

significant liability issues for mobile carriers.  
(26)

- There is no prospect that call prioritization could be deployed within one year after release of the Order. (26-27)
- The Commission should direct the industry to examine the issues raised by call prioritization and report back on whether implementation of such a scheme produces net benefits. (27)

Provision of location information

- Disagrees with the Commission's three-step approach.
  - Stage 1 proposal should not be adopted because base station identification provides overbroad and inaccurate information. Moreover, under current technology, the provision of base station identification precludes transmission of the MIN, which is more valuable to PSAP providers. (30)
  - State 2 proposal should not be adopted because it would compel wireless service providers, LECs and PSAP providers to invest in expensive and inaccurate technology that will have no utility once Stage 3 technology is available. (30)
  - Stage 3. Although AT&T shares the Commission's goal of deploying ALI capabilities, portions of the technology is in the earliest stages of development and there is no consensus national standard. There is no prospect of delivering accurate elevation data in the near term and the potential accuracy of elevation location technologies will vary with the architecture of the wireless systems. Thus mandatory, universal elevation requirement can not be justified. (32-33)
- The technologies referenced in the Notice (Global Positioning System, Time Difference of Arrival, Angle of Arrival, Received Signal Strength, CDMA Synchronization, KSI's Direction Finding Localization System) suffer form serious shortcomings. (33-35)

### Re-ring/call-back

- The provision of call-back information represents the most logical and achievable interim approach to compatibility. However, there are technical difficulties in implementing the call-back proposal. (27-28)
  - Delivery of ANI information to the PSAP is difficult because the required signalling format is not supported throughout the emergency services network. (28)
  - The mobile system would need to be able to override subscriber instructions to block incoming calls or direct calls to voice mail. (28)
  - Under current technology, cellular companies can send either seven digits of the MIN plus an information digit or the cell site location, but not both. (28)
- The Commission should set a three year target date and direct the industry to report periodically on its progress toward achieving compatibility. (29)

### Common channel signalling

- The Commission should avoid confusing "common channel signalling," which is an architecture, and "Signalling System 7," which is a protocol. (37)
- Send and receive protocols will need to be defined and developed. AT&T does not know whether the necessary upgrades to PSAPs and standards development can be accomplished within the three-year time frame proposed by the Commission. (37)
- Industry groups should determine what information should be provided. Some of the requested information, such as location of call origination, will not be available within three years, and some of the information will not be supplied by the wireless service provider. (37-38)

### Access by Text Telephone Devices

- The TTY requirement can be met from the standpoint of the wireless service provider. The implementation issue rests with the LEC and the

PSAP and whether they can accept the data transmitted by the TTY. (39)

#### Labelling

- Mandatory labelling requirement will create confusion and may deter subscribers from dialing 911. Customer education can better be accomplished through instruction manuals, service contracts, and bill inserts. (40)

#### Funding

- Wireless service providers should not be required to indemnify LECs and PSAP providers for their costs of assuring compatibility and they should not bear the costs of implementing 911 service in areas where it is not currently available to landline customers. (42)
- The Commission and the states should develop a cooperative funding mechanism. Deployment of technology to assure compatibility should not be a cost of business, but should be funded through tax revenues, occasionally supplemented with subscriber surcharges. (43)
- The Commission should initiate a further proceeding to address the funding issues. (42)

#### **Other Issues:**

##### Liability

- Wireless service providers should not face liability for violating privacy interests when transmitting identifying information or for giving important calls lower priority. (40-41)

##### Preemption

- State regulation of wireless compatibility with E911 systems should be preempted. Moreover, the Commission should preempt state or local zoning restrictions that would interfere with the deployment of location technologies at cell sites. (41-42)

Other

- To maximize compatibility, significant technical developments will be needed in each network or service element. To accommodate the necessary changes, manufacturers, LECs and PSAP providers will need to reach consensus on interfaces, transmission standards, and other technical matters. These standards should be developed by industry bodies rather than the agency. (23-24)

**BELL ATLANTIC**

**Interest:** LEC, cellular carrier.

**PBX-Related Issues:**

Ability of PBX to pass calling number and location identifier.

