COMMANDER'S DIGEST

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DCA -

Achieving a unified single system approach to long-haul communications

Achieving a Unified Single System Approach to—

LONG-HAUL COMM

A U.S. Navy radioman works in the DCA-Pacific Operations Center near the U.S. Pacific Command headquarters in Hawaii. The center is manned 24 hours a day in order to ensure timely and accurate system control actions are taken to maintain the effective operation of the Defense Communications System.

Prior to 1960, the Department of Defense had three separate long-haul communications systems, engineered, operated and maintained by the Army, the Navy, and the Air Force. Because they were designed separately, these systems were not compatible with each other. They were interconnected on a very limited basis, and were structured to be responsive to each individual Military Service chain of command, rather than to a strengthened joint structure of the Unified and Specified Commands capped by the Joint Chiefs of Staff (JCS) and the National Command Authorities (NCA). These factors, together with the rapidly escalating costs associated with telecommunications, were cause for concern within the highest levels of the national government.

As a result, the Defense Communications Agency (DCA) was established in May 1960 by the Secretary of Defense with the basic objective of achieving a unified single system approach to long-haul communications. This action was important far beyond the principal motivating factor, which was economic, for it laid the groundwork for the application of significant new technologies, principally those relating to electronic switching and satellite communications. Further, it laid the groundwork for a communications system, the Defense Communications System (DCS), which could be configured to respond to the increasing demands of a more centralized command and control concept.

It should be noted that the DCA mission does not include those communications generally defined as tactical: air-air, air-ground, ship-ship, ship-shore, and the elements of ground combat units. Also excluded from the DCS are those communications facilities of a local nature for support of a post, camp, station, air base, or shore installation.

In establishing the DCA, the Secretary of Defense provided the minimum overhead essential to the planning, engineering, programing ,and management of the new DCS. As a corollary, the Military Departments continued to operate and maintain the stations and facilities making up the DCS, but now under the operational direction and management control of the DCA. The financing of the DCS, to include operations, modifications and improvements, was continued as a departmental responsibility. Although the basic relationship between DCA and the Military Services has not changed over the years, the mission of DCA has broadened to include command and control support functions and the character of the organization has become increasingly weighted in the areas of planning and systems engineering. This tailoring of the agency's mission and organization has occurred largely in response to advancing technology and increasing demands for telecommunications and information processing services.

MISSION AND ORGANIZATION

The Defense Communications Agency plans, engineers, and manages telecommunications and information processing systems which serve the National Command Authorities, the Joint Chiefs of Staff, the Military Departments, and other agencies of the Federal Government. DCA is responsible for planning, engineering, and exercising operational direction and management control for the worldwide Defense Communications System. The agency is also responsible for systems engineering and technical support of high priority communications-electronics systems established for command and control of our Nation's military forces.

DCA exercises unique responsibilities for defense satellite communications. A recently issued DoD directive appoints DCA as the system architect for all defense satellite communications. A major

UNICATIONS

new DCA staff directorate, the Military Satellite Communications Systems office, has been created to discharge this new role. As system architect, DCA coordinates all defense satellite communications planning and programs to avoid duplication and ensure communications interoperability among diverse systems serving the complete spectrum of defense needs.

The DCA Director reports to the Secretary of Defense through the Joint Chiefs of Staff. The agency has grown as responsibilities have increased in scope and number. Today DCA has more than 1,600 military men and women from the Armed Services assigned, and over 1,600 civilian employees, including electronic engineers, communications specialists, mathematicians, computer specialists, and operations research analysts.

The DCA headquarters complex is located on South Courthouse Road in Arlington, Virginia, only a short drive from the Pentagon. Major staff elements include separate directorates for Plans and Programs, Operations, Military Satellite Communications Systems, Comptroller, Technical Support to the National Military Command System, and Systems Engineering. In addition to field activities located within the metropolitan Washington area, subordinate units and offices are positioned at various locations within the continental United States, Alaska, Europe, Hawaii, and throughout the Pacific area.

COMMAND AND CONTROL SYSTEMS

DCA is charged with major support responsibilities in the vital area of military command and control. The primary communications support to the Worldwide Military Command and Control System (WWMCCS) is provided by the DCS, for which DCA provides planning, system engineering, operational direction, and management control. In addition, DCA provides engineering and technical support directly to certain component subsystems of the WWMCCS.

Simply stated, WWMCCS provides the means for the operational direction and technical administrative support involved in the command and control of U.S. military forces. Through this worldwide system, the President, the Secretary of Defense, the Joint Chiefs of Staff, the Commanders in Chief of the Unified and Specified Commands, and other major commanders are informed of all important events affecting our national defense, provided adequate information on which to base military decisions, supplied the means for transmitting orders to the military forces, and given the ability to monitor the results of those orders.

