APPENDIX A

TEAM PARTICIPANTS

AGENCIES

King County E-911 Program Office
Washington State Patrol
King County's Sheriff's Office
Seattle Police Department

COMPANIES	SERVICE PROVIDED
Integrated Data Communications, Inc.	IDC's Wireless Location System & Integration Services
U S WEST*	9-1-1 Network Communications/Local Exchange Carrier (LEC)
AirTouch*	Wireless Network Carrier
GTE Wireless*	Wireless Network Carrier
Nextel Communications*	Wireless Network Carrier
Positron Industries, Inc.*	PSAP Terminals/ALI Controller
SCC Communications Corp.*	9-1-1 Selective Routing Data Base
Network Design Engineering, Inc.*	GPS Corrected Maps
Proctor & Associates, Inc.*	9-1-1 Selective Routing Protocol Converter
WR, Inc.*	GPS Re-radiation of buildings
SiRF Technology, Inc.	GPS Receiver Chipsets
Network Orange, Inc. *	Network Monitoring
MiTAC	Board-based Equipment

** Existing Public Safety Provider*

ABOUT THE PARTICIPANTS

Integrated Data Communications (IDC)

A developer of handset-based location technology, IDC is a privately held company based in the Seattle, Washington area. IDC entered the location technology market in 1997 with a cost-effective and proprietary system to locate wireless phones and other wireless devices using commercially available Global Positioning System (GPS) technology.

U S WEST

U S WEST provides integrated, one-stop communications solutions to 25 million-plus customers nationally and in 14 western and mid-western states. The company's primary products and services include: local telephone services; long distance; wireless PCS service in selected markets; custom calling service, such as Caller ID, Voice Messaging, and Call Waiting; local phone interconnections to interstate long-distance companies; operator services; and a host of high-speed data networking services and equipment. The Company is headquartered in Denver, Colorado.

AirTouch Communications

AirTouch Communications is the largest company in the world focused on wireless communications. The company offers a full range of wireless services - cellular, paging, personal communications services (PCS). AirTouch serves more than 40 million total customers (over 17 million based on the company's ownership interest) through its ventures in the United States and 12 other nations: Belgium, Egypt, Germany, India, Italy, Japan, Poland, Portugal, Romania, South Korea, Spain, and Sweden.

GTE Wireless

GTE is one of the largest publicly held telecommunications companies in the world. The company's business units are devoted to improving and implementing telecommunications technology worldwide. GTE Wireless provides telecommunications products and services to more than 4.5 million customers in 73 metropolitan and 53 rural markets nationwide.

Nextel Communications

Nextel Communications is North America's leading provider of fully integrated all-digital cellular services. Nextel's National Service Center is located in McLean, Virginia and has an employee base of approximately 9,000 people. Nextel also has international holdings through its wholly owned subsidiary, Nextel International, Inc., formerly McCaw International, Ltd. Nextel International has wireless operations and investments in Argentina, Brazil, Canada, Japan, Mexico, Peru, the Philippines, and Shanghai, China.

Positron Industries, Inc.

Positron Industries is a Montréal-based Canadian corporation specializing in the design and manufacture of 911 and public safety telecommunications products. Positron manufactures various advanced products, including specialized telephones for traders and dispatchers, emergency systems for public safety, and fiber-optic equipment. Positron Industries is the acknowledged leader in North America in designing and implementing emergency response

systems. Over 2,000 cities, states and communities worldwide have implemented Positron systems, including King County, Washington; Los Angeles; Las Vegas; Memphis; Philadelphia; Cleveland; Toronto; Montréal; Costa Rica, and many others localities.

SCC Communications Corp.
With headquarters in Boulder, Colorado, SCC currently employs 250 people. SCC Communications Corp. is the largest and fastest growing provider of 9-1-1 services and information technology systems for software products for the public safety market in North America. Their National Data Services Center (NDSC) provides Regional Bell Operating Companies (RBOCs) and other local telephone companies with essential services and software for operation of the Enhanced 9-1-1 network throughout North America.

Network Design Engineering, Inc.
NDE was a telecommunications engineering firm providing engineering and consulting services to clients. This company has since closed its doors for business.

Proctor & Associates, Inc.
Proctor has designed and manufactured high-quality equipment for the nation's telephone industry since 1957. They are a principal supplier of 9-1-1 telecommunications products, having been a part of this vital field since it began in the 1970's. As a result, Proctor has earned the top position in terms of the number of 9-1-1 backup systems and call receiving units in place and working today. Proctor uses embedded processor systems to create sophisticated solutions whose software can be updated when conditions change. Proctor is a member of NENA (National Emergency Number Association) and APCO (Association of Public Communications Officers).

WR, Inc.
WR, Inc. is a 5-year old company specializing in the GPS Market. They provide reliable, quality-made GPS networking solutions for specific GPS applications. WR is the only company that sells GPS re-radiating kits. These kits are to re-radiate the GPS signal indoors.

SiRF Technology Inc.
SiRF Technology, Inc. was founded in February 1995 to bring Global Positioning System (GPS) technology and other wireless innovations to a wide range of consumer applications. With two generations of GPS product families on the market and strategic relationships with industry leaders such as Ericsson, Hitachi, Intel and Nokia, SiRF is driving GPS into mainstream consumer platforms.

Network Orange, Inc.
Network Orange p/TAM Analyzers have been monitoring PSAPs for more than 5 years. US West has deployed p/TAM Analyzers in Seattle. Additional analyzers were provided by Network Orange for the King County E911 Phase II GPS trials and were used to monitor and diagnose data at various test PSAP locations. Network Orange has been providing data communications test equipment and systems for twenty years and is based in Boca Raton, Florida.

MiTAC

MiTAC International Corporation is a member company of the MiTAC Group. Founded in 1982, MiTAC International designs and manufactures computer products ranging from slim LCD PCs and notebooks to high performance file servers and radiation-free LCD monitors. MiTAC is ranked among Taiwan's top three computer manufacturers and the ninth largest electronics company in Asia outside Japan. MiTAC International is a global enterprise with 12 offices in 10 countries and is represented in more than 70 countries by a worldwide network of distributors selling its own branded products as well as private labels.

APPENDIX B

TECHNICAL EVALUATION PLAN

1.0 SCOPE

The King County E-911 Program Office and Integrated Data Communications, Inc. (IDC) have teamed with existing wireless and wireline Carriers and suppliers to conduct a technical evaluation project to locate E-911 callers using IDC's GPS based location technology. This trial was conducted within the existing telecommunications networks as a Federal Communications Commission (FCC) Phase II solution.

2.0 PURPOSE

The King County technical trial will determine whether GPS-enabled, wireless handsets meet E911 Phase II requirements, using existing wireless and wireline networks.

The technical evaluation project intends to show that GPS enabled 911 cellular calls can be reliably routed to the most appropriate Public Safety Answering Point (PSAP) based on caller location. Furthermore, the caller's location can be displayed on a graphical map display and in NENA text format on existing PSAP equipment to within 40 feet accuracy (using the Root Mean Square (RMS) distribution method).

3.0 LOCATION OF TECHNICAL EVALUATION PROJECT

The trial was conducted in King County, Washington. King County, Washington borders Puget Sound on the west, extends 60 miles to the summit of the Cascades on the East and is 40 miles from north to south. Within this area live over 1.6 million people, the major city being Seattle, Washington.

For the technical evaluation project, specially-designated wireless calls will be routed, based on caller location, to one of three Public Safety Answering Points (PSAPs) in the King County Emergency 911 (E-911) system over US West-provided trunk lines, switches, and display devices.

