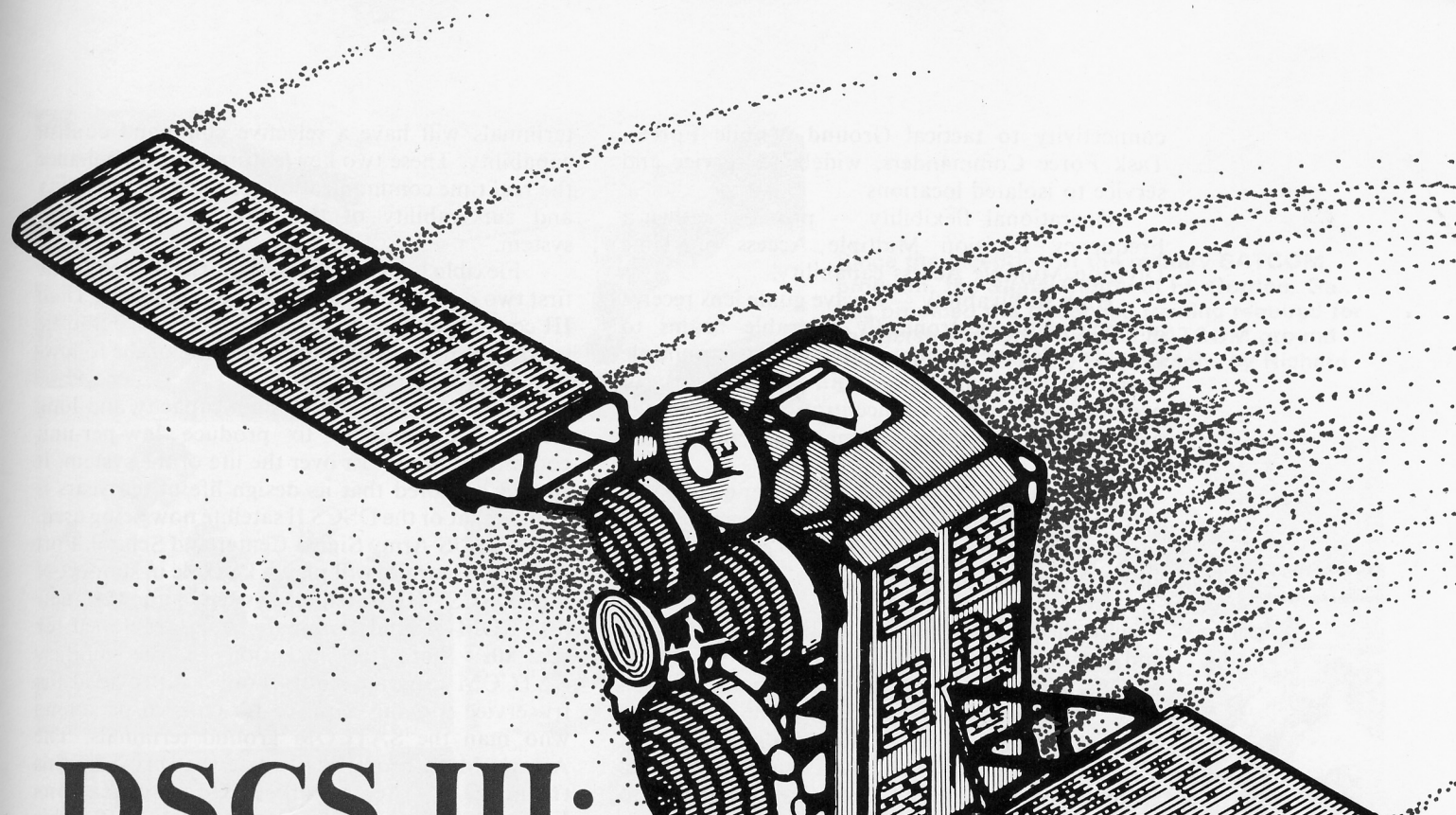


DSCS III: Military communications satellite for the 80's

by Floyd Felts

The successful launch of Explorer in January 1958 signalled the United States' entry into the space age. During this same year the world's first communications satellite — Project SCORE — was launched with the Army having the responsibility for performing the planned experimentation. President Eisenhower's Christmas greeting to all nations of the world was broadcast using SCORE as the transmission medium. Army space experiments in the 60s included TIROS, the world's first weather satellite and SYNCOM, an advanced communications satellite. These experiments were to become the forerunners of the military and civilian satellite systems in use today.

