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July 2, 1999

**EX PARTE**

Magalie Roman Salas
Secretary
Federal Communications Commission
Portals II, 445 12th Street, S.W.
Washington, D.C. 20554

Re: Revision of the Commission's Rules to Ensure Compatibility with Enhanced 9-1-1 Emergency Calling Systems, CC Docket No. 94-102
**Written Ex Parte Presentation**

Dear Ms. Salas:

TruePosition, Inc. ("TruePosition"), by its attorneys, hereby submits this *ex parte* presentation in the above-referenced proceeding to address two issues. First, attached as Exhibit A is a written summary of the oral presentation given by Lou Stilp, Executive Vice President of TruePosition, at the Commission's June 28, 1999 technology forum. Second, this letter responds to the June 1, 1999 and June 25, 1999 filings by SnapTrack, Inc. ("SnapTrack") regarding the apparent state of SnapTrack's GPS-based automatic location information ("ALI") technology. In its December 24 Public Notice the Wireless Telecommunications Bureau ("Bureau") requested information on the accuracy and reliability of alternative ALI technologies. It specifically requested "field test results of such technologies." Since SnapTrack's description of its test results incorrectly implies that such testing confirms the reliability and accuracy of integrated GPS-equipped handsets, TruePosition submits this response to ensure that the Bureau has an accurate record on which to consider the pending waiver requests.

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List A B C D E

SnapTrack has only recently divulged to the public that it had previously shown the Commission staff what SnapTrack purports is an integrated GPS phone.[1] Similarly, at the June 28 technology forum Walter Bell, representing SnapTrack, referred to several volumes of detailed reports of the company's recent tests in Tampa that had been "made available" to Commission staff, but these reports are not in the public record. Of course, TruePosition can respond only to what *is* in the public record, namely SnapTrack's June 1 and June 25 depictions of the company's Tampa trial results. And, after careful examination of the public filings and SnapTrack's presentation at the June 28 forum, the only conclusion one can draw is that, when stripped of all its camouflage and fanfare, SnapTrack's data demonstrates *absolutely nothing* regarding the performance criteria of integrated GPS-enabled handsets. In fact, the results attached to SnapTrack's June 1 filing discuss only the best results produced by the test phones using external antennas and no results for phones using an internal antenna.[2]

Even after more than five years of development and claiming 11 issued patents and having as many as 20 more pending, SnapTrack has not demonstrated the successful testing of a fully integrated, GPS-enabled wireless handset. SnapTrack's Denver trial used a hockey-puck sized GPS antenna to provide its system with sufficient gain. SnapTrack finally concedes that its Denver test did not involve an integrated handset,[3] thus whittling the record of its purportedly successful GPS-integrated handset demonstrations down to its Tampa trials.

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1 In its June 1 filing, SnapTrack states that "a prototype of the integrated GPS phone (with internal patch antenna) used in testing was shown to the Wireless Bureau and Chairman Kennard in April 1999." SnapTrack Ex Parte filed June 1, 1999, at 7-8 (hereinafter "June 1 Ex Parte").

2 See Exhibit B hereto. Exhibit B reviews the slides that were attached as Exhibit E of SnapTrack's June 1 filing and exposes the SnapTrack-selected results as little more than a demonstration that one can locate cellular users by attaching external GPS antennas to their cellular phones.

3 June 1 Ex Parte at 7.

To begin with, SnapTrack used two phones for the Tampa trials to compare to the stand-alone SnapTrack receiver, (1) an 800 MHz Motorola StarTac with a SnapTrack GPS module appended to the back of the phone, or "mechanically integrated," and (2) a 1900 MHz Samsung handset that was not mechanically integrated.[4] SnapTrack has not disclosed the capabilities of its "alpha prototype" integrated handset.[5] Some of the limitations of integration, however, are clear. At the recent NENA conference SnapTrack admitted that it can achieve only a 14 dB gain over traditional GPS receivers (-152 dBm for SnapTrack vs. -138 dBm for traditional GPS receivers).[6] This is significantly worse than the 20 to 24 dB gain SnapTrack suggested to the FCC last fall and reiterated by Mr. Bell at the June 28 technology forum. According to the Tampa test results, when a handset with an antenna is used 8 dB of that gain is lost (although no accuracy or yield results are discussed for such testing).[7] This leaves a margin of only 6 dB, which is less than that required for window or wall penetration in buildings or vehicles.

