

Expeditionary Communications

Deployments have always been part of military operations from the time of the American Revolution to the present day. With each deployment, lessons are learned and experience acquired. It should come as no surprise with most career fields being affected by Air and Space Expeditionary Forces; the cyber system operations career field is a crucial element in this concept. After all, effective communications is key to any command and control situation whether it is combat or a humanitarian mission. Your role and attitude will be deciding factors in the success or failure of your unit's mission. Understanding the importance of your job and having the proper training will enhance your abilities to help your unit succeed.

Deployable communication systems equipment

In most situations, but not all, equipment will be part of a unit type code (UTC). There are personnel only UTCs and equipment only UTCs, as well as UTCs with both resources. Any equipment available to meet mission requirements will be used in the deployed location. This equipment can include aircraft, power generation devices, weapons, and of course, communications equipment. We will look at the different types of deployable communications systems in this section.

Combat-ready communications and information support teams provide first-in capabilities to support peacetime through combat operations worldwide. These forces and equipment capabilities enable the Air Force to achieve its vision and success in combat operations. Communications and information (C&I) professionals plan, engineer, deploy, and employ this support for all air and space forces. For the expeditionary air and space force, our C&I forces are organized, trained, and equipped across the entire 3D career field to supply C&I capabilities when and where needed. The dividing line between "fixed" and "tactical" C&I will disappear as personnel become adept in the standardized expeditionary C&I skill sets needed to support expeditionary air and space forces throughout the entire pre deployment/deployment cycle. In short, all C&I professionals will be expeditionary Airmen, combat-ready at all times.

Recent years have brought several changes in the use and types of deployable communication systems by Air Force and other DOD agencies. Also due to emerging technologies and what recent deployments have taught us, these changes have occurred at a rapid rate. As we look at the types of equipment used and how this equipment is used, you will see certain systems can be utilized during both initial and sustained deployments. This versatility and flexibility allow a quicker response time, a more efficient use of resources, and more effective training than previous air and space expeditionary force (AEF) deployments. Your understanding of these communications systems and their purpose will enhance your abilities to perform if you become part of a deployment.

Initial communications support

Initial communications support teams are part of the first support teams to enter a deployed location because communications are paramount. For this reason, initial communications support teams are part of the first crews to enter a deployed location. They provide the communicating link between forces securing the area and setting up support facilities as well as providing messaging capabilities back to the garrison units. This is where initial communications support will be a major player. Initial communications support is designed to provide basic communications to a bare base operation within

24 to 72 hours of deployment notification and remain in place for up to 30 days. However the time at the deployed location can be extended. Initial communications support includes voice and data capabilities through satellite, wireless, and hard-wired sources. Even in a bare-bones environment, a commander will have the access to state-of-the-art equipment allowing communications with both field and in-garrison units.

Deployed communications are part of packages sent out under a UTC. Some of these packages have been around for several years while a few others are newer and are quickly replacing some of the earlier packages. Note that many of these packages are employed in both initial and sustained deployments. We will look at a few packages and see how field commanders employ them.

Theater deployable communication

The theater deployable communications program is a state-of-the-art ground communications infrastructure designed to provide deployed units with the same type of communications tools as their home station. This system can transmit and receive voice and data communications securely to and from wireless, satellite, or hard-wired sources. The theater deployable communications-integrated communications access package (TDC-ICAP) is configured into common man-transportable transit cases. These modular units are relatively small and lightweight for optimal airlift capacity and ease of ground deployment. This configuration provides the Air Force with the flexibility to tailor communication systems to specific needs and transport those systems anywhere in the world, while drastically reducing the problems usually associated with airlift, manpower, and training.

TDC-ICAP provides seamless interoperability between deployed air elements and CONUS-based operations, as well as interoperability throughout the deployed theater. The resulting connectivity between commercial and existing legacy systems allows users in the deployed area connectivity into and out of theater. TDC-ICAP customers are thereby able to use the high-capacity capabilities of current and future commercial systems.

The TDC program includes three major components. The first component, the lightweight multiband satellite terminal (LMST) provides easily deployable, long haul communications. The second component, the integrated communications access package (ICAP), provides switched voice and data traffic. The third component is the network control center-deployed (NCC-D).