3.1 KING COUNTY PSAPS TO BE INCLUDED IN THE TECHNICAL EVALUATION (TOTAL OF 3)

- King County Sheriff 's Office PSAP (downtown Seattle)
- Seattle Police Department PSAP (downtown Seattle)
- Washington State Patrol (Eastgate, 156th Street)

3.2 AREAS FROM WHICH CALLS WILL BE PLACED

The overall King County technical evaluation coverage area is shown in **Figure 4-1** in Section 4 of this document.

3.3 DISTRIBUTION OF CALLER LOCATION ENVIRONMENTS

Calls will be made from the following location environments in approximate proportion to existing wireless 911call distribution in King County.

This recommended call distribution is as follows:

- Urban Locations – 20%
- Suburban Locations – 30%
- Rural Locations – 20%
- Mountainous/remote Locations – 20%
- Other/Varied - 10%

3.2.2 Specific High Accuracy Location Test Areas based upon the Call Distribution

Achieving high location display and call routing accuracy is dependent on both the provided live location coordinate accuracy and the stored map database accuracy. Four specific King County map areas are selected for testing call routing and call location display. For these four areas, King County has supplied Roadway Centerline map segments (segments of a database). These database segments will be adjusted, by one of the technical evaluation project stakeholders, Network Design Engineering, Inc., to correspond to precise GPS measured coordinates.

The following four paragraphs depict the specific high accuracy test areas:

3.2.2.1 North Bend Test Area/Venue

North Bend is a small rural city thirty miles east of Seattle, nestled against 3,000 Ft. Mt. Si. to the north and against the Cascade Mountains to the east. People traveling between Seattle and Spokane pass through North Bend on Interstate 90. In North Bend, GPS receivers will experience fewer satellites in view due the mountains on three sides.

See Appendix D for a map of the North Bend test area.

3.2.2.2 North Mercer Island Test Area/Venue

Mercer Island is situated east of Seattle and west of the city of Bellevue, in Lake Washington. Interstate 90, which crosses the island (east/west) near its northern tip, is sunk below ground level. In fact, the interstate passes through a 400 foot curved tunnel on the west end of the island and under three wide overpasses before leaving the island. This unique roadway design results in major challenges to both wireless phone and GPS technology. Wireless carriers have responded by aiming antennas into the tunnel.

See Appendix D for a map of the North Mercer Island test area.

The waters off the north end of the island will be the site where caller location accuracy repeatability is evaluated for future use in marine boundary call routing situations (King County has no unique marine PSAP).

3.2.2.3 Snoqualmie Pass Test Area/Venue

Snoqualmie Pass is situated 20 miles east of North Bend, at the summit of the Cascade Mountains, at an elevation of 3,030-ft. Interstate-90 passes through deep valleys just east of the summit. This area is extremely mountainous with very steep horizons, severely limiting wireless phone coverage and the number of GPS satellites in view. This test area also includes many U.S. Forest Service roads and heavily wooded Denny Creek State Park.

See Appendix D for a map of the Snoqualmie Pass test area.

3.2.2.4 Seattle Downtown Test Area/Venue

This calling area is dominated by "urban canyons". Downtown tests will include caller location accuracy at intersections and mid block; location data reliability inside one type of building; callers at a building floor location for a special test case; and call routing accuracy for a section of Interstate-5 as it passes under the Washington Convention Center in a deep north/south corridor.

See Appendix D for a map of the Seattle downtown test area.

4.0 TECHNICAL EVALUATION PROJECT FUNCTIONAL REQUIREMENTS

In the following subparagraphs, the King County specified PSAP user functional requirements are shown in *italic* type font.

4.1 LATITUDE, LONGITUDE

4.1.1 Overall Location Accuracy

Locate Caller latitude/longitude on a PSAP map display within 40 feet for 90% of the test calls.

4.1.2 Caller Location Reference Coordinates

The latitude/longitude coordinates of each fixed caller location will be separately GPS surveyed and differentially corrected to a geo-spatial accuracy of one meter, minimum.

The map database, used for call routing and caller location display, will be registered to roadway centerlines. Map registration accuracy of three meters, minimum, will be achieved at specific registration points (shown on the map display).

4.2 ALTITUDE

Caller's altitude will be measured and displayed as feet above ground level. In addition, for buildings, altitude will be expressed as floor number, if possible.

4.2.1 Coordinate Correction

The incoming elevation (Z) reference will be corrected as part of the refresh string from the IDC Call Location Processor (CLP) at each PSAP. The Z value in the refresh data spill will indicate height above the spheroid, Mean Sea Level (MSL).

4.2.2 Elevation Display

Three Z coordinate text fields will be displayed in the Map display:

- Raw Z as above MSL
- Z as an altitude above ground level (AGL)
- An estimate as to floor #.

The location display function will detect a call within the 'enabled building' and display the floor location.

4.2.3 GPS-Enabled Building

A special elevation test situation will be designed for the technical evaluation project. This special test will involve installation of GPS re-radiation equipment on three floors of the King County Parking Garage, located in downtown Seattle on the corner of 5th Avenue and Jefferson Street. The GPS signals received at each of three separate located receivers on the building roof (different X, Y coordinates) will be re-radiated on a separate floor of the parking garage. The callers floor location will be determined and displayed by IDC-enabled software on the PSAP terminal.

4.3 SPEED

A text field in the map display will indicate caller's speed in miles per hour.

4.4 DIRECTION OF TRAVEL

A text field in the map display will indicate caller's Direction of Travel in '8-point' directionals (i.e., N, S, E, W, NW. etc.).

In addition, a text field in the map display will indicate Direction of Travel as course made good (vector) in degrees magnetic.

4.5 ALI DATABASE

Caller location latitude/longitude and calling party number will be appended to an Automatic Location Identification (ALI) database for use by the PSAP.

Data requests and responses will emulate communications protocols similar to those found in a commercial ALI database (i.e., SCC Communications) or be provided by the commercial ALI database in response to a PSAP generated request.

4.6 PSAP INFORMATION DISPLAY

4.6.1 Positron Industries, Inc. E911 Intelligent Workstation

Caller's ALI text and location map will be integrated and displayed on a Positron E911 Intelligent Workstation at each PSAP.

The location map application data source for the Positron workstation will be the IDC/Valor/NDE MapCad Workstation.

4.6.2 IDC/Valor/NDE MapCad Workstation

The IDC/Valor/NDE MapCad Workstation will provide the following functions for the technical evaluation project:

- In-band cellular phone communications (bi-directional)
- Received GPS coordinate correction
- Caller location map database
- Caller location mapping display application
- External mapping display support (to Positron Power 911)
- ALI data service emulation (SCC specification)

4.6.3 PSAP Initial Information Display

Average added time, from call initiation to display of initial ALI text information, due to location based call routing and GPS data processing, will not exceed two seconds.

The technical evaluation project system will be designed to meet the 2-second budget.

4.6.4 Information Refresh

Information will be updated every 15 seconds (if desired by the call taker).

Information refresh can be both manually requested by the PSAP call taker, automatically refreshed or manually initiated by the caller.

Updated information will not displace original call information.

The caller's initial location as well as refreshed location will be displayed.

4.7 CALL ROUTING

Technical evaluation project calls will be routed based on latitude/longitude of original call (selective routing).

Voice and data will be routed on the existing E-911 network, through existing E-911 telephone and PSAP equipment.

Some participating wireless carriers will 'call forward' technical evaluation project calls from their MSC directly to a specified PSAP. These calls will be not included in the call routing performance analysis.

4.8 CUSTOMER INFORMATION TO BE PROVIDED

The following data elements will be displayed at the PSAP for each call:

- *Customer name*
- *Customer billing address*
- *Calling party number*

5.0 TECHNICAL EVALUATION PROJECT PARTS

Technical evaluation project data collection is divided into three distinct parts, each part building on knowledge gained in the previous effort.