SnapTrack claims that in Tampa it successfully tested at both 800 MHz and 1900 MHz,[8] which is also misleading. Even by SnapTrack's own admission, the 1900 MHz phone lacked internal GPS integration, thus actual interference between the wireless network transmission and the GPS transmission was not measured. In any event, all of the connections between the phones and the

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4 Id. at Exhibit E, p. 3, slide 6.

5 TruePosition and others can only assume that the large phone displayed briefly by Mr. Bell at the June 28 technology forum was the same phone, or at least the same type of phone, that constituted the "mechanically integrated" phone during the Tampa tests. The phone displayed at the forum was a Motorola StarTac with an attached appendage that appeared at least as big as the phone itself. The GPS antenna and circuitry was still not integrated into the phone.

6 See infra p. 5, n.14.

7 June 1 Ex Parte at Exhibit E, p. 4, slide 7.

8 June 1 Ex Parte at Exhibit E, p. 3, slide 5.

SnapTrack Server were over a standard IS-99 circuit switched data call. Therefore, the connection was dedicated and always "up." In a real phone call, additional delays and loss of reliability will be encountered during normal call set-up. SnapTrack claims that the "Tampa trial in no way means that voice communication is not possible."[9] Nevertheless, the failure to maintain a voice connection, whatever the excuse SnapTrack gives for such failure,[10] simply belies this claim. Simply stated, SnapTrack has provided test results only for CDMA trials and "CDMA does not yet commercially support integrated voice and messaging."[11] Of course, network-based systems have no such messaging limitation with CDMA networks.

SnapTrack also disguised the level of antenna "integration" it actually tested in Tampa. Its own filing indicates that SnapTrack conducted at least 90% of the tests with external antennas and has never publicly disclosed the results of the few tests conducted with "internal patch" antennas.[12] Indeed, a careful review of the June 1 filing's Exhibit E reveals that *none* of the results described from the approximately 20 tests selectively depicted on the slides reflect testing of the internal patch antenna. The exhibit's narrative also fails to discuss the poorest of the test results, *i.e.*, the data points that reflect yield rates below 80% or accuracy levels exceeding 50-75 meters. It is reasonable to conclude, therefore, that the internal patch antenna produced such poor yield and accuracy levels.

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9 Id.

10 SnapTrack Ex Parte, filed June 25, 1999, at 2 (hereinafter "June 25 Ex Parte").

11 Id.

12 See Exhibit B hereto. Even at the June 28 forum SnapTrack's representatives did not dispute TruePosition's statement that 90% of the tests involved phones with external antennas.

Specifically, SnapTrack's testing involved four antennas different antennas.[13] Three were external: "M/A-COM" (also known as the "Reference"), "External Patch," "External Helix" (also known as "Symmetricom"). Only one was internal: "Internal Patch." There was an 8 dB difference in sensitivity between the Reference and the Internal Patch. This is a significant loss given that SnapTrack achieves processing gains of only 14 dB over standard GPS.[14] The Internal Patch was used only on the Motorola StarTac – which is a clamshell type of flip phone and one of the few phones where the user's hand does not cover the flip while talking. Testing this phone conveniently avoids the loss that a user's hand would cause with most other phones. The other antennas were mounted on the phone, but "tuned for user positions against their heads, *while most tests did not have the head blockage.*"[15] Only *four* of the test scenarios compared antennas by the head.[16] According to a Motorola antenna analysis, head blockage can cause 3 to 6 dB of loss versus free space.[17] Because the Samsung phone was not mechanically integrated with the

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13 June 1 Ex Parte, Exhibit E, p. 3, slide 5.

14 On June 15, 1999 at the annual NENA Conference in Charlotte, Carlton Peyton, Vice President of SnapTrack, claimed that the company's proprietary enhancements could achieve only a 14 dB gain over traditional GPS antennas. Similarly, at the April 13, 1999 IEEE Emerging Technology Conference in Dallas, Thomas Wrappe, also a Vice President of SnapTrack, claimed that the company could achieve only a 17 dB gain over traditional GPS antennas.

