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Client Reference No. - N° de référence du client W6451-RFI01	**GETS Ref. No. - N° de réf. de SEAG** PW-$$BL-298-25611
File No. - N° de dossier 298bl.660BL-120002	**CCC No./N° CCC - FMS No./N° VME**
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JOINT UNMANNED SURVEILLANCE AND TARGET ACQUISITION SYSTEM (JUSTAS) PROJECT REQUEST FOR INFORMATION (RFI)

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Acronyms

AAA - Anti-Aircraft Artillery
ACO - Airspace Control Order
ADS-B - Automatic Dependent Surveillance - Broadcast
AIS - Automatic Information System
AOI - Area of Interest
AOR - Area of Responsibility
ARTC - Artic
ATC - Air Traffic Control
ATO - Air Tasking Order
AVO - Air Vehicles Operators
ATOL - Automatic Takeoff and Landing System
AWS - Air Weapons System
BDA - Battle Damage Assessment
BG - Battle Group
BLOS - Beyond line-of-sight
BRU - Bomb Release Unit
CAF - Canadian Armed Forces
CAS - Close Air Support
CC - Crew Change
CJOC - Canadian Joint Operations Command
CSE - Communications Security Establishment
CRPA - Controlled Radiation Pattern Antennas
CTL - Collection Task List
DAR - Defense Advanced Research
DOB - Deployed Operation Base
ESM - Electronic Support Measures
EO - Electro-Optics
EO/IR - Electro-Optics/Infra-Red
EXPD - Expeditionary
FEP - Five Eyes
FAC - Forward Air Controller

FAM - Fighting Aged Males

FF - Friendly Forces

FM - Fairness Monitor

FOL - Forward Operating Location

FSR - Field Support Representative

FVEY - Five Eyes

GC - Government of Canada

GCS - Ground Control Stations

GDT - Ground Data Terminals

GETS - Government Electronic Tendering System

GFE - Government Furnished Equipment

GFS - Government Furnished Services

GMTT - Ground Moving Target Indicator

GPS - Global Position System

GSP - GC Security Policy

HLMR - High Level Mandatory Requirements

HPT - High Payoff Target

IA - Imagery Analyst

IAW - Indications, Analysis and Warning

IAW SOP - Indications, Analysis and Warning Standard Operating Procedure

ICT - Initial Cadre Training

IETM - Interactive Electronic Technical Manuals

I+F- Interim + Full JUSTAS

IFF - Integrated Identification Friend or Foe

IFR - Instrument Flight Rules

INS - Inertial Navigation System

IR - Infra-Red

ISP - Industrial Security Program

ISR - Intelligence, Surveillance and Reconnaissance

ISS Phase - In-Service Support Phase

ITB - Industrial and Technological Benefits

IUC - Interim UAS Capability

JCOC - Joint Combined Operations Centre

JFACC - Joint Force Air Component Commander

JFC - Joint Force Commander

JTFN - Joint Task Forces North

JTF - Joint Task Force

JTF-Afg - Joint Task Force Afghanistan

JPTL - Joint Prioritized Target List

JTAC - Joint Terminal Attack Controllers

L - Local Time

L&R - Launch and Recovery

LD - Laser Designator

LO - Liaison Officer

LOS - Line-of-sight

LOT - Line of tasking

LRE - Launch Recovery Element

LRF - Laser Range Finder

MANPADS - Man-portable air defence systems

MAR - Maritime

MCE - Mission Control Element

MOB - Main Operating Base

MND - Minister of National Defence

MSOC - Marine Security Operations Centre

MTOW - Maximum Take Off Weight

NRE- Non-Recurring Engineering

NWP - Northwest Passage

OEM - Original Equipment Manufacturer

OFFSTA - Off station

ONSTA - On Station

OPSEC - Operations Security

Op Tempo - Operational Tempo

OVRL- Overland

PBN - Performance Based Navigation

PID - Positive ID

PGM - Precision Guided Munitions

PNP - Portuguese National Police

PO - Payload Operators

POL - Pattern of Life

PWCS - Polar Weather and Communications Satellite

RCAF - Royal Canadian Air Force

RCMP - Royal Canadian Mounted Police

RCC - Rescue Coordination Centre

ROE - Rules of Engagement

RSO - Remote split operations

RVT - Remote Video Terminal

SAA - Sense and Avoid System

SAASM - Selective Availability Anti-Spoofing Module

SAR - Synthetic Aperture Radar

SAR - Search and Rescue

SIGINT - Signals Intelligence

SIGINT A - Signals Intelligence Analyst

SKAD - Survival Kit Air Droppable

SOR - Statement of Operational Requirements

Sqn - Squadron

SST - Steady State Training

TACP -Traffic Air Control Party

TCAS - Traffic Collision Avoidance System

TDL - Tactical Data Links

T&E - Test and Evaluation

TOI - Target of Interest

TRNG - Training

UA - Unmanned Aircraft

UAS - Unmanned Aircraft Systems

VFR - Visual Flight Rules

VHF - Very High Frequency

VP - Value Proposition

WGS - Wideband Global SATCOM

YFR - Yearly Flying Rate

YMCA - Y-Code/M-Code/Course-Acquisition

JOINT UNMANNED SURVEILLANCE AND TARGET ACQUISITION SYSTEM (JUSTAS) PROJECT

REQUEST FOR INFORMATION (RFI)

1.0 Purpose and Nature of the Request for information (RFI)

1.1. Public Services and Procurement Canada (PSPC) is requesting Industry feedback regarding long range, long endurance Unmanned Aircraft Systems (UAS) for the Government of Canada (GC), the Department of National Defence (DND) and the Canadian Armed Forces (CAF).

1.2. The objectives of this RFI are to:

a. share with Industry, the GC and the CAF long range, long endurance UAS requirements;

b. seek feedback from Industry on potential options to meet GC and CAF's needs and associated capability, schedule, cost, risk and economic benefits; and

c. utilize the feedback from Industry to develop detailed cost estimates and refine planning documents leading towards Definition phase funding approval.

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

1.4. 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.

1.5. Respondents are encouraged to identify, in the information they share with Canada, any information that they feel is proprietary or confidential. Canada will handle the responses in accordance with the *Access to Information Act*. Canada will not disclose proprietary or commercially sensitive information concerning Respondents or third parties, except and only to the extent required by law. For more information, please see http://laws-lois.justice.gc.ca/eng/acts/a-1/.

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

1.7. Participation in this RFI 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 RFI. Similarly, participation in this RFI is not a condition or prerequisite for the participation in any potential subsequent solicitation.

1.8. Respondents will not be reimbursed for any cost incurred by participating in this RFI. Responses to this RFI will not be returned to Respondents.

1.9. Responses will not be formally evaluated. However, the responses received may be used by Canada to develop or modify the procurement approach. Canada will review all responses received by the RFI closing date. Canada may, in its discretion, review responses received after the RFI closing date.

1.10. A review team composed of representatives of DND, CAF, PSPC and Innovation, Science and Economic Development Canada (ISEDC) will review the responses. Canada reserves the right to hire any independent consultant, or use any GC resources that it considers necessary to review any response. Not all members of the review team will necessarily review all responses.

2.0 Background Information

2.1 In support of the enduring Canadian defence strategy roles and missions, UAS will play a significant role in the CAF "system of systems" approach to Intelligence, Surveillance and Reconnaissance (ISR), with emphasis on the defence of Canadian territory, including the Arctic and maritime approaches, and a capability to support ISR and precision strike in support of deployed forces. As a result, the CAF has a need to field and support interoperable, network-enabled UAS to provide ISR, Target Acquisition, and a weapons carrying and delivery capability in support of CAF operations worldwide.

2.2 The conclusion of the Canadian mission to Afghanistan and the termination of the lease of the Heron UAS left Canada with no persistent UAS capability to support domestic and expeditionary taskings. Since the end of the Afghanistan mission, the CAF deployed, and continues to deploy, CF188 and CP140 on a number of international deployments. The Canadian contribution to these deployments could have been augmented by a UAS if that system had been available.

2.3 Following the expiration of the Heron contract in 2011, the JUSTAS project issued an RFI in 2012 to gather the required data from interested parties to prepare for the next phase of the project. A new RFI is required to address aspects of the project that were not covered in the 2012 RFI.

2.4 The JUSTAS project is investigating a number of options to deliver the strategic/operational level UAS for the CAF. The options being examined include:

a) Interim UAS Capability (IUC) - Acquisition of an interim capability that will deliver a single Line of Tasking[1] (LOT) in the short term. The interim capability would be for a fixed base period (assume five (5) years for costing purposes) with options for extension (multiple one-year extensions);

b) Interim + Full JUSTAS (I+F) - Acquisition of an interim capability that will deliver a single LOT in the short term to be followed by an option to meet the full JUSTAS High Level Mandatory Requirements (HLMR); and

c) Full JUSTAS - Acquisition of a capability to meet the full JUSTAS HLMR.

2.5 The intent of the interim capability is to provide an operational capability as soon as possible following contract award, to provide an opportunity for the CAF to gain operational and support experience and to allow for certain technologies, and certification and regulatory environments to fully mature prior to transitioning to the full JUSTAS capability. In addition, lessons learned from the acquisition and operation of this interim capability could inform the full UAS capability requirements. The operational focus of the interim capability is to conduct ISR missions in the domestic Area of

[1] A line of tasking (LOT) is defined as the personnel, air segment, ground segment, support and etc. required to sustain a single combat air patrol (orbit) up to 24 hours per day, seven days per week.

Responsibility (AOR); however, the ability to support expeditionary missions is highly desirable. The full JUSTAS capability is required to address all HLMR and support domestic and expeditionary missions.

2.6 Respondents are highly encouraged to offer alternatives to the project concepts and strategies outlined in this RFI. These alternatives should be accompanied by comprehensive arguments and analysis that clearly demonstrate how the proposed solution to the operational requirement is more advantageous to Canada with regard to operational suitability, effectiveness, schedule, cost and risk.

2.7 This RFI is one step of the Industry Engagement process by which the JUSTAS project seeks input on availability of technology, ability for industry to deliver and data necessary to develop detailed cost estimates for the required UAS capability. The intent, following receipt of RFI responses from Industry, is to continue interactive engagement with Industry throughout the project phases leading to the Request for Proposal (RFP) in accordance with the Defence Procurement Strategy.

3.0 Potential Work Scope

3.1 The Project will acquire and field a fully integrated and interoperable UAS weapon system. The JUSTAS Project's scope of work could include activities for the IUC, the Full JUSTAS or the two combined to deliver I+F as follows:

Item	IUC	Full JUSTAS
Project Management	X	X
Acquire one (1) UAS, comprising of up to four (4) Unmanned Aircraft (UA), that meet the user's approved operational requirements	X	
Acquire sufficient UAS to meet the full JUSTAS HLMR		X
Acquire four deployable Ground Control Stations (GCS), Ground Data Terminals (GDT) and ground support equipment required for the operation and support of the UAS capability	X	X
Acquire four fixed Ground Control Stations (GCS), Ground Data Terminals (GDT) for installation in the permanent JUSTAS infrastructure		X
Contracted Maintenance and In-Service Support for the duration of the interim capability	X	
Provision of a twenty years in-service support framework for the UAS with 1st and limited 2nd level maintenance to be provided by RCAF personnel		X
Acquire initial spares sufficient for 30 days of deployed operations		X
Acquire equipment and services to be furnished to the Contractor as Government Furnished Equipment (GFE)/Government Furnished Services (GFS)	X	X
Acquire technical data packages appropriate to Canada's needs as defined in Section V Costs V.c.3. and V.d.9.i.	X	X
Acquire satellite and terrestrial communications components and services for command and control of the UA and transmission of sensor data to ground facilities	X	X
Acquire infrastructure to support UAS, personnel, and related activities	X	X

Item	IUC	Full JUSTAS
Contracting of Ab-Initio Training for UAS personnel operating the UA, its sensors or analysing sensor data from the GCS. Annual serials will be required to train incoming personnel	X	
Contracting of Initial Cadre Training for UAS personnel operating the UA, its sensors or analysing sensor data from the GCS		X
Acquire system-specific training systems/packages for operations, intelligence, and maintenance personnel		X
Conduct of all activities required for introduction to service, including airworthiness and security certification and accreditation	X	X
Acquire War Stocks (If the interim solution is weapons-capable, DND will also acquire weapons for the interim IAW departmental policy)		X

Table 1 - JUSTAS Project Scope

3.2 The following JUSTAS HLMR were developed using input from the capability based planning process, CAF and allies' lessons learned, recent operations and direction from the GC. The JUSTAS team is requesting information regarding current capabilities that best fit the HLMR.

3.3 For the Full JUSTAS, the proposed system will need to meet all HLMR. For the IUC, not all HLMR will be considered mandatory. The subsections immediately following Table 2 amplify each HLMR and the applicability to the IUC.

3.4 To help Respondents assess their proposed system's ability to meet the HLMR, representative mission scenarios have been included as Annexes B through H. As a whole, the seven (7) scenarios cover all the HLMR and the typical context within which the JUSTAS capability is intended to be used.

Measure of Capability	JUSTAS High Level Mandatory Requirements
Awareness	**Surveillance and Target Acquisition:** Ability to conduct multi-spectral intelligence, surveillance and reconnaissance (ISR) in all weather conditions, day and night, to obtain positive identification and precision targeting data of land and sea surface targets. To include Electronic Support Measures / Signals Intelligence (SIGINT) collection.
Interoperability	Ability of the system to provide services and data to, and accept services and data from, joint and combined forces.
Reach	**Range**: Ability of the Unmanned Aircraft (UA) to reach to the edge of Canada's domestic Area of Responsibility (AOR) from the Main Operating Base or a suitable Deployed or Forward Operating Location.
Persistence	**Endurance**: Under reconnaissance configuration, the ability to search, detect, identify and persistently track a contact at the edge of Canada's AOR. Additionally, for a UA to manned aircraft turnover, sufficient endurance to persistently track the contact for a minimum of six hours and for a UA to UA turnover, sufficient endurance to affect a turnover.
Responsiveness	**Operational Suitability**: Ability to conduct sustained operations worldwide in appropriate classes of airspace, under specified adverse weather conditions. **Speed**: In a force application configuration, ability to provide kinetic effects on a target 150 km from the UA within 30 minutes of a request for support. In the reconnaissance configuration, sufficient speed to overcome the historical environmental conditions within the Canadian AOR. **Dynamic Control**: Ability to dynamically control the unmanned aircraft and payload, in near-real time, under line-of-sight (LOS), beyond line-of-sight (BLOS), and remote split operations (RSO), and respond to situational changes and new taskings. **Operational Tempo**: Sufficient operational and training systems, infrastructure, and logistical support to sustain: a single line of operation for force generation / employment in Canada; and two separate 24/7 lines of operation from a single deployment location (in Canada or overseas).
Survivability	Ability to operate in low-to-medium threat environments.
Lethality	**Force Application**: Capable of enabling Joint Fires and carrying and employing precision-guided munitions.
Flexibility/ Growth Capacity	The UA must possess the flexibility, growth capacity, and standard interfaces required to integrate new payloads to support enhanced overland capabilities and maritime domain awareness.

Table 2 - JUSTAS High Level Mandatory Requirements

3.5 Although it is up to the Respondent to define what sub-systems and payloads will be required to meet the HLMR, DND has provided a list of components (Table 3) that it believes should be part of the

proposed solution. Respondents should view the table as indicative of capabilities required to meet the HLMR. They should state in their response which components will or will not be included in their proposed system and how they plan to replace the capabilities provided by these omitted components. They should also identify any additional components (not part of Table 3) that are part of their proposed system, or will need to be integrated in order to meet the HLMR.

Full JUSTAS	
Reconnaissance Mission Configuration	**Force Application Configuration**
Electro-Optics/Infra-Red Turret (EO/IR) w/Laser Range Finder (LRF)	EO/IR w/LRF and Laser Designator (LD)
Synthetic Aperture Radar (SAR) with Overland and Maritime Modes	SAR with Overland and Maritime Modes
Automatic Information System (AIS)	AIS
Electronic Support Measures (ESM)	ESM
Automatic Takeoff and Landing System (ATOL)	ATOL
Traffic Collision Avoidance System (TCAS)	TCAS
Automatic Dependent Surveillance - Broadcast (ADS-B)	ADS-B
Sense and Avoid System (SAA)	SAA
Signals Intelligence (SIGINT) Payload	SIGINT
Dual U/VHF Radios	Dual U/VHF Radios
Line of Sight (LOS) Command Link	LOS
Beyond Line of Sight (BLOS) Command Link with Backup Link	BLOS with Backup Link
Link-16	Link-16
Mode 4/5 IFF	Mode 4/5 IFF
Type 1 Crypto	Type 1 Crypto
De-Icing and Anti Icing System	De-Icing/Anti Icing System
	Weapons

Table 3 – Expected UAS Sub-Systems

3.6 To meet the capability defined by the HLMR, the Interim UAS capability will need, as a minimum, the components listed in Table 4.

Interim UAS Capability
EO/IR w/LRF and LD
SAR
ESM
ATOL
Dual U/VHF Radios
LOS
BLOS (Ka or Ku) with Backup Link
Mode 4/5 IFF
Type 1 Crypto
De-Icing/Anti Icing System

Table 4 - Minimum Equipment for IUC

3.7 It is recognized that a number of the sub-systems required to meet the HLMR will be acquired by the GC and provided to the contractor as GFE for integration on the UAS.

3.8 The sub-sections that follow amplify each HLMR, summarize the key operational requirements from the JUSTAS Statement of Operational Requirements (SOR) and indicate the applicability to the IUC.

Awareness

3.9 The UA will carry a suite of sensors that will allow the crew to conduct surveillance, reconnaissance and information operations. Specifically, the UA will carry a stabilized sensor turret that enables the crew to covertly detect, identify and track targets (at least as small as humans with weapons), and obtain targeting data, day or night, while remaining clear of surface-based threat systems. Full motion video will be available for visual, near IR and IR wavelengths. The sensor turret will also be capable of determining the range to the target, its location and designating the target for self or third party engagement. In addition, the UA will be expected to carry a synthetic aperture radar capable of operating in the maritime environment, producing high-resolution spot images and strip maps, and detecting ground moving targets. An integrated Identification Friend or Foe (IFF) interrogator will be required. The UA will be equipped with an Electronic Support Measures (ESM) system/Signals Intelligence system (SIGINT) to detect, identify and locate ground and airborne electronic emitters. Finally, the UA will be equipped with an Automatic Identification System (AIS) receiver.

3.10 As a minimum, the interim capability will consist of an EO/IR turret, synthetic aperture radar and ESM system as described in this section.

Range and Endurance

3.11 The requirement for endurance at a given range is related primarily to the Arctic and maritime domain awareness missions (included as Annex B, C and D) in which the UA (with appropriate payloads) will be expected to transit to distant regions of Canada's maritime and Arctic AOR for surveillance and search and rescue (SAR) and remain on station for extended periods of time prior to returning to base. Specifically, the UA, in Reconnaissance configuration (defined in Table 3), must be capable of transiting to the outer edge of Canada's maritime AOR and the Canadian SAR Region (SRR), and be capable at that range to search, detect, localize, track, classify, identify, and monitor a contact of interest. The required endurance of the UA includes the following:

a) The UA in Reconnaissance configuration must provide the operator the following capabilities as detailed in the maritime scenario at Annex C:
   - The ability to search, detect, identify, persistently track a Vessel of Interest (VOI), and execute a turnover with another aviation asset at the edge of Canada's AOR;
   - For a UA to manned aircraft turnover, have sufficient endurance to persistently track the VOI for a minimum of six hours prior to the turnover (assumed time for a manned aircraft to respond and complete handover), and once turnover and/or on station period is complete, return to base;
   - For a UA to UA turnover, have sufficient endurance to effect a turnover (dependent on the response characteristics of the UA (speed)); and once turnover and/or on station period is complete, return to base.

b) Sufficient reserves or endurance to meet the following fuel requirements:
   - fuel for flight to the destination;
   - plus five per cent of the flight-planned fuel to destination;
   - plus two hours thereafter at the normal holding consumption (with approach fuel being included in the two hour holding fuel); and
   - plus unusable fuel.