5.1 TECHNICAL EVALUATION PROJECT PART-1 (CHARACTERIZE CALL LOCATION DATA ACCURACY AND RELIABILITY)

Testing will initially focus on GPS accuracy, map display accuracy and data availability. Test cases are selected to provide a broad overview of system performance. In addition, system timing will be characterized.

5.1.1 Caller Locations

See Appendix D – For All Test Area Maps and Locations

5.2 TECHNICAL EVALUATION PROJECT PART-2 (LOCATION BASED ROUTING; NENA II ALI TEXT DISPLAY)

Technical evaluation project Part-2 will focus on caller location coordinate based call routing. Routing accuracy and reliability will be assessed. In addition, display of a calling party's location to a specific floor of a building will be characterized. Other data elements assessed in Technical evaluation project Part-2 will be caller's Direction of Travel, caller's location altitude, caller's speed, and cellular phone and GPS availability in various buildings.

5.3 TECHNICAL EVALUATION PROJECT PART-3 (SYSTEM END-TO-END PERFORMANCE; STAKEHOLDER APPROVAL)

The purpose of Technical evaluation project Part-3 is to focus the stakeholders on an end-to-end system performance. Technical evaluation project Part-3 will be preceded by a specific review and approval of the Part-3 test plan and procedure, and succeeded by a review of technical evaluation project results and final report.

6.0 TEST METHODS

6.1 SYSTEM CHARACTERIZATION

6.1.1 Network Compatibility

Monitoring of existing network circuits will be conducted using Network Orange, Inc. p/TAM equipment and procedures to verify IDC GPS data compatibility with the existing network.

6.1.2 Call/Data Setup

Time Function segments will be measured for initial call/data setup:

- End-to-end for initial call/data setup: Manual stop-watch measurement.
- End-to-end for GPS data refresh: Refresh requested to call taker GUI update.
- Baseline end-to-end call setup times.

6.2 TECHNICAL EVALUATION PROJECT DATA COLLECTION METHODS

6.2.1 Calls Placed To the Automatic Caller Location Database (ACLD)

IDC will develop an automatic data collection software application which will be run at various times throughout the technical evaluation. Using this method, callers will initiate calls to the ACLD and enter a test ID; the ACLD will then request/receive caller location data, store it to a database and terminate the call without the need for a PSAP call taker's participation. Use of the ACLD will allow a greater number of technical evaluation project calls to be analyzed for caller location accuracy and reliability.

6.2.2 Calls Placed Or Routed To A PSAP

6.2.2.1 Non-Interference at PSAPs

PSAP supervisors will be asked to establish suitable call-in periods for the technical evaluation project. Callers will be instructed to followed procedures to minimize interruption of PSAP call taker duties. Call abort procedures will be followed in the event that the PSAP call taker is needed for a higher priority activity.

6.2.2.2 PSAP Call Taker Protocol

PSAP call takers will enter call data into a formatted Call Log, designed to capture data necessary to evaluate system performance against all of the stated PSAP requirements.

PSAP call takers will establish the best use of the features and controls of the caller location mapping devices installed, including map display size, map zoom controls, and data refresh method and rate.

6.2.3 Calls Automatically Routed to a PSAP Based on Caller's Location

Call routing accuracy tests will be based on test locations situated on the interstate highways. Both fixed and moving calls, placed from automobiles, will be evaluated.

6.2.4 Calls Initiated From Automobiles

How PSAP call takers will use the caller location mapping and data refresh feature is of particular interest when moving callers are involved.

Distinguishing a caller's location to a specific roadway in locations where that roadway passes over or under another will be evaluated.

6.2.5 Calls Initiated From Portable Handsets

Portable handsets will be used for calls where it is not practical to maneuver automobiles into position, such as inside buildings.

6.3 TEST RESULTS ANALYSIS AND REPORTING FORMATS

6.3.1 Subjective Methods

Selected callers will be instructed to develop subjective evaluations of system performance. Appropriate test cases could include re-enactment of actual emergency situations that could have resulted in a shorter response time had the callers location been known to the PSAP call taker, or simulation of 'where am I ' emergencies, etc.

These anecdotes will be reported from the perspective of the caller and the PSAP call taker, in a narrative format.

6.3.2 Objective Methods

Some tests, while systematically conducted, will not support a statistical method of results analysis. Moving caller tracking is an example of this type of test. These tests will however be objectively analyzed and reported.

The PSAP Call Log sheets will provide data for evaluating system performance against most of the PSAP user requirements.

6.3.3 Statistical Methods

Statistical analysis will be used to analyze location accuracy's for specific test cases. This data will primarily address map-independent GPS accuracy and will use historical Washington State survey monuments in King County.

7.0 QUALITY ASSURANCE

All aspects of the design, design review, implementation will adhere to the requirements as set fort in the IDC Certified Quality System to include but not limited to:

- Management and Staff Responsibility
- Design and Specification Control
- Documentation and Data Control
- Process Control
- Product Identification and Tractability
- Inspection and Testing
- Nonconformance and Correction
- Statistics and Quantification
- Internal Quality Audits and Records

IDC's Quality Management System (QMS) has been developed in accordance with the elements and requirements of ISO 9001. The QMS's goal is to create the proper work practices that will ensure delivery and performance the first time.

8.0 SYSTEM DESIGN

See Figure D-6 in Section D for the King County E911 Phase II Technical Evaluation System Architecture.

It is important to note that the specific telecommunications network architecture utilized for the technical evaluation is not the only possible network architecture. For example, the call routing decision could be made at a different node in the call data path without affecting the viability of the GPS location technology.

8.1 IDC GPS-ENABLED HANDSET

The IDC GPS-enabled handset contains a GPS receiver along with a data control processor which manages the initial call setup (data packet) and provides refresh GPS data in-band to the caller's wireless handset.

8.2 WR INC. GPS RF SIGNAL RE-RADIATION EQUIPMENT

WR Inc. re radiators consist of a passive receive antenna unit, signal amplifier, and a powered transmitter unit. Three GPS re-radiators are installed in the King County parking garage at separate latitude/longitude coordinates on the building roof. The three re-radiated GPS RF signals serve each of floors 4, 5, and 6 of the garage. At the PSAP IDC Call Data Processor workstation, the three unique latitude/longitude coordinates are associated to the Parking Garage location and translated to the caller's floor.

8.3 WIRELESS CARRIER'S WIRELESS PHONE

The IDC data generator employs a data encoding method that can be transmitted and received using all wireless communications types, without any modification to the standard wireless phone. Connection to the phone is made through the hands-free connector available on all phones.

The wireless communications types used in the technical evaluation project are:

- AMPS
- N-AMPS
- CDMA
- iDEN

8.4 WIRELESS CARRIER'S MOBILE SWITCHING CENTER (MSC)

MSCs provide the wireless-to-wireline communications interface and typically support numerous (200+) wireless towers and base stations. In the technical evaluation project, the wireless carrier's MSC will send all test calls, recognizable by their special number, to the Selective Router for location based-routing to the correct PSAP.

8.5 PROCTOR & ASSOCIATES SELECTIVE ROUTER (SR)

The SR is an intelligent interface device that manages the data control interfaces between the MSC and the actual wireline telephone switching mechanism to establish the desired 911 call routing. In the technical evaluation project, raw GPS coordinate data from the caller's phone is decoded in the SR and sent to an IDC correction processor to improve accuracy. The coordinate correction function involves eliminating artificially-inserted signal errors. The SR then sends these corrected location coordinates to another call location processor which associates them to with a specific PSAP Emergency Service Number (ESN). The SR sends the ESN to the telephone switch (Central Office), which uses the ESN to route the call.

The SR also sends the corrected location coordinates, along with other digits received from the MSC, to an ALI (Automatic Location Identification) database to be available at the PSAP the instant that the call taker answers up the call.