15 June 1 Ex Parte, Exhibit E, p. 3, slide 6.

16 Id.

17 See Motorola, Inc., "GPS Antenna Handset Integration Issues for Assisted GPS Positioning Method," T1P1.5/98-348 at 4, tbl. 2 (July 22, 1998). Motorola conducted an analysis of internal antennas last summer for the T1P1.5 standards group and concluded that internal antennas will cause losses on the order of magnitude of the processing gains achieved by the enhanced GPS techniques. Id. at 6. Ericsson concurred. See Scott Bloebaum of Ericsson, Inc., "Comments on Motorola Contribution T1P1.5/98-348,"

(continued...)

SnapTrack GPS receiver, all of the Samsung testing used only two of the external antennas.

Regarding its depiction of the Tampa trials, SnapTrack uses statistics and selective reporting to embellish its data. For instance, SnapTrack makes the misleading statement that "[w]here the yield is over 80%, FCC accuracy criterion is met."[18] The FCC accuracy criterion requires that *all* calls be located to a certain level of accuracy, the 125 meters RMS standard.[19] Under the Commission reliability standard, yield – which means the number of calls located per location attempt – must be 100%. The data presented in the June 1 filing shows that only 52 of the 88 dots (about 59%) were at or near 100% yield. In fact 22 of the 88 dots (25%) are below 80% yield, and 29 of the 88 dots (33%) are below 90% yield. Most significantly, however, none of the high yield results involved the testing of the mechanically integrated handset.[20]

Moreover, as for the accuracy standard, SnapTrack presents its results in terms of "Sigma Accuracy." With sigma, or standard deviation, the results are based on how close 67% of only those attempts that yielded a location came to some

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17 (...continued)
T1P1.5/98-397 at 4, 6 (August 17, 1998). Although SnapTrack contended at the June 28 technology forum that these studies have been refuted, it offered no cites for such claims. Indeed, even in the conclusion slides of the recent Tampa tests, Motorola *again* reiterated that the "small handset-sized antennas' performance was comparable to the larger GPS reference antennas, ONLY under "Open Sky' conditions," and that " 'solutions with handset-sized antennas will not be able to match larger sized GPS antennas' for in-building." June 1 Ex Parte at Exhibit E, p. 17, slide 33.

18 Id. at Exhibit E, p. 19, slide 37.

19 In re Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems, Memorandum Opinion and Order, 12 FCC Rcd 22665, at ¶¶125-26 (1997).

20 See Exhibit B hereto.

standard of comparison. For instance, where SnapTrack claims an 80% yield, assuming 100 location attempts, SnapTrack in fact found a location only 80 times, and of those, only about 67%, or 54, were within 125 meters of the standard of comparison used by SnapTrack, presumably the actual location. Assuming SnapTrack in fact is using these statistical terms in their ordinary meaning, then where the yield reached 80%, only 54 out of 100 calls – not the 80 calls implied by SnapTrack – were located to within 125 meters. These results should be a point of serious concern for the Commission.

Other shortcomings of SnapTrack's technology, as reflected by the Tampa test results submitted as part of the June 1 filing, include:

- Even if it could locate an actual voice call, SnapTrack could cut off a 9-1-1 caller while it is communicating with the dispatcher. During the Tampa trial, SnapTrack turned the wireless phone transmitter off when stabilizing its oscillator and collecting GPS signals. On a normal dial-up call, such as to 9-1-1, this is a very dangerous practice with a significant likelihood of a call drop occurring. Further, if SnapTrack proposes to provide location update during a call, then the phone will be repeatedly shut off during the 9-1-1 call, further increasing the risk of a call drop.

- In its June 25 ex parte, SnapTrack finally admitted that the time required for it to get a location fix is between 6 and 16 seconds (even though it had issued a press release April 12 claiming that its "innovative EGPS generally locates callers *within 2-3 seconds*"[21]). Thus, SnapTrack cannot meet one of the central tenets of enhanced 9-1-1, and one of the critical requirements identified by Public Safety, TIA, PCIA, and the Commission in 1994: location within 2 to 4 seconds from when the caller presses "9-1-1- SEND" in order to enable selective routing of the call to the appropriate PSAP based on the location data and the forwarding of such information to the PSAP at the time of call origination, which is the only time PSAPs can currently receive

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[21] See "SnapTrack Registers Pinpoint Accuracy in Florida Trials," dated April 12, 1999, at 2 (emphasis added) (attached as Exhibit C hereto).

location data.[22] SnapTrack blames an additional four-second delay on "system diagnostics and the prototype nature of the system," which is simply technical double talk. (In fact, eyewitnesses of the Tampa testing saw many location attempts take over 20 seconds.) There is no basis for SnapTrack's assumption that if SnapTrack can move from alpha prototype to full integration of handset and GPS technology, which would make the GPS signal even more difficult to access, these time-to-locate problems would go away.