Other than agency responsibilities for the communications provided as an integral part of the DCS, DCA's support to WWMCCS is provided by the National Military Command System (NMCS) Technical Support Directorate within the headquarters and by two DCA field activities, the National Military Command System Support Center in the Pentagon and the Joint Technical Support Agency located at Reston, Virginia.

NATIONAL MILITARY COMMAND SYSTEM

The NMCS is that portion of the Worldwide Military Command and Control System designed to directly support the President and Secretary of Defense on a priority basis. The NMCS has three major command centers: the National Military Command Center in the Pentagon, a hardened alternate center near Ft. Ritchie, Maryland, and the National Emergency Airborne Command Post. Included within the NMCS are the communications

MCEB Furnishes Guidance, Assistance

The Director, Defense Communications Agency (DCA) serves as the Chairman of the Military Communications-Electronics Board (MCEB). The board consists of the Director, DCA, the Director of Communications-Electronics (J-6) of the Organization of the Joint Chiefs of Staff, the senior communicator of each of the Military Services, and a representative of the National Security Agency.

The board furnishes selective guidance, assistance, and direction to the DoD on military communications-electronics matters which affect more than one service, including call signs, frequencies, communications security, procedures, and communications publications. The board also achieves coordination on military electronics matters between the DoD and other U.S. governmental organizations; and between DoD and representatives of foreign nations. The board works closely with the Joint Staff in accomplishing its functions, and interfaces with allies and similar boards in multinational organizations such as North Atlantic Treaty Organization (NATO).

The MCEB formally addresses well over 200 items annually. The detailed work of the MCEB is accomplished through specialized panels, whose members, assigned to the Joint Staff, Military Departments or National Security Agency, participate in the resolution of MCEB matters only as needed. A small, full time MCEB Secretariat provides overall direction and administration for the MCEB.

among the command centers and from these centers to the primary and alternate command centers of the Unified and Specified Commands. The need for warning and intelligence data from all sources, and for communicating decisions and commands to the military forces, requires that the NMCS be the most responsive, reliable and survivable system that can be provided within available resources.

Working in close coordination with the JCS, DCA is responsible for system engineering and system design and development of the NMCS. An on-going major DCA effort is the preparation of a master plan for the NMCS which will provide system configuration guidelines for developing a significantly improved NMCS for the early 1980s.

Concurrent with this future planning, DCA supports the NMCS in its continuous evolutionary improvement. Included in this area of work are survivability studies and enhancements, command center designs, upgrading of attack warning systems, and enhanced communications capabilities.

The DCA National Military Command System Support Center (NMCSSC) operates the computer facilities of the National Military Command Center and the Alternate National Military Command Center. It provides computer driven display and remote query capabilities and distribution systems as required, and furnishes direct-automatic data processing (ADP) support to the command centers of the NMCS and to certain offices of the Joint Staff and Secretary of Defense which utilize NMCS data bases and applications software. The NMCSSC also prepares analyses of attack hazards and vulnerabilities of forces and resources on a world-wide basis.

The overall objective of the WWMCCS Standard ADP Program, which is managed by the JCS, is to improve the exchange of data among command centers of the WWMCCS through the systematic standardization and improvement of the automatic data processing hardware and software used in support of the WWMCCS. The program includes the acquisition of a family of new standard computers, the development of standard system and applications software to meet the common requirements of the WWMCCS commands and installations, and the evolutionary development of these components into an integrated system.

The DCA Joint Technical Support Activity (JTSA) provides centralized technical support to the JCS, the Services and Defense Agencies, the Unified and Specified Commands, and other activities that comprise the WWMCCS

Air Force Lt. Gen. Gould Heads DCA

Air Force Lieutenant General Gordon T. Gould, Jr. has been Director of the Defense Communications Agency since September 1, 1971. A native of Alabama, he graduated from the U.S. Military Academy, West Point, New York, in 1941 and received a master of Science degree in Electrical Engineering from the Massachusetts Institute of Technology in 1950.

During World War II, he served with the 312th Fighter Wing in China where, as the communications officer, he was responsible for establishing much of the communications and control system for support of the first B-29 operations. In August 1945, General Gould was assigned to the Army Air Forces, China Theater headquarters, as staff communications officer. Following the Japanese surrender, he directed the reestablishment of airways systems and communications through the portions of China that had been occupied by the Japanese.

The postwar years found General Gould in a variety of research and development and communications assignments. In July 1960, General Gould was assigned to Headquarters, Strategic Air Command as Chief of the Communications-Electronics Division. In November 1964, he was appointed Deputy Commander of Air Force Communications Service. He became Director of Command Control and Communications, Headquarters, United States Air Force in July 1965, where he remained until he joined DCA as Vice Director in July 1971.

