

Appendix AA to Annex A

**System Requirements Specification (SysRS)
for the
Area Detection and Identification System
(ADIS)**

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AVIS

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TABLE OF CONTENTS

1	INTRODUCTION.....	1
1.1	Scope	1
1.2	Intended Use	1
1.3	System Overview	1
2	APPLICABLE DOCUMENTS.....	3
2.1	References	3
2.2	Glossary and Acronyms	3
3	REQUIREMENTS	4
3.1	Performance Requirements	4
3.1.1	General Requirements.....	4
3.1.2	Detection and Identification (D&I)	4
3.1.3	Video Camera	6
3.1.4	Global Positioning System (GPS)	7
3.1.5	Compass	7
3.1.6	Console	7
3.1.7	ADIS Networking Requirements.....	7
3.2	Interface Characteristics.....	8
3.2.1	The Console Graphical User (GUI)	8
3.2.2	Alarm Events at the Console	9
3.2.3	Alert Events	10
3.2.4	Power.....	11
3.2.5	Set-up and Start-up Time	13
3.3	Physical Requirements	14
3.3.1	Transit Cases.....	14
3.3.2	Dimensions	15
3.3.3	Weight	15
3.3.4	Platform Interface	15
3.4	Specialty Engineering	16
3.4.1	Electromagnetic Environmental Effects (E3).....	16
3.4.2	Emissions Security	17
3.4.3	Signature.....	17
3.4.4	Environment, Health and Safety	18
3.4.5	ADIS Security	18
3.4.6	Human Factors Engineering	20
3.4.7	Integrated Logistics Support Requirements	20
3.4.8	Contamination by Fluids.....	23
3.4.9	Labelling and Marking	24
3.4.10	Sharp Edges	24
3.4.11	Treatment, Painting and Finishes.....	24
3.5	Environmental Characteristics	25
3.5.1	Temperature – Storage	25
3.5.2	Temperature – Operation	25
3.5.3	Humidity	26

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

3.5.4	Thermal Shock	26
3.5.5	Solar Radiation.....	26
3.5.6	Blowing Rain	26
3.5.7	Freezing Rain	27
3.5.8	Snow	27
3.5.9	Dust.....	27
3.5.10	Salt Fog	27
3.5.11	Fungus	27
3.5.12	Vibration	27
3.5.13	Shock	28
3.5.14	High Altitude.....	28
3.6	Design and Construction	28
3.6.1	New Materials	28
4	VERIFICATION	30
4.1	Verification Scope.....	30
4.2	Verification Responsibility	30
4.3	Qualification Tests	30
4.4	Verification Methods.....	30
5	ADDITIONAL INFORMATION	31
5.1	Preparation for Delivery	31

1 INTRODUCTION

1.1 Scope

This System Requirements Specification (SysRS) outlines the performance requirements for the Area Detection and Identification System (ADIS). The ADIS SysRS establishes the minimum acceptable requirements for the ADIS. However, the inherent performance and capabilities of the system, their subsystems and equipment may exceed that specified in the SysRS.

1.2 Intended Use

The Canadian Armed Forces (CAF) is required to sustain operations despite the threat or presence of chemical, biological, radiological or nuclear (CBRN) hazards. A cornerstone of the defence posture is an effective warning system that can provide an early warning so that soldiers can survive and operate under the chemical threat by adopting protective measures.

Specifically, ADIS will be used for surveillance and early warning of medium and large size perimeters (camps, airfields, harbours, etc.), and may be used to assess the overall contamination following a chemical release.

The use of ADIS for a Detect-to-Warn role is not limited to fixed sites or static base camps, but could also include semi-static locations, such as formation HQs, detached or forward operating elements. ADIS may be setup and used as a survey and surveillance device prior to and during major events (Olympics, Summits, etc.) or used to conduct initial surveys during theatre activation. As well, it is anticipated that some of the ADIS will be adapted for ground survey/recce purposes, where they can be readily installed onboard any reconnaissance vehicle. Also, ADIS will be allocated to deployed CAF ships in order to provide added surveillance capability while in port, at anchor, or during naval boarding operations. Finally, it is expected that ADIS' extended detection range and extensive library of chemical substances may be used in other non-CBRN activities, such as intelligence gathering, detection of home-made explosives, or evaluation of emissions from DND facilities.

The protection of large areas, such as base camps and airfields, would typically require two or more ADIS sensors in order to provide the best coverage possible, and to allow for ranging and accurate localization of the threat through triangulation techniques. ADIS may be setup at ground level to Scan along a street, or be set up on top of building for a general wide-range Scan.

All deployed ADIS will be able to communicate and relay all pertinent information (including CBRN 4 messages) to a single sensor controller, which will be connected to a unit or formations command and control net.

1.3 System Overview

ADIS will be an early warning, field deployable, autonomous standoff detector, monitoring an immediate area of interest, capable of detection and identification of chemical threats at a distance of up to 3 km, or more. It utilizes passive or active technology to detect, analyze, and identify chemical warfare agents (CWA), and toxic industrial chemicals (TIC). Following identification, ADIS prepares and transmits a CBRN 4 message up the chain of command. ADIS will be capable of detection and identification as a single independent sensor, as shown in Figure 1, as well as part of a network of up to 6 ADIS, as shown in Figure 2. In addition to forming its own independent networks, ADIS will be capable of integrating into a multi-sensor mobile ad-hoc network.

ADIS may be operated from a static location protecting a vital point powered by batteries or grid power, vehicle mounted and powered or ship mounted and powered.

