AMCPM-SC-7 (25 Jun 73) 1st Ind
SUBJECT: AMC Historical Summary, FY 1973 (RCS-CSHIS-6(R2))

Headquarters, U.S. Army Satellite Communications Agency, Fort Monmouth, New Jersey 07703 — 6 Jul 73

TO: Commander, U.S. Army Materiel Command, ATTN: AMCHO, 5001 Eisenhower Avenue, Alexandria, Va. 22304

Basic correspondence complied with.

FOR THE COMMANDER:

EMIL E. LEVENSKY
LTC, Sig C
Executive Officer

1 Incl
Annual Historical Summary
(dupe)

HL SPACE II (32)

DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY MATERIEL COMMAND
5001 EISENHOWER AVE., ALEXANDRIA, VA. 22304

AMCHO 25 June 1973

SUBJECT: AMC Historical Summary, FY 1973 (RCS-CSHIS-6(R2))

SEE DISTRIBUTION

1. Reference: AMCR 870-1 dated 26 March 1969.

2. The Annual Historical Summary (RCS-CSHIS-6(R2)) for FY 1973, required by paragraph 10, AMCR 870-1, is due 15 August 1973.

a. Each project/product manager reporting directly to Headquarters, AMC, is requested to appoint an historical officer, or confirm the name of the existing officer, and submit in writing the name and telephone extension to the Chief, Historical Office by 10 July 1973.

b. The annual historical summary should be written from the viewpoint of the project/product manager to emphasize overall mission, management, organization, the correlation of functions, resources, and programs. An introductory or summary chapter, or both, should present the manager's assessment of the highlights in policy, organization, resources, programs, and events. Significant organizational changes and major trends and developments should be woven into the story in a manner that will provide a measure of unity to the entire summary. The summary should be clear, concise and complete, with emphasis on the events which have had a major impact on the policy and functions of the organization. It should be supported by such data and references as are necessary to make these events and developments meaningful.

for DALE BIRDSELL
Chief, Historical Office

DISTRIBUTION:
PM, Advanced Attack Helicopter
PM, Chaparral/Vulcan
PM, DCS (Army) Strategic Communications System
PM, Heavy Lift Helicopter
PM, Lance, US Army Missile Command

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SUBJECT: AMC Historical Summary, FY 1973 (RCS-CSHIS-6(R2))

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PM, Mobile Electric Power
PM, SAM-D, US Army Missile Command
PM, Satellite Communications Agency
PM, Surface Container-Supported Distribution System Development
PM, Utility Tactical Transport Aircraft System
PM, XM-1 Tank System

ANNUAL HISTORICAL SUMMARY
(Reports Control Symbol CSHIS-6(R2))

UNITED STATES ARMY
SATELLITE COMMUNICATIONS AGENCY

1 July 1972 - 30 June 1973

HL SPACE II (32)

B A C K G R O U N D

The U.S. Army Satellite Communications (SATCOM) Agency, as Army Project Manager for satellite communications, is responsible for providing the ground environment for the Department of Defense Satellite Communications System. The SATCOM Project Manager also acts as the Army's agent for all international military satellite communications systems such as The United Kingdom "Skynet" and the NATO system, and represents the Army in special DOD non-communications satellite projects, such as the Navigation Satellite Programs. In addition, the SATCOM Project Manager exercises complete life cycle management and support for the tri-service military satellite communications ground environment.

The Agency is an integrated facility performing satellite communications system engineering, research and development, testing and evaluation, and support functions for the Department of the Army under Headquarters, Army Materiel Command. From its headquarters at Fort Monmouth, New Jersey, the Agency also directs the operations of a CONARC field unit while in garrison at Lakehurst (N.J.) Naval Air Station This unit and the training area are used in testing and demonstrating tactical satellite communications equipment.

ANNUAL HISTORICAL SUMMARY 1 July 72-30 Jun 73

Major advances in the Defense Satellite Communications Program, in the development of small tactical satellite communications terminals, in the replacement of the Presidential "hot line" to the Soviet Union by a satellite link, in special user terminals, and in the burgeoning technology for navigation satellite systems marked Fiscal Year 1973 at the Army Satellite Communications Agency.

