The Challenges of Deploying Tactical Equipment in Strategic Environments

Comms mobility

1st Lt. William G. Bourn, Sgt. Nicolas J. Tafolla
51st Expeditionary Signal Battalion-Enhanced

The 51st Expeditionary Signal Battalion-Enhanced (ESB-E) was notified in the middle of 2023 that they would be deploying to U.S. Central Command (CENTCOM) in 2024 to support Operation Spartan Shield (OSS) under the 160th Theater Signal Brigade (TSB). This would mark a historic moment for the battalion as 51st would be the first ESB-E to deploy in the CENTCOM Area of Operations (AO). This would not only be a prestigious opportunity for the battalion but also an extensive technical challenge.

The 51st ESB-E would deploy with the new ESB-E equipment package: the Scalable Network Node (SNN). This new tactical signal equipment would be the primary means of communications throughout the deployment.

Deploying communication systems in a challenging environment demands not only technical expertise but also the ability to adapt and innovate on the fly. No amount of training in garrison can accurately reflect the unique scenarios that each deployment will bring. Being the first expeditionary signal company-enhanced (ESC-E) to deploy to Saudi Arabia, we knew we would face an abundance of challenges.

Upon integration to theater, our team immediately recognized the extreme technical difficulties with deploying tactical equipment into a strategic site. We were charged with providing communications to enable critical air defense assets in order for them to protect strategic locations and personnel throughout CENTCOM. Realizing the extreme importance and major challenges, the most technical NCO was nominated by platoon leadership to head up this extensive feat. Sgt. Nicolas Tafolla utilized his technical skills from certifications he has which include Certified Information Systems Security Professional (CISSP), Cisco Certified Network Associate (CCNA) certifications. This was an effort that presented a host of difficulties, particularly given the distinct nature of the equipment not organically having a power generation system with enough power to maintain operations, the lack of Tactical Fiber Optic Cable Assemblies (TFOCA), and it was not designed for protection from the elements in the harsh environments of the desert.

SNNs are designed for easy mobility and short-term or long-term use. They differ significantly from Warfighter Information Network-Tactical (WIN-T) Increment 2 equipment that were running the communications sites prior to us. Command Post Nodes (CPNs) are much larger and require more manpower and logistics to deploy and emplace. SNNs are unique in that they are rolled out in small packages that can be hand-carried, deployed, and manned by a minimum team of two Soldiers. The major advantage SNNs provide is that they are extremely simple to deploy; the smaller design provides a major logistical advantage for signal units. The ESB-E equipment packages provide the Army with a more deployable tactical signal network that directly increases signal commanders' ability to provide command and control (C2) in any environment or situation, unlike WIN-T equipment that is exceedingly large, immobile, and slow to deploy. Despite the benefits of SNN, it was not organically designed to support strategic (long-term) sites. This disparity became evident as we had to implement an SNN at a strategic site, where long-term reliability and stability were paramount.

1st Lt. William G. Bourn, 51st ESB-E. (Courtesy photo)

One of the primary challenges Tafolla and the team faced was the integration of Tactical Fiber Optic Cable Assembly 2 cabling, which is essential for long-distance communication and increased service speed. The SNN's design did not accommodate this cabling, necessitating an unconventional solution. Leaders put all the technical brains in the company to work and decided upon utilizing the Commercial Coalition Equipment kit (CCE) – that was organically designed to provide network connectivity to commercial and coalition networks – by repurposing it as a media converter. Despite the unorthodox approach, with precise programming and quick adaptation, we successfully established the necessary communication links. However, this was not our only hurdle. The harsh environment, with temperatures regularly exceeding 110 F,

Co-author Sgt. Nicolas J. Tafolla, of 51st ESB-E. (Photo by 1st Lt. Michael D. Way, 51st ESB-E)

exposed the SNN's lack of environmental protection. The compact design, while advantageous for mobility, left the equipment—and by extension, the mission—vulnerable to extreme conditions. Due to the extreme temperatures, the maintenance team on ground designed a shade cover for the SNN modem. This unique solution prevented overheating of the equipment, allowing long-term services to be established.

Another challenge for the SNN was power. Our native 2K generator, although capable of powering the SNN, could not simultaneously support air conditioning required to keep the base-band side of our equipment and our team operational. To overcome this shortfall, we relied on inorganic equipment including commercial powered generators and air conditioning to ensure full mission capability. It is critical that units deploying with the SNN ensure they have commercial power at their site and 5K and 10K generators as a contingency plan. Power issues with this system are constant, and a Primary, Alternate, Contingency and Emergency (PACE) plan for this equipment is crucial to mission success.

Despite its shortfalls, SNNs provide major benefits to execute signal support missions. The compact equipment provides a logistical advantage, creating a minimal footprint in deployed environments. The smaller design provides a maneuverability advantage, and compared to the CPNs, the SNNs are much easier to deploy. This ensures SNN teams do not hinder the movement ability for units they are attached to.

Another tactical advantage is the electromagnetic signature emitted by SNNs is much smaller than WIN-T signal equipment. This is crucial, as it is more difficult to locate signal assets and personnel across the multi-domain battlefield.

As the Army moves in the right direction with SNNs, certain additions will be critical in their long-term success. They need to be designed for interoperability with TFOCA II cabling. This immensely increases service speeds and the physical distance to provide services to customers. A contraption to protect the equipment from heat will also need to be reconsidered to increase its durability. Power generation, at a minimum, should organically possess a 5K generator to provide better power for long-term operations.

This experience underscores a need for additional environmental safeguards and highlights the importance of contingency planning. As the Army continues to deploy ESB-Es to CENTCOM with the same equipment package, our experiences with deploying the new ESB-E equipment will be paramount. Lessons learned will assist these units to achieve mission success by being able to provide extensive C2 for commanders of all branches and warfighting functions.

Moving forward, the design, deployment strategies, and lessons learned for tactical communications equipment in demanding environments must evolve to meet these challenges.