Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)
	)
Inquiry Concerning 911 Access, Routing,	)
and Location in Enterprise	) PS Docket No. 17-239
Communications Systems	)
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	)

COMMENTS OF COMTECH TELECOMMUNICATIONS CORP.

Comtech Telecommunications Corp. ("Comtech")[1] hereby submits its comments to the

Federal Communications Commission ("FCC" or "Commission") in response to the September

26, 2017 *Notice* of *Inquiry* ("NOI") in the above referenced docket.[2]

I. Background

Comtech's experience in Public Safety communications began over two decades ago and

includes the pioneering achievement, among others, of providing the first U.S. wireless E9-1-1

solution in 1997.[3] Today Comtech provides a comprehensive suite of Public Safety systems and

services to commercial carriers, and to state and local jurisdictions. As the ecosystem of "9-1-1"

continues to evolve towards the promises of Next Generation 9-1-1, and with it the aspirations of

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[1] On February 23, 2016 Comtech Telecommunications Corp. (symbol CMTL) purchased 100% of the stock of TeleCommunication Systems, Inc. (TCS) (symbol TSYS). When referencing Comtech, we also include the historic filings and positions of TCS.

[2] *Inquiry Concerning 911 Access, Routing, and Location in Enterprise Communications Systems,* (PS Docket No. 17-239) (FCC 17-125) Released: September 26, 2017 (Notice) https://ecfsapi.fcc.gov/file/09263029314893/FCC-17-125A1.pdf

[3] Comtech Telecommunications supports half of all U.S. wireless E9-1-1 calls. Our wireless and VoIP E9-1-1, together with our wireline E9-1-1 solutions, serve over 140 million wireless and IP-enabled devices. With the nation's only non-carrier TL 9000-certified wireless and VoIP E9-1-1 Network Operations Center (NOC), our highly-reliable E9-1-1 solutions ensure that a subscriber's emergency call routes to the appropriate PSAP and automatically pinpoints the caller's location information. Comtech and its subsidiaries have over 400 issued patents worldwide and over 300 pending applications (http://www.telecomsys.com/about/ip-licensing/patents/patents_overview.aspx)

a truly interconnected, highly reliable, and highly redundant multimedia 9-1-1 experience for end users and stakeholders, Comtech remains at the forefront of efforts to realize this potential.[4] We greatly value the relationships we have with the Public Safety community and the FCC, and welcome any opportunity to detail our experiences and what we believe can be the best practices for our industry.

The Commission's interest in Enterprise Communications Systems ("ECS") is prudent as ECS deserves the same attention as other elements of the seamless Next Generation 9-1-1 ("NG9-1-1") network paradigm. That is not in any way to discount NENA's exemplary long-standing MLTS model legislation efforts[5], pending Congressional legislation[6], state legislative efforts[7], and decades of local initiatives, but merely a recognition of the unique and important role of the Commission in this arena.

Many citizens spend a large proportion of their work, social, and recreation time in or near ECS environments. ECS operators benefit greatly from other elements of 9-1-1, and it is appropriate for the FCC to periodically ask, based on its unique point of view, if there are new actions that ECSs can or should take to positively impact 9-1-1 and/or NG9-1-1. For example, the related "smart city" movement[8] promises positive changes to government operations, citizen access to government services, and citizen lifestyle enhancements, yet there has been comparatively little discussion on the intersection of public safety (particularly 9-1-1) with smart cities. With its focus on "enterprise" level communications in government, can smart city initiatives, ECS, and 9-1-1 leverage their individual strengths to mutual benefit? Comtech's

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[4] Comtech and its subsidiaries lead the industry with multiple NG9-1-1 deployments in WA, IA, TN, and other jurisdictions. (http://www.telecomsys.com/products/public-safety/NxGenCo.aspx)

[5] https://www.nena.org/?page=MLTS_PBX

[6] H.R. 582: Kari's Law Act of 2017 [https://www.govtrack.us/congress/bills/115/hr582]

[7] http://files.meetup.com/3299882/State-E911-Legislation-Summary.pdf

[8] https://en.wikipedia.org/wiki/Smart_city

view is "yes" – there are new ECS-related location-based technologies that can, with little or

modest impact on ECS and/or landlords and tenants, greatly benefit 9-1-1, and in particular,

NG9-1-1. Upon review of the Comments in this docket, it may be useful for the Commission to

convene a workshop to gather additional information, views, and opinions.