STRATEGIC SYSTEMS

The first of the new terminals for the second phase of the Defense Satellite Communications System (DSCS), the Heavy Transportable (HT) AN/MSC-60 and the Medium Transportable (MT) AN/MSC-61 successfully completed acceptance tests. The AN/MSC-60 was in operation in support of an Air Force project for five months. The AN/MSC-61 electronic components were then substituted for the electronic components of the AN/MSC-60 and continued this mission. The AN/MSC-60 electronic components are now located at Fort Detrick, Maryland, with the antenna subsystem of the AN/MSC-61 on a training mission until the AN/MSC-60 antenna under construction at Fort Detrick is completed. At that time (1st quarter FY74) the electronic components will be integrated with the AN/MSC-60 antenna and a communications subsystem to complete the East Coast terminal. The AN/MSC-61 antenna will then become a part of the Agency's Engineering Test Facility at Fort Monmouth.

A contract has been awarded for the construction of two terminals at Fort Detrick to provide a satellite trunk to replace the existing

"hot line" between Washington, D.C. and Moscow. This program, called the Direct Communications Link (DCL) will utilize Molniya II satellites on the west to east link and Intelsat IV on the east to west link. Final technical details are still being clarified by additional meetings between the two countries based on the original agreements which resulted from discussions at the early Strategic Arms Limitation Talks (SALT).

First Article Acceptance Testing on communication subsystems at Philco-Ford was completed and production continued on 15 Contingency Communication Subsystems, 8 Nodal Communication Subsystems and 7 Non-Nodal Communication Subsystems. These subsystems are for use with the satellite earth terminals and interface with users of conventional military systems, either directly or through a Defense Communication System Technical Center Facility in the second phase of the Defense Satellite Communications System.

A contract was awarded to Magnavox Research Laboratories for the fabrication of 6 Engineering Development Models of the AN/USC-28, an advanced spread spectrum modulation-demodulation communication equipment for use in the earth terminals for increased anti-jamming protection with the DSCS second phase high power satellites.

These EDM models can provide either a full duplex, highly jam protected Link Order Wire (LOW) at rates up to 5 megahtz per second as the only mode or a LOW plus a digital data channel. Fabrication of certain portions of this equipment has been slowed to permit the achievement of a degree of interoperability with the Navy spread spectrum

equipment MD 904.

A contract was awarded to Linkabit Corporation, San Diego, California, for the development of a hard or soft decision, maximum likelihood decoder for use in the Defense Satellite Communications System to provide improved digital operation.

Acceptance testing proceeded at Radiation Inc., Melbourne, Florida, on the Phase Shift Keying (PSK) Modem and an Interconnect Facility (ICF) Modem. These modems operate at any data rate up to 10 MB/s and interface with the decoders. These modems will be utilized in Stages 1B and 1C of the second phase of the DSCS, to transmit digital traffic. The solid state terminal developed at Radiation was demonstrated at the Armed Forces Communications and Electronics Association (AFCEA) convention. This terminal utilizes microwave integrated components (MIC) to obtain miniaturized up converters, down converters, filters, intermediate radio frequency amplifiers, frequency synthesizers, and low noise receivers.

Raytheon Company was awarded a contract to design, fabricate and test (6) engineering development models of a TDMA (Time Division Multiple Access) subsystem. This equipment development represents the culmination of (5) years of research and development effort, studies, development of experimental equipment, experimental testing and conceptual design. One of the innovative concepts utilized in the TDMA equipment group is that of processor control of the format, operation, and the fault location and isolation procedures to achieve a high degree

of equipment availability, i.e. .9997. Raytheon is currently building an engineering model for design proof testing prior to the fabrication of the (6) EDM models.

Contracts were let for the modification of 14 AN/MSC-46 and 13 AN/TSC-54 terminals to operate with the Phase II satellite in support of the Defense Communication System. The AN/MSC-46 terminals (Hughes Aircraft Corp.) will be modified on site with a minimum interruption of communication time provided by collocated terminals or where required by temporarily deployed AN/TSC-54 terminals. AN/TSC-54 terminals will be modified on a pre-arranged schedule at the contractor's plant (Radiation).