AN/TSC-152 LMST

The AN/TSC-152 LMST trailer (TRL) configuration consists of non-developmental items (NDI), commercial-off-the-shelf (COTS) components, and government-furnished equipment (GFE). The AN/TSC-152 is configured in a lightweight, highly mobile, self-contained satellite terminal, and can be set up in 60 minutes or less by two trained operators/maintainers. The LMST is also capable of simultaneously interfacing and controlling an external X-band antenna.

The AN/TSC-152 can be operated worldwide with any satellite of the Defense Satellite Communications System (DSCS), DSCS II, DSCS III, North Atlantic Treaty Organization (NATO), NATO III, NATO IV, International Telecommunications Satellite Organization (INTELSAT), European Telecommunications Satellite Organization (EUTELSAT), Pan American Satellite Organization (PANAMSAT), or Domestic Satellite (DOMSAT). The AN/TSC-152 is also interoperable with ground mobile forces (GMF) AN/TSC-85/93/94/100 terminals and DSCS

Gateway terminals. The AN/TSC-152 trailer configuration contains the following equipment groups or subgroups:

- Receiver group.
- Transmitter group.
- Antenna group.
- Baseband group.
- Power group.
- Ancillary equipment group.

Interface with external Tri-Service Tactical Communications System (TRI-TAC) systems is accomplished with the simple adaptation of the existing Secure Mobile Anti-Jam Reliable Tactical-Terminal (SMART-T) technology. Integrated Services Digital Network (ISDN) and Digital Secure Voice Telephones (DSVT) can be integrated with a minimum need for special-purpose devices.

ICAP

The ICAP is compatible with local phone systems worldwide through the commercial private automatic branch exchange (PABX), which provides voice interoperability worldwide. This flexible open architecture can interface with and adapt to emerging commercial standards. TDC-ICAP supports the efficient transfer of command and control, intelligence, logistics, and administrative data between:

- Fixed sites and deployed locations.
- Different deployed locations.
- Different functional areas at each deployed location.
- CONUS gateway locations and deployed locations.

TDC-ICAP is composed of modules and components (or devices) and cable sets. Each module performs specific communication functions. Modules consist of a set of rack-mounted equipment housed in standard-sized “ruggedized” transit cases (11U or 13U). These transit cases require no special handling equipment. This is especially important under austere conditions, such as those in Air Force Special Operations Command (AFSOC) airfields. The modules are easily transportable and can be mixed and matched to support any deployment. The first-day airlift can easily fit on one pallet, yet provides operational core communications (standardized tactical entry point [STEP] sites, wing operations center (WOC), and three customer access nodes) in 1.5 hours. TDC-ICAP provides two independent network types:

1. The switched circuit network (SCN), or voice network, provides service for telephones and point-to-point serial digital data connections.
2. The datagram switched network, or data network, provides internet protocol (IP) data services for Ethernet and serial IP data users.

The initial module is called (fittingly enough) the basic access module or BAM. It provides users with both phone and data connectivity, and can be linked with other BAMs to provide greater capacity as needed.

If greater phone capacity is needed and adding more BAMs would not be cost effective, then a large voice module (LVM) can be added to increase the capacity. The next module is the red data module (RDM). This module is designed to provide for a classified network, that is a SIPRNet, at a deployed site. This unit currently consists of two switches—a router, and a Tactical Local Area Network Encryptor (TACLANE). A TACLANE is an encryption/decryption unit that can take classified data in from one side (the RED side), encrypt it, and transmit the encrypted data over the BLACK side, which is the unclassified.

Legacy module allows compatibility between a TDC-ICAP network and networks of different standards, such as a foreign telephone network. The microwave module provides line of site connectivity between two distant points via microwaves. This would primarily be used in situations where either normal landlines have yet to be setup, or it would be impractical to do so.

The multiplex module concentrates multiple signals into one signal for more efficient transmission of the data. Additionally it will take an incoming signal and separate it into separate lines to transmit it to separate destinations. The heavy NCC-D module is a two-case set that provides all the servers and equipment required to control a network. This includes a firewall, a network management server, virtual private network hardware, a global positioning system (GPS) time server, a backup server, and more. In theory, this will allow you to deploy to a site, connect the NCC-D to the rest of the TDC-ICAP setup, and start controlling the network. We will cover this more in depth below.

