Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
TECHNOLOGY TRANSITIONS POLICY TASK FORCE	)	GN Docket No. 13-5
	)	

COMMENTS OF APCO

The Association of Public-Safety Communications Officials-International, Inc. ("APCO") hereby submits the following comments in response to the Commission's *Public Notice*, DA 13-1016 (May 10, 2013), in which the Technology Transitions Policy Task Force seeks comments concerning potential trials of Internet Protocol (IP) networks.

Founded in 1935, APCO is the nation's oldest and largest public safety communications organization. Most APCO members are state or local government employees who manage and operate communications systems -- including Public Safety Answering Points (PSAPs), dispatch centers, radio networks, and information technology -- for law enforcement, fire, emergency medical, forestry conservation, highway maintenance, disaster relief, and other public safety agencies. APCO has long been involved in Commission proceedings regarding 9-1-1 capability and other aspects of public safety communications.

APCO supports the eventual transition to IP networks, and the need for well-designed and comprehensive trials to ensure a smooth transition, especially for 9-1-1 services. There are a number of significant issues related to 9-1-1 service over IP that must be considered and incorporated into any potential IP network trials. To date, IP and Next Generation 9-1-1 (NG9-1-1) transitions have been partial, and typically on a PSAP-by-PSAP and carrier-by-carrier basis. While there will soon be additional statewide and regional networks for IP traffic to 9-1-1, there

are database issues, last mile issues, and numerous PSAP CPE issues that must still be resolved. In addition, only wireless and VoIP traffic are currently being transitioned. A date has not been set to start transitioning wireline traffic on a large scale. Despite the initial activity at a variety of locations, there is not a significant body of documentation for the interconnection aspects associated with NG 9-1-1 transitions. Thus, there are still many challenges and policy issues associated with a fully implemented "real world trial."

IP networks will need to interconnect effectively with both legacy 9-1-1 and Enhanced 9-1-1 networks, new text-to-911 services, and future NG9-1-1 networks. The networks will be provided by a variety of service providers, both private and public. In addition, IP networks will need to adhere to both i3 and IMS (IP Multimedia Subsystem) standards. The IMS-based ESINet is already becoming a reality, and with the creation of FirstNet -- which is expected to be built on an IMS backbone -- the ability of 9-1-1 services and providers to connect to, and utilize, an IMS based ESINet is a necessary requirement.

The transition to IP at the PSAP level will certainly be much more gradual than at the provider level. IP-capable premise equipment and systems will require local governments to expend substantial financial resources. However, in the current economic environment, local governments are more likely to devote scarce resources first to equipment and supplies for daily, ongoing public safety operations that directly impact both responders and the public (*e.g.*, radios, squad cars, fire engines, ambulances, and all the equipment and supplies needed to keep First Responders, online and operational). As a result, legacy PSAPs are likely to remain operational for some time, and there will be a need to interconnect new IP-based networks to multiple PSAP types for many years to come.

Any NG9-1-1 transition trials must take into consideration that there are a number of interfaces, networks, and systems that need to interoperate with both Next Generation (NG) and legacy 9-1-1 systems to provide complete functionality to the entire PSAP community. Foremost among these are the originating network interfaces. The ATIS IMS9-1-1 committee has presented a proposal that existing IMS interfaces defined by 3GPP be utilized.[1] The existing 3GPP architecture defines the use of the E-CSCF only for support of originating emergency calls.[2] Therefore, the direct use of an E-CSCF when attempting to terminate calls to a PSAP is not defined. For this reason, the use of an [IMS911] Application Server to support the service is appropriate.[3] In particular, the use of the Public Service Identity (PSI) is used to identify the 911 service and the associated Application Server.[4] This is presented in 3GPP 23.228 as the Ma[5] interface between the Interrogating Call Session Control Function (I-CSCF) and the Application Server. As noted above, it is expected that FirstNet will be deploying the Nationwide Public Safety Broadband Network on an IMS architecture. Thus, all NG9-1-1 systems must have a mechanism for connectivity to, and function within, the FirstNet, IMS-based system.

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[1] http://www.atis.org/ESIF/index.asp

[2] The E-CSCF – Emergency Call Session Control Function, handles certain aspects of emergency sessions, e.g., routing of emergency requests to the correct PSAP. The CSCFs manage the session control: registration, set up, tear down, feature activation.

[3] Application Servers are where the application reside. There may, for example, be originating services or terminating services. The filtering criteria is loaded into the Serving-CSCF when the subscriber registers with the network.

[4] According to 3GPP TS 23.228, PSIs identify "services which are hosted by application servers". The specification then states that PSIs are used to identify user groups (i.e. sets of users).

