



A N N I V E R S A R Y

# NATIONAL COMMUNICATIONS SYSTEM



19981216 017



*Leadership Excellence  
in Technology*



35

A N N I V E R S A R Y

NATIONAL  
COMMUNICATIONS  
SYSTEM  
1963-1998



THE WHITE HOUSE

WASHINGTON

April 20, 1998

Congratulations to the members of the National Communications System as you celebrate 35 years of distinguished service to our nation. Established in 1963 to improve commercial communications services for the federal government, particularly during national emergencies and natural disasters, the NCS is a premier example of effective government-industry cooperation.

Your professional expertise and rapid response in restoring communications services in the aftermath of natural disasters reaffirm the critical role the NCS plays in coordinating emergency telecommunications preparedness. The NCS and the companies that support it have been on the scene in communities devastated by hurricanes, forest fires, unprecedented flooding, and other natural disasters. The success of your international communications restoration efforts, such as those with Canada during the 1997 floods, has fostered unprecedented cooperation in providing emergency telecommunications services.

Although emergency preparedness has been the core of the NCS mission, you have also undertaken a wide range of initiatives to ensure reliable commercial communications services for the federal government. Your efforts to enhance the security of U.S. telecommunications and information systems have produced noteworthy advances in the field. Similarly, your skilled management of the Federal Telecommunications Standards Program ensures telecommunications reliability, security, and interoperability.

On behalf of your fellow Americans, I thank you for maintaining America's leadership in communications technology, and I commend you for your outstanding achievements over the past 35 years. Best wishes for a memorable anniversary celebration.

*Bill Clinton*



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PART 1

A  
SLEEPING  
GIANT

## PART 1

# A SLEEPING GIANT

## WHY THE NATIONAL COMMUNICATIONS SYSTEM?

**S**ince the development of the telegraph in the 1840s, electrical communications have played a vital role in Presidential decision making. President Abraham Lincoln visited the War Department's telegraph office almost daily during the major campaigns of the Civil War, often spending hours reading messages and sending orders to his generals. During the Spanish-American War, President William McKinley fashioned the first "war room" in the White House, equipping it with maps, telegraph instruments, and telephones to follow the progress of American troops and the U.S. fleet in and around Cuba. On the eve of World War II, President Franklin Delano Roosevelt and British Prime Minister Winston Churchill installed a direct telephone link between their offices to communicate more freely.

By the 1960s, diplomatic and military communications had grown extremely complex. They involved control of nuclear weapons, intelligence-gathering activities, communications with our North Atlantic Treaty Organization (NATO) allies and other heads of state, control of U.S. military forces around the globe, and direct communications with the Kremlin. During the course of the Cuban Missile Crisis in October 1962, communications to and between some of these elements faltered at critical moments, prompting President John F. Kennedy to order an immediate investigation.

On October 26, 1962, Soviet Premier Nikita Khrushchev offered to withdraw Soviet missiles from Cuba in exchange for a U.S. pledge not to invade the island nation. Procedural and technical delays in transmitting and receiving this vital message created the most celebrated communications incident of the crisis. At this critical juncture, events were spinning out of control, with the United States only hours away from a decision to proceed with an air strike and land invasion. After a 12-hour delay, the message finally arrived, lowering tensions and providing the basis for an agreement averting a possible nuclear catastrophe, which was much nearer than was realized at the time.<sup>1</sup>

The National Security Council, in response to President Kennedy's verbal orders to review national security communications, including leader-to-leader exchanges, directed formation of an Interdepartment Committee on Communications headed by William H. Orrick, Jr., then Deputy Under Secretary of State for Administration.<sup>2</sup> The Committee's charter was direct and unambiguous: Take whatever action was necessary to eliminate the deficiencies in the Nation's communications networks supporting the President and other key decision makers and action officers. To underscore White House concerns, all agencies were instructed "to cooperate with Mr. Orrick in this mission to the fullest extent."

The Orrick Committee explored the problems of emergency communications for the next 8 months. It confirmed the close relationship among the military, diplomatic, and civilian agencies of Government during a crisis, and concluded that the missing link in this interdependence was a common communications system. To address this need, the Committee recommended establishment of a survivable national communications system to serve the President, the Department of Defense (DOD), essential diplomatic and intelligence activities, and key nonmilitary civilian leaders. Acting on this recommendation, President Kennedy issued a Presidential Memorandum on August 21, 1963, "Establishment of the National

## The President Gets a Telephone

It was a number of years before the telegraph and, later, the telephone moved into the corridors of power in the White House.

During Lincoln's Administration, the President had to walk across the White House lawn to the War Department where the Army Signal Corps had set up a telegraph office for his use. It was not until the Hayes Administration (1877–1881) that the first telegraph and telephone were installed in the White House proper.

When war was declared with Spain in 1898, Major Benjamin F. Montgomery, U.S. Signal

Corps, became the Chief of the Telegraph and Cipher Bureau in the McKinley White House. He established the first White House "war room," equipping it with telegraphs, telephones, and war maps that President McKinley used to follow the progress of U.S. forces in Cuba.

After World War I, the telephone moved into the Oval Office where, in 1929, Herbert Hoover became the first President to have a telephone on his desk. By 1941, the



telephone had become an instrument of presidential power, providing continuous communications services for the President under all circumstances.

**The McKinley War Room. President McKinley dictates his famous message to Admiral Sampson not to cripple his fleet against fortifications, but to bottle up the enemy at Santiago.**

Source: Smithsonian Institution

Communications System,"<sup>3</sup> that directed establishment of a system to provide better communications support to critical functions of Government during crises.

## THE CONCEPT TAKES FORM

The need for better organization and management of the Government's communications resources had come to the attention of the White House a few years earlier, during the administration of President Dwight D. Eisenhower. Early in 1959, the Eisenhower Cabinet discussed a detailed plan to build a unified communications system to better serve the Government in times of peace and emergency.<sup>4</sup> More than a year and a half later, a report to President-elect Kennedy noted the lack of coordination in both national and international communications, and urged a measure of

Communications Act of 1934.<sup>6</sup>

The Cuban Missile Crisis of October 1962 abruptly altered the communications priorities outlined in E.O. 10995. Instead of moving ahead with an across-the-board communications policy and planning program, the President, in his August 21, 1963, memorandum, ordered the DTM to turn his attention to the immediate development of an enhanced communications capability in support of Presidential decision making in crises. To provide the Director with broader authority to accomplish this new high priority assignment, the President gave him the additional title of Special Assistant to the President for Telecommunications.

President Kennedy's August 1963 memorandum specified that this new communications capability was to be acquired by linking together, improving, and

***...this new communications capability was to be acquired by linking together, improving, and gradually extending the communications facilities and components of various Federal agencies.***

gradually extending the communications facilities and components of various Federal agencies. System design would focus on improving hardness, mobility, and circuit redundancy to provide the necessary level of

consolidation. This report led to the February 16, 1962, issuance of Executive Order (E.O.) 10995, "Assigning Telecommunications Management Functions,"<sup>5</sup> establishing the office of Director of Telecommunications Management (DTM) within the Executive Office of the President (EOP).

The mission of the DTM was to centralize telecommunications policy leadership at the White House level to achieve a balanced and well-planned national and international telecommunications program. It was to be a broad-based, policy-oriented effort in which the Director was responsible for coordinating the communications activities of the Executive Branch. In addition, the Director was delegated authority to carry out the communications-related aspects of the President's war emergency powers, as set forth in Section 606 (now 706) of the

survivability. Initial improvements would focus on the most critical national security communications links, particularly to overseas areas. Then other Government needs were to be examined and satisfied as warranted. It was generally assumed that a national communications system would be composed of long-haul, point-to-point trunk communications that could serve one or more agencies.<sup>7</sup>

Two attachments accompanied President Kennedy's August 1963 memorandum. One was "Procedures and Working Relationships for the National Communications System," and the other was "Statement of Initial Tasks for the National Communications System."<sup>8</sup> Both were prepared by the President's National Security Advisor, McGeorge Bundy, who became a driving force behind the National Communications System (NCS) during its early years.

The procedures document established an organizational framework within the Executive Branch, while the initial tasks document outlined the plan of work.

The procedures document provided for a two-tier NCS structure. The positions of Director of Telecommunications Management and Special Assistant to the President for Telecommunications, both to be held by the same individual, were established at the White House level. The President named his science advisor, Jerome B. Wiesner, to fill these two positions on an acting basis. At the cabinet level, the Secretary of Defense, Robert S. McNamara, was appointed Executive Agent for the NCS and directed to name a Manager of the NCS. The procedures document also named six initial Government agencies to participate in the NCS activity and to provide communications assets. Those six agencies were the General Services Administration (GSA), DOD, the Department of State (DOS), the Federal Aviation Agency (FAA) (now the Federal Aviation Administration), the National Aeronautics and Space Administration (NASA), and the Central Intelligence Agency (CIA). Each organization was to designate an individual to serve full time as a representative to the NCS Executive Agent and to work with the Manager, NCS.

The Executive Agent's primary responsibility was to design an NCS for approval by the President. To accomplish this, Defense Secretary McNamara was given a number of assignments that were subsequently delegated to the Manager, NCS. The first was to prepare a definition of the NCS, including recommendations identifying those communications assets that should be included in the NCS then and in the future. The next task was to prepare a plan identifying the Government departments or agencies responsible for installing, operating, maintaining, and modifying NCS assets, including responsibility for budgeting and funding. Finally, the last task was to prepare a near-term plan and a series of annual long-range plans. The near-term plan was to be submitted

to the President by November 1, 1963, setting forth initial objectives and requirements to be met by the NCS. The first annual long-range plan was to be submitted to the President on April 1, 1964, and annually on that date thereafter. These annual plans were to move as rapidly as possible toward the definition of a final NCS concept—one the President could approve for implementation. Issues of policy



**President John F. Kennedy in the Oval Office**

Source: National Archives

and differing agency views were to be identified and brought to the President's attention.

As the President's acting Special Assistant for Telecommunications, Mr. Wiesner was the catalyst in this entire process. It was his specific task to advise the President regarding communications requirements for the NCS and to review the adequacy or inadequacy of the plans being developed by the Executive Agent.

Mr. Wiesner was instructed to work closely with

the President's National Security Advisor, the Director of the Office of Science and Technology (now the Office of Science and Technology Policy), and the Director of the Bureau of the Budget (now the Office of Management and Budget). In addition, because building the NCS required the assets and cooperation of a number of Federal departments and agencies, Mr. Wiesner was to arrange interagency coordination. In the critical area of funding, the Bureau of the Budget was to prescribe general guidelines and procedures for financing the NCS within the budget framework

of the participating agencies. As envisioned at the time, the individual agencies would be responsible for both funding and building specific portions of the system.

The proposed NCS program stressed two system objectives: interconnectivity (or linking together communications facilities and components) and survivability (achieved through hardness, mobility, circuit redundancy, and standardization). An early policy decision to separate program planning and design from funding

and implementation became a source of controversy. NCS-designated assets would be funded by the operating agencies, including improvements and modifications required for the NCS. Program planning, however, would originate with the Manager, NCS, with advice from the operating agencies.<sup>9</sup>

The second attachment to the memorandum of August 1963, "Statement of Initial Tasks," set the tone and direction of NCS long-range planning during the 1960s. Under this tasking, the Manager, NCS, was to—

- |                                                                                                                                                 |                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| ■ Select communications assets to be included in the NCS                                                                                        | range plans detailing the evolution of the NCS                                       |
| ■ Identify the Government departments or agencies responsible for installing, operating, maintaining, and modifying each subsystem or component | ■ Address standards associated with the Government's telecommunications requirements |
| ■ Develop plans detailing organizational arrangements for operating and managing the NCS, including a circuit restoration program               | ■ Develop a plan to allocate radio frequencies                                       |
| ■ Prepare an initial near-term plan, followed by a series of annual long-                                                                       | ■ Develop an NCS test and exercise plan                                              |
|                                                                                                                                                 | ■ Formulate a work program to carry out research on emerging technology              |
|                                                                                                                                                 | ■ Organize and staff the NCS activity.                                               |

## THE PLANNING BEGINS

The first of President Kennedy's emergency communications goals arising out of the Cuban Missile Crisis was realized with the opening of the Washington-to-Moscow Hot Line. One of the major communications trouble spots during the crisis concerned the exchange of private messages between President Kennedy and Soviet Premier Khrushchev. Thus, when President Kennedy called for a review of national security communications capabilities following the missile crisis, he also asked the

investigators to look for ways to improve leader-to-leader exchanges. Negotiations between Washington and Moscow were begun, and in early 1963 an agreement was reached to establish a direct teletype link between Washington and Moscow. On August 30, 1963, a teletype "hot line" was opened between the two capitals, providing an invaluable diplomatic tool that the two world leaders and their successors have used on a number of occasions to notify one another of the movement of nuclear forces during exercises or some third-world crisis.

The opening of the Hot Line stirred expectations

for the early completion of the NCS and came at a time when the President's acting Special Assistant for Telecommunications, Mr. Wiesner, was in the process of issuing guidance to the Executive Agent. In response to this guidance, Defense Secretary McNamara issued orders assigning NCS responsibilities and defining an organization.<sup>10</sup> He appointed Solis Horwitz from his staff as Assistant to the Secretary of Defense for the NCS, and Army Lieutenant General Alfred E. Starbird, Director, Defense Communications Agency (DCA), (now the Defense Information Systems Agency), as Manager, NCS. As Manager, General Starbird became the principal NCS technical planner, responsible for designing the system and developing plans for its operational management.<sup>11</sup>

To begin, General Starbird formed an NCS Actions Control Office headed part-time by Clifford D. May, who later became Deputy Manager, NCS.<sup>12</sup> Mr. May was to provide tasking to DCA elements, monitor their progress, and provide the primary interface with the liaison representatives of the assigned operating agencies. It was not until January 1966 that liaison personnel were permanently located in the NCS where they worked with and under the Manager.

One reason for designating the Secretary of Defense as Executive Agent



**The Pentagon terminal of the White House—Kremlin "hot line," which became operational August 30, 1963.**

Source: AP/Worldwide Photos

was to obtain the benefits of DOD's unified technical planning and operations. Planning for this new communications system was to be accomplished in steps by preparing a series of annual NCS long-range concept plans. These plans contained NCS objectives and requirements, and listed Federal agencies' communications assets that could become

part of the new system. In addition, requirements not fully met in present systems were to be identified along with recommendations for modifications and improvements. Once the agencies agreed to a communications system plan, it would be sent to the President for his approval.<sup>13</sup> Between October 1963 and July 1971, the NCS prepared an initial near-term plan and six annual long-range plans.



**LTG ALFRED E. STARBIRD, USA  
MANAGER, NCS, 1963-1967**

Planning for the NCS had only just begun when the Nation suffered a tragic loss with the assassination of President Kennedy on November 22, 1963. Because President Kennedy was clearly the NCS's leading advocate, the Nation's loss was a specific loss for the NCS program. Nonetheless, work on the project moved forward as General Starbird initiated planning for an integrated system whereby Government long-haul networks would be linked together procedurally and technically. Such a system would be composed of common-user networks, dedicated networks, and hot-line circuits. When completed, the NCS would provide capabilities for the command and control of military forces, continuity of Government, and management of foreign crises. Although no reference was made at this time to the new art of satellite communications, President Kennedy had already recognized such a possibility and directed Mr. Wiesner to assist in this area.<sup>14</sup>

the communications assets of several Federal agencies. The initial list of candidate NCS assets appeared in the first NCS long-range concept plan issued in August 1964. In all, a total of 32 communications networks comprised this inventory.<sup>15</sup>

The first NCS long-range concept plan recommended that the switched systems of the Defense Communications System (DCS) should be developed as the survivable secure portion of the NCS, while the Federal Telecommunications System (FTS) voice and data networks should serve the needs of the civilian agencies. The plan also recommended that provisions be made for the interchange of traffic between both voice and data components of the DCS and FTS.<sup>16</sup>

Before he forwarded the plan to the Executive Agent, General Starbird addressed two issues raised by representatives of the operating agencies. The first issue related to GSA's request to upgrade the

### Washington to Moscow Hot Line

The Cuban Missile Crisis of October 1962 was as much an exercise in global communications as it was diplomatic negotiations. Timing, privacy, and call completion were essential features as President Kennedy and Premier Khrushchev reached out to their respective public, diplomatic, and military constituencies.

The need for direct, timely, and private communications between

the two superpower leaders was critical. The United States and the Soviet Union signed an agreement in June 1963 to set up a duplex cable circuit (later augmented by a satellite hookup) between the two capitals. This circuit, known as the "Hot Line," became operational on August 30, 1963.

This new communications link, colloquially known as the "Molink" in Pentagon

circles, has been successfully used a number of times to prevent possible Soviet misunderstandings of U.S. fleet movements in the Mediterranean and during such crises as the Arab-Israeli Wars of 1967 and 1973. More recently, in the 1991 Gulf War, Presidents Gorbachev and Bush used the "Hot Line" to communicate with each other. The system continues intact today.

survivability of the FTS networks. The Manager argued against the proposal, citing cost and the fact that AUTODIN and AUTOVON had already been selected as the survivable and secure portions of the NCS. The second issue involved DOD's refusal to commit itself to any plan that allocated circuits to other NCS operating agencies in advance of an emergency.

An early planning objective was to identify Federal communications assets. The near-term plan, submitted in October 1963, provided an inventory of

The Manager's reply to DOD was that the Executive Branch could not plan or achieve an efficient and economical NCS unless all operating agencies were

willing to make the necessary commitments.<sup>17</sup>

It would be more than a year following the August 1964 submission of the first long-range plan before the President's Special Assistant completed his review. Part of the delay could be attributed to the search for a permanent replacement for Mr. Wiesner in his acting roles as DTM and Special Assistant to the President for Telecommunications.<sup>18</sup> On October 31, 1965, Army Lieutenant General (Retired) James D. O'Connell, who had been appointed in Mr. Wiesner's place, finally announced acceptance of the first NCS long-range concept plan as a planning document.<sup>19</sup> The selection of the DCS as the national security component of the NCS was approved, a move that was in agreement with earlier guidance from President Kennedy in 1962, in which he noted that "the National Military Command System now being planned should be recognized as, and designed to be, the basis for such a survivable national communications system."<sup>20</sup> The designation of the FTS was also approved to meet the needs of the Federal Government for telecommunications services that were not related to national security. Together, the DCS and the FTS would comprise the basic NCS system components.<sup>21</sup>

For the next long-range plan, the Manager, NCS, was told to include plans for the Executive Agent to manage NCS's surviving assets during a Presidentially declared emergency, as well as plans for interconnectivity, system survivability, and priority preemption. The White House also pressed for a definitive, final system concept. The time had come, said General O'Connell, to move decisively toward the—

*"...progressive evolution of the NCS components to form the single unified system approved by President Kennedy...and further announced and extended in the Presidential Memorandum of August 21, 1963, establishing the NCS."*<sup>22</sup>

The concept of a single unified system was strongly endorsed by President Kennedy's successor,

Lyndon B. Johnson. In approving the 1964 National Plan for Emergency Preparedness, President Johnson reaffirmed that there was to be "a single, unified communications system for use by the Federal Government under any condition, normal or otherwise." The NCS was named to fulfill this requirement, which the 1964 National Plan defined as—

*"...the unified governmental communications system, responsive to a single Executive Agent, derived from linking together, improving, and extending the communications facilities and components of the various Federal agencies."*<sup>23</sup>

Buoyed by this White House endorsement, the NCS began to prepare the second NCS long-range concept plan, this time hoping to achieve a final plan that the President could approve and sign. In January 1966, General Starbird formed an NCS organizational element, separate from the DCA, to more effectively marshal his resources behind this increasingly complex assignment. Under this new arrangement, an Office of the Manager, NCS (OMNCS) was created, composed of the Manager and his staff. It was directed on a day-to-day basis by the Deputy Manager and supported by two Assistant Deputy Managers, one for plans, the other for operations. With an independent NCS staff organization supported by assigned personnel from the operating agencies, the Manager was in a better position to address the members' different perspectives regarding the NCS and how it should function. In 1966, about 33 people were assigned to the NCS staff, 11 from civil agencies and the remainder from the military services and other agencies within DOD.<sup>24</sup>

The issue generating the most discussion at this point was who would manage the surviving components of the NCS during an emergency. President Kennedy's August 1963 memorandum had empowered the Secretary of Defense, as the Executive Agent for the NCS, to "allocate, reallocate, and arrange

for restoration of communications facilities to authorized users....” President Johnson’s National Plan for Emergency Preparedness also assigned the management function to the Executive Agent. From a systems perspective, these positions taken by both President Kennedy and President Johnson regarding a unified communications system appeared reasonable. However, the positions raised serious operational and legal issues concerning communications charters

operate with respect to the NCS during the remainder of the 1960s.<sup>25</sup>

The starting point for the NCS, said Mr. Wiesner, was to provide maximum integration and utilization of those communications assets necessary to protect national security. To acquire the necessary assets, the NCS would look primarily to the assets of DOD, DOS, and the CIA, plus the communications systems operated by GSA, NASA, and FAA. To support the

civilian side of Government during an emergency, the NCS would turn to the FTS operated by GSA. In response to GSA’s concern regarding the NCS’s proposed plans for controlling agency networks, Mr. Wiesner reminded

***The goal of interconnectivity was to progressively improve and link together key NCS networks so that the NCS could function as a “coherent single system.”***

among the departments and agencies, issues that President Kennedy had set aside in the interest of obtaining an effective and reliable emergency communications system as quickly as possible. During the Cuban Missile Crisis, President Kennedy had come face-to-face with the survival of the Nation and possibly society as a whole. In his mind, that was no time to argue over agency charters and prerogatives.

The issue of “who’s in charge” first surfaced in late 1963, as Defense Secretary McNamara was submitting the near-term plan to the White House. The plan called for the Secretary of Defense, as Executive Agent, to be in charge of communications during emergencies. When the civil agencies challenged this approach, Mr. McNamara suggested a study of Presidential Directives and Executive Orders assigning responsibilities for providing emergency communications. In response to this proposal, GSA Administrator, Bernard L. Boutin, questioned DOD’s position on this issue and posed a number of other questions concerning the Executive Agent’s plans for the NCS. Mr. Wiesner responded with a lengthy review of the philosophy and objectives of the NCS. While it did not resolve the dispute, it did clarify the assumptions on which the White House was to

GSA that the August 1963 Presidential Memorandum stated that each agency would continue to operate its own networks under normal conditions, even if a particular network had been designated as an NCS asset. Nonetheless, agency plans for NCS-designated networks were to be submitted to the Executive Agent for his review and recommendations. Mr. Wiesner also noted that the Executive Agent would be responsible for carrying out Presidential policy in prescribing operating standards and practices and in allocating and arranging for restoral of communications facilities within the NCS.<sup>26</sup>

Looking to the future, Mr. Wiesner concluded his remarks to GSA by observing, rather prophetically, that—

*“The establishment of the NCS is a major undertaking in Government which will occupy the best of our abilities for a long time to come if it is to successfully meet all the objectives established by the President. The contributions that each organization can make to this success are much more important than the rights, prerogatives or ambitions of the agencies concerned.”*<sup>27</sup>

The Manager, NCS, continued work on the

second annual NCS concept plan with a revised mission statement, which described an NCS that would be acquired by—

*“...joining together technically and operationally the separate telecommunications systems of several Executive Branch departments and agencies.... Such systems were to be improved progressively and so interlinked that the aggregate will function as if it were a coherent single system.”<sup>28</sup>*

As the work progressed, tasks were grouped under three headings: survivability, interconnectivity, and unified planning. A survivable system was defined as one that had sufficient primary or alternate routes to handle essential traffic following a nuclear attack. It would be supported by an operational management system and a precedence system to provide for the movement of information according to assigned priorities. The goal of interconnectivity was to progressively improve and link together key NCS networks so that the NCS could function as a “coherent single system.”

The survivability task examined four areas: existing communications resources, restoration priority, system management, and research and development. Because there was no database describing the communications resources of the operating agencies, the OMNCS began a program to inventory networks and facilities, particularly the major switched networks. In the area of restoration priority, the NCS issued NCS Memorandum No. 1-64, “Restoration Priority and Message Precedence Systems for the NCS.” This directive was implemented in December 1965 and provided for the initial categorization of circuit requirements by NCS operating agencies.

System management remained the most controversial area in the survivability task. The second long-range plan directed the Manager to draw up “organizational arrangements and necessary procedures for the NCS which will accomplish

effective allocation, reallocation, and arranging for restoral of circuits and channels and other assets of the NCS....” As a step toward this goal, in July 1965, the Executive Agent published NCS Instruction 45-1, “NCS Operations Center Organizational Arrangements and Structure.” This created the NCS Operations Center, collocated with DCA’s Operations Center complex. The instruction also established the NCS Emergency Action Group, which was composed of NCS operating agency representatives who would convene at the call of the Manager to begin processing emergency telecommunications circuit requests.<sup>29</sup>

The last area under survivability was research and development, which was receiving increased attention from the defense research community. Advances being made in satellite communications and the implications of those advances for overseas communications were of particular interest. Development of the Interim Defense Satellite Communications System in the early 1960s, followed by the launching of the Defense Satellite Communications System in 1965, prompted the Executive Agent to enter into dialogue with the Communications Satellite Corporation (COMSAT) concerning the utility of communications satellites. Electromagnetic pulse (EMP) phenomena were also becoming an area of growing concern. Nuclear bursts had introduced EMP effects of a magnitude never before experienced. This prompted intense interest in measuring these effects and incorporating the findings into the NCS design parameters. A third research and development area of interest was electrical power and the requirement for backup emergency power to maintain communications in the event of a power blackout such as occurred in the northeastern United States in 1965. Other advanced technologies receiving attention were electronic switching and digital communications.

The interconnectivity tasks assumed that a national communications system would be achieved by linking two or more of the major switched

networks serving Government agencies. This required not only a physical interconnection but also compatible operating procedures and routing instructions. During the 1960s, the interconnectivity efforts focused primarily on linking the voice and data networks of DOD's DCS (AUTOVON and AUTODIN) with those of GSA's FTS, and on the operating procedures to effect these changes. Steps were also taken to interconnect the State Department's Diplomatic Telecommunications System with the DCS. Another approach to interconnectivity initiated was the development of system standards, an area that continued to receive NCS attention over the years.

The only task under the third research area, unified planning, was the preparation of annual long-range plans. While projects under the other two research areas, survivability and interconnectivity, appeared to be proliferating, there was a noticeable lack of enthusiasm on the part of the operating agencies to enter into unified planning with the NCS until they better understood how the NCS would affect their own networks. The agencies were wary of how the NCS might become a communications system on the one hand, and potentially a systems manager on the other.

By the time the OMNCS had completed the second long-range plan in the summer of 1966, changes in the nuclear threat environment were raising serious NCS system design questions. The large increase in the variety and number of nuclear weapons and the emergence of the doctrine of "controlled response" were creating requirements for the near real-time transfer of large volumes of information, something that had not been programmed into the plans for the NCS.

Despite these complications, the second long-range plan was forwarded to the White House in July 1966 in a mood of high optimism, if for no other reason than the hope that the issues challenging the program might soon be resolved. Defense Secretary McNamara stated that this second plan—

*"...reflects the evolution of the NCS from a bold concept and a fledgling organization, i.e., one of a telecommunications super-management group cutting across agency lines, to an effective, viable organization. Its impact is being felt in terms of increased communications flexibility, survivability, and economy, and in the creation of an atmosphere of mutual support and joint planning within the departments and agencies of the Executive Branch."*<sup>30</sup>

The White House approved the second long-range concept plan as a planning document. The steps toward developing an acceptable system concept were encouraging, and listing research tasks by category was a promising device for identifying, analyzing, and resolving many of the technical, management, and financial problems confronting the NCS. However, despite progress, there was growing concern in the White House that a final system concept plan was still a long way off. To assure itself that a plan for the NCS would be available to the President in the near future, the White House tasked the Executive Agent to prepare, without further delay, a separate interim NCS concept plan for the 1970s.<sup>31</sup>

In placing this new requirement on the Executive Agent, General O'Connell acknowledged the host of underlying statutory problems confronting the NCS program. He observed that—

*"In the examination of the spectrum of available options, due considerations should be given to the statutory responsibilities and managerial prerogatives of the several Operating Agency heads. However, should these factors prove to inhibit the orderly development of the future system envisaged, this fact should be reported."*<sup>32</sup>

In response, the Executive Agent formed an ad hoc NCS working group to begin work immediately on an interim NCS concept plan for the 1970s. In the meantime, work continued on annual NCS long-range concept plans.

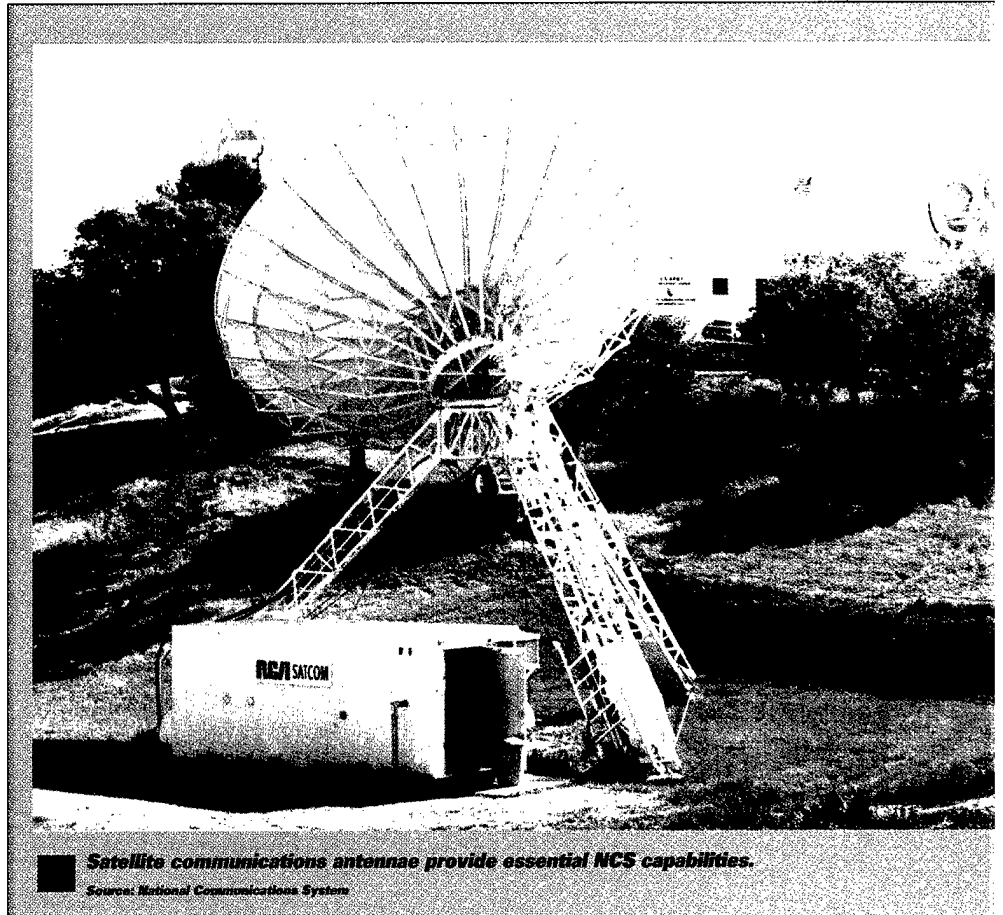
The third NCS long-range concept plan was published in March 1968, followed shortly thereafter by the publication of the fourth NCS long-range concept plan in December of that same year. Both reaffirmed earlier NCS plans identifying the DCS and the FTS as the basic system elements. However, progress toward interconnecting these two components was being delayed by agency rivalries and the uncertainties surrounding the role of the NCS. The new plans included a three-part research program of survivability, interconnectivity, and unified planning. The survivability studies addressed precedence systems, interconnected U.S. networks, emergency operations, effects of electromagnetic pulse, continuity of operations, and restoration priority systems. In the area of interconnectivity, there was heightened interest in technical solutions to network linking and in the development of hardware, software, and procedural standards. Unified planning continued to lag behind.

To develop the full potential of this last function, the

Executive Agent again urged the Manager to promote “an atmosphere of mutual support and joint planning” among the operating agencies.

Beginning with the third NCS long-range concept plan, each operating agency was

required to submit cost information on changes



and improvements in its systems.<sup>33</sup> In addition, considerable attention was directed at important trends in telecommunications technology, particularly the “marriage” of computers and communications. However, the third and fourth NCS long-range concept plans did not provide a final system concept for Presidential approval. In view of this, the White House staff renewed a call for an NCS interim concept plan for the 1970s “as a matter of urgency.”<sup>34</sup>

## DIFFERING VIEWS

Work on the NCS interim concept plan for the 1970s led to a finished product in the summer of 1968. As in the case of the annual NCS long-range concept plans, there was resistance from key agencies. Faced with the possibility of defeat, the new Manager, Air Force Lieutenant General Richard P. Klocko, offered each



**LT. GEN. RICHARD P. KLOCKO, USAF**  
**MANAGER, NCS, 1967-1971**

agency an in-depth review and assessment of the role and mission of the NCS. One thing was certain—something had to be done to get the program moving.