Lt. Gen. G. T. Gould, Jr.

His military decorations include the Distinguished Service Medal, Legion of Merit with two oak leaf clusters, Army Commendation Medal with one oak leaf cluster, and the Special Breast Order of Yun Hui from the Republic of China. He is a Fellow of the Institute of Electrical and Electronics Engineers (IEEE), Fellow of the American Association for the Advancement of Science, a member of Sigma Xi, and National Vice President of the Armed Forces Communications and Electronics Association (AFCEA).

In an interview with Commanders Digest on page 14, General Gould provides some interesting insights into the roles and technical expertise of the Defense Communications Agency.

Standard ADP community. This technical support includes the planning, design, development, maintenance, test, and evaluation of WWMCCS system software and other JCS-assigned standard software, as well as system configuration management support.

MEECN NETWORK

The Minimum Essential Emergency Communications Network (MEECN) is a composite of designated WWMCCS communications assets that netted together provide assurance that decisions of the National Command Authorities (NCA) can be delivered from the NCA to U.S. forces during all periods of stress.

DCA is the MEECN system engineer and provides the broad engineering necessary to ensure a more survivable future network with compatible, interoperable, and secure subsystems. The principal products of this activity include performance and survivability analyses and designs of alternative future network configurations, test plans and reports, and communications security equipment integration plans. A major program guidance document, the MEECN Master Plan (MMP) is prepared annually. The plan examines the next 10 years with emphasis on the Five Year Defense Program (FYDP) years. When approved by the JCS and the Secretary of Defense, the MMP becomes the definitive program guidance to the Services for preparation of their programs and budgets.

WHITE HOUSE COMMUNICATIONS AGENCY

The White House Communications Agency (WHCA) is a DCA field activity. Staffed mostly by military personnel, its mission is to provide direct communications support to the President and his immediate staff wherever they are located.

NATIONAL COMMUNICATIONS SYSTEM

The National Communications System (NCS) is a confederation of Federal departments and agencies participating in coordinated planning and other activities, with the goal of improving the Government's ability to provide necessary communications under all conditions ranging from a normal situation to national emergencies and international crises including a nuclear attack on the United States.

Army Maj. Gen. Robert D. Terry, left, has been Vice Director of the Defense Communications Agency since September 1971. A 1942 graduate of the U.S Military Academy, General Terry served as Deputy Director, National Military Command System Technical Support, DCA, for two years prior to his present assignment. Dr. Harry L. Van Trees, center, has been DCA's first Chief Scientist and Associate Director, Technology, since his appointment in 1972. A professor at MIT for 11 years, he has served as consultant to numerous government and industrial organizations. Navy Captain Lawrence Layman is DCA Chief of Staff. A 1952 graduate of the U.S. Naval Academy, he is a proven communications subspecialist.

The NCS consists of the 58 million channel miles of Federally owned and leased communications resources of its 10 member agencies. The operators of the largest component networks, Department of Defense, Department of State, Federal Aviation Administration, National Aeronautics and Space Administration and General Services Administration, are classified as major NCS agencies, while Department of Commerce, Department of the Interior, Atomic Energy Commission and the United States Information Agency are classified as minor NCS agencies. The Director, DCA, serves as the manager of the NCS and has a small, predominately civilian, staff, collocated with Headquarters DCA to assist him.

The primary functions of the NCS involve planning directly related to emergency preparedness and insuring the effective use of government assets. Included are plans and procedures for managing the government's telecommunications assets in wartime; communications support in major natural disasters; survivability/continuity of government communications studies; and administration of the national circuit Restoration Priority System. The enhancement of the government's day-to-day telecommunications capability is supported by the development of improved procedures and the coordination of member agency planning. Current and future interoperability capabilities of NCS networks are improved through the actions of the NCS-managed Federal Telecommunications Standards Program to systematically remove, through standardization, the technical impediments to interoperability. Federal telecommunications standards resulting from this program are developed in concert with the National Bureau of Standards and other Federal Agencies, Industry, and International Standards groups.

SUMMARY

DCA is a defense agency charged with responsibilities of significant national importance in the areas of command control support and communications. As a joint activity, DCA works closely with the Military Departments, the Unified and Specified Commands, the JCS, and the Office of the Secretary of Defense. DCA functions range from research and development, through systems engineering and implementation, to operational direction and management control.

DCS
A General-Purpose Communications System

The Defense Communications System (DCS) is a general-purpose system composed of leased and government-owned transmission media, relay stations, and switching centers. It embraces all of the long-haul point-to-point DCS assets of the three Military Departments. The DCS encompasses a wide range of services, including command and control, intelligence, and early warning, as well as administrative and logistical communications.