- SnapTrack's technology works only with CDMA systems. The GPS receiver relies on the CDMA carrier as a reference frequency to calibrate its oscillator.[23] This is only available for a CDMA system where all of the base stations must be time- and frequency-synchronized (coincidentally through GPS signals). AMPS, TDMA and GSM networks do not have synchronized base stations, and SnapTrack has previously publicly stated that its technology cannot work in these types of networks.[24] Indeed, without a reference signal for calibration, SnapTrack is very likely to lose some or most of its processing gain over a standard GPS receiver. Although at the June 28 technology forum SnapTrack claimed it could work with these other air interfaces, it offered no explanation on how it would overcome the lack of GPS timing to calibrate its oscillator. Absent verifiable test results, unspecified claims that its technology is being developed here or in other countries hardly constitutes evidence that it has overcome these problems.

Finally, instead of providing an estimate of the actual retail cost of its system to end users for the record, SnapTrack again avoids the issue and "simply

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22 See TR 45/94.08.23.11, "TR45 Joint Experts Meeting Report on Emergency Services," at 6.

23 June 1 Ex Parte at Exhibit E, page 3, slide 6.

24 At an April 13 IEEE conference, SnapTrack Vice President Thomas Wrappe publicly conceded that SnapTrack had tested its technology only with CDMA wireless systems because TDMA, GSM and AMPS system base stations lack the timing function necessary for its system to work. SnapTrack offered no solution for this deficiency.

responds that if it is not cost-competitive, it will lose in the marketplace."[25] A consumer who subscribes to wireless service, however, will ultimately pay the cost of the technology, yet has no choice as to which technology a carrier implements. Therefore, it is disingenuous for SnapTrack to suggest that its technology will have to cost less than network-based solutions for SnapTrack to compete. Since most subscribers do not purchase their wireless phones from carriers, carriers can have the costs of handset solutions deferred to subscribers without having to front-load those costs themselves. Thus, subscribers, the ultimate bearers of the costs, will have no say whatsoever in the choice of ALI solutions. To the extent handset-based ALI vendors repeatedly refuse to provide data on costs and methods of cost recovery, the only reasonable conclusions are either that they truly cannot predict such costs or the cost data are too dangerous to their cause for them to release.

This review of SnapTrack's depictions of its own technology trials illustrates the flaw in basing rulemaking decisions on a selective disclosure of test results. Unlike TruePosition's ongoing technology forums in the Houston and Philadelphia cellular markets, through which the Commission and others can view the real-time location of real wireless phones, incomplete disclosures like those contained in SnapTrack's June 1 and June 25 filings illustrate why bad facts will make bad law. At the June 28 technology forum the handset-based ALI developers suggested – as SnapTrack did in its June 25 filing – that answers to all of the nagging problems in their technologies are around the corner due to "planned software enhancements,"[26] antenna sensitivity improvements that they are "expected to develop,"[27] or other unspecified and/or undeveloped solutions.

TruePosition does not doubt that SnapTrack and other handset-based ALI vendors are working hard to develop their technologies. The plain truth, however, is that after many years of attempts all they have to show are promises of future enhancements that will cure the widely known problems posed by trying to get GPS signals to penetrate buildings, foliage, plastic phone casings and even the

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[25] Id. at 8.

[26] June 25 Ex Parte at 2.

[27] June 25 Ex Parte at 3.

human body. Some day they may overcome these problems. But to delay implementation of the ALI rules until it is clear whether and how they can do so will seriously jeopardize public safety.

Respectfully submitted,

TRUEPOSITION, INC.