In identical letters to each of the operating agencies, General Klocko noted that the Presidential charter of August 1963 called for a unified Governmental communications system.<sup>35</sup> Such a

operating many separate systems and the adoption of “common concepts, doctrine, system design, planning, and engineering.”<sup>37</sup>

The NCS interim concept plan of 1968 contained an “Integrated Government Communications System” under a single manager. This provided for a single unified Government telecommunications network

consisting of an integrated trunking system and circuit-switching services for all NCS networks. Ultimately, the existing networks were to be reconfigured on a basis other than current proprietorship; that is, they were to be

***“It seems clear that if national needs are to be served, the NCS must be viewed as an entity and not a confederation of networks. ...”***

system would be established and developed by linking together, improving, and extending, on an evolutionary basis, the communications facilities and components of the various Federal agencies. Reaching this goal would require the agencies to depart from “the present state of system fragmentation,” and, through a program of—

*“...common concepts, doctrine, system design, planning, and engineering, arrive at a National Communications System which provides interconnection and ultimately the interoperability which the President should expect.... In this regard, I intend to develop, in coordination with the NCS operating agencies, specific design concepts, standards, and criteria and technical and operational system planning guidance which will establish the parameters for the future NCS configuration.”*<sup>36</sup>

General Klocko reemphasized that day-to-day responsibility for operating NCS-designated communications would remain with the host agency. However, in the event of a national emergency, the NCS-designated assets would come under an NCS-operated management framework. He concluded that carrying out the Presidential mandate to create a unified system would require a radical departure from

reconstructed into multipurpose and special-purpose networks on the basis of function or service performed. Where feasible, the special-purpose networks were to interface with, and use, general-purpose networks to assure an unimpeded flow of traffic.<sup>38</sup>

The report, which had been approved by all agencies except DOD, was forwarded to Defense Secretary McNamara. It was the DOD representative's position that it was premature to adopt such a sweeping concept involving the integration of a number of communications assets. The Executive Agent agreed with the DOD representative's position and forwarded the report to the White House without a recommendation.<sup>39</sup> In his letter of August 12, 1968, to the White House, Defense Secretary McNamara expressed his desire to see the results of an AT&T study on AUTOVON/FTS integration before he made any final recommendation on the acceptability of the proposal.<sup>40</sup>

Responding to Defense Secretary McNamara, General O'Connell agreed that it was perhaps too early to decide on a specific NCS architecture without further study. However, he stressed the essential logic that lay behind the report, observing that—

*“It seems clear that if national needs are to be served, the NCS must be viewed as an entity and not*

*a confederation of networks. Consequently, establishment of a single integrated system under a single manager, singly financed, may well be the ultimate long-range objective. I would recommend, therefore, that the initial thrust of the follow-on studies be directed toward the analysis of the technical and operational feasibility and cost-effectiveness of this alternative.”*<sup>41</sup>

By October 1968, General O’Connell was beginning to entertain doubts about achieving a unified NCS system, doubts that he expressed to Defense Secretary McNamara:

*“Although unanimous agreement on a system concept and its managerial arrangement would be desirable, I realize that it may not be possible. In either case, your recommendations, together with any differing views, are solicited after reasonable attempts have been made to resolve any differences.”*<sup>42</sup>

Faced with the need to consider other alternatives, General Klocko had an independent contractor examine the interim NCS concept plan proposal. Completed in the fall of 1969, this study corroborated the original report. Instead of an “Integrated Government Communications System,” however, the study proposed a “National Communications Network,” which would be the equivalent of a Government common carrier designed to satisfy the overall trunking needs of the Government.<sup>43</sup>

The OMNCS continued work on the interim plan for the 1970s, detailing a conceptual framework for the “controlled evolution” of the NCS. Central to the proposed interim plan was the National Communications Network, composed of Government-controlled nodal points, associated circuit switches, and long-haul transmission facilities configured to provide the bulk of the trunking requirements of the Government on a worldwide basis. The entire

enterprise would be under the direction of a Federal committee for the NCS. This committee would be composed of representatives from Federal departments and agencies, including the NCS operating agencies, and would be responsible for the evolutionary development of the NCS, leading to a unified Governmental communications system.<sup>44</sup>

By early 1971, it was apparent to General Klocko that further work on the NCS interim plan for the 1970s or the annual NCS long-range concept plans had reached an impasse. In the fall of 1970, the House Committee on Appropriations added to NCS’s difficulties by deleting all funds for planning. The House Committee concluded that what was really needed was—

*“...a decision to either reorganize the existing management structure of the [NCS] system and grant it sufficient authority to enforce policy decisions needed to make the system operate effectively, or abandon the entire concept.”*<sup>45</sup>

This action by Congress, plus continued opposition from some of the operating agencies, prompted the NCS to reassess its role. In September 1971, the Manager, NCS, and the operating agency representatives met and agreed to postpone work on the interim plan until the growing debate over the NCS was resolved.<sup>46</sup>

## PROPOSALS FOR CHANGE

As the decade of the 1970s began, the great expectations of a “unitary national system” evolving from “a bold concept to a growing organization, cutting across Federal Agency lines, and [with] an effective and viable management structure,” as Defense Secretary McNamara had predicted in 1966, had not been realized. Departments and agencies continued to question the impact of the NCS on agency roles, charters, and system concepts.

In 1965, the Holifield Committee of the House

of Representatives expressed concern that the White House had not given the DTM a wider range of powers to enable him to take the lead in developing the new field of satellite communications. In addition, the report recommended that the Office of the DTM be strengthened by removing it from the Office of Emergency Planning and reconstituting it as a separate entity within the White House. The Holifield Committee also urged that the Office of the DTM be funded and staffed at a level to permit studies of the advances being made in telecommunications.<sup>47</sup>

Two years later, President Johnson named a Communications Task Force to conduct a comprehensive review of U.S. communications policy, with emphasis on satellites. At the same time, he directed the Bureau of the Budget to undertake an independent study of Governmental organizations in the field of communications and to propose needed modifications.<sup>48</sup>

The findings of the President's Communications Task Force, published in December 1968, called for a greatly expanded Government role in providing long-range planning, policy formulation, coordination, and mission support for the Nation's communications activities.<sup>49</sup> General O'Connell, serving both as DTM and as vice chairman of President Johnson's Communications Task Force, issued a partial dissent to the Task Force's findings. He noted that the proposed role for the executive branch's telecommunications functions focused too heavily on operational matters, rather than on its primary responsibility of policy development. In regard to the NCS, General O'Connell noted that this key aspect of our national telecommunications policy had not even been addressed in the Task Force report.<sup>50</sup>

Shortly after the publication of the Task Force report, the Bureau of the Budget issued its report, which recommended reorganizing and strengthening the NCS. Departmental and agency responses to the Bureau's NCS recommendations were generally positive. Many noted that stronger leadership at the

top was needed in the area of policy making and in guiding the orderly evolution of the proposed National Communications System.

With the arrival of President Richard M. Nixon's Administration in January 1969, official concern did not diminish over the issue of Federal telecommunications management, including the NCS. In July 1969, 9 months after the Bureau of the Budget report, the General Accounting Office (GAO) offered its assessment, again focusing on the NCS:

*"In the more than 5 years that have elapsed since the President directed that a unified NCS be established, hundreds of millions of dollars have been expended annually in the procurement, construction, operation, and maintenance of component networks, with little effective centralized direction and control.... Although the NCS has provided a forum for the interchange of ideas between agency communications staffs, significant issues and problems exist within the NCS organizational structure and management arrangements, which appear to be impeding the timely achievement of its objectives and goals. Consequently, there is no basic plan or blueprint to chart the course of the NCS from its present confederation of agency networks to the goal of a unified system. Even if such a blueprint existed, there is no effective or authoritative overview to ensure that agency planning and funding would conform to the overall plan."*<sup>51</sup>

The GAO concluded that the result was the continued proliferation of agency-oriented networks with little, if any, centralized direction in the interests of a truly national communications system. GAO recommended that President Nixon consider establishing a new organization with the "stature, authority, and resources sufficient to provide a strong central focal point in telecommunications matters."<sup>52</sup> It also recommended that the present roles and functions of the Executive Agent, NCS, and the Manager, NCS, be assigned to this proposed organization as a way of concentrating policy,

planning, and implementation.<sup>53</sup>

The GAO report and the Bureau of the Budget report that preceded it were followed by other high-level assessments and proposals. In the fall of 1969, the Secretary of Commerce proposed setting up a new office in the Department of Commerce to take over the functions of the Office of the DTM. The new NCS Executive Agent, Secretary of Defense Melvin R. Laird, however, felt that integrating this national policy function into the Department of Commerce could lead to serious interdepartmental conflicts—the same position taken earlier by the Commerce Department and other agencies relative to the Secretary of Defense's role as the NCS Executive Agent.<sup>54</sup>

By the time the Bureau of the Budget and GAO called for a National Communications System with “sufficient authority” to plan and build an effective network, movement was under way in the White House to reorganize the Executive Branch's approach to managing the Government's communications resources, including the NCS. In December 1969, the White House published its own assessment in which it concluded that—

*“There is no effective policy-making capability for telecommunications in the Executive Branch. The Administration is therefore largely unable to exert leadership or take initiatives.... [A]ttempts by the DTM to exercise leadership in communications policy have been largely ineffectual. The responsibilities and authority of the DTM are questioned by agencies with operating responsibilities. This situation results from a number of factors including organizational location, inadequate staff, and lack of clear authority.”*<sup>55</sup>

The White House determined that the solution was to abolish the Office of the DTM under the Office of Emergency Preparedness and replace it with an independent office within the White House as GAO had suggested. The White House report, however, did not agree with GAO's recommendation that the roles and functions of the NCS Executive Agent should be

transferred to this new organization. Rather, it recommended that the present NCS organizational arrangements be retained until further studies could be made.<sup>56</sup>

## THE PROGRAM IS REORGANIZED

The result of this White House review was Reorganization Plan No. 1 of 1970, delivered by President Nixon to the House of Representatives and the Senate on February 9, 1970. The President unveiled plans to abolish both the Office of the Director of Telecommunications Management and the position of Special Assistant to the President for Telecommunications, and replace them with the Office of Telecommunications Policy (OTP). These plans were implemented by E.O. 11556, “Assigning Telecommunications Functions,” dated September 4, 1970.<sup>57</sup>

Under this Executive order, the visibility and priority of the NCS were significantly reduced as the White House sought to move away from what had become a single-issue communications program (the NCS) to a more balanced consideration of a range of communications policy and management issues. Clay T. Whitehead was appointed OTP Director and was to serve as the President's principal advisor on telecommunications, setting forth plans, policies, and programs to promote the Nation's national and international communications interests. He was to take executive branch leadership in promoting standards, new technology, interoperability, privacy, security, mobilization, and spectrum use, and conduct economic, technical, and system studies. In addition, but without specific reference to the NCS, Mr. Whitehead was to develop plans to mobilize and use the Nation's telecommunications resources in any emergency, and to be prepared to “administer” these resources. Importantly, the OTP Director was empowered to identify competing, overlapping, duplicative, or inefficient telecommunications programs and to make recommendations concerning

the scope and funding of these programs. E.O. 11556 said nothing about the NCS, except for a short paragraph at the end that referred to the Presidential Memorandum of August 21, 1963.<sup>58</sup>

In early 1972, Mr. Whitehead formed the Council for Government Communications Policy and Planning to assist in restructuring the Government's telecommunications policy making and management roles. The Council's membership came from a number of agencies, including the NCS. A prime objective of the body was to foster interagency cooperation and to reach consensus on the coordination of Government communications activities. The Council was particularly concerned with soaring communications costs and duplication of communications systems within the Federal establishment. To this end, the Council stressed the importance of interagency planning to optimize the mix of networks and systems. Also, the Council underscored the need for awareness of technological change, particularly the interdependence among computers and data processing and communications transmission systems. The Council noted that the growth of integrated computer-communications networks struck at the heart of telecommunications planning.<sup>59</sup>

The Director of OTP rejected many of the basic premises on which the NCS planning originally had been based. Mr. Whitehead felt that the original purpose of the NCS had been joint planning and coordination, rather than total system integration. To emphasize his position, he canceled the plan to interconnect the FTS voice and DCS AUTOVON networks, a key provision in the original NCS plans.<sup>60</sup> Similarly, he opposed the idea of a communications czar in the national security area, or any other area. It was his view that—

*"Neither a single system for all Federal telecommunications needs, nor a single manager for all Federal communications operations, is an appropriate means of achieving [our] objectives."*<sup>61</sup>

The OTP strategy was detailed in Circular 12, published in October 1973. In this document, Mr. Whitehead divided communications services used by the Government into two categories: administrative communications and mission-oriented communications. The administrative class included communications services that were used by agencies in their day-to-day peacetime roles. The mission-oriented services included communications that supported specialized operations in four areas: national security, transportation, environment, and law enforcement. DOD was named lead agency in the national security area, with the Department of Transportation (DOT), DOS, CIA, and GSA providing support.<sup>62</sup>

In an effort to reassure Congress, Mr. Whitehead said he expected the approach set forth in Circular 12 to foster economy and efficiency of operations, and to stimulate the application of new communications technology. In a letter to members of Congress, he shared his belief that the new management arrangements would "eliminate many existing barriers to effective and coordinated planning, both within and across agency boundaries, and provide emphasis on planning in areas where it is most needed."<sup>63</sup>

## THE 1970s: A TIME OF RETRENCHMENT

While the debate swirled around General Klocko concerning the future of the NCS, he resumed work on the annual NCS long-range concept plans. The fifth NCS long-range concept plan was drafted but never published. The sixth (and final) long-range plan was forwarded to the White House in July 1971. The Executive Agent and the Manager rationalized, for the final time, a "unified" national communications system. As in the past, the operating agencies were unable to reach consensus on an NCS plan that could be presented to the President for his approval. Defense Secretary Laird said that one reason for this was the failure of the parties to reach agreement on

interconnecting the AUTOVON and FTS voice networks. These two major common-user networks were at the heart of the NCS plan from the beginning. Another consideration was the explosive growth of telecommunications technology, particularly as it related to computers. By the early 1970s, the computer had become an instrument of change, creating major system design challenges and opportunities for the NCS. Moreover, the interaction between automatic data processing and telecommunications was raising a host of regulatory and policy issues, making the Federal Communications Commission (FCC) a major player in the evolution of Federal telecommunications systems and policies. Another factor was the lack of progress in unified planning. A measure of agreement had been reached among the agencies concerning an NCS restoration priority system but much remained to be done to integrate NCS system planning among the operating agencies.<sup>64</sup>

Not long after the sixth long-range plan had been submitted to the White House, and immediately following the September 1971 decision to postpone further planning on the NCS, the new Manager, NCS, Air Force Lieutenant General Gordon T. Gould, Jr., conducted his own review of the NCS program. Instead of defending a single universal system, as his predecessors had done, General Gould concluded that whatever the NCS was supposed to be—

*"It was not a single communications system and probably will never be.... The concept of a single integrated NCS is unrealistic and further expenditure of effort aimed at that goal would be unwarranted."*<sup>65</sup>

Defense Secretary Laird approved the conclusions reached by General Gould and in April 1972 wrote a letter to Mr. Whitehead informing him



**LT. GEN. GORDON T. GOULD, JR., USAF  
MANAGER, NCS, 1971-1974**

that the NCS was dropping the universal single system approach. Instead, the NCS would concentrate "on the more modest but operationally worthwhile goal of interoperability—a lesser but understood level of integration."<sup>66</sup> From now on, the NCS would be viewed as a confederation of telecommunications networks run by a consortium of Federal agencies whose goals would be achieved through coordinated planning, interoperability, and system

standardization in an evolutionary environment.<sup>67</sup> The decision to step back from the universal system approach was widely applauded, because many of the agencies had been unwilling to accept the concept of a single integrated system, managed by the Executive Agent during emergencies.

In response to Defense Secretary Laird's letter, Mr. Whitehead agreed that interoperability was an appropriate goal for the NCS to pursue, at least for the near term. As far as he was concerned, the overriding need was implementation of the new, across-the-board telecommunications management plan, as set forth in Circular 12, in which the NCS was but one of many national communications priorities.<sup>68</sup>

Both the Executive Agent and the Manager resisted the solution offered in Circular 12. The Executive Agent saw the move as the "fractionalization of the NCS" and held that without a change in President Kennedy's August 1963 memorandum, the OTP did not have the authority to unilaterally modify NCS's role. Mr. Whitehead maintained that it was "well within the scope of the Presidential Memorandum of August 21, 1963, for us to revise the objectives, priorities, and membership in the NCS. ..."<sup>69</sup>

Unable to reach an agreement, the NCS Executive Agent announced that Circular 12 did not alter NCS's role of meeting the emergency

communications needs of the Federal Government as set forth in the August 1963 Presidential Memorandum. As in the past, the NCS would continue to provide an annual report containing inputs from all the operating agencies that it had previously identified. However, it would also provide OTP with a report on the National Security Group (NSG) as described in Circular 12, for which DOD was the lead agency.<sup>70</sup>

In 1974, NCS resumed its annual reports after a 3-year hiatus occasioned by OTP's reorganization of the NCS activity. The 1974 Annual Report also included a separate section on the NSG. In 1975, a separate NSG Summary Plan was issued in addition to the NCS Annual Report. For the following 2 years, the NSG Summary Plan was included as a part of the NCS Annual Report. In 1977, the NSG Summary Plan was discontinued. The NCS Annual Report continues to this day.

The policy, organizational, and philosophical changes brought about by E.O. 11556 in September 1970 removed the NCS from the main stream of communications policy planning. Nonetheless, the NCS was determined to forge ahead and carry out the mandate it received under the Presidential Memorandum of August 1963. Research was resumed, this time emphasizing generic communications topics integral to the evolutionary approach recently adopted for the NCS. The list of topics included interoperability, operational management, survivability, standards, circuit priority systems, and electromagnetic pulse phenomena.

Despite the decision to discard the single-system approach for the NCS, interest remained high within the OMNCS on how to structure and implement operational management of communications during emergencies. Receiving particular attention was E.O. 11490, issued in October 1969, which assigned emergency preparedness functions to Federal



**LT. GEN. LEE M. PASCHALL, USAF**  
**MANAGER, NCS, 1974-1978**

departments and agencies.<sup>71</sup> A thorough study of E.O. 11490 and related documents led the NCS to conclude that this Executive order needed to be amended to delimit and integrate the roles of several agencies, including the NCS.<sup>72</sup> In a related move, the NCS was tasked to assume operational management and planning responsibilities in other emergency communications areas. One example was Federal Emergency Plan D, prepared by the Office of Emergency

Preparedness. Under this plan, the NCS Executive Agent was responsible for the operational management and control of the telecommunications resources of all Federal agencies in a war situation. The NCS also had a role in preparing plans for Presidentially declared domestic emergencies. In 1971, the NCS prepared a "Plan for Support in Natural Disasters," followed in 1977 by a new "System Plan for Communications Support in Emergencies and Major Disasters." By 1977, this latter plan was implemented for 34 emergencies and 22 major disasters.<sup>73</sup>

The NCS also became involved in the question of industry standards, particularly as they related to interoperability and survivability. In August 1972, the NCS was assigned responsibility for the development and coordination of Federal Telecommunications Standards under the Federal Standards Program administered by GSA. The purpose of this program was to develop, coordinate, and issue the technical and procedural standards required to achieve operational compatibility among functionally similar telecommunications networks. Another goal was to increase the cohesiveness and effectiveness of the Federal telecommunications community's participation in national and international standards development programs, including the Federal Information Processing Standards Program. It was important that Federal systems interoperate not only

with each other, but also with those of state and local governments, the private sector, and other nations.<sup>74</sup>

The Federal Telecommunications Standards Program published 20 standards between 1972 and 1980, most of which were aimed at improving interoperability<sup>75</sup> and survivability. Unfortunately, these new standards did not achieve their goals because a number of Federal agencies failed to include them in their procurement specifications. In 1976 and again in 1978, this situation prompted the NCS to urge the FCC to set industry standards relative to national security and emergency preparedness telecommunications requirements.

In addition to operational management studies and standards activities, the Manager, NCS, also pressed for a realistic program for priority restoration of circuits that would assure the availability of critical circuits in national emergencies. During the 1960s, user agencies were authorized to assign appropriate restoration priorities to their circuits, with the provision that NCS staff would review them, after the fact, for conformance with established criteria. In 1969, the procedures were changed to require NCS review and certification of restoration priority assignments before they were issued to the carriers. This step reduced the number of protected circuits from a high of 37,800 in 1969, to 22,500 in 1970. Even this number was considered too high, and in 1974 the Office of Science and Technology and the Executive Agent directed the Manager, NCS, to review and recommend revisions to the Restoration Priority (RP) System.

Throughout the 1970s, the NCS RP Review Program continued to reduce the number of RP circuits. At the close of the Carter Administration in 1980, almost 10 percent of the Federal Government's circuits were RP circuits, down from a high of 42 percent in 1969. In the meantime, however, the number of Government circuits had grown from approximately 90,000 in 1970, to over 117,000 at the end of 1979, thus somewhat diminishing the significance of the lower percentages.

The final topic addressed by the NCS during the 1970s was EMP phenomena and the resulting threat to the communications infrastructure. In 1966, the second NCS long-range plan identified EMP as a major threat to commercial carrier systems. In December 1971, the NCS Executive Agent was designated as the Government's focal point for all EMP technical data relating to telecommunications.<sup>76</sup> In 1978, in response to this potential danger, and with advice from the Federal Telecommunications Standards Committee, the new Manager, NCS, Navy Vice Admiral Samuel L. Gravely, Jr., initiated an effort to develop Federal standards for protecting telecommunications facilities from EMP damage.

By the mid-1970s, the NCS had developed a body of knowledge on a wide range of current telecommunications topics, including EMP. In an effort to share this information, the OMNCS, in 1976, began publishing and distributing annual reports on current NCS research.<sup>77</sup>

## THE NEW STRATEGIC THREAT AND THE RE-EMERGENCE OF THE NCS

When President Nixon resigned in 1974, Vice President Gerald R. Ford became President. The resignation left many White House programs, including the NCS, in limbo as the new Ford Administration sought to establish and affirm its appropriate leadership role. It was during this interim that the OTP paused to take an introspective look at the NCS's past, as well as its future.

When OTP was established in 1970, it faced the task of relating its coordination and review role to the assigned responsibilities of DOD and GSA, and to the roles of Office of Management and Budget in the areas of program coordination and automatic data processing (ADP). In 1973, OTP issued Circular 12 outlining a coordination concept in which various Government agencies would serve as lead agencies, responsible for particular mission-oriented systems.

OTP was responsible for reviewing progress and providing planning guidance to the various lead agencies, including DOD.<sup>78</sup>

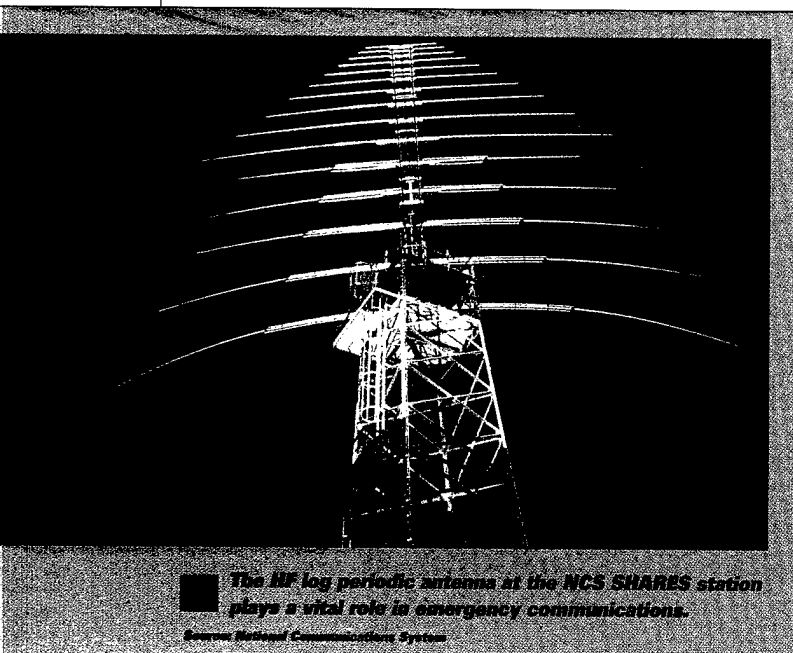
The OTP concluded that this approach had not worked well, primarily because of the confusion and overlap among the roles and functions of OTP, the Office of Management and Budget, DOD, and GSA with respect to the acquisition of separate telecommunications and automatic data processing capabilities by the various Government agencies. Moreover, DOD continued to express concerns about the limited scope of DOD's NCS responsibilities and authority. The OTP further concluded that a major realignment of telecommunications responsibilities and increased day-by-day involvement on its part was required to resolve these conflicts. This view implied a broader charter, a larger budget, and a considerable increase in the size of the OTP staff.<sup>79</sup>

None of these implied changes was forthcoming. The Ford Administration left office in 1977 and was replaced by the Carter Administration, which launched its own analysis of communications management at the White House level. As a result, President Jimmy Carter issued an Executive order disbanding OTP and

transferring its functions, including those associated with the NCS, to the Executive agencies that had traditionally handled such matters. Under E.O. 12046 of March 1978, the NCS activity was transferred to the National Security Council, which assumed responsibility for the development of policy, plans, programs, and standards for mobilization and use of the Nation's telecommunications resources during emergencies. The Office of Science and Technology Policy was given the task of implementing these functions under policy guidance from the National Security Council.<sup>80</sup>

Other telecommunications functions previously handled by OTP were transferred to the Department of Commerce and to a new office within Commerce, the Assistant Secretary for Communications and Information, from which evolved the National Telecommunications and Information Administration (NTIA). Under E.O. 12046, the Secretary of Commerce was to serve as President Carter's principal advisor on telecommunications policy and regulation of the telecommunications industry. The Secretary of Commerce was also assigned responsibility for conducting studies and evaluations concerning the improvement and operation of Federal telecommunications systems, a research role for which he had been responsible since the NCS was first formed in 1963. The Office of Management and Budget, on the other hand, retained its powerful budget oversight function, serving as President Carter's principal advisor on procurement and management of Federal telecommunications systems, including the NCS.<sup>81</sup>

Along with these internal management changes in 1978, new intelligence indicated rapid growth in the Soviet nuclear threat, particularly in the number and accuracy of Soviet intermediate-range and long-range nuclear warhead ballistic missiles. This discovery prompted the President's National Security Advisor, Dr. Zbigniew Brzezinski, to call once again for "leadership protection" through improved command



and control communications, reminiscent of President Kennedy's order 15 years earlier. The National Security Advisor also expressed concern about the impact of deregulation and the possible divestiture of AT&T on survivable and restorable telecommunications networks. Up until this time, such emergency services had been provided to the Government under an exclusive agreement between the AT&T Long Lines Department and the Federal Government.<sup>82</sup>



**VADM SAMUEL L. GRAVELY, JR., USN**  
**MANAGER, NCS, 1978-1980**

The 1978 NCS Annual Report echoed White House concerns about the possible AT&T divestiture, recommending a national policy statement regarding the importance of national security telecommunications. The NCS noted that one possible benefit of such a policy statement could be to increase the survivability of commercial networks serving national security interests by influencing how these private service providers constructed their systems. To this end, the NCS again urged the FCC to take an active, aggressive role, using its regulatory powers.

With national security telecommunications once again high on the Nation's agenda, the NCS began to emerge from the relative obscurity of the 1970s. In May 1978, the National Security Council, the Office of Science and Technology Policy, and the Executive Agent, NCS, joined together in a lengthy memorandum of understanding. This memorandum established the Executive Agent's responsibilities in the areas of national security telecommunications. These responsibilities included developing and coordinating plans, programs, and standards for the mobilization and use of the Nation's telecommunications resources in any emergency. The Manager, NCS, was to assist the Executive Agent in performing these responsibilities.<sup>83</sup>

While these new NCS assignments were being prepared, President Carter was acting at the policy

level. In late 1978, President Carter reviewed recommendations from his staff and the 1978 NCS Annual Report, and, in words reminiscent of President Kennedy's memorandum of August 1963, called for communications facilities adequate—

*"...to gather intelligence, conduct diplomacy, command and control our military forces, provide continuity of essential functions of Government, and to reconstitute the political, economic, and social structure of the Nation."*<sup>84</sup>

President Carter went on to outline an approach for achieving these goals that included giving priority to continuity of Government telecommunications, enhancing interoperability, and consulting with the FCC on implementing these principles. He also directed the NCS to place "substantial reliance" on the private sector for advice and assistance.<sup>85</sup>

Although there was uncertainty about who was responsible for implementing this new national security telecommunications policy, the NCS, backed by the National Security Council, soon emerged as the key coordinating organization. In response to the new policy guidance, the National Security Council formed a Steering Group to coordinate implementation of this new policy statement. The Steering Group then tasked the NCS to prepare a National Security Telecommunications Policy Implementation Concept Plan and to coordinate its implementation. By January 1980, the NCS Manager, Admiral Gravely, assisted by the NCS operating agencies, had prepared a draft Concept Plan and briefed it to the Federal agencies serving on the Steering Group, the commercial carriers, the FCC, and the FCC's National Industry Advisory Committee.

The agencies' responses to the Concept Plan were generally favorable. The Department of Commerce, while applauding the broad outline and purposes of the plan, questioned the leadership role

assigned to the Manager, NCS, because President Carter did not specifically assign implementation responsibility. Commerce also noted that the Concept Plan did not address potential jurisdictional conflicts. Despite these reservations, the Steering Group approved the planning approach in the summer of 1980 and directed the NCS to prepare a final strategic plan for implementing the new national security telecommunications policy.<sup>86</sup>

Coordinating the technical, regulatory, and policy aspects of the Concept Plan with the appropriate Federal agencies and commercial carriers proved to be a considerable challenge for the new Manager, NCS, Army Lieutenant General William J. Hilsman, who had succeeded Admiral Gravely. Despite frequent urging from the National Security Council that he assume executive branch leadership in this matter, General Hilsman realized that he did not have a clear-cut management mandate to do so. The President had simply not named the Manager, or any other organizational head, to be in charge of system implementation. As the Executive Agent noted in a memorandum to the National Security Council, "some Government organizations do not recognize or accept the role of the NCS"<sup>87</sup> as implied in the President's instructions, and suggested that it might be appropriate to announce to the community once again that the Manager, NCS, is



**LTG WILLIAM J. HILSMAN, USA**  
**MANAGER, NCS, 1980-1983**

fully responsible for coordinating the implementation of the national security telecommunications policy within the Federal Government.<sup>88</sup>

Rather than attempt to force a consensus on NCS's role and authority, the Steering Group turned to more immediate problems confronting the development of a national security telecommunications capability, particularly the economic and structural changes taking place in the telecommunications industry.

Up to the late 1970s, emergency communications for the President and key civilian and military officials had been supplied by Government networks and AT&T's Bell System, the latter functioning in the de facto role of the Government's system manager. The growing number of telecommunications providers and the 1974 suit by the Department of Justice seeking the break-up of the Bell System made it increasingly likely that this long-term and well-defined relationship between the

### Power Blackouts Disrupt Phone Service

The electrical power grid in the United States has features that ensure restoration whenever failures occur, usually without interrupting service to the majority of users. Despite these safeguards, a failure in 1965 triggered an outage in most of the northeastern United States that affected 22 percent of the Nation's heavy industry. The danger of similar

widespread power outages still exists from acts of war, sabotage, or from natural disasters such as earthquakes and hurricanes.

Although the telecommunications industry is relatively immune to the effects of routine power outages, extensive outages can disrupt telecommunications services. Long-lasting, widespread power

outages occurred during hurricanes Hugo (September 1989), Andrew (August 1992), and Iniki (September 1992). Only heroic efforts by the telecommunications companies to bring in additional emergency generators and fuel supplies from other regions prevented widespread loss of telecommunications service due to power losses.

Government and AT&T was about to come to an end. In the fall of 1980, the National Security Council anticipated such an event, and tasked the Executive Agent to review the Federal Government's dependence on commercial carriers.<sup>89</sup>

In December 1980, General Hilsman briefed the Steering Group on the Executive Agent's findings, one month before the Carter Administration left office. He confirmed what was already widely known: The Government had developed an overwhelming reliance on common and specialized carriers, and these carriers were vulnerable to a range of disruptions. To provide solutions to the problems identified in the study, the NCS member agency representatives identified a set of issues, grouped under three headings: technical, managerial, and national communications policy. The technical initiatives focused on system survivability and interoperability, and included reworking the previously abandoned AUTOVON/FTS interconnection concept. The managerial initiatives emphasized the need for a national security telecommunications focal point within Government, as well as the need for joint industry-Government planning. The final category, policy initiatives, stressed the importance of communications legislation then pending before Congress. Collectively, these initiatives became the building blocks of the national security telecommunications enhancement program of the 1980s.

