ROUTING AND RECORD SHEET

SUBJECT: (Optional)

1982 Mitre Report

FROM:	EXTENSION	NO.
Harry E. Fitzwater Deputy Director for Administration 7D 24 Hqs	[redacted]	DDA 83-1433
		DATE: 2 June 1983

STAT

83-1433

TO: (Officer designation, room number, and building)	DATE RECEIVED	DATE FORWARDED	OFFICER'S INITIALS	COMMENTS (Number each comment to show from whom to whom. Draw a line across column after each comment.)
1. Director of Security 4E 60 Hqs				Bill: I wonder if [redacted] is aware of the work Mitre is doing on the "Restricted Access Processor." [redacted] Att
2.				
3.				
4.				
5.				
6.				DD/A REGISTRY FILE: ~~90-8~~ 10-10
7.				
8.				
9.				DDA:HEFitzwater:kmg (2 Jun 83) Distribution: Orig PRS - D/OS w/p. 13 of Subj Report 1 - DDA Subj w/ps. 13, 15 & 16 1 - DDA Chrono 1 - HEF Chrono
10.				
11.				
12.				
13.				(NOTE: Ps. 13, 15 & 16 of Subj Report were sent to D/OC and D/ODP--FYI)
14.				
15.				

STAT

STAT

FORM 1-79 610 USE PREVIOUS EDITIONS

Local-Area Networks

Automated office equipment for word processing, data processing, image distribution, graphics processing, and voice exchange is becoming commonplace. Local-area networks can tie these functions together, providing data, voice, and video communications within and between buildings up to several miles apart. We are working on several local-area networks that can serve specific communications needs and support new automated office systems.

Broadband local-area networks are preferred because of their versatility and capacity for expanded service. We are developing and testing pilot and interim networks at Hanscom and Andrews Air Force Bases. Our work has also involved design and implementation of data communications gateways between these pilot networks and other networks, such as military and commercial telephone systems.

Although most of our work in the networking area is for the Air Force, at MITRE we have one of the largest operating local-area networks in existence – MITRENET. And we are designing two more: one for the Air Staff in the Pentagon, the other for the Canadian House of Commons in Ottawa.

This view of the Tigris-Euphrates valley and the Persian Gulf region was seen from the Space Shuttle orbiter Columbia during its third mission in March 1982. MITRE has supported the National Aeronautics and Space Administration in this program since its beginning, mainly in hardware acquisition, software development, and training for the network control centers.

National Aeronautics and Space Administration

In this time of reduced funding for space programs, NASA needs better, trimmer, data-handling systems for the 1990s. The systems must be flexible enough, and expandable enough, to cope with NASA's workload, while minimizing life-cycle costs.

NASA's data network will be significantly changed by 1985. The Tracking and Data Relay Satellite System (TDRSS) will have replaced most ground tracking stations. We are helping NASA develop long-term control facilities for the new TDRSS network by planning a network control center for operation in the mid- to late 1980s.

Satellite communications and tracking resources must also be made more secure in order to accommodate DOD missions in space. DOD and NASA are coordinating a security upgrade program including ground and spaceborne elements and involving mission planning, scheduling, and control systems. At Goddard Space Flight Center in particular, we are responsible for specifying security improvements. A key contribution is development of the Restricted Access Processor, a computer used to isolate uncleared civilian users from classified information; the concept is largely based on computer security technology developed by MITRE.

With completion of the Shuttle Orbiter test program, NASA, and later DOD, will begin flying operational shuttle missions. Both NASA and DOD missions will be controlled initially by NASA facilities at the Johnson Space Center – with DOD missions under security controls. For the future, however, DOD plans a facility in Colorado Springs. There, the Air Force will plan and control space missions, develop Shuttle software, and train astronauts and flight controllers. Air Force and NASA systems will have sufficient commonality to permit

Washington C^{3}I Operations

xander J. Tachmindji
President and General Manager
ngton C^{3}I Operations

Defense Communications Agency

MITRE continued to support the Defense Communications Agency (DCA) on a wide spectrum of important national command, control, and communications issues in 1982. Activities in the area of strategic C^3 included such programs as continued system engineering of the National Military Command System and of the broader Worldwide Military Command and Control System (WWMCCS). Emphasis was placed on connectivity among command elements and nuclear forces, and on the survivability/endurance needed to provide C^3 continuity during a potentially protracted war. In the theater C^3 area, we focused on command-and-control upgrades for theater nuclear forces, system engineering support to the Pacific and European commands, and support to the Supreme Headquarters Allied Powers Europe as well as the NATO Integrated Communications System Management Agency.

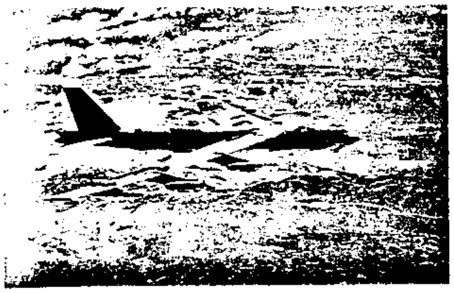
In overall system planning and engineering, our 1982 program included efforts such as development of the WWMCCS Command and Control Summary Plan, planning and architecture development for the Defense Communication System (DCS), and support to the National Communication System (NCS) in the area of emergency communications. Other activities included information and data communications system engineering for the WWMCCS Information System and the Defense Data Network. Following are some highlights of our support to DCA in 1982.