8.6 SCC INC./NDE INC. CALL ROUTING DECISION LOGIC

The call routing decision is based on associating the caller's latitude/longitude coordinates to an ESRD (Emergency Service Routing Digit) through the use of an accurate map database containing the PSAP routing overlays. SCC Communications is a telephone ALI database service supplier; NDE (Network Design Engineering) serves customers with precision GPS-based mapping services.

8.7 SCC/US WEST ALI DATABASE SERVICE

This PSAP data service provides a NENA II formatted text string for display on the PSAP call taker workstation.

8.8 POSITRON INDUSTRIES PSAP ALI CONTROLLER

The PSAP ALI Controller manages the interface between the telephone system and the call taker interactive workstations, providing telephone control, ALI database access, call transfer to another PSAP if needed, and synchronization of the call voice circuit with its associated data circuit and the PSAP Computer Aided Dispatch (CAD) database.

8.9 IDC/NDE/VALOR PSAP MAPCAD CALL TAKER INTERACTIVE WORKSTATION

The PSAP MapCad device supports the various call location display processing functions and is a combination of technologies from IDC, NDE and Valor. These functions include (with the company attribution in parenthesis):

- In-band communications with the caller's wireless phone needed for refreshing location data (IDC)
- GPS coordinates correction processing to achieve the desired location mapping accuracy (IDC)
- The location mapping engine and map database (NDE)
- Phase II caller location data records management CAD (Valor Systems)
- And an external LAN interface to enable the Positron workstations to display the same map information (IDC).

8.10 POSITRON INDUSTRIES POWER 911 CALL TAKER INTERACTIVE WORKSTATION

The PSAP call taker interactive workstation provides the user interface for all call taker activity, providing ALI text display and call management controls. For the technical evaluation project, this device displays the IDC MAPCAD graphical mapping of the caller's location via the Positron LAN.

Multiple displays displaying different size maps will facilitate call taker evaluation of their relative benefits.

9.0 TECHNICAL EVALUATION PROJECT PARTICIPANTS/STAKEHOLDERS

- IDC
- Airtouch Cellular
- GTE Wireless
- King County E911 Program Office
- NDE (Network Design Engineering, Inc.)
- Network Orange, Inc.
- Nextel Communications
- Positron Industries, Inc.
- Proctor & Associates
- SCC Communications
- US West Communications
- Valor Systems, Inc.
- WR Inc.
- Mitac, Inc.

APPENDIX C

TECHNICAL EVALUATION PROCEDURES

(Maps supporting this text are in Appendix D)

1.0 GPS ENABLED HANDSET EQUIPMENT SET-UP

1.1 Place the magnetic GPS antenna on the roof 8 feet back from the front bumper.

1.2 Assemble the equipment, plugging in the connections to the labeled locations.

1.3 Verify proper functioning by observing that the yellow LED light is on at power-on; it will turn off after a few minutes, then flash at approximately a one-second rate.

2.0 PROCEDURE FOR PLACING CALLS INTO THE IDC AUTOMATIC CALLER LOCATION DATABASE (ACLD)

2.1 FIXED POSITION CALLS

2.1.1 Use the map and positioning descriptions to select a calling point.

2.1.2 Drive to the calling point and position your vehicle as per the positioning description.

2.1.3 If you cannot get into position or are unsure of the proper position, abort that calling point and proceed to another calling point. (Placing a call from the wrong position will introduce undesirable data into our database.)

2.2 MOVING VEHICLE CALLS

2.2.1 Use the Map to identify a test section that is within a test area.

2.2.2 Drive to the starting end of the test section and place calls (Read the 'Placing a Call' paragraph first).

2.3 PLACING A CALL

2.3.1 Enter the phone number (two dedicated numbers supplied) and hit the **send** button.

2.3.2 After the call is answered, you will hear a "click" a second or two after the ring. Key in the **two-digit** equipment identification code on your phone.

2.3.3 Fixed position calls: the **two-digit** calling point identification code from which you are calling.

2.3.4 Moving Vehicle Calls: When on I-5 enter 05 as the **two-digit** identification code; when on I-90 enter 09 as the **two-digit** identification code; For other roadways, enter 00.

2.3.5 Listen to the data spill and observe the LED light blink as the data is transmitted.

2.3.6 The data spill will be followed by a "hang-up click" when the auto-call catcher grabs the data.

2.3.7 When you hear a "hang-up click," hit the end button.

2.3.8 If there is no "hang-up click" after the data spill, wait for a second or two and the data spill will be repeated (it may be repeated up to four times.)

2.3.9 During the repeat spill listen for the "hang-up click" and hit the end button when it occurs.

2.3.10 After the fifth data spill with no "hang-up click," the auto-caller will turn off.

2.3.11 When the auto-call catcher turns itself off, hit the end button.

2.3.12 If you make an entry error, stop entering data and wait 15 seconds, the call will be canceled automatically.

2.3.13 Repeat the process by hitting the send button to redial the supplied phone number you originally dialed and send the data. (Alternately, setup and use the speed dial capability.)

2.3.14 Complete 20 calls from each fixed calling point if possible.

2.4 GENERAL PROCEDURE FOR PSAP CALLER & CALL-TAKER PROTOCOL

2.4.1 Pre-arrange calling sessions in order to minimize PSAP resource demands.

2.4.2 Arrange sessions for Mondays through Fridays and between 10 AM and 2 PM unless specifically desired by the PSAP call taker.

2.4.3 The PSAP call taker will record all call information into the formatted Call Log sheets.

2.5 PSAP CALL TAKER'S LOG SHEET

(follows on next page)

PSAP Call Log Sheet

PSAP: _____ Date of call: _____ Call taker: _____

Caller:_____ Call location ID:_____ Time of Call:_____

Initial Displayed Caller Location:_____

Initial Actual Caller Location:_____

Location accuracy comments:_____

Caller found on map within: 40 feet ☐ 100 feet ☐ 200 feet ☐
300 feet ☐ 400 feet ☐ over 400 feet ☐

For a moving call, (8-point) Direction of Travel: Displayed _____; Actual: _____.

For a moving call, Speed: Displayed _____ MPH; Actual: _____ MPH.

☐ YES ☐ NO Was the Power E911 location map displayed within 2 seconds of ALI text?

☐ YES ☐ NO Was Power E911 ALI text correct, including Customer name, Customer billing address, and Calling party number?

☐ YES ☐ NO Were Caller's altitude above sea level displayed?

☐ YES ☐ NO If YES, was it useful?

☐ YES ☐ NO Was Caller's altitude above ground level displayed?

☐ YES ☐ NO If YES, was it useful?

☐ YES ☐ NO Did refresh requests result in location, elevation, speed, direction updates?

☐ YES ☐ NO Did caller's original map location remain on display after refresh?

☐ YES ☐ NO For calls using GTE Wireless service, was the call routed to the correct PSAP, based on caller's actual initial location?

☐ YES ☐ NO If caller at King County Garage, was correct floor displayed?

Caller's environment(s): ☐ Urban Canyon ☐ Suburban ☐ Rural ☐ Mixed Use Waterfront
☐ in Building ☐ Mountains ☐ Forest canopy ☐ Highway

Caller's weather: ☐ Sun ☐ Rain ☐ Partly cloudy ☐ Mostly cloudy

Other Comments_____

_____

_____.

3.0 FIXED CALL LOCATIONS

3.1 DOWNTOWN SEATTLE CALL LOCATIONS

3.1.1 Inside Building Call Locations

3.1.1.1 1000 - 2nd Avenue, 37th floor. Caller must arrange in advance with The Madrona Group, through Jennifer (Project manager will supply phone No.). Outside call location reference is No. 5.

3.1.2 Outside Call Locations

3.1.2.1 7th Ave. between Pine & Olive St., left lane, middle of block, US West loading zone, front bumper @ "Passenger Load Only" sign

3.1.2.2 3rd Ave. between Pine & Pike St., right lane in the middle of block with the front bumper @ "Passenger Load Only" sign.