- Although the proposed rules mandate the use of 10 digit ANI, some PSAPs can only process 7 digit ANI. Therefore the rules should either allow for the delivery of 7 digit ANI, or mandate that PSAPs upgrade their equipment. (7)

Attendant notification.

- Because some states explicitly prohibit three way 911 calls, the proposed rule should allow the PSAP or caller to inform in-house security on a separate line, after help has been summoned. (6)

PBX owner's obligation to update LEC.

- Supports the obligation of PBX owner to provide LEC with ALI and ANI for each PBX station. However, would additionally specify that PBX owners are responsible for creating the initial records in NENA format, delivering them to the LEC and updating them when changes occur. (2-3)
- The rules should require that the administrators of hospitals, military bases and universities provide updated ANI and ALI to the LEC, whether or not the facility in question utilizes PBXs. (6-7)

Need for standard data link interface.

- Requests that the Commission leave data transmission standards to voluntary industry consensus. If, however, the Commission does adopt data standards, suggests that they adopt the NENA standards. (5-6)

P.01 grade of service.

- Rather than require a certain number of dedicated 911 trunks, the FCC should set performance standards, which PBX owners and LECs can meet with the most efficient technological solution, which might change as technology evolves. (4-5)

- Prior to the FCC's mandating common channel signalling for 911 services, industry bodies need to determine whether SS7 is an appropriate standard. (7)

Funding.

- LECs should be able to recover the costs of storing and updating PBX ALI and ANI information through increased 911 tariffs. (3)

Other.

- All entities providing wireline local telephone service, including cable companies and competitive access providers, should have to meet the same E911 service obligations. (6)

**Wireless-Related Issues:**

General.

- Wireless users differ from wireline users in that they are often mobile, often calling to report another person's accident and often call in groups to report a single incident. Because of these unique characteristics, the FCC should allow the wireless and emergency services communities to work out solutions to their E911 problems. (8-9)

Scope of requirement (covered and excluded services).

- Agrees with Commission's definition of covered services. (8)

Need to press SEND.

- Believes that 9-1-1 SEND should be the standard dialing pattern. (8)

Availability of 911 to service-initialized handsets.

- Wireless 911 service should be available to all service-initialized users and subscribed-to roamers. (8)

911 call priority/provision of location information.

- Because neither wireless call priority nor wireless ALI is currently technologically achievable, the Commission should permit the wireless and emergency services industries to continue their joint efforts

towards developing and implementing these features, and periodically request progress reports. (9-11)

- The JEM Report recommends an "evolutionary path" to technical solutions. (10)
- Premature compliance deadlines might lead to the deployment of technologies whose costs outweighs its benefits or "dead end" technologies. (10-11)

#### Funding.

- Requests a future rulemaking in which the Commission develops a method to fully compensate wireless carriers for the costs they incur in providing E911 service. This compensation method must work in a competitively neutral fashion. (12)

#### **Other Issues:**

##### Privacy.

- Because the transmission of location information implicates privacy issues (i.e. the user might consider himself "under surveillance"), privacy issues should be addressed in a future rulemaking. (11)

##### Liability.

- Requests that 911 database providers and LECs be indemnified and held harmless for the provision of erroneous information to emergency systems resulting from erroneous information provided by the PBX owner. (3)
- Requests that wireless service providers be given immunity from liability in connection with the delivery of 911 calls, but would defer this liability issue until a future rulemaking. (11)

**BELLSOUTH, BELLSOUTH TELECOMMUNICATIONS, BELLSOUTH  
ENTERPRISES & BELLSOUTH CELLULAR**

**Interest:** LEC, cellular carrier.

**PBX-Related Issues:**

General.

