
Communications Van

Technical Acceptance Test Plan

Office of Emergency Services
City of Cupertino

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Revision History

Date	Revision	Notes
2/17/2012	1.0	Original
2/20/2012	1.1	Added (27) Test Summary and (28) Issues List pages
2/25/2012	1.2	Revised Test #25, Radio Interference Test based on actual test procedure

1. Introduction

This acceptance test plan (ATP) is designed to check the technical aspects of the work performed by Telepath Inc on the Cupertino Communications Van.

1.1. Strategy

The test strategy is three-fold.

1. Technical. To be performed by Cupertino Amateur Radio Emergency Service (CARES), this portion of the test will check out all installed systems and identify any gaps.
2. Structural. To be performed by the Cupertino City Services Staff, this portion of the test will check out how the van was overall constructed: mast mounts, internal cabinetry, etc.
3. Final acceptance. To be performed by CARES and the City Services Staff, this is the final review before Cupertino takes position of the van.

1.2. Purpose of this document

This document describes the Technical portion of the ATP. It will be used by CARES during the on-site review at Telepath to guide the technical check-out.

1.3. Tools required for the Technical ATP

The following tools will be required to support the test.

1. Volt Ohm Meter
2. Antenna Analyzer
3. 120VAC Outlet tester
4. 12VDC outlet tester
5. Length of CAT5 cable
6. PC, network enabled, capable of operating packet
7. TNC, TNC-to-Alinco cable, serial cable
8. 25 ft tape measure

2. Inventory Inspection

Test Description	Confirm all contracted components are installed
Performed by	
Test Date/Time	
Test Results	

2.1. Purpose

Locate the installed components per the 3 Telepath Quotes.

2.2. Procedure Steps

2.2.1. Set up

1. None

2.2.2. Proceed

2. Review the contents of the table, next page. Confirm all physical components are present.

2.2.3. Wrap up

3. None

2.3. Notes

Telepath Installation List

Ref	Quote	Print Date	Line Item	Sub Line	Category	Item	Deliverable	Observations, Notes
1	148341	8/24/2011 9:22:02AM	1	0	n/a	0.Title	CARES Trailer project	
2	148341	8/24/2011 9:22:02AM	2	0	Misc	LaborField	Labor	
3	148341	8/24/2011 9:22:02AM	2	1	Power, Supply	LaborField	rewire generator and electrical	
4	148341	8/24/2011 9:22:02AM	2	2	Cabinets	LaborField	Install new writing surfaces (laminated and writable cabinet doors) stations	
5	148341	8/24/2011 9:22:02AM	2	3	Power, Outlet	LaborField	Install 1 dual 110Vac outlet at each station,	
6	148341	8/24/2011 9:22:02AM	2	4	Power, Outlet	LaborField	Install 1-dual Powerpole Outlet Cover plate [at each station]	
7	148341	8/24/2011 9:22:02AM	2	5	Net	LaborField	Install 1 Ethernet jack [at each station]	
8	148341	8/24/2011 9:22:02AM	2	6	Lighting	LaborField	Install overhead LED light [at each station]	
9	148341	8/24/2011 9:22:02AM	2	7	Lighting	LaborField	Install 4 over-head LED overhead lights for the center isle of the van	
10	148341	8/24/2011 9:22:02AM	2	8	Power, Control	LaborField	Install 110VAC power distribution,	
11	148341	8/24/2011 9:22:02AM	2	9	Power, Control	LaborField	Install 12VDC power distribution,	
12	148341	8/24/2011 9:22:02AM	2	10	Radio	LaborField	Install 1 TV	
13	148341	8/24/2011 9:22:02AM	2	11	Radio	LaborField	Install 6 Ham Radios	
14	148341	8/24/2011 9:22:02AM	2	12	Antenna	LaborField	Install 34ft motorized mast	
15	148341	8/24/2011 9:22:02AM	2	13	Power, Supply	LaborField	Install shore power charging system	
16	148341	8/24/2011 9:22:02AM	2	14	Power, Outlet	LaborField	Create 5 qty "Anderson-to-FEMALE CLA" 12V pigtail adapters	