3.12 The UAS capability will be based at a Main Operating Base (MOB) (an existing Royal Canadian Air Force (RCAF) Wing in eastern Canada) with deployed operations from 19 Wing Comox (ICAO identifier CYQQ) and the RCAF Forward Operating Location (FOL) at Inuvik (ICAO identifier CYEV). It is also the intention of the CAF to be able to deploy to any suitable aerodrome for sustained operations when required. The currently proposed operating locations do not preclude a respondent from suggesting additional or other proposed locations as part of their submission to meet the HLMR however, the project will consider the potential additional operating, sustainment and infrastructure costs as part of this solution.

3.13 The interim capability will be required to meet the full extent of these HLMR.

Speed

3.14 To meet the speed requirement, the Full JUSTAS UA must be able, while carrying Precision Guided Munitions (Force Application configuration defined in Table 3), to transit 150 km and deliver the effects within 30 minutes of receiving the call for fire support. While in Reconnaissance Mission configuration (no weapons), the UA must be able to overcome historical winds in the Canadian AOR and, once in the operations are, have sufficient endurance remaining to conduct the mission.

3.15 The interim capability will be required to meet the Reconnaissance Mission configuration portion of this requirement.

Operational Tempo

3.16 The Full JUSTAS Operational Tempo (Op Tempo) requirement is for three (3) LOT with up to 12 aircraft providing up to 8,000 flying hours per year. The distribution of the flight hours between the operations domain will depend on whether the operations are conducted from the MOB or from a deployed location. In addition, a surge capability to 12,000 hours per year will be required once every 24 months. This surge capability is expected to be required over a six month period on a 21 days' notice-to-move posture. Overall, this surge capability can be summarized as the ability to sustain two (2) 24/7 LOT of Force Employment (FE) (approximately 720 hours per month per LOT) at a single, domestic or overseas deployed location.

3.17 The deployed location will generally be an established operating location with full base support functions (fuel, power, voice/data communications, meteorology, force protection, medical, etc.). The Op Tempo requirement for the Full JUSTAS capability is summarized in Table 5.

Domain	Domestic Only 3 LOT YFR[2]	2 LOT Domestic / 1 LOT Deployed YFR	1 LOT Domestic / 2 LOT Deployed – Surge YFR
Maritime (MAR)	4,400	1,600	1,600
Overland (OVRL)	800	800	800
Arctic (ARTC)	2,400	1,200	1,200
Training (TRNG)	400	400	400
Expeditionary (EXPD)	0	4,000	8,000
Total Hours	8,000	8,000	12,000

Table 5 - Full JUSTAS Operational Tempo

3.18 The IUC and the initial portion of the I+F's Op Tempo requirement is for a single (1) LOT providing up to 8,000 flying hours per year. This can be summarized as the ability to sustain one (1) 24/7 LOT of FE (approximately 720 hours per month) at a single, domestic or overseas deployed location (this deployed capability is expected to be required for up to six months on a 21 days' notice-to-move posture) or supporting operations from one domestic (Force Generation (FG), Operational Test and Evaluation (OT&E) and limited priority FE) and one deployed location on an alternating basis (and limited by the available Unmanned Aircraft (UA)).

[2] YFR: Yearly Flying Rate, effectively the total flight hours per year.

3.19 The deployed locations will generally be an established operating location with full base support functions (fuel, power, voice/data communications, meteorology, force protection, medical, etc.). The Op Tempo requirement for the interim capability is summarized in Table 6.

Domain	Domestic Only 1 LOT YFR	1 LOT Deployed 6 Months / 1 LOT Domestic 6 months YFR
Maritime (MAR)	4,000	1,600
Overland (OVLD)	1,200	800
Arctic (ARTC)	2,400	1,200
Training (TRNG)	400	400
Expeditionary (EXPD)	0	4,000
Total Hours	8000	8000

Table 6 - IUC Op Tempo Summary

Interoperability

3.20 The requirement for interoperability with our Five Eyes (FVEY) partners is central to the JUSTAS concept of operations. Interoperability is defined as the capability to provide data and services to, and receive data and services from, Joint and Combined Forces. Interoperability covers such varied aspects as laser target designators; standard air and ground power; standard single point fuelling receptacle; compatibility with airfield operations and safety; compatibility with DND single fuel (F-34, diesel) policy; Mode 4/5 IFF; secure voice communications; secure low- and high-bandwidth data exchanges (e.g. UHF SATCOM DAMA, TCDL); common operational picture (Link-16/22); standard physical data interfaces and MIL-STD data buses; standard payload data and metadata formats (e.g. STANAGS 4607, 4609, etc.); compatibility with ROVER series Remote Video Terminals (RVT); common Tactics, Techniques, and Procedures (TTP); and other factors. The UAS, including support equipment, must be air transportable by CAF C130J-30 or CC177 aircraft.

3.21 Inclusion of Link 16/22 and compatibility with ROVER series RVT will not be required on the Interim capability.

Operational Suitability

3.22 The UAS must be operationally effective and suitable in the intended operating environments as they relate to airspace, weather and frequency spectrum.

Airspace

3.23 The JUSTAS project intends to achieve unfettered access to domestic and international airspace. However, it is acknowledged that the necessary international regulations and/or UA equipage may not be in place during the timelines covered by IUC and the interim capability portion of I+F.

3.24 Domestically, it is the intent for IUC and the initial portion of I+F to operate in non-segregated Class A, B and C airspace and segregated Class F airspace (AltRev, Restricted Airspace, etc.). The IUC and the initial portion of I+F will also be flown over international waters and will be obliged to operate with due regard and or procedurally (to the extent supported by the equipage of the UA baseline configuration) for the safety of navigation of civil aircraft.

3.25 To support the operations described above, Respondents should anticipate requirements for Instrument Flight Rules (IFR) certification and system safety (airworthiness), Communication Navigation Surveillance/Air Traffic Management (CNS/ATM)-compliant navigation (en route, terminal, and approach), onboard Very High Frequency (VHF)/Ultra High Frequency (UHF) communications, Mode 3 Identification Friend-or-Foe (IFF), appropriate aircraft lighting, etc.

3.26 For the Full JUSTAS and the full JUSTAS portion of the I+F, Respondents will be required to meet growth requirements associated with integration of future payloads/sensors required for unfettered airspace access such as onboard air-to-air radar or sense-and-avoid technology once these systems become available.

3.27 For all options, while deployed, these UA must be able to integrate into combat air operations in the same manner as manned aircraft. The UA must be able to positively identify itself to ground-based and airborne interrogators as a Coalition aircraft to avoid engagement by friendly forces. As is the case with manned aircraft, this requirement implies the use of a Mode 4/5 IFF and associated Communications Security (COMSEC) material. The crew must also be able to maintain redundant, secure and non-secure, two-way communications, through the UA, with airspace control elements.

3.28 The UAS must be certifiable in accordance with DND airworthiness regulations, standards, and procedures for the planned missions and the UAS should already have an airworthiness certification from another government or military airworthiness authority.

Weather

3.29 The expected environment will include surface temperatures ranging from –37°C to above +42°C, high humidity, rain, snow, sand, wind and dust. While in flight, the UA will be expected to operate in light-to-moderate precipitation and light turbulence. Given the frequent icing conditions in Canada, the UA will be expected to detect icing conditions and employ anti-ice/de-ice systems to permit continuous operations in areas of light icing and maintain the ability to transit through moderate icing.

3.30 High winds at altitude, especially in winter, will require the operating envelope of the UA (combination of speed and endurance) to be sufficient to mitigate, as much as possible, the effects of adverse wind to ensure timely transit during maritime and Arctic surveillance missions at the outer reaches of Canada's AOR.

3.31 To operate under Canadian environmental conditions the UA, at its maximum gross takeoff weight and under International Standard Atmosphere (ISA) conditions, must be capable of taking off from a 8000 foot hard surface runway with an airfield density altitude of up to 7500 feet with zero wind; and taking off and landing on a contaminated runway (Canadian Runway Friction Index (CRFI) of 0.8 or higher) in a 15-knot crosswind component, day and night.

3.32 For the interim capability, anti-ice/de-ice systems suitable for continuous operation in light icing and transit through moderate icing will be highly desirable. In addition, the interim capability will be required to meet the full extent of the requirements noted in clause 3.31

Frequency Spectrum

3.33 The UAS will be required to address regulatory, technical and operational spectrum supportability risks for operations in Canada and abroad. Canada has limited spectrum available that is compatible with UAS command and control, therefore dynamic frequency selection within the assigned frequency band is mandatory.

3.34 Canada has secured access to the new Wideband Global SATCOM (WGS) constellation of military satellites. Respondents are asked to identify in their proposal whether their equipment has been integrated, tested and certified to operate on the WGS system's Ka-band, and indicate whether this is reflected in their cost estimate. If not, Respondents are requested to include the cost to integrate, test and certify for operations using WGS. For global operations, the UAS may take advantage of the available bandwidth on commercial Ka-band satellite constellations as an alternate.

3.35 Respondents are encouraged to offer solutions to address the Arctic communication challenges (northern latitudes above approximately 65° N), including the use of the Iridium and Iridium Next (when available) or other suitable satellite constellations.

3.36 The interim capability must include a solution for Arctic operations.

Survivability

3.37 The UA will be expected to operate in low-to-medium threat environments. To mitigate the threat of anti-aircraft artillery (AAA) and man-portable air defence systems (MANPADS), the UA will routinely operate outside AAA/MANPAD range. Other threats to the system and to operations security (OPSEC) include: intercepted, denied, or jammed communications; denied or spoofed navigation signals; denied satellite communications; and the interception and exploitation by a competent adversary of electromagnetic emissions from the UA. In light of these threats, the system will be required to employ Type 1 encryption of communication links, NATO-standard secure radios, employ a secure Mode 4/5 IFF transponder, employ Controlled Radiation Pattern Antennas (CRPA), and employ redundant, tightly coupled Embedded Global Position System (GPS)/Inertial Navigation System (INS) (EGI) navigation units that incorporate next-generation Y-code/M-code/course-acquisition (YMCA) GPS receivers and Selective Availability Anti-Spoofing Module (SAASM).

3.38 For the interim capability, the full HLMR will apply with the exception of the CRPA.

Dynamic Control and Responsiveness

3.39 The UAS must be able to operate in LOS and BLOS modes, and must support RSO. In RSO, missions worldwide are conducted from a Mission Control Element (MCE) located at the MOB in Canada. A Launch and Recovery Element (LRE) located at the deployed base launches the UA and hands it over to the MCE at a prearranged point. The MCE then controls the UA and payloads using a combination of high-bandwidth terrestrial and satellite communications links. Once the mission is complete, the MCE returns control of the UA to the LRE for recovery.

3.40 Since RSO allows the operations crews to remain in Canada without being physically deployed, the total manpower bill, training burden and cost are significantly reduced. Moreover, RSO allows the unit to continue to profit from the experience gained during multiple years of operations instead of diluting experience with every personnel rotation in theatre. For these reasons and others, and in light of the limited manpower and financial resources available, RSO is considered a critical enabling concept.

3.41 The interim capability will be required to meet the full extent of this HLMR.

Flexibility / Growth Capacity

3.42 Proposed systems will be required to meet growth requirements. In addition to the integration of a sense-and-avoid system, when available (see Airspace paragraph), it is expected that the UA will have sufficient spare capacity (space, weight, power and cooling) to accommodate future payloads. The UAS must comply with military standards and widely accepted commercial standards as required in all key system interfaces. The onboard electrical system must provide standard aircraft Alternate Current (AC) and Direct Current (DC) power, as well as clean power for payloads with tight power tolerances.

3.43 This HLMR is desirable for the interim capability.

Force Application

3.44 Force application refers to the ability of the UAS to carry and deliver precision guided munitions and to contribute to Joint Fires (Fires delivered using two or more aircraft/elements in cooperation to produce desired effects in support of a common objective). JUSTAS will: detect, classify, identify, and designate targets; provide full motion video to Joint Terminal Attack Controllers (JTAC) and Command and Control elements; coordinate strike missions using secure voice and data over Tactical Data Links (TDL); provide precision target coordinates; and deliver precision guided munitions. One of the overarching goals of the JUSTAS program is to provide support to Canadian and allied deployed forces Close Air Support through the acquisition and designation of targets and, when tasked, employ lethal organic weapons to hold surface targets at risk.

3.45 Domestically it is the desire of Canada to be able to carry and deploy survival kits such as the Lightweight Survival Kit Air Droppable (SKAD) used by the CF-188, in support of Search and Rescue operations. Typically, the SKAD is configurable for overland or marine operations and could weigh up to 500lbs. The SKAD is attached to the UA using NATO standard Bomb Release Unit (BRU).

3.46 The ability to deliver precision guided munitions and carry and deploy the Lightweight SKAD is highly desirable for the interim capability.

Requirements Summary

3.47 The solution for Full JUSTAS and the Full JUSTAS portion of I+F should meet all identified HLMR. For IUC and the initial portion of I+F, it is expected that the proposed systems will meet all the minimum requirements identified above except for the Flexibility/Growth Capacity and the Force Application requirements. Anti-ice/de-ice systems suitable for continuous operation in light icing and transit through moderate icing will be highly desirable for IUC and the initial portion of I+F. Regardless of

the option being addressed, achievement of the capability described in the HLMR will be assessed using the scenarios presented at Annexes B through H.

3.48 Respondents should identify which HLMR their solution cannot achieve, provide details concerning schedule, additional costs including necessary non-recurring engineering (NRE) to fully address the HLMR in the future and propose alternate solutions if available.

Security

3.49 JUSTAS equipment and infrastructure must be compliant with GC security regulations through all phases of acquisition, operations and sustainment. GC security regulations applicable to JUSTAS include, but are not limited to, those concerning industrial and contract security, supply chain security, personnel security, physical security, airworthiness security, security in construction, information technology security, sustainment and life cycle of use.

3.50 Factors impacting the JUSTAS security posture include the technology integrated into the UAS, the sensitivity of missions conducted, data collected by the UAS, and the networks and databases with which the UAS will integrate and share data. Respondents will be required to implement a solution that meets the project objectives while abiding by the security requirements outlined in the GC Security Policy (GSP) (http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=16578). Respondents will be required to support DND to achieve security assessment and authorization objectives for the IT systems supporting UAS flight operations. Moreover, respondents will have to abide by the requirements of the Industrial Security Program (ISP) of PSPC (http://iss-ssi.pwgsc-tpsgc.gc.ca/index-eng.html)

3.51 The project could include a requirement to accommodate national-level classified payloads which require the UAS to conform to specific national security guidelines. This includes a requirement for accreditation necessary for access to release-restricted COMSEC equipment. Given the classified nature of these national level systems, contractor and sub-contractor facilities and personnel must be eligible to be cleared to the appropriate Canadian national standard or acceptable equivalent. Specific technical and programmatic security requirements will be developed and communicated to industry as soon as possible as part of future industry engagement. Respondents are requested to confirm that their UAS architecture will support Top Secret level operations.

3.52 For the interim capability, the maximum security classification required by the system will be dictated by the presence/absence of a SIGINT payload. As a minimum, the UAS must be cleared to operate at the SECRET level.

Support Strategy

3.53 The intent of the support strategy for the Full JUSTAS capability is to have the UAS and associated equipment supported by a combination of CAF and Industry personnel at the CAF operating locations. The CAF will operate the UAS and its sensors and perform 1st and limited 2nd Level maintenance. The final support concept of the UAS will take into considerations responses to this RFI.

3.54 For IUC, Respondents are requested to recommend support options that meet the intent expressed in this RFI. Options may include the use of CAF personnel. The CAF will operate the UAS and its sensors for all phases of flight operations, including taxi.

System Upgrades

3.55 It is expected that advances in technology, changes in the missions supported by JUSTAS or changes in regulations will require changes to the UAS, other than those to address continuous improvements, in order to remain operationally relevant. These upgrades will require changes to both the UAS software and hardware. Respondents are requested to provide projections on cost and frequency of these upgrades based on their experience with other UAS customers or similar capabilities/systems.

3.56 For IUC, Respondents should also include an explanation of the range of time required to upgrade the individual UA or GCS. This will assist estimation of impact of upgrading the system on operations.

Training

3.57 For both the Interim and Full JUSTAS capability, it will be necessary that CAF personnel receive either Initial Cadre Training (ICT) or Ab-Initio Training to provide a pool of qualified military personnel (Air Vehicle Operators (AVO), Payload Operators (PO) and Imagery Analysts/Signals Intelligence Analysts (IA/SIGINT A) to conduct operations. Steady-state training of ops personnel may be delivered by CAF personnel or may be achieved by out-sourcing the training under a contractual arrangement. The requirement to train maintenance personnel will be determined by the requirements of the maintenance concept. As stated above, it is the intention that CAF personnel will perform 1st level and limited 2nd Level maintenance for the Full JUSTAS capability. However, proposals for contractor maintenance to support both the Interim and Full JUSTAS capability will be considered. Respondents are requested to describe their capabilities to provide all aspects of training support and complete the associated elements of the costing table (Annex A). The response should also include estimates for design of the training syllabus, preparation of training manuals, provision and maintenance of training aids/equipment and provision of steady state training on an annual basis.

Industrial and Technological Benefits

3.58 Although no agreement or contract will be entered into based on this RFI, Respondents should be aware that any contracts that are entered into as a result of a subsequent request for proposal that may follow this RFI will contain economic benefits requirements, which may include the Industrial and Technological Benefits (ITB) Policy or other methods to leverage industrial activity that may be considered by Canada. Under the ITB Policy, companies awarded defence procurement contracts are required to undertake business activities in Canada, equal to the value of the contract. In addition, a core element of the ITB Policy is a rated and weighted Value Proposition. Bidders will be motivated to put forward their best Value Proposition for Canada in their bid proposal, as industrial considerations will directly influence which bidding firm wins a contract. Additional information on the ITB policy can be found at:
www.ic.gc.ca/itb.

3.59 Canada is requesting that Industry provide information regarding Canadian capabilities, export potential, R&D activities, and industrial opportunities to help Canada determine the best leveraging approach for procurements that may occur as a result of this RFI. A list of questions is contained in SECTION VI below.

Technical Data

3.60 The solution will acquire the level of technical data necessary to support the acquisition and sustainment concept proposed by the Respondent. Technical data are any information describing the engineering and logistics characteristics which must be known to operate, maintain and support the system and equipment in a prescribed condition and manner. Technical data include research and engineering data including reliability and maintainability data, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identification and related information. Maintenance publications would need to be provided in an electronic format, such as IETM S1000D or similar.

Engineering Services

3.61 The engineering services will include program management, production of engineering data (reports, database, etc.) and preparation of documentation (operator manuals and checklists, Interactive Electronic Technical Manuals (IETM), operator and maintainer training materials) that are required to support all airworthiness acceptance, security certification and accreditation, testing & acceptance activities for the UAS and its support systems.

Proprietary Rights

3.62 The solution will take into account the level of Intellectual Property Rights necessary to support the acquisition and sustainment concept proposed by the Respondent.

Disposal Plan

3.63 The Respondent will propose steps required to facilitate future disposal of UAS

4.0 Legislation, Trade Agreements, and Government Policies

4.1 The JUSTAS procurement is subject to a National Security Exception and, as a result, none of the trade agreements apply.