- BellSouth urges the FCC to identify the magnitude of the PBX/E911 compatibility problem prior to promulgating rules which address this problem. Further, in promulgating rules, BellSouth urges the Commission to avail itself of the efforts of industry groups to set appropriate standards. (4-5)

Ability of PBX to pass calling number and location identifier.

- Because of the significant costs which will be incurred by customers in upgrading their equipment and maintaining their databases, and LECs in maintaining and updating their databases, PBX ALI requirements should be limited to PBXs serving multiple geographic locations or a large number of stations. (5-7)
- As an alternative to the Commission's mandatory requirements, BellSouth suggests that PBX owners be given the option of purchasing PBX ALI services from their LEC. (7-8)

PBX owner's obligation to update LEC.

- In order to maintain the integrity and confidentiality of the 911 database, PBX users should not have access to this data. (10)

Need for standard data link interface.

- Rather than simply adopting the NENA standard, a task force of affected entities should be convened to develop ALI database standards. These entities should bear in mind that the standards must be flexible enough to accommodate both large and small databases. (8-9, 10)

Other.

- Because the proposed rules will not require an additional DID number for each PBX station, the

rules should have a minimal impact on the NANP.  
(9)

- Because of the technological difficulties involved, the FCC should not require the passing of ALI from wireless PBXs. (11)

#### **Wireless-Related Issues:**

##### General.

- Because numerous technological hurdles must be cleared before wireless E911 can be implemented, if the Commission sets compliance deadlines at this point, it will likely force the industry into implementing interim "throw-away" technologies. Instead, the Commission should build on the PCIA JEM Report and allow all affected entities to jointly develop standards. (11-13)

##### Scope of requirement (covered and excluded services).

- Agrees that all real-time voice services provided on the public switched network should be capable of providing access to emergency services. (11)

##### Availability of 911 to service-initialized handsets.

- Supports requiring 911 service to be provided to all service initialized mobile handsets. However, BellSouth wishes the Commission to clarify that this requirement does not encompass non-service areas, locked phones, dead spots or areas where wireline 911 service is not available. (13-14)

##### 911 call priority.

- BellSouth suggests that wireless 911 call priority requirements are premature because mobile call queuing has yet to be implemented, prioritizing 911 calls might "bump" important non-911 calls (e.g. calls to poison control centers), and changes will have to be made to the handset, wireless system, LEC and PSAP in order to implement this feature. (18-19)

-- Therefore, prior to requiring wireless 911 call priority, the Commission should allow all affected entities to meet and develop a list of priorities and implementation strategies.  
(19)

Provision of location information.

- The requirement that wireless carriers provide 125 meter location data within 5 years is not technically feasible because prior to meeting this requirement, the wireless providers, LECs and PSAPs must select a location technology that can be deployed across diverse wireless systems, develop protocols for transmitting and receiving location data, develop data verification systems, and manufacture and deploy the necessary technology. (14-16)
- Instead of the Commission's proposed requirements, BellSouth suggests that wireless providers be required to route 911 calls to the PSAP nearest the receiving base station within 2 years.
- In order to develop wireless ALI standards beyond routing to the nearest PSAP, BellSouth suggests that all affected entities meet and develop these standards cooperatively. (16-17)

Re-ring/call-back.

- Numerous technological obstacles exist to the implementation of re-ring/call-back, including increasing the number of digits a PSAP can process, developing a method of directly re-dialing roamers, and developing the ability to override user-selected features such as call forwarding and voice mail. (17-18)
- Re-ring/call-back should be implemented in the same fashion as ALI. That is, the Commission should establish flexible goals while permitting the continuation of industry-wide developmental efforts. (18)

Funding.

- Once decisions on capabilities, time frames and the role of each participant have been reached, the FCC should initiate a separate rulemaking addressing funding. (20-21)

Other.

- Because wireless 911 service is dependant upon a number of links, some of which are beyond the control of the wireless provider, federal grade of

service standards are unwarranted at this time.  
(14)

**Other Issues:**

Privacy.