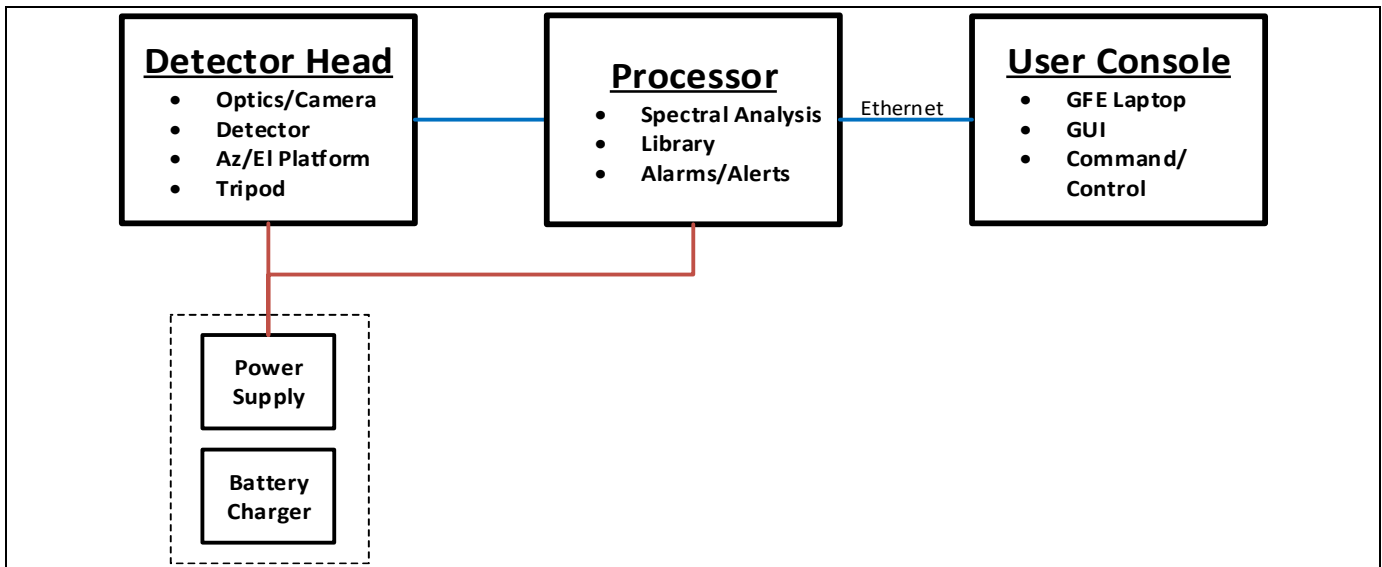


Figure 1: ADIS as a Single Stand-alone Sensor

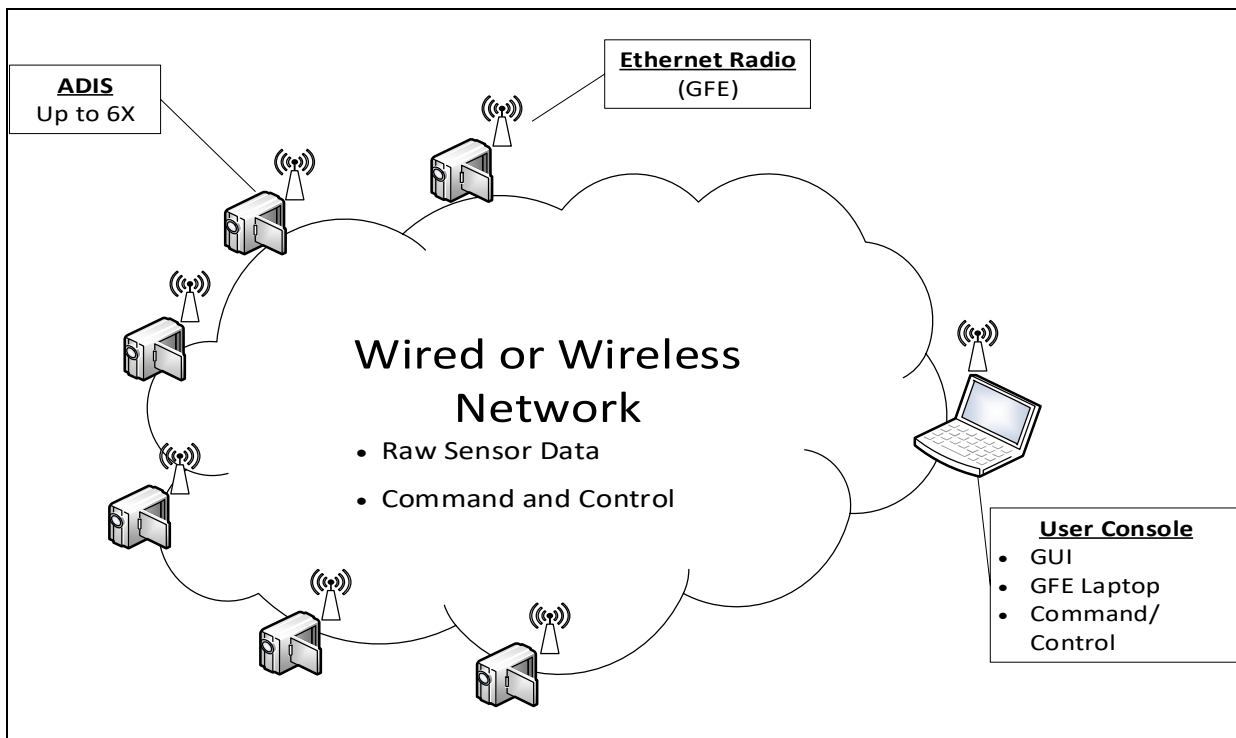


Figure 2:

ADIS as a Networked Sensors

2 APPLICABLE DOCUMENTS

2.1 References

The standards, specifications and publications referenced in this SysRS are listed and detailed in Volume 2, Annex A, Appendix AE, References, Acronyms and Glossary (RAG). In the event of a conflict between the text of this SysRS and the references cited herein, the text of this SysRS takes precedence.

2.2 Glossary and Acronyms

The Glossary of terms and list of acronyms used in the SysRS are defined and detailed in Volume 2, Annex A, Appendix AE, RAG.