4.2 The following is indicative of some of the legislation and government policies that may apply to any follow-on solicitation(s):

a) Defence Production Act

b) Treasury Board Policy on Government Security

c) Industrial and Technological Benefits (ITBs)

d) Defence Procurement Strategy (DPS)

e) Controlled Goods Program (CGP)

f) Federal Contractors Program for Employment Equity (FCP-EE)

g) Comprehensive Land Claim Agreements (CLCAs)

5.0 Schedule

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

a) Potential one-on-one sessions – Post RFI closure in April or May 2016; and

b) Contract Award - Industry should assume that contract award (if option is selected) will be no earlier than September 2018 for IUC, and no earlier than September 2019 for I+F and Full JUSTAS.

6.0 Response Preparation Instructions

6.1 This RFI is aimed at engaging industry to refine the CAF UAS requirements and support concepts, as well as confirming the budgets, schedule and defining risk elements associated with fielding an operationally suitable and effective ISR, target acquisition, and precision guided weapons carrying and delivery capability. Respondents are encouraged to be innovative in their proposed method(s) of capability delivery and support options.

6.2 To facilitate the review of responses to this RFI, Respondents are strongly encouraged to follow the response format described below (and cost table template at Annex A) and to provide requested information if available. As well, Respondents may include any additional information they believe to be relevant to the Project.

6.3 Respondents are requested to provide a response to Part 1, Part 2 and/or Part 3 of Annex A in order to participate in potential follow-on one-on-one activity. In addition, Respondents interested in one-on-one activity are requested to complete Annex J, One-on-one Session Registration Form.

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

Response Format:

SECTION I: EXECUTIVE SUMMARY

I.a. Respondents are requested to provide a high level description of the UAS capability and how they propose to meet the project requirements in terms of program management, technical solution, maintenance concept, costs, security and Industrial and Technological Benefits (ITB).

SECTION II: MANAGEMENT APPROACH

II.a. Respondents are to identify all companies that will be involved in providing the capability, their core competencies and experience, and the specific functions for which they will be responsible.

II.b. Respondents are to describe how each company will accomplish specific functions in terms of program management, engineering, manufacturing, repair and overhaul, contractor test and evaluation. Feedback on constraints and assumptions for conduct of each function along with recommended risk mitigation strategies.

II.c. Respondents are to identify any formal accreditations received as a result of demonstrated compliance with widely recognized international standards that are relevant to the Work and specifically CMMI, EIA-748 and ISO 9001.

II.d. Respondents are to describe their proposed maintenance concept with sufficient details to identify who (contractors or military personnel) will conduct the broad maintenance tasks (scheduled maintenance, unscheduled maintenance, UAS pre-flight preparation, UAS shutdown, etc.).

II.e. Respondents are requested to provide the earliest date they can deliver a system following contract award and a schedule for follow on deliveries.

SECTION III: TECHNICAL APPROACH

For each option (IUAS, I+F, Full JUSTAS and other options (if any)) being proposed by the Respondent, please provide the following information noted below under III.a. to i.

III.a. Respondents are to provide a description of the proposed UAS, including UA sub-systems, payloads, ground components, ground support and logistical elements.

III.b. Respondents are requested to identify any payloads and/or sub-system elements that will need to be integrated and tested in order to meet the HLMR, and in order to meet the base configuration in Table 3 and Table 4 as applicable. Any associated additional costs should also be identified.

III.c. Respondents are to provide a description of the Airworthiness Certification methodology and previously obtained regulatory approvals from airworthiness authorities for the system being described in the response. Respondents are requested to identify any additional engineering services and testing required to achieve airworthiness certification necessary to conduct the roles, and operate in the airspace associated with the scenarios described in the RFI annexes (Annexes B though I). Also, Respondents should identify any limitations in the releaseability of source technical data from the Respondent or the Regulatory body, used in the airworthiness certification activity.

III.d. Respondents are requested to describe their implementation plan for obtaining IFR certification (CNS/ATM requirements) for the UA. Provide a description, to include details on accuracy, integrity, continuity, functionalities, and type of navigation sensors that are integrated, of the Respondents' certifiable Performance Based Navigation (PBN) capability that includes: RNAV-5/2/1, RNP-10 (RNAV-10), RNP-4/2/1 and potentially RNP-APCH.

III.e. Respondent's approach to meeting the system performance objectives outlined in this RFI. For the interim + full JUSTAS and the Full JUSTAS options, state whether or not the proposed system is able to achieve the HLMR presented in Table 2 and described throughout Section 3.

III.f. Recommended fleet composition to achieve the operational objectives.

III.g. Typical infrastructure required for the UAS.

III.h. Technical Challenges

III.h.1. Recommended approach for providing high-bandwidth, BLOS communications to allow operations within the full extent of Canada's maritime AOR south of 65° N latitude;

III.h.2. Recommended approach for operating a UA under BLOS control north of 65° N latitude.

III.i. Other Challenges

III.i.1. DND would like to know if the solution you propose includes any equipment, software or information that may be subject to foreign export controls or restrictions, including US International Traffic in Arms Regulations (ITAR) controls, and if so, what is the anticipated process to address those controls or restrictions, such as initiation of an export license, Government to Government transfer arrangement or others;

III.i.2. Requirements identified in this RFI which you anticipate as being challenging, significant cost-drivers, or not being able to meet.

III.i.3. Confirm the proposed system's ability to achieve the scenarios presented at Annexes B through H.

III.i.4. Recommended approach to facilitate disposal.

SECTION IV: SECURITY

IV.a. Respondent's approach to meeting the industrial and contract security, supply chain security, personnel security, physical security, airworthiness security, and information technology security requirements of the project.

SECTION V: COST

V.a. To facilitate analysis of the responses, Respondents are requested to identify the costs of their proposed solution using the format presented at Annex A – Cost Table Template. In your response, if the cost associated with a specific element in the template is already embedded into another line item, clearly indicate so in your response.

V.b. Respondents are also encouraged to present innovative solutions that may differ in terms of quantities, components and/or services as long as the proposed solution meets the HLMR. In such cases, variations from the systems and services defined below should be clearly identified, along with an explanation and a description of the variation, in the response and associated cost table.

V.c. The expectations regarding equipment quantities and level of service are described below:

V.c.1. The Interim option costs should be based on a fleet of up to four (4) aircraft required to support one (1) LOT, including communication equipment, all payloads (one set per aircraft) to meet SOR requirements, four (4) deployable Ground Control Station (GCS), deployable pack-up kits including required spares to support a thirty (30) day deployment, and any aircraft maintenance support equipment to set-up the UAS capability or to maintain system readiness and availability. The interim option is expected to be in place for five years.

V.c.2. The Full option costs should be based on acquisition of up to twelve (12) aircraft, including communication equipment, all payloads (one set per aircraft) to meet requirements, four (4) fixed and four (4) deployable GCS, training devices and simulators for operator and maintainer training, ground support equipment necessary to conduct maintenance at the MOB and for deployed Launch & Recovery (L&R) operations, deployable pack-up kit including required spares to support a thirty (30) day deployment, recommended spare parts list and any aircraft maintenance support

equipment to set-up the UAS capability or to maintain system readiness and availability.

V.c.3. The engineering service costs should include program management costs, costs to produce engineering data (reports, database, etc.) and documentation (operator manuals and checklists, Interactive Electronic Technical Manuals, operator and maintainer training materials) required to support all airworthiness acceptance, security certification and accreditation, testing & acceptance activities for the UAS and its support systems.

V.c.4. The training costs should include training of initial cadre of operators (12 Air Vehicle Operators (AVO), 12 Payload Operators (PO)) and 20 maintainers at the Contractor facilities prior to system delivery. The training costs for providing steady state training on an annual basis should also be estimated.

V.d. The following is a description of costs to be identified under each element and sub-element of the Costing Table:

V.d.1. **Unmanned Aircraft System.** The overall cost will include all equipment, engineering, services, in-service support, training, maintenance and system upgrade in relation to the procurement of the capability.

V.d.2. **Unmanned Aircraft:** the sum of the individual systems which constitute the Air Vehicle in the ready for flight configuration, not including mission payloads, as follows:

V.d.2.i. **Airframe:** the baseline configuration of the UAV airframe will include all systems and components to meet mission requirements, and airworthiness and system safety requirements for certification.

V.d.2.ii. **Propulsion:** the baseline configuration of the UAV propulsion system will include all sub-systems and components to meet airworthiness and system safety requirements for certification.

V.d.2.iii. **Vehicle Sub-systems:** the baseline configuration of the UAV will include the following sub-systems: VHF/UHF Secure Radios, Embedded GPS/INS, TCAS, ADS-B, ATOL, IFF, and TCDL.

V.d.2.iv. **Avionics:** the baseline configuration of the UAV avionics system will include all components required to support navigation and command and control of the UAV to meet airworthiness and safety of flight requirements.

V.d.3. **Payloads:** the sum of all mission payloads that will be part of the baseline configuration and the integration cost of any mission payload provided as GFE, as follows:

V.d.3.i. **EO/IR Sensor Turret:** qty one (1) turret for each aircraft.

V.d.3.ii. **Synthetic Aperture Radar (SAR):** qty one (1) SAR system for each aircraft.

V.d.3.iii. **Automatic Information System (AIS):** qty one (1) AIS for each aircraft.

V.d.3.iv. **Electronic Support Measures (ESM):** qty one (1) ESM for each aircraft.

V.d.3.v. **SIGINT Payload:** qty one (1) SIGINT payload for each aircraft.

V.d.3.vi. **Integration of SIGINT Payload:** estimation of the integration cost of a SIGINT payload based on currently integrated SIGINT payload on proposed system.

V.d.3.vii. **Integration of Payloads and Sub-systems:** this cost element should include any additional costs for NRE, engineering services, integration and testing necessary to meet the HLMRs, costs necessary to meet airworthiness and airspace integration expectations for the Full capability and cost necessary to achieve the configuration in Table 3 and Table 4.

V.d.4. **Ground / Host Segment:** the sum of all components that constitute the ground control and communications systems, as follows:

V.d.4.i. **Fixed Ground Control Station:** the unit cost for each fixed GCS will include suitable Data Storage capacity for Level 2 and Level 3 data, back-up power supply and security measures (e.g. high speed guards). The GCS workstation configuration will be described in the response.

V.d.4.ii. **Deployable Ground Control Station:** the unit cost for each deployable GCS will include suitable Data Storage capacity for Level 2 and Level 3 data, back-up power supply and security measures. The GCS workstation configuration will be described in the response.

V.d.4.iii. **Deployable BLOS Ground Data Terminal:** back-up power supply will be included.

V.d.4.iv. **LOS Ground Data Terminal:** back-up power supply will be included.

V.d.5. **Contractor Management and System Engineering:** the sum of all costs related to project management functions, as follows:

V.d.5.i. **Project Management Fees:** specify project management fees and engineering support costs to conduct required systems integration and qualification testing of the proposed UAS design.

V.d.5.ii. **Airworthiness Certification:** specify management fees and engineering support costs to assist the DND airworthiness certification process.

V.d.5.iii. **Security Certification:** specify management fees and engineering support costs to assist the DND security certification necessary to integrate with information networks and databases, including classified information systems up to Level 3 compartmented.

V.d.6. **Shipping and Freight:** the initial and recurring costs for the shipping and transportation of equipment from Original Equipment Manufacturer (OEM) to CAF operational locations to support and sustain UAS operations.

V.d.7. **ITB / VP Offset Management:** This element will include all related costs to establish, manage and sustain the Value Proposition (VP) to Canada.

V.d.8. **Test and Evaluation (T&E):** the sum of costs related to all phases of test and evaluation required to achieve certification and meet operational requirements. This will include cost estimates related to the use of external test facilities necessary to augment OEM test capabilities. The following phases of T&E will be addressed:

V.d.8.i. **Engineering T&E**

V.d.8.ii. **Acceptance Tests**

V.d.9. **Data and Configuration Management:** This element will include the costs related to acquire the technical data and related proprietary rights and will include the recurring costs throughout the duration of the In-Service Support contract.

V.d.9.i. **Technical Data:** The cost to acquire the level of technical data necessary to support the acquisition and sustainment concept proposed by the Respondent. Technical data are any information describing the engineering and logistics characteristics which must be known to operate, maintain and support the system and equipment in a prescribed condition and manner. Technical data include research and engineering data including reliability and maintainability data, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identification and related information. Maintenance publications would need to be provided in an electronic format, such as IETM S1000D or similar.

V.d.9.ii. **Data Management:** The recurring costs required to integrate the technical data and media (electronic, hardcopy, photographic, etc.), hardware, software applications, and procedures. In certain cases, Data and Configuration Management could consist of a single activity.

V.d.9.iii. **Configuration Management:** The recurring costs required to identify, control, and report on the proposed, current or historical configuration (physical and functional) of all UAS related systems used or produced to ensure that the end products meet acquisition project and in-service operational requirements. In certain cases, Data and Configuration Management could consist of a single activity.

V.d.9.iv. **Intellectual Property Rights:** The cost to acquire the level of Intellectual Property Rights necessary to support the acquisition and sustainment concept proposed by the Respondent.

V.d.10. **Support Equipment:** This element will include the cost to acquire all the required support equipment for the operations and maintenance of the UAS, which consists of the following:

V.d.10.i. **Custom Support Test and Measurement Equipment:** Cost of the required custom support equipment to UAS for the testing of UAS related systems during the 1st and limited 2nd Level Maintenance.

V.d.10.ii. **Custom Support and Handling Equipment:** Cost of the required custom support and handling equipment to UAS for the maintenance (1st and limited 2nd Level) and operations of UAS.

V.d.10.iii. **Standard Support Test and Measurement Equipment:** Cost of the required standard support equipment for the testing of UAS related systems during the 1st and limited 2nd Level Maintenance.

V.d.10.iv. **Standard Support and Handling Equipment:** Cost of the required standard support and handling equipment for the maintenance (1st and limited 2nd Level) and operations of UAS.

V.d.11. **Supply Support:** This element will include the costs for the required spare parts to sustain UAS operations, including the cost of the pack up kits that will be used for deployed UAS operations.

V.d.11.i. **Pack Up Kits:** The cost of the UAS pack up kits that will comprise of the required spare parts for the UAS related systems to sustain up to 30 days of deployed UAS operations.

V.d.11.ii. **Unmanned Aircraft Spare Parts:** The cost of the required spare parts for the Unmanned Aircraft that will be held at the MOB to sustain UAS operations.

V.d.11.iii. **Ground Segment Spare Parts:** The cost of the spare parts for the UAS Ground Segment that will be required to sustain UAS operations at the MOB.

V.d.11.iv. **Consumables:** This element will include the annual costs to procure the required consumables to sustain UAS operations, e.g. hydraulic fluids, washers, cleaning products, rags, etc.

V.d.11.v. **Sustainment Spares:** This element will provide the annual costs to maintain sufficient spare parts in the supply chain to sustain UAS operations at 8000 flying hours per year.

V.d.11.vi. **Supply Chain Management:** This element will include the annual costs for establishing and operating a supply chain that will ensure the timely delivery of sustainment spare parts.

V.d.12. **Training:** This element will include the initial and recurring costs for the training of CAF and DND UAS personnel, as well as the procurement of training documentation and training equipment. Should also include projected costs to maintain training equipment and documentation in the same configuration as the UAS through its lifecycle.

V.d.12.i. **Air Vehicle, Payload, and SIGINT Operators Training Equipment:** The cost to procure the required training equipment for Air Vehicle, Payload, and SIGINT Operators that will be used at the Main Operating Base.

V.d.12.ii. **Maintenance Training Equipment:** The cost to procure the required maintenance training equipment for UAS (UA, GCS, payloads, and SIGINT) that will be used at the Main Operating Base.

V.d.12.iii. **Air Vehicle and Payload Operators Training Design Activities:** This element will include the costs (initial and recurring) of all activities related to the preparation and management of the Air Vehicle and Payload Operators training, such as:

A. Preparation of courseware;

B. Development of the Training Management Support Plan;

C. Development of the Training Needs Analysis;

D. Development of the Training Media Analysis;

E. Development of the Course Control Documentation;

F. French translation of all training documents and courseware; and

G. Upkeep and management of training courseware, materiel, and documentation.

V.d.12.iv. **Maintenance Training Design Activities:** This element will include the costs (initial and recurring) of all activities related to the preparation and management of the UAS maintenance training, such as:

A. Preparation of courseware;

B. Development of the Training Management Support Plan;

C. Development of the Training Needs Analysis;

D. Development of the Training Media Analysis;

E. Development of the Course Control Documentation; and

F. French translation of all training documents and courseware.

G. Upkeep and management of training courseware, materiel, and documentation.

V.d.12.v. **Initial Cadre Training:** This element will include the cost for the Contractor to provide initial cadre training (ICT) to CAF personnel at the Contractor's facilities for:

A. **ICT for Air Vehicle and Payload Operators:** provide ICT to the first Air Vehicle Operators (12) and Payload Operators (12).

B. **ICT for UAS Maintainers:** provide ICT to the first UAS Maintainers (20).

C. **ICT for IA and SIGINT Operators:** provide initial cadre collective training to the first IAs and SIGINT Operators (12), location to be determined later.

D. **ICT for SIGINT Maintainers:** provide ICT to the first SIGINT Maintainers (12), location to be determined later.

V.d.12.vi. **Delivery of Familiarization Training:** This element will include the cost (per serial) for the Contractor to provide UAS Familiarization Training to a predetermined number of CAF / DND students and course serials. The CAF / DND students will be composed of military and civil servants working as project managers or staff officers in operational and projects headquarters.

V.d.12.vii. **Management of Training Courseware:** This element will include the Contractor's recurring costs to maintain, update, upgrade, and manage all training courseware.

V.d.12.viii. **Optional Steady State Training (SST):** This element will include the recurring cost to sustain the training to CAF personnel conducted by the Contractor throughout the in-service support (ISS) phase. This element will only be relevant if Canada requires the Contractor to provide the training.

A. **Training of Air Vehicle Operators:** training of CAF Air Vehicle Operators conducted by the Contractor.

B. **Training of Payload Operators:** training of CAF UAS Payload Operators conducted by the Contractor.

C. **Training of IA:** training of CAF UAS IAs conducted by the Contractor.

D. **Training of SIGINT Payload Operators:** training of CAF UAS SIGINT Payload Operators conducted by the Contractor.

E. **Training of UAS Maintainers:** training of CAF UAS Maintainers conducted by the Contractor.

V.d.13. **Aviation Fuel:** This section will include the fuel consumption rate of the Unmanned Aircraft, in pounds per hour or pounds per year for 8,000 hours, as well as its recommended type(s) of fuel.

V.d.14. **Maintenance:** This element will include all recurring Contractor costs to perform maintenance, repair, overhaul, and continuous improvements of all UAS related systems, i.e. the Air and Ground segments, training equipment (if not already provided before), support equipment (custom, standard, test and measurement, etc.), armament (racks and pylons), as well and Contractor Field Support Representatives. Payloads and sub-systems not covered by the indicated cost should be explicitly identified as not included.

V.d.14.i. **Contractor Maintenance and Continuous Improvement, 2nd and 3rd Levels of Maintenance, UAS:** This element will include the recurring costs for the Contractor to perform 2nd Level and 3rd Level of Maintenance as well as continuous improvements (updates to hardware and software necessary to maintain system safety, reliability, maintainability and performance) to the following UAS related systems:

A. Air segment (including all payloads and sub-systems);

B. Ground segment;

C. Training equipment;

D. Software (air segment, ground segment, and training equipment);

E. Custom ground support equipment (hardware and software); and

F. Standard ground support equipment (hardware and software).

V.d.14.ii. **Contractor Maintenance and Continuous Improvement, 2nd and 3rd Levels of Maintenance, SIGINT Equipment:** This element will include the recurring costs for the Contractor to perform 2nd Level and 3rd Level of Maintenance as well as continuous improvements (updates to hardware and software necessary to maintain system safety, reliability, maintainability and performance) to the UAS SIGINT equipment, based on data from similar systems integrated and maintained by the Contractor.

