

Satcom's role in emergency response and military communications

The COVID-19 pandemic so far spanning 2019-2020 has brought about big changes to the world and has acted to highlight the need for connectivity more than ever before. Satellite is playing a key role in keeping the world running amid an unprecedented pandemic, keeping pace with the changing needs of global users.

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As governments and their agencies scrambled to contain COVID-19's wake, we've seen that the capacity of our national critical infrastructures can be pushed to the limit rapidly and without warning.

In this case, the global health sector was hardest hit. In instances such as fire disasters, earthquakes, or national security incidents, other cogs of the emergency response network are susceptible to equal pressure. Those tasked with managing the reaction to unprecedented events and emergencies must be able to do so quickly and effectively.

Emergency communications are an integral part of any government or defence organization – a capability for which satellite communications play a decisive role. Whether it be for establishing communication capabilities for rapidly deployed shelters or the sharing of real-time critical information, satellite's role is embedded in the ability to react to events. Yet as digital technologies and end-user demands evolve, the ability for satellite to become more flexible to meet more complex requirements and help deliver more efficient responses is crucial.

This formed the basis of a webinar recently held by ST Engineering iDirect.

Learning lessons

Recent events have shed a light on just how important critical communications are for every business, organization, agency and individual. The global Covid-19 pandemic has rapidly brought the requirement for emergency communications into sharp focus as front-line workers communicate and share mission critical information from wherever they are operating, no matter how remote.

Immediate requirements for telemedicine and response coordination are key pillars of governmental responses around the world. Telehealth has emerged as a priceless tool enabling health-related services and information to be distributed via electronic information and telecommunication technologies, allowing doctor-to-patient contact no matter how remote either parties may be. For first responders, hybrid networks have been deployed for increased resilience, mobile hotspots are enabling makeshift communication needs, and VSAT and LTE modems have provided the capacity for reliable and immediate connectivity.

In disaster response scenarios, Cells-on-Wheels (COWs) and Cells-on-Light-Trucks (COLTs) can re-establish critical voice and data connectivity in times when traditional wireless connectivity is not available. The COWs and COLTs can be driven to the area where connectivity is required and instantly deployed, creating a network where one did not exist previously or was destroyed.

The role of satellite

Satellite connectivity – with its ability to cover vast geographical areas and be deployed rapidly with no prior infrastructure in place – has been provided to set up facilities such as mobile



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testing centres. It has also proved to be integral to providing extra connectivity for organizations, including the UK's National Health Service (NHS) and other healthcare providers, for command vehicles. This is especially important for field hospitals where there is no available connectivity.

Satellite has helped respond to the reach of the pandemic's effect, which has compromised almost every facet of our daily lives. It has enabled backhaul, GPS navigation and timing, as well as broadcast capabilities – helping to power the mobile cellular phone industry and report on the spread of the epidemic worldwide. For education services that have been forced to go virtual, satellite has helped establish flexible school networks, back up for online learning systems, and provide distance learning.

Emergencies and disasters, both natural and manmade, occur worldwide every day. The pandemic headlines have occupied the front pages, yet events demanding rapid response from mission critical agencies have continued to pile on the pressure. Along with this, the developing technology and its networking needs to be addressed by the satellite industry.

Changing needs

Satcom demand was already on a growth trajectory before the COVID-19 pandemic hit and this is set to continue. More applications are creating more demand, especially in the telemedicine field.

The introduction of remote capabilities, such as video applications that enable groups to be kept separate but still able to communicate, will be a key driver for satellite. Doctors can assess, assist, and advise patients no matter the distance between them. In a military environment, for example, commanders can debrief together over a secure video link rather than physically being together in the same room. This can be carried out over complementary satcom or via military assets, depending on what the security levels are.

The remote collaboration experience is going to accelerate because the situation demands it, and people are going to be reluctant to travel as much as they once were. It will be applications that allow this kind of collaboration that are going to start driving that growth.



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Today, satellite is also being called upon to empower new technologies, such as Internet of Things (IoT) sensors and drones, to further help first responders on the ground when cellular and fiber networks are down. The Smart Nation concept will also require satellite's support. By utilizing sensors and smart systems that communicate, nations can improve quality of life for their citizens by providing more effective and efficient government services and to make their country a safer place. An integral application for these networks will be the support of emergency services.

On top of this, network architectures are getting more complex as technology evolves. 5G is likely to play a massive role in governmental communications responses, and with this will require highly capable networks, not to mention intensive security safeguards. The ability of satellite to accommodate for these new demands and the lower latency needed to run next-generation applications powered by technologies such as 5G will be crucial.

Invest and adapt

Government and military end-users need to be able to adopt more complex networks to meet current threats and emergencies and respond more efficiently. This necessary resilience of satellite networks will require investment in flexibility to meet these demands. For example, it is important that satellite integrates in a frictionless way into other larger networks. This includes enabling software-defined features that the terrestrial networks already experience and bringing that into the satellite space. By upgrading and investing in next-generation infrastructure, greater flexibility in network topology can be achieved. As network performance requires more than raw throughput, a holistic network design that covers aspects such as latency will be needed to 'bake in' this resiliency.

Multi-service networks (MSN), which enable users to cater for a wide range of services, applications and platforms using one single centrally managed system, will be key. MSNs mean that an overload of hub infrastructure will not be needed to cater for extra services.

One platform, and one or multiple hubs connected is all that is necessary for one MSN, depending on how the network is being distributed. When running a broadband service next to a hospital or educational network, it is all possible whether it's voice, video, or data-driven or multicasting.

The increased supply of capacity from geostationary (GEO) and non-GEO high throughput satellites (HTS) is on the rise, which will be key to meeting these demands. The ability to deliver 3200Gbps is expected by 2024 as exponential HTS supply is delivered to the market. This is driving lower capacity costs on a per-platform basis. A 2.5x reduction in pre-platform capacity costs by 2028 is expected. Adding more capacity sources into networks enables cost reduction through least cost routing and can offset and potential increased terminal costs. It also improves network reliability and resiliency through redundant sources of connectivity.

Looking forward

It is up to service providers and government organizations to continually evaluate how to be better prepared for the next emergency when networks are overloaded, inaccessible or destroyed. With the success or failure of recovery operations hinging on connectivity, organizations must be able to respond quickly and effectively.

In the future, we will migrate from dedicated, purposeful networks towards more flexible interfaces towards completely configurable network designs. National space agency programs, and other bleeding edge network designs that are coming out of the government and military procurement activities, are all focused on having this flexible infrastructure to be able to respond to emergency events. For the satcom industry, this means upping investment into greater network flexibility so it can continue assisting the response to these events. **GMC**