Before research could begin, however, there was a change of administrations from President Carter to President Ronald W. Reagan. A few weeks after the inauguration, President Reagan pledged to fulfill President Carter's national security telecommunications objectives and to strive for practical results as soon as possible.

## TOWARD A NEW BEGINNING

The momentum toward major improvements in national security telecommunications accelerated rapidly in the 1980s as the Nation entered a period of

unprecedented peacetime military buildup under the Reagan Administration. At the same time, countervailing trends were present complicating this development. Among these trends were: the proliferation of Government-owned and Government-leased networks with apparently little regard for interoperability; the pace of technological change bringing new opportunities for system improvements; divestiture and deregulation greatly increasing the number of industry players; and the resurgent role of the Congress, the courts, and the regulatory agencies in orchestrating a new economic and legal setting for telecommunications. However, as part of its approach to the challenges, the Government moved to consider telecommunications for wartime and for domestic emergencies as one entity referred to as national security and emergency preparedness (NS/EP) telecommunications.<sup>90</sup>

In January 1981, the Reagan Administration affirmed its support for President Carter's national security telecommunications policy statement, and E.O. 12046, which disbanded the OTP and transferred telecommunications authorities and responsibilities to the White House and other Federal agencies. Next, President Reagan increased the number of organizations involved with NS/EP telecommunications planning. The formation of the Emergency Communications Working Group (ECWG) was followed by creation of the President's National Security Telecommunications Advisory Committee (NSTAC) in 1982. These two bodies, the ECWG and the NSTAC, in addition to the NCS, became the Reagan Administration's initial focal points for developing NS/EP telecommunications policy.

The White House created the Emergency Mobilization Preparedness Board in December 1981 to devise plans for harnessing the Nation's mobilization potential.<sup>91</sup> The Board was chaired by the President's National Security Advisor, William P. Clark, and was composed of representatives from more than 20 Federal departments and agencies. One of the groups

formed under the Board was the ECWG, which was tasked to prepare plans for the use of communications in times of national emergencies. The Manager, NCS, was the chairman of the ECWG. The Administrator of the NTIA was the vice chairman.

The ECWG drew up a Communications National Plan of Action containing 8 implementation measures and 33 milestones. At the request of General Hilsman, the ECWG addressed the special issue of automated information processing (AIP). The AIP issue review was an early attempt to look at the challenges arising from society's dependence on AIP and the merging of telecommunications and information processing technologies.

Despite the relevance of the subject matter, both the research program and the ECWG itself came under increased scrutiny as delays in publishing results began to mount. Growing opposition within the executive branch to both the Working Group and its program added to the ECWG's dilemma. In early 1983, reports began to circulate that President Carter's telecommunications policy statement was being revised to give the NCS a greater role in NS/EP telecommunications. These reports were confirmed in

late 1983 when President Reagan issued new policy guidance.<sup>92</sup> In the following months, the National Security Council established a new telecommunications policy steering group, expanded the NCS membership to 22 members, and instructed the NCS to assume the functions of the ECWG.<sup>93</sup>

President Reagan's establishment of the NSTAC in 1982 recognized the major changes occurring in the telecommunications industry. For years the Federal Government had been concerned about impending changes in the industry and the impact they would have on providing communications for the President and other senior Government officials in an emergency. In 1978, the White House had sought to insulate itself from such developments by issuing guidance that encouraged the FCC to use its regulatory powers to influence the design of the growing number of U.S. commercial carrier systems. The Manager, NCS, had also been instructed to involve himself with the host of new private-sector telecommunications providers and to seek their advice and assistance in achieving national security goals.

In 1978, the Manager made known his opposition to the Justice Department's 1974 antitrust

suit against AT&T, viewing the move as an attempt "to fragment the integrated national aspects of the Nation's telecommunications networks." When the Modification of Final Judgment divesting the Bell Companies from AT&T was issued in January 1982, General Hilsman moved quickly to establish a new industry-Government

### **NSTAC Members as of April 1998**

|                                       |                                     |
|---------------------------------------|-------------------------------------|
| Advanced Digital Technologies Company | Nortel                              |
| AT&T                                  | National Telecommunications         |
| BankAmerica Corporation               | Alliance, Inc.                      |
| The Boeing Company                    | Pacific Telecom, Inc.               |
| COMSAT Corporation                    | Raytheon Company                    |
| Computer Sciences Corporation         | Rockwell International Corporation  |
| Electronic Data Systems               | Science Applications International  |
| Executive Security & Engineering      | Corporation                         |
| Technologies, Inc.                    | Sprint Corporation                  |
| GTE Corporation                       | Teledesic Corporation               |
| Hughes Electronics Corporation        | TRW Inc.                            |
| ITT Industries, Inc.                  | Unisys Corporation                  |
| Lockheed Martin Corporation           | United States Telephone Association |
| MCI Communications Corporation        | U S WEST, Inc.                      |
| Motorola, Inc.                        | WorldCom Inc.                       |

relationship that included not only AT&T, but also the many new service and equipment providers, and information processing companies. In March 1982, he initiated the first of two national security telecommunications conferences, inviting the chief executive officers of 30 telecommunications and

Moving quickly into its new responsibilities, the NSTAC created an Industry Executive Subcommittee (IES) and three additional bodies: the Resource Enhancements Working Group, the Emergency Response Procedures Working Group, and the Funding and Regulatory Working Group. In addition,

the NSTAC established ad hoc task forces to address specific issues. The NSTAC met three times between December 1982 and April 1984 and considered a number of major telecommunications issues, including: a national coordinating mechanism, commercial satellite survivability, and automated information

### **NSTAC: NS/EP Response to Divestiture**

The Kingsbury Decision of 1914 laid the legal framework that allowed AT&T to maintain its telephone monopoly for the next 70 years. The "benevolent giant" became the world's largest corporation, providing the most efficient and modern telephone system in the world.

As time went on, however, the monopoly was increasingly

challenged by small entrepreneurs and the FCC, as they sought to open the door to other service providers and equipment manufacturers. Finally, in 1974, the Government filed a suit charging AT&T with the monopoly of various telecommunications services. Then, after 8 tumultuous years of debate and negotiations, the breakup of the Bell System was announced in

January 1982, with divestiture scheduled for completion in January 1984.

To provide a means for the Government to coordinate with the expanding number of telecommunications companies, President Reagan established the National Security Telecommunications Advisory Committee in September 1982.

information processing companies to participate. A second conference was held in July 1982, followed by a series of industry-Government working group meetings at which three major issues were identified for future attention: commercial satellite survivability, joint network planning, and automated information processing survivability.

These conferences and meetings ultimately led to the issuance of E.O. 12382, which was signed by President Reagan on September 13, 1982, establishing NSTAC.<sup>94</sup> Composed of a maximum of 30 industry leaders, the NSTAC was to bring to the President and the Secretary of Defense, in his capacity as the Executive Agent, NCS, the knowledge, expertise, and insight available within the telecommunications industry on problems relating to the implementation of national security telecommunications policy.

processing survivability.

The third organization to which the Reagan Administration assigned major national security telecommunications responsibilities was the NCS. Since 1963, the NCS had seen its fortunes rise and fall as the White House searched for ways to implement President Kennedy's goal of a unified Governmental communications system. After a period of obscurity in the 1970s, the Carter Administration restored the NCS to a place of prominence by making it, once again, a focal point for emergency telecommunications activities within the Federal Government. This time, however, the character of the NCS role was changed. The NCS was no longer viewed as a communications system in the sense that President Kennedy had identified it. Rather, it was looked upon as a Government organization responsible for facilitating

and coordinating the development of an NS/EP telecommunications capability.

At the beginning of the Reagan Administration in 1981, the organizational structure of the NCS looked much as it did in 1966 following its establishment as a separate organizational entity within the DCA. The Secretary of Defense continued to serve as the Executive Agent, and the Director, DCA, as the Manager. The Assistant Secretary of Defense for Command, Control, Communications, and Intelligence functioned as deputy to the Executive Agent. Previously, this role of Deputy had been filled by various DOD offices, beginning in 1963 with the Assistant Secretary for the NCS. Additionally in 1981, the Office of the Manager, NCS, expanded from two offices (Plans and Operations, and Federal Standards) to three offices (Plans and Programs, Operations, and Federal Standards).

Another significant change within the NCS organization was the restoration of two bodies that had fallen into disuse during the 1970s: the NCS Principals and the NCS Representatives. These two groups were first identified in 1971-1972 when the Manager, NCS, General Gould, met with agency Representatives in December 1971, and then with agency Principals in January 1972, to outline his views on how the NCS should function in the 1970s under the new Office of Telecommunications Policy.

Up to that point, the NCS had been treated more or less as a DOD responsibility, with the Manager, NCS (who was also the Director, DCA) interfacing with the operating agencies only as the occasion required. But now that the single integrated communications system concept, planned and managed by DOD, had been discarded and replaced by the consortium approach, General Gould saw the need for and strength in a collective position in which the Principals and Representatives could help shape the agenda for the NCS in the 1970s and beyond. It was General Gould's view that the NCS operating agency Principals and Representatives could provide leadership, not only in defining a new concept, but also in

providing advice on the host of important telecommunications issues now coming to the fore, including standards, communications satellites, computers, digital communications, and the like. The Manager also noted the increasing Congressional attention being paid to telecommunications and the need for the Principals and Representatives, as well as the Manager, to monitor and provide inputs to these deliberations.<sup>95</sup>

In 1978, the Manager, NCS, Air Force Lieutenant General Lee M. Paschall, reaffirmed the enhanced role of these two informal bodies by chairing periodic meetings of the Principals to obtain their advice and assistance. In addition, the Deputy Manager began meeting regularly with the NCS Representatives.<sup>96</sup> By 1982, according to General Hilsman, the NCS operating agency members were playing "a predominant role in the formulation of telecommunications policy and the solution of mutual problems...."<sup>97</sup> However, it was not until 1984 that the Principals and Representatives, as organizational bodies, became official entities of the NCS organizational structure.

The list of operating agencies and assets published in 1964 had identified 11 operating agencies, along with 31 communications systems assets. Successive long-range plans in the 1960s continued to list the operating agencies and their assets, adding new ones and deleting others. After 1970, however, the practice of identifying agencies and communications assets fell into disuse, and it was not until the reorganization of Federal telecommunications activities in 1978 that the practice was resumed. The number of member agencies began with 6 in 1963, rising to 11 in 1964. The number remained constant until 1983, when it doubled. A 23rd member was added in 1984.<sup>98</sup>

At the beginning of the Reagan Administration in January 1981, one of the first tasks of the NCS was to continue work on the national security telecommunications initiatives begun under President Carter. In March, the NCS distributed a revised

Implementation Concept Plan identifying the range of issues to be addressed in the planning process. It also emphasized the importance of coordinated planning among the Executive agencies, commercial carriers, and the NCS staff. To this end, the Manager, NCS, requested that the agencies establish a point-of-contact to coordinate with the NCS staff.<sup>99</sup>

In addition to the planning process, the NCS launched a major push on technological initiatives. The NCS, through the Defense Nuclear Agency, awarded a contract to AT&T to study potential high-altitude electromagnetic pulse (HEMP) effects on the Bell System class 5 switch. In addition, this contract also addressed HEMP effects on the AT&T multimode fiber optic light wave transmission system used in the AT&T network.

Next, the Military Satellite Communications Systems Office developed and published a study on communications satellites. It was hoped that the results of this study would be applicable to the NCS commercial communications satellite architecture proposals. Finally, the NCS began monitoring legislative, regulatory, and judicial matters relative to telecommunications.

Two other developments in 1981 were also key to the continued evolution of the NCS role. The first was the approval of an NCS program budget element within DCA's budget structure. This gave the NCS a management tool to more adequately identify and justify personnel and funding requirements. The second development was the implementation of FCC Order 80-591 regarding restoration priorities. This order enhanced the NCS management of the RP System by requiring commercial carriers to incorporate the RP System into their day-to-day operating procedures.<sup>100</sup>

Work on the national security telecommunications initiatives remained a priority in 1982 as the NCS sought to carry out the National Security Council mandate to provide "telecommunications facilities adequate to satisfy the needs of the Nation during and after any national emergency." To strengthen the

working relationship between the NCS and other agencies, the Steering Group, formed by the National Security Council in 1978, established a Working Group in June 1982. The Working Group's chairman was from the Office of Science and Technology Policy, with the vice chairman from the National Security Council staff. The purpose of this subordinate organization was to research and define issues before they were brought to the Steering Group for decision—issues that had now been organized into three groups: survivability and inter-operability, management, and policy.

There were six programs under survivability and interoperability: commercial satellite survivability; common/specialized carrier transmission systems; a class 4/5 switch study; the AUTOVON/FTS interconnect; a national emergency amateur radio operations plan; and EMP. In June 1982, work on the commercial satellite survivability initiative was undertaken by both the NCS and the NSTAC. Six technical tasks were grouped under the common/specialized carrier transmission systems initiative to identify survivability and endurability enhancements that could be built into the common and specialized carrier transmission systems. For the class 4/5 switch study, a second contract was awarded in 1982 to undertake network design and engineering studies to determine how to route essential telephone traffic through the public switched network (PSN) when large portions of the PSN's hierarchical routing structure had been damaged or destroyed.

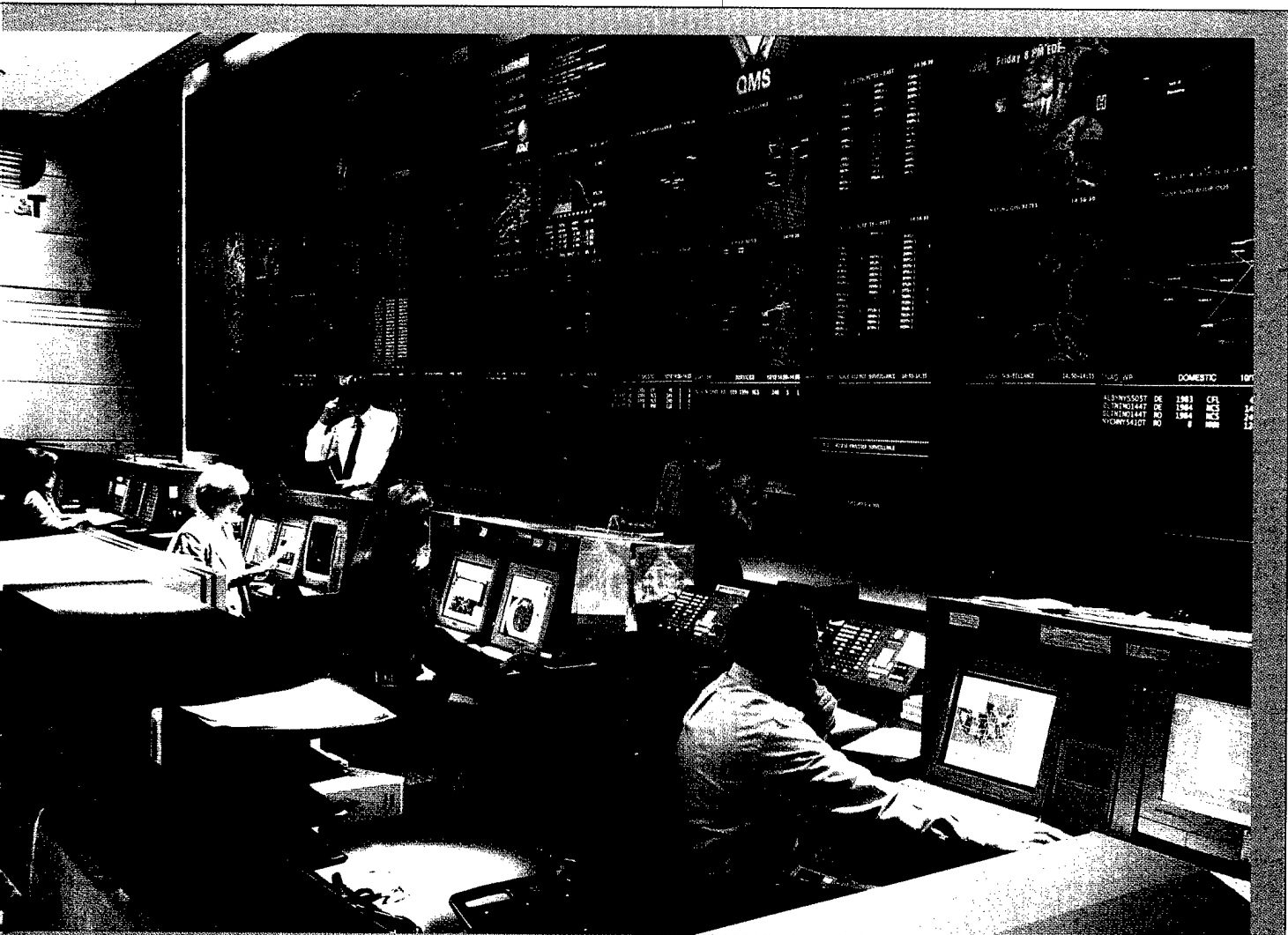
Following approval by DOD to permit a limited flow of FTS traffic into and out of AUTOVON, the Defense Commercial Communications Office issued a contract in December 1982 to implement the AUTOVON/FTS interconnect initiative, with an initial operational capability scheduled for September 1983. With respect to the Nation's 400,000 or more amateur radio operators, in June 1982, the Steering Group approved the NCS recommendation to develop this largely untapped resource. Close coordination was

established with the American Radio Relay League (ARRL) and the Military Affiliate Radio System (MARS) for this purpose.

Six management initiatives were also studied. The National Security Council was responsible for two of them, including the Coordination of National Security-Related Presidential Directives. Progress on a third initiative, the National Security Telecommunications Policy Implementation Plan, was slowed because of the difficulty in developing and validating Federal Government emergency communications requirements. A fourth management initiative, joint

industry-Government planning, was implemented with the establishment of the NSTAC in September 1982.

The final two management initiatives, physical security and the national electric power grid, were also addressed in 1982. The physical security of telecommunications facilities was examined in the context of the Defense Industrial Facility Protection Program, a voluntary program on the part of industry. Contact was established with AT&T and other operating companies to learn about their physical security programs, with the goal of influencing the general direction of their programs. At NCS's request,



**AT&T Transmission Network Operations Center, Bedminster, NJ**  
Source: AT&T

the Department of Energy initiated a study to assess the national electric power grid and the role that utilities played in NS/EP telecommunications. In June 1982, the Department of Energy requested the departments and agencies to comment on its draft plan to assess the Nation's vulnerability to major electric power outages.

In the area of Congressional legislation, the OMNCS provided staff support to the NCS Executive Agent, Secretary of Defense Caspar W. Weinberger, in his efforts to obtain pro-NS/EP legislation. Testifying at Congressional hearings in 1982 on the impact of the AT&T antitrust suit on NS/EP telecommunications capabilities, General Hilsman suggested four pro-NS/EP legislative initiatives: (1) pervasive recognition in the law of the critical importance of the telecommunications industry to national security and emergency preparedness; (2) legislative safeguards for all telecommunications carriers engaging in joint network planning and management; (3) statutory permission for any telecommunications carrier to provide an end-to-end service during times of emergency; and (4) assurances from Congress that provisions of the law can be implemented in an industry environment free from conflicting regulatory initiatives or jurisdictional conflicts. None of these suggestions was enacted into law.

In 1983, President Reagan issued new guidance to

replace policy established by the previous Administration.<sup>101</sup> The new guidance further consolidated NCS's primacy as the Government focal point for NS/EP telecommunications activities. The Manager, NCS, was instructed to coordinate development of plans to make available the unrestricted use of the Nation's domestic communications resources supporting NS/EP telecommunications requirements. In a similar manner, the NSTAC was invited to provide advice and information to the President and Executive Agent. Finally, all departments and agencies were instructed to incorporate the provisions of the new policy on national security telecommunications when modifying their current communications facilities, systems, or networks, or when planning new ones.

By the end of 1983, the Reagan Administration had arrived at an organizational structure to provide the Nation with an improved NS/EP telecommunications capability, focusing on the Manager, NCS, a Committee of Principals (principal executive officers of the member organizations), and the NSTAC. The next step was to codify this arrangement with the Federal Government. In view of the multi-agency responsibilities of the NCS, it was no surprise that the organization was tasked to draft a new executive order addressing the problem of sorting and assigning NS/EP telecommunications roles and responsibilities throughout the Federal establishment.

PART 2

THE NCS  
IN A  
CHANGING  
ENVIRONMENT

## PART 2

# THE NCS IN A CHANGING ENVIRONMENT

## REVITALIZING THE NCS

**T**he NCS underwent a fundamental change on April 3, 1984, when President Reagan signed E.O. 12472, "Assignment of National Security and Emergency Preparedness Telecommunications

Functions."<sup>102</sup> The original charter, the Presidential Memorandum of August 1963 establishing the NCS, was superseded.<sup>103</sup> In its place was a new and broader Executive order outlining an organizational structure and technical path for creating an NS/EP telecommunications capability. As in the original August 1963 memorandum, this capability was to serve the Federal Government under all circumstances, including crisis or emergency, attack, recovery, and reconstitution.

The new, revitalized NCS was structured as an interagency activity and focal point for joint industry-Government NS/EP telecommunications planning. Its responsibilities and organizational structure, as established by E.O. 12472, are in place to this day (although the central thrust of the mission has evolved considerably) and have created an organization that has successfully bridged the often tumultuous relationship between government and private industry. In addition to the Executive Agent and the Manager, NCS, the organizational structure established by the E.O. 12472 includes the NCS Committee of Principals (COP). The COP comprises those Federal departments, agencies, or entities, designated by the President, that lease or own telecommunications facilities or services of significance to national security and emergency preparedness. Federal agencies having relevant policy, regulatory, or enforcement authorities are also included.

What differentiated E.O. 12472 from legislation dealing with telecommunications responsibilities is that President Reagan's mandate focused exclusively on national security and emergency preparedness telecommunications. Under the order, the NCS would seek to use commercial, Government, and privately

owned telecommunications resources in support of national leadership and continuity of Government. To meet this capability, the NSTAC established the joint industry-Government National Coordinating Center for Telecommunications (NCC) to assist in initiating, coordinating, restoring, and reconstituting NS/EP telecommunications services or facilities under all conditions of crisis or emergency.

The role of the Secretary of Defense as Executive Agent remained to promote the conduct of unified planning and operations among NCS member organizations. The Secretary was to recommend, in consultation with the NCS COP, to the National Security Council, the Director, Office of Science and Technology Policy (OSTP), and the Director, Office of Management and Budget, the assignment of tasks and activities to NCS members. In addition, the Executive Agent was tasked with providing staff support and technical assistance to the NSTAC. These responsibilities would be accomplished primarily through the Manager, NCS, who would be responsible for recommending an evolutionary telecommunications architecture, preparing plans and procedures for a circuit priority restoration system, and chairing the NCS COP. The COP would serve as a forum for Committee members to review, evaluate, and present views and recommendations on current or prospective NCS programs to the Manager, the Executive Agent, and the White House.

Fortunately, the Manager, NCS, had adequate resources to cope with the enlarged scope and complexity of the tasks assigned under the new structure. The COP and its subordinate body, the Council of Representatives (COR), were available to study, review, and recommend policies and enhancement initiatives. The NCS, with industry participation, had established the NCC, which rapidly became a major operational element in coordinating

NS/EP telecommunications activities. The NSTAC was also making significant progress on other issues, including service restoration priority, commercial network survivability, commercial satellite survivability, and electromagnetic pulse effects. In addition, the staff resources within the OMNCS were expanding. By 1982, the OMNCS had reorganized into four offices: Emergency Preparedness; Joint Secretariat; Plans and Programs; and Technology and Standards.<sup>104</sup>

Before the Manager could move ahead with his new assignments, the issue of program funding had to be addressed. In the late 1970s, funding sources for NCS programs first became an issue as a result of the growing need for a higher level of communications survivability at increased costs. Initially, these costs were absorbed by DOD. In 1983, escalating defense costs led DOD to reduce its NCS budget by 50 percent and to recommend that non-DOD agencies share in the funding. Although there were rumblings of resistance among some of the agencies, this concept of shared funding continued to make headway in the Reagan Administration. In 1985, President Reagan specified that NCS member agencies were to share implementation and recurring costs for national-level NS/EP telecommunications programs (i.e., those that benefit multiple Federal departments, agencies, or entities). Each member's share of the costs would be determined by its share of NS/EP

telecommunications requirements.<sup>105</sup>

Development costs would remain the responsibility of DOD. While this new approach did not completely resolve the funding issue, it did open the way for planning to begin by calling for development of a national-level NS/EP telecommunications program financed under this new formula.

By 1984, it was understood that the mission of the NCS was not to build a stand-alone "system" in which some of the facilities and equipment would be



**LT. GEN. WINSTON D. POWERS, USAF**  
**MANAGER, NCS, 1983-1987**

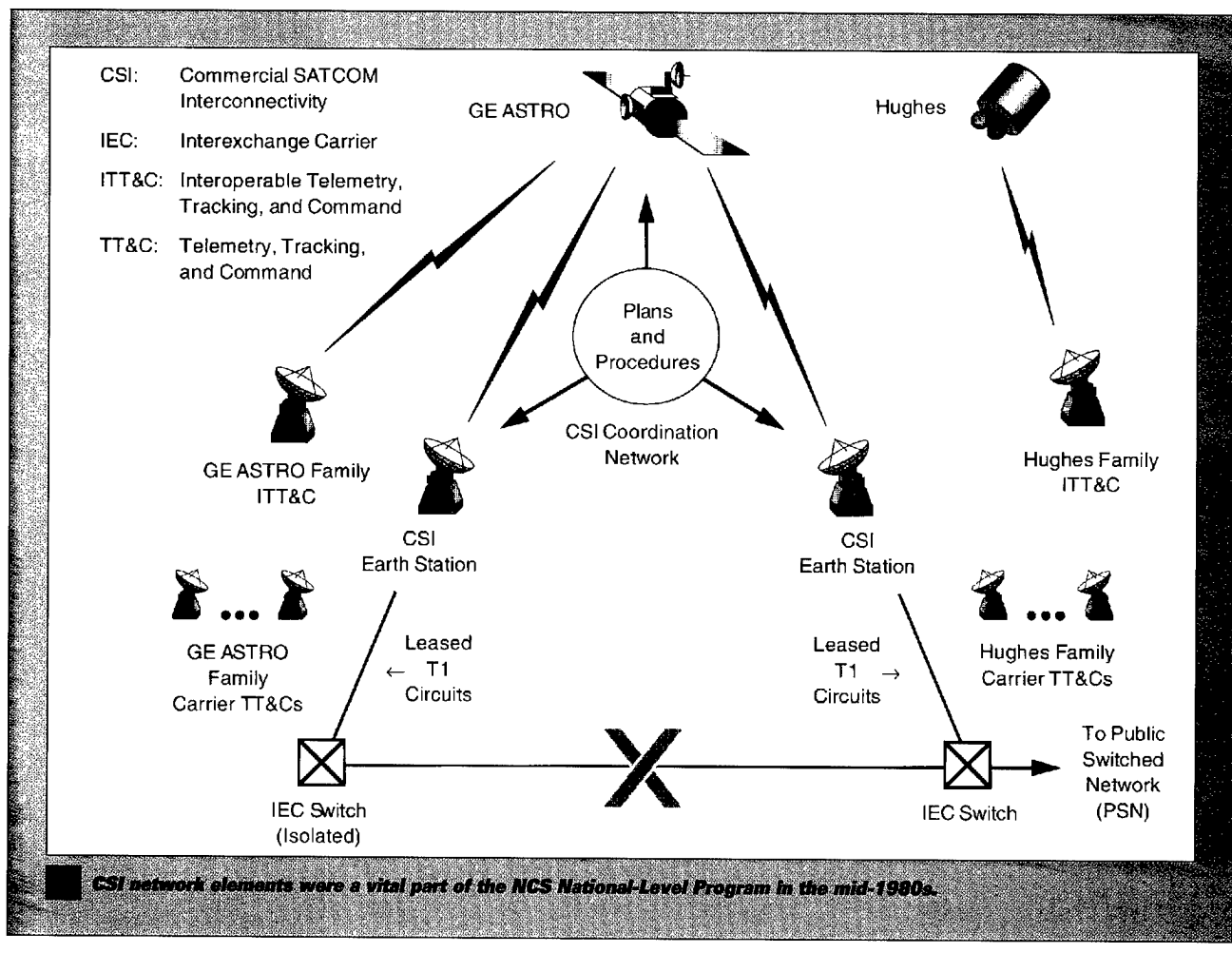
owned by the Government, but rather to provide the President and the Federal Government with NS/EP telecommunications services, primarily leased from commercial carriers. At the same time, the NCS was to implement effective management controls for coordinating, and possibly directing, the operation and use of emergency telecommunications services when the President invokes his emergency war powers functions under the provisions of Section 706 of the Communications Act of 1934. Overall, the improvement in NS/EP telecommunications services was to be evolutionary.

To acquire these improvements, the NCS used three approaches. The first was to use the considerable leverage of the NCS organization to influence the adoption of standards supportive of NS/EP telecommunications requirements. The second

approach was to encourage the PSN providers to incorporate particular technology features into their systems. The third approach was to program, implement, and fund NS/EP-oriented improvements in the PSN that the carriers were not planning to adopt at the time. These objectives, however, were to be accomplished in an environment marked by rapid changes in the U.S. telecommunications industry, accelerated growth of new technologies and services, and dramatic changes in the strategic threat.

## THE NATIONAL LEVEL PROGRAM

The period from 1984 to 1992 was one of the most dynamic periods in modern political history. In 1984, the U.S. Government's national security mission focused on the threat of full-scale nuclear war, as it had



for nearly 40 years. This threat dominated the strategy and mind set of the defense industry and all those involved in planning the response to any nuclear event that could destroy immense portions of the United States infrastructure. The core issue for NS/EP telecommunications was how to reconstruct a communications system to connect "islands" of users within a decimated infrastructure. Although the programs and policy of the NCS extended beyond recovery from physical destruction of the PSN, the central thrust for the organization reached a turning point when a coherent telecommunications response and recovery plan to the nuclear threat was reached with the development of the National Level NS/EP Telecommunications Program (NLP).

The White House approved the first NLP in 1986, along with its funding profile. This was a milestone in the NCS mission to develop an NS/EP telecommunications capability. In this initial NLP, the NCS projected the evolution of capabilities that enhanced the routing, survivability, connectivity, and interoperability of the PSN. The Program included Nationwide Emergency Telecommunications Service (NETS), Commercial Network Survivability (CNS), and Commercial SATCOM Interconnectivity (CSI) components. The NETS program was designed primarily to provide for the re-establishment of nationwide communications in the event of a nuclear war. The CNS and CSI programs<sup>106</sup> focused on reconstituting the commercial carrier networks, especially the need to reconnect islands of isolated users and islands of long-distance switches by maximizing the survivability and interoperability features of the commercial carriers.<sup>107</sup>

The NETS concept originated in the late 1970s with the requirement for step improvements in telecommunications serving the Federal Government in emergencies. In the fall of 1980, AT&T initiated a study of class 4/5 switches and concluded that the switches had a relatively high probability of surviving a nuclear exchange. It was technically feasible and

desirable, therefore, to build a nationwide network of surviving class 4/5 switches following a nuclear exchange. Drawing on these conclusions, the NCS launched a follow-on network engineering study to determine how to route essential telephone traffic through the PSN when large portions of the upper hierarchical routing structure (above the class 4/5 level) had been destroyed or damaged. By August 1981, the NCS study had evolved into the NETS Program. The first NETS Program Plan was issued on November 30, 1982, projecting an initial operating capability for July 1987, and a final operating capability 1 year later. The NETS Program received new impetus with the signing of E.O. 12472 in 1984 and the revised funding formula set forth the following year. NETS became the centerpiece of the initial NLP.<sup>108</sup>

As the years passed and the NETS Program approached implementation, the members of the COP became increasingly uneasy about the availability of emergency power to support the PSN, as well as the shared funding formula instituted in 1985. In August 1986, the Office of Management and Budget responded to this concern by asking the Manager, NCS, Air Force Lieutenant General Winston D. Powers, to conduct a program review. General Powers requested the National Research Council of the National Academy of Sciences to prepare an in-depth review of the program's potential vulnerabilities, technical longevity, and alternative technical approaches. The Council concluded that the NLP was on the correct path and employed a technically viable approach for providing essential NS/EP telecommunications, despite some unaddressed vulnerabilities such as the need for long-duration backup power and refueling, and for greater availability of trained telecommunications personnel.<sup>109</sup> Following this report, the NETS Program continued to expand, adding new local and interexchange carriers, and increasing the number of possible users from 4,000 to nearly 25,000. By the end of the 1980s, NETS was rapidly approaching the

implementation phase.

