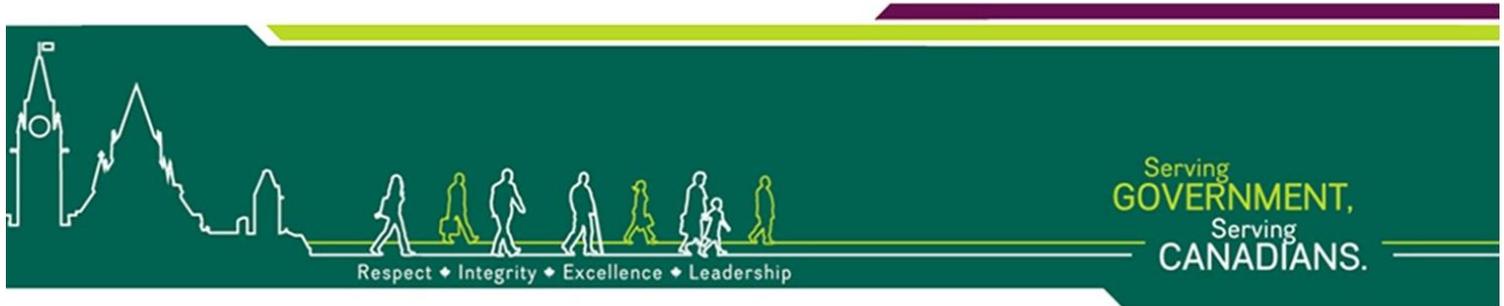
<p>10. PREPARATION INSTRUCTIONS</p> <p>10.1 The AP must be in Contractor's format.</p> <p>10.2 The AP must describe how the Contractor intends to manage all acceptance testing activities to demonstrate product conformance to the contract requirements. The AP must describe how the Contractor will verify the serviceability and prove product conformance to the approved Design Baseline.</p> <p>10.3 The AP must arrange for the the development of ATPs , the execution of the tests, and the analysis of test results.</p> <p>10.4 The AP must demonstrate that the system meets the work requirements through reviews of subsystems, component analysis, and test results. Following installation, test results must be reported in Acceptance Test Procedures (ATPs), but summarized and analyzed in subsequent submissions of the AP.</p> <p>10.5 The AP must outline the coordination mechanisms to ensure participation of DND TA in the testing activities.</p>	



2.6 SE-003 Acceptance Test Procedures

DATA ITEM DESCRIPTION (DID)		DND Form 1409	
1. TITLE		2. IDENTIFICATION NUMBER	
Acceptance Test Procedures (ATPs)		CDRL-005/SE-003	
3. DESCRIPTION/PURPOSE			
ATPs document the criteria and acceptance procedures to demonstrate that the product meets the requirements of the contract following installation.			
4. APPROVAL DATE	5. OFFICE OF PRIMARY INTEREST	6. OFFICE OF COLLATERAL INTEREST	
7. INTERRELATIONSHIP			
4.4.1			
8. ORIGINATOR		9. REFERENCES	





10. PREPARATION INSTRUCTIONS

- 10.1 ATPs describe the tests that define the criteria for the acceptance of the final delivered product.
- 10.2 The ATPs must be formatted to combine the procedures and results into one document. Included in the format will be columns for Contractor and DND initials to verify results and to document action items resulting from testing, as required.



2.7 SE-004 Configuration Management Plan

DATA ITEM DESCRIPTION (DID)		DND Form 1409
1. TITLE Configuration Management Plan (CMP)		2. IDENTIFICATION NUMBER CDRL-006/SE-004
3. DESCRIPTION/PURPOSE The CMP must describe how the Contractor will establish and maintain control of the VMT and PTT configuration.		
4. APPROVAL DATE	5. OFFICE OF PRIMARY INTEREST	6. OFFICE OF COLLATERAL INTEREST
7. INTERRELATIONSHIP 4.5.1		
8. ORIGINATOR		9. REFERENCES
10. PREPARATION INSTRUCTIONS 10.1 The CMP must be prepared and submitted for DND approval in Contractor format IAW the approved SEMP. Where reference to other documents is made from within the CMP, such documents must be attached as annexes to the CMP.		