The increased emphasis which the Department of Defense places on command, control, and communications has been reflected in DCA initiatives for fiscal year 1982. As a new initiative, steps were taken to ensure that telecommunications will be available for essential government, civil, and military activities during and after emergencies ranging from earthquakes to nuclear war. We are assisting the Manager of NCS in fulfilling his responsibilities to prepare policy guidance and in developing a plan of action to be followed by federal agencies to achieve essential emergency communications. In addition, we are assisting NCS in formulating national security/emergency preparedness policy, technical, and economic issues which must be resolved by the federal and commercial sectors. In the area of long-range planning, we are assisting with the development of system architectures for NCS which take into account other government initiatives to ensure the continuity of government during emergency situations.

As part of its support to DCA, MITRE recommends improvements in the readiness of strategic systems.

Our support to DCA on the Minimum Essential Emergency Communications Network (MEECN) also continued this past year. This network, which was established to ensure that the National Command Authority would be able to communicate with U.S. strategic forces, relies primarily on communications in very low or low frequencies. Because of their long-range propagation capability, better performance under stress, and ability to penetrate seawater, these systems are the primary means for communicating with nuclear-armed U.S. submarines. We are assisting DCA in tying together the systems which constitute MEECN and also in planning for improvements in the systems which provide connectivity among decision-makers and the sensor systems which provide them information.

In the area of strategic nuclear C^3, we recommended improvements in system "readiness." Of particular interest, we emphasized the importance of operational test and evaluation, and formulated the concept of "functional process testing." Implemented by DCA, functional process



MITRE is assisting DCA in tying together the systems constituting the Minimum Essential Emergency Communications Network, which is to ensure that the National Command Authority could communicate with strategic forces under stress.

tests were conducted during the fiscal year on the warning system and displays that would be used if an attack on the United States should occur. These tests allow us to assess the dependability, strength, and weaknesses of the systems and to recommend possible corrective action.

MITRE continued to support DCA in the role of system engineer for theater nuclear warfare. Focusing on the European theater, we recommended upgrading high-frequency communication networks and taking advantage of emerging technologies in the design of radios to decrease their vulnerability and the possibility of exploitation. Greater use of European defense communications and interoperability with commercial allied communications would also provide increased redundancy, and thus survivability. Aircraft outfitted with radio transponders operating in the ultra-high frequency band could act as backup for communication with nuclear weapon sites. A communication improvement plan has been prepared incorporating some of these concepts.

The Department of Defense terminated development of AUTODIN II in favor of the Defense Data Network as the packet-switching network for DOD's data communications. We took part in the comparative design study, conducted by DCA, that selected the new network, and are now involved in its development as general system engineer. The backbone of the system will consist of one hundred and seventy-one switching nodes located at some eighty-five sites distributed in a highly survivable network, which will feature encryption that separates subscriber traffic according to level of security.

Army

MITRE supports a diverse array of Army activities in various phases of the research, development, test, and evaluation cycle. Our work contributes to a basic understanding of the performance potential of tactical systems in combat. For the Armament Research and Development Command, for example, we are assessing the survivability of artillery systems in combat. This helps the Army in defining the design and operational concepts of a new cannon system at an early stage of its development.

Furthermore, MITRE has established an Intelligence Processing Laboratory to explore advanced techniques for the combination, or "fusion," of intelligence information derived from many different sensors to gain a better understanding of an enemy situation. By use of modeling and computer graphics, we have been able to create a simulated battlefield, where combinations of simulated sensor systems can observe anticipated threats. The resultant data are processed experimentally to locate and identify military units and to produce estimates of the tactical situation on a terrain background.

MITRE provides broad system engineering support to the Center for Systems Engineering and Integration, Communications-Electronics Command (CECOM) and its Director, who also serves as the Army Command and Control System (ACCS) Engineer. We have completed functional analyses for the fire support, intelligence/electronic warfare, air defense, and maneuver control segments, and have prepared a baseline specification describing the system, facilities, and information flows for the fire support segment. In support of CECOM activities to facilitate standardization and interoperability in the NATO area, we have completed a detailed analysis of the tactical C^3 area which led to the identification of several initiatives.

Test and evaluation are critical to achieving interoperability within the Army as well as with other services and other national forces. The CENSEI/MITRE-proposed "New Directions" approach to testing the Joint Interoperability of Tactical Command Control Systems (JINTACCS) has been validated, and the application of this approach has produced important test results in a relatively rapid and resource-economical manner, permitting shortened normal test activities. We also developed a concept for integrating the Army's Post-Deployment Software Support Centers into an internetted testbed to assure that all the Army's automated battlefield systems maintain interoperability throughout their life cycles.

We are helping the Communications and Electronics Command with acquisition of new jam-resistant communications to be used for distribution of data on the battlefield. This program builds on the Position Location and Reporting System, which, when combined with the Joint Tactical Information Distribution System, fosters improved survivability and jam resistance. We participate in technical reviews of prime-contractor activities, assess system performance and technical risk, and are responsible for developing viable system-control concepts to ensure responsiveness to operational needs under battlefield conditions.