Yet, concern lingered. In 1990, the COP established a special subcommittee to review the Fiscal Year 1992 National Level Program Plan. This time the COP chose to examine all aspects of the current NLP Program, including the threat, user requirements, program risks, technology alternatives, and costs. In conducting its review, the subcommittee also took into account the NSTAC Energy Task Force report published in February 1990, which addressed the power vulnerability of the PSN, and the National Research Council's report that had examined what it called "the growing vulnerability" of the PSN. The subcommittee concluded that the current NETS Program did not adequately meet the need. For the first time since it began reviewing the NLP in 1986, the COP declined to recommend White House approval.<sup>110</sup>

In response to the concerns expressed by the COP and others, the Office of Management and Budget directed the Manager, NCS, to delay implementing the NETS Program for 2 years and to restructure the NLP to address enduring electric power, technical alternatives, cost savings, and the strategic impact of the breakup of the Soviet empire. Shortly thereafter, the Manager, NCS, Army Lieutenant General Thurman D. Rodgers, appointed a panel of experts to conduct a sweeping, critical review of the NLP. In October 1991, the panel recommended that the NLP be replaced by a PSN-based technical approach that would take full advantage of carrier-funded improvements at substantial cost savings to the Government.<sup>111</sup> In January 1992, a modified technical and acquisition approach was developed and



**LTG JOHN T. MYERS, USA**  
**MANAGER, NCS, 1987-1990**

incorporated into a new program called the Government Emergency Telecommunications Service (GETS), which replaced NETS.

The GETS program was designed to provide a nationwide capability for switched-voice and voice-band data communications by using the surviving switching and transmission facilities of the PSN, augmented by selected Government networks, such as FTS 2000 and the Defense Information Systems Network. The Commercial Network

Survivability and Commercial SATCOM

Interconnectivity Programs remained integral parts of the NLP, although they were altered to incorporate the most recent switching, satellite, and software technologies. GETS changed the technological thrust of the former NETS Program by moving further away from hardware solutions and toward software-based solutions that provide greater system flexibility and efficiency at lower cost.<sup>112</sup>

The White House endorsed restructuring the NLP, and in October 1991, the President's National Security Advisor, Air Force Lieutenant General (Retired) Brent Scowcroft, issued a memorandum reminding the NCS community of the policy guidance and functional requirements governing development of an NS/EP

telecommunications capability. E.O.

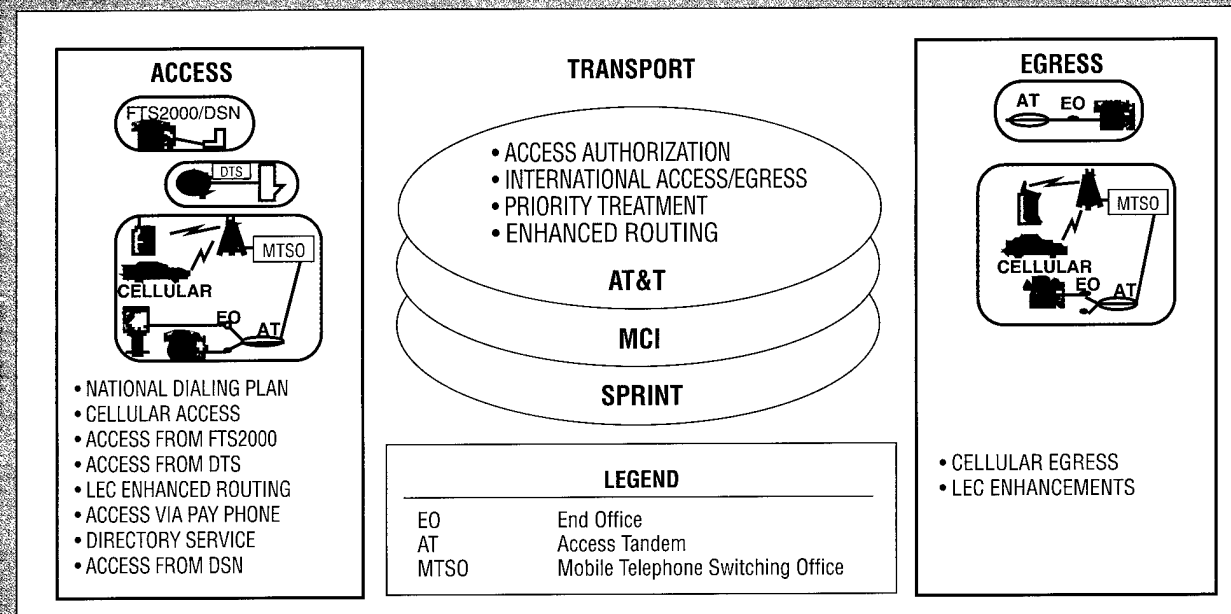
12472 remained the primary policy guidance, while E.O. 12656, issued by President Reagan on November 18, 1988, provided the primary guidance on the functional NS/EP responsibilities of Federal departments and agencies.

General Scowcroft also re-emphasized the key functional requirements integral to NCS plans: (1) voice-band service in support of



**LTG THURMAN D. RODGERS, USA**  
**MANAGER, NCS, 1990-1991**

## Government Emergency Telecommunications Service (GETS)



**GETS provides priority switched voice and voice-band data communications service to more than 8,300 NS/EP users.**

Presidential communications; (2) interoperability with resources of selected Government or private facilities or networks through the application of standards; (3) survivability and endurance in providing interconnection of surviving users; (4) international interface providing access to and egress from international service; (5) nationwide coverage supporting the national security leadership; and (6) intra/interagency emergency operations providing priority services for NS/EP traffic.<sup>113</sup>

Another significant policy change concerned funding and largely resolved the contention of the latter half of the 1980s. In April 1991, the National Security Council and the Office of Management and Budget shifted funding responsibility from the NCS member organizations as a whole to just two members.<sup>114</sup> Under this new arrangement, NLP implementation and recurring costs were shared by DOD (70 percent) and the Federal Emergency Management Agency (30 percent). As before, DOD remained responsible for all development costs.

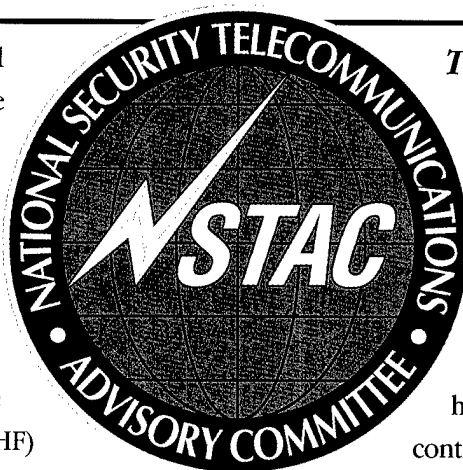
## BASELINE PROGRAM ACTIVITIES

At the time the NLP was being planned, the OMNCS was also involved in research programs and other activities designed to support and complement the NLP. The COP, the NSTAC, and the OMNCS all played major roles in baseline program activities. It was during this period that the NCS made significant progress in improving cooperation among member organizations.

### *The Committee of Principals*

In January, 1990, the Manager, NCS, Army Lieutenant General John T. Myers, organized the first off-site COP meeting at Wye Plantation to promote the team building that had become the hallmark of NCS activities in the late 1980s. As a consultative body, the 23-member COP was focused to promote coordination among agencies, and between agencies and the OMNCS. In addition, the COP provided advice to the Executive Agent and to the White House concerning

NCS proposals. Following its formal activation by E.O. 12472 in 1984, the COP established the COR as a permanent, subordinate group to help work NS/EP telecommunications issues. The COP was instrumental in establishing several continuing NS/EP programs, one of which is the Shared Resources High Frequency (HF) Radio Program (SHARES). In addition to its annual examination and recommendation of the NLP and funding profile, the COP advised the Executive Agent on recommendations for the President's response to the NSTAC's executive reports to the President, and deliberated on several major NS/EP telecommunications programs and activities, including the National Telecommunications Management Structure (NTMS), PSN security, and the Telecommunications Service Priority (TSP) System.



### *The President's NSTAC*

The establishment of the NSTAC, the other body of significance to emergency communications, was a major effort of the Manager, NCS. With the Manager serving as the focal point for joint industry-Government planning, the NSTAC has made a number of major contributions to the NCS mission. Except

for a few industry-Government committees, such as the FCC's Network Reliability Council, there has seldom been a close, on-going supportive relationship between the Federal Government and industry. With the breakup of the Bell System, however, and the proliferation of telecommunications service providers, there was an urgent need to replace the old AT&T-Government accord for NS/EP telecommunications planning with a new broad-based cooperative arrangement involving a number of service providers and equipment manufacturers. In

September 1982, the President established the NSTAC to provide such a vehicle.<sup>115</sup>

One of the first issues the NSTAC addressed was the need for a Government-carrier national coordinating mechanism to handle emergency telecommunications requests. The proposed solution was the NCC, staffed full time by both industry and

### **SHARES: An Innovative Enterprise**

SHARES combines the volunteered resources of hundreds of existing Federal HF stations on a shared, interoperable basis, to establish a backup national emergency HF communications infrastructure. It establishes two-way emergency communications to devastated areas in a systematic manner.

SHARES boasts more than 1,000 volunteer stations that, under emergency conditions, can be made available when

requested by a Federal organization. These stations are available in every state, most U.S. possessions, and in other overseas locations.

In 1992, SHARES was used to respond to Hurricane Andrew, which hampered communications in Florida. Andrew's 200 mile per hour winds blew down antenna support structures, making the radio systems and telephone services using these facilities inoperative. The only way emergency personnel could

communicate with each other was to use local two-way radio. The Governor of Florida could not reach his emergency coordinator until he used SHARES to establish contact. SHARES mobilized more than 400 stations to provide needed communications to emergency personnel. In the first hours of the disaster, the SHARES network of volunteers provided the only reliable method of communications to and from the disaster area.

Government representatives, with voice and data connectivity to their respective operations centers. President Reagan promptly and enthusiastically supported the idea, calling the completion of the NCC a matter of "urgent priority."<sup>116</sup> On January 3, 1984, less than 13 months after the NSTAC initiated its study, the NCC commenced operations. By the early 1990s, the NCC was coordinating restoration and provisioning of NS/EP telecommunications services and facilities in a number of natural disasters and armed conflicts, including Hurricane Hugo in 1988, the Loma Prieta earthquake in California in 1989, and Hurricanes Andrew and Iniki in 1992.<sup>117</sup>

During Operations Desert Shield and Desert Storm in 1990–1991, the NCC distinguished itself by coordinating and expediting 430 telecommunications services to the Persian Gulf and 16 other locations throughout the world.

These services ranged in size and complexity from individual point-to-point circuits to multiple, large-scale data services over many commercial facilities in the United States and abroad. Users included the White House, the Secretary of Defense, the Department of State, the Joint Chiefs of Staff, the Commander-in-Chief of the Central Command, the Defense Nuclear Agency, and the individual armed services. The response and recovery support activities of the NCC proved it to be a critical

component of emergency telecommunications.<sup>118</sup>

The NSTAC has also taken an active interest in communications survivability, particularly in the areas of commercial satellites and land-based networks, and has been an active player in that portion of the NLP. The NSTAC's Commercial Satellite Survivability (CSS) Task Force was formed in December 1982

to assess satellite vulnerabilities and identify enhancements to the NS/EP telecommunications infrastructure that could be achieved by using satellites and associated earth terminals.<sup>119</sup> A review of these enhancements led to the selection of twelve initiatives for improving the robustness of commercial satellite resources. In November 1984, the OMNCS established the CSS Program Office to implement these initiatives. In 1987, it was redesignated the CSI Program Office. In addition, the CSS Task Force endorsed the CSI as part of the NLP.<sup>120</sup>



In 1983, the NSTAC also began to develop and prioritize initiatives to enhance the survivability and interoperability features of the terrestrial portion of commercial carrier networks and facilities. The NSTAC IES initiated an assessment of the CNS issue in February 1984, forming the CNS Task Force and instructing it to evaluate ways to improve the survivability of commercial communications systems and facilities, and identify initiatives to improve

interactive emergency response capabilities among the commercial networks.<sup>121</sup>

In December 1982, automated information processing survivability was also placed on the NSTAC's agenda. The NSTAC established the AIP Task Force, which divided the automated information processing survivability problem into three parts: (1) the broad issue of AIP support to NS/EP functions; (2) the use of special purpose AIP embedded in telecommunications; and (3) the use of general purpose AIP for telecommunications operational support. As a consequence of NSTAC recommendations and the earlier review of the issue by the Emergency Communications Working Group, the White House directed the Emergency Mobilization Preparedness Board to review the broad issue of AIP support to NS/EP functions. The NSTAC determined the second issue, embedded AIP, would best be pursued by the NSTAC Commercial Network Survivability Task Force.<sup>122</sup>

The NSTAC AIP Task Force proceeded to pursue the third part, AIP telecommunications operational support. The NSTAC found that telecommunications increasingly depended on AIP and was vulnerable to credible threats to that AIP. Therefore, the NSTAC developed and proposed a strategy to enhance AIP survivability along with a plan for a joint industry-Government implementation. In the early 1980s, AIP was an issue of extreme importance because of the rapid advancements in automating telecommunications capabilities. As more highly evolved technologies and methods of voice and data transfer made information processing more secure, AIP issues began to be integrated into other NCS programs and forecast the 1990s efforts in network security and information assurance.

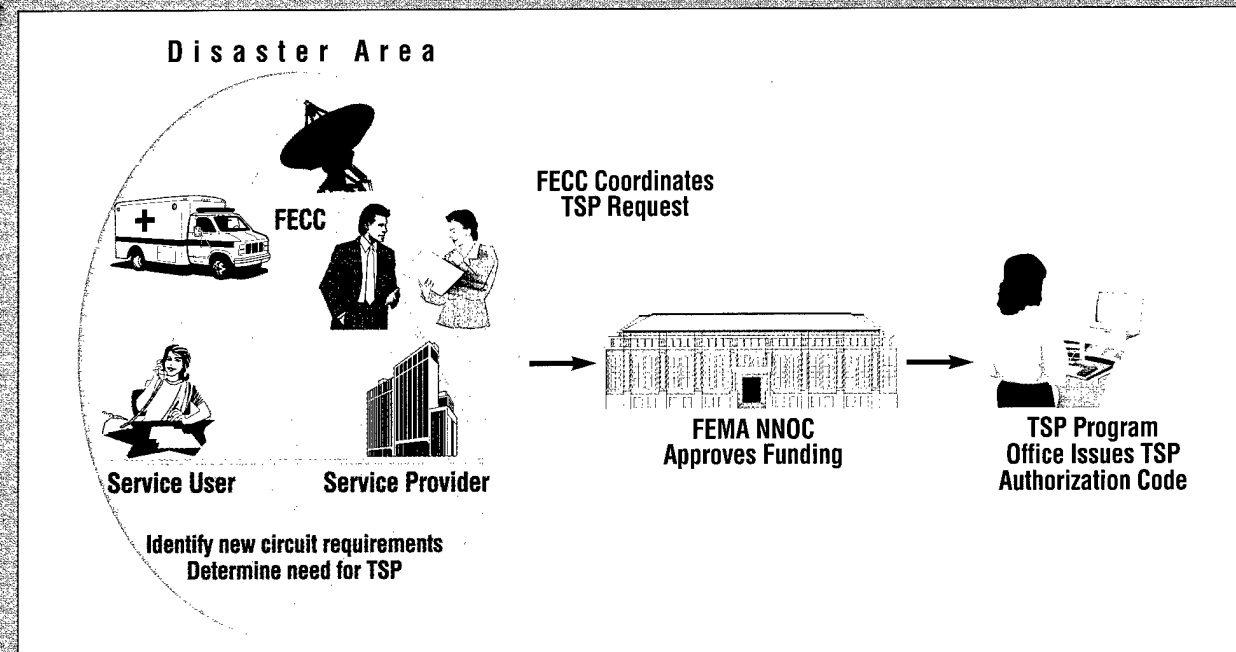
The promulgation of E.O. 12472 in 1984 gave further impetus and stature to the NSTAC's role. One of the long-standing issues of concern to the Manager, NCS, and the NSTAC was the need for an effective restoration priority system. Since 1968, the FCC and

the NCS had jointly administered the RP System, which provided service restoration of intercity dedicated private lines. This system, however, did not address provisioning of new or changed services, nor did it have the capability to alter priorities under stressed conditions. Furthermore, the lack of an automated management information system made record keeping difficult. By 1984, the combination of a restructured and less regulated telecommunications industry, new technology, and changes in NS/EP telecommunications policy had rendered the old RP System ineffective.

In December 1984, the NSTAC identified TSP as an urgent issue because of the need for a system that authorized both priority provisioning and restoration of NS/EP services for Federal, State, and local governments and private users. The NSTAC IES established the TSP Task Force in February 1985, to advise and assist the OMNCS in developing the TSP system. Along with a COR TSP Subcommittee, the TSP Task Force addressed provisioning of new or changed service, restoration of existing service, and the maintenance, legal, and regulatory issues associated with priority treatment. As a consequence of the joint efforts of the NSTAC and the NCS, the FCC issued a report and order in November 1988, establishing a new approach to assigning priorities. This new approach provided for both priority provisioning and priority restoration of qualified NS/EP telecommunications services. The TSP System provided the regulatory, administrative, and operational framework to authorize priority treatment for NS/EP telecommunications services.

The TSP System achieved initial operational capability on September 10, 1990,<sup>123</sup> and full operational capability in March 1993, at which time the old RP System was discontinued. In March 1990, the Manager, NCS, appointed 17 initial members from industry and Federal and State governments to the TSP Oversight Committee. The TSP Oversight Committee met five times during its first year, focusing primarily

## TSP Provisioning Process During Disaster Response



*The TSP provisioning process ensures appropriate priority treatment.*

on State and local implementation issues. The committee has continued to address evolving priority provisioning and restoration issues since its founding, incorporating lessons learned from emergency response efforts.<sup>124</sup>

Industry mobilization was a major issue during the mid-1980s when the combined conventional and nuclear threat of the Soviet Union peaked. In December 1984, the NCS COP asked the NSTAC to assist the Government in assessing telecommunications industry mobilization capabilities. A Joint industry-Government Telecommunications Industry Mobilization (TIM) Group was established in late 1985 to address the issue. The Group was instructed to identify possible impediments to effective telecommunications industry mobilization and to assist in developing corrective actions to overcome any identified impediments. From early 1986 until mid-1989, the Joint TIM Group investigated seven mobilization subjects: telecommunications personnel issues; service surge requirements; mobilization

management structure; dependence on foreign sources; dependence on other infrastructure elements; stockpiles and inventories; and Federal-State jurisdictional issues. These investigative efforts produced more than 30 recommendations for corrective action. In July 1990, the White House approved these recommendations and directed the NCS member organizations to implement them. As a result, a Baseline Mobilization Program was established within the OMNCS to work with the NCS member organizations on implementing the Joint TIM Group's recommendations over a 3-year period.<sup>125</sup> By early 1993, many of the recommendations had been implemented, and the Mobilization Program was nearing completion.

Rapidly emerging technologies and the possibilities they created for enhancing NS/EP telecommunications became a focal point for the OMNCS and NCS member organizations during the 1980s. The NSTAC established task forces for intelligent networks, wireless services, and network

security to study technological advances and their potential impact on NS/EP capabilities.

Formed in 1989, the Intelligent Networks Task Force began by developing an evolving telecommunications network architecture consisting of signaling systems, switches, computer processing, databases, and transmission media. The Task Force determined that NS/EP users could customize a software-controlled network to respond to their NS/EP needs and requirements rapidly, easily, and cost effectively, without assistance from their service providers. The Task Force also concluded that intelligent networks could offer NS/EP telecommunications users enhanced survivability and the possibility of rapid expansion of NS/EP services for emergency response, access, and egress through all media, at reduced costs. In response to the NSTAC's recommendations, the OMNCS formed the Advanced Intelligent Network (AIN) Program Office in November 1990 to help assure NS/EP requirements are included in intelligent networks technology improvements made by local exchange and interexchange carriers.<sup>126</sup>

AIN has made an enormous impact on

telecommunications in the last decade.<sup>127</sup> AIN technology permits customized network services that can be flexibly, rapidly, and cost-effectively configured to meet dynamically changing customer needs. Among other capabilities, AIN can provide priority recognition, user authentication, enhanced routing, and network management alternatives in support of NS/EP contingency operations.

Wireless services—identified as strategically critical—added significant new dimensions to the NS/EP telecommunications environment. New wireless technologies, such as mobile satellite services, land mobile radio/specialized mobile radio, and those later termed “personal communications services,” had decisive implications for the NS/EP community. Issues such as digitalization of wireless systems and the consequent interoperability impact on facsimile data and secure voice prompted the NSTAC IES to establish the Wireless/Low-Bit-Rate Digital Services (W/LBRDS) Task Force in March 1991, and a follow-on Wireless Services Task Force (WSTF) in December of the same year.<sup>128</sup> The W/LBRDS Task Force worked to define the scope of the issues regarding wireless services, and to

advise the Government—in this case, the OMNCS—on how to minimize any adverse effects of emerging digital mobile communications standards and technologies on mobile NS/EP users.<sup>129</sup>

In conjunction with the OMNCS Wireless Services Program Office and the Federal Wireless Users Forum, the WSTF addressed methods for incorporating priority access into wireless systems for NS/EP use. In July 1994, the WSTF established the Cellular Priority Access Service (CPAS) Subgroup<sup>130</sup> to investigate

## AIN Support to NS/EP

The President's NSTAC and the OMNCS identified the Advanced Intelligent Network (AIN) as having the potential to provide access control, priority treatment, user authentication, and other survivability features supporting NS/EP telecommunications. The OMNCS established the AIN Program in 1990 to address the emerging technology, and an associated AIN Program Office to plan, coordinate, and oversee the effort.

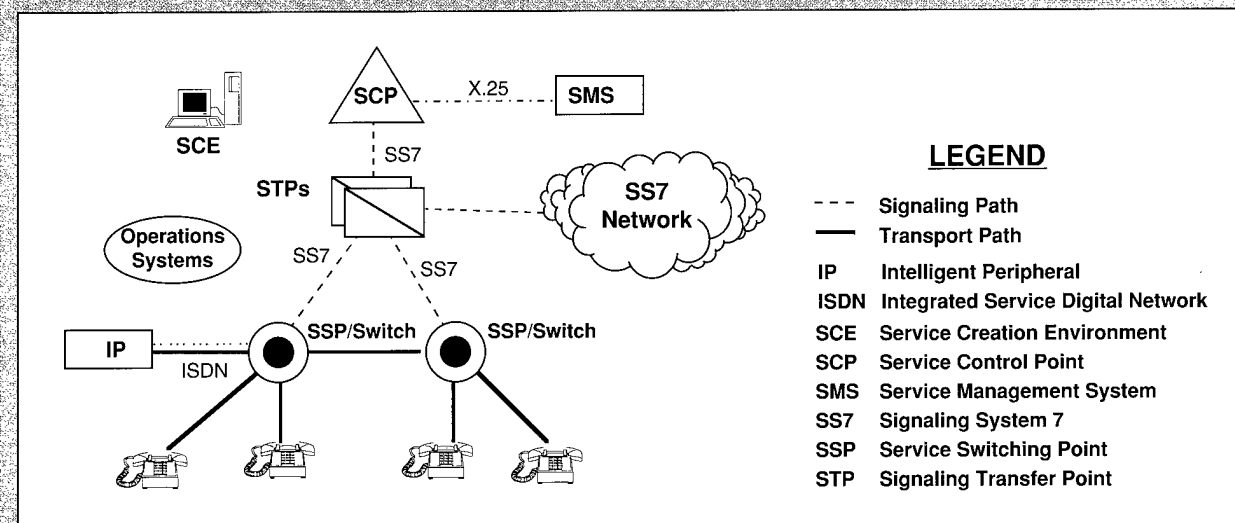
AIN is an evolving service-independent architecture within the Public Network that has the

potential to provide—

- Technical and cost advantages to telecommunications service providers who can now quickly and economically create, test, deploy, and modify a wider variety and diversity of services

- End-user control over service definition, service customization, and choice of equipment suppliers, as well as the ability to modify and manage their services without telecommunications service provider intervention.

## Generic AIN Architecture



**AIN architecture supports NS/EP contingency operations.**

technical, administrative, and regulatory issues associated with the deployment of a nationwide priority access capability for NS/EP cellular users.

The ability of emergency responders to communicate immediately and effectively, especially when the environment is stressed and the responders are highly mobile, is critical to disaster response efforts. The OMNCS developed the Cellular Priority Service (CPS) program to enhance NS/EP user capabilities by facilitating and coordinating the development of a nationwide CPAS that is uniform and cost-effective. The CPS program addresses the continuance of NS/EP telecommunications when wireless communications users experience high levels of call blocking. Just as land lines become congested during disasters, high levels of cellular channel traffic create network congestion that can block critical communications between disaster relief officials. Following the NSTAC recommendation to the President in 1995,<sup>131</sup> the OMNCS has continued to work, through its Regulatory Counsel, with the FCC on CPAS rules that address priority access service, responsibilities of all

stakeholders, and qualifying criteria for CPAS authorization.<sup>132</sup>

Network security became a global problem as the sophistication of human-machine interactions increased. The 1989 National Research Council study had underscored the growing vulnerabilities of the PSN to software intruders, commonly referred to as "hackers."<sup>133</sup> In April 1990, Duane Andrews, the Chairman of the National Security Council's Policy Coordinating Committee for National Security Telecommunications and Information Systems (PCC-NSTIS), requested the Manager, NCS, identify what actions should be taken by Government and the industry to protect critical national security telecommunications from the threat posed by computer intruders. The Manager, NCS, Army Lieutenant General Thurman D. Rodgers, asked the NSTAC to work with the Government to address the network security issue from an industry perspective. The NSTAC agreed and formed the Network Security Task Force (NSTF). In addition, General Rodgers formed the Government Network Security Subgroup (GNSS) to serve as the Government counterpart to the

NSTAC's NSTF. Composed of representatives of Government agencies with critical interests in network security, the GNSS sought to identify the Government's concerns and address the problem from the Government's perspective. The collaboration between the two groups provided the opportunity for industry and Government to exchange information and increase awareness levels regarding network security issues and their remedies.

In response to the Government's concerns, the NSTF focused its attention on exploring the potential "hacker" threat to the PSN and the PSN's vulnerability to software manipulation that may result in denial of service to NS/EP users or extraction of NS/EP significant information. The task force subsequently concluded that unless network security was strengthened, a motivated and resourceful adversary could degrade portions of the PSN and monitor or disrupt the telecommunications serving NS/EP users.

Working together, the Manager, NCS, and the NSTAC have established a structure and a process for addressing network security issues. Central to this structure and process are separate but closely coordinated Government and NSTAC Network Security Information Exchanges

(NSIEs). Government member organizations include departments and agencies that are major telecommunications services users, represent law enforcement, or have information relating to the network security threat. Industry member organizations include telecommunications service providers, equipment vendors, and major users. NSIE representatives are individuals engaged extensively in the prevention, detection, and/or

investigation of telecommunications network software penetrations, or who have security and investigative responsibilities as a secondary or collateral function. Selected Government and industry NSIE representatives are subject matter experts in their fields.

Beginning in 1991, the NSIE process provided a forum to identify issues involving penetration or manipulation of software and databases affecting NS/EP telecommunications. The NSIEs focus on exchanging information and views on threats, incidents, and vulnerabilities affecting public network (PN)<sup>134</sup> software. Periodically, the NSIEs assessed the risks to the PN from computer intruders: three risk assessments were conducted from 1992 to 1995 and documented in status reports to the Chairman, PCC-NSTIS. In their status report for 1995, the NSIE reported that the risk to the PSN remains a serious concern, and that the NSIE process should continue. Through documents, such as their risk assessments, and workshops and symposia, the NSIEs have sought to share lessons learned with other organizations that have similar concerns.

### *The OMNCS*

The OMNCS, as the lead organizational element of the

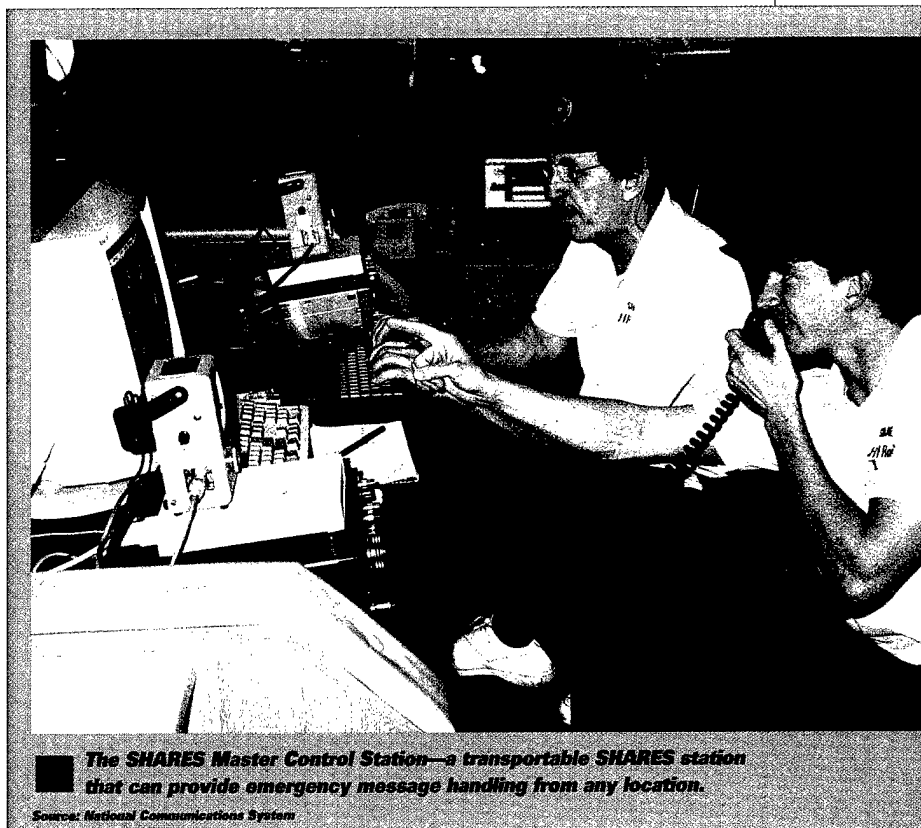
## **NSIE—An Unparalleled Level of Trust**

Imagine the level of trust required for competitors in the telecommunications industry to share information about network security events with each other and the Government. That is what has been achieved through the Network Security Information Exchanges developed by the NSTAC and the NCS. Industry and Government NSIE groups meet and discuss threats to the public network and share sensitive and proprietary information on network

intrusions and vulnerabilities. Lessons learned are shared outside the NSIEs through workshops and symposia, and NSIE-developed documents are distributed to organizations interested in improving network security. The level of trust between industry and Government representatives—from telecommunications service providers to law enforcement agencies—ensures the success of the NSIE process.

NCS, is responsible for the NCS baseline program activities and acts as a catalyst for all NCS programs. It provides the machinery and continuity to keep the NCS moving forward. It is responsible for administering and implementing plans and programs, conducting technical studies, consulting with the COP and the NSTAC, participating on Federal councils and boards concerned with NS/EP telecommunications, and keeping abreast of international emergency telecommunications activities. In the absence of any White House or Cabinet-level communications organization, the Manager and his staff are the most visible Government symbols of the Nation's NS/EP telecommunications activities.

The Manager's responsibility under E.O. 12472 is to position the NCS to address two key areas: (1) implementing an effective management system to facilitate provisioning, restoration, and operation of the Nation's telecommunications assets to support the NS/EP mission across the entire spectrum of emergencies; and (2) defining and implementing NS/EP enhancements to



the national telecommunications infrastructure.

One of the first major milestones in the revitalization of the NCS was the establishment of the President's NSTAC in 1982. This was followed by the establishment, in conjunction with the NSTAC, of the NCC in 1984. Following the NCC's move into its permanent quarters on March 29, 1985, the OMNCS continued to make improvements in the NCC's capabilities and readiness. These improvements included participation in national-level civil and military readiness exercises and preparation of the National Plan for Telecommunications Support in Non-Wartime Emergencies.<sup>135</sup> Other improvements included the addition of a TSP operational unit within the NCC complex to handle service

## Telecommunications Response Following an Earthquake

The Loma Prieta earthquake on October 17, 1989, caused major damage to power facilities, the transportation infrastructure, and other commercial and residential properties in the San Francisco area. However, the telecommunications infrastructure largely survived the quake and its aftershocks, with telephone company switches coming through the disaster with little or no damage. The most significant problems for the PSN

included downed subscriber lines and other vulnerable facilities, and heavy demand for network services. Network management controls were implemented to prevent the high volume of incoming calls from interfering with the ability of emergency workers to make outgoing calls, blocking 75 percent of incoming traffic for several days. Within 4 days, the PSN was functioning almost at its pre-earthquake level of service.

## SS7 Outages

On June 26, 1991, Washington, DC, and Los Angeles experienced a widespread local telecommunications service disruption. Lasting 6 hours, the Washington outage affected 5 million users; the Los Angeles outage affected 3 million users and lasted for 3 hours. These outages of the Signaling System 7 (SS7) were caused by a manual

input error of a single character in a new software release. The extent and duration of these outages served to remind people, dramatically and abruptly, of the degree to which the Nation relies on telecommunications services to conduct its business, and the disruption and chaos that can result when those services are suddenly not available.

provisioning and restoration requests, and the addition of a SHARES radio room to enable the NCC to use SHARES during emergencies and administer SHARES exercises.<sup>136</sup> Today, the NCC is vital to the day-to-day operations of the NCS.

