ELEVATING NETWORKS FOR UNPRECEDENTED EVENTS

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COVID-19 has made many governments realize the need to invest in crisis management networks, in which satellite communications play an important part. As governments adopt these solutions, they will need to customize their networks to fit their unique needs and circumstances. At ST Engineering iDirect, we offer advanced satellite communication products and solutions that not only support current needs but also adapt easily to meet evolving circumstances. In this whitepaper, we will provide short-term solutions to reduce the impact of the current pandemic and suggest longer-term satellite network architectures to prepare for upcoming disasters and virus outbreaks.

During the COVID-19 crisis, the world has seen a heightened need for online connectivity, and the importance of robust, reliable communication networks has been accentuated.
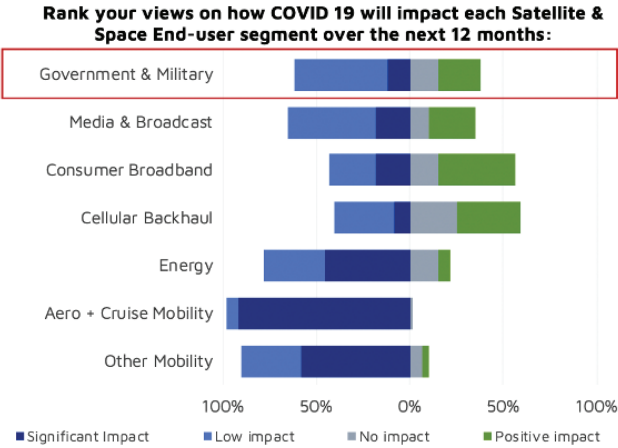
People at home need to be online, not just for entertainment purposes via over-the-top (OTT) content streaming but also for truly essential services. Students, teachers, and administrators need to continue educational activities remotely as distance learning becomes the norm. First responders need accessible, reliable networks as their teams see increased action. Health care organizations and facilities need more bandwidth as additional patients create a surge in connectivity demand. As military and welfare networks see an uptick in deployments, they require increased connectivity on both the individual and organizational levels.

In the satellite communications industry, the government and military vertical has remained relatively insulated from the crisis. In fact, those serving government and military customers may see a positive impact on their business during the COVID-19 crisis, as the pandemic has only further illustrated the need for reliable connectivity for government and military organizations. In fact, COVID-19 has demonstrated not only the need for reliable connectivity but also an opportunity to improve government networks by deploying short-term upgrades.

As we work our way through and, eventually, out of this crisis, it's clear that government organizations should think proactively about future disasters and plan to provide a resilient, multi-service, scalable and flexible network — one that will help citizens and agencies alike stay connected and safe as they respond and adapt to the next unprecedented event.

COVID-19's Impacts on Government Networks

According to a recent survey conducted by Northern Sky Research (NSR), the government and military market is expected to see some of the lowest levels of significant impact resulting from the COVID-19 crisis. Part of this can be attributed to the immediate requirements of pandemic response: Strong communication networks have been essential for telemedicine and response coordination as COVID-19 spread globally.

Rank your views on how COVID 19 will impact each Satellite & Space End-user segment over the next 12 months:

Government & Military
Media & Broadcast
Consumer Broadband
Cellular Backhaul
Energy
Aero + Cruise Mobility
Other Mobility

100%   50%   0%   50%   100%

■ Significant Impact   ■ Low impact   ■ No impact   ■ Positive impact

Source: NSR

This need for robust networks is about more than the ability to deploy engineers onsite and quickly reallocate resources from one platform to another. If, for instance, a ship needs to be retrofitted to serve as an offshore hospital during a time of crisis, it would need to be equipped to handle vastly increased communications needs. To raise the ship's capacity to the needed levels, it may be necessary to reallocate bandwidth at the expense of other current users in the system.

Ideally, this kind of reallocation wouldn't have to occur at the expense of other critical capacity — especially during times of crisis. Moving forward, it will be vital for government networks to have at their disposal large, reliable networks that are flexible and agile enough to rapidly allocate bandwidth where it's most needed while also possessing enough capacity to avoid shortchanging other critical systems. Multi-band and hybrid-network ground infrastructure will play a key role in enabling technology to meet these multi-domain requirements of government and military operations.

Solutions to Meet Current Needs

The COVID-19 pandemic has brought to light several deficiencies in the current networks and systems that government agencies and organizations rely on. However, there are solutions available that can help these organizations elevate their networks to meet their specific needs and help them effectively respond to the current pandemic, as well as prepare for future events.

In particular, four sectors of government are currently experiencing acute needs brought on by COVID-19: first response, health care, education, and military/welfare networks. Each sector has unique challenges, and each can ameliorate or overcome those challenges with network-based solutions.