Technical assistance was supplied by in-house engineers and technicians to the tri-service operated terminals for the Defense Satellite Communications System as follows:

a. AN/TSC-54:

DATES	SYSTEM	REASON
6-25 Aug 72	S/N 13 Lexington Blue-Grass Army Depot, Ky	Azimuth bullgear repair
25 Sep-14 Oct 72	S/N Guam	Dual exciter, power monitor installation
16-26 Oct 72	S/N 3 Lincoln, Calif	Dual exciter, power monitor installation
7-17 Nov 72	S/N 10 Norfolk, Va	Dual exciter, power monitor installation
10-24 Nov 72	S/N 8 Guantanamo Bay, Cuba	URC-61 reinstallation
3-10 Jan 73	S/N 3 Lincoln	Servo

DATES	SYSTEM	REASON
3-21 Jan 73	S/N 1 Kaena Pt, Hawaii	Transmitter
5-17 Feb 73	S/N 11 Nakon Phanom, Thailand	Redeployment, installation of special mission equipment and heat exchanger modification
9-13 Feb 73	S/N 7 Shemya, Alaska	Paramp courier, HE mod
14-20 Feb 73	S/N 1 Kaena, Pt	Servo
5-7 Mar 73	S/N 12 Brandywine, Md	HE mod
7-14 Mar 73	S/N 1 Kaena Pt	Transmitter, beam power supply
1-6 Apr 73	S/N 3 Lincoln	URC-61 checkout, URC-61/URC-55 interoperability
12-15 Apr 73	S/N 11 Nakhon Phanom	Courier paramp

b. AN/MSC-46:

16 Jul-7 Aug 72	S/N Clark AFB, P.I.	Predeployment inspection
21-22 Jul 72	S/N 2 Helemano, Hawaii	Interim widespread paramp
26 Jul-24 Aug 72	S/N 3 Clark AFB	Redeployment
7-27 Aug 72	S/N 14 Taegu, Korea	URC-55 repair and training
20 Aug-9 Sep 72	S/N 7 Saigon, Vietnam	URC-55 repair and training
20-23 Sep 72	S/N 4 Landstuhl, Germany	Phase II transition
24-26 Sep 72	S/N 13 Landstuhl	Phase II transition
29 Sep-12 Oct 72	S/N 3 Woomera, Australia	Shipping and customs

DATES	SYSTEM	REASON
30 Oct-29 Nov 72	S/N 3 Woomera	Installation and checkout
16-19 Nov 72	S/N 12 Brandywine	Transmitter
3-14 Nov 72	S/N 7 Saigon	DLTM exchange
5-11 Dec 72	S/N 7 Saigon	Predeployment inspection
14-26 Jan 73	S/N 12 Brandywine	DLTM exchange
29 Jan-16 Feb 73	S/N 13 Landstuhl	Servo azimuth drive
1-14 Feb 73	S/N 7 Saigon	Redeployment, removal of special mission equipment
19 Feb-5 Mar 73	S/N 2 Helemano	DLTM exchange
19 Feb-5 Mar 73	S/N 11 Helemano	DLTM exchange
25-26 Apr 73	S/N 12 Brandywine	System inspection
26 Apr 73	S/N 3 Woomera	Azimuth drive binding
1 May 73	S/N 7 Southeast Asia	Temporary siting
5 May 73	S/N 13 Landstuhl	Servo azimuth drive
1-30 Jun 73	S/N 7 Thailand	Installation and checkout

Technical assistance was provided to USASTRATCOM-CONUS for A&E drawings and site preparation for the Heavy Terminal (HT) at Fort Detrick, Md. as well as for the Direct Communications Link (DCL). Technical assistance was provided to USASTRATCOM, Thailand, and USASTRATCOM-PAC for site surveys and preparation in Thailand.

TACTICAL SYSTEMS

A contract was placed with Radio Corporation of America for a family of tactical satellite communication terminals; a quarter-ton

trailer, a shelter terminal mounted on a 1 ¼-ton truck and a shelter terminal on a 2½-ton truck for use with the DSCS. These equipments are characterized by their ease of siting and a high degree of transportability and reliability in the military environment. They are configured with appropriate interface equipment to provide point to point and multi-point communication facilities in situations where conventional ground communication equipment cannot operate.

Fourman-transportable special purpose terminals were developed under contract with ITT for special purpose contingency operation with the DSCS system. These terminals are packaged to permit installation and operation in special difficult access locations.

The Agency completed the in-house modification of the 1¼-ton shelter-mounted terminal and four jeep mounted SHF TACSAT terminals to permit their use with the DSCS Phase II satellites. When operated with the narrow beaming of the Phase II satellites, the jeep terminal will provide a single channel capability while the shelter terminal will provide 12 full duplex channel service.