Ref	Quote	Print Date	Line Item	Sub Line	Category	Item	Deliverable	Observations, Notes
17	148341	8/24/2011 9:22:02AM	2	15	Power, Outlet	LaborField	Anderson style plugs supplied by customer.	
18	148341	8/24/2011 9:22:02AM	2	16	Test	LaborField	Test for proper operation	
19	148341	8/24/2011 9:22:02AM	2	17	Docs	LaborField	Create As-Built docs.	
20	148341	8/24/2011 9:22:02AM	2	18	Misc	LaborField	1 year warranty on all equipment and workmanship.	
21	148341	8/24/2011 9:22:02AM	3	0	Lighting	PSC0CDCR	Purchase 6 DIODE COMPARTMENT LIGHT (white)	
22	148341	8/24/2011 9:22:02AM	4	0	Cabinets	MiscPartsSale	Wood (laminated) writing surface, cabinets, electrical conduit, outlets, circuit breakers and full wrap interior thin carpet and walk way flooring.	
23	148341	8/24/2011 9:22:02AM	5	0	Power, Control	MiscPartsSale	Blue Sea 3082 DC 10 Position Toggle Branch Circuit Breaker Panel. Includes wiring to devices.	
24	148341	8/24/2011 9:22:02AM	6	0	Power, Control	MiscPartsSale	[Installation]	
25	148341	8/24/2011 9:22:02AM	6	1	Power, Control	MiscPartsSale	All positive, negative and grounding buses installed, fully pre-wired	
26	148341	8/24/2011 9:22:02AM	6	2	Power, Control	MiscPartsSale	Includes set of 30 common DC labels	
27	148341	8/24/2011 9:22:02AM	6	3	Power, Control	MiscPartsSale	Label backlighting pre-installed	
28	148341	8/24/2011 9:22:02AM	6	4	Lighting	MiscPartsSale	All LEDs installed	
29	148341	8/24/2011 9:22:02AM	6	5	Docs	MiscPartsSale	Detailed installation instructions and cutout template	
30	148341	8/24/2011 9:22:02AM	6	6	Power, Control	MiscPartsSale	8028, 8-16 Volt DC Micro Voltmeter	
31	148341	8/24/2011 9:22:02AM	6	7	Power,	MiscPartsSale	8041, 0-50 Amp DC Micro	

Ref	Quote	Print Date	Line Item	Sub Line	Category	Item	Deliverable	Observations, Notes
					Control		Ammeter	
32	148341	8/24/2011 9:22:02AM	6	8	Power, Control	MiscPartsSale	Owner upgradeable to 24 Volts DC with 8243, 10-32 Volt DC Micro Voltmeter	
33	148341	8/24/2011 9:22:02AM	6	9	Power, Control	MiscPartsSale	7 15A Single Pole circuit Breakers	
34	148341	8/24/2011 9:22:02AM	7	0	Power, Supply	0918912SKIT	Auto Charger 4000 with Ejector Kit	
35	148341	8/24/2011 9:22:02AM	8	0	Power, Supply	091200EZM	Mounting plate with Auto Charge 4000	
36	148341	8/24/2011 9:22:02AM	9	0	Power, Supply	91185009	Stainless steel mounting plate w/LED	
37	148341	8/24/2011 9:22:02AM	10	0	Power, Supply	09118921235D	Auto Charge precision Status center	
38	148341	8/24/2011 9:22:02AM	11	0	Power, Supply	91139212	Auto Isolator 1 kit includes controller	
39	148341	8/24/2011 9:22:02AM	12	0	Power, Supply	TR12012	12v 120amp AGM Battery includes custom fabricated mounts.	
40	148341	8/24/2011 9:22:02AM	13	0	Radio	Prosetelite6	Proset 6- dual ear muff with boom mic	
41	148341	8/24/2011 9:22:02AM	14	0	Radio	AD1KM	Adapter for Kenwood Mobile	
42	148341	8/24/2011 9:22:02AM	15	0	Radio	FS3	Heavy duty footswitch	
43	148341	8/24/2011 9:22:02AM	16	0	Antenna	SBB2	ANTENNA (DUAL BAND) So-239 Mount 18" -1 for each radio and 1 spare with a loose antenna coax pigtail for front driver side communication.	
44	148341	8/24/2011 9:22:02AM	17	0	Radio	PG-5G	PROGRAMMING INTERFACE CABLE FOR TM-D710A FREE SOFTWARE IS #MCP-2A on the internet.	