First Response

First response teams deploy for all kinds of crises, from global pandemics to regional natural disasters. In all these situations, it's vital that these teams have access to reliable, flexible networks that guarantee uninterrupted connectivity — no matter the conditions. Satellite communications complement terrestrial networks to ensure extra reliability and connectivity in remote areas. During a disaster or a crisis, the terrestrial network is typically the first to go down or to become congested.

Having satellite as a primary or back-up solution increases network reliability and resilience considerably.

These networks must be portable enough to deploy at a moment's notice and powerful enough to handle a high volume of response-coordination communications. To support these needs, first response teams need simple equipment that's easy and quick to deploy, because when first responders at the scene relay data or information to headquarters, that message, and the speed with which it arrives, could be of life-saving importance.

Solutions that are currently available for adoption can empower first response teams as they perform their vital work. These include

- Hybrid network solutions that leverage both very small aperture terminal (VSAT) and LTE connections, ensuring constant connectivity even in cases of infrastructure degradation or destruction;
- Solutions that support on-the-move (OTM) or on-the-pause (OTP) applications that allow first response teams to remain connected;
- Backhauling solutions that aggregate situational awareness data, such as high-resolution images and video, to enable quick, fully informed decision-making in high-stakes scenarios;

- Solutions with reduced size, weight and power (SWaP), such as ultra-portable terminals and flat-panel antennas that can be easily transported into a vehicle and do not require large power sources; and
- Software and equipment upgrades that enable first response organizations to get the most out of their existing satellite networks.

In some instances, satellite news gathering (SNG) vehicles have been repurposed as command or satellite relay vehicles. Rather than standing idle in a garage during a pandemic, these SNG vehicles provide the necessary infrastructure to support first responder teams as they exchange mission-critical data from the disaster area. SNG vehicles can also be deployed ad hoc.

Health care

Health care facilities are feeling the burdens of COVID-19 in many ways, and, as more patients are admitted into these facilities, connectivity is just one more demand that needs to be met.

Telemedicine, teleconferencing, remote support for surgeries — all these now-common health care interactions also use video, which requires more and more bandwidth.

As more ambulances are deployed, they will need a similar, though likely less robust, connectivity infrastructure to the first responders noted above: communications-on-the-move (COTM) and cell-on-wheels (COW) capabilities will be necessary to keep these vehicles in contact with the facilities they're connected to.

In the event of a crisis that causes patient populations to surge, medical and connectivity needs may have to spread outside of main buildings and even into newly built or temporary facilities. This situation requires more connectivity infrastructure by way of both remote terminal hardware and higher throughput capabilities. Satellite communications is the quickest way to set up additional connectivity, as installing extra modems only takes a couple of hours and connecting to the internet only takes a couple of minutes. Satellite communication can also offload extra throughput that otherwise would cause congestion.

In general, hospitalized people need voice, data and video access to stay connected with loved ones and to occupy their time, so health care facilities can start by providing more bandwidth to accommodate patient demand.

On top of all this is the need for robust security solutions, as health care organizations deal with large volumes of sensitive medical information.

Education

With schools around the world shut down and students by the millions adapting to remote learning, education connectivity has never been more visible — or more important. To meet all these new educational connectivity demands in an equitable and scalable way, governments must provide a single multiservice platform that ensures all pupils and schools have the same access to educational resources, no matter where they're located. This platform needs the capacity to support any number of applications and services, including

- Broadband connectivity for schools;
- Distance learning for homebound or remote pupils that includes both pushing content to students and pulling content from various websites;
- Access to online learning platforms and the latest course materials;
- Broadcasting of courses and lectures;
- Remote education for teachers, including multicasting trainings and access to educational content; and
- School network intranets.

Many of these applications and services rely on capacity-hungry video feeds, so bandwidth is essential, and it must be supplied equitably, to even the most difficult-to-cover areas.

Of course, installing new networks and addressing high volumes of bandwidth can be cost-prohibitive for many educational organizations. With bandwidth sitting idle during non-school hours, schools would be wise to develop a plan that can repurpose unused bandwidth for other activities and agencies. Government activities like elections, mail delivery, administration, and medical services could likely benefit from reallocated bandwidth, as could local internet cafés and other community-benefit organizations.

This bandwidth repurposing can both positively influence a school's community and provide an opportunity to monetize the school's expanded network to improve the total cost of ownership. From a business perspective, this monetization opportunity could help garner buy-in for what is sure to be a sizable investment.

Military/Welfare Networks

Global crises naturally cause increased deployment of military personnel as their organizations mobilize in support of humanitarian or government actions. This uptick in deployment creates, in turn, an uptick in demand for connectivity among both individuals and broader units.

Deployed personnel members need more connectivity to not only to keep up with essential trainings but also to stay busy, be informed, and connect with loved ones. This morale, welfare, and recreation (MWR) connectivity is especially important when operations are prolonged or quarantines are employed due to COVID-19. If COVID-19 is detected on a military vessel or on a base, the local doctor needs access to e-medicine services to consult on-shore specialists about medical results or video surgeries.