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

3 REQUIREMENTS

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
1	<i>3.1 Performance Requirements</i>	Title	
2	<i>3.1.1 General Requirements</i>	Title	
3	ADIS must autonomously Scan, detect, identify, and alarm.	CoC	D
4	ADIS must operate in all of the following configurations as:		
5	a. A single independent system; and	CoC	D
6	b. a part of an independent network under the control of one Console.	CoC	D
7	<i>3.1.2 Detection and Identification (D&I)</i>	Title	
8	<i>3.1.2.1 Scanning Coverage For A Range Of 3 Km</i>		
9	The ADIS must scan an azimuth coverage of 360°.	CoC	D
10	The ADIS must scan a minimum elevation coverage of -10° to +40° at any azimuth.	CoC	D
11	The ADIS must allow the operator to select a fixed azimuth and elevation, within the coverage limits of the system.	CoC	D
12	The ADIS must complete monitoring coverage of 360° in azimuth and -10° to +40° in elevation in a maximum of 30 minutes.	CoC	D
13	<i>3.1.2.2 Identification Requirements - CWAs</i>	Title	

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
14	ADIS must detect and identify the mandatory CWAs listed in Table A of attachment AA1 to Appendix AA of Annex A. The Detection Criteria is defined as a probability of successful detection and identification of at least 80% (95% confidence level) under the following conditions:	T (Lab Trial)	
15	a. A Chemical Cloud width and depth of 50 meters;	T (Lab Trial)	
16	b. A Chemical Cloud at a distance of 3 km the Detector Head (DH) with an unobstructed line of sight;	T (Lab Trial)	
17	c. A temperature contrast between the cloud and the background (or background and cloud) of 2.0 degrees Kelvin; and	T (Lab Trial)	
18	d. An alarm be raised for the correct substance within 2 minutes of entering the sensor's field of view.	T (Lab Trial)	
19	ADIS should detect and identify all CWAs listed in Table A of Attachment AA1 to Appendix AA of Annex A at the lowest possible detection levels. The Detection Criteria is defined as a probability of successful detection and identification of at least 80% (95% confidence level) under the following conditions:AA1	T (Lab Trial)	
20	a. A Chemical Cloud width and depth of 50 meters or less;	T (Lab Trial)	
21	b. A Chemical Cloud at a distance of 3 km or more from the DH with an unobstructed line of sight;	T (Lab Trial)	
22	c. A temperature contrast between the Chemical Cloud and the background (or background and cloud) of 2 degrees Kelvin or less; and	T (Lab Trial)	
23	d. An alarm be raised for the correct substance within 2 minutes or less of entering the sensor's field of view.	T (Lab Trial)	
24	<i>3.1.2.3 Identification Requirements - TICs</i>		

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
25	ADIS must detect and identify at least 10 of the TICs listed in Table B of attachment AA1 to Appendix AA of Annex A.	TR	
26	ADIS should detect and identify more than 10 of the TICs listed in Table B of attachment AA1 to Appendix AA of Annex A.	TR	
27	<i>3.1.2.4 Cloud Boundaries</i>	Title	
28	ADIS should be able to display the chemical cloud's left-side and right-side boundaries.	PP	D
29	<i>3.1.2.5 Scanning Background</i>	Title	
30	ADIS must be capable of detecting and identifying chemical clouds following a line of sight that does not intersect hard targets (i.e. a uniform temperature sky background).	T	
31	<i>3.1.2.6 False Alarm Rate</i>	Title	
32	The ADIS should have a false alarm rate of 2/24 hours or lower.	TR	
33	<i>3.1.2.7 Multiple Targets</i>		
34	ADIS should detect and identify multiple distinct (not overlapping or mixed) Chemical Clouds, composed of any substance in its library, simultaneously present within the coverage area.	TR	
35	<i>3.1.2.8 Triangulation Mode</i>	Title	
36	ADIS must allow a triangulation when two or more ADIS are connected to the same console in a network.	PP	D
37	<i>3.1.3 Video Camera</i>	Title	

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
38	ADIS must have a video camera as a targeting aid for aligning DH with an element of interest.	CoC	D
39	<i>3.1.4 Global Positioning System (GPS)</i>	Title	
40	ADIS DH must be equipped with a GPS.	CoC	
41	The console must report the position of the DH to the operator in Military Grid Reference System coordinates or Latitude/Longitude based on operator selection.	PP	D
42	<i>3.1.5 Compass</i>	Title	
43	ADIS DH must be equipped with a compass.	CoC	
44	ADIS must report the DH orientation from true north.	PP	D
45	<i>3.1.6 Console</i>	Title	
46	The Console is a lightweight ruggedized military laptop computer, provided as Government Furnished Equipment (GFE).	Info	
47	The Console houses the OEM provided Graphical User Interface (GUI).	Info	
48	<i>3.1.7 ADIS Networking Requirements</i>	Title	
49	<i>3.1.7.1 Networked Sensors</i>	Title	
50	One Console with OEM software must wirelessly operate and control up to and including 2 ADIS.	PP	D
51	One Console with OEM software must, using hard wire, operate and control up to and including 2 ADIS.	PP	D
52	One Console with OEM software should wirelessly operate and control up to and including 6 ADIS.	PP	D

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
53	One Console with OEM software should, using hard wire, operate and control up to and including 6 ADIS.	PP	D
54	<i>3.1.7.2 Communications with ADIS Console and GFE Equipment</i>	Title	
55	ADIS DH must be wirelessly controlled using the Console that is connected to a GFE Ethernet radio having a RJ45 connector.	N	D
56	ADIS DH must be controlled up to 100m away using the Console via a wired connection.	N	D
57	<i>3.1.7.3 Communication with External Networks</i>	Title	
58	ADIS should be able to communicate CBRN sensor data to an external independent network.	CoC	D
59	<i>3.2 Interface Characteristics</i>	Title	
60	<i>3.2.1 The Console Graphical User (GUI)</i>	Title	
61	ADIS must have a GUI to provide an interactive information display to the operator in accordance with (IAW) MIL-STD-1472G Sect 5.2.2 or any human factors engineering equivalent standards.	N	D
62	The GUI must:		
63	a. Display information to the operators in a clear and easy-to-understand format	N	D
64	b. Permit the configuration of any ADIS in a network;	N	D
65	c. Enable the operator to view the main library of detectable CWA and TIC;	N	D
66	d. Enable the operator to select the library of detectable CWA and TIC from a series of stored libraries or list of CWAs and TICs;	N	D