3.1.2.3 3rd Ave. between Pike & Union St., right lane in the middle of block with the front bumper @ "Passenger Load Only" sign.

3.1.2.4 3rd Ave. between Union & Seneca St., right lane in the middle of the block with the front bumper @ "Passenger Load Only" sign.

3.1.2.5 2nd Ave. between Madison & Marion St., right lane of the street with the front bumper @ "Bus Loading Zone" signpost.

3.1.2.6 Alley between Spring & Madison St., between 2nd & 3rd Ave. in the middle of block at the open area under the building on the west (left) @ the yellow painted no parking area.

3.1.2.7 Spring St. between 3rd & 4th Ave., left lane with the front bumper @ "No Stops" sign up-hill from the parking spaces.

3.1.2.8 3rd Ave. between University & Seneca St., right lane "Load Only" sign with the front bumper @ the yellow parking meter.

3.1.2.9 Pike St. between 4th & 5th Ave., right lane to the "Truck Load Only" area with the front bumper @ the yellow parking meter.

3.1.2.10 Pike St. between 5th & 6th Ave., right lane to the "Truck Load Only" area with the front bumper @ the yellow parking meter.

3.1.2.11 Union St. between 7th & 6th Ave., right lane into the Sheraton parking lot with the front bumper @ "Self Parking" payment box.

3.1.2.12 Union St. between 4th & 5th Ave., right lane in "Load Only" area with the front bumper @ the yellow parking meter.

3.1.2.13 5th Ave. between Seneca & Spring St., left lane in parking area before Vantage Park Hotel, with the front bumper @ the "Passenger Load" zone sign.

3.1.2.14 Spring St. between 6th & 7th Ave., left lane with front bumper @ the "No Parking" sign.

3.1.2.15 5th Ave. between Marion & Columbia St., left lane with the front bumper @ the corner passenger load.

3.1.2.16 7th Ave. between Cherry & Columbia St., right lane with the front bumper @ the northern "30 min. Loading Zone" sign with the potted tree next to it.

3.1.2.17 7th Ave. between Marion & Madison St., right lane beyond island with front bumper @ the "No Parking" sign.

3.1.2.18 6th Ave. between University & Union St., right lane to the end of the block in the 3 min. "Passenger Load Only," with the front bumper @ the sign closest to Union Street.

3.1.2.19 7th Ave. between Union & University St., right lane in the passenger loading zone with the front bumper @ the yellow painted speed bump in the traffic lane.

3.1.2.20 5th Ave. between Jefferson & Terrace Street, middle of block at the King County Parking Building with the front bumper @ the entrance gate on 5th Ave.

3.1.2.21 KC parking @ floor level 4

3.1.2.22 KC parking @ floor level 5

3.1.2.23 KC parking @ floor level 6

3.2 MERCER ISLAND CALL LOCATIONS

3.2.1 Inside Building Call Locations

3.2.1.1 Plant Nursery at 76th Ave. SE between SE 24th Street & SE 27th Street (old Safeway store). Outside call locations reference is No. 34.

3.2.2 Water Call Locations

3.2.2.1 This is a call location group of 10 locations, 51 through 60. The group is calibrated in 40-foot increments with location No. 50 located at the registered monument, 40 feet inland,

perpendicular to the shoreline. All locations are connected by a string of connected floating markers at 40 foot intervals. Tests performed at this location group require the use of a watercraft.

3.2.2.2 At shoreline/waterline, 40 feet from monument No. 51.

3.2.2.3 40 feet into water, perpendicular to shore.

3.2.2.4 80 feet into water, perpendicular to shore.

3.2.2.5 120 feet into water, perpendicular to shore.

3.2.2.6 160 feet into water, perpendicular to shore.

3.2.2.7 200 feet into water, perpendicular to shore.

3.2.2.8 240 feet into water, perpendicular to shore.

3.2.2.9 280 feet into water, perpendicular to shore.

3.2.2.10 320 feet into water, perpendicular to shore.

3.2.3 Outside Call Locations

3.2.3.1 60th Ave. SE south of intersection with SE 24th Street, on parking area on west side of street, front bumper @ "Children at Play" sign.

3.2.3.2 60th Ave. SE, between 28th & 30th west side of street in Slater Park, front bumper @ head of handicap parking space.

3.2.3.3 Mercer Way, between 69th Place & 30th on west side of street, front bumper @ "Boys & Girls Club" sign.

3.2.3.4 66th Ave. SE, off of SE 24th Street between Mercer Way & 70th Ave. SE, east side of 66th Street, front bumper @ stop sign.

3.2.3.5 70th Ave. SE, bus stop on west side of street, bumper @ bus stop "203" sign.

3.2.3.6 SE 24th Street between 71st Ave SE & 70th Ave SE in United Methodist Church parking lot @ handicap parking spot with wheel stop bumper.

3.2.3.7 SE 22nd Street & 72nd Ave. SE, parking area on north side with front bumper @ parking space next to green electrical service box.

3.2.3.8 72nd Ave. SE between SE 22nd Street & North Mercer Way, VFW Post 5760 on east side of street, front bumper @ front steps to building.

3.2.3.9 N. Mercer Way to end of Roanoke Way, front bumper @ "No Beach Access" sign.

3.2.3.10 76th Ave. SE between SE 24th Street & SE 27th Street in Plant Nursery (old Safeway store) parking lot, front bumper @ painted cross walk closest to bus shelter.

3.2.3.11 SE 28th Ave. and 80th Ave. SE in Shell station parking area, front bumper @ telephone booth.

3.2.3.12 80th Ave. SE north of I 90 in "Park & Ride" lot, park with front bumper @ handicap parking spot closest to 80th Ave.

3.3 UNIVERSITY OF WASHINGTON ARBORETUM CALL LOCATIONS

3.3.1 Foster Island Rd. & Arboretum Drive E, parking spot to the east (left) of intersection, front bumper @ first "High Car Prowl Area" sign to the left.

3.3.2 Arboretum Drive E past "Loderi Vally" sign to next parking area on east (left) side of drive, front bumper @ "High Car Prowl Area" sign with 2 garbage cans in front of it.

3.3.3 Arboretum Drive E to the next parking area on east (left) side of drive with 2 gravel piles in it, front bumper @ "High Car Prowl Area" sign.

3.3.4 Arboretum Drive E past "Giant Sequoia" tree sign to 1st parking area on west (right)side of drive, front bumper @ "High Car Prowl Area" sign.

3.3.5 Arboretum Drive E to parking area on east (left) side of drive, @ parking place next to rock wall with a water fountain in it.

3.4 NORTH BEND CALL LOCATIONS

3.4.1 Inside Building Call Locations

3.4.1.1 Horste Residence: Turn onto 457th Ave. SE from 140th Street; Go about three blocks to 13716 457th Ave. SE (Tan house on right with small carved bear in front yard shrubbery). Outside call locations reference is No. 81.

3.4.2 Outside Call Locations

3.4.2.1 Underpass at I-90 and 424th Ave. SE: [The following eight sites are in a group, at 40 foot intervals, where I-90 crosses 424th Ave. SE, vehicle on East shoulder 424th Ave. at underpass (vehicle headed North). Park on shoulder with left edge of bumper at painted number on roadway, numbered 71 through 78 starting at the most southern site.]

3.4.2.2 marker '72'
3.4.2.3 marker '73'
3.4.2.4 marker '74'
3.4.2.5 marker '75'
3.4.2.6 marker '76'
3.4.2.7 marker '77'
3.4.2.8 marker '78'

3.4.2.9 Intersection of SE North Bend Way and SE Cedar Falls Way: Park on SE North Bend Way, east of intersection directly across from the Les Schwab tire store, heading East, bumper @ "SPEED LIMIT 25" sign, left side of vehicle at edge of pavement on roadway shoulder.