- Agrees that special measures need not be taken to protect the privacy of 911 callers. (19)

Liability.

- Requests that wireless and wireline carriers be held harmless for the provision of information to emergency systems. (20)

Preemption.

- Supports preemption. (20)

**BEXAR METRO 9-1-1 NETWORK DISTRICT**

**Interest:** Governmental entity which implements and administers 911 service in the counties of Bexar, Comal, Guadalupe, and Medina, TX.

**Other Issues:**

- Fully concurs with the comments of the Texas Advisory Commission On State Emergency Communications. (1)

**C.J. DRISCOLL & ASSOCIATES**

**Interest:** Author of the Survey of Location Technologies, referred to in ¶47 of the NPRM.

**Wireless-Related Issues:**

Provision of location information.

- Agrees with phased, three stage approach to ALI requirement. (1)
- In order to be effective, the Phase 2 requirements must include an accuracy requirement for distance from the base station. Driscoll suggests an accuracy requirement of 500 ft. for benign environments and 1,000 ft. for dense urban environments. (1)
- The chief obstacles to the implementation of wireless ALI are finding the necessary funding and coordinating the efforts of wireless providers and PSAPs. (2)
- Because there are already a number of systems in existence which meet Stage 3's 125 meter resolution requirement, the Commission's 5 year time frame for the implementation of this feature is not unrealistic. (2)
- In addition to the proposed Stage 3 requirements, the Commission should also require location systems to be capable of determining from which floor of a high-rise building a mobile caller calls for help. (2)
- In general, the speed with which wireless ALI develops will be determined by the Commission's requirements. (2)

**CADDO PARISH COMMUNICATIONS DISTRICT NUMBER ONE**

**Interest:** Establishment created to implement a parish-wide enhanced 911 system with a co-located modern dispatch center

**Other:**

Preemption

- Because 911 operational standards do not exist, 911 legislation varies from state to state. Coordination between the Commission and each state's communications regulatory agency is critical to insure that the Commission's action is not inconsistent with state or local requirements. (6-7)

Liability

- The labelling of non-compliant equipment presents liability issues. A better approach would be to have vendors develop equipment or interfaces that will allow old equipment to be retrofitted with new technology to allow the delivery of ALI. (7-8)
- The Commission should address directly the liability issue and provide national standards under which 911 centers and personnel could be judged immune from liability. If the Commission believes that it does not have the authority to take such action, it should seek such authority by congressional amendment of the Communications Act. (8)

## THE CELLULAR TELECOMMUNICATIONS INDUSTRY ASSOCIATION

**Interest:** Trade association for commercial mobile radio services providers.

### **Wireless-Related Issues:**

#### Availability of 911 to service-initialized handsets.

Believes the FCC is correct in recognizing that availability must be tied to activated status of the mobile phone. Any other result would preclude call-back and invite frivolous use that could impede access to 911. Validation is, however, unnecessary since cellular switches are generally programmed to put 911 calls through without screening. An industry committee should address outstanding issues. (12-13)

911 call priority. Suggests that an industry committee is necessary to examine possible solutions to difficult technical problems including: (1) the fact that, because cellular call processing does not provide customer interconnection until the user seizes a channel by pressing "send" after dialing the digits, 911 call priority in a wireless network is not comparable to a landline call; (2) suggestions that PACA provides a solution are wrong -- PACA allows the carrier to prioritize based on identity of the customer, it does not distinguish among calls placed from any one mobile unit; and (3) the nature of 911 usage from wireless phones lends itself to multiple calls by users witnessing the same incident, and requires special considerations to solve the queuing problem. (13-14)