10.2 The CMP must include all approved design changes, deviations and waivers as annexes.

2.8 SE-005 Design Change, Deviations, and Waivers

DATA ITEM DESCRIPTION (DID)		DND Form 1409
1. TITLE Design Changes, Deviations and Waivers	2. IDENTIFICATION NUMBER CDRL-007/SE-005	
3. DESCRIPTION/PURPOSE A Design Change is a proposed change in the configuration item after establishment of the Design Baseline. It contains the documentation and data describing the change. A deviation authorizes departure from a particular contractual requirement. A Deviation is a specific written authorization, granted prior to the manufacture of an item, to depart from a particular performance or design requirement of a specification, drawing or other document for a specific number of units or a specific period of time. A deviation differs from an engineering change in that an approved engineering change requires corresponding revision of the documentation defining the affected item whereas a deviation does not contemplate revision of the application specification or drawing. A waiver authorizes acceptance of an item not conforming to contractual requirements. A Waiver is a written authorization to accept an item, which during production or after having been submitted for inspection, is found to depart from specified requirements, but nevertheless, is considered suitable for use "as is" or after rework by an approved method.		
4. APPROVAL DATE	5. OFFICE OF PRIMARY INTEREST	6. OFFICE OF COLLATERAL INTEREST

7. INTERRELATIONSHIP

4.5.5

8. ORIGINATOR

9. REFERENCES

D-02-006-008/SG-001

10. PREPARATION INSTRUCTIONS

10.1 The Contractor must prepare and submit Design Changes, Requests for Waivers and Deviations IAW D-02-006-008/SG-001.



2.9 ILS-001 Training Plan

DATA ITEM DESCRIPTION (DID)		DND Form 1409	
1. TITLE Training Plan (TP)		2. IDENTIFICATION NUMBER CDRL-008/ILS-001	
3. DESCRIPTION/PURPOSE The TP must provide all information required to deliver on-site training to DND instructors to enable operation of the VMTs and PTTs.			
4. APPROVAL DATE	5. OFFICE OF PRIMARY INTEREST	6. OFFICE OF COLLATERAL INTEREST	
7. INTERRELATIONSHIP			



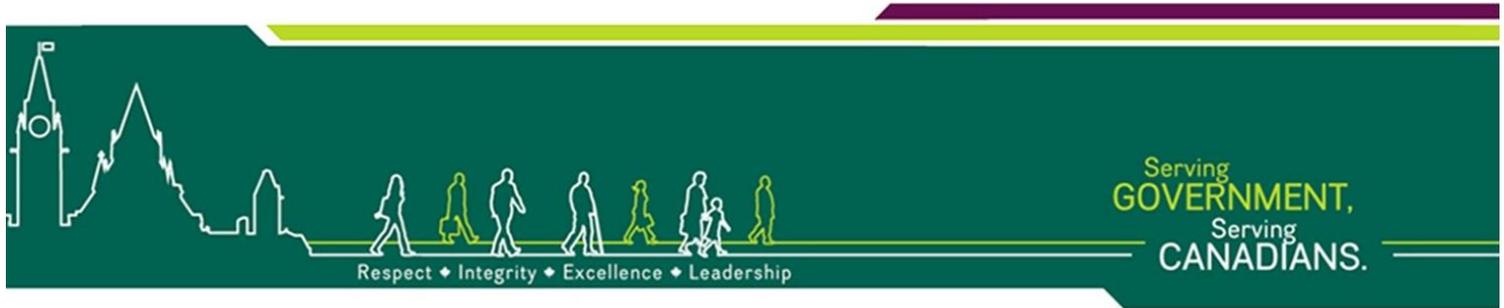
5.1.2	
8. ORIGINATOR	9. REFERENCES
<p>10.0 PREPARATION INSTRUCTIONS</p> <p>10.1 The TP must be prepared in Contractor format and must describe how the Contractor will provide training to DND instructors. Training must be in sufficient depth to enable:</p> <ul style="list-style-type: none"> a. Instructors to operate the VMT and PTTs in their training role without assistance; and b. Editing of Lesson Plans without assistance. <p>10.2 The TP must include the preparation of all documentation, and all other information and material necessary to conduct the training of the instructors.</p> <p>10.3 The TP must be tailored to support an initial cadre of approximately 64 DND instructing staff. All 64 instructional staff must be trained on the VMTs. The breakdown for training on the PTTs is as follows:</p> <ul style="list-style-type: none"> a. Integrated Avionics PTT: approximately 32 AVS instructors b. Power Generation and Distribution PTT: approximately 32 AVN/AWS instructors c. Flight Control PTT: approximately 32 AVN/AWS instructors d. Landing Gear PTT: approximately 32 AVN/AWS instructors 	