Multiple ICAP access nodes composed of circuit switched voice and data, packet data, and broadband capabilities are distributed to key functional area controls and/or large and small user concentrations on a deployed base/location. Line-of-sight (LOS) systems, such as microwave, are used along with fiber-optic and copper cables to interconnect ICAP access nodes on a deployed base. Satellite, TROPO, and LOS radio systems interconnect deployed locations within the same theater area. Connectivity to locations outside the theater area is accomplished via the Air Force's own commercial and military satellite systems, as well as other commercial host-nation facilities. We will look at some more aspects of the TDC later.

NCC-D

Before we cover the purpose of the NCC-D, it may be helpful to review functions of the network control center (NCC). The NCC performs local network defense; generates a local situational awareness picture; manages local network configuration; and delivers information assurance. It performs fault, configuration, accounting, performance, and security management on combat and combat support networks and mission systems. This includes voice, video, imagery, data, and sensor networks supported by base/site long-haul links, trunks, and circuits. A NCC provides these services for a fixed base, while a NCC-D provides the same services for a theater air base or other deployed site. NCC technicians provide flexible and scalable levels of service to functional system administrators, workgroup managers, and users 24 hours per day, 7 days per week. NCC-D technicians perform in the same manner in a deployed location. It is important to note a NCC-D is used in both an initial and sustained deployment. As a *minimum* the following must be provided by the NCC-D:

- Radio communications may include, but are not limited to: very high frequency (VHF) LOS ultra high frequency (UHF), UHF/super high frequency (SHF) satellite communications (SATCOM), to

include International Maritime Satellite, high frequency/single side band, and personal communications services (land mobile radios, cellular telephones, and pagers).

- Voice communications capabilities will include secure and non-secure Defense Switched Network and, if available, local telecommunications capabilities.
- Record communications, or an approved follow-on system, will be used for official message traffic.
- Data communications (to include imagery) will be provided by the Joint Worldwide Intelligence Communications System for SCI connectivity, SECRET Internet Protocol Router Network (SIPRNET) or Unclassified Internet Protocol Router Network (NIPRNET). Additionally network management services and systems administration support may be necessary to support C2 and administrative support systems.
- Visual information services will be provided to support operational briefings, status reporting intelligence activities, and public affairs requirements. Combat camera (COMCAM) teams may be tasked to assist in the processing of armament delivery record (ADR) imagery at the theater level and provide coordination with the respective supported CINC staff. Special communications connectivity considerations may be necessary to support the gathering, processing and dissemination of material within the area of operation, as well as for distribution of products to the Joint Combat Camera Center.
- Information protection (IP) measures will be implemented to protect friendly information systems by preserving the availability, integrity, and confidentiality of the systems and the information contained within the systems. IP includes communications security, computer security, and emission security.

Sustained communications support and theater deployable communications integrated communications access package

Sustained communications support becomes part of the deployments if it extends past 30 days. The mission of sustained communications support teams is to ensure air and space expeditionary force and air and space expeditionary wing (AEW) commanders have connectivity and an uninterrupted flow of mission critical information to field units, in-garrison units, and to command structures for the duration of the contingency. With current technology and the packaging of tactical communications, many of the initial communications support and the sustained communications support elements are very similar. We will explore a few of the sustained communications support packages you may encounter. The biggest difference between the two is with the former; you will have to help set it all up and get it running. With the latter, you will simply be rotating in with your AEF to relieve the previous rotation and continue operations. If you are lucky enough to be there when the base closes down, you will have to shut down operations in an orderly manner and ensure all the equipment is redeployed.

This is a big difference between the philosophy behind the way the Air Force operates and the Army operates. With the Air Force, we deploy to a location, set up communications, and then transfer operational control of the network stateside. Personnel onsite maintain equipment and handle situations much the same way workgroup managers do at home base. The actual network managing occurs stateside. When personnel are rotated out and new personnel rotate in, the equipment stays in place. With the Army, personnel are not normally rotated individually, units are rotated. Additionally when a new unit rotates in, they set up their equipment, transfer services over to their equipment, and

the previous unit redeploys to home station with their equipment. The benefit of the Army method is that each unit keeps track of their equipment. With the Air Force concept, you have more continuity, because once everything is set up, the same group manages it no matter how long it is there. Additionally you do not have the risk of service interruptions when transferring services from one unit's equipment to another's.