Ref	Quote	Print Date	Line Item	Sub Line	Category	Item	Deliverable	Observations, Notes
45	148341	8/24/2011 9:22:02AM	18	0	Antenna	MiscPartsSale	DUAL BAND 2M/220MHZ antenna whip (NMO STYLE)	
46	148341	8/24/2011 9:22:02AM	19	0	Antenna	D130J	Discone All Band Antenna -For the customer supplied scanner.	
47	148341	8/24/2011 9:22:02AM	20	0	Power, Supply	379957	Samlex Pure Sinewave Inverter 2000/4000W	
48	148341	8/24/2011 9:22:02AM	21	0	Power, Supply	36883	Remote on/off switch for Samlex inverter	
49	148341	8/24/2011 9:22:02AM	22	0	Radio	MiscPartsSale	Flatscreen 20" LED TV with flat wall mount and outdoor low profile off-air antenna	
50	148341	8/24/2011 9:22:02AM	23	0	Antenna	425701	CNT-195 Low Loss Cable. [250ft jo]	
51	148341	8/24/2011 9:22:02AM	24	0	Antenna	Info	250ft	
52	148341	8/24/2011 9:22:02AM	25	0	Antenna	CPL9C	PL259 Male Rg58 Connector	
53	148341	8/24/2011 9:22:02AM	26	0	Antenna	QW470	Antenna 1/4 Wave 470-490 Mhz - for City of Cupertino Radio	
54	148341	8/24/2011 9:22:02AM	27	0	Net	MiscPartsSale	8 port Industrial grade Ethernet 10/100/1000 switch. 4 jacks (1 per position)	
					x			
55	148524	8/24/2011 9:13:45AM	1	0	n/a	0.Title	CARES TRAILER RADIO GEAR	
56	148524	8/24/2011 9:13:45AM	2	0	Antenna	MiscPartsSale	34' telescoping motorized antenna mast with top section base for antennas. Tucked height of 7'8". Includes 12VDC power wench, safety auto-stop limiter and a 2ft X 2ft removable top plate for antennas.	
57	148524	8/24/2011 9:13:45AM	3	0	Radio	TM-D710A	KENWOOD HAM RADIO 2M-440	

Ref	Quote	Print Date	Line Item	Sub Line	Category	Item	Deliverable	Observations, Notes
							WITH APRS	
58	148524	8/24/2011 9:13:45AM	4	0	Misc	GPS18PC	GPS UNIT (WITH RS232 OUTPUT)	
59	148524	8/24/2011 9:13:45AM	5	0	Misc	G5	GPS DISPLAY	
60	148524	8/24/2011 9:13:45AM	6	0	Radio	DR235	Sup	
61	148524	8/24/2011 9:13:45AM	7	0	Radio	TK8180HK	450-512MHz 45W 512 Ch/128 Zones CONV-LTR - High Powered City of Cupertino Radio	
62	148524	8/24/2011 9:13:45AM	8	0	Radio	IC7000	Icom 7000 Mobile HF Radio	
63	148524	8/24/2011 9:13:45AM	9	0	Antenna	ICAH4	80M-6M 120W auto Tuner for IC7000	
64	148524	8/24/2011 9:13:45AM	10	0	Antenna	ICAH2B	HF Mobile antenna	
					x			
65	148996	10/6/2011 11:47:12AM	1	0	n/a	0.Title	ADD-ON to CARES VAN.	
66	148996	10/6/2011 11:47:12AM	2	0	Radio	Header	Low Band (RING DOWN RADIO)	
67	148996	10/6/2011 11:47:12AM	3	0	Radio	AAM25CKD9AA2	Motorola Cdm1250 36-50Mhz 60Watts 64 Channels.	
68	148996	10/6/2011 11:47:12AM	4	0	Misc	HKN9327	Ignition Switch Cable	
69	148996	10/6/2011 11:47:12AM	5	0	Antenna	RAB4003ARB	Antenna 36-42Mhz	
70	148996	10/6/2011 11:47:12AM	6	0	Radio	AAHHLN4182	Dtmf Decode Board	
71	148996	10/6/2011 11:47:12AM	7	0	Radio	RLN4823	Mobile Option Board Instal Kit	
72	148996	10/6/2011 11:47:12AM	8	0	Radio	ProgramExp	Programming Expanded (new radio) includes installation and test of DTMF ring-down board.	
73	148996	10/6/2011 11:47:12AM	9	0	Radio	Install	Installation of Low Band radio	
74	148996	10/6/2011 11:47:12AM	10	0	n/a	0.Break	*****	
75	148996	10/6/2011 11:47:12AM	11	0	Misc	Header	PA SYSTEM WITH SPEAKER	