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
67	e. Allow the operator to manually zero the DH in reference to the geographic north;	N	D
68	f. The GUI must display the azimuth and elevation angles of the DH;	N	D
69	g. Have an indicator for the current function;	N	D
70	h. Be available in Canadian English and Canadian French;	N	D
71	i. Allow the operator to choose between Canadian English or Canadian French upon demand; and	N	D
72	j. In the event of a malfunction of the Console, ADIS must be controllable by a substitute laptop computer running the same ADIS Console software. This will require the capability to download ADIS software onto another laptop.	N	D
73	All ADIS functions including those related to networking operation must be available through the GUI.	N	D
74	<i>3.2.2 Alarm Events at the Console</i>	Title	
75	ADIS must have visual and audible alarms IAW MIL-STD-1472G, Sections 5.7.2 and 5.3.1 respectively or any human factors engineering equivalent standards.	N	D
76	ADIS must allow the operator to adjust audio alarm intensity.	N	D
77	ADIS must automatically provide audio and visual alarms and messages to the console within 10 seconds of the detection of a chemical threat.	N	D
78	In the event of a detection of a chemical threat, the Console must display a visual alarm IAW MIL-STD-1472G, section 5.2.2 or any human factors engineering equivalent standards.	N	D
79	In the event of a detection of a chemical threat, the Console must sound an auditory alarm IAW MIL-STD-1472G, section 5.3.1.3 or any human factors engineering equivalent standards.	N	D
80	During an alarm, the Console GUI must display:		

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
81	a. The names of all the detected compounds as they appear in the library;	N	D
82	b. The date and time of the event;	N	D
83	c. The zone, in azimuth, of the detected chemical cloud;	N	D
84	d. When two or more ADIS are in a network, which ADIS alarmed; and,	N	D
85	e. ADIS must be able to report triangulation information.	N	D
86	The GUI must provide command, control and visualization over the functions and settings of a single ADIS or all networked ADIS.	N	D
87	The GUI must display a CBRN 4 message using the prefilled fields and the identification data from the deployed ADIS.	N	D
88	ADIS must allow the operator to:		
89	a. View and save the CBRN 4 message;	N	D
90	b. Save or copy the status record of detected chemicals and warnings to an external file; and	N	D
91	c. Cancel all audio and visual alarms from the Console.	N	D
92	ADIS should allow the operator disable or enable further alarms triggered by certain signatures or sources.	N	D
93	<i>3.2.3 Alert Events</i>	Title	
94	In the event of an ADIS malfunction the GUI must display an audible and visual alert IAW MIL-STD-1472G sections 5.2.2 and 5.3.1 respectively or an equivalent human factors standard.	N	D
95	The audio and visual alerts indicating an equipment malfunction must be clearly distinct from those indicating detection of a CWA or TIC.	N	D

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
96	GUI must maintain and provide a status record of the alert events encountered by ADIS with corresponding time stamp.	N	D
97	ADIS must automatically provide messages to the console within 10 seconds of a malfunction of any ADIS component.	N	D
98	<i>3.2.4 Power</i>	Title	
99	ADIS must conform to the relevant Canadian standards. (Reference: https://www.esasafe.com/electricalproducts/marks and https://www.esasafe.com/consumers/safety-and-security/product-safety/product-approval)	CoC	I
100	<i>3.2.4.1 Battery Power</i>	Title	
101	<i>3.2.4.1.1 External Battery Pack</i>	Title	
102	ADIS primary power source must be the External Rechargeable Battery Pack.	CoC	
103	Lithium rechargeable batteries, if used, must comply to UN3481	CoC	I
104	A single External Battery Pack must provide power for ADIS to operate continuously for at least four hours at 20° C ± 5° C on a single charge.	CoC	T
105	A single External Battery Pack should provide power for ADIS to operate continuously for more than four hours at 20° C ± 5° C on a single charge.	N or PP	D
106	The External Battery Pack must have a low battery indicator.	CoC	D
107	ADIS should allow hot-swappable battery replacement without powering down the ADIS.	N	D
108	<i>3.2.4.2 Battery Charger</i>		

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
109	The Battery Charger must fully charge the depleted External Battery Pack within 240 minutes or less at 20° C ± 5° C.	N or PP	D
110	The Battery Charger must visually indicate when the External Battery Pack is fully charged.	CoC	I
111	The Battery Charger must visually indicate if there is a fault with the External Battery Pack.	CoC	I
112	The Battery Charger must only engage when the External Battery Pack is at a safe temperature level.	CoC	
113	The Battery Charger must not overcharge the External Battery Pack.	CoC	D or A
114	The Battery Charger must accept and use a voltage of 24 V DC	N or PP	
115	The Battery Charger should accept and use a voltage range of 12-36 V DC.	N or PP	D
116	The Battery Charger must accept and use 100-240 V AC ± 10%, 50-60 Hz ± 5%.	CoC	
117	The Battery Charger AC input must by default include a NEMA 5-15P connector that fits in standard Canadian wall sockets.	N or PP	I
118	The Battery Charger should comply with MIL-STD-1275E, sections 5.1.1, 5.1.2 and 5.1.3.	N or PP	T or TR
119	<i>3.2.4.3 External Power</i>	Title	
120	ADIS must operate using input power with a voltage of 24 V DC.	N or PP	D
121	ADIS should operate using input power with a voltage range of 12-36 V DC.	N or PP	D
122	ADIS should comply with MIL-STD-1275E sections 5.1.1, 5.1.2 and 5.1.3.	N or PP	T or TR
123	ADIS must operate using input power with a single phase voltage of 100-240 V AC ±10% and a frequency of 50-60Hz ± 5%.	CoC	
124	ADIS AC power input cable must include a NEMA 5-15P connector that fits in standard Canadian wall	N or PP	I

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
	sockets.		
125	ADIS should have automatic changeover from one source of power to another without a full shutdown.	N or PP	D
126	ADIS must include reverse polarity protection.	CoC	
127	<i>3.2.5 Set-up and Start-up Time</i>	Title	
128	<i>3.2.5.1 ADIS Set-up Time</i>	Title	
129	The starting condition is that all packed ADIS transit cases are on the ground. Set-up includes, but is not limited to:	Info	
130	a. Unpacking the ADIS components and cables from their transit cases;	Info	
131	b. Assembling the ADIS components;	Info	
132	c. Connecting the components together;	Info	
133	d. Powering up the ADIS;	Info	
134	e. Warmed-up, initialized and calibrated; and	Info	
135	f. Full operating condition.	Info	
136	ADIS must be set-up by no more than two operators wearing Individual Protective Equipment (IPE), in less than 60 minutes for a single ADIS.	PP	D
137	<i>3.2.5.2 ADIS Tear-down Time</i>	Title	
138	ADIS Tear-down is performed by a team of no more than two operators in IPE. The starting condition is that the ADIS is operational on the ground. Tear-down includes, but is not limited to:	Info	