3.4.2.10 I-90 Exit-32 & 436th Ave. SE: On 436th Ave. SE, park heading north, several hundred feet north of freeway; Bumper at fire hydrant, 30 feet north of "SPEED LIMIT 45 " sign. Left side of vehicle at edge of roadway, tires just on the gravel shoulder.

3.4.2.11 13716 457th Ave. SE(Horste Residence): Turn onto 457th Ave. SE from 140th Street; Go about three blocks to 13716 457th Ave. SE (Tan house on right with small carved bear in front yard shrubbery). Bumper at security system sign, left side of vehicle three feet from edge of driveway.

3.4.2.12 I-90 Exit-34 & 468h Ave. SE underpass: On 468th Ave. SE, park heading north on the I-90 Eastbound underpass, Bumper at 3rd overpass pillar. Left side of vehicle 6 feet from white roadway edge stripe.

3.4.2.13 I-90 Exit 34 & 468th Ave. SE, on 468th: Park heading south on 468th, 200 feet before 150th St. Bumper on "BRIDGE WEIGHT LIMIT AHEAD" sign; Left side of vehicle three from white roadway edge stripe.

3.5 SNOQUALMIE PASS CALL LOCATIONS

3.5.1 Inside Building Call Locations

3.5.1.1 Stephenson residence: 21 Saint Anton Strasse: Heading east on I-90, Take Exit-52 (East Summit); Turn left at stop sign, onto Alpental Road; Turn right on Oberstrasse, at the blue Alpental Private Community sign; Turn left at first intersection (approximately one block), third chalet on the left, 21 Saint Anton. Outside call location reference is No. 86.

3.5.2 Outside Call Locations

3.5.2.1 I-90 East overpass at Exit 52: Heading east on I-90, Take Exit-52 (East Summit); Turn left at stop sign, onto Alpental Road, stopping almost immediately, under the I-90 East overpass (you are heading north). Bumper @ 4th overpass pillar (of 6); Right side of vehicle is 10 feet from pillar.

3.5.2.2 Stephenson residence, 21 Saint Anton Strasse: Heading east on I-90, Take Exit-52 (East Summit); Turn left at stop sign, onto Alpental Road; Turn right on Oberstrasse, at the blue Alpental Private Community sign; Turn left at first intersection (approximately one block); Survey site is third chalet on the left, 21 Saint Anton. Turn vehicle around, pointing back toward Oberstrasse; Bumper @ first edge of entrance sidewalk with right side of vehicle at pavement edge.

3.5.2.3 Junction of Alpental Road and Denny Creek Road: Heading east on I-90, Take Exit-52 (East Summit); Turn left at stop sign, onto Alpental Road; Park vehicle on Alpental Road heading South (toward freeway). Bumper @ YIELD sign, right side of vehicle four feet from signpost.

3.5.2.4 Junction of Denny Creek road and campground entrance: Heading west on I-90, Take Exit-47 (Denny Creek); Turn right at stop sign, then immediate right onto Denny Creek road; In approximately ½ mile, park on right shoulder, directly across from the entrance road to Denny Creek Campground. Bumper @ brown directions sign with left side of vehicle 8 feet from white roadway edge stripe.

3.5.2.5 Junction of I-90 East, Exit-47 and Tinkham Road: Heading east on I-90, Take Exit-47 (Denny Creek); Turn right at stop sign; Stop at junction with Tinkham road (500 Feet); Park on Tinkham Road heading East (toward the summit). Bumper @ "Trail park pass required at trailheads" sign, right side of vehicle 3 feet from signpost.

3.6 CLASSIFICATION OF CALL LOCATION ENVIRONMENTS

Test Area	Loc. ID	Urban Core	Inside Bldg.	Highway	Rural Mtns	Suburb	Forest canopy	Tunnels & underpass	Mixed use waterfront	Water
D'town Sea.	1	X								
D'town Sea.	2	X								
D'town Sea.	3	X								
D'town Sea.	4	X								
D'town Sea.	5	X								
D'town Sea.	6	X								
D'town Sea.	7	X								
D'town Sea.	8	X								
D'town Sea.	9	X								
D'town Sea.	10	X								
D'town Sea.	11	X								
D'town Sea.	12	X								
D'town Sea.	13	X								
D'town Sea.	14	X								
D'town Sea.	15	X								
D'town Sea.	16	X								
D'town Sea.	17	X								
D'town Sea.	18	X								
D'town Sea.	19	X								
D'town Sea.	20	X								
D'town Sea.	21	X	X							
D'town Sea.	22	X	X							
D'town Sea.	23	X	X							
D'town Sea.	24	X	X							
Mercer Is.	25					X				
Mercer Is.	26					X				
Mercer Is.	27					X				
Mercer Is.	28					X				
Mercer Is.	29					X				
Mercer Is.	30					X				
Mercer Is.	31					X				
Mercer Is.	32					X				
Mercer Is.	33					X				
Mercer Is.	34					X				
Mercer Is.	35					X				
Mercer Is.	36					X				
Mercer Is.	37		X			X				
Not assigned	38									
Not assigned	39									
Not assigned	40									

Test Area	Loc. ID	Urban Core	Inside Bldg.	Highway	Rural Mtns	Suburb	Forest canopy	Tunnels & underpass	Mixed use waterfront	Water
Arboretum	41					X	X			
Arboretum	42					X	X			
Arboretum	43					X	X			
Arboretum	44					X	X			
Arboretum	45					X	X			
Not assigned	46									
Not assigned	47									
Not assigned	48									
Not assigned	49									
Not assigned	50									
Mercer Is.	51								X	
Mercer Is.	52								X	
Mercer Is.	53									X
Mercer Is.	54									X
Mercer Is.	55									X
Mercer Is.	56									X
Mercer Is.	57									X
Mercer Is.	58									X
Mercer Is.	59									X
Mercer Is.	60									X
Not assigned	61									
Not assigned	62									
Not assigned	63									
Not assigned	64									
Not assigned	65									
Not assigned	66									
Not assigned	67									
Not assigned	68									
Not assigned	69									
Not assigned	70									

Test Area	Loc. ID	Urban Core	Inside Bldg.	Highway	Rural Mtns	Suburb	Forest canopy	Tunnels & underpass	Mixed use waterfront	Water
North Bend	71					X		X		
North Bend	72					X		X		
North Bend	73					X		X		
North Bend	74					X		X		
North Bend	75					X		X		
North Bend	76					X		X		
North Bend	77					X		X		
North Bend	78					X		X		
North Bend	79					X				
North Bend	80					X				
North Bend	81					X				
North Bend	82					X				
North Bend	83					X				
North Bend	84		X			X				
Snoq. Pass	85				X			X		
Snoq. Pass	86				X					
Snoq. Pass	87				X					
Snoq. Pass	88				X		X			
Snoq. Pass	89				X		X			
Snoq. Pass	90		X		X					
Not assigned	91									
Not assigned	92									
Not assigned	93									
Not assigned	94									
Not assigned	95									
Not assigned	96									
Not assigned	97									
Not assigned	98									
Reserved	99									

4.0 OVERALL CALLER LOCATION ACCURACY

Requirement: Locate caller's latitude/longitude on a PSAP map display to within 40 feet for 90% of the test calls.

4.1 PROCEDURE FOR TECHNICAL EVALUATION OF OVERALL CALLER LOCATION ACCURACY USING THE IDC AUTOMATIC CALLER LOCATION DATABASE (ACLD).

4.1.1.1 Make ACLD 'Fixed Calls' calls using the Procedure for placing calls into the IDC Automatic Caller Location Database.