Ref	Quote	Print Date	Line Item	Sub Line	Category	Item	Deliverable	Observations, Notes
76	148996	10/6/2011 11:47:12AM	12	0	Misc	PAP112	Whelen PA/Air Horn Incl. Microphone	
77	148996	10/6/2011 11:47:12AM	13	0	Misc	SA315P	123dB Speaker, Nylon Composite	
78	148996	10/6/2011 11:47:12AM	14	0	Misc	SAK1	SPEAKER MOUNT KIT UNIVERSAL	
79	148996	10/6/2011 11:47:12AM	15	0	Misc	Install	Installation	
80	148996	10/6/2011 11:47:12AM	16	0	n/a	0.Break	*****	
81	148996	10/6/2011 11:47:12AM	17	0	Misc	Header	CAR ALARM FOR THE CARES VAN	
82	148996	10/6/2011 11:47:12AM	18	0	Misc	MiscPartsSale	Viper 350HV Alarm	
83	148996	10/6/2011 11:47:12AM	19	0	Misc	MiscPartsSale	Alarm Pins for each entry point of vehicle	
84	148996	10/6/2011 11:47:12AM	20	0	Misc	Install	Installation	
85	148996	10/6/2011 11:47:12AM	21	0	n/a	0.Break	*****	
86	148996	10/6/2011 11:47:12AM	22	0	Misc	Header	BACK UP CAMERA FOR SAFETY	
87	148996	10/6/2011 11:47:12AM	23	0	Misc	MiscPartsSale	Backup Camera	
88	148996	10/6/2011 11:47:12AM	24	0	Misc	MiscPartsSale	7" LCD 12volt Monitor for viewing the backup camera.	
89	148996	10/6/2011 11:47:12AM	25	0	Misc	Install	Installation	
90	148996	10/6/2011 11:47:12AM	26	0	n/a	0.Break	*****	
91	148996	10/6/2011 11:47:12AM	27	0	Power, Outlet	Header	Speciality "Anderson style DC plugs"	
92	148996	10/6/2011 11:47:12AM	28	0	Power, Outlet	MiscPartsSale	Anderson power jacks 12VDC. - labor \$125.00 included in original project cost.	
93	148996	10/6/2011 11:47:12AM	29	0	n/a	0.Break	*****	

Ref	Quote	Print Date	Line Item	Sub Line	Category	Item	Deliverable	Observations, Notes
94	148996	10/6/2011 11:47:12AM	30	0	Power, Control	Header	REWIRING THE ACCY PANEL SWITCHES & CLEAN UP ENGINE COMPARTMENT UNDER THE HOOD.	
95	148996	10/6/2011 11:47:12AM	31	0	Power, Control	LaborShop	Labor -In shop repair. 2.5 days to rewire, remove & add new switch panel on dash board for accessories. Includes removing all unused wires and parts under the hood.	
96	148996	10/6/2011 11:47:12AM	32	0	n/a	0.Break	*****	
97	148996	10/6/2011 11:47:12AM	33	0	Misc	Header	AMBER TRAFFIC ADVISOR LIGHT BAR.	
98	148996	10/6/2011 11:47:12AM	34	0	Misc	TAM8348	AMBER TRAFFIC ADVISOR LED, CNTL TACTLD1 48" SUPER LED.	
99	148996	10/6/2011 11:47:12AM	35	0	Misc	Install	Install Traffic Advisor light bar	

3. Cabinet Operations

Test Description	Check the installation and operation of the surfaces, cabinets, drawers, and other enclosures.
Performed by	
Test Date/Time	
Test Results	

3.1. Purpose

This test checks the installation and operation of the surfaces, cabinets, drawers, and other enclosures. Door latches, slides, and pulls are confirmed operational.

3.2. Procedure Steps

3.2.1. Set up

1. none

3.2.2. Proceed

2. Inspect all surfaces.
3. Open and close all cabinets. Check all latching operations.
4. Record the results.

Cabinet	Notes
Work surfaces	
Overhead cabinets, driver side.	
Storage Cabinets, passenger side	
All drawers	
Work surface supports	

5. Other tests performed:

3.2.3. Wrap up

6. None

3.3. Notes

4. Internal Lighting Functional Test

Test Description	Confirm the operation of all internal lighting.
Performed by	
Test Date/Time	
Test Results	

4.1. Purpose

Check that all isle and work surface lighting is operational.

4.2. Procedure Steps

4.2.1. Set up

1. Main 12VDC power breaker is on.
2. Dash Lighting Control switch is on.

4.2.2. Proceed

3. Confirm all internal isle lighting is operational.
4. Turn on and off all work surface lighting.
5. Record current reading from the 12VDC breaker panel for the lighting conditions as follows:

Lighting	Voltage	Current	Notes
All lights off			
Isle lights on			
Isle lights + Pos 1			
Isle lights + Pos 2			
Isle lights + Pos 3			
Isle lights + Pos 4			
Isle lights + Pos Supervisor			
Isle lights + All Operating Positions			

6. Other tests performed:

4.2.3. Wrap up

7. none.

4.3. Notes

5. External Lighting Functional Test

Test Description	Confirm the operation of all external lighting.
Performed by	
Test Date/Time	
Test Results	

5.1. Purpose

Checks the operational performance of all isle and work surface lighting.