Tremendous strides in the practical application of space systems were taken in the 60s and 70s. Satellites orbiting the earth today routinely provide international and domestic communications services as well as live color television programming of events taking place throughout the world. The military satellite communications (SATCOM) networks in place today are providing a communications capability that would not be possible using conventional terrestrial systems. The addition of new earth terminals such as the AN/FSC-78/79 have not only extended the operational capability of these systems, but have also greatly increased their overall reliability.

During these developments, certain concerns relating to communications security and survivability were being worked on by the responsible military departments. Because of these efforts — and the lessons learned in the 70s — a new family of satellites was developed: the Defense Satellite Communications System III (DSCS III). These satellites, scheduled for launch in the early 80s, were designed to provide operational flexibility, security and survivability at a low life cycle cost. Some of the key features of these satellites include:

All service capability — protected service to ground, ship and airborne systems including

connectivity to tactical Ground Mobile Forces, Task Force Commanders, wideband service and service to isolated locations.

Operational flexibility — provides either a Frequency Division Multiple Access or Time Division Multiple Access capability.

High survivability — a wave guide lens receive antenna with electronically steerable beams to provide selective anti-jam nulling. Two multiple beam transmit antennas with a capability of providing a spot beam concentration of RF energy over selected areas. The system is hardened to JCS guidelines.

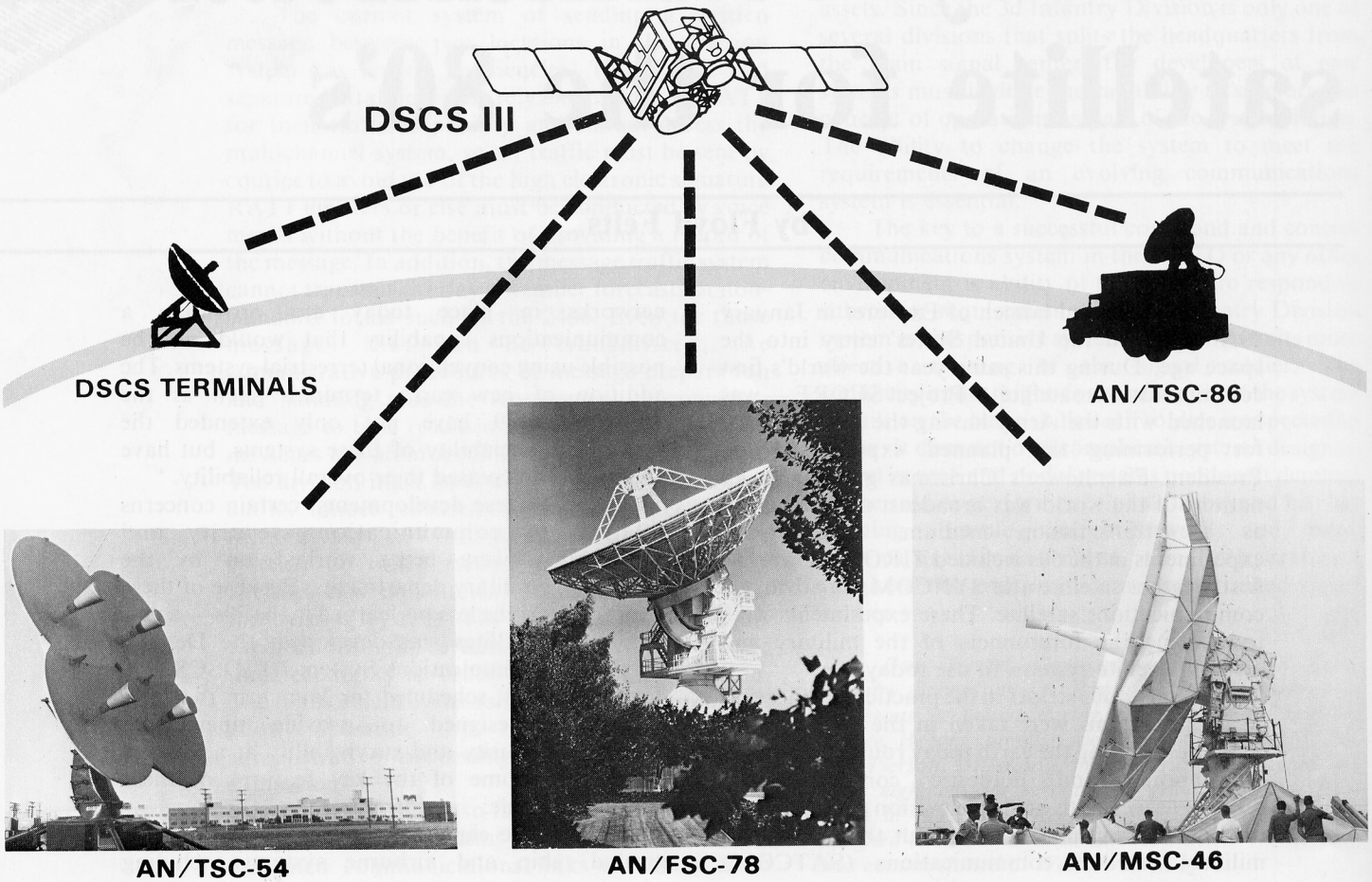
High RF power — total RF power distributed among six independent TWTs is transmitted via earth coverage, multibeam and high gain parabolic antenna systems.