V.d.14.iii. **Full Contractor Maintenance, Training Equipment:** This element will include the recurring costs for the Contractor to perform all maintenance to the UAS training equipment for Air Operators, Payload Operators, and UAS Maintainers.

V.d.14.iv. **Contractor Field Support Representatives (FSR):** This element will include the costs for the Contractor to provide FSRs to the CAF operational locations to support UAS maintenance performed by CAF / DND personnel.

A. **FSR Domestic Operations:** FSR to support domestic operations from the MOB.

B. **FSR Domestic Deployments:** FSR to support domestic operations from a DOB or FOL.

C. **FSR Expeditionary Deployments:** FSR to support expeditionary deployments. Locations can range from low-hazard environments (Nepal) to proximity to combat (Afghanistan). A range of cost is acceptable for this item.

V.d.14.v. **Optional Full Contractor Maintenance, Air Segment:** This element will include the recurring costs for the Contractor to perform all maintenance to the UAS air segment. These costs will only be relevant if the entire CAF UAS maintenance is contracted out.

V.d.14.vi. **Optional Full Contractor Maintenance, Ground Segment:** This element will include the recurring costs for the Contractor to perform all maintenance to the UAS ground segment. These costs will only be relevant if the entire CAF UAS ground segment maintenance is contracted out.

V.d.14.vii. **Optional Full Contractor Maintenance, Support Equipment:** This element will include the recurring costs for the Contractor to perform all maintenance to the UAS support equipment. These costs will only be relevant if the entire CAF UAS support equipment maintenance is contracted out. The UAS support equipment included is as follow:

A. Ground support standard equipment;

B. Ground support custom equipment;

C. Custom test and measurement equipment; and

D. Standard test and measurement equipment.

V.d.15. **UAS Upgrades:** This section will include the projected cost of UAS upgrades, both software and hardware, to maintain the system's operational relevance for the UAS' estimated 20 years life. Upgrades would include technology upgrades, upgrades mandated by changes in legislation, upgrades required by changes in the user's mission requirements, etc. Respondents are requested to use their experience and historical data on their systems to provide a representative frequency and cost for typical system upgrades.

V.d.15.i. **Software Upgrades:** Software upgrades to the air and the ground components of the UAS. This element should clearly indicate the cost per upgrade and the frequency of the upgrades.

V.d.15.ii. **Hardware Upgrades:** Hardware upgrades to the UA and any ground component of the UAS. This element should clearly indicate the cost per upgrade and the frequency of the upgrades.

SECTION VI: INDUSTRIAL AND TECHNOLOGICAL BENEFITS

VI.a. Industry is requested to provide information on the following questions related to the options outlined in this RFI and any other options that the Respondent may propose as part of this RFI process. The responses should indicate the optimal leveraging strategy that the Respondent would propose for each scenario that it may propose. Specific questions related to this RFI include:

VI.a.1. Which proposed option provides most significant opportunity for long term economic benefit to Canada? Please describe.

VI.a.2. Where do you see economic opportunities for your company to undertake work directly with Canadian industry related to the Acquisition of this procurement?

VI.a.3. Where do you see economic opportunities for your company to undertake work directly with Canadian industry related to the In-Service Support of this procurement?

VI.a.4. Are these areas of opportunity already established in Canada or do these areas require investment? What partnerships have you developed to date with Canadian industry and what are their roles within your proposed solution?

VI.a.5. How would it work in the areas outlined above in terms of positioning you and your suppliers for future export opportunities from Canada?

VI.a.6. To what extent do you propose to undertake R&D activities related to this procurement and in other economic sectors in Canada? What would you anticipate will be the proportion of R&D activities performed internally or with supply chain partners? Is there scope for post-secondary institutions to be involved?

VI.b. Other areas of economic opportunity:

VI.b.1. Where do you see strategic opportunities for Canada that could be leveraged as a result of these procurements in the defence sector or in other economic sectors? Please describe.

SECTION VII: ADDITIONAL INFORMATION FROM RESPONDENTS

VII.a. Respondents are welcome to provide any additional information, compliance matrices, technical brochures, and other materials they believe would be of interest to the project team.

7.0 Enquiries and Submission of Responses

7.1 All enquiries and other communications related to this RFI and associated Industry Engagement activities must be directed exclusively to the PSPC Contracting Authority, using the JUSTAS e-mail address below. Since this is not a bid solicitation, Canada will not necessarily respond to enquiries in writing or by circulating answers to all Respondents.

7.2 Respondents are requested to submit their responses by e-mail to the PSPC Contracting Authority, using the JUSTAS e-mail address below.

TPSGC.SIISAO-JUSTAS.PWGSC@tpsgc-pwgsc.gc.ca

7.3 Alternatively, Respondents may submit their responses (in 4 paper copies or on 4 USB memory drives) to the PSPC Contracting Authority below:

Mr. Feridon Dadashzadeh
Supply Team Leader
Public Services and Procurement Canada
11 Laurier Street, Gatineau, QC K1A 0S5
Place du Portage, Phase III, 6C1
Telephone: 819-956-9132

8.0 Changes to the RFI and the Closing Date

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

8.2 Responses to this RFI are to be submitted to the PSPC Contracting Authority identified above, on or before the time and date indicated on the cover page of the RFI document.

9.0 One on one Sessions

9.1 Canada may, in its discretion, contact any Respondents to follow up with additional questions or for clarification of any aspect of a response. The Respondents who have not submitted a response to at least one of the three parts of Annex A (Part 1, Part 2 or Part 3) will not be contacted.

9.2 The Contracting Authority may communicate with Respondents through direct e-mail rather than by posting additional notices on the GETS in order to plan the one-on-one sessions.

9.3 Each one-on-one session would involve representatives of Canada and one Respondent at a time.

9.4 The one-on-one sessions would be held in the National Capital Region (Ottawa/Gatineau). The exact time and location would be determined and communicated by e-mail after the responses to RFI are processed.

10.0 Fairness Monitor

10.1 Canada has engaged the services of an organization to act as an independent third party Fairness Monitor (FM) for the JUSTAS procurement process. The role of the FM is to provide an attestation of assurance on the fairness, openness, and transparency of the monitored activities.

10.2 The Fairness Monitor's duties will include, but will not be limited to:

a. observing all or part of the procurement process;

b. providing feedback to Canada on fairness issues; and

c. attesting to the fairness of the procurement process.

10.3 Please note, for the purpose of carrying out its Fairness Monitor related obligations, the Fairness Monitor will be granted access to industry responses and related correspondence received by Canada pursuant to this RFI and may act as an observer at the subsequent follow-up activities.

10.4 The Fairness Monitor engaged for this procurement is Samson and Associates.

ANNEX A – Cost Table Template

The following tables are provided as a guide for providing cost data for each of the three options: Interim UAS Capability, Full JUSTAS and a combined option. Respondents are requested to use these templates to breakdown the total costs of each of their proposals based on the description of the cost elements provided in Section V. If a specific cost element is not applicable to your proposal please indicate this in applicable column (i.e. N/A) and address in the text of your response.

Part 1 - Full JUSTAS

UAS				
V.d.2	**Unmanned Aircraft**			**$**
V.d.2.i		*Airframe*	$	
V.d.2.ii		*Propulsion System*	$	
V.d.2.iii		*UA Sub-systems*	$	
V.d.2.iv		*Avionics*	$	
V.d.3	**Payloads**			**$**
V.d.3.i		*EO/IR*	$	
V.d.3.ii		*Radar*	$	
V.d.3.iii		*AIS*	$	
V.d.3.iv		*ESM*	$	
V.d.3.v		*SIGINT Payload*	$	
V.d.3.vi		*Integration of SIGINT*	$	
V.d.3.vii		*Integration of other Payloads and Sub-systems*	$	
V.d.4	**Ground/Host Segment**			**$**
V.d.4.i		*Fixed GCS*	$	
V.d.4.ii		*Deployable GCS*	$	
V.d.4.iii		*Deployable BLOS GDT*	$	
V.d.4.iv		*LOS GDT*	$	
Engineering Services				
V.d.5	**Contractor Management & System Engineering**			**$**
V.d.5.i		*Project Management Fees*	$	
V.d.5.ii		*Airworthiness Certification*	$	
V.d.5.iii		*Security Certification*	$	
V.d.6	**Shipping and Freight**			**$**
V.d.7	**ITB/VP Offset Management**			**$**
V.d.8	**Test and Evaluation**			**$**

V.d.8.i		*Engineering T&E*	$	
V.d.8.ii		*Acceptance T&E*	$	
In-Service Support				
V.d.9	**Data and Configuration Management**			**$**
V.d.9.i		*Technical Data*	$	
V.d.9.ii		*Data Management*	$	
V.d.9.iii		*Configuration Management*	$	
V.d.9.iv		*Intellectual Property Rights*	$	
V.d.10	**Support Equipment**			**$**
V.d.10.i		*Custom Support Test and Measurement Equipment*	$	
V.d.10.ii		*Custom Support and Handling Equipment*	$	
V.d.10.iii		*Standard Support Test and Measurement Equipment*	$	
V.d.10.iv		*Standard Support and Handling Equipment*	$	
V.d.11	**Supply Support**			**$**
V.d.11.i		*Pack Up Kits*	$	
V.d.11.ii		*UA Spare Parts*	$	
V.d.11.iii		*Ground Segment Spare Parts*	$	
V.d.11.iv		*Consumables (annual)*	$	
V.d.11.v		*Sustainment Spares*	$	
V.d.11.vi		*Supply Chain Management*	$	
Training				
V.d.12.i	**Operators Training Equipment**			**$**
V.d.12.ii	**Maintenance Training Equipment**			**$**
V.d.12.iii	**AVO and PO Training Design Activities**			**$**
V.d.12.iv	**Maintenance Training Design Activities**			**$**
V.d.12.v	**Initial Cadre Training Delivery**			**$**
V.d.12.v.A		*ICT AVO and PO*	$	
V.d.12.v.B		*ICT Maintainers*	$	
V.d.12.v.C		*ICT IA and SIGINT*	$	
V.d.12.v.D		*ICT SIGINT Maintainers*[1]	$	
V.d.12.vi	**Familiarization Training Delivery (per serial)**			**$**
V.d.12.vii	**Training Courseware Management**			**$**

V.d.12.viii	**Optional Steady State Training Delivery (per serial)**			**$**
V.d.12.viii.A		*SST AVO*	$	
V.d.12.viii.B		*SST PO*	$	
V.d.12.viii.C		*SST IA*	$	
V.d.12.viii.D		*SST SIGINT*	$	
V.d.12.viii.E		*SST Maintainers*	$	
Maintenance (Provide comments on how items were costed in an Appendix)				
V.d.14.i	**UAS Maintenance – 2nd and 3rd Level**			**$**
V.d.14.ii	**SIGINT Maintenance – 2nd and 3rd Level**			**$**
V.d.14.iii	**Training Equipment Maintenance – Full**			**$**
V.d.14.iv	**OEM Field Support Representatives**			**$**
V.d.14.iv.A		*Domestic Operations*	$	
V.d.14.iv.B		*Domestic Deployments*	$	
V.d.14.iv.C		*Expeditionary Deployments*	$	
V.d.14.v	**Optional Air Segment Maintenance – Full**			**$**
V.d.14.vi	**Optional Ground Segment Maintenance – Full**			**$**
V.d.14.vii	**Optional Support Equipment Maintenance – Full**			**$**
System Upgrades				
V.d.15	**System Upgrades**			**$**
V.d.15.i		*Software Upgrades*	$	
V.d.15.ii		*Hardware Upgrades*	$	
Aviation Fuel				
V.d.13	**Average Fuel Consumption (lbs/hr or lbs/8000 hrs)**			

Part 2 - Interim UAS Capability (IUC)

UAS				
V.d.2	**Unmanned Aircraft**			**$**
V.d.2.i		*Airframe*	$	
V.d.2.ii		*Propulsion System*	$	
V.d.2.iii		*UA Sub-systems*	$	
V.d.2.iv		*Avionics*	$	
V.d.3	**Payloads**			**$**
V.d.3.i		*EO/IR*	$	
V.d.3.ii		*Radar*	$	
V.d.3.iii		*AIS*	$	
V.d.3.iv		*ESM*	$	
V.d.3.v		*SIGINT Payload*	$	
V.d.3.vi		*Integration of SIGINT*	$	
V.d.3.vii		*Integration of other Payloads and Sub-systems*	$	
V.d.4	**Ground/Host Segment**			**$**
V.d.4.i		*Fixed GCS*	$	
V.d.4.ii		*Deployable GCS*	$	
V.d.4.iii		*Deployable BLOS GDT*	$	
V.d.4.iv		*LOS GDT*	$	
Engineering Services				
V.d.5	**Contractor Management & System Engineering**			**$**
V.d.5.i		*Project Management Fees*	$	
V.d.5.ii		*Airworthiness Certification*	$	
V.d.5.iii		*Security Certification*	$	
V.d.6	**Shipping and Freight**			**$**
V.d.7	**ITB/VP Offset Management**			**$**
V.d.8	**Test and Evaluation**			**$**
V.d.8.i		*Engineering T&E*	$	
V.d.8.ii		*Acceptance T&E*	$	
In-Service Support				
V.d.9	**Data and Configuration Management**			**$**
V.d.9.i		*Technical Data*	$	
V.d.9.ii		*Data Management*	$	

V.d.9.iii		*Configuration Management*	$	
V.d.9.iv		*Intellectual Property Rights*	$	
V.d.10	**Support Equipment**			**$**
V.d.10.i		*Custom Support Test and Measurement Equipment*	$	
V.d.10.ii		*Custom Support and Handling Equipment*	$	
V.d.10.iii		*Standard Support Test and Measurement Equipment*	$	
V.d.10.iv		*Standard Support and Handling Equipment*	$	
V.d.11	**Supply Support**			**$**
V.d.11.i		*Pack Up Kits*	$	
V.d.11.ii		*UA Spare Parts*	$	
V.d.11.iii		*Ground Segment Spare Parts*	$	
V.d.11.iv		*Consumables (annual)*	$	
V.d.11.v		*Sustainment Spares*	$	
V.d.11.vi		*Supply Chain Management*	$	
Training				
V.d.12.i	**Operators Training Equipment**			**$**
V.d.12.ii	**Maintenance Training Equipment**			**$**
V.d.12.iii	**AVO and PO Training Design Activities**			**$**
V.d.12.iv	**Maintenance Training Design Activities**			**$**
V.d.12.v	**Initial Cadre Training Delivery**			**$**
V.d.12.v.A		*ICT AVO and PO*	$	
V.d.12.v.B		*ICT Maintainers*	$	
V.d.12.v.C		*ICT IA and SIGINT*	$	
V.d.12.v.D		*ICT SIGINT Maintainers*[1]	$	
V.d.12.vi	**Familiarization Training Delivery (per serial)**			**$**
V.d.12.vii	**Training Courseware Management**			**$**
V.d.12.viii	**Optional Steady State Training Delivery (per serial)**			**$**
V.d.12.viii.A		*SST AVO*	$	
V.d.12.viii.B		*SST PO*	$	
V.d.12.viii.C		*SST IA*	$	
V.d.12.viii.D		*SST SIGINT*	$	
V.d.12.viii.E		*SST Maintainers*	$	

Maintenance (Provide comments on how items were costed in an Appendix)				
V.d.14.i	**UAS Maintenance – 2nd and 3rd Level**			**$**
V.d.14.ii	**SIGINT Maintenance – 2nd and 3rd Level**			**$**
V.d.14.iii	**Training Equipment Maintenance – Full**			**$**
V.d.14.iv	**OEM Field Support Representatives**			**$**
V.d.14.iv.A		*Domestic Operations*	$	
V.d.14.iv.B		*Domestic Deployments*	$	
V.d.14.iv.C		*Expeditionary Deployments*	$	
V.d.14.v	**Optional Air Segment Maintenance – Full**			**$**
V.d.14.vi	**Optional Ground Segment Maintenance – Full**			**$**
V.d.14.vii	**Optional Support Equipment Maintenance – Full**			**$**
System Upgrades				
V.d.15	**System Upgrades**			**$**
V.d.15.i		*Software Upgrades*	$	
V.d.15.ii		*Hardware Upgrades*	$	
Aviation Fuel				
V.d.13	**Average Fuel Consumption (lbs/hr or lbs/8000 hrs)**			

Part 3 – Combined Interim + Full JUSTAS

UAS					
			IUC	**Full**	**Combined Total**
V.d.2	**Unmanned Aircraft**				
V.d.2.i		*Airframe*	$		
V.d.2.ii		*Propulsion System*	$		
V.d.2.iii		*UA Sub-systems*	$		
V.d.2.iv		*Avionics*	$		
V.d.3	**Payloads**				
V.d.3.i		*EO/IR*	$		
V.d.3.ii		*Radar*	$		
V.d.3.iii		*AIS*	$		
V.d.3.iv		*ESM*	$		
V.d.3.v		*SIGINT Payload*	$		
V.d.3.vi		*Integration of SIGINT*	$		
V.d.3.vii		*Integration of other Payloads and Sub-systems*	$		
V.d.4	**Ground/Host Segment**				
V.d.4.i		*Fixed GCS*	$		
V.d.4.ii		*Deployable GCS*	$		
V.d.4.iii		*Deployable BLOS GDT*	$		
V.d.4.iv		*LOS GDT*	$		
		UAS Sub-Total: $			
Engineering Services					
V.d.5	**Contractor Management & System Engineering**				
V.d.5.i		*Project Management Fees*	$		
V.d.5.ii		*Airworthiness Certification*	$		
V.d.5.iii		*Security Certification*	$		
V.d.6	**Shipping and Freight**		$		
V.d.7	**ITB/VP Offset Management**		$		
V.d.8	**Test and Evaluation**		$		
V.d.8.i		*Engineering T&E*	$		
V.d.8.ii		*Acceptance T&E*	$		
		Engineering Services Sub-Total: $			
In-Service Support					
V.d.9	**Data and Configuration Management**				
V.d.9.i		*Technical Data*	$		

V.d.9.ii		*Data Management*	$		
V.d.9.iii		*Configuration*	$		
V.d.9.iv		*Intellectual Property Rights*	$		
V.d.10	**Support Equipment**				
V.d.10.i		*Custom Support Test and Measurement Equipment*	$		
V.d.10.ii		*Custom Support and Handling Equipment*	$		
V.d.10.iii		*Standard Support Test and Measurement Equipment*	$		
V.d.10.iv		*Standard Support and Handling Equipment*	$		
V.d.11	**Supply Support**				
V.d.11.i		*Pack Up Kits*	$		
V.d.11.ii		*UA Spare Parts*	$		
V.d.11.iii		*Ground Segment Spare*	$		
V.d.11.iv		*Consumables (annual)*	$		
V.d.11.v		*Sustainment Spares*	$		
V.d.11.vi		*Supply Chain*	$		
	In-Service Support Sub-Total: $				
Training					
V.d.12.i	**Operators Training Equipment**		**$**		
V.d.12.ii	**Maintenance Training Equipment**		**$**		
V.d.12.iii	**AVO and PO Training Design Activities**		**S**		
V.d.12.iv	**Maintenance Training Design Activities**		**S**		
V.d.12.v	**Initial Cadre Training Delivery**				
V.d.12.v.A		*ICT AVO and PO*	$		
V.d.12.v.B		*ICT Maintainers*	$		
V.d.12.v.C		*ICT IA and SIGINT*	$		
V.d.12.v.D		*ICT SIGINT Maintainers*[1]	$		
V.d.12.vi	**Familiarization Training Delivery (per serial)**		$		
V.d.12.vii	**Training Courseware Management**		**$**		
V.d.12.viii	**Optional Steady State Training Delivery (per serial)**				
V.d.12.viii.A		*SST AVO*	$		
V.d.12.viii.B		*SST PO*	$		