TDC

The TDC program is a state-of-the-art ground communications infrastructure designed to provide base level full spectrum communications to the commander and all agencies on that base. The theater deployable communications system can transmit and receive voice and data communications securely to and from wireless, satellite, or hard-wired sources. The TDC-ICAP is configured into common man-transportable transit cases. These modular units are relatively small, lightweight and of similar size for optimal airlift capacity and ease of ground deployment. The TDC-ICAP is used both in initial communications support and sustained communications support.

TDC-ICAP

Earlier we looked at TDC-ICAP and its use in an initial deployment. Because of TDC-ICAP's scalable features and its expandability, it also is useful in a sustained deployment. We will look at its architecture and how the design of this system can provide many features in a deployed environment. The TDC-ICAP network is a scalable network providing telephone, data, and switched message service to customers at various locations within a metropolitan area. It is hard to think of some of the deployed locations as metropolitan but in a network "metropolitan" means simply connecting more than one LAN together to pass information. The TDC-ICAP metropolitan area network (MAN) is a hub-spoke design supporting redundant connections to critical customers. User nodes can be connected to a primary network hub (base hub) or to another user node.

The TDC-ICAP network can also be connected as nodes to external wide area networks (WAN). This "building block" concept allows planners to scale the network to meet the needs of deployments ranging from a few subscribers to a full wing, or even a Joint Air Force Command Component. The system can be expanded to meet growing customer requirements as operations mature. Conversely as missions "draw down" and units and personnel begin to redeploy, the TDC-ICAP network can be downsized accordingly. Modules can be taken out of service with little or no disruption of communications support to the remaining forces.

A MAN normally covers an area between 2 and 50 square kilometers. Each of the user nodes is a LAN. The connectivity outside the ICAP network (which could be as varied as host nation, satellite data link, etc.) indicates that this particular MAN is a part of a WAN.

In terms relative to an Air Force operation, if this MAN supported a wing, each of the user nodes (or LANs) might support a group or squadron section. The base hub (MAN) is the conduit that ties all the LANs together and provides the interface to other networks.

The TDC-ICAP MAN may be connected externally to other networks. Once these connections are made, ICAP becomes a node of these other networks.

Deployment cycle

Deploying the TDC is a process that covers a total of six phases, and include preparing the equipment and personnel, transporting the equipment and personnel to the location it is needed at, setting it up, operating it for the duration of the deployment, taking the equipment down and transporting it back to home base, and replacing used equipment and training personnel to get ready for another deployment. Sometimes these phases don't always happen in this order, for example, you could re-deploy from one deployed site to another location instead of re-deploying to home station.

Pre-deployment

The pre-deployment phase is where all the preparation is done. Individual personnel and teams must ensure their training will be current through the deployment, vaccinations need to be up-to-date, their personnel bags are ready, and all of their personal affairs, such as wills and power of attorneys, are in order. On the equipment side, the UTC must be complete, having all it's equipment and expendables (such as toner cartridges) fully stocked. Often parts from one kit will be cannibalized to make another kit complete, and this is the stage where you ensure that you do not deploy without the proper equipment and resources.

Deployment

The deployment phase typically has four steps to it—the warning order, the alert order, the deployment order, and the execution order.

Warning order

The actual deployment phase starts with a warning order. At this point, your unit will begin organizing the equipment for transport, checking everyone's bags, reviewing procedures, and ensuring that all of your personal affairs are in order. Your unit getting a warning order does not mean that you are deploying but that you may. A warning order indicates that at the headquarters level, they are formulating the mix of forces, they think would fulfill the requirements; your unit is one of those being considered.

Alert order

The alert order tells your unit that it has been selected as a part of the force mix and that it will be deploying. At this point, final checks are run on equipment, quality assurance personnel inspect the mobilized gear for any issues, and personal gear is normally collected in preparation to palletize it. Personnel are usually either restricted to base or put on "three ring" telephone standby at their residence. At this point, no information is officially known about a time, a date, or a location. That information usually comes with the next step, the deployment order.