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
139	a. Powering off the ADIS;	Info	
140	b. Disconnecting the ADIS components;	Info	
141	c. Disassembling the ADIS components; and	Info	
142	d. Packing the ADIS components.	Info	
143	ADIS must be torn-down by no more than two operators wearing IPE, in less than 60 minutes.	PP	D
144	<i>3.2.5.3 ADIS Network Set-up Time</i>	Title	
145	A network of two or six ADIS DHs and a console must be set up and ready to operate within two or six hours respectively, by no more than two operators wearing IPE.	PP	D
146	<i>3.3 Physical Requirements</i>	Title	
147	<i>3.3.1 Transit Cases</i>	Title	
148	ADIS must be packed in hard shelled, weather proof, ruggedized transit cases.	PP	I or D
149	The transit cases must:		
150	a. Include an air pressure relief valve;	N or PP	I
151	b. Be designed to protect the ADIS hardware during transport;	PP	D
152	c. Include folding handles of sufficient quantity to meet the Human Factors lifting requirements per MIL-STD-1472G Section 5.8.6.3 or any human factors engineering equivalent standards;	N or PP	I
153	d. Be labelled in accordance with the Labelling and Marking section, para 3.4.9; and	N or PP	I
154	e. Be stackable.	N or PP	D

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
155	<i>3.3.2 Dimensions</i>	Title	
156	ADIS, in transit configuration, must be transportable using a light truck with dimensions limits of 1.35 m x 1.85 m x 0.90 m without modification to the vehicle.	PP	A or I
157	ADIS, in transit configuration, should be transportable using a utility transport vehicle with dimensions limits of 1.15 m x 1.52 m x 0.83 m without modification to the vehicle.	PP	A or I
158	<i>3.3.3 Weight</i>	Title	
159	While in transit configuration individual loaded transit cases must not exceed 46 kg each.	PP	I
160	No ADIS component intended for single-person carry should weigh more than 35 kg.	PP	I
161	<i>3.3.4 Platform Interface</i>	Title	
162	<i>3.3.4.1 Ground Mount</i>	Title	
163	ADIS must include a tripod for ground mounting.	CoC	
164	The tripod must meet the following requirements:		
165	a. Support the combined load of the DH, AZ/EL P, and cables without damage or degradation;	N	D
166	b. Have leg heights that adjust, as a minimum, from 100 cm to 150 cm;	N	D
167	c. Have collapsible, adjustable legs with lock systems, and lockable pan (horizontal swing) and tilt (vertical) movements;	N	D
168	d. Be transportable on the operator's back;	N	D
169	e. The AZ/EL P must mount securely to the tripod without the use of tools; and	N	D

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
170	f. The AZ/EL P must be capable of being levelled while mounted on the tripod.	N	D
171	<i>3.3.4.2 Vehicle Mount</i>	Title	
172	ADIS should offer a vehicle mount.	CoC	
173	ADIS should offer a telescoping mast	CoC	
174	<i>3.4 Specialty Engineering</i>	Title	
175	<i>3.4.1 Electromagnetic Environmental Effects (E3)</i>	Title	
176	<i>3.4.1.1 Radiated Susceptibility</i>	Title	
177	ADIS must not exhibit any malfunction, degradation of performance, or deviation from specified operation, when subjected to the radiated emissions listed in MIL-STD-461F:		
178	a. Method RS101, Figure RS101-2, Navy, from 30 Hz to 100 kHz; and	TR	
179	b. Method RS103, Table VII, Army Ground, from 2 MHz to 18 GHz.	TR	
180	<i>3.4.1.2 Radiated Emissions</i>	Title	
181	Electric field emissions from ADIS must not radiate in excess of those specified in MIL-STD-461F:		
182	a. Method RE101, Figure RE101-2, Navy; and	TR	
183	b. Method RE102, Figure RE102-4, Navy Mobile and Army.	TR	
184	<i>3.4.1.3 Electrostatic Discharge</i>	Title	

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
185	ADIS must meet the specifications for electromagnetic environmental effects of electrostatic discharge control in accordance with MIL-STD-464C section 5.8.	CoC	
186	Compliance must be verified by test MIL-STD-461G CS118, or IEC 64000-4-2 Ed 2.0 Dec 2008. Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test.	CoC	
187	<i>3.4.1.4 Electrical Bonding</i>	Title	
188	ADIS must meet the specifications for Electrical Bonding in accordance with MIL-STD-464C section 5.11.3.	CoC	
189	ADIS electrical bonding must provide electrical continuity across external mechanical interfaces on electrical and electronic equipment, both within the equipment and between the equipment and other system elements, for control of E3 such that the system operational performance requirements are met.	CoC	I
190	<i>3.4.1.5 Grounding</i>	Title	
191	ADIS must meet the specifications for Electrical Grounding in accordance with MIL-STD-464C sections 5.12.	CoC	
192	The system must have an external electrical grounding attachment point to which a bonding strap or cable can be attached.	CoC	I
193	<i>3.4.2 Emissions Security</i>	Title	
194	ADIS should, as a system, meet TEMPEST Level II compliance in accordance with CID/09/15A Level II, SDIP 27 Level B, or an equivalent TEMPEST standard.	N	T
195	<i>3.4.3 Signature</i>	Title	