V.d.12.viii.C		*SST IA*	$		
V.d.12.viii.D		*SST SIGINT*	$		
V.d.12.viii.E		*SST Maintainers*	$		
		Training Sub-Total: $			
Maintenance (Provide comments on how items were costed in an Appendix)					
V.d.14.i	**UAS Maintenance – 2nd and 3rd Level**		**S**		
V.d.14.ii	**SIGINT Maintenance – 2nd and 3rd Level**		**$**		
V.d.14.iii	**Training Equipment Maintenance – Full**		**$**		
V.d.14.iv	**OEM Field Support Representatives**				
V.d.14.iv.A		*Domestic Operations*	$		
V.d.14.iv.B		*Domestic Deployments*	$		
V.d.14.iv.C		*Expeditionary*	$		
V.d.14.v	**Optional Air Segment Maintenance – Full**		$		
V.d.14.vi	**Optional Ground Segment Maintenance – Full**		$		
V.d.14.vii	**Optional Support Equipment Maintenance – Full**		$		
		Maintenance Sub-Total: $			
System Upgrades					
V.d.15	**System Upgrades**			**$**	
V.d.15.i		*Software Upgrades*	$		
V.d.15.ii		*Hardware Upgrades*	$		
Aviation Fuel					
V.d.13	**Average Fuel Consumption (lbs/hr or lbs/8000 hrs)**				

ANNEX B
To JUSTAS RFI
2016

1. ARCTIC SORTIE SCENARIO

Disclaimer: *The scenario described below is solely imaginary and integrates a JUSTAS UAS into a fictional Arctic marine security operation. There is no intent to imply that the FOL in this scenario will be selected to support JUSTAS UAS operations.*

1.1. General Description

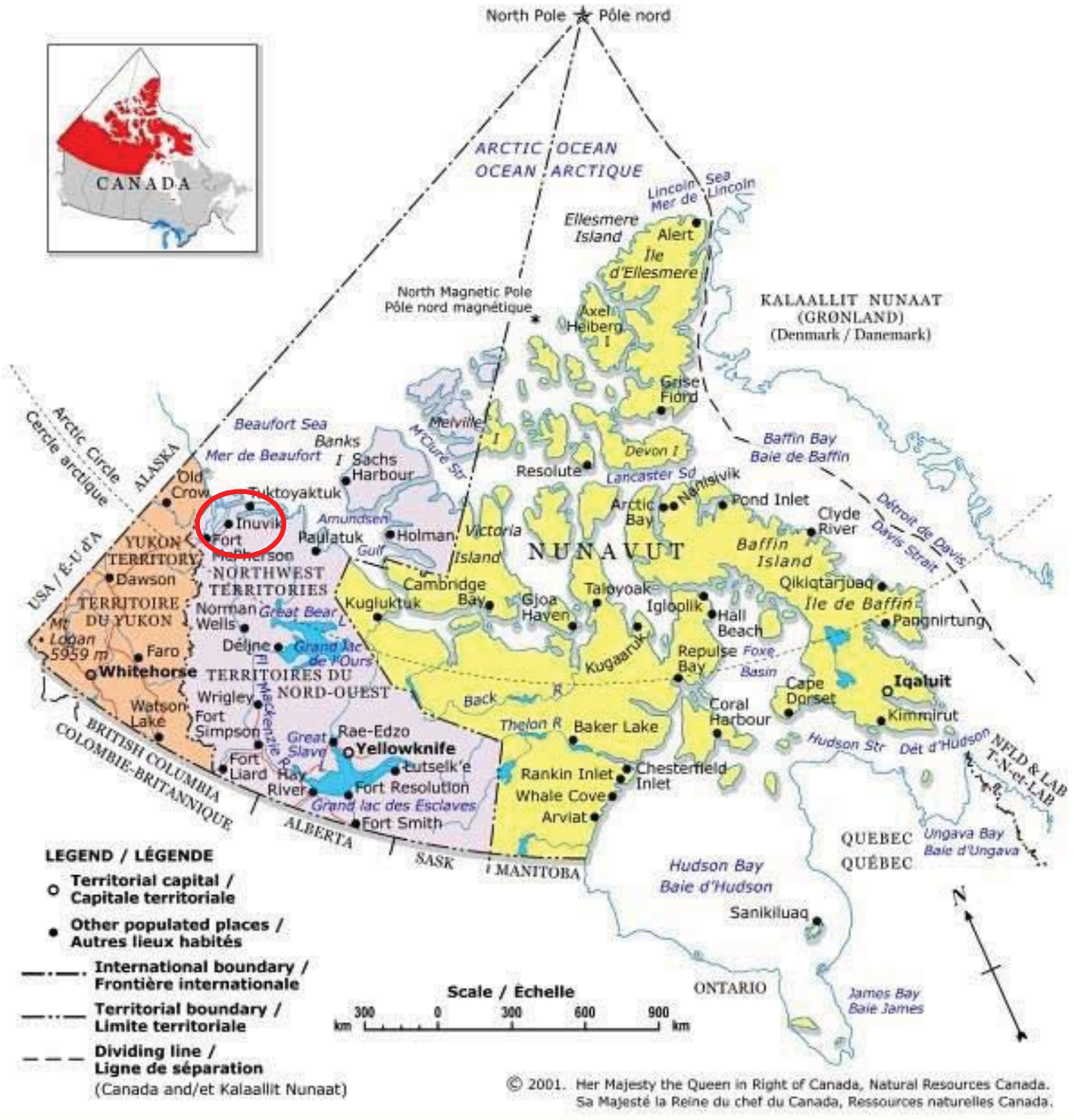

Figure B-1 Canadian Arctic

The JUSTAS UAS is tasked to support an Arctic maritime security operation coordinated by Joint Task Forces North (JTFN) on behalf of the Canadian Armed Forces Joint Operations Command (CJOC) and the Marine Security Operations Centre (MSOC) Halifax and Victoria. The scenario occurs during the shipping season in the Arctic (July to October). At least two unmanned aircraft (UA), a launch and recovery team, and maintenance and support staff will be deployed from the JUSTAS main operating base to the Inuvik Forward Operating Location (FOL) (222 ft above MSL, main runway length of 6,001 ft). For illustration purposes and only for this scenario, Inuvik is assumed to be a suitable Arctic FOL.

The scenario assumes that the Northwest Passage (NWP) will be navigable during the summer to early fall. Additionally, wideband satellite communication data link connectivity is assumed to be provided by the Wideband Global SATCOM (WGS) and the Polar Weather and Communications Satellite (PWCS) systems.

1.2. Scenario Details

Poseidon's Journey is on an around the world event aimed at highlighting the state of the world's oceans and the impact climate change is having on our planet. Fifteen to twenty sailing vessels will be participating in the portion of the event taking place in the NWP (Fig G-2) transiting from Barrow, Alaska, to Nuuk, Greenland, during the months of July and August. Because this expedition will involve multiple small vessels with varying levels of experience, the likelihood of a request for CAF assistance is assessed as high. JTFN has determined that 24/7 coverage of the group is required during the transit through the Canadian AOR.

Figure B-2 Northwest Passage Shipping Route

The UAS mission is to detect and classify all vessels in the Area of Interest (AOI), and to locate and identify all vessels travelling eastward that could meet the Poseidon's Journey vessel parameters. The intent is to perform an all sensor search (SAR, EO/IR, ESM, SIGINT, AIS) of the AOI to locate and track the group before it reaches the entrance of the NWP. It is JTFN's intention that the vessels be tracked continuously until clear of the Arctic shipping zone and eastbound to Nuuk out of the Canadian AOR. UA visual and aural covertness is not a requirement for this mission.

1.3. General Scenario Information

Crew: Air Vehicle Operator, Payload Operator, Imagery and Signals Analysts, Launch and recovery crew at the FOL, including Air Weapons System (AWS) technicians for the Survival Kit Air Droppable (SKAD).

Configuration: Armed Reconnaissance (EO/IR, Radar, SIGINT, AIS, 2 x Light-weight SKAD (mounted to the UAV using NATO standard BRU and weighing up to 500lbs per SKAD))

Flight Duration: 24 hours on station; scheduled take off 0600L.

Weather Conditions: The relative humidity is 20% and rainfall is not forecast. Visibility is unrestricted.

Take off:	Clear, 15°C, density altitude approximately 300 ft, wind speed 5 kts.
Area:	Clear. Later in the period expecting scattered to broken at 15,000 feet.
Landing:	15000 Broken, 4°C, wind speed westerly at 12 kts with temporary condition of 2000 broken at landing time

Airspace: Class A with Edmonton Centre for transit then Visual Flight Rules (VFR) for Onsta period.

Threats: Intelligence indicates that there are no threats to the UA.

Operating Area: The mission is tasked to provide surveillance of a group of vessels moving through the North-West Passage.

1.4. Mission Sequence of Events

Table B-1 provides a chronology of sample mission events in hours and minutes, referenced to target vessel departure from Barrow (T) and local time.

Relative to Departure from Barrow	Local Time	Event
T+00:00	0800 L	Poseidon's Journey vessels depart Barrow, AK.
T+22:00	+1 0500 L	Information from Poseidon's Journey website indicates the vessels are approaching the Canadian AOR in the Beaufort Sea.

Relative to Departure from Barrow	Local Time	Event
T+23:00	+1 0600 L	UA Launches from Inuvik.
T+24:00	+1 0700 L	ONSTA, UA enters AOI and commences all sensors search for vessels in the AOI.
T+24:30	+1 0730 L	UA completes search of western entrance of, identifies group of vessels and commences tracking.
T+26:30	+1 0930 L	New crew arrives at the GCS for crew change (CC)
T+27:00	+1 1000 L	CC complete (this will happen every four hours until the end of mission)
T+40:00	+1 2300 L	Relief UA launched from Inuvik (FOL).
T+41:00	+2 0000L	AVO is contacted by inbound UA crew. AVO confirms inbound crew is established in the area, with 1,000 feet of altitude separation and is on the same Link 16 net. Link 16 track 6001 is passed as the TOI. AVO authorizes PO to PO handover of tracking responsibility once positive ID of the TOI is confirmed.
T+41:30	+2 0030 L	Relief UA conducts positive handover with on station UA and continues tracking, relieved UA initiates returns to FOL.
T+42:30	+2 0130 L	Returning UA lands at FOL.
T+43:00	+2 0200L	Crew intercepts VHF-FM Channel 16 Mayday call from FV Northern Pride. Position is determined to be 25nm west of the UA's position. Mission Commander contacts RCC Trenton via Land Line and passes on the details of the Mayday and advises the Watch Commander of the UA's position, ETA to the last known position and SAR stores being carried. Watch commander retasks the crew to proceed to the area and be prepared to carry out SAR duties. Mission Commander advises CJOC of their retasking and commences a descent to 10000 feet.
T+43:30	+2 0230	UA arrives in the area, RADAR was unable to locate any contacts and commences expanding square EO/IR search of the area with a 1 NM spacing.
T+43:35	+2 0235	Payload Operator locates a group of five or six survivors huddled together all appearing to be wearing survival suits. The Payload

Relative to Departure from Barrow	Local Time	Event
		Operator commences a RADAR search for vessels in the area. The closest radar contact is 64 NM. The decision is made to drop a SKAD. The closest radar contact is hailed on VHF-FM and given the position of the survivors. That ship, SS Minnow confirms that they are heading to the area at best speed, ETA 3 hours.
T+43:38	+2 0238	The AVO selects the SKAD pattern in the UAS mission computer and inputs the information required. The UA then automatically flies to the SKAD release position at the pre-determined altitude and speed.
T+43:48	+2 0248	The SKAD is released from the UA. It opens and the rafts inflate upwind of the survivors.
T+44:15	+2 0315	The UA remains in position waiting for the SS Minnow to arrive in the area. The PO observes the survivors climbing into the rafts. Radio contact is established with the survivors using radio relay between the UA, SS Minnow and the radios in the survival kits contained in the rafts.
T+46:40	+2 0540	The SS Minnow arrives in the area of the rafts and takes the survivors aboard.
T+47:10	+2 0610	The UA returns to the original mission of overwatch of Poseidon's Journey.
T+57:30	+2 1630 L	Relief UA launched from FOL.
T+59:00	+2 1800 L	Relief UA conducts positive handover with on station UA and continues tracking, relieved UA initiates returns to FOL.
T+60:00	+2 1900 L	Returning UA lands at FOL.
This continues until the group of vessels clears the Canadian AOR in Davis Strait en route to Nuuk		

Table B-1 Arctic Scenario

ANNEX C
To JUSTAS RFI
2016

1. MARITIME SCENARIO – SECURITY EVENT EAST COAST

Disclaimer: *The scenario described below is solely imaginary and integrates a JUSTAS UAS into a fictional domestic marine security operation. There is no intent to imply that the Main Operating Base (MOB) in this scenario will be selected to support JUSTAS UAS operations.*

1.1. General Description

The JUSTAS UAS is tasked to support a domestic maritime security operation coordinated by the Marine Security Operations Centre (MSOC) Halifax. The scenario is situated during January. The UAS will be operated from 3 Wing Bagotville (522 ft above MSL, main runway 10,000 ft).

1.2. Scenario Details

Intelligence indicates that a motor yacht (MV Python) that is moored in Ponta Delgada (37 44N 25 40W), Azores, is carrying illicit drugs and potentially terrorists and their equipment. The 75 ft yacht is enroute to an unknown destination on the east coast of North America, somewhere between Goose Bay, NL, and Miami, Fl. Its range of plausible speeds is between 8 and 22 kts. The Royal Canadian Mounted Police (RCMP) has previously secured the assistance of the Canadian Armed Forces (CAF) for the purpose of detecting and tracking the vessel. The Python is not believed to be nor required to carry an AIS transponder.

The UAS mission is to detect and classify all vessels in the Area of Interest (AOI), and to locate and identify all vessels travelling westward within the AOI that could meet the Python parameters. The intent is to locate using an all sensor search (EO/IR, ESM, SAR, SIGINT, AIS) and track the Python before it reaches the east coast of Canada. The plan is to perform a search of the area to detect all ships of medium size or larger, and to determine their headings. If travelling westward, these ships are to be classified using all available sensors and any vessel assessed as between 40 and 150 ft is to be visually identified with EO/IR. The UA will enter the south-western portion of the area and then be operated to cover the AOI from west to east using SAR, EO/IR, AIS and SIGINT. Once the Python is identified, the UA is to covertly track the vessel for a minimum of six hours until relieved by a manned asset or for as long as required until relieved by another UA. During all phases, the UA is to maintain necessary distance required for covertness, and be able to collect the required data.

1.3. General Scenario Information

Crew: Air Vehicle Operator, Payload Operator, Imagery and Signals Analysts

Configuration: Reconnaissance (EO/IR, SAR, AIS, ESM, SIGINT)

Flight Duration: 24 hours; scheduled take off 1900L

Weather Conditions: Due to the presence of a low-pressure system over the North Atlantic and the associated mass of moist and unstable air, weather conditions are not expected to be

conducive to the use of EO/IR. Cloud ceilings below 15,000 ft AGL are expected for 75% of the mission.

Take off:	Visibility 5 nm, 5,000 broken 17,000 broken, Temp -28C, Winds 290M10G15kts
AOI:	Visibility 15 nm, 4,300 broken 12,000 broken 21,000 broken, Surface Temp 2C, Winds Surface 250T05kts, FL180 270T35kts, FL300 290T45kts
Landing:	Visibility 10 nm, 5,000 broken 15,000 broken, Temp -32C, Winds 310M14kts

Threats: Intelligence indicates that there are no threats to the UA.

Operating Area: International airspace above FL055 and uncontrolled airspace below FL055. The UA will be operating Due Regard if able or in an Altitude Reservation while in international airspace.

1.4. Mission Sequence of Events

Table C-1 provides a chronology of sample mission events in hours and minutes, referenced to target vessel initial report (T) and local time.

Relative to Initial Report	Local Time	Event
T+00:00	2000	MV Python confirmed moored in Ponta Delgada by Portuguese National Police (PNP)
T+12:00	+1 0800	PNP discover vessel is no longer docked, begin local search and inform RCMP
T+16:00	+1 1200	RCMP informs CF LO to activate previously MND-authorized Op Order to launch CAF maritime surveillance mission
T+24:00	+1 2000	First standby UAS crew (on 12 hr standby posture) arrives at MOB and flight planning begins
T+27:00	+1 2300	UA launch
T+30:00	+2 0200	ONSTA, UA enters Op area, commences all sensor search using EO/IR, SAR, AIS, ESM and SIGINT.
T+33:30	+2 0530	Next crew arrives at the GCS for Crew Change (CC)
T+34:00	+2 0600	CC complete (this will happen every four hours until the end of mission)
T+38:00	+2 1000	UA completes radar search, investigates a total of 6 possible contacts with EO/IR. Two contacts required descent to 10,000 ft to positively identify the vessels as not being the target of interest (TOI). The TOI is located in the north-east corner of the operating area. After climbing to altitude the UA establishes an orbit to maintain positive contact on the TOI using Radar and EO/IR. The UA is directed to maintain a minimum of Radar contact unless another vessel closes within 5nm of the TOI. Once another vessel closes within 5nm of the TOI the UA must maintain EO/IR contact at all times to watch for any potential illicit activity.
T+43:50	+2 1550	AVO is contacted by inbound CP140 crew. AVO confirms inbound crew is established in the area, with 1,000 feet of altitude separation

Relative to Initial Report	Local Time	Event
		and is on the same Link 16 net. Link 16 track 6001 is passed as the TOI. AVO authorizes PO to handover tracking responsibility to CP140 once positive ID of the TOI is confirmed by CP140.
T+43:55	+2 1555	On station PO confirms inbound CP140 is holding the same TOI on EO.
T+44:00	+2 1600	On station AVO hands responsibility to CP140 crew and formally declares handover complete using positive handover procedures to ensure continuity of evidence.
T+51:00	+2 2300	RTB, UA returns to MOB

Table C-1 Maritime Scenario - Security Event East Coast

ANNEX D
To JUSTAS RFI
2016

1. MARITIME SCENARIO – SECURITY EVENT WEST COAST

Disclaimer: *The scenario described below is solely imaginary and integrates a JUSTAS UAS into a fictional domestic marine security operation. There is no intent to imply that the Deployed Operating Base (DOB) in this scenario will be selected to support JUSTAS UAS operations.*

1.1. General Description

The JUSTAS UAS is tasked to support a domestic maritime security operation coordinated by the Marine Security Operations Centre (MSOC) Esquimalt. The scenario is situated during November. The UAS will be operated from 19 Wing Comox (84 ft above MSL, main runway 10,000 ft). For illustration purposes, and only for this scenario, 19 Wing Comox is assumed to be a suitable DOB.

1.2. Scenario Details

Intelligence indicates that a converted fishing trawler (FV Cobra) is en route from the Philippines and is carrying approximately 300 illegal migrants from the Tamil controlled areas of Sri Lanka. The 230 ft vessel is suspected to be heading to an unknown destination on the west coast of North America somewhere between Prince Rupert, BC, and Seattle, WA. The range of plausible speeds is between 5 and 17 kts. From national assets, the last known position of the vessel is 52 00N 149 30W heading easterly. The Royal Canadian Mounted Police (RCMP) has previously secured the assistance of the Canadian Armed Forces (CAF) for the purpose of detecting and tracking the vessel. The Cobra is equipped with an AIS transponder.