DCS NETWORKS

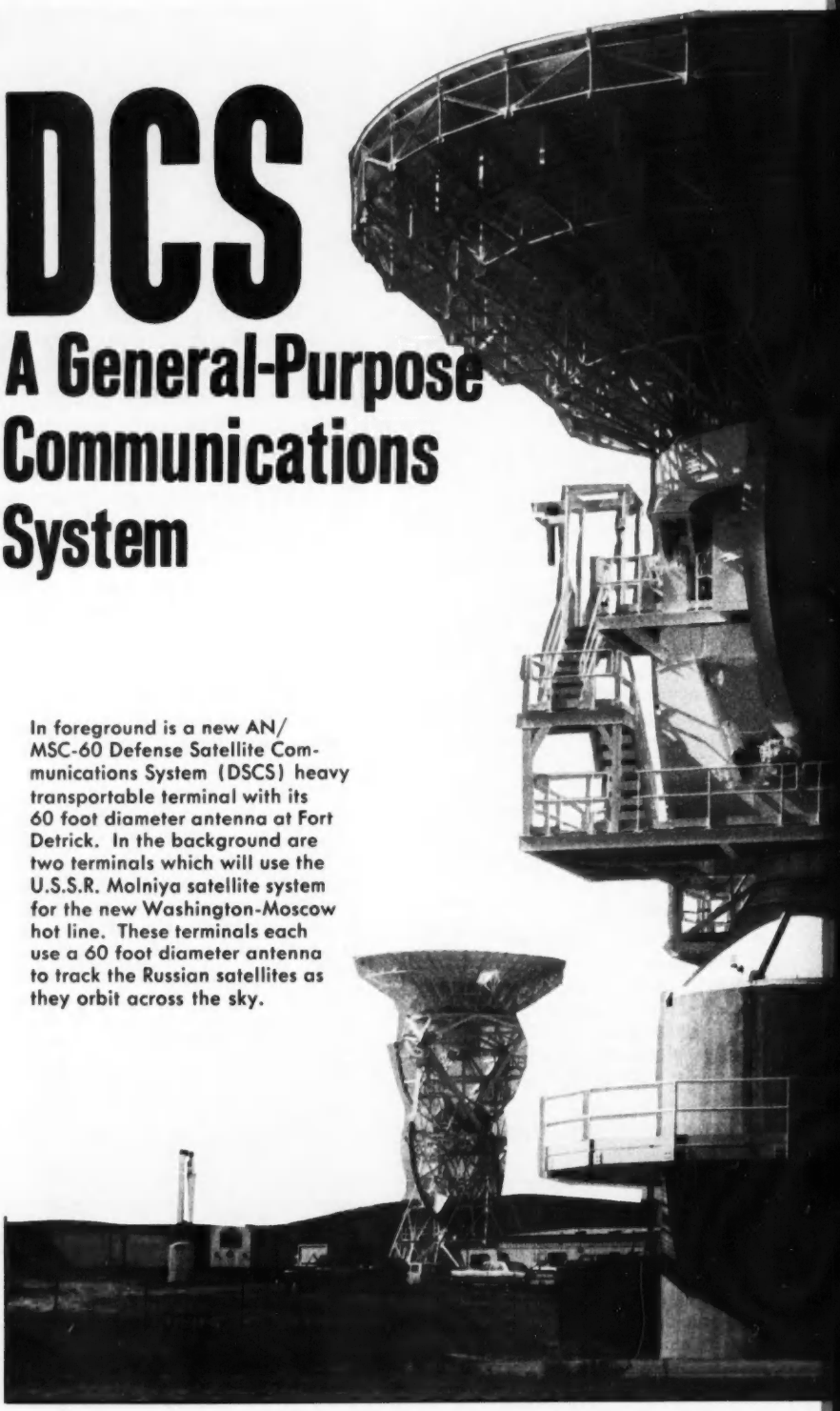
The three major networks within the DCS provide voice, secure voice, and secure record communications service. Each of these networks is characterized by a degree of automatic switching, a military precedence system, worldwide trunking, and service to a large community of defense and other U.S. Government users.

AUTOMATIC VOICE NETWORK

The best known network in the DCS is the Automatic Voice Network (AUTOVON). It is the principal long-haul telephone network of the DCS. It has over 300,000 users connected by some 17,000 access lines and automatically handles approximately three quarters of a million calls daily.

AUTOVON, which began in 1964 with nine switches, now has a total of 86 operational switching centers connected by approximately 7,900 trunks. Sixty switching centers are located within the continental United States, 9 in Canada, and 17 at overseas locations. Survivability is provided by employing many switching centers, locating them away from population centers, and interconnecting them in a multiple routing configuration.