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
196	<i>3.4.3.1 Acoustic Signature</i>	Title	
197	The ADIS noise level, except alarms, must be non-detectable at a distance of 30 m in accordance with MIL-STD-1474D, Table 2-1.	N	T
198	The ADIS noise level, except alarms, should be non-detectable at a distance of 10 m in accordance with MIL-STD-1474D, Table 2-1.	N	T
199	<i>3.4.3.2 Visual Signature</i>	Title	
200	ADIS should have a "Black Out" function, in which all external light sources, except the Console are extinguished so that no visible light is emitted.	N	D
201	<i>3.4.4 Environment, Health and Safety</i>	Title	
202	ADIS must not present a safety or health hazard to the operator and must comply with the Canadian Occupational Health and Safety Regulations, SOR/86-30, Parts VII, VIII and X. (Reference: http://laws-lois.justice.gc.ca/eng/regulations/SOR-86-304/page-1.html).	N	CoC
203	<i>3.4.4.1 Laser Safety</i>		
204	ADIS must meet ANSI Z136.1-1986 Class I requirements for laser safety.	CoC	
205	The ADIS laser beam must be invisible.	CoC	D
206	ADIS must include all required bilingual laser safety labels in accordance with ANSI Z136.1 (2000-10-26).	N	I
207	<i>3.4.5 ADIS Security</i>	Title	
208	ADIS must have operator and administrator or super administrator access levels.	N	D

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
209	<i>3.4.5.1 Data Logs for Audit</i>	Title	
210	ADIS must produce, store and display activity logs which include alarms, alerts, and system status.	PP	D
211	ADIS must create a log entry each time:		
212	a. An operator, administrator or super administrator logs into ADIS;	N	D
213	b. A mission parameter is changed;	N	D
214	c. The library is modified;	N	D
215	d. All privileged operations are executed;	N	D
216	e. Whenever attempts to elevate privileges failed;	N	D
217	f. There are security related system alerts and failures;	N	D
218	g. There are deletions and modification to System operator and group additions, permissions; and	N	D
219	h. There are unauthorised access attempts to systems and files.	N	D
220	ADIS data logs must record:		
221	a. Date and time of the event;	N	D
222	b. Event description;	N	D
223	c. Success or failure of the event; and	N	D
224	d. Event source (e.g. application name).	N	D
225	ADIS must protect data logs from:		
226	a. Modification and unauthorised access; and	N	D

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
227	b. Whole or partial loss within a definable retention period.	N	D
228	<i>3.4.5.2 Software Malfunction</i>	Title	
229	Following a software malfunction ADIS must revert to a known safe state.	N	D
230	<i>3.4.6 Human Factors Engineering</i>	Title	
231	ADIS, while in its transit cases, must be crew-portable by a two-person detachment in accordance with the requirements of MIL-STD-1472G or human factors engineering equivalent.	N	D
232	Vendor supplied ADIS components must be capable of day and night operation and be compatible with night vision goggles (NVG).	N	D
233	An operator clothed in full fighting order (helmet, tactical vest, and ballistic vest) and wearing IPE must be able to operate the ADIS.	N	D
234	An operator clothed in full fighting order (helmet, tactical vest, and ballistic vest) and wearing IPE must be able to perform Operator Maintenance.	N	D
235	ADIS must be operable by the 5th percentile female to the 95th percentile male of the CAF population as defined in DRDC-RDDC-2015-R186. Note: Throughout this specification, if there are discrepancies between MIL-STD-1472G and the anthropometric data in the DRDC Report, the latter will take precedence.	N	A or D
236	<i>3.4.7 Integrated Logistics Support Requirements</i>	Title	
237	<i>3.4.7.1 Reliability</i>	Title	
238	ADIS must have a Mean Time Between Failures (MTBF) of at least 1000 hrs.	CoC	A

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
239	ADIS should have a MTBF of at least 2500 hrs.	CoC	A
240	<i>3.4.7.2 Maintainability</i>	Title	
241	<i>3.4.7.3 Operator Maintenance</i>	Title	
242	ADIS should have a Mean-Time-To-Repair at the First Line of 60 minutes. This includes:	PP	A
243	a. Isolate the problem to the Line Replaceable Unit (LRU);	PP	
244	b. Remove/replace the faulty LRU; and	PP	
245	c. Verify the serviceable condition of ADIS.	PP	
246	<i>3.4.7.4 Preventive Maintenance</i>	Title	
247	ADIS must not require preventative maintenance more than once in any 24-hour period except for cleaning the optical lens in dusty conditions and the charging or replacement of batteries.	PP or A	A
248	ADIS preventative maintenance must not exceed 15 minutes per day.	PP	A
249	<i>3.4.7.5 Built In Test (BIT)</i>	Title	
250	ADIS must include a BIT capable of isolating a failure down to the LRU level and report results to the console.	N	D
251	The BIT must be initiated when ADIS is powered on.	N	D
252	ADIS must log the BIT results.	N	D
253	<i>3.4.7.6 Service Life</i>	Title	

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
254	ADIS must have a minimum 10-year in-service life.	A	
255	<i>3.4.7.7 Lens Cleaning Kit</i>	Title	
256	ADIS must include a lens cleaning kit.	N or PP	I
257	<i>3.4.7.8 Cables and Connectors</i>	Title	
258	Power and data cables must be multi-conductor, shielded, flexible cord.	N	A
259	Data cables should be flexible fibre-optic cables.	N	I
260	ADIS cables must be flexible at cold storage temperature, -33°C, in accordance with FED-STD-228A, Method 2011.1, Flexibility, Insulation, and Low Temperature.	N	CoC or TR
261	All cable connectors must provide strain relief.	N	I
262	All cables and connectors must have captive dust caps.	N	I
263	Unless otherwise stated in this specification, all connectors, inlets and outlets must be in accordance with MIL-DTL-38999L.	CoC	I
264	Cable tags must consist of a white solid background plastic identification marker tube or sleeve printed in dark contrasting ink using a character height not smaller than 2 millimeters and must be covered and protected by clear heat shrink tubing.	CoC	I
265	ADIS Cables must have a marker tags, “catalogue” and “functional” co-located at each end of every cable.	CoC	I
266	The Catalogue tags must be located at 3-metre intervals where the overall Cable length exceeds 5 meters.	CoC	I