5.2. Procedure Steps

5.2.1. Set up

1. Main 12VDC power breaker is on.

5.2.2. Proceed

2. From the Dashboard power panel, turn each light on as follows:
3. Record current reading from the 12VDC breaker panel for the lighting conditions as follows (if applicable):

Lighting	Voltage	Current	Notes
Front Amber Traffic Advisor Light			
Rear Amber Traffic Advisor Light			
Left Front Flood Light			
Right Front Flood Light			
Left Rear Flood light			
Right Rear flood light			
Left roof remote floodlight			
Right roof remote floodlight			
All external lights on			
Brake Lights			
Rear red running lights			

4. Other tests performed:

5.2.3. Wrap up

5. none

5.3. Notes

6. 120VAC Outlet Functional Test

Test Description	Confirm the installation and operation of all 120VAC outlets.
Performed by	
Test Date/Time	
Test Results	

6.1. Purpose

Check the wiring and operation of all outlets, both internal and external. This test requires a 120VAC outlet checker.

6.2. Procedure Steps

6.2.1. Set up

1. Ensure the van is on shore power.

6.2.2. Proceed

2. Turn on the 120VAC circuit breaker for the outlets.
3. Install the Outlet checker into each outlet, both top and bottom.
4. With the outlet checker in one outlet, turn the 120VAC breaker off and on. Verify power is turned off to each outlet.
5. Record the results:

120VAC Outlet locations	Test (pass/fail)	Notes
Operating Position 1		
Operating Position 2		
Operating Position 3		
Operating Position 4		
Printer drawer		
Supervisor position		
External, driver side		
External, passenger side		

6. Other tests performed:

6.2.3. Wrap up

7. none

6.3. Notes

7. 12VDC Outlet Functional Test

Test Description	Confirm the installation and operation of all 12VDC outlets.
Performed by	
Test Date/Time	
Test Results	

7.1. Purpose

Check the wiring and operation of all outlets. This test requires a volt meter or an Anderson PowerPole test fixture.

7.2. Procedure Steps

7.2.1. Set up

1. Ensure the 12VDC circuit breaker is on.

7.2.2. Proceed

2. Install the Outlet checker into each 12VDC outlet, both top and bottom.
3. With the outlet checker in one outlet, turn the 12VDC breaker off and on. Verify power is turned off to each outlet.
4. Record the results:

12VDC Outlet locations	Test (pass/fail)	Notes
Operating Position 1		
Operating Position 2		
Operating Position 3		
Operating Position 4		
Printer drawer		
To shelf above TV		
Supervisor position		
Cab operating position		

5. Other tests performed:

7.2.3. Wrap up

6. none

7.3. Notes

8. Inverter Functional Test

Test Description	Check the installation and operation of the 12VDC to 120VAC inverter.
Performed by	
Test Date/Time	
Test Results	

8.1. Purpose

Confirm that the 12VDC to 120VAC inverter is operating correctly. This test requires that a 120VAC load to be connected.

8.2. Procedure Steps

8.2.1. Set up

1. Confirm the Batteries are fully charged.

8.2.2. Proceed

2. Plug in the 120VAC load into the inverter.
3. Turn the inverter on and off locally.
4. Turn the inverter on and off remotely.
5. With a VOM, record the inverter output voltage.
6. Plug in various 120VDC loads (at least one). Record the battery voltage and current.

Load Description	Voltage	Current	Notes

7. Other tests performed:

8.2.3. Wrap up

8. None.

8.3. Notes

9. Battery Charge Control Test

Test Description	Confirm the installation and operation of all battery charge systems.
Performed by	
Test Date/Time	
Test Results	

9.1. Purpose

Check the wiring and operation of the battery charge subsystem.

9.2. Procedure Steps

9.2.1. Set up

1. Position the vehicle in the sun.

9.2.2. Proceed

2. Confirm that the solar charger circuit is charging the batteries.
3. Plug in shore power. Confirm that the solar charger circuit is dis-engaged and the batter charger is charging the batteries.
4. Record the results:

Point of observation	Test	Notes
Solar Charger		
Shore Power		

5. Other tests performed:

9.2.3. Wrap up

6. none

9.3. Notes

This system is not fully understood. We need to see the wiring diagrams for the charging subsystem. This test may need to be repeated or rewritten.

10. Battery Duration Test

Test Description	Confirm the load sustainability of all battery system.
Performed by	
Test Date/Time	
Test Results	

10.1. Purpose

Confirm the load sustainability of all battery system. This test requires that a standard operating load is created to test the useful life of the installed battery capacity.