The UAS mission is to detect and classify all vessels in the Area of Interest (AOI), and to locate and identify all vessels travelling eastward within the AOI that could meet the Cobra's parameters. The intent is to locate and track the Cobra as it enters Canada's Area of Responsibility (AOR) and before it reaches the west coast. The plan is to perform an all sensor search (SAR, EO/IR, ESM, SIGINT, AIS) of the area to detect ships and to determine their headings. If travelling eastward, these ships are to be classified and any vessel assessed as between 150 and 300 ft is to be visually identified. The UA will enter the south-eastern portion of the area and then be operated to cover the AOI from south to north using all sensors. Once the Cobra is identified with EO/IR, the UA is to covertly track the vessel for a minimum of six hours until relieved by another asset. During all phases, the UA is to maintain necessary distance required for visual and aural covertness, and be able to collect the required data.

The UA will be retasked in the middle of the scenario to support a domestic emergency as a result of a major earthquake that will hit the Prince Rupert area during the scenario. The UA will be tasked to act as a Comm Relay platform, to do Damage Assessment and to provide direct support to First Responders. As this earthquake will hit at night, the UA's sensors will be particularly useful in supporting the initial response.

1.3. General Scenario Information

Crew: Air Vehicle Operator, Payload Operator, Imagery and Signals Analysts

Configuration: Reconnaissance (EO/IR, SAR, AIS, ESM, SIGINT)

Flight Duration: 24 hours; scheduled take off 0200L

Weather Conditions: Due to the presence of a low-pressure system over the north eastern Pacific Ocean and the associated mass of moist and unstable air, weather conditions are conducive to the development of undercast conditions in some areas. Cloud ceilings below 15,000 ft AGL are expected for 50% of the mission.

Take off: Visibility 5 nm, 5,000 broken 17,000 broken

AOI: Visibility 15 nm, 6,000 broken 12,000 broken 21,000 broken

Landing: Visibility 10 nm, 5,000 broken 15,000 broken

Threats: Intelligence indicates that there are no threats to the UA.

Operating Area: International airspace above FL055 and uncontrolled airspace below FL055. The UA will be operating Due Regard while in international airspace and not under an IFR clearance.

During the domestic emergency the UA will be provided a block of restricted airspace as required to conduct the mission as a result of standing agreements between the Royal Canadian Air Force (RCAF) and Transport Canada/Nav Canada.

1.4 Sequence of Events

Table D-1 provides a chronology of sample mission events in hours and minutes, referenced to target vessel last detection (T) and local time.

Relative to Last Detection	Local Time	Event
T+00:00	2000 L	MV Cobra last located using national means at 52 00N 149 30W heading easterly.
T+12:00	+1 0800 L	No location information received for past 12 hours.
T+16:00	+1 1200 L	RCMP informs CAF LO to activate previously Minister of National Defence (MND)-authorized Op Order to launch CAF maritime surveillance mission.
T+28:01	+2 0001L	First standby UAS crew (on 12 hr standby posture) arrives at DOB and flight planning begins.
T+30:00	+2 0200 L	UA launch
T+30:45	+2 0245 L	On Station (ONSTA), UA enters AOI, commences search at South-East corner of AOI.
T+33:30	+2 0530 L	Next crew arrives at the GCS for Crew Change (CC)

Relative to Last Detection	Local Time	Event
T+34:00	+2 0600 L	CC complete (this will happen every four hours until the end of mission)
T+40:00	+2 1200 L	UA completes radar search, investigates a total of 8 possible contacts with EO/IR. One contact required descent to FL100 to positively identify the vessels as not being the target of interest (TOI). The TOI is located in the north-west corner of the AOI. After climbing to altitude the UA establishes an orbit to maintain positive contact on the TOI using Radar and EO/IR (cloud cover permitting). The UA is directed to maintain a minimum of Radar contact unless another vessel closes within 5nm of the TOI. Once another vessel closes within 5nm of the TOI the UA must maintain EO/IR contact at all times to watch for any potential illicit activity.
T+45:50	+2 1750 L	AVO is contacted by inbound CP140 crew. AVO confirms inbound crew is established in the area, with 1000 feet of altitude separation and is on the same Link 16 net. Link 16 track 6001 is passed as the TOI. AVO authorizes PO to handover tracking responsibility to CP140 once positive ID of the TOI is confirmed by CP140.
T+45:55	+2 1755 L	ONSTA PO confirms inbound CP140 is holding the same TOI on EO and RADAR.
T+46:00	+2 1800 L	ONSTA AVO hands responsibility to CP140 crew and formally declares handover complete using positive handover procedures to ensure continuity of evidence. UA receives ATC clearance and proceeds to 19 Wing Comox.
T+46:30	+2 1830 L	UA retasked to Prince Rupert, British Columbia (BC) to provide support to First Responders, assess damage and provide communication relay from local authorities to national agencies as the earthquake response unfolds.
T+47:00	+2 1900L	While enroute to the affected area the Mission Commander and UAS Squadron (Sqn) operations staff assess the weather in the operating area, ascertain the required airspace to conduct operations and prepare the second 19 Wing based UA for launch prior to airborne UA return to Comox. In addition, a CP140 is also being readied for immediate launch as well as aircraft and helicopters from 442 Search and Rescue Squadron. UAS Sqn Operations is working with 19 Wing Operations to de-conflict all aircraft involved in the Emergency Response. The UA has been assigned the 4000-5000 foot altitude block, entry and exit corridors have also been assigned.

Relative to Last Detection	Local Time	Event
		UAS Sqn Operations informs the UA crew of their assigned airspace, contact frequency for Emergency Management BC and informs the crew that their imagery is being streamed via the internet to Emergency Management Operations in Victoria, BC. A portable video terminal is being airlifted to the Prince Rupert 911 dispatch centre via CH149 helicopter to receive the UA feed directly.
T+49:00	+2 2100L	UA arrives at the entry gate level at 4500 feet and proceeds to commence its assigned tasks by providing EO/IR imagery to first responders and provincial and national Emergency Management agencies, relaying communications and assessing damage to assist in prioritizing first responders search and rescue efforts.
T+50:00	+2 2200L	2nd UA launched from 19 Wing Comox
T+51:30	+2 2330L	2nd UA arrives ONSTA. UA Swap performed
T+51:35	+2 2335L	Off Station (OFFSTA), UA proceeds to exit gate and commences climb and return to 19 Wing Comox.
T+53:55	+3 0155L	UA touches down at 19 Wing Comox

Table D-1 Maritime Scenario - Security Event West Coast

ANNEX E
To JUSTAS RFI
2016

1. DOMESTIC OVERLAND ISR SORTIE SCENARIO

Disclaimer: *The scenario described below is solely imaginary and integrates a JUSTAS UAS into a fictional Group of 20 Nations Summit (G20). There is no intent to imply that the MOB location used in the scenario is the one selected for the JUSTAS UAS.*

1.1. General Description

The JUSTAS UAS is tasked to support Royal Canadian Mounted Police (RCMP)-led security operations at a G20 Summit being held for two days at Montmorency Falls Park located just east of Quebec City, Quebec. The scenario is situated during June (average maximum temperature is 22°C and average minimum temperature is 9°C, average monthly precipitation is 89 mm). The UAS will be operated from 3 Wing Bagotville (522 ft above MSL, main runway length is 10,000 ft). Operational Control of the UAS is exercised by the Joint Force Air Component Commander (JFACC), who is responsible to the Commander Joint Task Force (JTF).

1.2. Scenario Details

The scenario takes place during the hours leading up to the beginning of the conference. Several groups have openly indicated their intent to protest and intelligence indicates that radical elements may exploit the presence of international media to further their anti-capitalist cause by disrupting the Summit. The mission is tasked to conduct surveillance of the Summit site security zone, report activities that may threaten security, assist in the monitoring of crowds and access control, and record data for legal purposes.

1.3. General Scenario Information

Crew: Air Vehicle Operator, Payload Operator, Imagery and Signals Analysts

Configuration: Reconnaissance (EO/IR, SAR, ESM, SIGINT)

Flight Duration: 24 hours; scheduled take off 0800L

Weather Conditions: Due to the presence of a low-pressure system over south western Quebec and the associated mass of moist and unstable air, weather conditions are conducive to the development of severe storms in some areas. Cloud ceilings below 15,000 ft are expected for 40% of the mission.

Take off:	Visibility 5 nm, 5,000 broken 17,000 broken
G20 Site:	Visibility 15 nm, 4,300 broken 12,000 broken 21,000 broken
Landing:	Visibility 10 nm, 5,000 broken 15,000 broken

Airspace: The UA will transit from Bagotville to the restricted airspace under an IFR flight plan. While in restricted airspace, the UA will be under control of JFACC and maintain VHF comms with Air Traffic Control (ATC).

Threats: Intelligence indicates that there are no threats to the UA.

Operating Area: Restricted airspace established for G20 Summit site (surface to FL240, 10 nm radius).

1.4. Mission Sequence of Events

Table E-1 provides a chronology of sample mission events in hours and minutes, referenced to UA take off.

Relative to Takeoff	Local Time	Event
T+00:00	0800L	UA launch.
T+00:30	0830L	AVO reports in with JFACC and obtains current information.
T+00:45	0845L	UA arrives at operating area.
T+01:00	0900L	AVO directs PO to initiate EO/IR surveillance of areas adjacent to the Summit site.
T+03:10	1110L	Cloud layer moves into operating area and prevents surveillance of the ground.
T+03:12	1112L	AVO advises control authority that crew is no longer able to observe the ground.
T+03:15	1115L	AVO initiates descent below cloud layer and advises ATC.
T+03:20	1120L	UA breaks clear of cloud at 5000 ft
T+03:25	1125L	PO re-establishes surveillance of security zone.
T+03:30	1130L	Next crew arrives at the GCS for Crew Change (CC).
T+04:00	1200L	CC complete (this will happen every four hours until the end of mission).
T+06:00	1400L	Radar (Ground Moving Target Indicator (GMTI) mode) automatically detected a series of moving targets. PO slews EO/IR to GMTI contacts.
T+06:02	1402L	PO focuses the EO/IR on the area of the moving targets
T+06:03	1403L	AVO reports to the control authority
T+06:05	1405L	Control authority directs AVO to assist ground security forces control a crowd of protestors.
T+06:10	1410L	Streaming video is provided via a Remote Video Terminal (RVT) to ground security team.
T+07:05	1505L	AVO reports storm cells 5 nm to the south of the UA and tracks the cell

Relative to Takeoff	Local Time	Event
		using the radar weather mode.
T+07:40	1540L	AVO reports that the storm cells have moved off to the northwest and no longer pose a threat to the UA.
T+08:20	1620L	Low clouds have cleared and AVO initiates climb to 15,000 ft
T+08:30	1630L	UA reaches 15,000 ft
T+08:50	1650L	PO observes a contact on Radar moving at 90 kts and cross cues the EO/IR sensor to the location. PO observes a low flying Cessna on the EO sensor approaching the no-fly zone. Aircraft was not picked up by the Air to Air Interrogator (AAI) or the Terminal Collision Avoidance System (TCAS) due to the aircraft transponder more than likely being non-operational.
T+08:52	1652L	AVO reports the aircraft to the control authority.
T+08:55	1655L	ATC contacts the aircraft and warns the pilot of the restricted airspace.
T+09:00	1700L	PO observes the aircraft turning away from the restricted airspace.
T+10:15	1815L	Control authority directs the AVO to provide surveillance of the United States (US) President's motorcade travelling from CYQB to the conference site. The motorcade is scheduled to depart CYQB at 1830L and arrive at 1900L which will be followed with a welcome ceremony.
T+11:25	1925L	Control authority directs the AVO to resume surveillance of the security zone.
T+13:10	2110L	Sunset
T+14:10	2210L	PO observes a car on the IR parked in a field out of the sight of the road. IR indicates that the engine is warm.
T+14:12	2212L	AVO reports the vehicle to the control authority. Streaming video is provided via an RVT to ground security team.
T+14:20	2220L	Security team is dispatched to the location.
T+14:35	2235L	Security team identifies the vehicle occupants as a group of underage drinking teenagers. Security team hands the teenagers over to the Sûreté du Québec.
T+17:20	+1 0120L	PO observes two people on EO/IR sensor crossing a field towards the Summit site.
T+17:22	+1 0122L	Streaming video is provided via the RVT to ground security team.

Relative to Takeoff	Local Time	Event
T+17:25	+1 0125L	Using radio relay, the UA communicates with the security team on a secure channel and vectors them to the area where they spot the vehicle and intercept it, identify the occupants and ascertain that the individuals were attempting to hang a banner concerning global warming.
T+20:45	+1 0445L	Sunrise
T+22:50	+1 0650L	Control authority directs AVO to assist ground security forces control a crowd of protestors.
T+22:52	+1 0652L	Streaming video is provided via the RVT to ground security team.
T+23:00	+1 0700L	AVO is contacted by inbound UA crew. AVO confirms inbound UA is established in the area, with 1,000 feet of altitude separation and is on the same Link 16 net. Link 16 track 6001 is passed as the centre coordinates for the protest. AVO authorizes PO to PO handover of tracking responsibility once positive ID of the protest site is confirmed by incoming crew.
T+23:05	+1 0705L	On station PO confirms inbound PO is holding the same individuals on EO. On station PO shuts down RVT transmissions. In bound PO starts transmitting to the RVT and confirms with RCMP that they are receiving video
T+23:10	+1 0710L	On station AVO hands responsibility to inbound crew and formally declares handover complete.
T+23:30	+1 0730L	AVO initiates contact with Montreal Centre and requests IFR clearance to Bagotville. UA departs the operating area.
T+23:45	+1 0745L	AVO initiates UA descent into Bagotville
T+24:15	+1 0815L	AVO lands the UA using the automatic landing system
T+24:25	+1 0825L	Mission crew completes shutdown of the Fixed GCS, ensuring that all relevant mission data has been stored.

Table E-1 Chronology of Domestic Overland Scenario Sortie Events

ANNEX F
To JUSTAS RFI
2016

1. EXPEDITIONARY MARITIME SORTIE SCENARIO

Disclaimer: *The scenario described below is solely imaginary and integrates a JUSTAS UAS into a fictional expeditionary marine security operation.*

1.1. General Description

The JUSTAS UAS is deployed to the Seychelles International Airport (10 ft above MSL, runway length is 9, 800 ft) in support of North Atlantic Treaty Organization (NATO) Counter Piracy Operation BLACK BEARD. The scenario is situated during September.

1.2. Scenario Details

Allied Joint Command Lisbon is in overall command of Operation BLACK BEARD while Maritime Component Command Headquarters Northwood, United Kingdom, executes day-to-day tactical control. Naval forces in support of the operation consist of units comprising the Standing NATO Maritime Group 2 (SNMG2). HMCS HALIFAX is deployed as part of SNMG2 and will be conducting patrols in the eastern portion of the operating area during the mission. Canada has also contributed one UAS line of tasking to provide 24/7 UAS coverage under command of the Joint Force Air Component Commander at Northwood.

The mission is tasked to provide all sensor surveillance (SAR, EO/IR, SIGINT, ESM, AIS) of the area from the Horn of Africa to the Kenyan/Somalia border out to 500nm from the African coast where numerous piracy events have occurred. Crews are to concentrate on the high traffic shipping lanes and report all suspicious contacts, possible pirate mother vessels and pirate skiffs (especially high speed traffic) in the vicinity of large merchant vessels. HMCS HALIFAX and the ship's boarding teams are equipped with RVTs and will intercept suspicious vessels in its vicinity. The UAS crews are to warn all potential target vessels in the vicinity of suspicious vessels. The UAS is to provide continuous surveillance in the event of naval boarding parties or piracy attacks. Crews are also to be on the lookout for FV Grecko (90ft, fishing vessel) which is believed to be a mother ship for the pirates.

The UAS detachment is expected to provided 24/7 coverage of the operating area for the month of September. For planning purposes the UAS crew expects to be able to detect with radar the small pirate vessels at 50nm and the FV Grecko at 90nm.

1.3. General Scenario Information

Crew: Air Vehicle Operator, Payload Operator, Imagery and Signals Analysts

Configuration: Armed Reconnaissance (EO/IR, SAR, SIGINT, AIS, 2 x AGM114 Hellfire Missiles)

Flight Duration: There is no specific timeline for this scenario as the Canadian UAS is expected to provide continuous coverage commencing 01 Sept 0000 UTC to 30 Sept 2400 UTC. In the event of mission abort, a second UA is to be prepped and ready for launch within an hour of notification that the on station UAS is returning to base.

Weather Conditions: The relative humidity is 11% and rainfall is not forecast. Visibility is 5 nm.

Take off:	Clear, 32°C, density altitude 6,000 ft, wind speed 5 kts
Area:	Clear
Landing:	Clear, 30° C, wind speed 4 kts

Airspace: Class A for transit then Due Regard for Onsta period. HMCS HALIFAX can provide air advisory when UAV is within HALIFAX's air search radar range.

Threats: The anti-air threat is assessed as low and may include small arms fire.

Operating Area: The mission is tasked to provide surveillance of a 300 x 300 nm area commencing 12 nm off the coast of Somalia.

1.4. Mission Sequence of Events

Table F-1 provides a chronology of sample mission events in hours and minutes, referenced to UA take off and local time in the operating area (Seychelles local minus 1 hour).

Relative to Takeoff	Local Time	Event
T+0000	0700L	UA takes off
T+0015	0715L	Launch and Recovery (L&R) AVO hands over control of the UA to the mission AVO (Fixed GCS at the MOB).
T+0050	0750L	UA reaches transit altitude of FL240.
T+0150	0850L	PO begins to plot radar and AIS contacts in area and initiates tracks.
T+0210	0910L	UA arrives at operating area. PO reports 12 contacts in the eastern part of the area.
T+0212	0912L	AVO initiates descent FL180.
T+0215	0915L	PO initiates ISAR imaging of contacts.
T+0220	0920L	UA levels at FL180.
T+0225	0925L	PO reports 3 contacts that appear to be skiffs. One of the contacts is heading towards a merchant vessel located 5 nm away. AIS indicates vessel is MV Copperhead.
T+0227	0927L	AVO directs UA towards contact.
T+0250	0950L	UA arrives in the vicinity of the contact.

Relative to Takeoff	Local Time	Event
T+0255	0955L	PO identifies the contact with EO as a fast moving open boat with eight men onboard.
T+0300	1000L	AVO contacts MV Copperhead and warns them that they may be the target of a pirate attack and that there are no NATO ships close enough to assist them.
T+0305	1005L	PO observes pirates attempt to board MV Copperhead.
T+0315	1015L	Pirates depart MV Copperhead after being repelled by water hoses.
T+0317	1017L	PO initiates track on pirates. AVO contacts HMCS HALIFAX for intercept coordination.
T+0325	1025L	PO initiates streaming video to RVT on board HMCS HALIFAX.
T+0330	1030L	Next crew arrives at the GCS for Crew Change (CC).
T+0400	1100L	CC complete (this will happen every four hours until the end of mission).
T+0410	1110L	HMCS HALIFAX disembarks boarding party and launches Sea King.
T+0412	1112L	PO reports what looks like boxes being tossed into the sea.
T+0420	1120L	Boarding party boards skiff.
T+0450	1150L	Boarding party releases pirates.
T+0452	1152L	AVO directs UA towards second skiff contact to resume surveillance.
T+0505	1205L	Using EO, PO assesses that the skiff is non-pirate.
T+0507	1207L	AVO directs UA towards third skiff contact.
T+0520	1220L	Using EO, PO assesses that the skiff is non-pirate.
T+0522	1222L	AVO directs UA to northern part of area for surveillance.
T+0535	1235L	PO reports 15 contacts in the northern part of the area.
T+0537	1237L	PO initiates ISAR imaging of contacts.
T+0545	1245L	PO reports four contacts that are skiffs.
T+0547	1247L	AVO directs UA towards first skiff contact.
T+0605	1305L	Using EO, PO assesses that the skiff is non-pirate.
T+0607	1207L	AVO directs UA to second skiff contact.
T+0630	1330L	Using EO, PO assesses that the skiff is non-pirate.