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
267	The Functional tag must contain the following information: a) Cable functional title (e.g. XX System Battery Charger Power Cable) b) Cable rating (e.g. 110 V Cable) c) Cable Part Number (e.g. P/N XXXX) d) Cable length (e.g. Length XX M)	CoC	I
268	The Catalogue tag must contain the following information: a) NSN xxxx-xx-xxx-xxxx b) Cage Code c) Part Number (e.g. P/N XXXXX) d) Cable length (e.g. Length XX M)	CoC	I
269	Cable connectors and their receptacles must be marked for identification (e.g. P1, C1 etc.)	CoC	I
270	<i>3.4.7.9 Calibration</i>	Title	
271	ADIS must automatically self-calibrate.	N and CoC	
272	<i>3.4.8 Contamination by Fluids</i>	Title	
273	ADIS performance should not be degraded when exposed to the following 10 chemicals, as described in MIL-STD-810G, Method 504.1, Procedure II. 1. Cleaning compound, solvent (Rifle bore cleaner); 3. Engine Oil; 4. Lubricant, semi-fluid, automatic weapons; 5. Lubricating oil, general purpose, preservative (water displacing, low temperature); 7. Gasoline, commercial, or combat;	TR	T

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
	9. Fuel oil diesel (DL-2) and other Grades; 10. Insect repellent, personal application; 14. Simulated sea water or 5% NaCl; 20. DS-200 Decontaminating Agent; and 25. Other Solvents.		
274	<i>3.4.9 Labelling and Marking</i>	Title	
275	ADIS must bear ID plates in accordance with MIL-STD-1472G, section 5.8.6.3.12 and D-02-002-001/SG-001.	N	I
276	All non-pictorial ADIS safety warnings must be in Canadian English and Canadian French.	N	I
277	ADIS labels and markings must be legible following exposure to the environmental conditions outlined in para 3.5	N	I
278	<i>3.4.10 Sharp Edges</i>	Title	
279	ADIS must not have any sharp edges and burrs on any interior and exterior surfaces and corners of ADIS per MIL-STD-1472G section 5.7.7.6.	N	I
280	<i>3.4.11 Treatment, Painting and Finishes</i>	Title	
281	All ADIS components must be Green 383 (colour chip 34094), in accordance with FED-STD-595B.	N	CoC
282	ADIS must have a matte finish, with a gloss value of less than 3 in accordance with ISO 2813.	N	CoC
283	A Chemical Agent Resistant Coating must be applied on the external paintable surfaces of ADIS, in compliance with MIL-DTL-53072C excluding the transit cases, optics, accessories, GFE and parts for which it would interfere with its operation.	N	CoC

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
284	<i>3.5 Environmental Characteristics</i>	Title	
285	ADIS must meet all performance requirements in this SysRS without degradation of performance of the ADIS and its sub-systems (including any integrated Government Supplied Material (GSM) and Government Furnished Equipment (GFE)) during and after exposure to any combination of the meteorological and induced climatic conditions that can be found within the geographic climatic regions identified in this SysRS and described in MIL-STD-810; or NATO STANAG 4370, AECTP 200, AECTP 230, Leaflet 2311/1 and Leaflet 2311/2.	CoC	
286	<i>3.5.1 Temperature – Storage</i>	Title	
287	ADIS, in its transit cases, must operate following high temperature storage as described in MIL-STD-810G, Method 501.6, Procedure I Table 501.6-II (A2-Basic Hot) Induced Conditions with maximum temperature amended to 60°C.	TR	
288	ADIS, in its transit cases, should operate following high temperature storage as described in MIL-STD-810G, Method 501.6, Procedure I using Table 501.6-III (A1-Hot Dry) Induced Conditions.	TR	
289	ADIS, in its transit cases, must operate following low temperature storage as described in MIL-STD-810G, Method 502.6, Procedure I using Table 502.6-I (C1-Basic Cold) at constant temperature of -32°C.	TR	
290	ADIS, in its transit cases, should operate following low temperature storage as described in MIL-STD-810G, Method 502.6, Procedure I using Table 502.6-I (C3- Severe Cold) at a constant temperature of -51°C.	TR	
291	<i>3.5.2 Temperature – Operation</i>	Title	
292	ADIS must operate during high temperature extremes as described in MIL-STD-810G, Method 501.6, Procedure II, using Table 501.6-II (A2-Basic Hot) Ambient Air Conditions with maximum temperature amended to 40°C	TR	

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
293	ADIS should operate during high temperature extremes as described in MIL-STD-810G, Method 501.6, Procedure II, using Table 501.6-III (A1-Hot Dry) Ambient Air Conditions.	TR	
294	ADIS must operate during Low Temperature extremes as described in MIL-STD-810G, Method 502.6, Procedure II and III using Table 502.6-I (C1-Basic Cold) at constant temperature amended to -20°C.	TR	
295	ADIS should operate during exposure to low temperature extremes as described in MIL-STD-810G, Method 502.6, Procedure II using Table 502.6-I (C1-Basic Cold) at constant temperature of -32°C.	TR	
296	<i>3.5.3 Humidity</i>	Title	
297	ADIS must operate during and after exposure to high relative humidity up to 95% ± 5% as described in MIL-STD-810G, Method 507.6, Procedure II (10 day Aggravated Cycle).	TR	
298	<i>3.5.4 Thermal Shock</i>	Title	
299	ADIS must operate after being subjected to thermal shocks as described in MIL-STD-810G, Method 503.6, Procedure 1-C with test temperature limits of +40°C and -20°C, or Procedure I-D when transferred from a controlled ambient condition of 20°C to a cold environment of -20°C and from a controlled ambient condition of 20°C to a hot environment at +40°C.	TR	
300	<i>3.5.5 Solar Radiation</i>	Title	
301	ADIS must operate throughout temperature cycles and solar radiation of up to 1120 W/m ² as described in MIL-STD-810G, method 505.6, Figure 505.6-1 Procedure I (A1-Hot Dry).	TR	
302	<i>3.5.6 Blowing Rain</i>	Title	
303	ADIS must operate while and after being exposed to Blowing Rain as described in MIL-STD-810G, Method 506.6, Procedure I, using rainfall rate of 1.7 mm/min (4 in/hr), and a wind speed of 18 m/sec (40 km/h).	TR	

