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National Technical Systems Environmental & Dynamics Lab 1601 Dry Creek Dr. #2000 Longmont, CO 80503

Date: 20 MARCH 2019

Customer: Pro V&V, Inc. 700 Boulevard South Huntsville, AL 35802

Purchase Order Number: 2019-002

A.	TEST:	Environmental Hardware Testing
B.	TEST ITEMS:	Dominion ICE See page 4 for Test Item Identification
C.	SPECIFICATIONS:	1. Quotation Number OP0512325-0 2. MIL-STD-810D 3. ISO 17025:2005 (NTS Quality)

D. <u>RESULTS:</u>

This is to certify that the Dominion ICE Voting System was subjected to testing according to the above specifications.

See Page 4 for Summary of Test Results. The test sample was returned to Pro V&V for post-tests and final evaluation.

Test data, an equipment list, and photographs are attached.

Greg Gagne, Technical Writer

Bob Polverari, Technical Reviewer

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REVISIONS

Revision	Reason for Revision	Date
NR	Initial Release	20 March 2019



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TEST ITEM IDENTIFICATION

Quantity	Sample Description	Part Name	Serial Numbers
2	ICE Victing System	Dominion ICE	AAFEBIK1847
2	ICE Volling System	DOMINIONICE	AAFEBCN0012

SUMMARY OF TEST RESULTS

Upon completion of testing, the test sample was removed from the test fixture and subjected to a visual inspection. The Test Sample was returned to Pro V&V, Inc.

Environmental and Vibration Testing

Testing was started on 19 February 2019 and completed on 14 March 2019 by exposing two (2) test samples to testing in accordance with Quotation Number OP0512325-0 and MIL-STD-810D. The table below describes the test program. Testing was performed as indicated in the Test Log on the following page.

Test	Description	Dates
Low Temperature	MIL-810D Method 501.2 non-operating at -4F	04-05 March 2019
High Temperature	MIL-810D Method 502.2 non-operating at +140F	05-06 March 2019
Humidity	MIL-810D Method 507.2 non-operating for (10) 24-hr humidity cycles	19 February – 04 March 2019
Bench Handling	MIL-810D Method 516.3 Procedure VI. (6) 4" drops on each edge for 24 drops. Repeat for 2 sample configurations.	06 March 2019
Transportation Vibration	MIL-810D Method 514.3 Category 1 Basic Transportation Vibration per Figures 514.3-1 through 514.3-3 using suggested common carrier profiles and durations of 1 hour per axis along each of 3 axes.	07 March 2019
Temperature/Power Variation	24-hr operation with power cycled accordingly over 85 hours with NTS support provided 24-hrs daily for first 85 hours per Method 502.2 and 501.2.	11-14 March 2019



TEST LOGS

Low Temperature:

TEST L	.ow Temp	o -20c Test			MJO	PR094223	
CUSTOM	ER <u>Pro</u>	o V&V Inc	P/N	N/A	S/N	See Below	
TEST ITE	M ICE	Voting System & Monitor - Qty 1 Each					
SPECIFIC	ATION	MIL-STD-810D			PARA		
DATE	TIME		LOG	ENTRIES			INITIALS
03/04/19	09:45	Start -20c high temp test					КM
03/05/19	06:30	-20c high temp temp has completed					KM
		Open chambers doors per customer a	nd allov	w UUT's to set at air te	mperature		KM
03/05/19	10:00	Customer inspected UUT's and perform	ned fur	nctional test			KM
		Note:All test pass or fail determinations	s decid	ed by Pro V&V Inc.			
		ICE Voting System S/N - AAFEBIK184	7				
		Monitor S/N - ICE-MON-001					
		TEST BY Kerry Martin			DATE	03/05/19	
PAGE 1	OF 1				GOV'T QAR	N/A	



High Temperature:

TEST H	ligh Tem	perature +60c Test			MJO	PR094223	
CUSTOM	ER <u>Pro</u>	o V&V Inc	P/N	N/A	S/N	See Below	
TEST ITE	M ICE	Voting System & Monitor - Qty 1 Each					
SPECIFIC	CATION	MIL-STD-810D			PARA		
DATE	TIME		LOG	ENTRIES			INITIALS
03/05/19	09:25	Start +60c high temp test					KM
	14:30	+60c high temp temp has completed					КM
03/05/19	15:00	Open chambers doors per customer a	nd allov	w UUT's to set at air te	emperature		КМ
03/06/19	09:00	Customer inspected UUT's and perform	ned fui	nctional test			КМ
		Note:All test pass or fail determination	s decid	ed by Pro V&V Inc.			
		ICE Voting System S/N - AAFEBIK184	7				
		Monitor S/N - ICE-MON-001					
		TEST BY Kerry Martin			DATE	03/06/19	
PAGE 1	OF 1				GOV'T QAR	N/A	