AUTOVON has several interesting features that distinguish it from a commercial telephone system. The first feature is a multilevel precedence system. This feature relies on the originator of the call to designate the importance of his particular call in relation to all other calls. An electrical indication of this precedence is provided within the system, with the higher precedences receiving preferred service. A second feature automatically disconnects calls of lower precedence when a period of increased stress has increased the number of calls



In foreground is a new AN/MSC-60 Defense Satellite Communications System (DSCS) heavy transportable terminal with its 60 foot diameter antenna at Fort Detrick. In the background are two terminals which will use the U.S.S.R. Molniya satellite system for the new Washington-Moscow hot line. These terminals each use a 60 foot diameter antenna to track the Russian satellites as they orbit across the sky.

in the system. A final distinguishing feature is the method of paying for the AUTOVON service, where the various users share the cost according to the calling areas and precedence levels available for their use.

SECURE VOICE COMMUNICATIONS

A second subsystem of the DCS is the Automatic Secure Voice Communications Network (AUTOSEVOCOM). This is a network of some 1,400 subscribers throughout the world, made up of manual and automatic switches, each of which serve from 3 to 250 subscribers.

AUTOSEVOCOM provides two types of service. First, in some key locations, such as Washington, D.C., Strategic Air Command headquarters, and North American Air Defense Command headquarters, encrypted calls of superior voice quality can be made within each local area and, to a limited extent, between such areas. However, most subscribes use secure voice instruments which do not have access to the special, more costly telephone circuits which permit transmission of high fidelity calls. Instead, different voice processing techniques must be used, techniques which are compatible with the available telephone circuits. As a result, voice quality, although it is understandable, is less than that desired. Future improvements, which will provide better quality service, are programed.

AUTOMATIC DIGITAL NETWORK

The third major network, the Automatic Digital Network (AUTODIN), is similar to commercial networks designed to deliver record communications, e.g., telegrams. However, AUTODIN, the DoD worldwide record communications network, has been designed to meet necessary DoD security, timeliness, and reliability requirements.

Security is provided by the encryption of messages entering or leaving each of the 19 message switching centers. Timeliness is attained by computerized message switches which rapidly process each message based on its relative importance. Messages containing time-sensitive information of a critical nature are processed from point of entry to destination in less than three minutes

while messages containing less time-sensitive information are processed in less than 15 minutes. Reliability is attained by locating the network's 19 automatic message switching centers (ASC) strategically throughout the world, providing backup equipment where necessary, connecting the ASC's via diversely routed high speed circuits, and properly accounting for each of the approximately 400,000 messages delivered daily by the network.

FUTURE DCS

In the present environment, the DCS networks provide efficient and highly satisfactory service. Developing requirements, however, dictate that substantial changes must be planned. Our national security policy, based on flexible response, makes reliable, effective command and control of our deployed forces very important. More extensive secure voice service is required and new computer data service demands, characterized by rapid query and response modes, must be satisfied. DCA planners and engineers are now addressing the challenging tasks encountered in evolving from the present system to that required as technology and operating procedures advance.

Responsibilities for WWMCCS

What Others Do	What DCA Does
1. JCS states NMCS technical support operational requirements.	1. a. DCA provides NMCS system engineering. b. DCA determines best means of meeting requirements, develops plans for accomplishing technical support requirements, and provides technical project management. c. DCA field activity provides ADP operational support.
2. JCS manages MEECN, coordinates actions with MILDEPs/CINCS.	2. DCA provides MEECN system engineering.
3. JCS/WWMCCS elements state ADP technical support requirements.	3. DCA field activities develop software, provide ADP installation support and technical assistance to WWMCCS.

Mrs. Sherry Zulka is ready to operate the control console of the general-purpose computer of the Defense Communications Agency Hybrid Simulation Facility at the Engineering Center, Reston, Virginia.

DCS FACILITIES AND KEY ORGANIZATIONS

There are 42 million channel miles of various types of circuits which connect over 1,000 locations in many parts of the world. In terms of people, 17,000 DoD communicators operated and maintained the DCS during fiscal year 1974. These communicators come from the Military Departments: 7,700 from the Army, 2,700 from the Navy, and 6,800 from the Air Force. In addition, DCA has about 2,300 military and civilian personnel committed to exercising management direction and operational control, engineering, and planning of the DCS.

The $600 million annual expenditures for the DCS include leased service charges, pay for military and civilian DCS personnel, research and development, and other items. The total DCS plant investment is approximately $3 billion. Sixty percent of the DCS is in the continental United States and is mostly leased; the remaining 40 percent is overseas and is primarily government owned. The overseas DCS utilizes cable, microwave radio, tropospheric scatter radio, high-frequency radio, and satellite transmission media.