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TruePosition®
Wireless Location System



# PRESENTATION OF TRUEPOSITION, INC.
# BY LOU STILP, EXECUTIVE VICE PRESIDENT

## FCC TECHNOLOGY FORUM
## June 28, 1999

TruePosition®
Wireless Location System

FCC Technology Forum
June 28, 1999

TruePosition uses a network-based system relying on TDOA and Pathfinder technology

- The technology is compatible with all air interfaces: AMPS, TDMA, CDMA, GSM, iDEN
- Capable of meeting current FCC RMS, WEIAD 67%, and 90 meters CEP accuracy standards
- Does not require FCC rule modifications for compliance

TruePosition®
Wireless Location System

FCC Technology Forum
June 28, 1999

TruePosition has extensive experience in wireless locations systems

- Over $60 million and 300 man-years invested in technology, trials, development

- The TruePosition Wireless Location System is currently installed on almost 200 cell sites These sites include:

  - Urban, suburban and rural areas as well as waterways
  - Both AMPS/TDMA

- TruePosition has a joint development and marketing agreement with Ericsson Systems

TruePosition®
Wireless Location System



Separate rhetoric from reality

- TruePosition has had a "technology forum" running for a year
- FCC staff can come to Houston and Philadelphia and witness a real system locating real cellular calls
- In contrast, SnapTrack and other handset ALI vendors have not successfully integrated their technology into a phone
- Use a stopwatch – time the systems. Can they perform locate within 2-4 seconds of when the caller presses "9-1-1" send? Who works with selective routers *now*?
- Conduct their own poll of the American public – do they want ALI now or in 10 years?

TruePosition®
Wireless Location System



Current status

- AMPS system in operation since 1997
- TDMA system in operation since February 1999
- CDMA system about to go from lab to field within weeks
  - No requirement to power up phone
  - 30 dB gain from storing signal/station based processing

Accuracy of system

- Passed Greater Harris County 9-1-1 Network (wide-area PSAP) testing under a commercial contract with GHC
  - Delivering 9-1-1 location records to SignalSoft/SCC Phase I system
  - Delivering 9-1-1 records into PSAP is a contractual issue (between GHC and carrier) and not a technology issue; TruePosition can do so now
- Coverage is limited to the rollout plan agreed to by GHC and carrier
  - 1st stage of deployment is AMPS on 70 cell sites
  - AMPS/TDMA chassis ready to ship
- Scheduled to deploy CDMA location system later this year under GHC's contracts with TruePosition and other Houston cellular carrier

- Over 1 million calls in Houston on the system since turn-on in early February 1999
  - >67% of calls located within 85 meters (280 feet)
  - >36% of calls located within 30 meters (100 feet)
  - >22% of calls located within 15 meters (50 feet)
- Philadelphia system has had another 4 to 5 million calls since January 1977
  - TruePosition's location systems have located almost 500,000 separate MINs from almost every state in the U.S.
- Demonstrating live 911 location records from both Houston and Philadelphia on display here in Commission Meeting Room

Accuracy Determinants

- TruePosition's accuracy is based on a single control channel burst
  - 100 mili-seconds (ms) for AMPS, 20 ms for TDMA, 160 ms for CDMA
  - Location calculated within 2 to 4 seconds of "9-1-1 SEND" (Time is tissue)
  - No requirement for standards development, can locate all existing phones

- Voice channel access will allow integration of up to several seconds
  - Integration gain means more accuracy
  - Far more integration capacity on a controllable signal (phone) than GPS

- Voice channel location – repeat location for 9-1-1 calls that require the most accuracy
  - Clustering occurs around the caller's true position
  - Predicting accuracy yield @ 67% in the 100 to 200 foot range

## Rural Solutions

- Problem in context:
  - One carrier at a time, >90% of cell sites have 2 additional cells within 10 to 15 miles
  - One carrier at a time, >95% of cell sites have 1 additional cell within 20 miles
  - Multiple carrier/towers, >98% of cell sites have 2 other towers within 20 miles
- Solution is straightforward – apply multiple technologies to the rural problem
  - Apply creative solutions from multiple vendors
  - For example, combine TDOA / AOA , tower sharing
- TruePosition continues to operate in rural New Jersey (part of Philadelphia cellular system) without location problems – cell site spacing is between 15 and 20 miles

Network solutions are cheaper than handset solutions

- Network solutions are not the least bit dependent upon the future of handset churn predictions
  - Therefore, the cost of handset solutions are dependent on fluctuations in demand for handsets and ALI handsets specifically, manufacturing volume, distribution channels

- What is certain – in the future the number of subscribers per cell will continuously increase
  - This is the very reason for TDMA and CDMA creation
  - The industry is currently at about 1100 subs/cell → >1500 subs/cell by 2003
  - Most cellular markets are currently at about 1700 subs/cell → >2300 subs/cell by 2003