Humidity:

TEST 1	0 Day H	umidity Test			MJO	PR094223	6
CUSTOM	ER Pro	o V&V Inc	P/N	N/A	S/N	See below	
TEST ITE	M ICE	Voting System & Monitor - Qty 1 Each					
SPECIFIC	CATION	MIL-STD-810D			PARA _		
DATE	TIME		LOG EN	ITRIES			INITIALS
02/19/19	11:45	Install UUT into chamber					KM
	11:50	Start 10 day humidity test					КM
03/04/19	06:30	Test complete & open chambers door	s and allo	w UUT to drift back	to ambient		KM
		Note after lookind at data test ran a to	otal of 11 c	ycles have informed	customer		KM
03/04/19		Customer inspected UUT and perform	ned functio	onal test			KM
		Note:All test pass or fail determination	ns decided	by Pro V&V Inc.			
		ICE Voting System S/N - AAFEBIK18	47				
		Monitor S/N - ICE-MON-001					
		TEST BY Kerry Martin			DATE	03/04/19	
PAGE 1	OF 1				GOV'T QAR	N/A	

Bench Handling:

TEST E	Bench Te	st				MJO	PR094223	3
CUSTOM	ER <u>Pro</u>	o V&V Inc	P/N	N	N/A	S/N	See Below	
TEST ITE	M ICE	Voting System & Monitor - Qty 1 Each						
SPECIFIC	ATION	MIL-STD-810D				PARA		
DATE	TIME		LOG	ENTRIES		<u> </u>		INITIALS
03/06/19	10:30	Start 6 drops per corner of UUT from 4	inche	S				КМ
03/06/19	11:30	Total of 24 drops from 4 inches for UU	T com	olete				КМ
		Note:All test pass or fail determination	s decid	led by Pro V	/&V Inc.			
		ICE Voting System S/N - AAFEBIK184	7					
		Monitor S/N - ICE-MON-001						
		TEST BY Kerry Martin				DATE	03/06/19	
PAGE 1	OF 1					GOV'T QAR	N/A	



Transportation Vibration:

Start Da	ate: 3-7	7-19 End	Date:	3-7-19		MJO N PR094	lo: 223
Custom	er: Pro	V&V			Test Performed: Random Vibration	Test G. Engineer: Ma	athews
Part Na	me:				Serial numbers:	Customer Witness:	
Test Sp	ecificat	ion: MIL	-STD 8	310D Fiç	g 514.3-1	Temp: 70° Humidity: 22%	
Date	Time	Axis	Run No.	Serial No.	Remarks		Initials
3-7-19					Set up both UUT's on shake testing in the Longitudinal a	er #ED3 for xis.	GM
3-7-19	1254	Longitudinal	1		Run the 0.74 gRMS random minutes in the Longitudinal	n profile for 30 axis.	GM
3-7-19					Set up both UUT's on shake testing in the Transverse ax	er #HYD06 for kis.	GM
3-7-19	1418	Transverse	2		Run the 0.74 gRMS random minutes in the Transverse a	n profile for 30 axis.	GM
3-7-19					Set up the UUT on shaker # testing in the Vertical axis.	#ED3 for	GM
3-7-19	1457	Vertical	3		Run the 1.04 gRMS random minutes in the Vertical axis.	n profile for 30	GM



Test profiles

Vertical



Transverse

Frequency (Hz) Amplitude (G ² /Hz) Slope Tolerance Abort dB * 1 10 0.00013 (dB/Oct) (+) () (+) (-) 2 20 0.00065 > 6.99 3 3 6 9 3 30 0.00065 > 0 3 3 6 9 4 78 2e-05 > 532 3 3 6 9 5 79 0.00019 > 0 3 3 6 9 6 120 0.00019 > 6.211 3 3 6 9 7 500 1e-05 > 6.211 3 3 6 9
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
5 79 0.00019 6 120 0.00019 7 500 1e-05
6 120 0.00019 >6.211 3 3 6 9
7 500 1e-05 >6.211 3 3 6 9