4.1.1.2 Generate scatter diagrams for specific fixed call locations, showing the distribution of calls on the Technical Evaluation map background.

4.2 PROCEDURE FOR TECHNICAL EVALUATION OF OVERALL CALLER LOCATION ACCURACY USING THE PSAP CALLER/CALL TAKER PROTOCOL

4.2.1.1 Make PSAP 'Fixed calls' and 'Moving calls' using the General Procedure for PSAP caller & call-taker protocol.

4.2.1.2 The call taker shall record the caller's actual location, initial displayed location, an estimate of the displayed location accuracy, and any location comments on the Call Log sheet.

4.3 WATER ENVIRONMENT

Requirement: Overall caller location accuracy should extend to over-water environments.

Conduct the following tests at call locations Nos. 51 through 60, on Mercer Island at the North terminus of 72nd Ave. SE, a small parking area and beach waterfront on the North tip of the island. This test will require the use of a watercraft.

Deploy the supplied 400 foot string of buoys, each buoy marking at 40 foot increments, from the monument at call location No. 51 north into the water to its anchor point. Buoy No. 52 should be located at the water's edge.

4.3.1 Procedure For Technical Evaluation Of Over-Water Environment Using The PSAP Caller/Call Taker Protocol

4.3.1.1 Make a PSAP 'Fixed call' from each buoy location, starting with No. 51 and proceeding through No. 60, using the General Procedure for PSAP caller & call-taker protocol.

4.3.1.2 The call taker shall record the caller's actual location, initial displayed location, an estimate of the displayed location accuracy, and any location comments on the Call Log sheet.

4.3.2 Procedure For Technical Evaluation Of Over-Water Environment Using The IDC Automatic Caller Location Database (ACLD).

4.3.2.1 Make ten ACLD 'Fixed Calls' from each call location No. 51. through 60., using the Procedure for placing calls into the IDC Automatic Caller Location Database. The call location reference marker is No. 51.

4.3.2.2 Generate scatter diagrams for specific fixed call locations, showing the distribution of calls on the Technical Evaluation map background.

4.4 INSIDE BUILDING ENVIRONMENT

Requirement: Overall caller location accuracy should extend to inside building environments.

4.4.1 Procedure For Technical Evaluation Of Inside Building Environments

4.4.1.1 Caller will use call locations listed as Inside Building Call Locations.

4.4.1.2 Power-on a portable configuration GPS enabled handset for a few minutes while outside the building, at the Outside Call Location Reference No. indicated.

4.4.1.3 Make a PSAP 'Fixed call' from this outside reference location using the General Procedure for PSAP caller & call-taker protocol.

4.4.1.4 The call taker shall record the caller's actual location, initial displayed location, an estimate of the displayed location accuracy, and any location comments on the Call Log sheet.

4.4.1.5 Make PSAP 'Fixed calls' or 'Moving calls' from various locations inside the building, using the General Procedure for PSAP caller & call-taker protocol.

4.4.1.6 The call taker shall record the caller's actual location, initial displayed location, an estimate of the displayed location accuracy, and any location comments on the Call Log sheet.

4.4.1.7 Repeat this procedure for all listed buildings.

4.5 TECHNICAL EVALUATION OF HIGHWAY UNDERPASS ENVIRONMENT

Requirement: Overall caller location accuracy should extend to the underpass environment.

4.5.1 North Bend I-90 Underpass, Call Locations 71 – 78 (>60 Feet)

4.5.1.1 Make 10 'fixed calls' from each of the eight call locations in the group, using the Procedure for placing calls into the IDC Automatic Caller Location Database.

4.5.1.2 Generate scatter diagrams for specific fixed call locations, showing the distribution of calls on the Technical Evaluation map background.

4.5.1.3 Make PSAP 'Fixed calls' from each of the numbered sites, using the General Procedure for PSAP caller & call-taker protocol.

4.5.1.4 The call taker shall record the caller's actual location, initial displayed location, an estimate of the displayed location accuracy, and any location comments on the Call Log sheet.

4.5.2 Snoqualmie Pass Underpass Evaluation (>60 Feet)

4.5.2.1 Conduct this evaluation in the Snoqualmie Pass test area, using the I-90 underpass several feet from test site number 88.

4.5.2.2 Make PSAP 'Fixed call' from a random location around or under the overpass deck, using the General Procedure for PSAP caller & call-taker protocol.

4.5.2.3 The call taker shall record the caller's actual location, initial displayed location, an estimate of the displayed location accuracy, and any location comments on the Call Log sheet.

4.5.2.4 Repeat this procedure from various random sites.

4.5.3 Downtown Seattle Washington State Convention Center I-5 Underpass (> 400 Ft).

4.5.3.1 Make PSAP 'Moving call' from I-5, several minutes travel time prior to the underpass , using the General Procedure for PSAP caller & call-taker protocol. Caller's moving speed shall be maintained at 20 MPH (approx. 30 feet per second).

4.5.3.2 The call taker shall initiate a call data refresh command every 5 seconds, stopping several refreshes after the caller's location has emerged from the underpass.

4.5.3.3 The call taker shall record the caller's actual location, initial displayed location, an estimate of the displayed location accuracy, and any location comments on the Call Log sheet.

4.5.4 Downtown Seattle Spring St. Between 6th & 7th Ave Under I-5. (Call Location No. 14)

4.5.4.1 Make ACLD 'Fixed Calls' calls using the Procedure for placing calls into the IDC Automatic Caller Location Database.

4.5.4.2 Generate scatter diagrams for specific fixed call locations, showing the distribution of calls on the Technical Evaluation map background.

4.5.5 Mercer Island I-90 Lid Underpass (> 1000 Feet)

4.5.5.1 Make PSAP 'Moving call' from I-90, several minutes travel time prior to the underpass , using the General Procedure for PSAP caller & call-taker protocol. Caller's moving speed shall be maintained at 20 MPH (approx. 30 feet per second).

4.5.5.2 The call taker shall initiate a call data refresh command every 5 seconds, stopping several refreshes after the caller's location has emerged from the underpass.

4.5.5.3 The call taker shall record the caller's actual location, initial displayed location, an estimate of the displayed location accuracy, and any location comments on the Call Log sheet.

5.0 ELEVATION DISPLAY AT PSAP

Requirement: Caller's altitude will be measured and displayed as feet above ground level. For buildings, altitude will be expressed as floor number, if possible.

Note: Elevation accuracy is not specified.

5.1 PROCEDURE FOR TECHNICAL EVALUATION OF OVERALL ELEVATION DISPLAY

5.1.1 Make PSAP calls using the General Procedure for PSAP caller & call-taker protocol.

5.1.2 The call taker shall indicate on the Call Log sheet, whether the two Z coordinate text fields are properly displayed:

5.1.3 Raw Z as above Mean Sea Level (MSL)

5.1.4 Z as an altitude above ground level (AGL) above or below datum

5.2 PROCEDURE FOR TECHNICAL EVALUATION OF CALLER'S FLOOR IDENTIFICATION IN BUILDING

5.2.1 Make a PSAP 'Fixed Call', from call location No. 21, floor 4 of the King County Parking Garage, using the General Procedure for PSAP caller & call-taker protocol.

5.2.2 The call taker shall indicate on the Call Log sheet the callers displayed and actual floor.

5.2.3 The call taker shall refresh and record the caller data as the caller moves to various locations on the floor.

5.2.4 Repeat this procedure from call location No. 22 (floor 4) and No. 23 (floor 6).

6.0 SPEED

Requirement: A text field in the map display will indicate caller's speed in miles per hour. (Note: Speed accuracy is not specified.)