10.2. Procedure Steps

10.2.1. Set up

1. Confirm the Batteries are fully charged.
2. Remove power to the battery charge system.

10.2.2. Proceed

3. Turn on all 12VDC loads – Lighting, radios, etc. Operate the radios requesting periodic radio checks to simulate transmission events.
4. Record the battery voltage and current over time:

Time	Voltage	Current	Notes
0 min			
30 min			
60 min			
2 hours			
3 hours			
4 hours			
5 hours			
6 hours			

5. Once discharged, record the time to recharge the batteries.
6. Other tests performed:

10.2.3. Wrap up

7. None.

10.3. Notes

11. On-board Generator Test

Test Description	Check out on-board generator.
Performed by	
Test Date/Time	
Test Results	

11.1. Purpose

This test checks the operation of the generator. Other inspections may be performed as part of the Structural evaluation performed by the City.

11.2. Procedure Steps

11.2.1. Set up

1. Disconnect shore power.

11.2.2. Proceed

2. From the generator compartment, manually start the generator.
3. Plug in the Van into the Generator outlet and confirm all 120VDC systems are operational.
4. Turn off the generator.
5. From cab, remotely start the generator.
6. Other tests performed:

11.2.3. Wrap up

7. Reattach the antenna coax to the radio.

11.3. Notes

12. Network Functional Test

Test Description	Confirm the installation and operation of the Network router.
Performed by	
Test Date/Time	
Test Results	

12.1. Purpose

Confirm the installation and operation of the Network router. This test requires a CAT5 cable and a PC or other network-enabled device.

12.2. Procedure Steps

12.2.1. Set up

1. Confirm the Van is on shore power.

12.2.2. Proceed

2. Inspect the Router. Verify that its indicators are on and show normal operation.
3. On the first connection, record the configuration of the Wireless network.

Router Admin IP: _____

Logon, Password: _____

WAP Name: _____

4. Plug in the network cable into each LAN outlet. Verify that an IP address is assigned. Record the results:

Outlets	Test (pass/fail)	Notes
Operating Position 1		
Operating Position 2		
Operating Position 3		
Operating Position 4		
Printer drawer		
Supervisor position		
Wireless connection		

5. Other tests performed:

12.2.3. Wrap up

6. None.

12.3. Notes

13. GPS Functional Test

Test Description	Confirm the installation and operation of the Navigation GPS system.
Performed by	
Test Date/Time	
Test Results	

13.1. Purpose

Confirm the installation and operation of the Navigation GPS system.

13.2. Procedure Steps

13.2.1. Set up

1. The Van has a clear view of the sky to lock on to GPS satellites.

13.2.2. Proceed

2. Power on the GPS.
3. Verify a satellite lock is achieved.
4. Verify the operation of the GPS display.
5. Take a drive test to confirm it is operational.
6. Other tests performed:

13.2.3. Wrap up

7. None.

13.3. Notes

14. Public Address Functional Test

Test Description	Confirm the installation and operation of the PA system.
Performed by	
Test Date/Time	
Test Results	

14.1. Purpose

Confirm the installation and operation of the Navigation PA system.

14.2. Procedure Steps

14.2.1. Set up

1. Caution: the PA can be loud.

14.2.2. Proceed

2. Power on the PA system.
3. Use the microphone to test a voice announcement.
4. Use the horn button to test the horn.
5. Other tests performed:

14.2.3. Wrap up

6. None.

14.3. Notes

15. Vehicle Alarm Functional Test

Test Description	Confirm the installation and operation of the Vehicle Alarm system.
Performed by	
Test Date/Time	
Test Results	

15.1. Purpose

Confirm the installation and operation of the Vehicle Alarm system.

15.2. Procedure Steps

15.2.1. Set up

1. None.

15.2.2. Proceed

2. Close all alarmed doors.
3. Arm the alarm system.
4. Open each armed door, one at a time. Confirm the alarm is initiated. Reset the alarm to continue with the test.

Outlets	Test (pass/fail)	Notes
Driver Side door		
Passenger Side door		
Rear door		
Hood		
Generator enclosure		

5. Let one alarm go all the way to sounding the siren. Reset the alarm when done.
6. Other tests as necessary.

15.2.3. Wrap up

7. None.

15.3. Notes

16. Backup Camera Functional Test

Test Description	Confirm the installation and operation of the Backup Camera system.
Performed by	
Test Date/Time	
Test Results	

16.1. Purpose

Confirm the installation and operation of the Backup Camera system.

16.2. Procedure Steps

16.2.1. Set up

1. None.

16.2.2. Proceed

2. Turn on the backup camera.
3. Verify the focus and field of view of the camera.
4. Verify the camera is on when in all forward and reverse gears.
5. Other tests as necessary.

16.2.3. Wrap up

6. None.

16.3. Notes

17. Antenna Mast Functional Test

Test Description	Confirm the installation and operation of the Mast system.
Performed by	
Test Date/Time	
Test Results	

17.1. Purpose

Confirm the installation and operation of the Mast system.