- The average cost per subscriber will therefore drop as the number of subscribers per cell site increases

- TruePosition as example: 25 to 40 cents/sub

- SnapTrack as example (handset + network + royalty): $0.45 to $1.00/sub
  - Churn is a two-edged sword: The more churn, the more carriers must spend on handset subsidies
  - SnapTrack has projected $150 million in license/royalty in 2003 and growing

TruePosition®
Wireless Location System

FCC Technology Forum
June 28, 1999

Comments on GPS/Handset Technologies

- After 5 years it's worth reflecting on the state of technology development
- We should evaluate proposed handset-based solutions vs. end-user requirements established and well documented 5 years ago by PSAPs, FCC, TIA, PCIA
  - Technical needs haven't changed, call volume pressure on PSAPs has grown
- Hundreds of cell sites with network systems from multiple vendors
  - TruePosition alone can locate hundreds of thousands of phones per day
  - TruePosition has been locating live 9-1-1 callers since 1997
- But not a single deliverable EGPS handset exists

There are numerous conditions and qualifications before EGPS can work

- IF the internal antenna issue can be solved
  - All of Denver tests used hockey-puck antennas. 90% of Tampa used external antennas.
  - The public record contains NO discussion of the performance of the phone tested in Tampa with the "mechanically integrated" internal antenna
  - Tampa conclusion is still internal antennas ONLY under open-sky

- IF a sufficient sensitivity gain can be achieved
  - Started at 24 dB last fall and now down to 14 dB
  - Even Tampa showed they lose minimum 8 dB of the 14 dB with internal antennas

- IF the interference problem (cell phone transmitting into GPS antenna) can be resolved
  - According to eyewitness accounts from the Tampa tests and SnapTrack's June 1 FCC filing regarding same, SnapTrack had to turn off the wireless phone, and therefore risk the call dropping (if there had been a voice connection) to avoid GPS signal interference

There are numerous conditions and qualifications before EGPS can work (cont.)

- IF SnapTrack's assisted GPS technology can be made to work with AMPS and TDMA and GSM
  - Only CDMA has timing/frequency stability to aid EGPS
  - What do we do with the other 85% of the phones out there?
  - 12 million analog phones sold just last year

- IF standards bodies can reconcile all of the approaches and solve the roaming problem
  - SnapTrack, SiRF, Qualcomm, Lucent, IDC, Aerial and others all have different handset-based ALI approaches that must be perfected before the standardization process can conform them all

- IF they can produce acceptable yield
  - 1/3 of Tampa tests have less than 90% yield
  - 1/4 of Tampa tests have less than 80% yield
  - Yields would be worse if 1400 of 9000 locations weren't "open-sky" and 90% weren't using external antenna

There are numerous conditions and qualifications before EGPS can work (cont.)

- IF location can be calculated fast enough for E9-1-1 selective routers
  - SnapTrack press release says location took 2 to 3 seconds in Tampa tests
  - SnapTrack told CDG, IEEE, NENA (have on audio tape) reality is 8 to 12 seconds
  - SnapTrack recently told FCC it takes 6-16 seconds plus 4 more seconds for "system diagnostics"
  - Eyewitnesses in Tampa saw 20 to 25 seconds
  - PSAP routers require 2 to 3 seconds

- IF consumers choose to churn their handsets fast enough
  - Studies are all over the map. Are we willing to bet lives on them?
  - Churn is not uniform; the entire subscriber base will not change out because many wireless users retain phones for longer periods

- IF the industry is willing to deal with the 30 patents filed by SnapTrack
  - $150 million per year in royalties
  - You don't get there at pennies per handset

There are numerous conditions and qualifications before EGPS can work (cont.)

- IF the American public is willing to wait another 8 to 10 years to get the service

- IF handset manufacturers are willing to commit to make ONLY EGPS handsets
  - No manufacturer has committed to the FCC on:
    - Costs figures
    - Availability of the first one, let alone the next tens of millions
    - Willingness to drop ALL other lines of phones
    - Reliability in all conditions

- IF wireless carriers are willing to sell ONLY EGPS handsets
  - Recent filings say NO, even for those who adopt handset-based ALI solutions
  - Carriers that deploy network-based solutions will not want to subsidize higher priced ALI-enabled phones