Relative to Takeoff	Local Time	Event
T+0632	1332L	AVO directs UA to third skiff contact.
T+0650	1350L	Using EO, PO assesses that the skiff is non-pirate.
T+0652	1352L	AVO directs UA to fourth skiff contact.
T+0710	1410L	Using EO, PO assesses that the skiff is non-pirate.
T+0715	1415L	AVO directs UA to western part of area for surveillance.
T+0725	1425L	PO reports 21 contacts in the western part of the area.
T+0727	1427L	PO initiates ISAR imaging of contacts.
T+0730	1430L	Crew 1 arrives for handover brief.
T+0735	1435L	PO reports five contacts that are skiffs.
T+0737	1437L	AVO directs UA towards first skiff.
T+0750	1450L	Using EO, PO assesses that the skiff is non-pirate.
T+0752	1452L	AVO directs UA towards second skiff.
T+0810	1510L	Using EO, PO assesses that the skiff is non-pirate.
T+0812	1512L	AVO directs UA towards third skiff.
T+0830	1530L	PO reports that skiff and personnel appear suspicious.
T+0832	1532L	AVO initiates orbit to monitor skiff.
T+0900	1600L	PO reports that skiff has changed direction towards a tanker. AIS identifies the tanker as MV Arabian Star.
T+0902	1602L	AVO contacts MV Arabian Star and warns them that they may be the target of a pirate attack and that there are no NATO ships close enough to assist them.
T+0910	1610L	PO observes skiff crew retrieve weapons from storage box.
T+0920	1620L	PO observes pirates attempt to board MV Arabian Star.
T+0930	1630L	PO observes pirates abandon boarding attempt and depart from the tanker.
T+0935	1635L	HMCS HALIFAX dispatches a Sea King to intercept the pirates. Crew is to track vessel until Sea King arrives.
T+1000	1700L	Sea King arrives overhead the pirates.
T+1005	1705L	AVO directs UA to fourth skiff contact to resume surveillance.

Relative to Takeoff	Local Time	Event
T+1025	1725L	Using EO, PO assesses that the skiff is non-pirate.
T+1027	1727L	AVO directs UA to fifth skiff contact.
T+1035	1735L	Using EO, PO assesses that the skiff is non-pirate.
T+1037	1737L	AVO directs UA to southern part of area for surveillance.
T+1040	1740L	Sunset
T+1100	1800L	PO reports 17 contacts in the southern part of the area.
T+1102	1802L	PO initiates ISAR imaging of contacts.
T+1115	1815L	PO reports four contacts that are skiffs and one contact that could be the suspected FV Grecko.
T+1117	1817L	AVO directs UA towards first skiff contact.
T+1135	1835L	Using IR, PO assesses that the skiff is non-pirate.
T+1137	1837L	AVO directs UA to second skiff contact.
T+1155	1855L	Using IR, PO assesses that the skiff is non-pirate.
T+1157	1857L	AVO directs UA to third skiff contact.
T+1215	1915L	Using IR, PO assesses that the skiff is non-pirate.
T+1217	1917L	AVO directs UA to fourth skiff contact.
T+1235	1935L	Using IR, PO assesses that the skiff is non-pirate.
T+1237	1937L	AVO directs the UA towards the suspected FV Grecko.
T+1250	1950L	PO confirms vessel is FV Grecko using IR.
T+1252	1952L	AVO reports position and heading of vessel to HMCS HALIFAX and controlling authority.
T+1300	2000L	Crew receive distress message from MV Asian Glory on VHF-FM channel 16. Vessel is being boarded by pirates and is requesting assistance. Broadcast position indicates that the vessel is located 50nm outside the southern corner of the area. Closest NATO ship, the USS Boone, is 100 nm away from the position.
T+1302	2002L	AVO directs UA towards MV Asian Glory.
T+1320	2020L	PO establishes IR surveillance of MV Asian Glory.
T+1330	2030L	UA arrives in the vicinity of the MV Asian Glory. PO initiates streaming video to an RVT onboard the USS Boone.

Relative to Takeoff	Local Time	Event
T+1710	0010L	USS Boone arrives in the vicinity of the MV Asian Glory and assumes on-scene commander.
T+1715	0015L	USS Boone advises crew that special forces aboard the ship plan to storm the pirates on board the MV Asian Glory when the situation is favorable. Crew is to maintain surveillance of all activities on the deck of the vessel in order to determine number, location and armament of pirates.
T+1720	0020L	PO initiates close up examination of deck, individuals and boarding access.
T+1740	0040L	PO initiates monitoring of individual pirate routines.
T+2100	0400L	USS Boone advises that special forces will storm the vessel at 0445L.
T+2102	0402L	AVO advises that a new crew will take over in 15 min and that replacement UA will arrive on scene at 0430L.
T+2105	0405L	AVO advises that to ensure continuity the onsta aircraft has sufficient fuel to remain in the area for one hour
T+2130	0430L	Replacement UA arrives in area and is tasked to monitor any activity outside 5nm of the MV Asian Glory.
T+2140	0440L	AVO and PO provide final update to USS Boone and confirm comms with Special Forces. Special Forces confirms video reception via RVT.
T+2145	0445L	Special Forces team storms the MV Asian Glory. AVO and PO provide support.
T+2155	0455L	Vessel and pirates confirmed secured
T+2200	0500L	AVO and PO begin handover procedures with second UA.
T+2205	0505L	Second UA assumes responsibility for monitoring of the mission and confirms positive comms and RVT with Special Forces
T+2205	0510L	AVO initiates UA climb to FL250.
T+2230	0530L	UA levels at FL250.
T+2230	0530L	UA departs the area.
T+2230	0530L	Sunrise
T+2400	0700L	AVO initiates UA descent for approach to Seychelles.
T+2420	0720L	AVO hands over the UA to the L&R AVO.

Relative to Takeoff	Local Time	Event
T+2430	0730L	L&R AVO lands the UA.
T+2445	0745L	Mission crew completes shutdown of the Fixed GCS, ensuring that all relevant mission data has been stored.

Table F-1 Expeditionary Maritime Scenario

ANNEX G
To JUSTAS RFI
2016

1. EXPEDITIONARY ISR / STRIKE SORTIE SCENARIO

Disclaimer: *The scenario described below is based on Canadian Armed Forces (CAF) Joint Task Force Afghanistan (JTF-Afg) experiences as is representative of contemporary CAF expeditionary land operations in a counter-insurgency environment. It is solely imaginary and integrates a JUSTAS UAS expeditionary scenario into a JTF-Afg type contextual framework. There is no intent to imply that future CAF land operations will involve the same strategic and operational circumstances as those present in JTF-Afg.*

1.1. General Description

The JUSTAS UAS is deployed to the Kandahar airfield (3,330 ft above Mean Sea Level, runway length 10, 498 ft) in Afghanistan in support of JTF-Afg. Record minimum and maximum temperature for Kandahar are -10°C and 44°C respectively, which correspond to an airfield density altitude of 1,500 and 7,500 ft. The scenario is situated during July (average maximum temperature 39°C, average minimum temperature 17°C, average monthly precipitation of 3 mm).

Operational Control of the UAS is exercised by the Joint Force Air Component Commander (JFACC). As per the Collection Task List (CTL) sensor data is transmitted to the various operations centres, both domestic and in theatre, for processing and exploitation.

1.2. Scenario Details

CAF-led coalition patrols have established a presence in the area roughly 100 km x 100 km, 25 nm to the West of Kandahar to extend the region of influence of friendly security forces. As per the Air Tasking Order (ATO), the UAS crew is tasked to conduct an ISTAR mission. The UAS will contribute to force protection by providing early warning of visible threats to CAF elements. Primary mission is to conduct pattern of life (POL) assessments at several suspected insurgent operating locations. Secondary mission is to conduct route survey for a coalition convoy and provide over watch to the convoy. This secondary mission is to be conducted at the beginning of the sortie and is expected to take approximately six hours. Because of the possibility of a High-Payoff Target (HPT) – a mortar mounted on the back of a white pickup truck - in the area, the UAS is tasked to carry one AGM114 Hellfire Missiles and two 250 lbs GBU 48 laser guided bombs. The HPT is on the approved Joint Prioritized Target List (JPTL) and the Rules of Engagement (ROE) permit the engagement of this target when approved by the Joint Force Commander (JFC).

1.3. General Scenario Information

Crew: Air Vehicle Operator, Payload Operator, Imagery and Signals Analysts

Configuration: Armed Reconnaissance (EO/IR, SAR, SIGINT, 1 x AGM 114 Hellfire Missiles and 2 x 250 lb GBU48 Precision Guided Munitions (PGM)

Fuel Load: Fuelled to Maximum Take Off Weight (MTOW) of aircraft.

Flight Duration: 20 hours; scheduled take off 2100 Local Time (L)

Weather Conditions: The relative humidity is 11% and rainfall is not forecast. Visibility is 6+ statute miles.

Take off:	Clear, 32°C, density altitude 6,000 ft, wind speed 5 knots.
Area:	Clear.
Landing:	Clear, 30°C, wind speed 4 knots.

Airspace: In accordance with the Airspace Control Order (ACO) and ATO, UAS is to operate between FL200 and FL300. Attacks will be conducted between FL130 and FL200 (clearance required). Clearance required to deviate from ATO assigned altitudes blocks.

Threats: The anti-air threat is assessed as low to moderate and may include small arms fire and light anti-aircraft artillery (AAA). The possibility of the insurgents employing man-portable air defence systems (MANPADs) is assessed as low.

Operating Area: The south east corner of the area of operation is 25nm to the west-northwest of Kandahar and is approximately 100 km x 100 km. The terrain elevation rises from 2,600 ft above MSL in the southwest to 5,300 ft in the north.

1.4. Mission Sequence of Events

Table G-1 provides a chronology of sample mission events in hours and minutes, referenced to UA take off and local time.

Relative to Takeoff	Local Time	Event
T+00:00	2100L	UA takes off using the automatic take off system.
T+00:15	2115L	Launch and Recovery (L&R) AVO hands over control of the UA to the mission AVO (Fixed GCS at the MOB.
T+00:40	2140L	UA arrives at operating area. AVO reports in with the control authority and obtains current information on convoy task.
T+00:45	2145L	AVO initiates route survey and directs PO and IA to identify, mark and record targets off interest (TOI) in the north-west corner of the operating area.
T+01:00	2200L	AVO is contacted by controlling authority by mIRC Chat, retasking the UA to a “troops in contact (TIC)” in progress at Grid Position 392 216. The AVO and PO plot the new position and conclude that it is in south east corner of the operating area approx 76 nm away and the AVO increases the UA speed to max available to dash to the new area.
T+01:20	2220L	As the UA arrives in the area of the reported TIC, PO searches for combatants who are engaging friendly forces (FF). The AVO sets the UA speed to Loiter.

Relative to Takeoff	Local Time	Event
T+01:30	2230L	UA is established in the area of the TIC, the PO spots a muzzle flash on EO and the IA confirms the weapon and starts a Positive ID (PID) checklist. The legal and controlling agency authorizes the use of force under ROE 999.
T+01:35	2235L	The PO uses the laser to target the combatant and the AVO goes through the engagement checklist and fires one AGM 114 at the combatant.
T+01:45	2245L	Troops on the ground report that the firing has stopped and ask that the UA do Battle Damage Assessment (BDA).
T+02:00	2300L	The PO and IA conclude the damage assessment and report findings.
T+02:15	2315L	AVO is contacted on mIRC by the controlling authority and released from the TIC and instructed to continue with planned mission.
T+02:50	2350L	UA arrives back in the area of planned mission and continues over watch of the convoy.
T+04:00	+1 0100L	The IA transfers an area of interest to the AVO and PO. The PO uses this information to cross-cue the EO/IR and sets up the SAR for Ground Moving Target Indicator (GMTI) search of the area.
T+04:20	+1 0120L	The GMTI is used to cross-cue the EO/IR and after a brief search, the IA reports that the PO is tracking HPT. The Forward Air Controller (FAC) reports that there is Close Air Support (CAS) in the area and asks that the target be illuminated with laser designator.
T+04:40	+1 0140L	All criteria in the ROE are satisfied and the CAS begins its first pass, firing munitions at the truck.
T+04:45	+1 0145L	Second pass is complete and UA is tasked to do a damage assessment. Results are reported and the UA is instructed to continue with previous mission.
T+05:15	+1 0215L	UA arrives back in the area of planned mission and resumes over watch of the convoy.
T+07:30	+1 0430L	The PO spots a group of three Fighting Aged Males (FAMs) standing near a long wall close to the road that the convoy is traveling on.
T+07:39	+1 0439L	One of the IAs adds this new activity to the mIRC Chat window for the supported agency (Battle Group (BG)) to see. The second IA begins to clip images of the three FAMs.
T+07:45	+1 0445L	The convoy slows to allow the UA to investigate the activity.

Relative to Takeoff	Local Time	Event
T+07:50	+1 0450L	The PO zooms the EO/IR camera in for more detail and it appears that there is some disturbed earth roughly two feet in diameter on the side of the road directly in front of the long wall. The IA reports this new information on the mIRC.
T+07:52	+1 0452L	As the UA circles to get different angles of the scene, it appears on the EO/IR camera that there is a wire coming from the area of disturbed earth and running in the direction of the wall and the three FAMs. The IA reports this new information on the mIRC.
T+07:55	+1 0455L	Using the EO/IR camera the PO and the IA see that one of the three FAMs appears to be holding a small radio or cell phone in his hand.
T+07:59	+1 0459L	As the UA circles to get different angles of the scene, it appears on the EO/IR camera that there is a shovel leaning against the wall next to the three FAMs. This is reported on mIRC and the three FAMs are now labelled as combatants.
T+08:10	+1 0510L	The IA confirms the radio, shovel and disturbed earth and starts a PID checklist for Insurgent Activity. The legal and controlling agency authorize the use of force under ROE 999.
T+08:20	+1 0520L	The PO uses the laser to target the combatant and the AVO goes through the engagement checklist and launches a GBU49 at the combatant.
T+08:40	+1 0540L	The PO and IA conclude BDA and report findings.
T+08:50	+1 0550L	AVO is contacted on mIRC by controlling authority and released from the engagement and BDA and instructed to continue with planned mission of convoy over-watch.
T+09:40	+1 0640L	The Convoy reached its destination. The UA is directed to initiate POL for suspected areas for 90 minutes each until Offsta.
T+19:00	+1 1600L	UA is handed back to the L&R unit, Kandahar ATC authorizes entry into their airspace and issues approach and landing instructions. The UA is then landed using the auto land capability using line-of-sight (LOS) communications

Table G-1 Chronology of Sortie Events

ANNEX H
To JUSTAS RFI
2016

1. TRAINING SORTIE SCENARIO

Disclaimer: *The scenario described below is based on Canadian Armed Forces (CAF) experiences as it is representative of Live-Fire training missions for crew qualifications. There is no intent to imply that the MOB and training location used in the scenario are those selected for the JUSTAS UAS.*

1.1. General Description

The UAS Squadron Standards Flight is conducting an ISR support mission for the Combat Team Commander's Course to include weapons qualification for two UAS crews. It will also qualify the load crew for live weapon handling. The scenario takes place during September (average maximum temperature is 20°C and average minimum temperature is 8°C, average precipitation 97 mm). The UAS will be operated from 3 Wing Bagotville (522 ft above MSL, main runway 10,000 ft). For illustration purposes only for this scenario, Bagotville is assumed to be the MOB. Once the ISR support portion is complete, the sortie will drop the munitions on the range at CFB Gagetown (elevation 170 ft).

1.2. Scenario Details

The ground crew will prepare the UA and load two laser-guided weapons. Crew 1 will be responsible for the sortie up until they achieve the crew qualification requirements. Responsibility for the sortie will then be transferred to Crew 2, who will complete their qualification requirements and then return the UA to Bagotville for recovery.

Each crew is to search the area provided at briefing and locate the tasked target. Target for the mission is a painted three-dimensional tank mock-up. A dark coloured range control truck that has had the engine running for a minimum of 30 mins will be used as a moving target to aid in tracking training. Once the target is located and identified, crews are to obtain attack clearance from range control. Crews are to conduct a battle damage assessment after the attack.

1.3. Mission Conditions

Crew: Air Vehicle Operator (AVO), Payload Operator (PO), AWS technician for weapons loading before flight.

Configuration: Armed Reconnaissance (EO/IR, Radar, 2 X PGM).

Flight Duration: 6.0 hours; scheduled take off 0800L.

Weather Conditions: CYBG forecast 5,000 broken, 10,000 broken, 25,000 overcast, winds 330/50, temperature 12, dew point 10.

CYFC forecast: 20,000 overcast, winds 270/20, 7/5

Airspace: The UA will transit from Bagotville to the restricted area CYR724 under an IFR flight plan. While in CYR724, the UA will be under range control.

Montreal FIR	FL180 to FL600	Class A
	Above 12,500′	Class B
	12,500′ and below	Class E
Moncton FIR	FL180 to FL600	Class A
	Above 12,500′	Class B
	12,500′ and below	Class E
Bagotville MTCA	FL180 to FL600	Class A
	Above 12,500′	Class B
	12,500′ and below	Class E
	1,200′ AGL up to and including 12,500′ ASL within specified area	Class D
Bagotville Control Zone		Class D
CYR724	Surface to FL250	Class F

Threats: Intelligence indicates that there are no threats to the UA.

Operating Area: CYR724

1.4. Mission Sequence of Events

Table H-1 provides a chronology of sample mission events in hours and minutes, referenced to UA take off (T) and local time.

Relative to Takeoff	Local Time	Event
T-02:00	0600L	Crew 1 and 2 assemble for mission brief.
T-01:45	0615L	UA towed to arming spot for PGM loading.
T-01:30	0630L	Crew 1 disperse for individual pre-GCS duties. Ground crew prepares UA IAW SOP.
T-01:00	0700L	Crew 1 AVO files IFR flight plan. Dangerous Cargo. Depart CYBG, climb to FL 230, UBG DCT TAFFY DCT YFC DCT CYR724. Alternate recovery site CYZX. Return T+0400 YFC DCT TAFFY DCT XBG FL 240. Lost link; intend continuing on flight plan for 30

Relative to Takeoff	Local Time	Event
		min then proceed on return IFR leg to CYBG.
T-00:30	0730L	UA towed to arming spot for PGM arming.
T-00:20	0740L	AVO calls CYBG clearance delivery on UHF for IFR clearance.
T-00:19	0741L	AVO and PO commence engine start procedure. AVO calls CYBG ground on UHF for taxi clearance and informs ground that final arming checks are required immediately prior to takeoff.
T-00:05	0755L	Pre-takeoff checks are complete (arming crew confirms to AVO via UHF radio that all missiles and weapons are armed), AVO calls CYBG tower for takeoff clearance.
T	0800L	Takeoff clearance received. UA takes off and follows CYBG SID.
T+00:02	0802L	AVO calls CYBG terminal on UHF for en-route clearance.
T+00:10	0810L	CYBG terminal hands the UA over to Montreal Centre. AVO calls Montreal Centre on VHF for further en-route clearance.
T+00:20	0820L	UA levels at FL230.
T+00:30	0830L	AVO and PO conduct post-takeoff and sensor checks, initiate chat with TACP or JTAC and receive tasking and SA brief.
T+00:40	0840L	UA is handed-off to Moncton Centre. AVO contacts Moncton Centre via VHF.
T+00:50	0850L	AVO contacts Gagetown range control on UHF and requests clearance to operate in CYR724 at 10,000'.
T+01:00	0900L	UA arrives at operating area. AVO contacts Moncton Centre, proceeds operational, and informs ATC of 1200L further clearance time. AVO initiates descent to 10,000'.
T+01:35	0935L	UA levels at 10,000'.
T+01:40	0940L	PO initiates multi-mode/multi-sensor search for both the moving and static targets.
T+01:50	0950L	PO locates the moving target using the GMTI of the SAR.
T+01:55	0955L	PO confirms identity of target with the EO and tracks target as it transits a nearby area of the range. AVO reports target location to TACP/JTAC.
T+02:10	1010L	TACP/JTAC re-tasks UA to search for second target. PO breaks off tracking of moving target and searches for static tank mock-up.