2.10 ILS-002 Quality Assurance Plan

DATA ITEM DESCRIPTION (DID)		DND Form 1409	
1. TITLE Quality Assurance (QA) Plan		2. IDENTIFICATION NUMBER CDRL-009/ILS-002	
3. DESCRIPTION/PURPOSE The Contractors Quality Assurance (QA) Plan must define how the quality system requirements of ISO 9001:2008 will be met for the VMT and PTT.			
4. APPROVAL DATE	5. OFFICE OF PRIMARY INTEREST	6. OFFICE OF COLLATERAL INTEREST	
7. INTERRELATIONSHIP 5.4.2			
8. ORIGINATOR		9. REFERENCES ISO 9001:2008 ISO 10005:2005	





10. PREPARATION INSTRUCTIONS

10.1 General. The Contractor's Quality Plan must define how the quality system requirements of ISO 9001:2008 - Quality management systems will be met for the project.

10.2 Content of the Quality Plan. The content of the Quality Plan must be based on ISO 10005:2005: Quality management systems -- Guidelines for quality plans and the specific requirements of this DID.



2.11 ILS-003 VMT Operating Instructions

DATA ITEM DESCRIPTION (DID)		DND Form 1409
1. TITLE VMT Operating Instructions	2. IDENTIFICATION NUMBER CDRL-010/ILS-003	
3. DESCRIPTION/PURPOSE To provide VMT Operating Instructions manual to allow instructors and maintainers to operate the VMT.		
4. APPROVAL DATE	5. OFFICE OF PRIMARY INTEREST	6. OFFICE OF COLLATERAL INTEREST
7. INTERRELATIONSHIP 5.6.1.1		
8. ORIGINATOR	9. REFERENCES	



10. PREPARATION INSTRUCTIONS

- 10.1 The VMT manual must be the sole reference necessary for VMT operation. The manual will also be a reference handbook for operators and maintenance personnel who will need to operate the VMT for maintenance purposes. It must include descriptions of all VMT modes, and procedures. Descriptions must cover every control, button, switch, readout, and display affected by the program at the level required for efficient operation. Illustrations must be included to aid operators in locating controls. Equipment interconnections necessary for correct system operation must be included.
- 10.2 The VMT Operating Instruction must be provided in a format IAW Sharable Content Object Reference Model (SCORM) requirements to be uploaded to the Defence Learning Network.



2.12 ILS-004 PTT Operating Instructions

DATA ITEM DESCRIPTION (DID)		DND Form 1409
1. TITLE PTT Operating Instructions	2. IDENTIFICATION NUMBER CDRL-011/ILS-004	
3. DESCRIPTION/PURPOSE To provide PTT Operating Instructions manual to allow instructors and maintainers to operate the VMT.		
4. APPROVAL DATE	5. OFFICE OF PRIMARY INTEREST	6. OFFICE OF COLLATERAL INTEREST
7. INTERRELATIONSHIP 5.6.1.2		
8. ORIGINATOR	9. REFERENCES	
10. PREPARATION INSTRUCTIONS 10.1 The PTT manuals must be the sole reference necessary for PTT operation. The manual will also be a reference handbook for operators and maintenance personnel who will need to operate the PTT for maintenance purposes. It must include descriptions of all PTT modes, and procedures. Descriptions must cover every control, button, switch, readout, and display affected by the program at the level required for efficient operation. Illustrations must be included to aid		



operators in locating controls. Equipment interconnections necessary for correct system operation must be included.

10.2 The PTT Operating Instruction must be provided in a format IAW SCORM requirements to be uploaded to the Defence Learning Network.

2.13 ILS-005 Drawings and Maintenance Manuals

DATA ITEM DESCRIPTION (DID)		DND Form 1409
1. TITLE	2. IDENTIFICATION NUMBER	



Drawings & Maintenance Manuals		CDRL-012/ILS-005	
3. DESCRIPTION/PURPOSE To provide Engineering drawings, their associated lists and Maintenance Manuals that enable support to the VMT and PTTs over their lifecycle.			
4. APPROVAL DATE		5. OFFICE OF PRIMARY INTEREST	6. OFFICE OF COLLATERAL INTEREST
7. INTERRELATIONSHIP 5.6.1.3			
8. ORIGINATOR		9. REFERENCES	
		D-01-100-214/SF-000, Para 3.8.3	
10. PREPARATION INSTRUCTIONS 10.1 The Contractor must provide engineering drawings and maintenance manuals necessary to support the VMT and PTTs. 10.2 <u>Engineering Drawings</u> : The drawing set must conform to paragraph 3.8.3 of D-01-100-214/SF-000 and must include: 10.2.1 Drawings essential to accommodate installation, maintenance, removal, and repair of all equipment; 10.2.2 Drawings for all electrical schematics, cabling, interconnections, and wiring diagrams.			