The modification included the addition of tactical pulse-code modulation multiplex terminating equipment and new eight-foot diameter antennas with associated tracking receiver to the shelter equipment, and the addition of four-foot antennas (removed from the shelter equipment) to the jeep terminals for improved system performance.

With the successful launching of the Phase II satellites in the fall of 1973, these terminals will provide the means for demonstrating

tactical SHF satellite trunking service as is being done with the UHF netting terminals.

Technical assistance was supplied to the 4th Detachment, 3rd Mobile Communications Group, U.S. Air Force, Lincoln, Calif., on TACSAT AN/TSC-80.

Technical assistance was provided to the Air Force when phase noise investigations were conducted aboard C-135B aircraft at Wright-Patterson AFT, Dayton, Ohio.

On 15 November, 1971, a portion of the Satellite Communications Agency Test and Evaluation Directorate became the 235th Signal Detachment (TACSATCOM). The 235th Signal Detachment (TACSATCOM) is a CONARC TO&E unit which, in garrison, is under the operational control of the SATCOM Agency. When in the field, it is under the control of the unit which it is supporting.

The 235th Signal Detachment (TACSATCOM) has the distinction of being the only Unit in the U.S. armed forces with capability of providing a highly mobile and reliable means of communications by satellite, using tactical radio equipment. It is the mission of this unit to provide the capability to serve the requirements of the U.S. Army and the unified and specified commands, to support any important national requirements, to meet contingencies, and to contribute to the further development of military satellite communications.

The first mission assigned to this newly activated unit was to provide a full duplex voice net via satellite as the primary means of

communications for President Richard M. Nixon to the United States during his trip to the Azores. This unit provided one 5/4-ton UHF terminal (AN/TRC-157) and four men to meet his contingency from 12-14 Dec., 1971. The unprecedented success of this mission resulted in the personnel and the unit being commended by the White House Communications Agency. The four men, SFC John C. McNally, SFC Ralph N. Bardsley, SFC Donald F. Sacchetta, and SSG Walter Sherle, were cited by a Presidental Letter of Appreciation.

In August 1972, the 235th Signal Detachment deployed to Alaska to support the Army Alaska-directed and ALCOM-coordinated, joint field training exercise Ember Dawn IV. This unit provided one AN/TRC-156 and two AN/MSC-58's and personnel. The TACSATCOM equipment provided a command and control net from the 172d Infantry Brigade TOC at King Salmon to their headquarters at Fort Richardson. The team pack deployed with a detachment from the 4/23d Infantry in support of a "mop-up" phase in the Port Heiden area. The over-all success of this mission was noted by the USARAL C&E officer and the commander of the 172d Infantry Brigade, who praised highly the quality of the communication and the professional attitude of the team.

TACSATCOM personnel and all the 235th's UHF satellite communications assets deployed with the XVIII Airborne Corps for Exercise Deep Furrow in Greece from 17-26 Sep., 1972. This unit's mission was to provide a command and control net for Joint Allied Forces in Greece and back to corps headquarters at Fort Bragg, N.C. The success of this mission

was commended by the commander of the XVIII Airborne Corps.

In January 1973, four UHF terminals were deployed to Europe for a special test of TACSATCOM equipment providing support communications to Special Ammunition Storage (SAS) sites. This test, which was suggested by Dr. Eberhardt Rechtin, ASD(T), was requested by CINCEUR and directed by DA. One satellite terminal was located at CINCEUR Headquarters at Patch Barracks. The other three were first deployed to Italy, where they supported two SAS detachments and one SAS team. After two weeks in Italy, these three-terminals were redeployed to Greece, again in support of two detachments and a team. They remained in Greece until late March 1973.

In both situations, the TACSATCOM terminals provided voice and secure teletype communications. The tests compared the TACSATCOM voice to the European Command and Central Communications (ECCC) System and the Cemetery Net HF System. The TACSATCOM teletype was evaluated against the in-country NATO Teletype System.

In summary, the TACSATCOM equipment compared favorably with the ECCC system when the terminals were in garrison. When the detachments and teams were deployed, they were beyond the reach of the fixed plant ECCCS. Here the TACSATCOM equipment competed only against the HF Cemetery Net. The satellite system was definitely superior since the propagation limitations of the HF Cemetery equipment reduces its reliability.