17.2. Procedure Steps

17.2.1. Set up

1. The mast is fully retracted.

17.2.2. Proceed

2. Ensure the antenna mast cables are free and clear and not in a stowed position.
3. Raise the mast.
 - Confirm the mast stops when the upper limit switch is set.
 - Confirm the mast cables pay out correctly without tangles.
4. Lower the mast.
 - Confirm the mast stops when the lower limit switch is set.
 - Confirm the mast cables recover correctly without tangles.
5. Raise the mast. Engage the manual retract gearing to lower the mast.
6. With mast lowered
 - measure the overall height from the ground to the top most antenna.
 - inspect the method for securing the cable for storage and travel.
7. Other tests as necessary.

17.2.3. Wrap up

8. None.

17.3. Notes

18. Antenna SWR Test

Test Description	Measure the SWR for each antenna installed on the Van.
Performed by	
Test Date/Time	
Test Results	

18.1. Purpose

Tests the SWR of all cabling to and including the antenna. This test will be run once per installed antenna.

18.2. Procedure Steps

18.2.1. Set up

1. For each Antenna, remove the coax connector from the back of each radio.

18.2.2. Proceed

2. Attach the Antenna Analyzer to the coax.
3. Tune the analyzer for center band.
4. Record the measurement frequency and SWR. Do both 2m and 440 where applicable.

Radio Position	Frequency	SWR Reading	Notes
Kenwood TM-710, #1			
Kenwood TM-710, #2			
Kenwood TM-710, #3			
Kenwood TM-710, #4			
Alinco DR-235			
ICOM IC-7000 HF			
City Trunk Radio			
EOC Net Radio			
Scanner			
Dash Mount Radio			

18.2.3. Wrap up

5. Reattach the antenna coax to the radio.

18.3. Notes

19. Television Reception Test

Test Description	Check the installation and operation of the on-board Television system.
Performed by	
Test Date/Time	
Test Results	

19.1. Purpose

Check the installation and operation of the on-board Television system

19.2. Procedure Steps

19.2.1. Set up

1. none

19.2.2. Proceed

2. On the roof, position the TV antenna for reception.
3. In the Van, turn on the TV monitor.
4. Tune in local over-air broadcast stations. Reposition the antenna as necessary to improve picture quality.
5. Record the stations we could receive.

Station	Quality	Notes

6. Other tests performed:

19.2.3. Wrap up

7. Lower the TV antenna to its stowed position.

19.3. Notes

20. Amateur Radio Voice Radio Functional Test

Test Description	Check the installation and operation of the VHF, UHF, and HF radio.
Performed by	
Test Date/Time	
Test Results	

20.1. Purpose

Check the installation and operation of all voice radio. Only operate one radio at a time.

20.2. Procedure Steps

20.2.1. Set up

1. none

20.2.2. Proceed

2. For each radio, turn on its appropriate 12VDC Circuit breaker.
3. For each radio, ensure the antenna cable is connected. Turn on the radio.
4. Tune to a local repeater frequency for a radio check.
5. Confirm the operation of each Headset.
6. Confirm the operation of each Foot switch.
7. Request a radio check with any station on frequency.
8. Record the results.

Radio Position	Test (pass/fail)	Notes
Kenwood TM-710, #1		
Kenwood TM-710, #2		
Kenwood TM-710, #3		
Kenwood TM-710, #4		
ICOM IC-7000 HF		

9. Other tests performed:

20.2.3. Wrap up

10. none

20.3. Notes

21. City Trunk Radio Functional Test

Test Description	Check the installation and operation of the City 450MHz radio.
Performed by	
Test Date/Time	
Test Results	

21.1. Purpose

Check the installation and operation of the City voice radio. Only operate one radio at a time.

21.2. Procedure Steps

21.2.1. Set up

1. none

21.2.2. Proceed

2. Turn on its appropriate 12VDC circuit breaker.
3. Ensure the antenna cable is connected. Turn on the radio.
4. Request a radio check with City Service Center.
5. Record the results.

Radio Position	Test	Notes
City Trunk Radio		

6. Other tests performed:

21.2.3. Wrap up

7. none

21.3. Notes

22. County EOC Radio Functional Test

Test Description	Check the installation and operation of the County EOC radio.
Performed by	
Test Date/Time	
Test Results	

22.1. Purpose

Check the installation and operation of the City voice radio. Only operate one radio at a time.

