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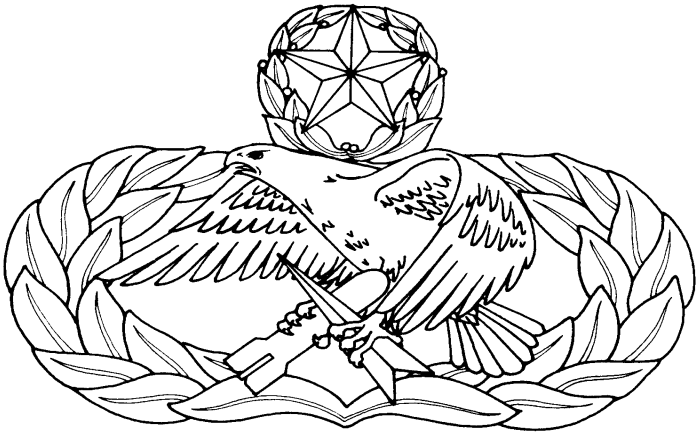
SATELLITE, WIDEBAND AND TELEMETRY SYSTEMS



CAREER FIELD EDUCATION AND TRAINING PLAN

SATELLITE, WIDEBAND AND TELEMETRY SYSTEMS
AFSC 2E1X1
CAREER FIELD EDUCATION AND TRAINING PLAN

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AFSC 2E1X1
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PART I

Preface

1. Resource constraints in the Air Force are impacting the availability of our most valuable resource--people. This condition, which will continue to exist in the future, makes it essential for the work force to be effectively and efficiently trained to perform duties within each skill level of an Air Force Specialty (AFS). To meet the challenges of tomorrow the Air Force must place a greater emphasis on career field training. This Career Field Education and Training Plan (CFETP) is a management tool that enables the Air Force and each MAJCOM to place the needed emphasis on total career field training. It provides the framework and guidance necessary to plan and develop a career field training program. The plan, which is a "training road map" for the career field, identifies mandatory and optional training requirements. It includes initial skills, upgrade, and continuation training that individuals should receive during their career in this specialty.

2. The CFETP, which documents the career field training program, consists of two parts. Management uses both parts to plan, manage, and control training within the career field.

2.1. Part I, Section A, provides the information necessary for overall management of training in the career field. It contains administrative details and explains the purpose and use of the CFETP. Section B provides a description of the specialty, suggests career field progression, provides career field information, documents training decisions, defines each skill level, and identifies MAJCOM continuation training options. Section C specifies qualification requirements for upgrade/progression in each subsequent skill level in the career field. It also identifies sources of training other than those provided by the Air Education and Training Command (AETC). Section D identifies known resource constraints.

2.2. Part II of the CFETP contains the Specialty Training Standard (STS) and identifies the various training sources and courses available to members of the specialty. The STS is comprised of the Course Training Standard (CTS) and the Career Training Guide (CTG). The CTS includes the tasks and knowledge requirements for award of the three skill level The CTG includes task and knowledge requirements for upgrade/progression to subsequent skill levels in the career field and identifies career development course (CDC) subject content. Supervisors and trainers at the unit level use Part I, Section C, and Part II of the CFETP to identify, plan, and conduct unit level training commensurate with the overall goals of this plan.

3. Use of the guidance provided in this CFETP ensures individuals in this career field receive effective and efficient training at the appropriate points in their careers. This plan enables the Air Force to train today's work force for tomorrow's jobs.

Abbreviations/Terms Explained

This section provides a common understanding of the terms that apply to the Satellite, Wideband and Telemetry Systems Career Field and Education Training Plan.

Advanced Training. A formal course of training that leads to a technical or supervisory level of an AFS. Training is for selected airmen at the advanced level of an AFS.

Air Education Training Command (AETC). Responsible for the recruiting, training and education of Air Force personnel. AETC also provides pre-commissioning, professional military, and continuing education.

Air Force Career Field Manager (AFCFM). Representative appointed by the respective HQ USAF Deputy Chief of Staff or Under Secretariat to ensure that assigned AF specialties are trained and utilized to support AF mission requirements.

Air Force Institute for Advanced Distributed Learning (AFIADL). The result of a merger between the Air Force Distance Learning Office and the Extension Course Institute (ECI).

Air Force Job Qualification Standard (AFJQS). A comprehensive task list that describes a particular job type or duty position. Supervisors use the AFJQS to document task qualification. The tasks on AFJQSs are common to all persons serving in the described duty position.

Air Force Qualification Training Package (AFQTP). An instructional course designed for use at the unit to qualify or aid qualification in a duty position, program, or on a piece of equipment. It may be printed, computer-based, or other audiovisual media.

Air Force Specialty (AFS). A group of positions (with the same title and code) that require common qualifications.

Career Field Education and Training Plan (CFETP). A CFETP is a comprehensive core training document that identifies: life-cycle education and training requirements; training support resources, and minimum core task requirements for a specialty. The CFETP aims to give personnel a clear path and instill a sense of industry in career field training. CFETPs are officially posted at http://www.e-publishing.af.mil/.

Career Training Guide (CTG). A document that uses Task Modules (TM) in lieu of tasks to define performance and training requirements for a career field.

Certifying Official. A person assigned by the commander to determine an individual's ability to perform a task to the required standard.

Computer Based Training (CBT). A forum for training in which the student learns via a computer terminal. It is an especially effective training tool that allows the students to practice applications while they learn.

Continuation Training. Additional advanced training that exceeds the minimum upgrade training requirements and emphasizes present or future duty assignments.