Concurrent with establishment of the NCC, the Manager, NCS, also pursued planning for the NTMS, including the establishment of regional teams for handling telecommunications emergencies. The NTMS was designed to provide a survivable and enduring telecommunications management capability by which the Government and industry coordinate and support NS/EP telecommunications requirements across the entire spectrum of potential emergencies.<sup>137</sup> NTMS operations were defined in three response levels. Response Level I (day-to-day operations, including daily activities within the NCC); Response Level II (deployed operations commencing concurrently with a national Emergency Support Function [ESF] #2 activation); and Response Level III (occurring in anticipation of a national security emergency or concurrently with a Presidential activation of the national

security structure).

On March 25, 1988, the NTMS received Presidential approval and was tasked to support continuity of government activities. During the period 1990-1993, numerous NTMS operating sites were activated, providing backup HF radio communications primarily to support national security crises and emergencies. However, in response to the changing geopolitical environment and increased emphasis on Federal response to

non-wartime emergencies, and to promote the more efficient use of government resources, the OMNCS

## Order Out of Chaos: The National Coordinating Center in Action

The result of the NSTAC's first recommendation to the President, the National Coordinating Center for Telecommunications continues to serve as a joint industry-Government coordination center for the initiation and restoration of telecommunications service during emergencies.

The NCC opened for business in January 1984 with the mission to assist in the initiation, coordination, restoration, and reconstitution of NS/EP telecommunications services and facilities under all conditions, including those of crisis or emergency. The synergy fostered between Government and telecommunications industry personnel is unparalleled in the Federal Government. Seventeen telecommunications industry and

Government representatives staff the NCC full-time and serve as liaisons with their parent organizations. The NCC is the operational focal point for all joint industry/ Government telecommunications response across the spectrum of emergencies.

■ Riots at Federal prisons in Louisiana and Georgia began on Thanksgiving morning, 1987, and the NCC was pressed into service before noon. Over the next 4 days, the NCC coordinated telecommunications installations, providing Government leadership with communications to respond to the riots.

■ Hurricane Andrew, in August 1992, was the single most workload-producing emergency since the NCC

## Participation in SHARES as of March 1998

▶ 66 Federal, State, and industry organizations contributing personal resources

▶ 1,130 HF radio stations  
▶ More than 250 frequencies

▶ 34 sites in 26 countries and U.S. possessions overseas

began investigating options to enhance the NTMS in order to provide a seamless, all-hazard emergency telecommunications management capability. Additional guidance to enhance the NTMS came from the Director, OSTP in a memorandum dated June 11, 1993, which instructed the Manager, NCS to *"continue with implementation of the National Telecommunications Management Structure and take steps necessary, within current budgetary guidance, to enhance the NTMS to ensure a flexible, integrated response*

*capability to manage the Nation's telecommunications assets across the full spectrum of domestic and national security emergencies."*<sup>138</sup>

In response to the OSTP memorandum, the OMNCS formed a joint task force that identified actions required to accomplish that goal—organizational and operational concepts that guided all activities to achieve the integrated, all-

hazard response capability. Since 1990, the NTMS National Telecommunications Coordinating Network (NTCN) has provided orderwire communications connectivity among and between the various NTMS operating elements via landline voice communications with HF radio as a backup.<sup>139</sup> However, by the mid- to late-90s, advances in technology and changes in the threat began to drive a reassessment of the NTCN, with a view toward a multimedia approach to support communications requirements across the entire spectrum of emergencies. The reassessment also closely examined the NTCN for its potential non-PN-reliant response capability.

The late 1980s and early 1990s were times of expansion and reengineering of programs and policy for the NCS. Radical new challenges posed by exploding technology and political change the world over required that the NCS adjust the way it approached the provisioning of NS/EP telecommunications and its role in providing them. No longer could the NCS, the NCC, and the NSTAC focus primarily on planning a response to a nuclear incident. Serious new risks to the Nation's telecommunications infrastructure were developing, in addition to the nuclear threat. The NCS agenda expanded, placing increased emphasis on responding to natural and manmade disasters, public events of significance, and localized conflicts. The NCS also began to address a need to broaden its focus to include international telecommunications issues. The economic, political, and technological impact of foreign providers on U.S. NS/EP telecommunications demanded NCS reaction and adjustment. New technology pushed NCS planning into a world of software-based architectures that provided users with

was established. In just 27 days, the NCC processed 374 TSP invocations establishing 4,118 services for emergency telecommunications to disaster offices in Florida and Louisiana.

■ NCC involvement internationally has established it as the preeminent coordinating mechanism for government emergency response telecommunications. When flooding wreaked havoc across the Pacific Northwest in 1996 and 1997, Canadian telecommunications companies crossed into the United States with vehicles and crews to support restoration efforts. This cross-border assistance was coordinated by the NCC and Industry Canada using Civil Emergency Planning Telecommunications Advisory Group (CEPTAG) channels.

services and capabilities uniquely their own, while still residing within the PN. During the period 1992-1997,

the NCS underwent a shift as dramatic as its restructuring under E.O. 12472.

## Network Design and Analysis Center

Telecommunications networks today literally form the backbone of business and Government. Links of copper, fiber, and radio waves connect computers, satellites, and mobile phones. They transmit voice, data, and video, enabling critical functions ranging from air traffic control and banking, to military command and

control, and the Internet.

The Public Network (PN) is the fundamental infrastructure that supports public, private, and government telecommunications. The PN in the United States comprises three types of networks: those of interexchange carriers (IECs) (providing long distance service), local exchange carriers (LECs)

(providing local service and access to IECs), and wireless service providers (providing mobile communications and access to IECs and LECs).

To maintain a thorough understanding of the operation and vulnerabilities of the PN and to predict how it will perform under conditions of stress, the OMNCS has developed a set of

analytical modeling tools at the NDAC. Located off-site in suburban Washington, DC, the NDAC is a secure computing laboratory for the design, modeling, and analysis of telecommunications networks.

**The NDAC provides secure design, modeling, and analysis capabilities for the OMNCS.**

*Source: National Communications System*



## PART 3

# TECHNOLOGY INSERTION AND A NEW INTERNATIONAL BALANCE

## UNPRECEDENTED CHANGE

**T**he end of the twentieth century has been a period of change and innovation unprecedented in modern times. The collapse of the Soviet Union, increased political cooperation internationally, and growth in the global economy have, together, created an entirely new power structure. Throughout the world, fervent ideologues have fallen and new forms of governance have been instituted where violence and unrest were once the

norm. As we enter into the next millennium, the global political and economic climate is stronger and more positive, with technology the driving force behind the interconnection of business, politics, and people. Exchanges over computers, cellular phones, and satellites are the hallmarks of today's communication and business dialogue. A maturing international information infrastructure is developing that will connect the world in ways no one could have imagined just a few years ago. The information age has created new world standards and a wealth of opportunity.

In the last 5 years, computers have changed the way information is transferred, stored, and prioritized as radically as the printing press changed the exchange of information in the 17th century. It is possible to pick up the telephone, dial into an electronic mail (e-mail) account, command the computer by voice, and have the computer read messages over the telephone. Users can draft e-mail messages by telephone and send

them, without ever touching a keyboard. Personal communications systems now come in packages light and small enough to fit in a pocket or purse. These devices can send facsimiles, record conversations, create conference calls, and act as pagers or answering machines. The possibilities for our interexchange with others are evolving at a rate that gives the impression of limitless capability.

## THE METAMORPHOSIS OF THE INTERNET AND THE NII

The Internet has had as great an impact on communications as any voice-based system. The invention of the telegraph, telephone, radio, and computer set the stage for this unprecedented integration of capabilities. The Internet is, at once, a worldwide broadcasting capability, a mechanism for information dissemination, and a medium for collaboration and interaction between individuals. Most importantly, it is available without regard to geographic location. It has closely connected the world and irreversibly altered what we have come to expect of business, ourselves, and our future.

The Internet represents one of the most successful examples of the benefits of sustained investment and commitment to research and development of information infrastructures.<sup>140</sup> A driving force that made such extraordinary American progress in computer interaction possible was the Defense Advanced Research Projects Agency

(DARPA)—formerly ARPA. The University of California at Los Angeles (UCLA) was established as the first “node” on the original Advanced Research Projects Agency Network (ARPANET), which evolved into the Internet. ARPANET, the pioneering packet switched network, grew to include packet satellite networks, ground-based packet radio networks, and other communications networks.<sup>141</sup>

The Internet, as we now know it, embodies a key underlying technical idea—open-architecture networking. In an open-architecture network, individual networks can be separately designed and developed, each with its own unique user interface and in accordance with its own specific environment and user requirements. In practical terms, the Internet provides a medium through which these vastly different systems can connect to exchange information quickly and efficiently. This rapid, unimpeded flow of information, not only over the Internet, but over other interconnected computer and information systems, has resulted in a massive communications infrastructure.

### From Computing to Communicating

Since the 1970s, “time sharing” for many people has meant having the use of a vacation home once a year for a week. The term “time sharing,” however, had been in use for at least a decade before it came to be associated with vacation places. In the computer community, time sharing was the answer to batch processing.

Before the 1960s, computers operated in batch mode: a user

provided punched cards to the computer center and waited—sometimes more than 24 hours—to see the results of the input. Researchers sought ways to improve the interface between people and computers, and the concept of “time sharing” evolved. Pioneered by Massachusetts Institute of Technology scientists, time sharing made it possible for several people to use the same computer simultaneously.

The initial results were less than desirable, and developers at first thought time-sharing a failure.

Networking projects, experiments, and refinements continued, and by the end of the 1960s, the development of packet switching and communications protocols had made possible the linking of time-shared computers into a collection of people, hardware, and software. No longer just a means for computing,

the single multiaccess computer with a community of users became a communications node in a geographically distributed computer network. This kind of communication is thought to have fostered cooperation and promoted coherence far more effectively than did former arrangements of program and data sharing in which users exchanged magnetic tape by messenger or mail.

## The Internet—An Intellectual Public Utility

The interconnection of computers in the 1960s led to a much broader class of connections than most researchers expected. New social dynamics evolved, and communities of common interest, rather than of common location, grew out of the ability to network. In each field or area of expertise, the overall community of interest supports vast data systems for those who

have access.

J.C.R. Licklider, the founding director of ARPA's Information Processing Techniques Office, was a visionary whose ideas on human-computer interaction foreshadowed today's Internet. A psychologist by training, Licklider envisioned universal interactive computing long before it could be a reality. In 1968, he posed a prophetic question

about access. "For the society," he said, "the impact will be good or bad depending mainly on the question: Will 'to be on line' be a privilege or a right?"

Licklider's concern that networked computers and the wealth of information available through them must be made accessible to all is an issue that still must be addressed. The information made

available via the Internet is becoming as vital to society as electricity, water, or fuel. Will we see discontinuity in the spectrum of intellectual opportunity because only a privileged few have the chance to enjoy what Licklider termed "the advantage of intelligence amplification?" Or will information become as accessible a commodity as water, power, food, and fuel?

The Internet, the various public, private, and proprietary networks, on-line services, computer support systems, and other emerging information technologies collectively known as the National Information Infrastructure (NII),<sup>142</sup> include an ever-expanding range of equipment including cameras, scanners, keyboards, telephones, facsimile (fax) machines, computers, switches, compact disks, video and audio tape, cable, wire, satellites, optical fiber transmission lines, microwave nets, switches, televisions, monitors, printers, and many other media.<sup>143</sup> When the concept of the NII was first introduced as a structure demanding national attention in the late 1980s, information systems were still largely operationally independent. By the early 1990s, the Government's dependence on the interconnection of information systems had become an important part of communications.

President Clinton was aware of the NII's potential to transform the life-style of ordinary citizens, change the way all business is transacted, and deliver a variety of government services.

Recognizing that changes of this magnitude would raise important policy and technology issues, he created a framework, under the leadership of Secretary of Commerce Ron Brown, within which Government and the private sector could address these issues. On September 15, 1993, the Administration released *The National Information Infrastructure: An Agenda for Action*, which served to establish and guide the components of this framework. The *Agenda for Action* sought to facilitate a partnership among business, labor, academia, the public, and government to ensure the development of a coherent policy regarding the NII. The United States Advisory Council on the NII was established<sup>144</sup> to represent the private sector's perspectives, while the Government's interagency Information Infrastructure Task Force (IITF) was chartered to articulate and coordinate the Administration's vision of the NII. The *Agenda for Action* recognized the importance of the NCS's ongoing work to reduce the vulnerability of the Nation's telecommunications systems. It also called

for the NSTAC to continue offering advice to the President on NS/EP telecommunications issues, work with the Federal Communications Commission's Network Reliability Council, and complement the work of the U.S. Advisory Council on the NII. In response to this direction, the NSTAC established its National Information Infrastructure Task Force. Using this framework, Government and industry addressed a variety of issues, such as the impact the NII might have on network security, NS/EP capabilities, and privacy. Other priorities included defining the roles of the private and public sectors in considering the impact of current and proposed regulation, integrating the NII with manufacturing and electronic commerce, and improving the delivery of health care and educational programs.

## EXPANDING THE VISION AND THE STRATEGY

When E.O. 12472 redefined the mission of the NCS in 1984, it addressed communications concerns in the context of the world as it was at the peak of the nuclear buildup. At that time, the NCS was to—

*"Assist the President...in (1) the exercise of the telecommunications functions and responsibilities set forth in Section 2 of this order; and (2) the coordination of the planning for and provision of national security and emergency preparedness communications for the Federal Government under all circumstances, including crisis or emergency, attack, recovery and reconstitution."*<sup>145</sup>

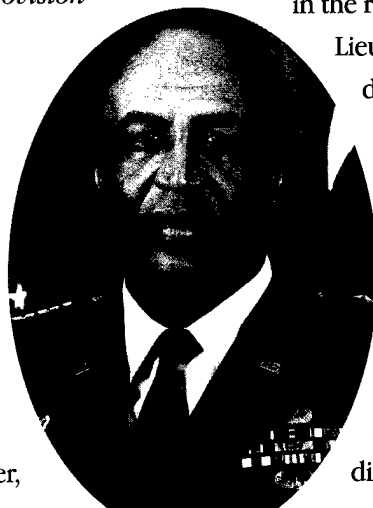
Today the NCS addresses a widening spectrum of disruptive and destructive threats that include nuclear incidents, terrorist activities, civil disorder, information warfare, natural disasters, and crises resulting from severe weather

conditions. Regional conflicts, ideological flash points, domestic disturbances, and the adverse use of high technology (e.g. electronic intrusion/disruption) challenge our national security and ability to respond. These profound changes in the threat, together with the rapid insertion of new technologies, brought to light a need for restructuring throughout the Federal government. The NCS broadened its response capability in light of the dynamic threat of computer intrusion, new legislation enabling increased growth and diversity in the telecommunications environment, and a more sophisticated terrorist threat. Today's broader focus is on providing the means to ensure that common and ubiquitous communications services are available during any crisis to support critical government functions.

This change in focus was brought about by several legislative initiatives. In early 1993, President Clinton requested an intensive study of the Federal government's ability to do business.<sup>146</sup> The result of that 6-month intensive study of government operations, the *Report of the National Performance Review (NPR)*, identified changes that Federal departments and agencies must make to "create a government that works better and costs less." Although the recommendations of the NPR applied only to the Federal departments and agencies named

in the report, the Manager, NCS, Army Lieutenant General Alonzo E. Short, Jr., determined that the NCS could benefit from a re-examination of its operations.

Concurrent with the NPR study, the Director, OSTP, had issued his memorandum on NS/EP telecommunications (June 11, 1993), providing the NCS additional impetus for restructuring. The memorandum directed the Manager, NCS, to take steps necessary to enhance the NTMS to ensure a flexible, integrated response



**LTG ALONZO E. SHORT, JR., USA**  
**MANAGER, NCS, 1991-1994**

capability to manage the Nation's telecommunications assets "across the full spectrum of domestic and national security emergencies."<sup>147</sup> This effectively paved the way for an expansion of the NTMS mission to more closely reflect the mission of the NCS and encompass emergency telecommunications response following natural and manmade disasters and emergencies.

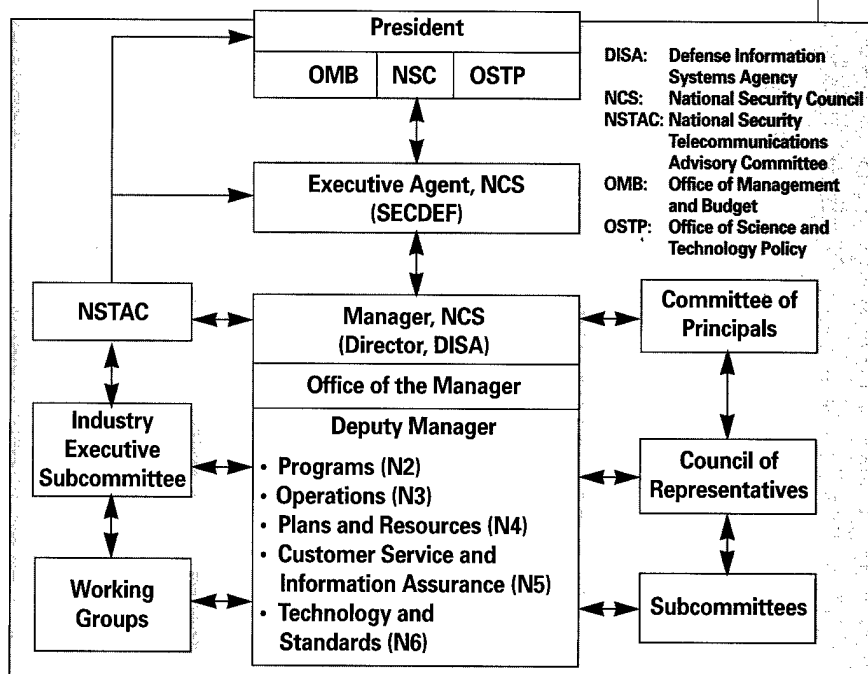
In light of changes in the threat, increasing advances in technology, the NPR report, a declining Federal budget, and the new NTMS mission defined by the Director, OSTP, the NCS performed an extensive self-appraisal. The appraisal encompassed a review of authorities and mandates, identification of issues, and synthesizing of strategic goals. The Manager, NCS, established the Office of Strategic Planning on April 1, 1994, to assist in developing future NCS strategy.

In October, 1994, the Committee of Principals in an off-site meeting created a new purpose, mission, and vision for the NCS, and identified a number of issues for task forces to resolve.<sup>148</sup> The COP stated its view of the NCS in terms that speak directly to the environment in which we find ourselves today. It endorsed a vision statement that succinctly describes where it projected the NCS heading in the future, at the same time incorporating an inevitable paradigm shift from communications technology to information technology. The COP said—

*"The NCS team, in partnership with industry, ensures immediate, interoperable, and secure global information services to support national security requirements and preparedness for emergency response to all hazards."*<sup>149</sup>



**LT. GEN. ALBERT J. EDMONDS, USAF**  
**MANAGER, NCS, 1994-1997**



**The restructuring of the OMNCS in November 1995 resulted in functional divisions that complement the vital roles of the NSTAC and the COP.**

The COP further specified how the NCS could achieve that objective, by defining what it saw as its mission. The NCS, it said, should—

*"Lead the planning, coordination, and integration of government telecommunications capabilities to ensure access to, and use of, critical information services required for effective response in an all-hazards environment."*<sup>150</sup>

On November 1, 1995, the OMNCS was restructured for the first time in over a decade. The offices were realigned into functional divisions based on complementary programs, services, and activities. The Manager and Deputy Manager remained the guiding authority of the NCS. However, the organizational structure below the Deputy Manager was revamped. Cleaner lines of authority and specialization were implemented, dividing the OMNCS into five distinct

divisions: Programs, Operations, Plans and Resources, Customer Service and Information Assurance, and Technology and Standards.

In response to the new mission statement developed by the COP and concurrent with the restructuring of the OMNCS, the NCS identified relevant issues that should be addressed. Building on the conclusions and recommendations of the COP task force reports, the NCS developed seven strategic goals that serve as a road map to achieving its vision. The NCS Strategic Plan was created and then adopted in January 1996, "ensuring the government has the telecommunications capabilities to gain access to and use critical information services in an all-hazards environment."<sup>151</sup> The seven goals defined in the Strategic Plan were accompanied by 28 objectives and supporting strategies for the development of the NCS into the next millennium. In February, 1998, the OMNCS began its first review of NCS Strategic Plan goals and objectives, and initiated the development of performance measures by which it could assess its progress in meeting its objectives.

The NCS Strategic Plan was adopted to guide the NCS through the new technology-driven, highly

sophisticated, and continuously evolving NS/EP telecommunications environment. When E.O. 12472 was issued by President Reagan, continuity of government and continuity of operations were principal concerns of the NCS. The emergency personnel who now respond to the spectrum of disasters depend on NS/EP telecommunications to efficiently and effectively react to hurricanes, floods, earthquakes, and acts of terrorism. This increasingly large NS/EP telecommunications requirement has forced the NCS to broaden the way it defines its customers.

The NCS mission now includes responding to national and international disasters and crises that require NS/EP telecommunications. Peacekeeping operations in Bosnia, military activities in Iraq, the terrorist bombing in Oklahoma City in April 1995, and floods in the Pacific Northwest have demonstrated the wide variety of events that require a coordinated telecommunications response. Given the growing importance of advanced information technologies in Federal emergency response efforts, future events of this type will require the constant monitoring, analysis, and improvement of the information infrastructure, focusing on NS/EP telecommunications and information services.

Modern society increasingly relies on advanced telecommunications, computer, and automated information systems in everyday life. A secure, highly efficient information infrastructure is vital to the national security and economic growth of the U.S. because both the Government and industry are heavily dependent on the information

## Information Assurance

Securing essential national infrastructures such as electric power, financial services, and transportation is vital to national security. These national infrastructures rely on key public and private elements of the Nation's information infrastructure to function. Improved technology is only part of the solution to protecting our critical

national infrastructures. The success of the NSTAC's approach to addressing information assurance is in its engagement of other private sector entities that depend on the telecommunications and information infrastructures. The participation of security practitioners, as well as industry and Government

leaders and the perspectives they offer, is increasingly critical in addressing the dynamic security challenges facing the Nation. The process of addressing information assurance through the NSTAC also reveals the need for other infrastructures to engage in intra-industry and industry-Government cooperation.

infrastructure for day-to-day operations and business transactions. However, the Nation's vital communications systems are vulnerable to attacks that could result in sustained outages and widespread disruption. Furthermore, the risk to these systems extends to other national infrastructures supporting American society as well. Finance, transportation, air space management, energy systems, and everyday business transactions depend on automated information networks to carry out their functions. The massive interconnection of computerized communications and information networks across the public and private sectors has increased the

vulnerability of the entire system and has provided existing and potential adversaries with a means to attack U.S. interests.

The concept of "information assurance" is not new; the need to protect sensitive information has been an enduring one throughout the history of civilization. Until the past few years, concern has focused primarily on protecting classified information within the Defense, intelligence, and law enforcement communities, and the rapid evolution of the NII has intensified the level of interest in IA within these specialized communities. However, the emerging NII has also made information protection become

## Telecommunications Reform Reaches Out to America

On February 1, 1996, after months of negotiations, Congress passed the most sweeping overhaul of communications regulation in more than 60 years—the Telecommunications Act of 1996. This act provides for the most comprehensive changes in the U.S. telecommunications industry since the Communications Act of 1934, the core law that has governed the communications industry for six decades. When that statute was passed, there were no televisions, no satellites, no cellular telephones. Sixty years ago, the latest in telephones was the rotary dial desk set that came in only one color—black.

The Telecommunications Act of 1996 dramatically changes the ground rules for competition and regulation in virtually all sectors of the communications industry, from local and long-distance telephone services, to cable television, broadcasting, and equipment

manufacturing. With the Act, Congress set a course that clearly adopts competition as the basic charter for all telecommunications markets. In addition to ensuring competition within the industry, the Act ensures that schools, libraries, hospitals, and clinics have access to advanced telecommunications services, and calls for them to be connected to the "information superhighway" by the year 2000.

In his remarks during the signing ceremony at the Library of Congress, President Clinton likened the Telecommunications Act to one signed in 1956 by President Eisenhower that "... seized the opportunities of the moment. It made them more broadly available to all Americans. It met the challenge of change. It reinforced our fundamental values and aspirations. And it was done in a harmonious, bipartisan spirit." The Federal Aid Highway Act that created our interstate highway system, he

said, "literally brought Americans closer together. We were connected city to city, town to town, family to family, as we had never been before. That law did more to bring Americans together than any other law this century, and that same spirit of connection and communication is the driving force behind the Telecommunications Act of 1996."

As we approach the turn of the century, we will likely see an increased velocity of change in the telecommunications and information industries. FCC Commissioner Susan Ness, in a speech to students at The Wharton School of the University of Pennsylvania, on February 22, 1996, claimed this change would make the transition from ENIAC (the world's first large-scale, general purpose electronic computer) to the silicon chip pale by comparison. "Technology will fuel the change," she said, "and technology does not stand still."

increasingly important to the private sector. Protecting proprietary information has always been important, but the concern has increased because proprietary material is now available on-line and is consequently more vulnerable. The general population has also become more aware of the importance of protecting information they use, and generate, as they go about their daily lives doing things as simple as filling a prescription or as complex as buying a house. The telecommunications infrastructure plays a unique role in the NII: it is a key component enabling the other infrastructures to implement technological developments, but it is also a potential avenue through which electronic intruders could attack these infrastructures. Further, the telecommunications infrastructure is itself vulnerable to the threat from electronic intruders. Having studied the electronic intruder threat to the telecommunications infrastructure and implemented programs to address this concern, the NCS and the NSTAC recognized that the lessons learned from this work might be useful to the other infrastructures.

In January 1995, the Director of the National Security Agency presented a briefing to the NSTAC principals on threats to U.S. information systems and the need to improve the security of the Nation's critical infrastructures. The NSTAC principals considered the issues identified in that briefing and forwarded a letter to the President in March of that year stating that "[the] integrity of the Nation's information systems, both government and public, are increasingly at risk from intrusion and attack." Moreover, that correspondence noted that "other national infrastructures ... [such as] finance, air traffic control, power, etc., also depend on reliable and secure information systems, and could be at risk." President Clinton replied to the NSTAC letter in July 1995 and requested "the NSTAC principals—with input from the full range of NII users—provide me with your assessment of national security emergency preparedness requirements for our rapidly evolving

information infrastructure."

In May 1995, the NSTAC formed the Information Assurance Task Force (IATF) to work closely with the U.S. Government to identify critical national infrastructures and their importance to the national interest. Following several meetings with elements of the national security community, law enforcement, civil agencies, and the private sector, the IATF selected the electric power, financial services, and transportation infrastructures for further study. The IATF subsequently determined to assess the extent to which these infrastructures depended on information systems and whether the associated risks were understood within the electric power, financial services, and transportation industries.

At the same time, the OMNCS established the Information Assurance Branch to combine and coordinate its network security and information assurance initiatives. The IA Branch develops technical analyses examining threats, vulnerabilities, and risks to public networks and the NII. As the Government's reliance on commercial communications continues to grow, the IA Branch has leveraged its unique working relationship with industry to ensure that the telecommunications infrastructure is responsive to the needs of the President and Federal departments and agencies.

These activities, combined with DOD concerns about information warfare and several high profile computer intrusion cases involving Rome Laboratories and Citibank, were instrumental in generating enormous interest in the executive and legislative branches of Government. One of the first Congressional initiatives was an amendment to the National Defense Authorization Act (NDAA) for fiscal year (FY) 1996 sponsored by Arizona Senator Jon Kyl. The amendment required that the President submit to Congress a report on the national policy and architecture for protecting the NII against strategic attack, including plans for establishing an indications, warning, and assessment function. The Kyl

Amendment also requested that the Administration consider the need to expand and modernize the mission of the NCS in light of the changing threat environment.

Another important Congressional activity was the "Security in Cyberspace" hearings conducted by the U.S. Senate Permanent Subcommittee on Investigations in the summer of 1996, to examine emergent electronic threats to the Nation's infrastructures. At those hearings, the General Accounting Office presented a report outlining the vulnerabilities of the Department of Defense to electronic intrusion, and other testimony described growing threats to U.S. information systems. At the request of the Subcommittee, the President's NSTAC provided an information package that outlined its

provision of expert guidance to critical infrastructures to detect, halt, or confine an attack and to recover and restore service. In addition, the IPTF was to coordinate a number of other activities, such as: issuing threat and warning notices; providing training and education on methods of reducing vulnerabilities; and conducting after-action analyses to identify possible future threats, targets, or methods. Finally, the IPTF had responsibility for coordinating with pertinent law enforcement authorities during or after an attack to facilitate any resulting criminal investigation.<sup>153</sup> The OMNCS participated in the IPTF, providing expertise in the telecommunications and information assurance arenas.

Another initiative taken with regard to the security of the telecommunications infrastructure resulted from

the issuance of Presidential Decision Directive-39 (PDD-39), *U.S. Policy on Counterterrorism*, which President Clinton signed on June 21, 1995. PDD-39 states that the United States must be

***The end of the Cold War and the emergence of the technological innovations of the early- to mid-1990s gave the NCS a clear path to follow in providing reliable telecommunications that are both interoperable and secure.***

efforts to examine the security of the PN. The package was included in the final Subcommittee report.

At the final Subcommittee hearing on July 15, 1996, Deputy Attorney General Jamie Gorelick announced that President Clinton had signed Executive Order 13010, "Critical Infrastructure Protection." That order established the President's Commission on Critical Infrastructure Protection and the Infrastructure Protection Task Force (IPTF). The Commission was tasked to work with the private sector for 1 year to "recommend a comprehensive national policy and implementation strategy for protecting critical infrastructures from physical and cyber threats."<sup>152</sup>

The IPTF, established under the leadership of the Department of Justice, was tasked to identify existing expertise inside and outside the Government. The mission of the IPTF was to facilitate and coordinate the

prepared to combat terrorists by reducing vulnerabilities, deterring and responding to terrorist acts, and maintaining the capability to prevent and manage the consequences of terrorists' use of nuclear, biological, and chemical weapons.<sup>154</sup> In the Directive, the President tasked the Director, Federal Emergency Management Agency (FEMA), to ensure the FRP was adequate to respond to terrorist activities directed against the U.S. In response to this tasking, the Catastrophic Disaster Response Group (CDRG) established the Presidential Core Group on Federal Response to a Terrorist Incident, of which the NCS was a member because of its role in coordinating telecommunications response for departments and agencies that may respond to a terrorist incident. The Core Group developed an assessment of the Federal Government's capabilities to perform that response, and presented the assessment, *Federal Capability to*

*Respond to the Consequences of an NBC Terrorist Incident*,<sup>155</sup> to the President in February 1997. The Core Group then developed a list of shortfalls and potential solutions, and they continue to meet regularly to work on ways to implement the solutions.

## THE NCS RIDES THE WAVE OF TECHNOLOGICAL ADVANCE

The technological trends that created the NII have changed the threats facing the NCS. In the late 1980s and early 1990s, the Nation's potential dependency on the PN during crises and war had led to the development of GETS and other NLP initiatives. Recognition that the PSN and critical infrastructures of the Federal government are vulnerable to computer hacker attack made information assurance the main issue of the 1990s. The move from the threat of a massive coordinated nuclear attack to a diffuse, amorphous threat placed new importance on protecting critical infrastructures, particularly telecommunications, which are key to providing effective NS/EP response.

The OMNCS responded by creating programs and planning groups that provide cutting-edge NS/EP telecommunications services and continuing their proactive approach in developing standards that support NS/EP telecommunications requirements. These initiatives are the foundation of the current NCS. When E.O. 12472 was signed in 1984, the NCS was still an organization in transition. Although technology was making possible important new NS/EP capabilities, emergency telecommunications response planning in the 1980s had focused on recovering from a nuclear incident. Efforts had centered on assuring communications connectivity for national command and control. The end of the Cold War and the emergence of the technological innovations of the early- to mid-1990s gave the NCS a clear path to follow in providing reliable telecommunications that are both interoperable and secure.

The structure envisioned in 1986 by the National Level Program remains the foundation upon which the NCS coordinates its programs with its member organizations. Although the individual telecommunications programs have changed to encompass technological advances in the field, they continue to reflect the policy objectives outlined in E.O. 12472, and their planning and programming are responsive to White House direction. GETS and the wireless extension programs, consisting of CPS and Enhanced Satellite Capability (ESC), are critical programs directed by the OMNCS Programs Division. GETS has been the most visible program, perhaps because of its widespread use among emergency responders, and has developed into an advanced, effective NS/EP telecommunications service.