#### Provision of location information.

- The technology necessary to allow CMRS service providers that provide real-time access to voice service to provide the same level of access to 911 and E911 as is available to wireline customers is still being developed and none has been commercially demonstrated that meets the Commission's ultimate goals. (6-7)
- Although CTIA commends the Commission's ultimate goals for the provision of access to E911 services by CMRS providers, it cannot support the time frame set forth in the NPRM, which is inconsistent with the underlying technical solutions necessary to achieve the desired features. (7-8)
- Urges the FCC to bear in mind the differences between wireline and wireless services as they relate to location functions. The location feature for a landline telephone almost always provides essential location information to the PSAP because the caller is ordinarily

in close proximity to the person in crisis. The same is not true of mobile services. (7-8)

- Similarly, mobile units are not meaningfully associated with subscriber addresses, and PSAP databases will have to be altered to accommodate a mobile location feature. (8-9)
- With regard to Phase 3 of the Commission's proposal, which would require the provision of precise three-dimensional location within 125 meters to the PSAP within 5 years of adoption of standards, states that it is simply unknowable which potential technological alternatives could evolve into feasible solutions and when, since each known choice poses problems. (9-10)
- The incremental phase-in approach would not efficiently or effectively achieve the long term objective of three-dimensional location using a common PSAP protocol. Implementation of the first phase of user location/ALI could be accomplished, albeit in a vacuum, and it is uncertain whether implementation of the second phase is economically or technically viable in the anticipated time frame, particularly in view of technical limitations. (10)
- Phases 1 and 2 should not be implemented independent of the progress on Phase 3, particularly if the earlier phases are incompatible with the systems needed to implement phase three. Such a result would require carriers and PSAPs to make substantial investments that would be almost immediately obsolete and would delay deployment of superior technologies. (10-11)
- The industry is willing to implement broader access to E911 services, but the steps toward this end must be economically and technically rational -- this requires a uniform understanding of the technological capabilities and protocols available to address the issue -- such as is underway with JEM. (11-12)
- Urges the Commission to take account of the special concerns and needs of rural communities, noting that the availability of 911 and E911 services in rural areas is considerably reduced, and that local governments must be free to prioritize their spending. It would be arbitrary for the FCC to require national deployment of functions that PSAPs are not ready or able to receive. (16)

- Urges the Commission to allow for industry study and analysis to ensure that the special needs of rural communities and rural service providers are met. Due to wider spacing of cellular towers in such areas, the proposal for location features based on cell sector data are questionable in this context. (16)
- The optimal path toward a uniform protocol for the provision of E911 by CMRS providers is through an FCC-sanctioned industry advisory committee formed to address the technical, economic, and policy issues presented. The Commission has recognized the need for formation of an industry advisory committee in other contexts, and its rationale is equally applicable here. (17-18)
- Suggests that the advisory committee be created, conducted, and terminated pursuant to the Federal Advisory Committee Act, thereby providing for advance public notice of meetings, ensuring meaningful opportunity to participate on all issues raised in the notice, and placing reliance on private sector funds for non-government participation. (18)
- Urges the Commission to avoid placing undue burdens on CMRS providers, and states that CMRS providers should not be required to implement new features until the PSAP operator is equipped to handle the information transmitted by the CMRS provider -- any requirement ultimately promulgated should apply on receipt of a bona fide request from a PSAP capable of processing the information. This concept is familiar in telecommunications and has been employed by the FCC in implementing policies governing expanded interconnection, transport, and equal access. (18-20)
- States that it is premature for the Commission to determine specific requirements to be placed on base and mobile equipment to achieve the agency's desired objectives, and urges the agency to stall considering altering equipment requirements until technical and economic solutions are reasonably identified and available. (21)

Re-ring/call-back. Supports this goal, but notes substantial technical upgrades required to achieve call-back capability. In particular, the inability to provide 10 digits will disable call-back for roamers, and will create problems for "home" units in areas where the cellular carrier's service area extends across multiple NPAs. Suggests that, to resolve these and additional issues (such as the unavailability of call-back capability where a roamer's home system has not deployed Automatic Call Delivery capabilities, or the

inability to accomplish call-back if the unit is not a validated account) require industry input and solution. (12, 14)