SATCOM

Communications service via satellites, both leased and government-owned, provides the most technically advanced medium in use in the DCS today. In coordination with the authorized transoceanic commercial communications companies and the International Telecommunications Satellite Consortium (INTELSAT), DCA leases nearly 200 long-haul communications satellite trunks.

The Defense Communications Agency manages the Defense Satellite Communications System (DSCS). The DSCS is being implemented in phases. Phase I has provided an operational capability since 1967. Phase I consists of low-power satellites drifting slowly in orbit around the earth, and 33 earth terminals of various types positioned around the world including some on Navy ships.

Phase II of the DSCS is now completing tests to become fully operational. Two Phase II satellites were launched in December 1973 and placed into earth synchronous orbits which make them appear stationary. The new satellites are larger and have considerably more capability than the older, drifting satellites. Present earth terminals are undergoing modification to effectively utilize this greater capability. The two Phase II satellites now in orbit will provide vital communications links to deployed DoD forces in both the Atlantic and Pacific areas.

DCA OPERATIONS CONTROL COMPLEX

A principal function of the DCS is providing responsive communications in support of the Unified and Specified Commands. To assure optimum support and close coordination between the agency and these key commands, the DCA has located major organizational subelements, called Areas, as follows: DCA Pacific located with Headquarters, U.S. Pacific Command in Hawaii; DCA Europe located with Headquarters, U.S. European Command in Germany; and

DCA Western Hemisphere located with Headquarters, North American Air Defense Command at Colorado Springs, Colorado. To provide close daily contacts with subordinate unified commands, component commands, and Military Department-operated DCS facilities, areas have been further subdivided into the following regions: DCA—Germany in Heidelberg; DCA—United Kingdom at RAF Croughton, England; DCA—Mediterranean in Spain with a field office in Athens, Greece; DCA—Alaska at Elmendorf Air Force Base; DCA—Thailand; DCA—Japan with a field office in Okinawa; DCA—Korea; and DCA—Southwest Pacific at Clark Air Force Base, Philippines, with a field office in Taiwan.

Collocated with the headquarters in Washington, D.C. is the DCA Operations Center (DCAOC). The DCAOC and similar centers located at the areas and regions collectively constitute the DCA Operations Control Complex (DOCC), which maintains continuous surveillance over the operating DCS.

The purpose of the various DOCC elements is to control the routing and restoral of DCS communications within their assigned geographical areas. If a communications site fails, critical circuits must be quickly rerouted and actions taken to restore the service to an operating condition. Decisions are made at the lowest possible level. For example, should a DCS outage occur within Korea, the necessary action will be taken by the appropriate operating Military Department and the DCA—Korea Regional Office, and an after-the-fact report transmitted to the DCA—Pacific Area headquarters. As appropriate, summary reports are forwarded to the DCAOC.

Real time operational direction of the DCS is exercised by the DOCC. The DCA Operations Directorate exercises staff supervision over the operation of the DOCC, and, in addition, provides a longer range, system overview management of the entire DCS. It focuses on system deficiencies and necessary corrective actions, evolutionary improvements in the DCS, and general management activities important to the continued health of the DCS.

COMMERCIAL COMMUNICATIONS LEASING

The DCA spends approximately $400 million for leased communications services and facilities each year. The Defense Commercial Communications Office (DECCO), a DCA field activity located at Scott Air Force Base, Illinois, is responsible for contracting for all the DCS and private line leasing for the Department of Defense. DECCO also leases communications for other government agencies as directed.

COMMUNICATIONS ENGINEERING

The key to coordinating the DCS associated operation and maintenance and research and development activities of the Military Departments is the DCA system engineering of the DCS. Most of the DCA engineers carrying out this element of the DCA mission work at the Defense Communications Engineering Center, a field activity of DCA located in the Virginia countryside at Reston. There, in the Derey Engineering Building, engineers employ the latest technology, including computer simulation techniques. Fourteen percent of the assigned professional personnel are PhDs, and another 37 percent hold masters degrees. The range of activities encompasses future systems engineering, survivability, research and development, subsystem and project engineering, and standards and engineering support to the operating DCS, to include quick response assistance to field activities with special problems.

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Responsibilities for DCS

What Others Do	What DCA Does
1. JCS, CINCS, and MILDEPs state the requirements.	1. DCA determines best means of meeting requirements.
2. SECDEF approves DCA-developed plans.	2. DCA develops plans for system improvements and evolution.
3. MILDEPs accomplish detailed project engineering and implementation.	3. DCA performs overall system engineering.
4. MILDEPs budget, fund, man, and operate DCS facilities.	4. DCA establishes standards and evaluates system operation.
5. JCS sets priorities for system use.	5. DCA directs manner of use.
	6. DCA reports to SECDEF through JCS.