Briefings on this successful test were given to DA, ASD(T), and

other senior telecommunications personnel.

On 28 March, 1973, three UHF terminals (one palletized and two ¼-ton terminals) were deployed to Fort Bragg to support the 18th Airborne Corps in the joint Exercise Exotic Dancer VI. One ¼-ton terminal served as the Army terminal in the Joint Exercise Voice Command Net (Circuit 21). The remaining two terminals were in general support of the 18th Corps in the Camp Lejeune, N.C. area. The exercise terminated on 11 April, 1973.

On 11 April, 1973, two additional UHF terminals (one team pack and one 5/4-ton terminal) joined the Exotic Dancer terminals and all were flown to Fort Hood, Tx for Exercise Gallant Hand 73. This is a divisional sized field training exercise emphasizing highly mobile armored maneuvers. The five UHF terminals formed a Division Command Voice Net, passing non-secure voice traffic, and were active from 15 April to 1 May, 1973. TACSATCOM is ideally suited for this type of extremely mobile use and proved extremely satisfactory as a command control communications means under such conditions.

A continuation of the testing of UHF TACSATCOM support for SAS sites commenced in June for a period of 60 to 90 days.

NAVIGATION SYSTEM

The "Materiel Need for Army User Equipment for Use With the Defense Navigation Satellite System: (MN-AUE/DNSS)" prepared by the Army Combat Developments Command Intelligence Agency, acting for USACDC, and USASATCOMA, acting for USAMC, was approved in January 1973. The

MN-AUE/DNSS established requirements for three basic applications: manpack, land and sea vehicles, and airborne. There are requirements for four special applications: Field artillery and engineer survey, geodetic, signal intelligence (SIGINT), and target acquisition.

In order to develop a sound basis for a determination of the extent and nature of probable Army use of DNSS, an Army Positioning/Navigation Special Task Force was established at Fort Belvoir in February, with USASATCOMA providing a project manager designee for AUE for DNSS. A sub-task group was formed at Fort Monmouth with USASATCOMA participating, to provide analysis requested by the POS/NAV Task Group on (a) applicability of DNSS to meet Army user requirements, (b) an assessment of the technical and operational issues which must be resolved by Army participation in the DNSS demonstration program and (c) a cost and effectiveness analysis of DNSS vs. alternates to meet user requirements for the 1980's. USASATCOMA let a 5-month contract on 6 April 73 to CALSPAN Inc., to support the effect of the sub-task group in the DNSS area.

The Air Force Airborne Laboratories (AFAL), via a contract with TRW Inc., tested a single-channel NAVSAT receiver/computer integrated with a high grade inertial platform, in a high-dynamics aircraft. These tests used a ground-based satellite simulation configuration at White Sands Missile Range, in an inverted geometry. USASATCOMA placed a contract with TRW, through AFAL, to provide a NAVSAT system using a single channel receiver/computer and a lower cost inertial reference

system. It was flown in a helicopter against the same satellite simulators, with the receiver only, and in an aided mode, to obtain performance data pertinent to Army missions. The equipment was laboratory tested prior to going to a field test at White Sands.

USASATCOMA funded several Army organizations, as participating developers, to provide technical support to the Army Project Manager for DNSS. The Army Engineer Topographic Laboratories provided support for the application of DNSS to survey requirements for terrain mask angle, ground user multipath, and satellite to satellite transfer of satellite ground control data and by contract to TRW Inc. to study methods for getting azimuth bearing from DNSS. The Army Electronics Command (USAECOM) Avionics Laboratory undertook studies of airborne related user equipments; investigated antenna and multipath problems relating to helicopters and ionospheric problems relating to DNSS and by contract to TRW studied Army User Equipment for DNSS. The USAECOM Electronic Warfare Laboratory analyzed applications. The USAECOM Combat Surveillance and Target Acquisition Laboratory evaluated surveillance, target acquisition and night operations (STANO) applications. Frankford Arsenal covered the area of application to fire control systems.

A 13-month contract was let to the Analytic Sciences Corp., through AFAL, to support USASATCOMA with studies on a comparison of various DNSS concepts, on definition of the signal format for DNSS, and on possible extension of the Army White Sands tests with the

Navy TIMATION III satellite, which will carry transmitters representative of two DNSS concepts.