Common channel signalling. This issue requires substantial study and cannot be rationally addressed without extensive coordination and consideration by all relevant parties. Thus, it should be referred to an industry study group. Enormous costs could be incurred by PSAPs and carriers to achieve the necessary modifications and upgrades, and the NPRM's analogy to the wireline network is not transferrable, and the overall proposal is of questionable utility in the mobile context. (14-15)

Access to TTY devices. TTY mobile units are in the development stage and are not readily available. While TTY access is provided today through the relay center, full deployment will require additional standards consensus among carriers and PSAPs to ensure PSAP receipt of data. (15)

Labelling. States that the problem with the FCC's proposal is that the service provider -- not the mobile unit -- is the greater determinant of capability. Similarly, local emergency providers' abilities provide a more direct influence upon the functionalities available to consumers in any given locality. Labels can become obsolete upon changes in locality or between service providers. Accordingly, the issue should await solution of the overall issues in the proceeding. (22)

Other.

- Estimates that approximately 550,000 911 cellular calls are made each month, which is notable given the technical, economic, and legal hurdles to basic 911 availability in the wireless environment. (2-3)
- 911 services were designed to provide access for wireline subscribers, and do not address the unique characteristics applicable to wireless communications, including the fact that RF signals do not respect political boundaries, the reality of multiple wireless service providers with different coverage areas and service and technical configurations and protocols, the lack of wireline availability of 911 or E911 to wireless service providers needing to interconnect with PSAPs to provide 911 service, and the fact that PSAPs have taken varying positions with respect to implementation of wireless 911 service. (3-5)

**Other Issues:**

Liability. Urges the Commission to ensure that CMRS providers are free to implement 911 and E911 services without fear of liability. It is long-settled federal public policy to allow common carriers to limit their liability for negligent acts as a means for promoting carriers' willingness and ability to provide reasonably priced service. A federal rule limiting liability of wireless providers will minimize implementation costs and facilitate broadened availability of E911. (20-21)

**COMSAT CORPORATION**

**Interest:** U.S. signatory to the International Maritime Satellite Organization

**Wireless-Related Issues:**

Scope of requirement

- Because COMSAT's maritime customers already rely on internationally approved systems and procedures of the GMDSS to route distress and safety messages, the FCC's proposed rules are unnecessary and undesirable for maritime users of Inmarsat terminals, even when located in U.S. waters. The rules would impose additional requirements and would cause confusion. (3-4)
- COMSAT's current authority to serve aeronautical and land mobile customers does not warrant imposition of the FCC's proposed rules. These customers represent a small portion of COMSAT's market, and present policies require COMSAT to transition domestic customers to AMSC. It would be unreasonable and burdensome to impose the FCC's compatibility rules for this limited use of Inmarsat services. Moreover, these customers do not expect 911 access and are aware of the availability of the LEC operator for assistance. (4-8)
- The Commission's proposal to impose its domestic emergency calling requirements on global providers raises issues that are beyond the scope of this proceeding. Such a decision could result in conflicting requirements, unnecessary costs, and user confusion. The Commission should coordinate its efforts with respect to emergency messages with international regulatory bodies. (8-9)

**CONSTELLATION COMMUNICATIONS INC.**

**Interest:** Pending applicant to construct low-earth orbit (LEO) mobile satellite system (MSS) to be operated in the 1.6 and 2.4 GHz frequency bands which will provide voice service to customers worldwide.

**Wireless-Related Issues:**

Scope of requirement (covered and excluded services).

- LEO MSS should not be within the scope of these rules. (1)
- As a startup technology, LEO MSS is just beginning to establish costs and pricing, service requirements and system operational requirements. Therefore, adding an E911 requirement at this point would create significant hardships by adding cost and complexity to a new system. (2)
- Because the home service area of a LEO MSS subscriber will be the entire United States, it will be difficult for a satellite service provider to route the call to the appropriate PSAP. (2)
- Any E911 requirements for LEO MSS systems should be deferred until these systems are further developed and the impact of these requirements can be better assessed. (2-3)

**CONSUMERS FIRST AND THE AD HOC ALLIANCE FOR PUBLIC ACCESS TO  
911**

**Interest:** Collective of non-profit safety concerns representing consumers, public interest groups and the general public.