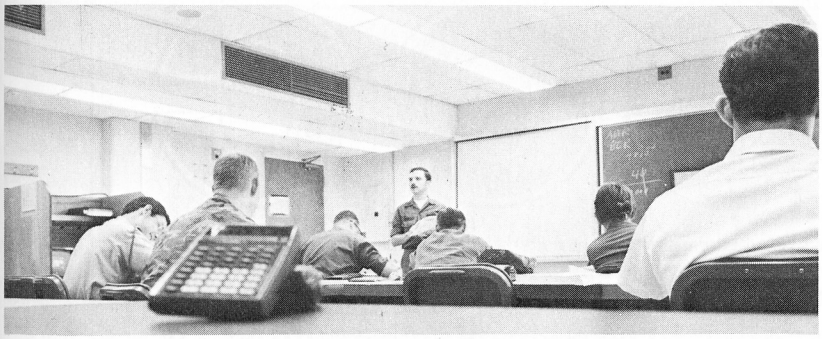
Real time configuration and command control — with the present DSCS II satellite in use, attitude and command control positioning of the satellite as well as communications subsystem configuration must be accomplished by use of the Air Force Satellite Control Facility, Sunnyvale, California. The DSCS III system will modify eight net-control ground terminals located throughout the world to provide them the capability of independent selection and management of the communications channels on board the satellites. In addition, these terminals will have a selective command control capability. These two key features further enhance the real time communications capability, reliability and survivability of this vital communications system.

Flexible launch capability — the launch of the first two demonstration models will be via the Titan III conventional launch system. The Space Shuttle is scheduled for use for the launching of the follow-on operational satellites.

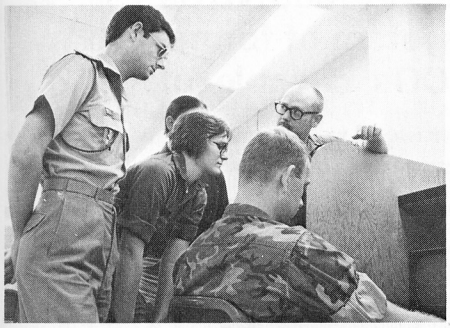
Low life cycle cost — high capacity and long service life combine to produce low-per-unit communications cost over the life of the system. It should be noted that its design life of ten years is double that of the DSCS II satellite now being used.

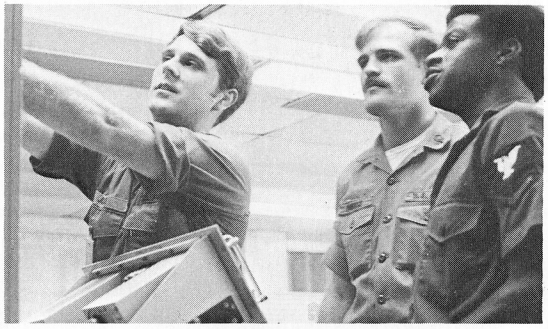
The US Army Signal Center and School, Fort Gordon, Georgia, will play a key role in support of the DSCS III satellite system and the new SATCOM ground terminals being developed for the 80s. Since the inception of the military SATCOM program, this school has provided the tri-service training required for enlisted personnel who man the SATCOM ground terminals. The Army's MOS producing course that provides this training is the Satellite Communications Equipment Repairer Course, MOS 26Y10. This course is 40 weeks long and provides soldiers with the knowledge and techniques required to operate,