This DCS station at Fort Buckner, Okinawa, contains a SATCOM earth terminal, a submarine cable head, multiple microwave terminals, technical control facility, plus AUTOVON and AUTODIN switching centers.

PLANNING AND PROGRAMING

The Plans and Programs Directorate within the headquarters is responsible for DCS plans and programs to ensure a reliable, effective long-haul system. Specifically, the directorate exercises management control over the acquisition and implementation of approved projects. Life-cycle support, to include training, logistics, and maintenance is emphasized within the programing process.

The planning structure is capped by the DCS Ten Year Plan. Published once every two years, this plan includes the objectives, principles, doctrine, and concepts which, after approval by the JCS, serves as planning and programing guidance for the development of the DCS.

The plan is keyed to the requirements forecast by the JCS, the Commanders in Chief of the Unified and Specified Commands, the Military Departments, and other DoD components, and to the communications trends analyses conducted by DCA.

Whereas the DCS Plan provides the road map for the future DCS, current needs are always present and must be addressed within the constraints of available time and money. The near-term road map, called the System Improvement Program (SIP), identifies what has to be done, on a project by project basis, reviewing the various alternatives and recommending preferred solutions. The SIP contains guidance on required funds and designates the Military Departments responsible for project implementations.

Pertinent DCA Questions

Answered By General Gould

Commanders Digest: Basically, what does the Defense Communications Agency (DCA) do?

Answer: DCA has several different but very interesting roles. First we plan, manage, and system engineer the Defense Communications System, or DCS. We provide technical support to the Worldwide Military Command and Control System and systems engineering to its priority component, the National Military Command System. We are responsible for planning and system engineering the Minimum Essential Emergency Communications Network, and recently we have been tasked to act as DoD's system architect for satellite communications programs. Finally, we provide communications support for the President, primarily through the White House Communications Agency, a field activity assigned to DCA.

CD: What kind of people are employed by DCA?

A: We are extremely fortunate to have a group of very dedicated and highly qualified military and civilian personnel. DCA began in 1960 with just 212 people. Today we have more than 3,000. Half of these are civil service and half are military. All four of the military services are represented.

Most of our professional positions are technical in nature and, not surprisingly, a vast majority of our professionals, both military and civilian, hold a bachelor of science degree or higher. We have 44 PhDs in the agency and we have a vigorous technical education program underway which permits our people to upgrade and update their technical competency. A masters degree program in engineering was initiated in 1972 in coordination with Virginia Polytechnical Institute and State University. The curriculum emphasizes two areas of advanced technical knowledge, computer science and communications systems engineering. Additionally, other personnel are enrolled in off-duty courses at local universities. We are conducting both technical and management seminars, drawing upon outstanding individuals from industry as well as our own personnel. We've even started a program of sending selected professional civilians full time to civilian colleges for continuing education. Two are now attending Massachusetts Institute of Technology (MIT). We are in the process of establishing a technical library and integrating two MIT produced video-tape courses into our educational program.

CD: Who operates the DCS?

A: While the agency has about 2,000 persons directly involved in the support and supervision of the DCS, it is actually operated by some 17,000 military communicators assigned to the commands of the Military Departments: the Army Communications Command, the Naval Telecommunications Command, and the Air Force Communications Service. Over the past two years, we have attempted to maximize their responsibilities for the daily operation and maintenance of the DCS. Meanwhile, we have attempted to complement and reinforce their efforts. For example, a strong, jointly developed Quality Assurance Program is now emerging. This program stresses system performance and the early detection and correction of potential problems. The new approach should provide us and the Military Departments with performance visibility to a degree never before achieved. It will give us knowledge at all management levels which will enhance system reliability and quality. In addition to the Quality Assurance Program, we have reorganized and relocated some of our field organizations to better harmonize their work with that of the Military Department operating commands.

CD: What changes have occurred most recently in the DCS?

A: Recently, we have seen two major changes. First, the withdrawal of American fighting forces from the Republic of Vietnam was accompanied by a successful major realignment of the DCS. Some facilities, such as automatic digital message switching equipment and satellite terminals, were redeployed from Vietnam to meet pressing requirements elsewhere. Other facilities were turned over to the Vietnamese armed forces after a suitable training period. The relatively smooth withdrawal and realignment of the DCS were performed with no significant lapse in communications support to remaining forces.

A second major recent change has been the completion of the successful integration of the teletype network serving the DoD intelligence community into the DCS digital data network. This latter network is called the AUTODIN which stands for the Automatic Digital Network. This successful integration has saved the government 1,777 manpower spaces and will save approximately $72 million over the next five years.