**Wireless-Related Issues:**

General.

- Supports the goal of broad availability of E911 service. (2)
- In order to provide greater access to wireless 911 services, mobile phones should be manufactured so as to lock on to and access the stronger of the two 911 signals in any given service area. (8-9)

Availability of 911 to service-initialized handsets.

- The current trend towards not allowing roamer access to non-subscribed cellular networks will leave large gaps in the nation's 911 network. (3-4)
- Because of their unfamiliarity with local emergency services, mobile users are more dependant upon easy access (i.e. through dialing 9-1-1) to 911 service than landline users. (4-5)
- In order to promote public safety, and because the number of 911 calls is a very small portion of the total number of mobile calls, wireless carriers should be required to provide 911 service to all users, without regard to prior service agreements. (2, 6-7)

**COWLITZ COUNTY TECHNICAL SERVICES CENTER**

**Interest:** Enhanced 911 dispatch center

**Wireless-Related Issues:**

- The Commission should rule decisively to set the tone that the communications industry needs to consider the effects of designs and products on enhanced 911 systems. (1)

**E.F. JOHNSON CO.**

**Interest:** Manufacturer of radio communications products for commercial and public safety use including base stations and mobile transceivers.

**Wireless-Related Issues:**

Retrofitting.

- All existing wireless equipment should be deemed compliant in order to save substantial retrofitting costs. (2-3)

Scope of requirement (covered and excluded services).

- "Local" two-way radio services should be exempt from these rules because:
  - They lack a large user base from which they can recover their costs. (5)
  - Two way radio users do not expect the same access to E911 services as do broadband wireless (e.g. cellular, PCS) users. (5)
- Private mobile radio services should be exempt from these rules, as the Commission proposes. (6)

Labelling.

- Supports labelling requirements in conjunction with grandfathering existing equipment. However, responsibility for labelling should rest with the party who presently controls the equipment (i.e. the user rather than the manufacturer). (3-4)

**ELERT & ASSOCIATES**

**Interest:** Involved in the consulting and engineering of all aspects of E-911 systems.

**Wireless-Related Issues:**

Provision of location information.

- Provides a chart highlighting the pros and cons of the following location search techniques: (1) direction finding; (2) time of arrival differential; and (3) geographic positioning system ("GPS"). (1)
  - Technical limitations and poor operational accuracy make directional technology unsuitable for a long range solution to the mobile E911 and vehicle fleet control problem. Direction finding is extremely expensive -- it requires a national network of active directional antennae to achieve any reasonable acquisition time and directional accuracy. The information gathered with this technique can be ambiguous in an urban environment due to reflective structures and the acquisition time is too long for many emergency situations. While the widespread use of existing cellular equipment favors the application of this technology, it does not address the comprehensive dispatch and emergency response requirements of the future. (2)
  - The advantage of time of arrival differential techniques is that existing, unmodified cellular equipment is used and that no additional or modified antenna sites are required. However, this technology cannot be seen as a long term solution to the public safety control problem as inherent technical limitations restrict the precision of the system and its range of applications. Its application is strictly limited to mobile E911 use with medium locating accuracy. (2-3)
  - The most promising and most expensive long term solution is GPS. The primary problem with this solution is that communications equipment must incorporate a GPS receiver but the cost of such receivers has recently dropped from thousands of dollars to below \$400. (3)
- Cellular telephones with integrated microphones and head pieces are not suitable for modification for operation with a GPS receiver. Future units must be developed with an incorporated GPS receiver. The GPS unit will only receive and translate satellite data when placing a 911 call. (4)