Relative to Takeoff	Local Time	Event
T+02:20	1020L	PO locates the static target with EO.
T+02:23	1023L	PO confirms identity of static target. AVO reports target location to TACP/JTAC. FMV transmitted through TCDL.
T+02:25	1025L	TACP/JTAC confirms target ID and tasks UA to destroy target. PO initiates ground search within potential collateral damage area.
T+02:30	1030L	PO laser-designates the target.
T+02:32	1032L	AVO conducts attack.
T+02:35	1035L	PO confirms that target destroyed. AVO reports to TACP/JTAC and advises of imminent crew change.
T+02:40	1040L	Crew 1 handover to Crew 2.
T+02:45	1045L	PO initiates multi-mode/multi-sensor search for both the moving and static targets.
T+02:55	1055L	PO locates the moving target using the GMTI of the SAR.
T+03:00	1100L	PO confirms identity of target with the EO and tracks target as it transits a nearby area of the range. AVO reports target location to TACP/JTAC.
T+03:15	1115L	TACP/JTAC re-tasks UA to search for second target. PO breaks off tracking of moving target and searches for static tank mock-up.
T+03:25	1125L	PO locates the static target with EO.
T+03:28	1128L	PO confirms identity of static target. AVO reports target location to TACP/JTAC. FMV transmitted through TCDL.
T+03:30	1130L	TACP/JTAC confirms target ID and tasks UA to destroy target. PO initiates ground search within potential collateral damage area.
T+03:35	1135L	PO laser-designates the target.
T+03:37	1137L	AVO conducts attack.
T+03:40	1140L	PO confirms that target destroyed.
T+03:41	1141L	After obtaining clearance from JTAC, AVO initiates UA climb to FL240.
T+03:45	1145L	AVO requests IFR clearance back to YBG from Moncton Centre. Moncton Centre clears UA flight plan route to YBG.
T+04:00	1200L	UA levels at FL240 and departs operating area.

Relative to Takeoff	Local Time	Event
T+04:15	1215L	UA is handed-off to Montreal Centre. AVO contacts Montreal Centre via VHF.
T+04:45	1245L	Montreal Centre hands the UA over to YBG terminal.
T+04:50	1250L	UA begins descent into Bagotville.
T+05:15	1315L	AVO lands the UA using the automatic landing system and established procedures.
T+05:45	1345L	Mission crew completes shutdown of the Fixed GCS, ensuring that all relevant mission data has been stored.

Table H-1 Chronology of Sortie Events

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JUSTAS UAS EMPLOYMENT STATISTICS GENERATION

1. This annex explains the methodology used to generate the various tables presented in the RFI under the Operational Tempo section.

Projected Yearly Flying Rate (YFR) Distribution

2. The basic 8,000 hours YFR allocation has been provided by the RCAF. This represents the flying rate that can be indefinitely sustained by the projected organization with regard to manning. This basic YFR allocation can support both a Domestic-Only Operations and a mix of Domestic and Deployed Operations (single LOT deployed). To support a more robust deployment (2LOT) and maintain domestic surveillance, an increase of the YFR to 12,000 hours will be required. It is envisioned that 2LOT will be deployed for six months every second year, effectively alternating the YFR requirement between 8,000 and 12,000 hours on an annual basis.

3. Discussions between Canadian Joint Operations Command (CJOC), Directorate Air Requirements (DAR) 8 and Project Management Office (PMO) JUSTAS allowed a distribution of the YFR in each deployment posture between the various domains. This distribution is purely for planning purposes and will be continually adapted by CJOC to optimize the response to the demand.

Domain	3 LOT Domestic YFR	2 LOT Domestic / 1 LOT Deployed YFR	1 LOT Domestic / 2 LOT Deployed YFR
MAR	4,400	1,600	1,600
OVRL	800	800	800
ARTC	2,400	1,200	1,200
TRNG	400	400	400
EXPD	0	4,000	8,000
Total Hours	8000	8000	12000

Table 5-1 Projected YFR Distribution

Takeoff/Landing and Altitude Change Cycles

4. The number of takeoff and landing cycles is obtained by dividing the number of flight hours of Table 5-1 by 25 hours (the notional flight duration). This assumes that an average mission lasts 25 hours and is defined as: one takeoff, a climb to altitude, a mission portion, a descent for the approach and a landing.

5. Figure 1 presents representative flight profiles for the various operational domains (defined in paragraph 6). The number of Descent & Climb cycles for each domain does not include the initial post-takeoff climb to transit altitude or the descent for the approach and landing at the end of the mission.

6. The rationale for the number of Descent & Climb cycles for each domain is as follows:

a. **MAR**: Complete Radar Plot from altitude and correlate contacts with AIS. Descend for visual identification of uncorrelated or suspect contacts. Repeat process for second area;

b. **OVRL**: Transit to operations area and set up for tasking. Once ready, descent to ONSTA altitude for tasking execution;

c. **ARTC**: If possible, remain at high altitude to facilitate satellite communications;

d. **TRNG**: Perform multiple training scenarios with supported forces; and

e. **EXPD**: Perform ISR tasking from optimum altitude and adjust altitude when required for visual identification or for weapons employment.

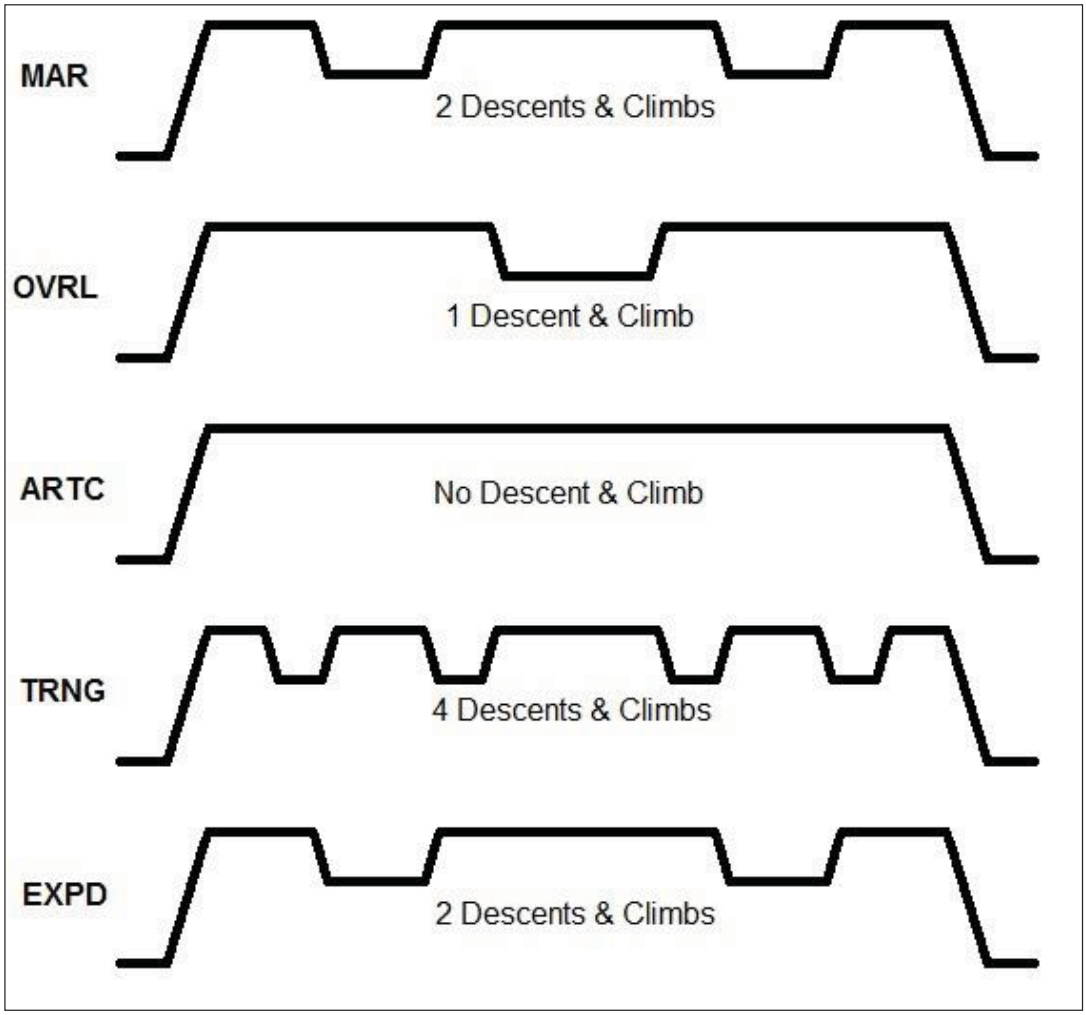

Figure 1 Individual Domains Representative Flight Profiles

7. It must be recognized that those numbers are speculative and should be updated with actual statistics once JUSTAS has accumulated sufficient flight hours in the various domains.

Change Cycles	Takeoff & Landing			Descent & Climb		
	3 LOT Domestic	2 LOT Domestic 1 LOT Deployed	1 LOT Domestic 2 LOT Deployed	3 LOT Domestic	2 LOT Domestic 1 LOT Deployed	1 LOT Domestic 2 LOT Deployed
MAR	176	64	64	352	128	128
OVRL	32	32	32	32	32	32
ARTC	96	48	48	0	0	0
TRNG	16	16	16	64	64	64
EXPD	0	160	320	0	320	640
Total YFR (Hours)	8,000	8,000	12,000	8,000	8,000	12,000

Table 5-2 Takeoff/Landing and Altitude Change Cycles

Percentage Time Spent at Various Power Settings

8. It is expected that the UA will be operated mostly at four specific power settings:

a. **Max Power**: Used for takeoff (UA close to Maximum Gross Takeoff Weight) and to expedite transit from point A to point B (when called to provide close air support to troops in contact with hostile forces);

b. **Cruise**: Power setting that maximizes distance travelled per pound of fuel. Used for the transit to and from the operations area. For transit distance calculations, a nominal value of 175 kts is used for cruise speed;

c. **Loiter**: Power setting that minimizes fuel consumption while maintaining the UA safely above stall speed. Used during most of the On-Station period. As the stall speed is mostly dependant on the aircraft weight and altitude, loitering at different altitudes will have different fuel consumptions; and

d. **Min Power**: Minimum power setting used at start-up for initialization of on-board systems and taxiing to takeoff position.

9. The time spent at each power setting will depend on the mission type and domain. It is expected that, for a typical 25 hours duration flight, the average time spent at each power settings will vary as detailed below:

a. **MAR**: Max power will only be applied for the takeoff and climbs back to high altitude (30 min for post takeoff climb + 2 x 15 min climbs from medium to high altitude). An 800 nm average distance to the patrol area is used, requiring a two-way cruise duration of 2 x 800nm / 175kts = 9 hrs (36%). The remaining airborne

time (60%) is split between high and medium altitude with a 2:1 ratio in favour of high altitude;

b. **OVRL**: Max power will only be applied for the takeoff and the one climb back to high altitude (30 min for post takeoff climb + 15 min climb from medium to high altitude). A 350 nm average distance to the operations area is used, requiring a two-way cruise duration of 2 x 350nm / 175kts = 4 hrs (16%). The remaining airborne time (81%) is spent at high altitude setting up the surveillance pattern and the comms with the supported unit (8%) and at medium altitude to conduct the surveillance (73%);

c. **ARTC**: Max power will only be applied for the takeoff and climb to high altitude (30 min for post takeoff climb). A 1200 nm total distance to the ends of the North West Passage from a suitable Northern FOL is used, requiring a two-way cruise duration of 1200nm / 175kts = 7 hrs (28%). The remaining airborne time (70%) is also spent at high altitude maintaining satellite communications links while conducting surveillance;

d. **TRNG**: Max power will be applied for the takeoff, climbs back to high altitude (30 min for post takeoff climb + 4 x 15 min climbs from medium to high altitude) and maximum speed excursion during training scenarios (4 x 15 min). A 100 nm average distance to the training area is used, requiring a two-way cruise duration of 2 x 100nm / 175kts = 1 hrs (4%). The remaining airborne time (86%) is split between high and medium altitude, running through multiple short scenarios; and

e. **EXPD**: Max power will be applied for the takeoff, climbs back to high altitude (30 min for post takeoff climb + 2 x 15 min climbs from medium to high altitude) and maximum speed excursion to quickly re-position for troop support (2 x 30 min). A 175 nm average distance to the operations area is used, requiring a two-way cruise duration of 2 x 175nm / 175kts = 2 hrs (8%). The remaining airborne time (84%) is split between high and medium altitude, remaining above small arms and MANPAD reach as much as possible.

	Initialization	**Takeoff, Climb and Airborne Time**			
% Flight Time at Power Setting	**Min Power**	**Max Power (Takeoff/Climb, Expedite)**	**Cruise (Transit)**	**Loiter**	
				High Altitude	**Med Altitude**
MAR	2	4	35	40	19
OVRL	2	3	16	8	73
ARTC	2	2	28	70	0
TRNG	2	10	4	40	46
EXDP	2	8	8	44	40

Table 5-3 Percentage of Flight Time Spent at Various Power Settings

Payload Usage Across Mission Domains as Percentage Time ON

10. The principal sensors on the UA are the EO/IR, the multi-mode radar, the AIS receiver and the SIGINT payload. All but the AIS can provide useful information in all the domains. The AIS is strictly for the maritime or coastal environment as it provides information of large commercial shipping vessels.

11. The principal sensors employment in the various domains is expected to be as follows:

a. **MAR**:

i. EO/IR: Used for Identification of contacts/targets day and night;

ii. Radar: Used for initial search, then tracking and imaging of contacts;

iii. AIS: Used to correlate AIS information with radar contacts and EO/IR information; and

iv. SIGINT: Used to detect, identify, establish intent and pinpoint origin of electromagnetic emissions IAW the CSE mandates under the National Defence Act.

b. **ARTC**:

i. EO/IR: Used for Identification of contacts/targets day and night;

ii. Radar: Used for initial search, then tracking and imaging of contacts. Can also detect sea surface ice coverage;

iii. AIS: Used to correlate AIS information with radar contacts and EO/IR information; and

iv. SIGINT: Used to detect, identify, establish intent and pinpoint origin of electromagnetic emissions IAW the CSE mandates under the National Defence Act and Canadian law.

c. **TRNG**:

i. EO/IR: Used for Identification of contacts/targets day and night and for targeting;

ii. Radar: Used for imaging and detecting/tracking moving targets. Limited use when performing visual tracking;

iii. AIS: Used to correlate AIS information with radar contacts and EO/IR information in maritime scenarios only; and

iv. SIGINT: Used to detect, identify, establish intent and pinpoint origin of electromagnetic emissions IAW the CSE mandates under the National Defence Act and Canadian law.

d. **EXPD**:

i. EO/IR: Used for Identification of contacts/targets day and night and for targeting;

ii. Radar: Used for imaging and detecting/tracking moving targets. Limited use when performing visual tracking;

iii. AIS: AIS: Used to correlate AIS information with radar contacts and EO/IR information in the maritime environment only; and

iv. SIGINT: Used to detect, identify, establish intent and pinpoint origin of electromagnetic emissions IAW the CSE mandates under the National Defence Act and Canadian law.

Payload Usage as % Flight Time ON	EO/IR	Radar	AIS	ESM/SIGINT
MAR	100	100	100	100
OVRL	100	75	0	50
ARTC	100	100	100	100
TRNG	100	90	50	90
EXPD	100	90	15	100

Table 5-4 Payload Usage as Percentage of Flight Time ON

Other Systems Employment

12. In addition to the payloads and engine, statistics on other systems need to be tracked. For JUSTAS, these systems are:

a. Navigation System; and

b. Communications System.

13. These systems are initiated as power is applied to the UA and shut down during the UA shutdown process. It is estimated that these systems will be powered for 105% of the YFR.

Projected GCS Time ON

14. In addition to tracking the usage parameters of the UA and its sensors, the usage of the various GCS types must be tracked. The base mission data is taken from Table 5-1, the projected YFR distribution, and Table 5-2, the number of takeoffs and landings.

15. The basic assumption is that all missions are controlled from the MOB GCS after takeoff. GCS time ON amounts to the total YFR plus the pre- and post-flight work performed in the GCS (mission planning, mission replay, mission data archiving for 4 hours per flight) and the period of time a deployable GCS is ON to perform UA takeoff and landing (5 hours per takeoff and land cycle).

16. For the TRNG domain, additional GCS time will be required to conduct scenarios in simulation mode (no actual UA flying, the system uses emulators to generate realistic sensor data) with replacement crewmembers.

17. For each crew, the 68 hours of sim-time is expected as detailed below:

a. Famil sessions: 2 x 3 hours = 6 hours

b. Trade-specific missions: 4 x 3 hours = 12 hours

c. Full crew missions: 5 x 10 hours = 50 hours

18. The annual throughput is expected to be 6 crew per year for a sim-time GCS use of 6 x 68 hours = 408 hours. These 408 hours are added to the 464 hours required for the live flights for a Fixed GCS TRNG total of 464 + 408 = 872 hours.

GCS Time On (hours)	Domestic Only		1 LOT Deployed		2 LOT Deployed	
	Fixed	Deploy	Fixed	Deploy	Fixed	Deploy
MAR	5,104	440	1,856	160	1,856	160
OVRL	928	80	928	80	928	80
ARTC	2,784	480	1,392	240	1,392	240
TRNG	872	30	872	30	872	30
EXPD	0	0	4,640	800	9,280	1,600
Total	9,688	1,030	9,688	1,310	14,328	2,110

Table 5-5 Projected GCS Time ON

ANNEX J
To JUSTAS RFI
2016

One-on-one Session Registration Form

SECTION A: CORPORATE INFORMATION
NAME OF COMPANY (Please include legal corporate name, corporate address, as well as a general telephone number and e-mail address for any future correspondence)
Name: _____ No./Street: _____ City: _____ Province/State:_____ Telephone Number:_____ Name of Contact Person: _____ E-mail Address of Contact Person*: _____ * This email address will be used by Contracting Authority to send confirmation of registration
BRIEF DESCRIPTION OF COMPANY (Please include primary business line and area of expertise in relation to JUSTAS Project and size of your Company)
What is your primary business line? _____ What type of goods and/or service does your company specialize in? _____ _____ What size would you estimate your company to be? (√) Small ☐ Medium ☐ Large ☐ Small – fewer than 100 employees; Medium – between 100 and 500 employees; Large – more than 500 employees

SECTION B: ONE-ON-ONE SESSION ATTENDANCE
Respondent representatives will be required to attend onsite. Videoconference and teleconference will not be available.
The purpose/objective for the potential one-on-one meeting is to: _____ _____ _____ _____ How many representatives from your company do you estimate will be attending the potential one-on-one session? Number: _____
PRESENTATION LOGISTICS
The Government of Canada will provide a display device for the meeting room for displaying presentation material for all meetings, should any participants require it. Respondents participating in one-on-one sessions are welcome to bring their own laptop to connect to the display device, if they so require, for the purposes of making a presentation, however, it is neither mandatory nor required to make a digital presentation if the participants do not wish to.
Internet access will not be available.