Starting in January 1992, GETS began implementing plans to provide NS/EP users with priority switched voice and voice-band data communications service throughout the PN. Developed in response to White House tasking, GETS provided authenticated access, enhanced routing, and priority treatment<sup>156</sup> in local and long-distance telephone networks. Users accessed GETS through a simple dialing plan and a personal identification number. The OMNCS maintains GETS in a constant state of readiness to make maximum use of all available telephone resources should outages from congestion or damage occur during an emergency, crisis, or war.

GETS achieved Initial Operational Capability (IOC) on October 1, 1995.<sup>157</sup> Full operational capability is expected in 2001. Thereafter, GETS will continue to evolve, as new technology that can enhance NS/EP telecommunications is deployed in the PN. Since achieving IOC, the NCS has seen extensive use of GETS during national emergencies such as hurricanes, floods, wildfires, earthquakes, and airplane disasters. Reports from emergency responders across the country document the contribution made by GETS under emergency conditions.



Through the ESC program, the OMNCS investigates emerging satellite technologies, analyzes their potential ability to support NS/EP requirements, and works to improve and enhance their capability to support NS/EP users. The ESC program was initially created from two separate industry-Government cooperative efforts—the Advanced Communications Technology Satellite (ACTS) Program and the American Mobile Satellite Corporation (AMSC) effort. Since that time, it has evolved to include all areas of satellite communications support to NS/EP users.

The OMNCS has had a memorandum of understanding with NASA since October 1989 to participate in the ACTS program. ACTS provides industry and government with an opportunity to experiment with new voice, data, and video technologies that will be incorporated into the next generation of commercial communications satellites. The implications of this program for NS/EP communications are many, as wireless satellite communications become an alternative to increasingly congested landline networks. For example, using an ACTS mobile terminal with support from NASA and the Jet Propulsion Laboratory, the NCS assisted in the response effort following the pipe bomb explosion during the 1996 Summer Olympics in Atlanta. The portable terminals provided twelve 64 kilobits per second communications lines, demonstrating the capacity and flexibility of the system to support a wide array of emergency operations.<sup>158</sup>

OMNCS also worked with AMSC to demonstrate NS/EP communications over AMSC's Mobilsat System. Mobilsat, a commercial satellite system, uses a geostationary satellite to provide mobile communications throughout North America. The NCS has been cooperating with AMSC to investigate potential uses of their systems to fulfill NS/EP requirements and to support development of appropriate capabilities within the AMSC system.<sup>159</sup>

In addition to the ACTS and AMSC activities, the ESC program has expanded its activities to include other emerging and planned satellite systems, such as Iridium, Globalstar, ICO, and ORBCOMM. The continued goal of these efforts is to analyze, assess, and influence the capability of emerging technologies to provide telecommunications services to NS/EP users.

Providing the communications needed to maintain an informed and equipped emergency response team has always posed a serious challenge to disaster and recovery operations. In 1995, the NCS, in conjunction with FEMA, undertook an effort to improve disaster area communications capabilities by identifying the full range of communications requirements within the disaster area and by implementing effective solutions to improve those communications.<sup>160</sup> They found that emergency response personnel need to exchange information with various parties, anywhere and anytime, with security and flexibility. They need to access, retrieve, and provide a wide range of distributed information from the disaster area itself, the Disaster Field Office, regional offices, and department/agency headquarters. They determined that the Internet, the medium that has revolutionized information exchanges, could support many of these wide-ranging communications needs.

Accordingly, the OMNCS developed the Emergency Response Link (ERLink) to take advantage of the versatility and ubiquity of the Internet. ERLink is based on the Internet's World Wide Web technology and provides a Web site for Federal Response Plan (FRP) participants to upload and retrieve response reports and documents.<sup>161</sup> Links to various agencies also provide a wide array of response-related information. Agencies participating in ERLink determine the type of information provided to the system and who in the ERLink community will be allowed to view it.

Authorized NS/EP participants can download documents and reports, eliminating the need to send response information out in hard copy or e-mail format and simplifying overall information dissemination. The pilot test of ERLink began on September 17, 1996, with the participation of the Departments of Transportation, Commerce, and the Interior, the Nuclear Regulatory Commission, GSA, the U.S. Army Corps of Engineers, and the State of California.<sup>162</sup> The OMNCS began transitioning ERLink to its operations component in 1997.

The need for reliable transportable telecommunications became evident during Hurricane Marilyn (September 1995) when the telecommunications infrastructure of the U.S. Virgin Islands was severely damaged. In response, the OMNCS designed an emergency response telecommunications and information processing package using off-the-shelf components and software. Carried to the disaster site from OMNCS headquarters, the Emergency Response Fly-Away Kit (ERFAK) enhances the ability of on-site emergency response personnel to communicate to or from anywhere in the United States quickly and effectively via voice, data, and video.<sup>163</sup>

## WHERE EMERGENCY RESPONSE AND TECHNOLOGY MEET

Because of the tremendous technological advances affecting emergency response telecommunications in the mid- to late-1990s, emergency responders have come to rely on GETS, the wireless extension programs, and the ERLink for effective telecommunications connectivities during and following natural disasters and in support of NS/EP activities. However, as important as those technologies have become to the user, they would be far less effective were it not for the parallel growth and technological progress of the organization responsible for coordinating nationwide emergency telecommunications, the NCC.



*In the wake of the devastation from Hurricane Marilyn in 1995...*



*... commercial telecommunications provided support to the disaster response...*



*... and NCS IMAs deployed to St. Thomas to assist the FECC in the response effort.*

The success of the NCC since its inception in January 1984 exemplifies the progress made in NS/EP telecommunications. The NCC has created a synergy between industry and Government unparalleled in private/public sector relations. The commercial

telecommunications industry owns the majority of the world's telecommunications assets, including the facilities, equipment, and personnel trained to restore NS/EP services. These industry assets become the primary resources for the Government during disaster response operations. Industry representatives work from their offices within the NCC, and are in direct contact with their company senior management and key operations centers. This enables the NCC to respond with exceptional effectiveness in emergency and disaster situations.

This cooperative relationship succeeds because industry representatives and NCC personnel work together before, during, and after emergencies to ensure a seamless response capability. NCC representatives routinely support interagency

exercises such as the Federal Radiological Emergency Response Plan Exercise (April 1995), the Health and Medical Services Tabletop Exercise (December 1996), and the ERLink Exercise (April 1997), to prepare NS/EP personnel to function effectively in a stressed environment. These exercises are complemented by joint reports that are prepared following disasters to analyze response activities, identify needed improvements, and document lessons learned.<sup>163</sup>

After Hurricane Andrew devastated South Florida in 1992, telecommunications carriers joined forces to provide personnel, equipment, and supplies to the response effort. The accounting, billing, and liability issues raised during the disaster recovery operation prompted a coalition of carriers to establish standardized procedures for use during emergencies. The result was

## NCS IMAs Respond to Natural Disasters

The NCS IMA Program is a valuable and cost-effective resource of trained telecommunications experts who support the NCS mission during national security emergencies and natural disasters.

The original mission of the NCS IMA Program was to provide emergency telecommunications support to the OMNCS during mobilization and wartime. More recently, the NCS IMA mission has been expanded to reflect the all-hazard NCS mission of providing emergency telecommunications support to the full spectrum of wartime and

peacetime contingencies. NCS IMAs are geographically dispersed across the continental United States and are, therefore, often among the first personnel to respond to crises and emergencies. Following the Northridge earthquake in January 1994, the Oklahoma City bombing in April 1995, Hurricanes Marilyn and Opal in September and October 1995, and the floods in the Pacific northwest in February 1996, NCS IMAs deployed to assist regional personnel and the Federal Emergency Communications Coordinator in the provision of

telecommunications in the disaster areas.

The Nation's business is no longer conducted as a one-dimensional voice communications function. The mission to provide telecommunications support for peacetime disasters and emergencies, and the potentially greater NS/EP role driven by the ever-increasing use of telecommunications systems to conduct critical business and fulfill national defense requirements, mean that the services of the NCS IMAs will become even more vital than ever in the 21st century.

Bellcore's Local Exchange Carrier Mutual Aid Agreement,<sup>164</sup> which delineates procedures for requesting and providing supplies, equipment, vehicles, network capacity, personnel, and billing.<sup>165</sup> The agreement also covers liability issues associated with both requesting and receiving payments. After the agreement was completed, Canadian telecommunications carriers requested a copy so they could develop their own mutual aid agreement. This exchange bolstered one of the most successful international

cooperative arrangements for responding to NS/EP telecommunications requirements.

For over a decade, the NCS and the NCC have been involved in assisting other countries and international organizations in NS/EP telecommunications planning. The US/Canada Civil Emergency Planning Telecommunications Advisory Group (CEPTAG),<sup>166</sup> established in 1988, addresses concerns and arrangements for cross-border cooperation and mutual assistance in the event of an emergency. In 1996 and 1997, repair personnel from Canadian telecommunications companies deployed to the U.S. to assist in repairing flood damage. The Canadian assistance was coordinated by the NCC and industry using CEPTAG channels. This effort led to the development of a coordinated NCC/U.S. Canada operating procedures to cover cross-border responses.

After the earthquake that devastated Kobe, Japan, in January 1995, the Japanese Ministry of Posts and Telecommunications invited NCS personnel to brief Japanese government and civilian disaster emergency planners on the U.S. emergency response structure, specifically emergency telecommunications planning and response to earthquakes. Personnel from industry and Government, led by the Deputy Manager, NCS, visited Japan and briefed Japanese government and industry personnel on the NCC's mission, capabilities, and emergency response procedures, and helped analyze the effects of a catastrophic earthquake on a modern society heavily dependent on telecommunications and information services.

The readiness of personnel to quickly and effectively respond to emergencies is critical to effective NS/EP telecommunications emergency response capabilities. Training and exercise of NCS personnel and capabilities had been ongoing for several years when, in 1994, the OMNCS established

the Training and Exercise Branch within its Operations Division to support the NCS NS/EP mission. The Branch conducts training events and activities for OMNCS staff, NCS Regional Managers, and NCS member organizations and industry participants. The primary goal of the OMNCS in conducting this training is to enhance the emergency response community's ability to effectively execute its responsibilities during all crises and emergencies. The OMNCS has pursued this goal through a series of training seminars that focus on provisioning emergency telecommunications service within a disaster site. Telecommunications Emergency Response Training (ERT) seminars are conducted in coordination with NCS member organizations, State governments, and the telecommunications industry. Phase I of the ERT

***This cooperative relationship succeeds because industry representatives and NCC personnel work together before, during, and after emergencies to ensure a seamless response capability.***

seminars was conducted by NCS personnel from May 1993 through April 1995, and was extremely successful, with seminars held throughout the Nation. During Phase I, the OMNCS concentrated on providing an overview of the Federal Response Plan and the Federal, State, and industry relationships to support FRP Emergency Support Function #2 (ESF #2) (Communications).

With the support of member organizations, State governments, and industry representatives, Phase II was developed. Phase II, which began in March 1996, focuses on telecommunications services and priority provisioning; national, state, and emergency operations; and current and future technologies. Various technology demonstrations complement the seminars. More than 1,000 emergency response personnel have attended the

sessions. As a result of the NCS ERT seminars, member organizations and State governments have requested additional sessions to target special risk areas and situations. The NCS continues to support member requests for training assistance and continues to strengthen Federal, State, and industry partnerships in emergency response through its comprehensive training program.

In addition to ERT seminars, the OMNCS conducts exercises and analyses that cover many aspects of industry/Government cooperation in NS/EP telecommunications. The NCS also sponsors focused tabletop exercises designed to examine specific telecommunications requirements and assess the capabilities of new technologies. In addition, training sessions and a tabletop exercise were developed for the NATO Civil Communications Planning Committee to explore the crisis response capabilities of NATO and its member organizations.

## ADVANCES IN STANDARDS AND TECHNOLOGY

The OMNCS is actively involved in developing communications capabilities that can support NS/EP requirements. It performs technical studies, analyses, and technology demonstrations, and participates in cooperative research and development efforts to determine potential effects of technology on NS/EP telecommunications. The OMNCS also develops plans, procedures, and standards to improve the interoperability, reliability, security, and network management of commercially provided and Government-owned telecommunications and information systems.

The OMNCS manages the Federal Telecommunications Standards Program (FTSP), which promotes the reliability, interoperability, and security of Government telecommunications systems and capabilities. This program ensures, whenever feasible,

that existing and evolving industry, national, and international standards support the needs of Federal telecommunications users. Consequently, the FTSP facilitates lower cost telecommunications products, services, and systems. Technological headway in the 1990s has transformed not only the way in which we communicate, but the way we think about what communications technology can do. Wireless technology has broken new ground in providing capabilities that can be used for NS/EP activities. As we approach the end of the 20th century, the OMNCS is focusing on the application of wireless technologies to NS/EP requirements. One of the wireless communications focuses is personal communications services (PCS). PCS provides a set of capabilities combining terminal mobility, personal mobility, and service profile management. PCS technology is also widely supported by current networks, further expanding its utility for NS/EP users.<sup>167</sup> In 1995, the OMNCS began developing priority treatment services via CPAS for digital cellular systems. The OMNCS also developed initial contributions for the standardization of Priority Access Channel Assignment for digital wireless systems (cellular and PCS).

The OMNCS made significant headway in the area of multimedia communications in the mid-1990s. Following the 1992 Federal Telecommunications Standards Committee (FTSC) approval of Federal Standards for visual communications, the OMNCS pursued development of electronic imagery in communications, and implemented a video teleconferencing (VTC) interoperability testing facility in 1994. The initial modest goals were to gain in-depth knowledge by hands-on experience and testing the degree of interoperability among systems. By 1995, the facility consisted of five permanent desktops with Integrated Services Digital Network and Basic Rate Interface connections to the DOD TEMPO network. Testing the equipment revealed that U.S. Government connections using FTS 2000 could not support VTC, and the OMNCS consequently began

working with GSA to solve the problems. In a cooperative partnership with NTIA's Institute for Telecommunication Sciences, the OMNCS began development of a multimedia performance handbook to provide performance information for Government users to assist them in selecting multimedia communications systems that meet their defined requirements. Work on the handbook continued through the next several years, with the publication of Version 1 on CD-ROM in 1996, and Version 2, which focused on desktop and conference room video teleconferencing applications, in 1997.<sup>168</sup>

In 1996, important steps were taken to standardize VTC to enable more ready use over the PN. The International Telecommunication Union—Telecommunication Standardization Sector (ITU-T) has approved many new standards related to VTC. Among the most important of these recommendations is the H.324 series that defines a multimedia communications terminal enabling VTC over the PN. Presently, wireless radio systems support disaster recovery with standardized video systems that use wireless transmission capabilities.

The wireless capabilities now available are the direct result of the application of standards to telecommunications. The OMNCS has played an active role, directly and indirectly, in guiding the development and use of standards, both within the Government and through cooperation with industry. Every administration since 1963 has reemphasized the strategic role of standards and the position of the NCS



The Federal Telecommunications Standards Committee, shown here in its November 1997 session, draws its membership from across all Federal departments and agencies.  
Source: Federal Communications System

in guiding their development. In 1984, the OMNCS was tasked by E.O. 12472 to ensure that "where feasible, existing or evolving industry, national, and international standards are used as the basis for Federal telecommunications standards." To do this, the OMNCS continues to participate in national and international standards organizations that develop commercial telecommunications standards.<sup>169</sup> The benefits of NCS participation are many. The development of commercial standards will result in telecommunications infrastructures with far more advanced capabilities and features. Because many evolving commercial architectures, services, features, and functions have viable potential uses in NS/EP telecommunications capabilities, they may be incorporated into NCS programs. Firsthand knowledge of emerging telecommunications technologies of direct interest to the NCS gives the organization an advantage in promoting NCS interests during standards development.

## THE FOCUS THEN AND NOW

When President Kennedy created the NCS in 1963, building a reliable and effective communications system was an urgent priority for national security. The systems that connected the world had failed during the Cuban Missile Crisis and had brought the United States to the brink of a potentially disastrous exchange with the Soviet Union. Those systems are now so robust and reliable that almost no thought is given to the possibility of super-power leaders being unable to communicate with one another at a moment's notice. The PNs of the world are highly efficient and dependable compared with those of the early 1960s. The probability of a war or nuclear incident that would incapacitate the Nation's telecommunications capabilities is lower than it has been for four decades. Although the threat of nuclear war lessened following the enactment of a number of arms reduction treaties, the challenges that the NCS faces today are as complex and significant as those faced by the United States during the Cold War.

In the past decade, the threats to U.S. interests have grown more diffuse and difficult to isolate. Although the international political scene is in an unprecedented state of peace and stability, unrest and war remain distinct threats in many parts of the world. For the first time in its history, the United States has witnessed terrorist acts on its soil. The Nation's security and interests can no longer be defined strictly in terms of geopolitical alliances and military might. The long-term safety and success of the United States has broadened that interest to include national competitiveness and technological leadership. This will likely require continued development of national policy frameworks, whether they be related to the growing vulnerabilities of the Nation's information



**LTG DAVID J. KELLEY, USA**  
**MANAGER, NCS, 1997-**

systems and critical infrastructures or to further telecommunications industry reform to enhance competition in all market segments. The OMNCS, working closely with the 23 NCS member organizations and the NSTAC, will remain at the forefront of the efforts to examine information-based threats to and vulnerabilities of the telecommunications and other critical infrastructures. These efforts will also include considering the potential consequences of terrorist

acts, coordinating responses to catastrophic natural and technological disasters, and assessing the accelerated evolution of the telecommunications industry fostered by increased competition in all market segments.

In practical terms, the focus for the NCS over the next decade will be to protect the evolving telecommunications infrastructure from all threats. The infrastructure that carries government, business, and private communications and transactions will continue to grow increasingly complex and integrated. A continuing and active national-level effort will provide interoperable, secure, and timely NS/EP telecommunications in an all-hazard environment. The Nation's reliance on information technology as the underpinning of its critical infrastructures necessitates public and private sector cooperation to protect these infrastructures in an environment marked by increasing technological complexity and attendant potential vulnerabilities.

The telecommunications environment and associated technologies are on the verge of exponential change. Many of the Nation's critical infrastructures, such as power and finance, rely on telecommunications systems to rapidly and efficiently exchange vital information. Technological advances are providing integrated and compatible information and communications systems that benefit the Nation's

economy and security. However, those seeking to exploit vulnerabilities in the telecommunications infrastructure pose significant threats to an increasingly interconnected world. The Telecommunications Act of 1996 opened the marketplace to new service providers who may be unfamiliar with these threats. Thus, the interdependence of the Nation's critical infrastructures, coupled with ever present physical and electronic threats, creates new telecommunications challenges for both industry and Government.

The next decade for the NCS will be a time of constant prioritization and realignment as technological advances continue to test the Government's ability to provide secure, reliable, and interoperable NS/EP telecommunications. The position of the NCS as a bridge between industry and

Government and a catalyst for NS/EP telecommunications advancement and coordination could be challenged as never before. The NCS must remain the conduit by which our private industries that provide the telecommunications infrastructure can support the Federal Government in its duty to protect and promote the interests of the citizens of the United States and ensure the security of the Nation. Although the "single system" President Kennedy and his administration envisioned has not been achieved by physically linking the separate systems of the NCS member organizations, the miracle of evolving technology and the enormous substantive impact of joint industry-Government planning has, in fact, produced a holistic, virtually interconnected system that is, in many ways, far more resilient, reliant, and survivable than anyone could have dreamed.

# END NOTES

## END NOTES

- 1 McGeorge Bundy, *Danger and Survival*, New York: Vantage Books, 1990, pp. 438-445, and ABC News Special, "The Missiles of October: What the World Did Not Know," October 17, 1992. See also, Theodore C. Sorenson, *Kennedy*, New York: Harper and Row, 1965, p. 265, and David Kahn, *The Code-Breakers*, New York: MacMillan, 1967, pp. 713-716. For additional background see: Graham T. Allison, *Essence of Decision: Explaining the Cuban Missile Crisis*, Boston: Little, Brown and Company, 1971, and Edward Weintal and Charles Bartlett, *Facing the Brink*, New York: Charles Scribner's Sons, 1967.
- 2 National Security Action Memorandum 201 (NSAM-201), "Establishment of the Subcommittee on Communications," October 26, 1962.
- 3 The White House, Memorandum to the Heads of Executive Departments and Agencies, "Establishment of the National Communications System," August 21, 1963. This August 21 memorandum was preceded by National Security Action Memorandum 252 (NSAM-252), July 11, 1963, which was identical to the August 21 memo except for one brief reference to the CIA.
- 4 The White House, Memorandum, "Cabinet Agenda for Friday, January 25, 1959, Item B: The Development of a Unified Federal Civilian Communication System," January 20, 1959.
- 5 The White House, Executive Order (E.O.) 10995, "Assigning Telecommunications Management Functions," February 16, 1962. The position of Director of Telecommunications Management was to be held by an Assistant Director of the Office of Emergency Planning.
- 6 E.O. 10995.
- 7 August 21, 1963, Presidential Memorandum.
- 8 The White House, "Procedures and Working Relationships for the NCS," August 21, 1963, and "Statement of Initial Tasks for the NCS," August 6, 1963.
- 9 "Procedures and Working Relationships."
- 10 Department of Defense (DOD) Directive 5100.41, "Arrangements for the Discharge of Executive Agent Responsibilities for the National Communications System," October 5, 1963.
- 11 DOD Directive 5100.41.
- 12 Throughout the life of the NCS, there have been seven Deputy Managers: Clifford D. May (1966-1969, 1970-1973); BG Irving R. Obenchain, USA (1969-1970); Joseph Rose (1973-1981); John G. Grimes (1981-1984); Benham E. Morriss (1984-1993); Robert M. Marquette, Jr. (1994-1995); and D. Diane Fountaine (1995-). These individuals brought continuity and direction to the NCS and played key roles in shepherding the NCS through the vicissitudes of the Washington bureaucracy.
- 13 "Procedures and Working Relationships."
- 14 August 21, 1963, Presidential Memorandum.
- 15 Manager, NCS, Memorandum for the Executive Agent, NCS, "Submission of the First Annual NCS Long-Range Plan," August 12, 1964. See also, Office of the Secretary of Defense, National Communications System Directive, No. 2-63, "Approval of Initial NCS Tasks 1 and 2," December 13, 1963.
- 16 Manager, NCS, "Submission of the First Annual NCS Long-Range Plan," August 12, 1964. The first long-range plan also established the concept of "major" and "minor" operating agencies. The Major Operating Agencies, which included the departments of State and Defense, the General Services Administration, the Central Intelligence Agency, the Federal Aviation Administration, and the National Aeronautics and Space Administration, were so named because of the size, sophistication, and ubiquitous nature of their communications systems. The initial list of Minor Operating Agencies included the Departments of Commerce and Interior, the Federal Communications Commission, the United States Information Agency, and the Atomic Energy Commission.
- 17 LTG Alfred D. Starbird, Manager, NCS, to Executive Agent, NCS, "Submission of First Annual NCS Long-Range Plan," August 12, 1964.
- 18 Dr. Irvin Stewart was nominated as Assistant Director of the Office of Emergency Preparedness (OEP) to serve as the Director of DTM. He was confirmed by the Senate on March 28, 1962, and took the oath of office on April 3. He resigned one year later. Dr. Jerome Wiesner, President Kennedy's science advisor, filled the office of DTM on an acting basis until April 18, 1964, when President Lyndon Johnson nominated LTG James D. O'Connell, a former Chief Signal Officer of the Army, to the post. General O'Connell was first appointed Assistant Director of OEP, which opened the door to his appointment as DTM. General O'Connell held the position of DTM, as well as Special Assistant to the President for Telecommunications, until 1971.
- 19 Letter, James D. O'Connell, Jr. to Robert S. McNamara, October 1, 1965.

- 20 National Security Action Memorandum 166 (NSAM-166), "Establishment of the National Military Command System," June 25, 1962.
- 21 Letter, O'Connell to McNamara, October 1, 1965.
- 22 Ibid. General O'Connell, from the outset, saw interconnectivity as the vital part of the NCS process. See also, Letter, J.D. O'Connell to Solis Horwitz, November 9, 1964.
- 23 Executive Office of the President, Office of Emergency Preparedness, *The National Plan for Emergency Preparedness*, December 1964, p. 55.
- 24 National Communications System Memorandums to the Director, "Reorganization of the Office of the Manager, NCS," February 4, 1966, Joint Staff, and "Manager, NCS, Final Report on NCS Initial Task 10," January 7, 1965.
- 25 Letter, Jerome B. Wiesner to Bernard L. Boutin, January 24, 1964.
- 26 Ibid.
- 27 Ibid.
- 28 NCS, "Second Long-Range Plan for the National Communications System (NCS) for FY 1968-1972," July 27, 1966.
- 29 NCS Instruction 45-1 (NCSI 45-1), "NCS Operations Center Organizational Arrangements and Structure," July 28, 1965. Interim instructions had been issued the previous year in NCS Circular 130-2 (NCSC 130-2), "Interim Procedures for Processing NCS Emergency Telecommunications Circuit Requirements," January 24, 1964, and approved by President Johnson in a memorandum to Secretary McNamara on August 27, 1964. Related documents during this time period include: NCS Circular 70-1 (NCSC 70-1), "Operating Procedures for the NCS," June 22, 1964; NCS Instruction 55-1, "Procedures for Placing into Effect the NCS Private Line Circuit Restoration Priority System," January 18, 1965; NCSC 70-2 "Technical Control Procedures," October 1965; NCSC 175-2, *Technical Standards Manual*, March 1968; NCSC 70-3, "Performance Objectives for the NCS," August 13, 1968.
- 30 Robert S. McNamara, Memorandum for the President, "Submission of the Second Annual Long-Range Plan for the NCS, FY 1968-1972," July 27, 1966.
- 31 Letter, J.D. O'Connell to Robert S. McNamara, October 31, 1966.
- 32 Ibid.
- 33 NCS Memorandum 2-69, "Interim Procedures for Application of Planning-Programming-Budgeting System (PPBS) Features in the NCS Planning Process," October 31, 1969.
- 34 Letter, J.D. O'Connell to Melvin Laird, June 2, 1969.
- 35 Letter, LTG Richard P. Klocko, Manager, NCS, to William H. Goodman, Deputy Assistant Secretary of State for Communications, April 12, 1968. General Klocko envisioned a three-stage development for the NCS, beginning with what was available now, progressing through a step-by-step interconnection process, and ending with complete interoperability.
- 36 Ibid.
- 37 Ibid.
- 38 NCS Memorandum to Task Manager, Long-Range Concept, "System Design Concept Description," February 27, 1968.
- 39 Up to 1968, the DoD did not have a full-time representative in the Manager's office. Finally, in 1968, in an agreement between DoD and NCS, a full-time DOD representative was assigned to the NCS in order to obtain a coordinated DoD position on NCS actions. See Memorandum of Understanding, David L. Solomon, OASD, General Klocko, and General Harold W. Grant, USAF (Ret.), Director for Telecommunications Policy for DoD, July 3, 1968.
- 40 Letter, Solis Horwitz (for Secretary McNamara) to J.D. O'Connell, August 12, 1968.
- 41 Letter, J.D. O'Connell to Solis Horwitz, October 9, 1968.
- 42 Letter, J.D. O'Connell to Clark M. Clifford, June 2, 1969.
- 43 NCS Memorandum to the Major Operating Agencies, "NCS Long-Range Concept Follow-On Studies," November 15, 1969.
- 44 NCS, "National Communications System Long-Range Development Concept," February 11, 1971. As the NCS Executive Agent (Secretary of Defense) searched for a consensus among the operating agencies regarding the design and management of the NCS, the Defense Department was going about its systematic way, building its own elaborate command-control-communications system. The Worldwide Military Command and Control System (WWMCCS), established in 1962, along with its primary component, the National Military Command System (NMCS), had, by the early 1980s, achieved a capability to provide the national command authorities (the President and the Secretary of Defense) with the means to exercise their authority and responsibility around the globe. See Department of Defense

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| <p>Directive No. 5100.30, "World-Wide Military Command and Control System (WWMCCS)," December 2, 1971.</p> <p>45 U.S. House of Representatives, Committee on Appropriations, "Department of Defense Appropriation Bill, 1971," October 6, 1970.</p> <p>46 Memorandum, NCS Long-Range Planning Study Group, "Meeting on the NCS Long-Range Concept, 14 September 1971," September 23, 1971.</p> <p>47 Holifield (Rep. Chester E. Holifield, D-CA) Committee Report, "Government Telecommunications Management," 1965. In its investigation, the Holifield Committee reviewed the Government's role in telecommunications policy making dating back to the Radio Act of 1912.</p> <p>48 President's Task Force on Communications Policy, Final Report, December 7, 1968, Tab A, "President's Message on Communications Policy."</p> <p>49 Ibid., pp. 27(29).</p> <p>50 Ibid., Tab B, "Statement of Partial Dissent by General J.D. O'Connell."</p> <p>51 General Accounting Office, <i>Review of Status of Development Toward Establishment of a Unified National Communications System</i>, July 14, 1969.</p> <p>52 Ibid.</p> <p>53 Ibid.</p> <p>54 Department of Defense Press Release, October 13, 1969.</p> <p>55 White House Memorandum, Peter Flanigan to Melvin R. Laird, December 6, 1969.</p> <p>56 Ibid.</p> <p>57 The White House, E.O. 11556, "Assigning Telecommunications Functions," September 4, 1970.</p> <p>58 Ibid.</p> <p>59 Memorandum, Office of Telecommunications Policy (OTP) Council for Government Communications Policy and Planning, "Coordination of Government Communications Activities," November 21, 1972. In this memorandum, the Council questioned the need for the NCS. "A decision must be made," said the Council, "either to reorient the NCS...or to abandon it...." In the meantime, the NCS Manager and the representatives of the operating agencies were meeting to plan their work required under the Presidential Memorandum of August 21, 1963.</p> | <p>60 Letter, Clay T. Whitehead to Robert M. O'Mahoney, February 8, 1972.</p> <p>61 The White House, Office of Telecommunications Policy, News Release, October 12, 1973.</p> <p>62 The White House, Office of Telecommunications Policy, "Government Communications Planning Program," OTP Circular 12, October 12, 1973.</p> <p>63 White House News Release, October 12, 1973.</p> <p>64 Clifford D. May, Deputy Director of the NCS, wrote of this institutional resistance to joint planning: "...our past experience has shown that we cannot expect full agency cooperation in planning efforts which affect the resources and prerogatives of the individual operating agencies." NCS Memorandum to Chairman, NCS Long-Range Planning Study Group, "Report to the NCS Long-Range Planning Study Group," July 3, 1972.</p> <p>65 NCS Memorandum to Executive Agent, NCS, "NCS Long-Range Planning," April 12, 1972.</p> <p>66 Letter, Executive Agent, NCS, to Clay T. Whitehead, Director, OTP, April 21, 1972.</p> <p>67 Ibid.</p> <p>68 Letter, Clay T. Whitehead to E. Reichtin, May 25, 1972.</p> <p>69 Letter, Office of Telecommunications Policy to Assistant Secretary of Defense, June 18, 1973. See also, Letter, Charles C. Joyce, Jr. to Thomas C. Reed, January 9, 1975.</p> <p>70 National Communications System, <i>NCS Summary Plan</i>, May 1972.</p> <p>71 The White House, Executive Order 11490, "Assigning Emergency Preparedness Functions to Federal Departments and Agencies," October 30, 1969.</p> <p>72 <i>NCS Summary Plan</i>, May 1972.</p> <p>73 During the 1970s, the NCS Operations Staff went out into the field to coordinate communications support during natural disasters.</p> <p>74 National Communications System Circular 175-1 (NCSC 175-1), "Federal Telecommunication Standards Program," June 6, 1973.</p> <p>75 Interoperability refers to the ability of various devices to effectively communicate and process information when connected, which is a prime NS/EP concern. Successful and widespread interoperability stems from the acceptance of the Open Systems Interconnection (OSI) seven-layer architecture concept and complementary standards. Considerable efforts are</p> |
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| <p>directed at interoperability and the development of standards to assure that new and existing systems can communicate with one another.</p> <p>76 Office of Telecommunications Policy, Telecommunications Circular 3300.5, "Federal Government Focal Point for Electromagnetic Pulse (EMP) Information," December 30, 1971; Memorandum, Office of Secretary of Defense, Office of Executive Agent, NCS Memorandum 1-73, "Federal Government Focal Point for Electromagnetic Pulse (EMP) Information," November 16, 1973.</p> <p>77 National Communications System, Office of the Manager, NCS Instruction 205-1 (NCSI 205-1), "Reporting of Significant Telecommunication Research and Development Activities of the NCS Operating Agencies," March 29, 1976.</p> <p>78 Office of Telecommunications Policy, "Ad Hoc Review Group for Organization for Telecommunications within the Executive Branch," February 9, 1976, prepared by Charles C. Joyce, Jr., p. 35.</p> <p>79 Ibid.</p> <p>80 The White House, E.O. 12046, "Relating to the Transfer of Telecommunications Functions," March 27, 1978.</p> <p>81 Ibid.</p> <p>82 Memorandum, National Security Council (Zbigniew Brzezinski) to Secretary of Defense, "Telecommunications and C3I Policy Issues," August 10, 1979.</p> <p>83 Memorandum of Understanding Between the National Security Council, the Office of Science and Technology Policy, and the Executive Agent, National Communications System, June 5, 1978. See also, The White House, Memorandum for Heads of Departments, Agencies, etc., "National Security and Emergency Preparedness Telecommunications Management and Coordination Responsibilities," July 5, 1978.</p> <p>84 Presidential Directive 53 (PD-53), "National Security Telecommunications Policy," November 15, 1979.</p> <p>85 Ibid.</p> <p>86 President Carter's National Security Advisor, Zbigniew Brzezinski, was particularly anxious that the NCS assume the Federal coordinating role for providing emergency communications. The national-level plans for providing telecommunications resource management and telecommunications support in emergency situations, which were being prepared by the NCS, said Brzezinski, "will continue as the formal</p> | <p>U.S. Government documents applicable to all Federal Departments and Agencies. The Executive Agent, NCS, is hereby tasked as the coordinating authority for the National Security Council in these functional (emergency communications) areas." See White House Memorandum to Heads of Departments, July 5, 1978.</p> <p>87 Department of Defense Memorandum to National Security Council, July 1980.</p> <p>88 Ibid.</p> <p>89 Memorandum, Joseph Rose, Deputy Manager, NCS, to General Jacobsmeyer, "National Security Council Tasking to Assess Commercial Common Carrier Vulnerability and to Develop Possible Guidance to Commercial Common Carriers and Government Agencies," September 25, 1980.</p> <p>90 The term, "National Security and Emergency Preparedness Telecommunications," was first used in a memorandum from the White House in July 1978. See White House to Executive Offices, "National Security and Emergency Preparedness Telecommunications Management and Coordination Responsibilities," July 5, 1978.</p> <p>91 The EMPB was established by memorandum in December 1981. National Security Decision Directive 47 (NSDD-47), "Emergency Mobilization Preparedness," July 22, 1982, defined preparedness policy and further identified the role of the EMPB. In reference to communications, NSDD-47 stated that it is "the policy of the United States to ensure that communications resources be available and adequate to respond to the Nation's needs."</p> <p>92 The White House, National Security Decision Directive 97 (NSDD-97), "National Security Telecommunications Policy," August 3, 1983.</p> <p>93 The White House, Memorandum for the Chairman, FCC, et al., "The National Communications System," October 7, 1983. A 23rd member, the Department of Health and Human Services, was added in 1987.</p> <p>94 The White House, E.O. 12382, "President's National Security Telecommunications Advisory Committee," September 13, 1982. A forerunner of NSTAC was the short-lived National Security Council Advisory Board, formed in July 1981, and consisting of top executives from the common carriers. See National Security Council Memorandum, July 23, 1981.</p> <p>95 National Communications System, "Highlights of Manager/Representatives Meeting, 20 December 1971," and "Manager, NCS/NCS Agency Principals Meeting, 28 January 1972," February 7, 1972.</p> |
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- 96 National Communications System, *Organization and Functions Manual*, Office of the Manager, NCS, August 1978.
- 97 National Communications System, "NCS Organization and Functions," June 1982.
- 98 As indicated previously, the concept of Major and Minor Operating Agencies was introduced in the First Annual Long-Range Concept Plan published in 1964. In 1978, the designations "major" and "minor" were discontinued in favor of a single list.
- 99 In early 1981, the newly designated NCS Manager, LTG William J. Hilsman, actively sought National Security Council support in reaffirming the NCS lead role as the Government coordinator of NS/EP telecommunications plans and programs. This role, first enunciated during the Carter Administration, came under increasing pressure from other agencies and departments who felt that the NCS was reaching beyond its authority. The issue would not be finally resolved until the reorganization of the NCS in 1984 (E.O. 12472). See Letter, LTG William J. Hilsman to MG Robert Schweitzer, NSC, February 23, 1981, and, The White House, Memorandum for the Secretary of State, "National Communications System," May 19, 1982.
- 100 For a number of years, the NCS had been pressing for a realistic circuit restoration priority (RP) program, one that would provide assurance of the availability of critical circuits in national emergencies. During the 1960s, user agencies were authorized to assign RPs to their circuits, with the provision that the NCS staff would review them, after the fact, for conformance with established criteria. In 1969, the procedures were changed to require NCS review and certification of RP assignments prior to the issuance of certifications to the carriers. This step led to lowering of the number of RP-protected circuits from a high of 37,800 in 1969, to 22,500 in 1970. Yet even this number was too large, leading the Office of Technology Policy and the Executive Agent, in 1974, to direct the Manager of the NCS to review and recommend revision to the current RP system. The result was the establishment, within the Office of the Manager, of the NCS/Circuit Restoration Priority Program and the NCS Data Base Maintenance System. The RP program was designed to ensure that only the most critical circuits would be selected for restoration. The Data Base Maintenance System was designed to provide a file of all Federal Government circuits.

