Use Case 1

Dynamic Incident Area Network with No Existing Coverage or Backhaul

This use case represents an unplanned scenario in an environment where there is no terrestrial LTE coverage or access to the existing PSBN. This type of scenario could be a result of geographical factors such as remote isolation (e.g., the terrestrial network does not reach the area where the incident is occurring), and/or terrain-based isolation (e.g., the response occurs in an area of austere terrain or dense foliage which limits useful line of sight communications from a fixed network). The denial of access could also be caused by an environment in which a man-made or natural disaster disables terrestrial coverage from the PSBN. In either case, it is assumed that there is no interference from, or possibility of interaction with, an existing network.

For this use case, it is also assumed that there is no (or extremely limited) backhaul to an existing network such as the nationwide core of the PSBN or the public internet. All of the applications and information required for supporting incident operations must be stored locally on the deployed network. It is feasible to assume that the various components of the highly mobile network were able to access public networks and the PSBN core leading up to the disaster. For example, equipment would likely be stored and maintained in an area which has established connectivity so that databases, software, images, etc. can be updated and cached locally prior to leaving their home base and forward deploying to the incident site.

Finally, it should be assumed that multiple agencies with their agency-owned and maintained deployable systems may be working in the same incident and will therefore need to interconnect to share information and to have their users interact with other users in the incident. For this interaction to happen, users will have to establish a roaming arrangement on other agencies' networks, and some form of handovers should be possible, despite the networks having no prior coordination with other networks.

For this use case to be successful, the following technologies need to be implemented or developed:

- A reliable and open standard internetwork mesh connection must exist so that individual networks can connect with other networks in an ad hoc mesh network manner. This should be an open protocol, ideally leveraging unlicensed spectrum, but it is recommended that it not use a common protocol such as 802.11 due to robustness and interference concerns.
- There must be a way for two cores to establish an "ad hoc roaming" relationship where a device from another network can attempt to authenticate on its non-home network. The non-home core can either request authentication from the home network, or there can be temporary additions to the non-home network.

- There must be edge-based instances of the needed applications, and those applications must be able to cache all pertinent information when connected. For example, if there is a situational awareness toolkit, maps must be cached prior to being deployed, and the server must still retain all functionality when it is being used locally. Furthermore, if two or more systems maintain the same applications with the same types of databases, those systems should be able to synchronize their information with one another so that all systems on the network have the most up-to-date information available.
- There must be an offline identity, credential, and access management (ICAM) solution so that users can access different levels of data without having to be authenticated from a central ICAM service. This offline solution will allow for multiple levels of information classification to be collected, archived, and consumed at the edge.
- The system must be rapidly deployable and should be able to integrate into any equipment or onto a remotely controlled vehicle (airborne or otherwise) so that the network delivery can take place without significant logistical challenges.
- The individual networks must be able to share their locations and radio frequency (RF) transmission parameters with other networks in the environment so that parameters such as effective isotropic radiated power (EIRP) and directivity can be modified to avoid interference with one another.