6.1 PROCEDURE FOR TECHNICAL EVALUATION OF CALLER'S MOVEMENT SPEED

6.1.1 Make PSAP 'Moving Calls' using the General Procedure for PSAP caller & call-taker protocol.

6.1.2 The call taker shall indicate on the Call Log sheet, caller's displayed and actual speed.

7.0 DIRECTION OF TRAVEL

Requirement: A text field in the map display will indicate caller's Direction of Travel in '8-point' directionals (i.e., N, S, E, W, NW. etc.).

Note: Direction of Travel accuracy is not specified.

7.1 PROCEDURE FOR TECHNICAL EVALUATION OF CALLER'S DIRECTION OF TRAVEL

7.1.1 Make PSAP 'Moving Calls' using the General Procedure for PSAP caller & call-taker protocol.

7.1.2 The call taker shall indicate on the Call Log sheet the caller's displayed and actual 'direction of travel.

8.0 ALI DATABASE

Requirement: Caller location Lat./Lon. and calling party number will be appended to an Automatic Location Identification (ALI) database for use by the PSAP.

8.1 PROCEDURE FOR TECHNICAL EVALUATION OF LOCATION ENHANCED ALI DATABASE USAGE

8.1.1 Make PSAP calls using the General Procedure for PSAP caller & call-taker protocol.

8.1.2 The call taker shall indicate on the Call Log sheet whether the caller's Lat./Lon. and Calling Party Number is displayed in the ALI text field.

9.0 POSITRON INDUSTRIES, INC. E911 INTELLIGENT WORKSTATION

Requirement: Caller's ALI text and location map will be integrated and displayed on a Positron Power-911 Intelligent Workstation at each PSAP.

9.1 PROCEDURE FOR TECHNICAL EVALUATION OF ALI TEXT AND LOCATION MAP ON THE POSITRON E911 WORKSTATION

9.1.1 Make PSAP calls using the General Procedure for PSAP caller & call-taker protocol.

9.1.2 The call taker shall indicate on the Call Log sheet whether the ALI text and location map displayed on the Positron E911.

10.0 INITIAL INFORMATION DISPLAY (CALL SETUP)

Requirement: Average added time, from call initiation to display of initial ALI text information, due to location based call routing and GPS data processing, will not exceed two seconds.

10.1 PROCEDURE FOR TECHNICAL EVALUATION OF CALL SETUP TIME

Conduct this procedure at call location Nos. 20, 31, 34 and 79

10.1.1 Baseline Call Setup Time

10.1.1.1 Establish voice communications between PSAP call taker and caller outside the 911 phone network (i.e., each person has a separate wireless phone).

10.1.1.2 Make a direct PSAP call (the direct 10 digit PSAP project number), using a non-GPS Enabled GTE Wireless handset (so that location based call routing equipment is not invoked); Call taker measure the baseline setup time and record on the Call Record Sheet, using a stopwatch; Start timing when the caller simultaneously says and presses "send" on the calling handset; Stop timing when initial ALI text information is displayed at the PSAP.

10.1.1.3 Repeat the previous two steps ten times at this call location.

10.1.2 Routed And Map Displayed Call Setup Time

10.1.2.1 Establish voice communications between PSAP call taker and caller outside the 911 phone network (i.e., each person has a separate wireless phone).

10.1.2.2 Make a PSAP call using a GPS Enabled GTE Wireless handset (so that location based call routing equipment is invoked); Call taker measure the call setup time and record on the Call Record Sheet, using a stopwatch; Start timing when the caller simultaneously says and presses "send" on the calling handset; Stop timing when initial ALI text information and the caller location map is displayed at the PSAP.

10.1.2.3 Repeat the previous two steps ten times at this call location

11.0 INFORMATION REFRESH

Requirement: Information will be updated every 15 seconds (if desired by the call taker).

11.1 PROCEDURE FOR TECHNICAL EVALUATION OF INFORMATION REFRESH FUNCTION

11.1.1 Make PSAP calls using the General Procedure for PSAP caller & call-taker protocol.

11.1.2 The call taker shall activate the 'Refresh' button on the IDC workstation.

11.1.3 The call taker shall indicate on the Call Log sheet whether the refresh information (Location, Speed, movement direction, elevation) were received and displayed.

12.0 DISPLAY OF UPDATED INFORMATION

Requirement: Updated information will not displace initial call information.

12.1 PROCEDURE FOR TECHNICAL EVALUATION OF PROPER DISPLAY OF UPDATED INFORMATION

12.1.1 Make PSAP calls using the General Procedure for PSAP caller & call-taker protocol.

12.1.2 The call taker shall activate the 'Refresh' button on the IDC workstation.

12.1.3 The call taker shall indicate on the Call Log sheet whether the caller's initial location as well as the refresh information (location, speed, movement direction, and elevation) were received and displayed.

13.0 CALL ROUTING

Requirement: Trial calls will be routed based on latitude/longitude of original call (selective routing).

Note: All PSAP Calls using GTE Wireless handsets and wireless service will be dynamically routed based on the caller's initial location and the routing correctness will recorded.

Other participating wireless carriers will 'call forward' trial calls from their MSCs directly to a specified (caller dialed) PSAP. these calls will not be included in the call routing technical evaluation.

13.1 PROCEDURE FOR TECHNICAL EVALUATION OF CALL ROUTING

13.1.1 I-90 Overpass With 424th Ave. SE In North Bend

13.1.1.1 Initiate a PSAP 'Moving call' (press the "SEND" button) while driving Eastbound on I-90, approximately just as the automobile is passing over 424th Ave SE, using the General Procedure for PSAP caller & call-taker protocol.

13.1.1.2 The call taker shall indicate on the Call Log sheet whether the caller's initial actual location resulted in the correct call routing to the Washington State Patrol PSAP.

13.1.1.3 Repeat steps a) and b) while driving Westbound on I-90.

13.1.1.4 Proceed to call location 71, the first of a group of 8 call locations on 424th Ave. SE Passing under I-90.

13.1.1.5 Make separate PSAP 'Fixed Calls' call locations 71 and 78.

13.1.1.6 The call taker shall indicate on the Call Log sheet whether the caller's initial actual location resulted in the correct call routing, to the King County Sheriff PSAP.

13.1.2 I-90 Overpass With 72nd Ave. SE On Mercer Island

13.1.2.1 Initiate a PSAP 'Moving call' (press the "SEND" button) while driving Eastbound on I-90, approximately just as the automobile is passing over 424th Ave SE, using the General Procedure for PSAP caller & call-taker protocol.

13.1.2.2 The call taker shall indicate on the Call Log sheet whether the caller's initial actual location resulted in the correct call routing to the Washington State Patrol PSAP.

13.1.2.3 Repeat steps a) and b) while driving Westbound on I-90.

13.1.2.4 Proceed to call location 31, SE 22nd Street & 72nd Ave. SE, and make a PSAP 'Fixed Call'.

13.1.2.5 The call taker shall indicate on the Call Log sheet whether the caller's initial actual location resulted in the correct call routing, to the King County Sheriff PSAP.

13.1.2.6 Proceed to call location 36, 80th Ave. SE north of I 90 in "Park & Ride" lot, and make a PSAP 'Fixed Call'.

13.1.2.7 The call taker shall indicate on the Call Log sheet whether the caller's initial actual location resulted in the correct call routing, to the King County Sheriff PSAP.

14.0 NETWORK INFRASTRUCTURE

Requirement: Voice and data will be routed on the existing E-911 network, through existing E-911 telephone and PSAP equipment.

14.1 PROCEDURE FOR TECHNICAL EVALUATION OF USE OF EXISTING NETWORK INFRASTRUCTURE

14.1.1 Install network circuit monitoring equipment, provided by a traditional supplier in the telephone community, at each PSAP and at the call routing point.

14.1.2 Continuously monitor and record the existing network circuits for indications that the data path being used for the technical evaluation uses these network circuits and that the added signaling has no effect on the normal performance of these circuits.