II. Comments

A. ECS's Impact on Location Services, Particularly Indoor Location

In NOI paragraph 22 the Commission seeks input regarding ECS's interaction with caller

location.[9] When a caller served by an ECS initiates an emergency call, the ECS should provide

adequate location information to permit; 1) accurate call routing to the appropriate PSAP serving

that ECS caller's physical location as well as, 2) first responders to find the caller at that physical

location. Since call origination environments vary greatly, a "dispatchable" location would

ideally include a complete civic street address including pertinent floor (if a multi-story

location), as well as optional zone and/or room number information. Geospatial coordinates (ex.

latitude/longitude with z-axis elevation) position information should also accompany a dispatch

quality civic location, and must include estimates for both horizontal and vertical uncertainty, if

available. The geospatial coordinates provide the PSAP the ability to better qualify / analyze

reported civic address information to validate a dispatch determination.

Even as ECS systems producing either precise position information or dispatch quality

location evolve, there will be occasions where no location information is available during call

initiation. As a fallback, systems that produce coarse location, such as cell site and sector

location in use today, should remain in use and flagged as such upon delivery to the PSAP.

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[9] Comtech is the leading provider of advanced 9-1-1 location services and has been Recognized by Frost & Sullivan
as the only provider of every element in the location based services (LBS) value chain.
(http://www.telecomsys.com/products/location-based-services/infrastructure-GSM/default.aspx)

Fallback location typically is sufficient for routing the call to the appropriate PSAP, but often relies on the call-taker's actions to help determine a better location for dispatch, if needed.

Paragraph 31 of the NOI addresses the potential of a collateral benefit by ECS on indoor location accuracy. Provisioned static locations used in many older ECS systems, while potentially accurate when input correctly, are subject to errors or missing information when devices are installed, moved, or replaced. Migration to automated location systems that apply location information to emergency calls, offers distinct advantages. Some location technology even includes real-time location determination of mobile devices within an enterprise demonstrating a path toward automation that can be integrated with existing ECS systems. For example, new enterprise-centric location systems employing managed Wi-Fi access point and Bluetooth beacon ("BLE")[10] deployments inside buildings will help to shift acquisition of location indoors from manual input of static location entries to legacy databases, to dynamically measured and associated location information. Further, these location systems can provide calculated position information represented as a point within a computer-generated area polygon or floor map and ultimately reference civic address location information associated to or within the floor map area.

Integration of real-time enterprise location systems with ECSs, such as PBX systems supporting mobile handsets in enterprise environments could also leverage address formats such as the National Emergency Address Database ("NEAD")[11] infrastructure after standards are extended to include additional interfaces to ECSs. Some ATIS[12] standards development work is

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[10] More information about Bluetooth low energy and 911is found at https://gigaom.com/2014/08/17/how-beacons-and-bluetooth-can-help-us-get-to-the-best-possible-wireless-911/
[11] More information about the NEAD is available at http://www.911nead.org/
[12] http://www.atis.org/

underway to extend NEAD capabilities and interconnections further into such enterprise location environments.

B. Real Time Text and ECS

Paragraph 27 of the NOI asks about the connection between ECS and real-time text ("RTT"). RTT communication used in emergency calls will likely rely on the presence of both OEM installed features and user downloaded applications on originating smart phones. RTT implemented in the near term as solely text will quickly evolve to support of audio and video multi-media. Based on recent end-to-end standards developed within ATIS, transmitting location along with these text and multi-media based 9-1-1 calls is designed to work similarly to that of voice calls. Because of RTT's use by the deaf and hearing/speech impaired communities, it is crucial that ECS systems provide a civic form of location for emergency calls made indoors.