Longitudinal

	rarameters	Limits	Channe	is Data	lables	Calc	R-o-R	S-0-R	S-o-R Par	am Notc	n
Freque (Hz)	ncy /	Amplitude (G²/Hz)		Slope		Tole	rance		Abort	dB	-
10	0.0	065		(dB/Oct)	((+)	()		(+)	())
20	0.0	065	>	0	3		3	6)	9	
120	0.0	002	>	-5.849	3][3	6		9	
121	0.0	03	<	982.3	3		3	6	i	9	
200	0.0	03	-<	0	3		3	6		9	
240	0.0	015	<	-11.44	3		3	6		9	
340	3e-	05	<	-33.81	3		3	6		9	
500	0.0	0015	-<	12.56	3		3	6		9	
					[√ Use s	ingle Tol/A	bort set	tting		
sert	Delete		First	Li	ast						Control Units
	(Hz) 10 20 120 121 200 240 340 500	10 0.0 10 0.0 20 0.0 120 0.0 121 0.0 200 0.0 240 0.0 340 3e- 500 0.0	Interface Implicate (Hz) (G²/Hz) 10 0.0065 20 0.0002 121 0.003 200 0.0015 340 3e-05 500 0.00015	Interpretention Amplitude (Hz) (G²/Hz) 10 0.0065 20 0.0065 120 0.0002 121 0.003 200 0.0015 240 0.0015 340 3e-05 500 0.00015	Interpreter Slope 10 0.0065 20 0.0065 20 0.0002 120 0.0002 121 0.003 200 0.0015 340 3e-05 500 0.00015 sert Delete	Interface Slope 10 0.0065 0 3 20 0.0065 >0 3 120 0.0002 >5.849 3 121 0.003 >0 3 200 0.0015 >0 3 240 0.0015 >11.44 3 340 3e-05 >12.56 3 500 0.00015 >12.56 3	Inequency Finiplicade Slope Tole 10 0.0065 > 0 3 20 0.0065 > 0 3 120 0.0002 > 982.3 3 121 0.003 > 0 3 200 0.0015 > -11.44 3 240 0.0015 > -3.81 3 340 3e-05 > 12.56 3 500 0.00015 > 12.56 3	Incure (Hz) Amplitude Slope Tolerance 10 0.0065 > 0 3 3 20 0.0065 > 0 3 3 120 0.0002 > 982.3 3 3 121 0.003 > 982.3 3 3 200 0.003 > 0 3 3 240 0.0015 > -11.44 3 3 340 3e-05 > 12.56 3 3 500 0.00015 > 12.56 3 3	Integration Silope Tolerance 10 0.0065 (dB/Oct) (+) () 20 0.0065 > 0 3 3 6 120 0.0002 > 982.3 3 3 6 121 0.003 > 982.3 3 3 6 200 0.003 > 0 3 3 6 200 0.0015 > -11.44 3 3 6 340 3e-05 > -12.56 3 3 6 500 0.00015 > 12.56 3 3 6 V Use single Tol/Abort set	Incure (Hz) Minimute (G ² /Hz) Slope Tolerance Abort 10 0.0065 > 0 3 3 6 20 0.0065 > 0 3 3 6 120 0.0002 > 5.849 3 3 6 120 0.0002 > 982.3 3 3 6 121 0.003 > 0 3 3 6 200 0.003 > 0 3 3 6 240 0.0015 > -3.81 3 3 6 340 3e-05 > 12.56 3 3 6 500 0.00015 > 12.56 3 3 6	Incuder Minimude Slope Tolerance Abort dB 10 0.0065 (dB/Oct) (+) () (+) () 20 0.0065 > 0 3 3 6 9 10 0.0065 > 0 3 3 6 9 20 0.0065 > -5.849 3 3 6 9 120 0.0002 > 982.3 3 3 6 9 121 0.003 > 0 3 3 6 9 200 0.003 > 0 3 3 6 9 240 0.0015 > -3.81 3 3 6 9 340 3e-05 > 12.56 3 3 6 9 500 0.00015 > 12.56 3 3 6 9 V Use single Tol/Abort setting





Temperature/Power Variation:

TEST _	[emperat	ure Power Variation Test			MJO	PR094223	<i>i</i>		
CUSTOM	IER <u>Pr</u>	o V&V	P/N	N/A	S/N	See Below			
TEST ITE	M See	Below							
SPECIFIC		MIL-STD-810D			PARA				
DATE	TIME		LOG EN	FRIES			INITIALS		
03/11/19	09:00	Set VAC to 117vlts & ramp to +10c					RSP		
	09:00	Start dwell at 117vlts & +10c for 4hrs					RSP		
	13:00	Lower VAC to 105vlts & dwell for 4hrs	ower VAC to 105vlts & dwell for 4hrs						
	17:00	7:00 Raise VAC to 129vlts & dwell for 4hrs							
	21:00	Lower VAC to 117vlts & Raise temper	ature to +3	5c & dwell for 4hrs			КМ		
03/12/19	01:00	Lower VAC to 105vlts & dwell for 4hrs	;				КМ		
	05:00	Raise VAC to 129vlts & dwell for 4hrs					КМ		
	09:00	Lower VAC to 117vlts & Lower temper	rature to +	0c & dwell for 4hrs			RSP		
	13:00	Lower VAC to 105vlts & dwell for 4hrs	;				RSP		
	17:00	Raise VAC to 129vlts & dwell for 4hrs					КM		
	21:00	Lower VAC to 117vlts & Raise temper	ature to +3	5c & dwell for 4hrs			КМ		
03/13/19	01:00	Lower VAC to 105vlts & dwell for 4hrs	;				КМ		
	05:00	Raise VAC to 129vlts & dwell for 4hrs					КM		
	09:00	Lower VAC to 117vlts & ramp to +23c	ambient				RSP		
	09:00	Temp and power variation portion of te	est has cor	npleted			RSP		
03/13/19	09:00	Test will continue to run at +23c ambie	ent for anot	her 37hrs			RSP		
03/14/19	22:00	All Testing complete for a total of 85hr	ſS				КМ		
		Note:All test pass or fail determination	is decided	by Pro V&V Inc.					
		ICE Voting System S/N - AAFEBIK184	47						
		ICE Voting System S/N - AAFEBCN00	J12						
		ICE M260 - HG306013							
		ICE M260 - HG306012							
		ICE HighPro - 0078K28 - Note UUT fa	ailed 03/12/	19 test will continue	with remainin	ig UUT's			
		ICE HighPro - 0080K28 - Note UUT fa	ailed 03/12/	19 test will continue	with remainin	ig UUT's			
		TEST BY Kerry Martin			DATE	03/14/19			
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Low Temperature:





High Temperature:





















Bench Handling:













Transportation Vibration:









Temperature and Power Variation:









TEST SETUP





Transportation Vibration:













TEST EQUIPMENT

Low Temperature:

Test Title:	Low Temperature	e -20c Test				
Customer:	Pro V&V Inc		Date	: 03/04/19		
Part	ICE Voting Syste	m & Monitor - Qty 1		PR094223	3	
Name:	Each		MJO No.	:		
Part No.:	N/A		P.O. No.	:		
Serial No.:	See below		NTS Eng.	.:		
Test						
Spec:	MIL-STD-810D		Revision	:		
Eq	uipment	Manufacture / Model	NTS I.D. #	Cal. Date	In-Service	Due Date
Chamber 59)	N/A	1733	N/A	Yes	N/A
Controller		Watlow F4	1653	09/21/18	Yes	09/21/19
Chart Recor	rder	Honeywell	1654	09/21/18	Yes	09/21/19
ICE Voting S	System S/N	AAFEBIK1847				
Monitor S/N		ICE-MON-001				
	Test					
	By:	Kerry Martin		Da	nte: 03/	05/19
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High Temperature:

TEST H	ligh Terr	perature +60c Test			MJO	PR094223	3
CUSTOMER Pro V&V Inc P/N N/A S/N See Below							
TEST ITE	M_ICE	Voting System & Monitor - Qty 1 E	ach				
SPECIFI	CATION	MIL-STD-810D			PARA		
DATE	TIME		LOG EN	ITRIES			INITIALS
03/05/19	09:25	Start +60c high temp test					KM
	14:30	+60c high temp temp has complet	ed				KM
03/05/19	15:00	Open chambers doors per custom	er and allc	w UUT's to set at	air temperatu	e	KM
03/06/19	09:00	Customer inspected UUT's and pe	erformed fu	inctional test			KM
		Note:All test pass or fail determina	itions deci	ded by Pro V&V In	IC.		
		ICE Voting System S/N - AAFEBI	(1847				
		Monitor S/N - ICE-MON-001					
		TEST BY Kerry Martin			DATE GOV'T	03/06/19	
PAGE 1	UF 1					N/A	