Throughout the 1970s, the NCS Restoration Priority review program continued to lower the percentage of RP circuits, until by 1980, at the close of the Carter Administration, only 10 percent of the Federal Government circuits were designated RP circuits,

down from a high of some 42 percent in 1969. In the meantime, however, the number of Government circuits had grown from approximately 90,000 in 1970, to over 117,000 at the end of 1979.

In October 1980, the FCC adopted FCC Order 80-851, which provided for a uniform system of priorities for the restoration of vital intercity private line services during emergency situation. Nine years later, the FCC issued a second order (Title 47 CFR, Part 64, Appendix A, "Telecommunications Service Priority [TSP] System for National Security Emergency Preparedness, [NSEP])." This revised system mandated by this order was subsequently implemented within the NCS by the NCS Directive 3-1, July 5, 1990. This directive is currently in effect.

- 101 National Security Decision Directive 97, August 3, 1983, superseded Presidential Directive/NSC-53 of November 15, 1979.
- 102 The White House, E.O. 12472, "Assignment of National Security and Emergency Preparedness Telecommunications Functions," April 3, 1984.
- 103 *Ibid.*, Section 4, paragraph (b)(2).
- 104 National Communications System, "Organization and Functions," June 1982.
- 105 National Security Decision Directive 201 (NSDD-201), "National Security Emergency Preparedness (NS/EP) Telecommunications Funding," December 17, 1985.
- 106 The CNS and CSI issues evolved from the NSTAC's initial focus on Telecommunications Systems Survivability that began in December 1982.
- 107 National Communications System, *NCS FY 1988 Annual Report*, pp. 19-23.
- 108 Cohen, Michael L., "Government Communications in the Nuclear Age: Attempts to Develop a Nationwide Emergency Telecommunications Service," April 25, 1991. This unpublished manuscript traces the evolution of and need for a national emergency communications system during and after the Cold War, and presents some of the possible reasons why, after 30 years, the system first proposed by President Kennedy in 1963, has yet to be realized.
- 109 *Ibid.*, pp. 53-57.
- 110 Subcommittee Report to the NCS Committee of Principals, "Review of the National Level NS/EP Telecommunications Program," May 29, 1990. See also Cohen, "Government Communications," pp. 80-86.
- 111 Panel of Experts Report to the Manager, NCS, "National Level NS/EP Telecommunications Program

(NLP) Review," October 1991, pp. 48-53.

- 112 National Communications, *FY 1992 NCS Annual Report*, November 1992, pp. 2-15 to 2-21.
- 113 The White House, Memorandum for Executive Agent, NCS, "National Level Telecommunications Program Implementation and Functional Requirements," October 15, 1991.
- 114 National Security Directive 56 (NSD-56), April 1991.
- 115 E.O. 12382, September 13, 1982.
- 116 Letter, Ronald Reagan to Rand V. Araskog, February 21, 1984.
- 117 "Evolution of the National Coordinating Center," *NS/EP Telecom News*, Vol. 3, No. 6, June 1992.
- 118 Ibid.
- 119 NSTAC, *Issue Review*, December 1997, pp. 37-39.
- 120 The CSI Program Office investigated satellite technologies, such as Ku-band, and enhanced capabilities, such as connecting to local exchange carriers' switches and providing PSN remote access to NS/EP users, as part of the CSI architecture development effort. The projected CSI Phase II architecture implementation date was in FY 96, but due to budgetary constraints, the CSI program was terminated in September 1994.
- 121 The CNS Program Office worked with other NLP elements to ensure interoperability of CNS network enhancements with other NLP component programs, such as CSI and GETS. In September 1994, the CNS program was terminated due to budget constraints.
- 122 Rand V. Araskog to the President, August 19, 1983; Ronald Reagan to Rand V. Araskog, February 21, 1984.
- 123 "TSP Program Launched," *NS/EP Telecom News*, Vol. 2, No. 2, October 1990, and NSTAC *Issue Review*, December 1997, p. 32.
- 124 In 1993, the TSP Oversight Committee contributed to developing a training program to educate State government and telecommunications industry personnel about the Federal Response Plan and the TSP System. From 1994 through 1997, Oversight Committee members provided invaluable assistance and support to the OMNCS in its effort to further a nationwide CPAS program. In 1994, the committee developed automated procedures for TSP System users and addressed the issue of cellular priority access for NS/EP users. In 1995, many committee members were active in providing assistance and advice to the Federal Government to achieve a nationwide CPAS capability in support of NS/EP

telecommunications. In 1996, TSP Oversight Committee members reviewed the committee's charter and bylaws to determine the modifications necessary to include CPAS system oversight and addressed the complex issues of prioritizing access to wireless services for NS/EP users. In 1997, committee members were involved in improvements in TSP administrative efficiency, monitoring the development of the TSP client-server system and home page, analyzing the impact of the Telecommunications Act of 1996 on the TSP System, and reviewing the proposed CPAS Manual.

- 125 *FY 1988 Annual Report*, pp. 16-17 and *FY 1991 Annual Report*, p. 2-9.
- 126 NS/EP functional requirements that AIN capabilities must meet include intra/interagency emergency operations, voiceband service, interoperability, survivability/endurability, nationwide coverage, and international interface.
- 127 By the mid-1990s, the AIN program had become widely focused, encompassing research and development and implementation programs for AIN-based technologies. The AIN Program Office defines, develops, and demonstrates AIN NS/EP applications to ensure that NS/EP requirements influence evolving AIN technology. The AIN Program Office also assesses AIN architectures, standards, and implementation procedures to facilitate their integration into Government initiatives. After successful proof-of-concept demonstrations, preliminary services can be introduced into appropriate NS/EP initiatives. The GETS program, for example, coordinated the deployment of AIN-based alternate carrier routing to support local exchange carrier enhanced routing. The AIN Program Office will continue to assess next-generation AIN standards for development, demonstration, and eventual implementation as NS/EP telecommunications enhancements.
- 128 NSTAC, *Issue Review*, December 1997, pp.15-18.
- 129 The W/LBRDS Task Force concluded that no Government organization existed for defining NS/EP requirements for wireless digital communications, and that there were compatibility problems between certain existing and developing voice/data devices and the emerging digital wireless network. Accordingly, the Government tasked the OMNCS Wireless Services Program Office with the responsibility for addressing and monitoring wireless digital interface issues.
- 130 At the September 22, 1995, IES meeting, the WSTF was placed on standby status until needed by the Government. At that meeting, the IES also voted to place the CPAS Subgroup under the direction of the NS/EP Group. Since then, the subgroup has assisted

- in developing CPAS forms and a manual for the administration of CPAS. Additionally, the subgroup monitors the development and modification of standards and regulatory issues relevant to CPAS.
- 131 The WSTF published the *Cellular Priority Access Services Subgroup Report* in September 1995 along with the *Emerging Wireless Services Report*.
- 132 In October 1995, the OMNCS submitted a CPAS Petition for Rulemaking to the FCC to authorize the nationwide CPAS capability. In April 1996, the FCC published a CPAS Public Notice, soliciting comments from industry on the CPAS Petition for Rulemaking. As of October 1996, the FCC had received all Comments and Reply Comments on the Public Notice. The OMNCS is currently working on CPAS implementation through four parallel approaches: modifying cellular standards to incorporate CPAS, encouraging the FCC to issue CPAS rules, developing CPAS administrative processes, and stimulating competitive interests of service providers to implement the CPAS capability.
- 133 National Research Council Committee on Review of Switching, Synchronization and Network Control in National Security Telecommunications, *Growing Vulnerability of the Public Switched Networks: Implications for National Security Emergency Preparedness*, Washington: National Academy Press, 1989, p. 88.
- 134 To better reflect evolving technology, the NSTAC began to use the term "public network" or "PN" in 1995 with the publication of *An Assessment of the Risk to the Security of Public Networks*. The PN includes any switching system or voice, data, or video transmission system used to provide communications services to the public (e.g., public switched networks, public data networks, private line services, wireless systems, and signaling networks).
- 135 Executive Office of the President, Office of Science and Technology Policy, *National Plan for Telecommunications Support in Non-Wartime Emergencies*, January, 1992. The National Plan establishes responsibilities, outlines missions, and identifies functions in support of the Federal official exercising the authorities of the "Stamford Act" and E.O. 12472.
- 136 The SHARES High Frequency Radio Program is a key element of the NS/EP infrastructure. Approved by the Executive Office of the President in 1989, SHARES provides the Federal emergency response community with a single interagency emergency message handling system for the transmission of NS/EP information by bringing together existing high-frequency (HF) radio resources of Federal and federally affiliated organizations when normal communications are destroyed or unavailable. Participation in SHARES is open to all Federal departments and agencies and their designated affiliates on a voluntary, non-interfering basis.
- 137 OMNCS, *NTMS Organization & Operations Plan*, September 30, 1995, p.6.
- 138 Director, Office of Science and Technology Policy, memorandum to the Manager, NCS, "National Security and Emergency Preparedness Telecommunications," June 11, 1993.
- 139 *FY 1991 Annual Report*, pp. 2-20 to 2-27.
- 140 J.C.R. Licklider, formerly of the Massachusetts Institute of Technology (MIT) and DARPA, first introduced the idea of an "intergalactic network" in August 1962, a year after the concept of packet switching theory was developed. Leonard Kleinrock, chairman of the computer science department at UCLA, and formerly of MIT, convinced researchers of the theoretical feasibility of communications using packets rather than circuits (the data exchange technology of the Internet. This was the first major step along the path toward computer networking. In 1965, Thomas Marill and Lawrence Roberts connected a TX-2 computer in Massachusetts to a Q-32 in California and created the first wide area computer network. Continuing the research and advancement of the new technology, however, would require extensive cooperation between government and Academia.
- 141 Leiner, Barry M., et al., "A Brief History of the Internet," Uniform Resource Locator: <http://www.isoc.org/internet-history/#Introduction>
- 142 The White House, E.O. 12864, "United States Advisory Council on the National Information Infrastructure," September 15, 1993.
- 143 United States National Information Infrastructure Virtual Library, co-sponsored by the President's Information Infrastructure Task Force and the Council on Competitiveness. This web site is being developed by the Information Technology Laboratory of the National Institute of Standards and Technology. Uniform Resource Locator: <http://nii.nist.gov/>
- 144 With the signing of E.O. 12864 on September 15, 1993, the President established the Advisory Council on the National Information Infrastructure (NII) to advise the Secretary of Commerce on matters related to the development of the NII. In addition, the Council advises the Secretary on a national strategy for promoting the development of the NII. The NII, according to the Executive Order, "shall be the integration of hardware, software, and skills that will make it easy and affordable to connect people with each other," through the use of telecommunications

and information technology, "with computers, and with a vast array of services and information resources." Within the Department of Commerce, the National Telecommunications and Information Administration has been designated to provide secretariat services to the Council.

- 145 E.O. 12472, April 3, 1984.
- 146 The White House, *Creating a Government that Works Better & Costs Less*, Report of the National Performance Review, September 7, 1993.
- 147 Director, OSTP memorandum, "National Security and Emergency Preparedness Telecommunications," June 11, 1993.
- 148 As part of the NCS Vision 21 Total Quality Management Process established by the COP, three focus teams, or task forces, were formed to address 12 issues identified by the COP at their off-site meeting in October 1994. Focus Team 1, named to address NCS Process/Services/Image, concentrated on developing a process for selecting a COP Vice Chair; the team also identified opportunities for presenting NCS-related information to senior Federal Government officials and State and local emergency coordinators. Focus Team 2—Interoperability/Emerging Technology—researched and monitored Federal network security activities, emerging technologies, and satellite services available to the NCS during emergencies. Focus Team 3 concentrated on the National Information Infrastructure, and identified potential Federal, State, and local NS/EP customers of the NII.
- 149 During an off-site meeting in October 1994, the COP developed this vision statement, as documented in the NCS Strategic Plan.
- 150 National Communications System, *Strategic Plan*, January 1996, p. 3
- 151 Ibid., p. 5
- 152 The White House, E.O. 13010, "Critical Infrastructure Protection," July 15, 1996.
- 153 E.O. 13010, Section 7(e).
- 154 Presidential Decision Directive-39 (PDD-39), *U.S. Policy on Counterterrorism*, June 21, 1995.
- 155 *Federal Capability to Respond to the Consequences of an NBC Terrorist Incident*, February 1997.
- 156 The priority treatment enjoyed by GETS users is the result, in part, of the American National Standards Institute's (ANSI) approval and publication, on June 28, 1993, of "Signaling System No. 7 (SS7) High Probability of Completion (HPC) Network Capability" (ANSI T1.631-1993). This standard describes a capability with two key functions: 1) a special indicator with call setup signaling message that the network carries to identify an NS/EP call, and 2) special marking for each setup message by every network exchange. This increases the probability that a message will be transferred to another exchange during congestion in the signaling network. In 1994, the OMNCS further refined priority requirements when it published "High Probability of Completion (HPC) Service Requirements" on July 18.
- 157 FY96 Annual Report of the NCS, p. 3-3.
- 158 Ibid., p. 3-6.
- 159 Ibid.
- 160 OMNCS, *Disaster Area Architecture, Baseline Architecture and Near-Term Enhancement Report*, April 1995.
- 161 The server supporting ERLink is controlled and continuously monitored by the OMNCS and may be accessed and augmented by NS/EP participants. To encourage and promote the ease of using ERLink, the OMNCS server was established as a virtual server accessible to all parties with a role in NS/EP response activities. This architecture enables participants to host and share information without incurring procurement, administration, and maintenance costs. Security is ensured through restricted access and encryption. Access is restricted to those who have a registered ERLink user name and password, and plans are in progress to require a digital certificate to verify user access. Traffic between the ERLink server and user is also encrypted using the Secure Socket Layer protocol, and user groups have different levels of read/write privileges.
- 162 FY96 Annual Report of the NCS, p. 3-9.
- 163 Beginning with the after-action report for Hurricane Andrew in February 1993, industry/Government representatives also produced such reports as the "Northridge Earthquake After-Action Report" in June 1994, and the Joint Government/Industry Emergency Response Planning Report, "A Report on the Joint Industry/Government Capability to Support a Network Security Indications, Warning, and Assessment Mission," in October 1995.
- 164 Bellcore, Local Exchange Carrier Mutual Aid Agreement, March 4, 1995.
- 165 The Agreement can be reviewed online at <http://www.ncs.gov/ncc/Mutual/LEC2.htm>
- 166 Canadian emergency response efforts can be reviewed online at <http://hoshi.cic.sfu.ca/epc/index.html> and at <http://www.ic.gc.ca/>

- 167 Wireless local and wide area networks are practical and evolving support mechanisms for PCS and will provide nationwide data transmission and receipt capabilities to emergency response personnel. The promise of PCS, however, rests in its versatility and digital capability. Laptop computers will soon be able to send or receive information as if over a land line, with superior quality and dependability.
- 168 Copies of Version 2 of the Multimedia Performance Handbook were passed to interested FTSC members for review. As a result, the FTSC's Multimedia Telecommunications Performance Measurements Subcommittee prepared two draft Federal Telecommunications Recommendations: 1) Digital Transport of Video Teleconferencing/Video Telephony Signals – Video Test Scenes for Subjective and Objective Performance Assessment, and 2) Digital Transport of One-Way Video Signals – Parameters for Objective Performance Assessment.
- 169 According to GSA, on August 8, 1996, the Information Technology Management Reform Act of 1996 transferred the responsibility for all telecommunications standards from GSA to the National Institute of Standards and Technology (NIST). According to NIST interpretation, the Technology Transfer and Advancement Act of 1995, Public Law 104-113, precludes Federal standards from adopting industry standards, since the law already mandates that the Federal Government use industry standards. As a result of these positions, the OMNCS in 1997 began publishing Federal Telecommunications Recommendations in the areas where there is no industry working group developing commercial standards.

# ACRONYMS

## ACRONYMS

**A**

|         |                                              |
|---------|----------------------------------------------|
| ACTS    | Advanced Communications Technology Satellite |
| ADP     | Automatic Data Processing                    |
| AIN     | Advanced Intelligent Network                 |
| AIP     | Automated Information Processing             |
| AMSC    | American Mobile Satellite Corporation        |
| ANSI    | American National Standards Institute        |
| ARPA    | Advanced Research Projects Agency            |
| ARPANET | Advanced Research Projects Agency Network    |
| ARRL    | American Radio Relay League                  |
| AT&T    | American Telephone & Telegraph Company       |

**B**

|     |                        |
|-----|------------------------|
| BOB | Bureau of the Budget   |
| BOC | Bell Operating Company |
| BRI | Basic Rate Interface   |

**C**

|        |                                                            |
|--------|------------------------------------------------------------|
| CDRG   | Catastrophic Disaster Response Group                       |
| CEPTAG | Civil Emergency Planning Telecommunications Advisory Group |
| CIA    | Central Intelligence Agency                                |
| CNS    | Commercial Network Survivability                           |
| COMSAT | Communications Satellite Corporation                       |
| CONUS  | Continental United States                                  |
| COP    | Committee of Principals                                    |
| COR    | Council of Representatives                                 |
| CPAS   | Cellular Priority Access Service                           |
| CPS    | Cellular Priority Service                                  |
| CSI    | Commercial SATCOM Interconnectivity                        |
| CSS    | Commercial Satellite Survivability                         |

**D**

|       |                                                 |
|-------|-------------------------------------------------|
| DARPA | Defense Advanced Research Projects Agency       |
| DCA   | Defense Communications Agency                   |
| DCAOC | Defense Communications Agency Operations Center |
| DCL   | Direct Communications Link                      |
| DCS   | Defense Communications System                   |
| DECCO | Defense Commercial Communications Office        |
| DISA  | Defense Information Systems Agency              |
| DOD   | Department of Defense                           |
| DODD  | Department of Defense Directive                 |
| DOE   | Department of Energy                            |
| DOJ   | Department of Justice                           |
| DOS   | Department of State                             |
| DSCS  | Defense Satellite Communications System         |
| DTM   | Director of Telecommunications Management       |

**E**

|        |                                           |
|--------|-------------------------------------------|
| ECC    | Enhanced Call Completion                  |
| ECWG   | Emergency Communications Working Group    |
| EMP    | Electromagnetic Pulse                     |
| EMPB   | Emergency Mobilization Preparedness Board |
| E.O.   | Executive Order                           |
| EOP    | Executive Office of the President         |
| ERFAK  | Emergency Response Fly-Away Kit           |
| ERLink | Emergency Response Link                   |
| ERT    | Emergency Response Training               |
| ESC    | Enhanced Satellite Capability             |
| ESF    | Emergency Support Function                |

**F**

|      |                                                |
|------|------------------------------------------------|
| FAA  | Federal Aviation Agency/Administration         |
| FCC  | Federal Communications Commission              |
| FEMA | Federal Emergency Management Agency            |
| FRP  | Federal Response Plan                          |
| FTS  | Federal Telecommunications System              |
| FTSC | Federal Telecommunications Standards Committee |
| FTSP | Federal Telecommunications Standards Program   |
| FY   | Fiscal Year                                    |

**G**

|      |                                                 |
|------|-------------------------------------------------|
| GAO  | General Accounting Office                       |
| GETS | Government Emergency Telecommunications Service |
| GNSS | Government Network Security Subgroup            |
| GSA  | General Services Administration                 |

**H**

|      |                                     |
|------|-------------------------------------|
| HEMP | High-Altitude Electromagnetic Pulse |
| HF   | High Frequency                      |
| HHS  | Health and Human Services           |
| HPC  | High Probability of Completion      |

**I**

|       |                                                                                |
|-------|--------------------------------------------------------------------------------|
| IA    | Information Assurance                                                          |
| IDT   | International Diplomatic Telecommunications                                    |
| IEC   | Interexchange Carrier                                                          |
| IES   | NSTAC Industry Executive Subcommittee                                          |
| IMA   | Individual Mobilization Augmentee                                              |
| IOC   | Initial Operating Capability                                                   |
| IPTF  | Infrastructure Protection Task Force                                           |
| ISS   | Industry Information Security                                                  |
| IITF  | Information Infrastructure Task Force                                          |
| ITU-T | International Telecommunication Union—Telecommunication Standardization Sector |

**L**

LEC Local Exchange Carrier  
LEO Low Earth Orbit

**M**

MARS Military Affiliate Radio System  
MEO Medium Earth Orbit  
MIT Massachusetts Institute of Technology

**N**

NASA National Aeronautics and Space Administration  
NATO North Atlantic Treaty Organization  
NBC Nuclear, Biological, and Chemical  
NCA National Command Authority  
NCC National Coordinating Center for Telecommunications  
NCM National Coordinating Mechanism  
NCS National Communications System  
NCSD NCS Directive  
NDAA National Defense Authorization Act  
NDAC Network Design and Analysis Center  
NDER National Defense Executive Reserve  
NETS Nationwide Emergency Telecommunications Service  
NII National Information Infrastructure  
NLP National Level Program  
NMCS National Military Command System  
NPR National Performance Review  
NS/EP National Security and Emergency Preparedness  
NSAM National Security Action Memorandum  
NSC National Security Council  
NSD National Security Directive  
NSDD National Security Decision Directive  
NSG National Security Group  
NSIE Network Security Information Exchange  
NSTAC National Security Telecommunications Advisory Committee  
NSTF Network Security Task Force  
NSTIS National Security Telecommunications and Information Systems  
NTCN National Telecommunications Coordinating Network  
NTIA National Telecommunications and Information Administration  
NTMS National Telecommunications Management Structure

**O**

OEP Office of Emergency Preparedness  
OMB Office of Management and Budget  
OMNCS Office of the Manager, National Communications System  
OSTP Office of Science and Technology Policy  
OTP Office of Telecommunications Policy

**P**

PCC-NSTIS Policy Coordinating Committee for National Security Telecommunications and Information Systems  
PCCIP President's Commission on Critical Infrastructure Protection  
PCS Personal Communications Services  
PD Presidential Directive  
PDD Presidential Decision Directive  
PN Public Networks  
PPBS Program Planning Budgeting System  
PSN Public Switched Network

**R**

RP Restoration Priority

**S**

SAPT Special Assistant to the President for Telecommunications  
SATCOM Satellite Communications  
SHARES Shared Resources High Frequency Radio Program  
SIG Service Interagency Group  
SS7 Signaling System 7

**T**

TIM Telecommunications Industry Mobilization  
TSP Telecommunications Service Priority

**U**

UCLA University of California at Los Angeles  
USA United States Army  
USAF United States Air Force  
USN United States Navy

**V**

VTC Video Teleconferencing

**W**

W/LBRDS Wireless/Low-Bit-Rate Digital Services  
WSTF Wireless Services Task Force  
WWMCCS Worldwide Military Command and Control System

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# CHRONOLOGY

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**EISENHOWER ADMINISTRATION (1953-1961)****1959**

*January* Eisenhower Cabinet considers proposal for a Unified Federal Civilian Communications System

**1960**

*May* Defense Communications System (DCS) and Defense Communications Agency (DCA) formed.

*December* Report to President-Elect Kennedy underscores need for better coordination of Federal communications activities.

**KENNEDY ADMINISTRATION (1961-1963)****1961**

*March* The DCA Operations Center (DCAOC) activated. DCA begins exercising supervision and operational control of military long-haul, point-to-point communications.

*March* DCA assumes operations direction of DCS.

**1962**

*February* Position of Director of Telecommunications Management (DTM) established by Executive Order (E.O.) 10995 with mission to coordinate the telecommunications activities of Executive Branch.

*March* LTG Alfred D. Starbird, USA, succeeds to command of DCA.

*June* National Military Command System (NMCS) established by the President in National Security Action Memorandum (NSAM) 166. The Memorandum states that the NMCS "should be recognized as, and designated to be, the basis for...a unified, survivable national communications system."

*October* Cuban Missile Crisis.

*October* The National Security Council (NSC) publishes NSAM-201, *Establishment of Subcommittee on Communications*, October 26, 1962. It established the interdepartmental Subcommittee on Communications, headed by William H. Orrick, Jr., then Deputy Under Secretary of State for Administration, to investigate communications failures during Cuban missile crisis, and to make recommendations to eliminate deficiencies.

**1963**

- February** Federal Telecommunications System (FTS) established.
- July** In response to Orrick Committee recommendations, the NSC issues NSAM-252, July 11, 1963 (CONFIDENTIAL), directing the establishment of the National Communications System (NCS).
- August** President Kennedy publishes unclassified version of NSAM-252 (Presidential Memorandum, August 21, 1963). Designates the DTM as Special Assistant to the President for Telecommunications (SAPT) to advise and assist him with respect to communications requirements and plans for the NCS. Secretary of Defense named the Executive Agent, NCS. The Director, DCA, General Starbird, named Manager, NCS. The purpose of the NCS is to provide the necessary communications for the Federal Government, particularly the President, under all conditions of emergency, including nuclear war.
- August** As a direct result of the Cuban Missile Crisis, the U.S. and the USSR implement a joint Direct Communications Link (DCL) teletype system providing a secure, reliable, and private means of communications between the Heads of State of the two countries. The "Hot Line" remains operational to this date.
- October** The first NCS planning document, the *Near-Term Plan*, published. Inventories potential NCS communications resources.
- October** DoD Directive (DoDD) 5100.41, "Arrangements for the Discharge of Executive Agent Responsibilities for the National Communications System," issued.
- November** President Kennedy assassinated.

**JOHNSON ADMINISTRATION (1963-1969)****1964**

- January** Procedures for processing NCS telecommunications circuit requirements published.
- January** Institutional resistance to NCS surfaces as the General Services Administration (GSA) voices opposition to a "single" NCS under control of Executive Agent (Secretary of Defense).
- August** *First Annual NCS Long-Range Plan* published. Major and Minor Operating Agencies identified. DCS and FTS proposed as the two main components of NCS.
- December** *National Plan for Emergency Preparedness*, published by the Johnson Administration. Repeats call for a "unified governmental communications system, responsive to a single Executive Agent."

**1965**

- October** The *First Annual NCS Long-Range Concept Plan* approved for planning purposes by General James D. O'Connell (Ret.), DTM.

**November** House Holifield (Rep. Chester E. Holifield, D-CA) Committee calls for a greater delegation of powers to DTM to strengthen his role in managing Government telecommunications.

### 1966

**January** Separate NCS organizational unit established by the Director, DCA.

**September** Bureau of the Budget (BOB) asks all NCS operating agencies to submit program and cost information for inclusion in BOB's planning-programming-budget system (PPBS) process.

**October** *Second Annual NCS Long-Range Concept Plan* published. Debate over NCS technical design and management arrangements continues. SAPT directs preparation of *Interim NCS Concept Plan* for the 1970s, separate from the annual planning process.

### 1967

**August** President Johnson appoints task force to study U.S. communications policy. In addition, Johnson tasks BOB to make a thorough study of existing governmental organization in the field of communications and to propose needed modifications.

**November** Lt Gen Richard P. Klocko, USAF, succeeds General Starbird as Director, DCA, and Manager, NCS.

### 1968

**March** *Third Annual NCS Long-Range Concept Plan* forwarded to the White House.

**April** In the face of continued opposition to a unified system, the Manager, NCS, writes to all agencies seeking to balance individual agency prerogatives with requirements for a unified system ordered by the President.

**August** Executive Agent, NCS, forwards 1970s *Interim Concept Plan* to White House without recommendation. Plan calls for an "Integrated Government Communications System." DOD resists and asks for further study.

**November** BOB issues report strongly critical of the Government's management of telecommunications. Urges a reorganized and strengthened NCS.

**December** *Fourth Annual NCS Long-Range Concept Plan* forwarded to the White House. Little progress made toward a final NCS concept plan to be approved by the President. Separate task force formed to prepare *Interim NCS Concept Plan* for the 1970s.

**NIXON ADMINISTRATION (1969-1974)****1969**

- July* General Accounting Office (GAO) issues report critical of NCS. Recommends White House create a new organization with the "stature, authority, and resources sufficient to provide a strong central focal point in telecommunications matters."
- October* President Nixon signs E.O. 11490 clarifying emergency preparedness assignments.
- December* White House study (Flanigan Report) calls for elimination of DTM and establishment of a new independent White House telecommunications office.