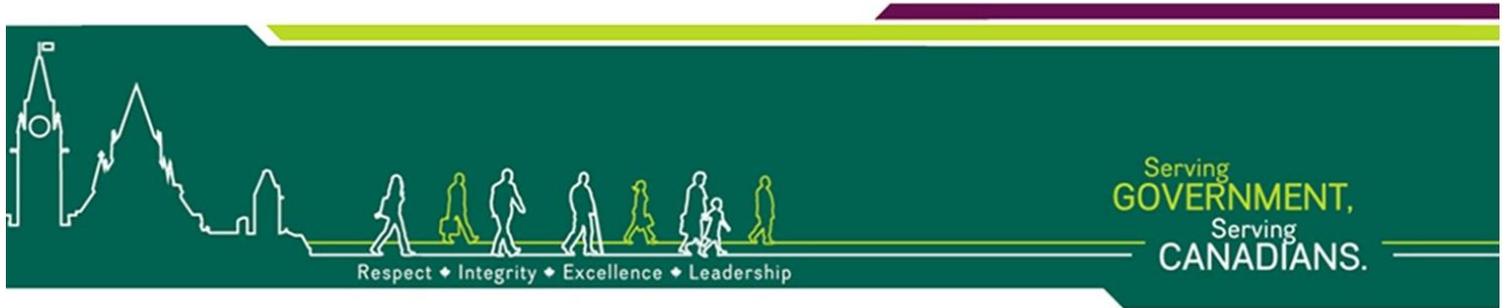
- 10.3 System Maintenance Manuals: Manuals must outline the scope and configuration of the system, and must augment and relate to manuals supplied with vendor equipment (e.g. computer). Manuals must include as a minimum:
- 10.3.1 operating procedures;
 - 10.3.2 guidance on routine servicing;
 - 10.3.3 system fault finding, use of maintenance and test programs, and corrections;
 - 10.3.4 a functional description showing the parameters and interrelationship of the equipment comprising the total system;
 - 10.3.5 illustrations, block, wiring, and system diagrams showing equipment inter-connection and signal paths;
 - 10.3.6 information on any modifications, special configuration or options to vendor equipment,
 - 10.3.7 information on fabricated cables and connectors peculiar to the system;
 - 10.3.8 information on special parts required which are not covered by individual manual parts lists; and
 - 10.3.9 information relating to system assembly/disassembly and setup procedures.
- 10.4 Vendor Publications: Publications prepared by manufacturers of commercial vendor equipment must be included with the publication set.



2.14 ILS-006 Software Documentation

DATA ITEM DESCRIPTION (DID)		DND Form 1409
1. TITLE Software Documentation		2. IDENTIFICATION NUMBER CDRL-013/ILS-006
3. DESCRIPTION/PURPOSE To provide software documentation package that will enable software use of the VMT throughout its life cycle.		
4. APPROVAL DATE	5. OFFICE OF PRIMARY INTEREST	6. OFFICE OF COLLATERAL INTEREST
7. INTERRELATIONSHIP 5.6.1.4		
8. ORIGINATOR		9. REFERENCES ISO/IEC 90003:2004
10. PREPARATION INSTRUCTIONS 10.1 The Contractor must deliver all software documentation required to operate and maintain VMT software over its lifecycle. Software documentation must conform to ISO/IEC 90003:2004 (version effective at contract signature). The documentation provided must include		





amendments to existing documents where applicable, and any new documents IAW the approved technical proposal.



2.15 ILS-007 Itemized Parts List

DATA ITEM DESCRIPTION (DID)		DND Form 1409
1. TITLE Itemized Parts List		2. IDENTIFICATION NUMBER CDRL-014/ILS-007
3. DESCRIPTION/PURPOSE To provide a comprehensive list of the parts available from the vendor to support PTT and VMT operation.		
4. APPROVAL DATE	5. OFFICE OF PRIMARY INTEREST	6. OFFICE OF COLLATERAL INTEREST
7. INTERRELATIONSHIP 5.3.1		
8. ORIGINATOR		9. REFERENCES
10. PREPARATION INSTRUCTIONS 10.1 The Contractor must submit an itemized list of the parts required to support the PTT and VMT operation. As a minimum, for each item, the list shall include the following: 10.1.1 OEM and source of supply;		