CD: What use of new technology is being made by DCA?

A: Current estimates of future DoD record and APD (automatic data processing) data requirements suggest that our common-user data network capabilities must evolve rapidly to meet new demands on a timely basis. The packet switching technique, in essence, the subdividing of messages into very short units for communication handling, represents new technology offering extremely rapid and responsive service with possible application to a future common-user integrated data net work. The Defense Advanced

Research Projects Agency has developed this concept using a prototype packet switched network and is sharing valuable engineering and operational experience with us.

In addition, we are employing the new technology of communications satellites more and more. The Defense Satellite Communications System became operational in 1967 using 26 slowly drifting R&D satellites. This system is still operational and has been used extensively in support of critical long distance communications requirements, for example, special high speed data communications between the U.S. and Southeast Asia. Currently, we are replacing the original satellites with larger and much more powerful satellites. The existing family of 33 earth terminals is being upgraded and somewhat increased in numbers to take advantage of the greatly expanded communications capability that the new satellites will make available.

A recently issued DoD directive has assigned responsibility to DCA to serve as the System Architect for DoD satellite communications. As the System Architect, DCA will develop plans and concepts and perform general systems engineering applicable to all defense communications satellites systems. In so doing, DCA will fill a role not previously assigned to any one agency or activity. Military Department acquisition functions will continue without change. Overall, I think that this new DCA role will assist the DoD to exploit, effectively, the potential represented by communication satellite technology. I expect that DCA will continue to play a vital role in this key area.

CD: What sort of impact is the growth of automatic data processing (ADP) having on DCA and the DCS?

A: Today we have more than 750 on-line computers and 7,000 data terminals communicating via the DCS. Within 10-15 years, we anticipate growth to more than 2,500 computers and nearly 25,000 data terminals. This would present a daily traffic load of more than 300 billion bits, 50 times today's traffic. The explosive increase in data traffic and the growing use of general-purpose computers as a component of communications systems clearly indicate that we've got to plan for a new family of requirements. Because of the rapid growth in data communications, coupled with the need for more digital secure voice and the inherent technical advantages of digital multiplexing in terms of efficiency and quality over long distances, we are now making plans to transition the DCS into an all-digital system. This is a long-range goal and one to which we expect to evolve with proper attention to system interfaces, survivability, and capital investment.

CD: What are some other major challenges facing DCA?

A: A major challenge is meeting, cost effectively, the growing demands for more and more information and more rapid and responsive command and control. As the DCS and Worldwide Military Command and Control System are extended and improved, we are challenged to design better and more effective systems under the pressure of a declining percentage of the national budget available to meet defense needs.

We must be ready with both the required procedures and equipment to provide responsive communications support for joint, multiservice, as well as combined, multinational operations. National policy and our recent experiences in responding to contingencies and crises clearly indicate that these will be the rule rather than the exception. In this regard, we must be prepared to use foreign and domestic commercial facilities where it is economical to do so. Interoperability, therefore, becomes a paramount concern to us. We seek to achieve nearly transparent interoperability with U.S. tactical systems, represented by TRI-TAC, as well as with the communications systems of our allies, such as the NATO Integrated Communications System. Here we are looking for a degree of interoperability that will minimize unique features and interface equipment. This will require an exchange of detailed engineering information among all concerned and a full mutual understanding of needs and capabilities. I strongly feel that the matter of interoperability represents a major challenge for DCA.

Providing total security for all communications means represents a formidable but critically important challenge to all of DoD including DCA. The lessons learned in Vietnam confirmed our traditional views regarding the critical need for total security on all military voice circuits. Recent Office Secretary of Defense (OSD) policy announcements has reinforced this position. Today we have a secure voice system in the DCS called AUTOSEVOCOM for Automatic Secure Voice Network. It serves only 1,400 of the 300,000 DCS voice subscribers around the world because present equipment is too expensive. Voice quality on long distance secure voice calls is also a problem. It is not acceptable to many potential users because of the limited number of high-cost, wideband trunks. The development of a high-quality, economical, and easy-to-use secure voice network for the DoD is another major challenge now facing DCA.

I have already mentioned the challenge resulting from the new data service demands associated with rapid escalation in ADP communications requirements and the challenge of ensuring a smooth evolution of the DCS from an analog to an all-digital system. Engineering and planning the optimum architecture for future DoD satellite communications is another major challenge for DCA.

In summary, I think it is clear that the agency has a big and important job to do. But I also believe that we can look to the future with a large degree of confidence. Working as a team with the Military Departments, the JCS, OSD, civilian industry, and the commercial carriers, we have already accomplished a great deal. I am certain that we will prove equal to the problems and challenges of the future.

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