From a broader organizational perspective, units and fleets need more connectivity for mission-critical communications, applications and more as they're deployed to perform humanitarian tasks in response to the pandemic. When, for instance troops are deployed to respond to the COVID-19 crisis, these units could benefit from a satellite communications system that is flexible and scalable enough to cater to this new and unusual type of military mission.

To meet these needs, military and welfare organizations can upgrade their networks to DVB-S2X, ensuring their data speeds are as fast and efficient as possible. They can leverage throughput licenses as needed to increase bandwidth while maximizing flexibility and minimizing costs. And they can prepare themselves to quickly deploy additional modems to their networks to expand them as situations dictate.

Building "Smart Nations"

As governments adopt these network improvements, they will be taking steps toward building smart nations. Essentially, countries are looking to use sensors and smart systems that communicate with one another to improve the quality of life for their citizens, to provide more effective and efficient government services, and to make their countries safer places.

Even before the COVID-19 crisis, government agencies were driving toward these infrastructure and operations updates. Coming out of the crisis, these updates will be even more urgent. As we've seen during the pandemic, governments need to adopt network systems and technologies that support inclusion, social services expansion and robust emergency response. To this end, the applications of smart nation technology are limitless, from monitoring of critical infrastructure, to collecting environmental and sensor data collection, to situational awareness after a man-made or natural disaster, to support of emergency services, to military and intelligence operations.

These smart nation initiatives are a convergence of the latest communication and network technologies. They rely heavily on machine-to-machine (M2M), 5G and internet of things (IoT) technologies. Satellite communications play an integral part of the network to provide secure, resilient, and efficient communications between all network nodes and the smart nation network operation center.

Solutions to Meet Future Needs

The steps outlined above can help government organizations catch up and rise to the current challenge. Looking forward, these organizations should use the pandemic as a learning opportunity and start taking steps to prepare their networks for the next crisis. With a resilient, multiservice, scalable, and flexible network to support it, a government organization can respond to future disasters in more efficient and effective ways.

An advanced VSAT platform, for instance, can deploy a satellite network that is composed of different constellations in different orbits, and can connect global operations while supporting regional services and applications on land, at sea, and in the air. The network can be centrally managed, allowing for easier planning, management, and monitoring. It is scalable enough to support both small and large network deployments. And by relying on a "network of layers," the platform ensures constant connectivity by automatically repointing to backup satellites in the network if needed.

Thanks to the inherent flexibility of the advanced satellite network technology and new satellite constellations, agile services can be provided and VSAT hubs and deployed modems easily reconfigured and upgraded to react quickly to changing conditions in government and defense operations.

As satellite communications services grow more dynamic and sophisticated, so too do the networks' functionalities and efficiencies. Technologies like network virtualization and software defined networking aim to increase network efficiency, reduce costs and improve agility. New satellite services can be introduced much more quickly, along with optimization solutions that fine-tune network operations. And with the availability of resource virtualization, distributed cloud-based platforms, and global partnerships, government organizations can move away from dedicated hardware middle-boxes at centralized locations to respond more effectively to market demands. In these virtual and software defined networks, management and orchestration functionality plays a key role in providing functions for automated deployment and operation of network services.

Large governments should also consider adopting a pooling and sharing configuration, wherein a network operator aims to pool satellite capacity, satellite services and ground segment infrastructure and distributes it to whichever agencies or organizations need it the most at the time. This arrangement ensures secure and guaranteed access to connectivity when it's needed.

The main objective of an advanced satellite network is to improve operational efficiency and increase flexibility and resilience. The end result: higher success rates of operations and better decision-making.

Our Solutions to Help You Adapt, Prepare, and Thrive

As governments adopt these solutions, they will need to customize their networks to fit their unique needs and circumstances. At ST Engineering iDirect, we offer advanced satellite communications products and solutions that not only support current needs but also adapt easily to evolving circumstances.

Our DVB-S2X VSAT platforms, including iDirect Evolution with iQ Series modems and Newtec Dialog, enable improved performance, agility and increased efficiency. The iQ LTE satellite modem, for instance, provides hybrid VSAT and LTE connectivity for persistent communications— ideal for first response teams and mobile command centers that need to set up a local hotspot for emergency communications. These efficiency gains result in higher throughput, better user experience and higher service availability. You can also add more remotes to the network within the same satellite bandwidth or a combination of these elements. The MDM9000 is a field-proven DVB-S2X modem designed to support a wide range of fixed and mobile government and defense applications. It is deployed in emergency networks to set up point-to-point high-speed links to exchange mission critical data.

Visit ST Engineering iDirect (iDirect.net/government) to learn about the best platform solutions for your unique needs.

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