10.1.2 OEM part number;

10.1.3 Contractor part number;

10.1.4 Unit cost; and

10.1.5 Quantity per unit.

2.16 ILS-008 Instructor Operator Training Package

DATA ITEM DESCRIPTION (DID)		DND Form 1409
1. TITLE Instructor Operator Training Package	2. IDENTIFICATION NUMBER CDRL-015/ILS-008	
3. DESCRIPTION/PURPOSE The Instructor Training Package must provide instructors with the required knowledge to operate and instruct scenarios with the PTTs and VMTs, to perform operator level daily maintenance actions on the VMT suites and PTT devices, including installing software updates, upgrades and patches on the VMT suites.		
4. APPROVAL DATE	5. OFFICE OF PRIMARY INTEREST	6. OFFICE OF COLLATERAL INTEREST
7. INTERRELATIONSHIP 5.1.3		
8. ORIGINATOR	9. REFERENCES	



10. PREPARATION INSTRUCTIONS

10.1 The Instructor Training Package must be in the Contractor's format.

10.2 The Instructor Training Package images must be printed in colour.

10.3 CONTENT

10.3.1 The Contractor must design the training to enable DND personnel to:

10.3.1.1 use devices to instruct apprentices; and

10.3.1.2 develop and edit lesson plans without assistance.

10.3.2 The Contractor must provide on-site initial cadre training (in Borden) to 64 instructors IAW the approved TP and project schedule.

10.3.3 The training package must be sufficient for the instructors to operate, develop and teach scenarios with the VMT.

10.3.4 The training package must be sufficient for instructors to operate, develop and teach scenarios, with the PTTs.

10.3.5 The training data package must be supplied electronically and conform to instructional design best practice. The design must make best use of distributed learning and include a hands-on portion to take place on the training device(s) for demonstrations and practice. This requirement is subject to modification based on a vendor developed training analysis and final training plan.

10.3.6 The instructor course must describe the operation of all equipment in support of all instructional requirements. The course must reflect the lesson plans and other material that will be used on an ongoing basis to train new instructors in the future. It is expected that any individual will be able to operate the trainer even if they possesses no previous training experience.



2.17 ILS-009 Student Training Package

DATA ITEM DESCRIPTION (DID)		DND Form 1409
1. TITLE Student Training Package	2. IDENTIFICATION NUMBER CDRL-016/ILS-009	
3. DESCRIPTION/PURPOSE The Student Training Package (STP) details the simulated unserviceability, including corrective actions, for every simulated fault included with the VMT and PTTs.		
4. APPROVAL DATE	5. OFFICE OF PRIMARY INTEREST	6. OFFICE OF COLLATERAL INTEREST
7. INTERRELATIONSHIP 5.2.1		
8. ORIGINATOR	9. REFERENCES	
10. PREPARATION INSTRUCTIONS 10.1 The Student Training Package must be in the Contractor's format. 10.2 The Student Training Package images must be printed in colour.		



10.3 CONTENT

10.3.1 The Student Training Package must meet these requirements by including the following as a minimum:

10.3.1.1 Descriptions of each fault, how to trigger them, what the effects are and what the resolving solution is; and

10.3.1.2 Technical manuals for the maintenance procedures to be performed by the student in the simulated VMT or PTT environment.

10.3.2 Technical manuals must include the following:

10.3.2.1 General description of the system and components;

10.3.2.2 System diagrams;

10.3.2.3 Functional check-out procedures;

10.3.2.4 Troubleshooting flow charts;

10.3.2.5 Parts removal and installation procedures;

10.3.2.6 Parts lists;

10.3.2.7 Parts location diagrams;

10.3.2.8 Block diagrams; and

10.3.2.9 Wiring diagrams.



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Annex E – Training Availability Requirement (TAR)

Maximum possible training days / year	260 days	52 weeks X 5days
Block leave - 5 weeks / year	25 days	5 weeks X 5 days
Statutory Holidays	7 days	Not including Xmas/New Year (3) or August Civic (1) (part of block leave)
Available training days / year	228 days	Available = max – block leave – stats
Training hours per day	8.5 hours	0730 hrs – 1600 hrs daily
Maximum training hours per year	1938 hours	Available training days * training hours per day

Table 1: CFSATE Typical Yearly Training Breakdown

Equipment	Number of Devices	Expected Training Requirement*	Maximum Allowable Hours Unserviceable*
VMT Suites	3	1938	102
Landing Gear PTT	8	1190	85
Control Surface PTT	8	850	85
Power Generation Distribution PTT	3	1020	85
Integrated Avionics Trainer PTT	6	850	85

* hours per device per year

Table 2: VMT Suite and PTT Device Training Availability Requirement