Deployment order

When the deployment order "comes down," your unit will be given information concerning times, dates, and location(s) it will be deploying to. This information will be passed along in the form of a concept of operations (CONOPS) briefing. Additionally several other briefings will be given. They typically include, but are not limited to:

- Intelligence.
- OSI.

- Legal affairs.
- Medical.
- Airmen and Family Readiness Center.
- Others as appropriate.

These briefings are given as part of the “processing line” that handles the final preparations for deploying personnel. A troop commander for your group will be selected at this point. That person is usually an officer or a senior enlisted, and they will be responsible for ensuring the integrity of their group through to the deployed location. Additionally equipment being deployed will be organized according to the order it will be loaded onto an aircraft. Often you will not know when air transport will be available. It is because this is often part of a huge “orchestra,” utilizing assets from all over the country, and when you are working on that kind of scale, you have to factor in some variances. Up to this point, we have been assuming the use of air transport, but it is also possible that transport may be by ground convoy, rail, or even by ship.

Execution order

This order tells you to load personnel and equipment on the aircraft, truck, train or whatever means of transportation is being used. During transit, you may have stopping points for aircraft refueling, swapping out crews, or maintenance problems. During those stops, the troop commander is responsible for ensuring all personnel are ready to move when the stop is completed. Always make sure the troop commander knows your location. Once your unit arrives at the deployed location, you will most likely roll into the next phase of the deployment, establishing services.

Establish services

After disembarking from the transportation (plane, train, etc.), you will work to establish services. First you will in process to the deployed location, so the location of all personnel in the theater can be tracked. Depending on the needs of the command, you may immediately start setting up your equipment and establishing connectivity or you may get a chance to rest up first. Additionally, depending on the situation, you may be the team setting up initial communications; you may be augmenting a previous team, or you could be completely replacing a smaller initial communications team, such as a quick reaction package (QRP). Often the smaller packages, such as the QRP, are sent to new locations until sufficient communications resources arrive in theater to provide the support needed for the mission. At this stage, EVERYONE will want to know when they will get their connectivity.

Extended services

In this phase, as the buildup of forces in the theater increases, the communications infrastructure will mature. Low throughput connections will be replaced with higher ones, mobile communications setups will be moved into buildings, capacity will be increased (storage space, processing power, services provided), and over time the communications infrastructure will become similar to that of permanent communications infrastructures at military bases located outside the theater of operations.

Re-deployment

The redeployment stage occurs when your unit is no longer needed in the theater. This may be because the campaign is winding down, it may be because regular rotations have been set up, or it may be

because the temporary base you helped build is transforming into a permanent base. If the location is being shut down or being turned over to other entities, you will have to take down your equipment and prepare it for transport back to home station.

Reconstitute

Reconstitution normally takes place at home station and consists of medical and psychological reviews for personnel, repair/replacement of worn or missing equipment, and replenishment of supplies. It is also the phase you need to be careful not to relax too much, because usually personnel experience a “let down” of adrenaline and emotion. They are finally back at home base; they can relax, and that is when many accidents occur. The principles of operational risk management (ORM) still apply. Additional problems that can occur are expecting everything to be the same as when you left. Depending on the duration of your deployment, a great number of things may have changed, and these things could cause stress. If you notice your wingman having problems, talk to them.

After the equipment is replaced or repaired, and personnel have had some time to re-adjust, relax, and re-focus, you roll into the pre-deployment phase again and start training for the next deployment. Deployments are now a part of everyday military life and during the course of your career, you can expect to be part of a deployment or assisting in the preparation for a deployment. The use of a UTC allows for flexibility and rapid execution of deployment orders. UTCs can combine equipment and personnel, either together or separately, into packages for quick marshalling and placement during any contingency. Equipment and personnel will establish air operations in a tactical environment. Different needs exist for initial and sustained environments. The type of communications equipment in use will depend on the length of deployment and the type of deployment environment. A few of the packages can be used in both initial and sustained deployments, for example the NCC-D, while others are designed strictly for use in an initial deployment, for example the wing initial communications package.

Providing the tactical commander with communications connectivity to theater units, upper echelon command level, and in-garrison units will be a crucial role. With the proper training, you will be a vital part of your unit’s mission. Attitude and teamwork are also of utmost importance and can be the deciding factors in a successful operation.