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
	There must not be water ingress in the equipment.		
304	<i>3.5.7 Freezing Rain</i>	Title	
305	ADIS should operate following exposure to a buildup of 6 mm of freezing rain as described in MIL-STD-810G, Method 521.4, and after the optical and moving parts are freed from ice.	TR	
306	<i>3.5.8 Snow</i>	Title	
307	ADIS should withstand snow loads of 49 kg/m ² of area as described in MIL-HDBK-310 section 5.1.13.3 for portable equipment.	CoC	
308	<i>3.5.9 Dust</i>	Title	
309	ADIS must operate with the optics covered during, and operate with the optics uncovered following exposure to blowing dust as described in MIL-STD-810G, Method 510.6, Procedures I, after the optical lens has been cleaned off. An IP6X rating is also a sufficient means to demonstrate compliance to this requirement.	TR	
310	<i>3.5.10 Salt Fog</i>	Title	
311	ADIS should operate following exposure to salt fog as described in MIL-STD-810G, Method 509.6 after the optical lens has been cleaned off.	TR	
312	<i>3.5.11 Fungus</i>	Title	
313	ADIS should be constructed of fungus resistant materials.	CoC	
314	<i>3.5.12 Vibration</i>	Title	
315	ADIS must not be damaged and operate following a standardized vibration test.	TR	

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
316	ADIS, while in its transit cases, must not be damaged and operate following secured cargo transportation in military pattern vehicle transportation as described in MIL-STD-810G, Method 514.7, Procedure I, Category 20 - Ground Vehicles (Composite Wheeled Vehicle – 1 minute exposure per 20 km).	N	T
317	The ADIS, while in its transit cases, should not be damaged and operate following truck/trailer transportation as described in MIL-STD-810G, Method 514.7, Procedure II, Category 5 – Loose Cargo.	TR	
318	The ADIS, while in its transit cases, must not be damaged and operate following secured cargo transportation in a CH-146 Griffon and a CH-47 Chinook helicopter as described in MIL-STD-810G, Method 514.7, Procedure I, Category 9 – Helicopter, simulating 312 flight hours.	N	T
319	The ADIS, while in its transit cases, must not be damaged and operate following secured cargo transportation in a CC-130J Hercules aircraft as described in MIL-STD-810G, Method 514.7, Procedure I, Category 8 – Propeller Aircraft, simulating 20 flight hours.	N	T
320	<i>3.5.13 Shock</i>	Title	
321	The ADIS, while in its transit cases, must operate following a tactical transport drop test as described in MIL-STD-810G, method 516.7, Procedure IV, for infantry and man-carried equipment.	N	T
322	The ADIS, while outside of its transit cases, should operate following a tactical transport drop test as described in MIL-STD-810G, method 516.7, Procedure IV, for infantry and man-carried equipment.	TR	
323	<i>3.5.14 High Altitude</i>	Title	
324	ADIS should operate at altitudes up to 3,000 m in accordance with MIL-STD-810G, Method 500.6, Procedure II.	TR	
325	<i>3.6 Design and Construction</i>	Title	
326	<i>3.6.1 New Materials</i>	Title	

Department of National Defence
Canadian Armed Forces Chemical Agent Sensors - ADIS
Appendix AA of Annex A of Volume 2 – System Requirements Specification

ID	Requirements	Verification Method at Bid Evaluation	Verification Method at FQR
327	ADIS must be built using new materials.	CoC	
328	No ADIS part must be used for which the contractor suspects or has been formally or informally notified of their proposed production termination.	CoC	

4 VERIFICATION

4.1 *Verification Scope*

Verification includes all inspections, demonstrations, analyses, tests and certifications to be performed to determine that the ADIS offered for acceptance conforms to the requirements in para 3 of this SysRS. Verification methods are defined in para 4.4.

4.2 *Verification Responsibility*

The responsibility to carry out verification lies solely with the Contractor.

4.3 *Qualification Tests*

ADIS must undergo qualification tests in accordance with the verification methods after each requirement in para 3 to verify that the ADIS design meets all of the requirements of this SysRS. ADIS must be verified using the verification methods (A, CoC, D, I, N, PP, T, or TR).

ADIS must be verified under controlled laboratory conditions.

4.4 *Verification Methods*

The classification of verification methods are as follows:

Analysis (A): Analysis is an element of verification that uses established technical or mathematical models or simulations, algorithms, charts, graphs, circuit diagrams, engineering drawings or other scientific principles and procedures to provide evidence that stated requirements are met. It may also include, as determined by the TA, a reasonable plan to meet the requirements within the project limitations.

Certificate of Conformance (CoC): A document certified by a competent authority with a formal statement that it certifies or warrants that the proposed system, supplied goods or services fully comply with the required specifications.

Demonstration (D): Demonstration is an element of verification that involves the actual operation of an item to provide evidence that the required functions were accomplished under specific scenarios. The items may be instrumented and performance monitored. The Demonstration could potentially be performed live and monitored through a video feed.

Inspection (I): Inspection is an element of verification that is generally non-destructive and typically includes the use of sight, hearing, smell, touch, simple physical manipulation; and mechanical and electrical gauging and measurement. Inspection may include verification of bidder documents as submitted in response to the Bid Evaluation.

Narrative (N): There are some requirements that it is anticipated that commercially available systems do not currently offer, that will require some minor modification. The Bidder is expected to provide a technical narrative outlining how they will meet this requirement following Contract Award, including risk and level of effort expected.

Preliminary Proof (PP): Bidder is expected to provide preliminary proof of meeting the given requirement, with the understanding that due to potential tailoring of the equipment following Contract Award (CA), this requirement must be formally verified during FQR. PP may include video (submitted on USB, CD, or DVD, or a private electronic link to the video files), screen shots, still images, and simplified test reports, or other methods as approved by the TA.

Test (T): Test is an element of verification in which scientific principles and procedures are applied to determine the properties or functional capabilities of items. It involves proof of compliance using instrumentation and facilities to verify compliance, through data capture and review as well as a test report.

Test Report (TR): Document that records system data obtained from an experiment of evaluation in an organized manner, describes the environmental or operating conditions, and shows the comparison of test results with test objectives.

Please Note that in a formal BID, failure to provide proof as requested in the “Verification at Bid Eval” column will imply non-compliance and a consequently disqualification.

5 ADDITIONAL INFORMATION

5.1 *Preparation for Delivery*

All ADIS components, including GFE, must be packed in its respective transit cases prior to delivery. Unless otherwise specified, commercial packaging for delivery is acceptable.