C. Costs and Benefits of Supporting E9-1-1

Regarding the questions in paragraph 32, managing Wi-Fi and BLE location systems as part of an ECS will require some investment, though such costs may be offset by the ability to leverage the same infrastructure for associated high value propositions (ex., quickly locating and retrieving expensive Wi-Fi or BLE enabled medical equipment, locating critical personnel, network security, etc., based on knowing real-time precise location inside a location enabled ECS environment). In a real-time location enabled ECS environment, much of the maintenance burden is shifted from tediously provisioning a location for each Wi-Fi access point or BLE beacon deployed, to that of making a single association of dispatch quality location information for each individual floor map. Both Wi-Fi access points and BLE beacons are automatically discovered within the established floor plan area, as are mobile devices initiating emergency calls. Overall, incorporation of these functions will result in added capability, increased

information, and more accurate location determination to aid in the dispatching of first responders.

D. Next Generation 9-1-1 Capabilities of ECS

Paragraph 30 of the NOI frames questions regarding the intersection of NG9-1-1 and ECS. NG9-1-1 is designed to accept all types of incoming emergency calls, whether circuit-switched through a gateway (e.g., Legacy Network Gateway)[13] or via IP/SIP directly to the originating Border Control Function at the edge of an ESInet. Location information for such calls that traditionally gets stored in an ALI must eventually migrate to a LIS function in the Access Network to support a fully evolved NG9-1-1 ESInet system, since it is the Access Network that usually knows where the caller is.

Transition to more intelligent ECS' has a positive impact on NG9-1-1 compatible location systems. ECS deployments are also expected to be able to leverage Additional Data Repositories, developed within the NENA i3 network mode.[14] These are enabled (and in some cases required) within the originating ECS or carrier's originating environment to supply rich supplementary data about the call, the caller, and more detail about the location information that was provided with the call.

E. Consumer Expectations

Paragraph 34 of the NOI concerns ECS and consumer expectations. Comtech believes the goal is clear: public safety should be given, wherever practicable, consistent, and accurate location information, with every 9-1-1 call. Likewise, it is in the interest of enterprise operators, building owners, employers, managers, and tenants to provide the best location information

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[13] List of common ESInet acronyms: http://nd911.homestead.com/description_of_fes.pdf

[14] Detailed Functional and Interface Standards for the NENA i3 Solution, NENA-STA-010.2-2016 [http://c.ymcdn.com/sites/www.nena.org/resource/resmgr/standards/NENA-STA-010.2_i3_Architectu.pdf] and NENA Standard For NG9-1-1 Additional Data, 71-001 v1 [https://www.nena.org/?page=NG911_AdditionalData]

available for employees and visitors during an emergency request. However, lacking integration of personal mobile devices into ECS wireless interface facilities, 9-1-1 callers will resort to "best guess" judgement as to the exact spot where help is needed or trust in the veracity of the ECS information, technical feasibility of mobile positioning deep indoors, or familiarity/ease of use with their calling devices.

For example, some buildings don't facilitate good GPS (or A-GPS) location fixes deep indoors, but it may work adequately near a window. Likewise, some ECS systems are only capable of providing statically-provisioned street level addresses, whereas real-time ECS integrated location systems can provide very accurate, dynamically updateable indoor location information, including floor, room, and/or zone. Neither enterprise technology solution providers nor ECS operators should be responsible for the creation of building floor plans, but it is expected that once building floor plans exist, that enterprise solution providers will be able to provide more robust solutions due to the integration of floor map information into their solutions.

We also encourage the FCC to consider incentives, and to cooperate with local/state governments regarding the need for regulations that require building owners to create, maintain, and make available to Public Safety jurisdictions in their local area, all detailed floor maps for enterprise environments (when they are created), and where possible, for the First Responder community (ex. Fire Districts) to consider the cost / benefits of incorporating a requirement for quality floor maps (beyond exit plan requirements) as part of their fire safety and emergency plan assessments (ex., local / state fire codes) within their communities. Indoor venues nearly always have inside structure. These structures are made up of entrances, walls, rooms, corridors, exits, stairwells, elevator shafts, etc., which can be problematic when dispatching detailed routing instructions to first responders. Floor maps document these features. Once integration of

reasonably accurate floor maps into an ECS real-time location system occurs, then 9-1-1 routing of calls, location presentation to the PSAP, and accurate dispatch of first responders to the actual caller's location will be greatly improved. The requirements of properly described building floor maps for each floor of a multi-story building is essential.

III. Conclusion

Comtech is proud of our pioneering and continuing accomplishments in 9-1-1 Public Safety, and offers these comments in the hope they will spur further discussion and review of this important topic.

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Respectfully submitted,

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