22.2. Procedure Steps

22.2.1. Set up

1. none

22.2.2. Proceed

2. Turn on its appropriate 12VDC Circuit breaker.
3. Ensure the antenna cable is connected. Turn on the radio.
4. Request a radio check with County EOC, or any other responding station.
5. Request a ring-down request from a remote station.
6. Record the results.

Radio Position	Test	Notes
County EOC Radio		

7. Other tests performed:

22.2.3. Wrap up

8. none

22.3. Notes

23. Scanner Radio Functional Test

Test Description	Check the installation and operation of the Scanner radio.
Performed by	
Test Date/Time	
Test Results	

23.1. Purpose

Check the installation and operation of the Scanner radio.

23.2. Procedure Steps

23.2.1. Set up

1. none

23.2.2. Proceed

2. Turn on its appropriate 12VDC Circuit breaker.
3. Ensure the antenna cable is connected. Turn on the radio.
4. Tune to a local County Fire and County Sheriff frequency for monitoring. Verify the reception.
5. Monitor the channel.
6. Record the results.

Radio Position	Test	Notes
Scanner		

7. Other tests performed:

23.2.3. Wrap up

8. none

23.3. Notes

24. Packet Radio Functional Test

Test Description	Check the installation and operation of 220 Packet radio.
Performed by	
Test Date/Time	
Test Results	

24.1. Purpose

Check the installation and operation of the packet radio. This test requires a TNC, TNC-to-Alinco cable, serial cable, and a PC capable of operating packet.

24.2. Procedure Steps

24.2.1. Set up

1. none

24.2.2. Proceed

2. Turn on its appropriate 12VDC Circuit breaker.
3. Ensure the antenna cable is connected. Turn on the radio.
4. Connect the TNC and PC to the Packet Radio.
5. Set the frequency for a local packet BBS.
6. Send and receive a packet message.
7. Record the results.

Radio Position	Test	Notes
Alinco DR-235		

8. Other tests performed:

24.2.3. Wrap up

9. none

24.3. Notes

25. Radio Interference Test (v2)

Test Description	Measure the extent of the interference each radio will induce into each other.
Performed by	
Test Date/Time	
Test Results	

25.1. Purpose

This test will show what we can expect when all radios are on, and we are ad-hoc operating on different bands and frequencies.

25.2. Procedure Steps

25.2.1. Set up

1. Turn on all radios.

25.2.2. Proceed

2. With all radios on their respective frequency, key up each radio. Record any interference received from other radios. Use other side of this sheet to record additional Comments.
3. Record the results.

Check at Initiator	TM-710, #1	TM-710, #2	TM-710, #3	TM-710, #4	IDR235	IC-7000	City Trunk	Low Band	Scanner	Dash
TM-710, #1 146.460, Pos1										
TM-710, #2 146.116, Pos 2										
TM-710, #3 147.570, Pos 3										
TM-710, #4 442.500, Sup										
DR-235 222.630										
IC-7000 HF										
City Trunk										
EOC Low Band										
Scanner										
Dash Radio										

25.3. Notes

26. Documentation Inspection

Test Description	Check for the presence of all documentation for installed components.
Performed by	
Test Date/Time	
Test Results	

26.1. Purpose

This is a review of all manuals, drawings, diagrams, notes, and other documentation used in the construction of the vehicle.

26.2. Procedure Steps

26.2.1. Set up

1. none.

26.2.2. Proceed

2. Check the following

Radio Position	Test	Notes
Radio Manuals		
Antenna manuals		
Power distribution		
Electrical drawings		
Antenna Placement drawings		
Mast manuals		
Maintenance notes (ie: how to open access panels, etc)		
Parts lists for procured, installed parts		

26.2.3. Wrap up

3. none

26.3. Notes

27. Test Summary

Test	Test Date	In progress	Pass
2. Inventory Inspection			
3. Cabinet Operations			
4. Internal Lighting Functional Test			
5. External Lighting Functional Test			
6. 120VAC Outlet Functional Test			
7. 12VDC Outlet Functional Test			
8. Inverter Functional Test			
9. Battery Charge Control Test			
10. Battery Duration Test			
11. On-board Generator Test			
12. Network Functional Test			
13. GPS Functional Test			
14. Public Address Functional Test			
15. Vehicle Alarm Functional Test			
16. Backup Camera Functional Test			
17. Antenna Mast Functional Test			
18. Antenna SWR Test			
19. Television Reception Test			
20. Amateur Radio Voice Radio Functional Test			
21. City Trunk Radio Functional Test			
22. County EOC Radio Functional Test			
23. Scanner Radio Functional Test			
24. Packet Radio Functional Test			
25. Radio Interference Test			
26. Documentation Inspection			

28. Issues List

Issue#	Test#	Issue	Disposition

Issue#	Test#	Issue	Disposition