**1970**

- February* President's Reorganization Plan No. 1 submitted to Congress. Calls for establishment of the Office of Telecommunications Policy (OTP) and elimination of DTM.
- September* NCS suspends planning until dispute over roles and prerogatives is resolved.
- September* E.O. 11556 promulgated, establishing OTP as an independent office within the Executive Office of the President (EOP). DTM abolished. OTP begins review of the Government's telecommunications policy and resources.
- October* Congress deletes funds for NCS planning studies. Urges Executive Branch to strengthen NCS management structure or "abandon the entire concept."

**1971**

- May* Congress reviews DoD Worldwide Communications Report. Report states that the performance of the DCS fell far short of meeting minimum standards for responsiveness to crisis situations. It concluded that "the heart of the problem is in the management of the communications at all levels..."
- July* NCS submitted *Sixth Annual NCS Long-Range Concept Plan* to White House. (Fifth long-range plan drafted but never published.) In the sixth plan, the NCS proposes a single, unified NCS communications network for the final time.
- September* LtGen Gordon T. Gould, USAF, succeeds General Klocko as Director, DCA, and Manager, NCS.
- December* DoD issues DoDD 5100.30, naming the National Command Authority (NCA) as the primary mission of the Worldwide Military Command and Control System (WWMCCS), and the NMCS as the primary component of WWMCCS in support of the NCA.

**1972**

- April* Executive Agent announces the elimination of a single integrated communications system as a goal of the NCS. To concentrate instead "on the more modest but operationally worthwhile goal of interoperability." Organizationally, the NCS now viewed as a confederation, with emphasis on consensus-building among the representatives of the operating agencies.

*August* NCS assigned responsibility for the development and coordination of Federal telecommunications standards under the Federal Standardization Program administered by the GSA.

*October* First meeting of the Federal Telecommunication Standards Committee.

**1973**

*October* OTP Circular 12 makes major revisions in Government's approach to communications organization and planning. Government communications services divided into general-purpose systems and mission-oriented systems, with DoD as Executive Agent, NCS, lead agency for national security systems, one of the four specialized mission areas identified by OTP. Net effect is to lower the NCS profile and make it one among a group of mission competing for funds.

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**FORD ADMINISTRATION (1974-1977)**

**1974**

*July* LtGen Lee M. Paschall, USAF, succeeds General Gould as Director, DCA, and Manager, NCS.

*July* NCS announces OTP Circular 12 does not alter its responsibilities outlined in Presidential Memorandum of August 21, 1963. Will continue to be responsive to both.

*August* *First NCS Annual Report* published. Published annually thereafter.

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**CARTER ADMINISTRATION (1977-1981)**

**1978**

*January* Intelsat and Molniya satellite links, providing communications backup to the Hot Line, installed and now operational.

*March* E.O. 12046 signed by President Carter. Abolishes OTP and transfers telecommunications functions to NSC, Office of Science and Technology Policy (OSTP), and elsewhere. NSC responsible for the development of policy, plans, programs, and standards for the mobilization and use of the Nation's telecommunications resources during emergencies. OSTP given the task of implementing these functions under policy guidance of the NSC. Renewed emphasis on national security and emergency preparedness (NS/EP) telecommunications as the President's National Security Advisor renews Kennedy's call for "leadership protection" through enhanced command, control, and communications systems.

*June* Memorandum of Understanding between NSC, OSTP, and Executive Agent, NCS, providing new tasking assignments for the NCS. Revitalizes the NCS, making it once again the focal point for emergency telecommunications development in the Federal Government.

- July** U.S. District Court Judge Harold Green assigned Justice Department suit against American Telephone & Telegraph Company (AT&T).
- September** VADM Samuel L. Gravely, USN, succeeds General Paschall as Director, DCA, and Manager, NCS.
- 1979**
- November** Presidential Directive (PD) 53, "National Security Telecommunications Policy," published. Calls for communications facilities adequate "to gather intelligence, conduct diplomacy, command and control our military forces, provide continuity of government, and to reconstitute the political, economic, and social structure of the Nation." Restates policy objectives of the August 21, 1963, Presidential Memorandum, but without end-product (a National Communications System). PD-53 Steering Group set up to implement directive.
- 1980**
- January** The NCS, assisted by the NCS Operating Agencies, prepares a draft *National Security Telecommunications Policy Implementation Concept Plan* for the implementation of PD-53 and briefs it to the Federal agencies serving on the NSC PD-53 Steering Group. Twenty-two PD-53 telecommunications initiatives identified by Steering Group.
- September** LTG William J. Hilsman, USA, succeeds Admiral Gravely as Director, DCA, and Manager, NCS.
- September** AT&T undertakes a survivability study of class 4/5 switches in a nuclear war. AT&T concludes that their survivability is technically feasible and could be of use to support essential Government communications.
- December** PD-53 Steering Group briefed on NCS findings regarding Government reliance on common carriers. NCS study confirms the Government's overwhelming reliance on common and specialized carriers and the vulnerability of these carriers to a variety of disruptions. Steering Group proposes a set of initiatives (known as the PD-53 initiatives) which became the building blocks of the NCS communications enhancement programs in the 1980s.

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**REAGAN ADMINISTRATION (1981-1989)**

**1981**

- January** Reagan Administration takes office. Endorses PD-53 objectives and E.O. 12046 reorganizing Federal telecommunications management.
- June** At a Senate hearing, the Manager, NCS, was asked about the issue of national security dependence on the Nation's Automated Information Processing (AIP) resources. NCS initiates development of the NS/EP AIP issue.
- July** Office of the Manager, NCS (OMNCS) launches major study of PD-53 initiatives.
- November** Drawing on the AT&T study showing the feasibility of building an emergency communications service around surviving class 4/5 switches, the NCS launches a follow-on

network engineering study to define routing through the Public Switched Network (PSN). By August 1981, the NCS study had evolved into the Nationwide Emergency Telecommunications Service (NETS) Program.

**December**

Emergency Mobilization Preparedness Board (EMPB) established by Presidential Memorandum, with the Emergency Communications Working Group (ECWG) as one of 12 EMPB working groups. The ECWG chaired by the Manager, NCS, with the Administrator, National Telecommunications and Information Agency (NTIA), as vice chair.

**1982**

**January**

On January 8, the Department of Justice (DOJ) and AT&T announce agreement to break up AT&T (the Modification of Final Judgment). On the day following, the DCA/NCS begin preparing for AT&T divestiture.

**March**

Manager, NCS, identifies the National Coordinating Mechanism (NCM), AIP, and Commercial Satellite Survivability (CSS) issues as candidates for joint Government-industry study.

**March**

Manager, NCS, testifies before the House Telecommunications Subcommittee reaffirming "our previously expressed view that legislation is necessary to assure that our telecommunications industry, in concert with the government, can meet all urgent national requirements..."

**June**

The PD-53 Steering Committee appoints a PD-53 Working Group with the chair from OSTP and vice chair from the NCS.

**July**

The President approves National Security Decision Directive 47 (NSDD-47) (*Emergency Mobilization Preparedness*, July 22, 1982). In NSDD-47, the President states that it is "the policy of the United States to ensure that communications resources be available and adequate to respond to the Nation's needs," and directs the EMPB to prepare a Plan of Action to implement NSDD-47.

**September**

National Security Telecommunications Advisory Committee (NSTAC) established by E.O. 12382 providing a legal framework for industry/Government joint planning to respond to the emergency telecommunications needs of the Federal Government. NSTAC is the result of the breakup of AT&T. Prior to January 1982, AT&T supplied the Government's emergency telecommunications needs.

**November**

First *NETS Program Plan* issued on November 30, 1982, projecting an initial operating capability (IOC) for July 1987.

**December**

NSTAC I meets and approves three issues for study: NCM, CSS, and API.

**December**

Contract issued through the Defense Commercial Communications Office (DECCO) to implement the NCS-proposed AUTOVON/FTS interconnect initiative with an IOC date of September 1983.

**1983**

- February** The NSTAC recommends to the President that a National Coordinating Center (NCC) for Telecommunications be established as the operational arm of this new industry-Government communications committee.
- March** EMPB Plan of Action approved by the President. Contains 32 ECWG milestones or tasks, providing for an enhanced emergency communications capability. Milestones are to be the responsibility of various departments and agencies.
- July** NSTAC II meets and formally recommends the establishment of the NCC as a mechanism for coordinating industry and Government responses to NS/EP telecommunications requirements. The NSDD-97 Steering Group enlarges the membership of the NCS to include 22 Federal departments and agencies. The NCS assumes the functions of the ECWG.
- August** NCS updates national security telecommunications policy (NSDD-97, *National Security Telecommunications Policy*, August 3, 1983), replacing PD-53. The goal of the NCS is to assure a survivable telecommunications infrastructure, rather than a discrete communications system as originally envisioned in the 1960s. Gives NCS enlarged coordination and planning role. ECWG responsibilities assumed by the NCS.
- September** LtGen Winston D. Powers, USAF, succeeds General Hilsman as Director, DCA, and Manager, NCS.

**1984**

- January** Court-ordered divestiture of the Bell System implemented.
- January** Interim NCC activated at the NCS, Arlington, Virginia. This joint industry-Government operation created to assist in the initiation, coordination, restoration, and reconstitution of NS/EP telecommunications. The NCC manned by 11 telecommunications industry representatives, including the U.S. Telephone Association, together with representatives from NCS member agencies.
- February** President approves NSTAC-recommended projects. Presses for establishment of a permanent NCC.
- April** NSTAC III meets on April 3 and recommends approval at the National Coordinating Mechanism Implementation Plan and a new CSS Program.
- April** Management of Federal emergency telecommunications resources reorganized under E.O. 12472, "Assignment of National Security and Emergency Preparedness Telecommunications Functions." The Presidential Memorandum of August 1963 superseded. The Committee of Principals (COP) now a formal part of the NCS organization, along with the Executive Agent and the Manager, NCS. NCS emerges with enlarged powers and responsibilities to coordinate the establishment of an NS/EP telecommunications capability.
- September** NSDD-145, "National Policy on Telecommunications and Automated Information Systems Security," promulgated.

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>October</i>   | DCA awards contract to ITT World Communications to establish a facsimile circuit over the Intelsat international satellite system.                                                                                                                                                                                                                                                                                                                                                                                            |
| <i>December</i>  | President approved NSTAC III recommendations, including the National Coordinating Mechanism Plan, except for the General Forum. NSTAC IV convenes. Two new issues adopted: Telecommunications Service Priority (TSP) and Telecommunications Industry Mobilization (TIM). NSTAC recommends industry play a larger role in NS/EP telecommunications planning and that the Government establish a focal point for AIP planning. Government-industry cooperation in the emergency telecommunications field now on strong footing. |
| <b>1985</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <i>January</i>   | Permanent Computer II NS/EP waiver granted to Bell Operating Companies (BOCs) and AT&T, making these two organizations the exclusive points of contact, during emergencies, for 21 designated Federal systems. This decision is, in effect, a return to predivestiture arrangements in which AT&T Long Lines was solely responsible for providing communications to the Government in emergencies.                                                                                                                            |
| <i>January</i>   | House of Representatives' Bill H.R. 642 introduced. Calls for establishment of OTP in EOP, similar to the one established in the early 1970s. Not passed.                                                                                                                                                                                                                                                                                                                                                                     |
| <i>March</i>     | NCC Staff moves into permanent quarters at the NCS, Arlington, Virginia.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>June</i>      | "National Security Emergency Preparedness Telecommunications Procedures" issued by NCS pursuant to E.O. 12472.                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>July</i>      | DCA Instruction 310-135-1, "National Security Emergency Preparedness Telecommunications Procedures," was issued in support of DCA/NCS policy "that all commercially provided NS/EP telecommunications service requirements processed through DCA...comply with the procedures prescribed in this instruction."                                                                                                                                                                                                                |
| <i>September</i> | NSDD-188 establishes a new National Security and Emergency Preparedness Service Interagency Group (SIG) to oversee all Federal Government NS/EP activities, including emergency communications.                                                                                                                                                                                                                                                                                                                               |
| <i>October</i>   | In response to NSTAC IV recommendations, the President directs NCS to increase industry participation in NS/EP planning and to form a Government focal point for information on AIP survivability.                                                                                                                                                                                                                                                                                                                            |
| <i>October</i>   | NSTAC V meeting. Over past three years NSTAC has worked ten major issues, and made recommendations in six: NCM, CSS, AIP, International Diplomatic Telecommunications (IDT), Commercial Network Survivability (CNS), and Electromagnetic Pulse (EMP). The President has directed the Executive Agent to pursue four of those six: i.e., NCM, CSS, EMP, and AIP.                                                                                                                                                               |
| <i>November</i>  | A joint industry-Government TIM Group established, with representatives from NSTAC and NCS member agencies. Purpose: to assist the Government in assessing the telecommunications industry mobilization capabilities.                                                                                                                                                                                                                                                                                                         |

**December** President signs NSDD-201, "NS/EP Telecommunications Funding," setting forth Government policy on funding NS/EP improvements. Development costs funded by Executive Agent, NCS. Implementation and recurring costs to be shared among NCS member agencies.

### **1986**

**May** NSTAC VI meeting. Industry's TSP Task Force continues to assist Government in the development of the TSP System concept, which has been submitted to the Federal Communications Commission (FCC) for its action. A new Joint industry/Government TIM Group formed. NSTAC agrees to assist Government in implementing Industry Information Security (ISS) measures.

**June** President Reagan informs Congress that the United States is strengthening the command and control network as the result of deploying Defense Satellite Communications System (DSCS) III.

**August** In response to the COP's concerns over rising NETS costs, the Office of Management and Budget (OMB) asks NCS to conduct a comprehensive program review of NETS. The National Research Council of the National Academy of Sciences selected to conduct review.

**August** EOP approves the first National Level NS/EP Telecommunications Program (NLP) consisting of three elements: NETS, CNS, and Commercial SATCOM Interconnectivity (CSI).

**October** EOP approves the NCS "NS/EP Telecommunications Planning Process" report, prepared in support of E.O 12472.

### **1987**

**February** NSTAC VII meeting. NSTAC recommends that the Government's mobilization management structure be updated and that steps be taken to mitigate the potential loss of foreign-sourced semiconductors.

**February** House of Representatives' Committee on Government Operations requests GAO to "undertake a comprehensive review into all aspects of the NS/EP telecommunications program."

**April** GAO report, "Interoperability Among C3 Systems," lists three major causes for interoperability problems: 1) DOD's decentralized management structure; 2) lack of clearly defined joint requirements; 3) absence of an effectual central enforcement authority.

**May** LTG John T. Myers, USA, succeeds General Powers as Director, DCA, and Manager, NCS.

**May** Department of Health and Human Services (HHS) becomes 23rd member of the NCS COP.

**August** National Research Council concludes that the NETS Program is on the right path for providing a technically viable NS/EP telecommunications capability.

**October** In a letter to NSTAC, the President praises NSTAC's sustained record of accomplishments. Assigns high priority to the TSP System as well as to making improvements in the NTMS. President announces measures regarding dependence on foreign-sourced semiconductors.

and directs the Department of Energy (DOE) to work closely with NSTAC regarding survivability of electric power sources.

**November**

NSTAC VIII meeting at Kennedy Space Center, Florida. NSTAC recommends that: (1) the NCS in, conjunction with industry, monitor the potential effects of mobilization on telecommunications industry personnel; (2) a mechanism be established to assess dependence on foreign sources; and (3) the President approve the NTMS implementation concept.

**1988**

**March**

NCC participates in its first nationwide exercise of single sideband voice radio communications.

**May**

NCC conducts high-frequency radio teletype tests with the North Atlantic Treaty Organization (NATO).

**July**

In response to NSTAC VIII, the President approves the NTMS implementation concept and agrees that the Government and industry should continue monitoring potential effects of personnel call-ups. Also directs establishment of a mechanism to monitor effects of off-shore dependence for identified Government needs. Reminds NSTAC that TSP remains the number one priority.

**August**

NCS celebrates its 25th anniversary. A fully defined and implemented NS/EP telecommunications capability yet to be realized.

**September**

NSTAC IX held in Washington, D.C. As a consequence of its IIS investigation, NSTAC recommends Government actions for major enhancements to telecommunications protection. NSTAC also recommends continued industry/Government work on TSS and TIM.

**November**

FCC issues order establishing the TSP System, providing the regulatory, administrative, and operational framework for authorizing priority treatment for NS/EP telecommunications services, including procedures for restoration and provisioning. The TSP System achieved initial IOC on September 10, 1990.

**November**

E.O. 12656, "Assignment of Emergency Preparedness Responsibilities," signed by the President. The order refers to E.O. 12472 for guidance relative to NS/EP telecommunications functions. Each Government department and agency to work within the framework established by E.O. 12472 to ensure adequate NS/EP telecommunications support.

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**BUSH ADMINISTRATION (1989-1993)**

**1989**

**January**

The President's National Security Advisor reminds the DoD community of the continuing need for an interoperable and survivable national telecommunications infrastructure, and directs the community to coordinate major telecommunications plans, programs, and system architecture with OMNCS.

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>April</b>    | National Security Directive (NSD) 10, <i>National Security Telecommunications and Information System Policy Coordinating Committee (PCC)</i> , issued. The PCC replaces the NSDD-97 Steering Group, previously responsible for oversight of national security telecommunications policy implementation.                                                                                                                                                      |
| <b>June</b>     | NSTAC X meeting held in Washington, D.C. As a consequence of its extensive TIM study, NSTAC recommends Government actions regarding telecommunications service surge requirements, dependence on other infrastructure systems, and jurisdictional issues, as well as establishment of a national level mobilization management policy and plan. NSTAC also recommends Government action regarding energy, and endorses continuing NSTAC work on TSP and CSS. |
| <b>December</b> | FCC approves the NCS TSP implementation procedures.                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>1990</b>     |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>January</b>  | By the early 1990s, the NCC is coordinating the restoration and provisioning of NS/EP telecommunications services in natural disasters and armed conflicts, including Hurricane Hugo in 1988, the Loma Prieta earthquake in California in 1989, Hurricanes Andrew and Iniki in 1992, and Operations Desert Shield and Desert Storm in 1990-1991.                                                                                                             |
| <b>January</b>  | Manager, NCS, the COP, and senior members of the OMNCS hold an offsite meeting to launch NCS Vision 21. Vision 21 is a total quality management program, which seeks to identify and define a range of problems and opportunities before the NCS. Vision, purpose, mission, and goals of the NCS studied, with a target date for achieving these objectives set for January 1, 2001.                                                                         |
| <b>March</b>    | Special COP Subcommittee formed to review the NLP, particularly NETS. Examines threat, user requirements, program risks, technology alternatives, costs. As a result of this study, the COP declines to recommend approval of the FY92 NLP.                                                                                                                                                                                                                  |
| <b>March</b>    | NSTAC XI meeting held in Washington, D.C. Recommends that the conclusions of the CSS Task Force be approved for action, and that the Government develop a program to assign electric power restoration priorities and to fund studies to determine feasibility of developing cost-effective back-up power systems.                                                                                                                                           |
| <b>April</b>    | Chairman, Policy Coordinating Committee for National Security Telecommunications and Information System (PCC-NSTIS) directs Manager, NCS, to ensure coordination of Government and industry efforts regarding protecting the PSN from computer intruders. OMNCS designated as Government focal point. Manager, NCS prepares action plan. Government Network Security Subgroup (GNSS) and NSTAC Network Security Task Force formed to study network security. |
| <b>May</b>      | Second offsite NCS Vision 21 meeting.                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>June</b>     | LTG Thurman D. Rodgers, USA, succeeds General Myers as Director, DCA, and Manager, NCS.                                                                                                                                                                                                                                                                                                                                                                      |
| <b>July</b>     | White House tasks Manager, NCS, to implement the recommendations of the Joint TIM Group. In response, the Manager developed an implementation plan.                                                                                                                                                                                                                                                                                                          |

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>September</i> | TSP System becomes operational. Replaces existing restoration priority (RP) system. Called into use for Operation Desert Shield.                                                                                                                                                                                                                                                                                                     |
| <i>October</i>   | First NTMS Operating Center becomes operational.                                                                                                                                                                                                                                                                                                                                                                                     |
| <i>December</i>  | NSTAC XII held in Washington, D.C. Committee briefed on NCC support of Operation Desert Shield, noting that IOC had been achieved for the TSP System. NSTAC recommends Government continue to support the TSP System. In addition, NSTAC continues work on intelligent networks and network security.                                                                                                                                |
| <b>1991</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <i>March</i>     | NETS IOC date delayed for two years. Panel of experts appointed to again review the NETS Program.                                                                                                                                                                                                                                                                                                                                    |
| <i>June</i>      | Name of DCA officially changed to Defense Information Systems Agency (DISA).                                                                                                                                                                                                                                                                                                                                                         |
| <i>July</i>      | LTG Alonzo E. Short, Jr., USA, succeeds General Rodgers as Director, DISA, and Manager, NCS.                                                                                                                                                                                                                                                                                                                                         |
| <i>September</i> | Third offsite Vision 21 meeting held to reevaluate and consider the future direction of the Vision 21 process.                                                                                                                                                                                                                                                                                                                       |
| <i>September</i> | Advanced Intelligent Network (AIN) Program Office established in OMNCS to study and influence the direction of intelligent networks technology research. Among the topics of interest were AIN and Personal Communications Services (PCS) technologies, AIN and multimedia communications, and international AIN technology developments.                                                                                            |
| <i>October</i>   | Panel of experts recommends that NETS be replaced by a PSN-based technical approach that would take maximum advantage of commercial off-the-shelf capabilities at substantial cost savings.                                                                                                                                                                                                                                          |
| <i>October</i>   | White House memorandum identifies six basic functional requirements for NS/EP telecommunications; voice-band service in support of Presidential communications; interoperability with selected Government and commercial systems; survivability in order to provide interconnection with surviving users; international interface; nationwide coverage; intra/interagency emergency operations.                                      |
| <i>October</i>   | NSTAC XIII held in Washington, D.C. NSTAC heard reports from four investigations: Network Security, Enhanced Call Completion (ECC), Wireless Digital Services, and Intelligent Networks. NSTAC recommends that the Government establish a focal point to monitor wireless digital interface issues and that Government establish an Intelligent Networks Program Office. NSTAC also directed establishment of new energy task force. |
| <i>November</i>  | Government wireless services focal point established in the OMNCS.                                                                                                                                                                                                                                                                                                                                                                   |

**1992**

- January* A modified technical and acquisition approach was developed and incorporated into a new NLP program called Government Emergency Telecommunications Service (GETS), replacing NETS. Objective of GETS: to provide authorized Government users with a nationwide NS/EP switched-voice and low-speed data communications service by utilizing the surviving PSN resources.
- February* In the wake of several major telephone outages, the Network Reliability Council (NRC) is established.
- April* FEMA publishes the Federal Response Plan, which provides for a coordinated disaster response effort.
- May* EOP approves NCS Directive (NCSD) 3-1, "Establishment of the National Telecommunications Management Structure (NTMS)."
- July* President approves NSTAC XIII recommendations on intelligent networks and digital wireless communications.
- July* NSTAC XIV held in Washington, D.C. NSTAC celebrates its tenth anniversary, receiving commendation from the President, the National Security Advisor, and the Manager, NCS, for its continuing contributions to the Nation's NS/EP telecommunications policies and programs.

**CLINTON ADMINISTRATION (1993- )****1993**

- January* COP approves the NCS Vision 21 charter.
- April* The President approved NSTAC XIV recommendations regarding network security and enhanced call completion, asking the telecommunications industry to continue its efforts to identify and implement network security standards initiatives. In regard to enhanced call completion, the Manager, NCS, was directed to take steps to improve call completion rates during periods of stress and congestion.
- April* All six NTMS teams activated.
- May* NSTAC XV held in Washington, D.C. NSTAC recommended continued Government support of DOE's Telecommunications Electric Service Priority initiative and increased emphasis on survivability of electric power through the President's National Energy Strategy. NSTAC also recommended changes in computer crime legislation that could directly enhance the security of the Nation's telecommunications infrastructure.
- June* The Director, Office of Science and Technology Policy, John Gibbons issues a memorandum instructing the Manager, NCS, to take steps necessary to ensure a flexible, integrated response capability to manage the Nation's telecommunications assets "across the full

spectrum of domestic and national security emergencies." This effectively paved the way for an expansion of the NCS mission to encompass emergency telecommunications response following natural and manmade disasters and emergencies

**September**

E.O. 12864, United States Advisory Council on the National Information Infrastructure (NII) is signed. The Council was created to provide a coordinating mechanism to advise the Federal Government on a national strategy to foster further development of NII capabilities and applications.

**1994**

**April**

The Manager, NCS, established the Office of Strategic Planning to assist in developing strategies that focus NCS efforts on projects that contribute to the successful accomplishment of the NCS mission. The Office of Strategic Planning also supports NII initiative task forces and working groups.

**July**

Lt. Gen. Albert J. Edmonds, USAF, succeeds General Short as Director, DISA, and Manager, NCS.

**September**

The Manager, NCS, approves an information resources security plan to encourage sharing of compatible security solutions and to reduce the total security costs to the Federal Government.

**October**

President Clinton signs the Communications Assistance for Law Enforcement Act (CALEA) (Public Law 103-414, 47 U.S.C. 1001-1010), which seeks to ensure that telecommunications carriers will have the necessary technical ability to fulfill their statutory obligation to accommodate requests for assistance.

**October**

The NCS Committee of Principals endorses a vision statement for the NCS, stating that it should "*lead the planning, coordination, and integration of government telecommunications capabilities to ensure access to, and use of, critical information services required for effective response in an all-hazards environment.*"

**1995**

**March**

Bellcore's *Local Exchange Carrier Mutual Aid Agreement* delineates procedures for requesting and providing supplies, equipment, vehicles, network capacity, personnel, and billing.

**June**

President Clinton signs PDD-39, US Policy on Counterterrorism. NCS assists FEMA in identifying key assets and shortfalls in telecommunications and information technology for emergency response activities.

**October**

GETS reaches Initial Operating Capability.

**October**

The Manager NCS restructures the OMNCS, realigning offices into functional divisions based on complementary programs, services, and activities to improve response to the ever-changing threat to NS/EP telecommunications.

|                         |                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i><b>December</b></i>  | NCC coordinates cross-border assistance from Canada during response efforts following flooding in the Pacific northwest.                                                                                                                                                                                                                                                          |
| <b>1996</b>             |                                                                                                                                                                                                                                                                                                                                                                                   |
| <i><b>January</b></i>   | The NCS Strategic Plan is created and adopted, ensuring the government has the telecommunications capabilities to gain access to and use critical information services in an all-hazards environment. The Strategic Plan defines seven goals that are accompanied by 28 objectives and strategies for the development of the NCS into the next millennium.                        |
| <i><b>January</b></i>   | Deputy Manager, NCS, initiates the National Communications Awareness Partnership (NCAP) to revalidate NS/EP telecommunications requirements, promote the OMNCS programs and services available to NCS member organizations, and increase interagency awareness and coordination among NCS members.                                                                                |
| <i><b>February</b></i>  | The Telecommunications Act of 1996 dramatically changes the ground rules for competition and regulation in virtually all sectors of the communications industry, from local and long-distance telephone services, to cable television, broadcasting, and equipment manufacturing.                                                                                                 |
| <i><b>February</b></i>  | NSTAC XVIII focuses on information assurance, and presentations describe threats to information systems, infrastructure vulnerabilities, and potential consequences of an electronic attack against the Nation's most critical infrastructures. To further discuss and better understand the threats to information systems, a special session of the NSTAC is scheduled for May. |
| <i><b>February</b></i>  | Communications Resource Information Sharing (CRIS) initiative begins. The CRIS Directory lists agency contact numbers and the types of equipment, services, and capabilities that are available. It contains more than 30 different systems from more than 20 resource contributors.                                                                                              |
| <i><b>March</b></i>     | The Emergency Response Fly-Away Kit (ERFAK) enables emergency response personnel to coordinate disaster relief from remote locations.                                                                                                                                                                                                                                             |
| <i><b>May</b></i>       | The NCS and NIST co-sponsor a Federal Wireless Users Forum workshop, to provide an opportunity for potential and current Government wireless users to obtain information on evolving wireless technology, define Government wireless requirements, and interface with industry and Government representatives.                                                                    |
| <i><b>July</b></i>      | The President issues E.O. 13010, Critical Infrastructure Protection, establishing the President's Commission on Critical Infrastructure Protection and the Infrastructure Protection Task Force (IPTF). The NCS becomes an active participant because of its vast experience within the telecommunications and information assurance arenas.                                      |
| <i><b>September</b></i> | The pilot test of the Emergency Response Link (ERLink) begins, with Federal Response Plan departments and agencies and several States participating.                                                                                                                                                                                                                              |

***September***

The NSTAC's Network Security Group sponsors a joint industry and Government R&D exchange that focused on issues of authentication, intrusion detection, and access control. Industry representatives from AT&T, Bellcore, CSC, EDS, ITT, Mitre, UNISYS, and Government representatives from DOE, DARPA, NSA, and NIST shared the latest R&D concepts with an extensive industry and Government audience.

***October***

Officials approve the Telecommunications Industry Association/ Electronics Industry Association Interim Standard 136, the air interface standard that includes Priority Access and Channel Assignment in Time Division Multiple Access systems.

**1997**

***February***

OMNCS conducts its first ERLink exercise with the NCC Blue Emergency Operations Team, focusing on use of ERLink as a new information resource.

***March***

NSTAC XIX approves four recommendations to the President: three address the growing concern for the information-based vulnerabilities of the Nation's electric power infrastructure and its NS/EP implications, and the fourth advises the President to endorse the establishment of an industry-based Information Systems Security Board as a potential mechanism for enhancing the reliability and trustworthiness of the Nation's information products and services.

***March***

The NCS-N5 Information Assurance Branch co-sponsors the Prosperity Game for Infrastructure Surety with DOE, the President's Commission on Critical Infrastructure Protection (PCCIP), and Sandia National Laboratories, to examine threats and vulnerabilities to critical infrastructures and identify possible solutions.

***May***

The NCS and NSA co-sponsor a Federal Wireless Users Forum workshop to address mobile satellite systems, wide area data services, and commercial dispatch services.

***June***

LTG David J. Kelley, USA, succeeds General Edmonds as Director, DISA, and Manager, NCS.

***August***

An NCS study, The Electronic Intrusion Threat to NS/EP Telecommunications, concludes that electronic intrusions can have serious ramifications for both the public network and NS/EP activities that rely on that network.

***December***

NSTAC XX in Washington, DC, marks the 15th anniversary of its founding.

# NATIONAL COMMUNICATIONS SYSTEM LEADERSHIP

## US Presidents

## Executive Agents, NCS

## Managers, NCS

## Deputy Managers, NCS

1960

JOHN F. KENNEDY  
1961-1963

ROBERT S. McNAMARA  
1961-1968

ALFRED D. STARBIRD  
Lieutenant General, USA  
1963-1967

LYNDON B. JOHNSON  
1963-1969

1965

CLIFFORD D. MAY  
1966-1969

RICHARD P. KLOCKO  
Lieutenant General, USAF  
1967-1971

RICHARD M. NIXON  
1969-1974

CLARK M. CLIFFORD  
1968-1969  
MELVIN R. LAIRD  
1969-1973

IRVING R. OBENCHAIN  
Brigadier General, USA  
1969-1970

1970

GORDON T. GOULD, JR.  
Lieutenant General, USAF  
1971-1974

CLIFFORD D. MAY  
1970-1973

GERALD R. FORD  
1974-1977

ELLIOT L. RICHARDSON  
1973-1973  
JAMES R. SCHLESINGER  
1973-1975  
DONALD H. RUMSFELD  
1975-1977  
HAROLD BROWN  
1977-1981

LEE M. PASCHALL  
Lieutenant General, USAF  
1974-1978

JOSEPH ROSE  
1973-1981

1975

JIMMY E. CARTER  
1977-1981

SAMUEL L. GRAVELY, JR.  
Vice Admiral, USN  
1978-1980

1980

RONALD W. REAGAN  
1981-1989

CASPAR W. WEINBERGER  
1981-1987

WILLIAM J. HILSMAN  
Lieutenant General, USA  
1980-1983

JOHN G. GRIMES  
1981-1984

WINSTON D. POWERS  
Lieutenant General, USAF  
1983-1987

1985

BENHAM E. MORRIS  
1984-1994

FRANK C. CARLUCCI III  
1987-1989

JOHN T. MYERS  
Lieutenant General, USA  
1987-1990

1990

GEORGE H.W. BUSH  
1989-1993

RICHARD B. CHENEY  
1989-1993

THURMAN D. RODGERS  
Lieutenant General, USA  
1990-1991

WILLIAM J. CLINTON  
1993-

LES ASPIN  
1993-1994  
WILLIAM J. PERRY  
1994-1997

ALONZO E. SHORT, JR.  
Lieutenant General, USA  
1991-1994

1995

ALBERT J. EDMONDS  
Lieutenant General, USAF  
1994-1997

ROBERT M. MARQUETTE, JR.  
1994-1995

D. DIANE FOUNTAINE  
1995-

WILLIAM S. COHEN  
1997-

DAVID J. KELLEY  
Lieutenant General, USA  
1997-

2000