Humidity:

TEST 1	0 Day H	umidity Test				MJO	PR094223	3
CUSTON	CUSTOMER Pro V&V Inc P/N N/A S/N See below							
TEST ITE	M ICE	Voting System & Monit	or - Qty 1 Each					
SPECIFI	SPECIFICATION MIL-STD-810D PARA PARA							
DATE TIME LOG ENTRIES							INITIALS	
02/19/19	11:45	Install UUT into chamb	ber					KM
	11:50	Start 10 day humidity t	est					KM
03/04/19	06:30	Test complete & open chambers doors and allow UUT to drift back to ambient						KM
		Note after lookind at data test ran a total of 11 cycles have informed customer						KM
03/04/19		Customer inspected UUT and performed functional test						KM
		Note:All test pass or fail determinations decided by Pro V&V Inc.						
		ICE Voting System S/I	N - AAFEBIK184	17				
		Monitor S/N - ICE-MO	N-001					
		TEST BY Kerry Mai	tin			DATE	03/04/19	
PAGE 1	OF 1						N/A	

Bench Handling:

Test Title:	Bench Test					
Customer:	Pro V&V Inc		Date	: 03/06/19		
Part	ICE Voting Syste	em & Monitor - Qty 1		PR094223		
Name:	Each		MJO No.	:		
Part No.:	N/A		P.O. No.	:		
Serial No.:	See Below		NTS Eng.	:		
Test						
Spec:	MIL-STD-810D		Revision	:		
Equ	uipment	Manufacture / Model	NTS I.D. #	Cal. Date	In-Service	Due Date
Wooden Blo	ock	4 Inch Wooden Block	N/A	N/A	N/A	N/A
ICE Voting S	System S/N	AAFEBIK1847				
Monitor S/N		ICE-MON-001				
	Test					
	By:	Kerry Martin		Da	ite: 03/	06/19



Transportation Vibration:

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
WC021574	UD	T-1000	n/a	Shaker system ED3	For refere	ence only
1751	Team	483 48-16	494	Shaker System HYD05	For reference only	
	Vibration Research	VR9500	95268B57	Vibration Controller	9/18/2018	9/18/2019
1671	PCB	333A12	30540	Control accelerometer	8/17/2018	8/17/2019
1673	PCB	333A1 2	30641	Control accelerometer	8/17/2018	8/17/2019
1869	PCB	352C34	LW256906	Control accelerometer	10/1/2018	10/1/2019
1870	PCB	352C34	LW256907	Control accelerometer	10/1/2018	10/1/2019
1766	Fluke	971	3623064	Temperature/Humidity meter	4/23/2018	4/23/2019
1858	CDI Torque Products	1002MFRMH	518704072	Torque Wrench	5/23/2018	5/23/2019

Temperature and Power Variation:

Test Title:	Temperature Por	wer Variation Test				
Customer:	Pro V&V Inc		Date	: 03/11/19		
Part				PR094223	5	
Name:	See Below		MJO No	.:		
Part No.:	N/A		P.O. No	.:		
Serial No.:	See below		NTS Eng	.:		
Test						
Spec:	MIL-STD-810D		Revisior	:		
Eq	uipment	Manufacture / Model	NTS I.D. #	Cal. Date	In-Service	Due Date
Chamber 59	9	N/A	1733	N/A	Yes	N/A
Controller		Watlow F4	1653	09/21/18	Yes	09/21/19
Chart Recor	rder	Honeywell	1654	09/21/18	Yes	09/21/19
ICE Voting	System	S/N - AAFEBIK1847				
ICE Voting S	System	S/N - AAFEBCN0012				
ICE M260		S/N - HG306013				
ICE M260		S/N - HG306012				
ICE HighPro	C	S/N - 0078K28				
ICE HighPro	C	S/N - 0080K28				
	Test					
	By:	Kerry Martin		Da	ate: 03/	14/19
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END OF REPORT