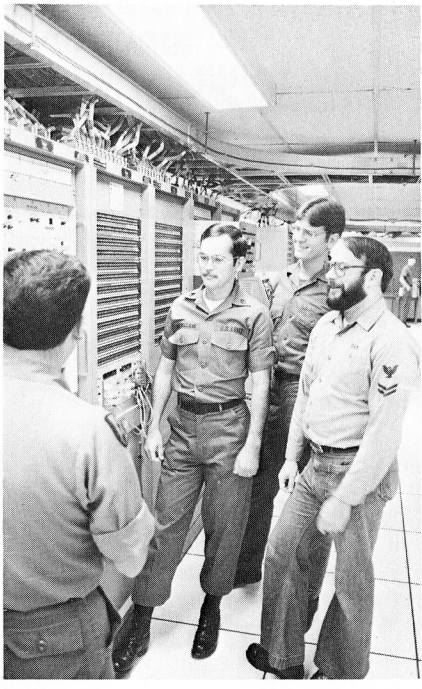


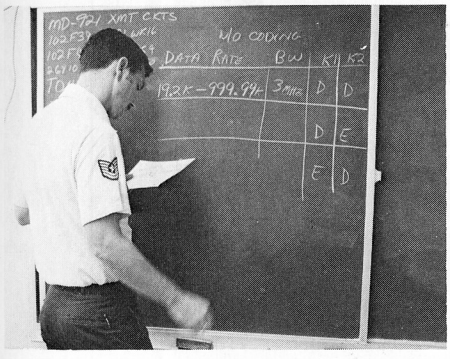


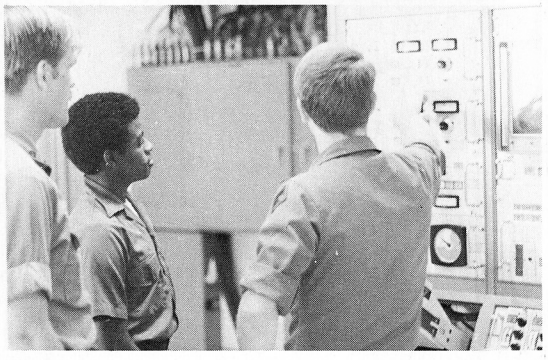
Since the inception of the military SATCOM program, the Signal Center at Ft. Gordon, Ga., has provided the tri-service training required for the personnel who man the SATCOM ground terminals. (U.S. Army photographs by Richard Davis, Jr.)











maintain, troubleshoot and repair the SATCOM Ground Terminal AN/FSC-78/79. Additional training is provided on common analog, digital communications and spread spectrum subsystems.

Air Force and Navy personnel receive the same training on the AN/FSC-78/79 system after completion of the necessary prerequisite training at an Air Force or Navy training facility. Functional courses are also conducted to provide the same level of training on other SATCOM ground terminals and associated communications subsystems. Two of these courses are Additional Skill Identifier (ASI) level courses that provide training on SATCOM Ground Terminals AN/MSC-46 (ASI-L1) and AN/TSC-54 (ASI-L7). Army, Navy and Air Force personnel possessing MOS 26Y or its equivalent, are selected for terminal training based upon projected assignments to a specific ground terminal facility.

The other principal equipment course is the Digital Communications Subsystem (DCSS) course. This system provides the digital interface with the AN/FSC-78 ground terminal.

The SATCOM Controller's Course, 102-F26 (ASI-A1) will play a significant role in the implementation and operation of the DSCS III and other systems of the 80s. It is anticipated that with the new computerized control systems and the real time control aspects involved, this course will expand dramatically.

Earlier this year, this course trained key management personnel from the Defense Communications Agency along with selected Air Force personnel in preparation for their assignment to the DSCS III program.

The DSCS III satellite system is a firm step toward extending the communications capability required of a modern military force. As the Ground Mobile Forces Tactical SATCOM Systems are fielded, a dramatic extension of the command and control structure will come about. With this strengthening of the global command and control machinery, the commander at the highest echelon will have a reliable system of instantaneous reaction to whatever situation may arise.

Mr. Felts is a GS-11 Training Specialist at the Avionics-SATCOM Dept. at Ft. Gordon, Ga. During his 27 years of military service, he served as SATCOM station chief at stations in Asmara, Ethiopia; BaQueo, Vietnam; and Landstuhl, Germany. He has attended New York Institute of Technology and Dekalb Community College in Georgia.