[5] Per 3GPP 23.228:

> The Ma reference point is between the Interrogating CSCF and the service platform(s).
>
> The Interrogating CSCF to AS reference point is used to:
>
> -forward SIP requests destined to a Public Service Identity hosted by an Application Server directly to the Application Server;
>
> -originate a session on behalf of a user or Public Service Identity, if the AS has no knowledge of a S CSCF assigned to that user or Public Service Identity.

Similarly, i3 interfaces as defined by NENA will also need to be designed for, and tested. Both i3 and IMS architectures are likely to co-exist. Perhaps more importantly, as networks and carriers transition to IP based systems, there will still be a significant number of PSAPs that remain legacy in nature. Interfaces from the IP network to legacy PSAPs must also be tested.

The transition to an all-IP network and the resulting NG9-1-1 ecosystem has the potential to bring significant benefits to the public safety community. IP-based networks, when properly designed and implemented should be both logically and physically redundant. Larger "pipes" may eventually facilitate NG 9-1-1 services, including text, photo, data, and video transmissions, in addition to voice. Those same "larger pipes" may prove to be "not large enough" for the influx of bandwidth-intensive data services that the average consumer is going to expect when interacting with emergency services. Therefore, gradual, cooperative, and smart implementation of IP in conjunction with other emerging technologies and capabilities must be the preferred path.

This transition is obviously not without its challenges, and APCO believes that several important issues, in addition to those raised above, must be addressed in both trials and ultimate IP networks:

Reliability. Current time-division multiplexing (TDM) copper networks have generally been built to 99.999% reliability. IP fiber-based and wireless networks are not built to the same standard—while more capable, and feature rich, they may be less reliable. Any trials need to design to a reliable, redundant standard in real world conditions with scalable traffic based on real world activities as encountered by the PSAPs.

Security. As public safety and the industry have already seen, security is a critical issue. IP and wireless networks present new cyber-based and other security-related vulnerabilities and are not presently as secure as the "closed loop" that is a copper-based 9-1-1 system. IP networks have been compromised by hackers, and denial of service, spamming, swatting, and other attacks are even more easily perpetrated on an IP-based system. Security thus becomes a cascading issue with the variety of transport providers, network service providers, and a plethora of new interconnect players.

Power. Copper-based networks are self-powered, whereas IP-based fiber networks rely on power from the consumer electric grid. Thus, IP-based networks, as well as wireless networks, are more susceptible to power outages. During power outages, telephone service will not be available unless sufficient backup power is available. Further, the customer now becomes responsible for maintaining/ensuring battery back-up. Network designs need to consider stand-by power, battery back-up, and other contingency plans for power supply. Consumer education will also be key.

Congestion. IP networks that use both wireless and wired technology are also susceptible to congestion, packet collision, quality of service issues and a number of considerations that were "easily" solved with dedicated trunking. IP "trunks" are network pipes, not dedicated facilities. Shared bandwidth is just that, and capacity considerations need to be given to anomalies as well as normal operations.

Peering Disputes. Peering is the interconnection of separate networks to facilitate the exchange of traffic between the customers of each network. Peering requires a physical interconnect of the networks, an exchange of routing information, and is often accompanied by peering agreements of varying formality and complexity. From a public safety perspective, a

peering dispute simply cannot interrupt service. Indeed, in the IP world, as in wireless, public safety networks require robust Quality of Service (QoS) capabilities and priority service allocation based on that QoS. Defining, and implementing true priority and Quality of Service systems is critical to success. As was detailed in the FirstNet Statement of Requirements, Priority and QoS for Public Safety are absolute requirements.

Location Information. There must be solutions to provide reliable and accurate location information from fixed and mobile applications. While IP technology permits innovative solutions that can improve upon existing location technologies (such as floor number or specific apartment or office location) advances in technology have actually led to a decline in location information accuracy in some cases. For example, the interim SMS text-to 9-1-1 solution moves technology forwards in many respects, though it provides significantly less location accuracy for text than a voice call from the same wireless device. Similarly, nomadic VoIP creates major problems when customers fail to register changes in location (leading to situations such as an emergency call from Florida being answered in Colorado). Technology has the promise of moving location accuracy forward (*e.g.*, with vertical information and in-building options), but it can also create new challenges for PSAP operations. Those factors must be considered in IP network trials.

CONCLUSION

Therefore, the Technology Transitions Policy Task Force and the Commission must ensure that IP network trials, and future all-IP networks, take into consideration the issues set forth above concerning 9-1-1 services and PSAPs.

Respectfully submitted,

/s/

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