Core Task. A task AFCFM's identify as a minimum qualification requirement for everyone within an AFSC, regardless of duty position. Core task may be specified for a particular skill level or in general across the AFSC. Guidance for using core task can be found in the applicable CFETP narrative.

Course Training Standard (CTS). A standard developed for all courses not governed by an STS, including specialized training packages and computer-based training courses.

Enlisted Specialty Training (EST). A mix of formal training (technical school) and informal training (on-the-job) to qualify and upgrade airmen in each skill level of a specialty.

Exportable Training. Additional training via computer assisted, paper text, interactive video, or other necessary means to supplement training.

Go/No Go. In OJT, it is the stage at which an individual has gained enough skill, knowledge, and experience to perform a task without supervision.

Initial Skills Training. A formal resident course resulting in award of the 3-skill level.

Instructional System Development (ISD). A deliberate and orderly (but flexible) process for planning, developing, implementing, and managing instructional systems. It ensures personnel are taught in a cost efficient way the knowledge, skills, and attitudes essential for successful job performance.

Major Command (MAJCOM). A MAJCOM represents a major Air Force subdivision having a specific portion of the Air Force mission. Each MAJCOM is directly subordinate to HQ USAF. MAJCOMs are interrelated and complementary, providing offensive, defensive, and support elements. aircraft, are assigned to ACC.

Occupational Survey Report (OSR). A detailed report showing the results of an occupational survey of tasks performed within a particular AFSC.

On-the-Job Training (OJT). Hands-on, over-the-shoulder training conducted to certify personnel in both upgrade (skill level award) and job qualification (duty position certification) training.

Qualification Training. Hands-on, performance based training designed to qualify airmen in a specific duty position. This training program occurs both during and after the upgrade training process and is designed to provide skills training required to do the job.

Resource Constraints. Resource deficiencies (such as money, facilities, time, manpower, and equipment) that preclude desired training from being delivered.

Skill Training. A formal course that results in the award of a skill level.

Specialty Training Package and COMSEC Qualification Training Package. A composite of lesson plans, test material, instructions, policy, doctrine, and procedures necessary to conduct training. These packages are prepared by AETC, approved by National Security Agency (NSA), and administered by qualified communications security (COMSEC) maintenance personnel.

Specialty Training Standard (STS). An Air Force publication that describes an Air Force specialty in terms of tasks and knowledge that an airman in that specialty may be expected to perform or to know on the job. Also identifies the training provided to achieve a 3-, 5-, or 7-skill level within an enlisted AFS. It further serves as a contract between AETC and the functional user to show which of the overall training requirements for an Air Force Specialty Code (AFSC) are taught in formal schools and correspondence courses.

Standard. An exact value, a physical entity, or an abstract concept established and defined by authority, custom, or common consent to serve as a reference, model, or rule in measuring quantities or qualities, establishing practices or procedures, or evaluating results. It is a fixed quantity or quality.

Task Module (TM). A group of tasks performed together within an AFSC that requires common knowledge, skills, and abilities. TMs are identified by an identification code and a statement.

Total Force. All collective components (active, reserve, guard, and civilian elements) of the United States Air Force.

Training Capability. The capability of a training setting to provide training on specified requirements, based on the availability of resources.

Training Planning Team (TPT). Comprised of the same personnel as a U&TW, TPTs are more intimately involved in training development and the range of issues examined is greater than in the U&TW forum.

Training Requirements Analysis (TRA). A detailed analysis of tasks for a particular AFSC to be included in the training decision process.

Training Setting. The type of forum in which training is provided (formal resident school, on-the-job, field training, mobile training team, self-study, etc.).

Upgrade Training. Mandatory training which leads to the award of a higher skill level.

Utilization and Training Pattern. A depiction of the training provided to and the jobs performed by personnel throughout their tenure within a career field or AFS. There are two types of patterns: 1) Current pattern, which is based on the training provided to incumbents and the jobs to which they have been and are assigned; and 2) Alternate pattern, which considers proposed changes in manpower, personnel, and training policies.

Utilization and Training Workshop (U&TW). A forum of the AFCFM, MAJCOM functional managers, subject matter experts (SME), and AETC training personnel that determines career ladder training requirements.

Wartime Tasks. Those task that must be taught when courses are accelerated in a wartime environment. They are identified by an "*" in CFETP Part II, Section A, CTS. In response to a wartime scenario, these task will be taught in the 3- level course in a streamlined training environment. These task are only for those career fields that still need them applied to their schoolhouse tasks.

Section A - General Information

1. Purpose of the CFETP. This CFETP provides the information necessary for career field managers, training management, supervisors, and trainers to plan, develop, manage, and conduct an effective and efficient career field training program. The plan outlines the training that individuals should receive in order to develop and progress throughout their careers. For purposes of this plan, training is divided into three areas: initial skills, upgrade, and continuation training. Initial skills training is the AFS specific training an individual receives upon entry in the Air Force, normally conducted by AETC at one of the technical training centers. Upgrade training identifies the mandatory courses, task qualification requirements, and Career Development Course (CDC) completion required for award of the 5-, 7-, or 9-skill level. Continuation training is additional training provided to 3-, 5-, 7-, and 9-level personnel to increase their skills and knowledge beyond the minimum required for upgrade. The CFETP has several purposes, some of which are:

1.1. Serves as a management tool to plan, develop, manage, and conduct a career field training program. Also, ensures that established training is provided at the appropriate point in an individual's career.

1.2. Identifies task and knowledge training requirements for each skill level in the specialty and recommends training throughout each phase of an individual's career.

1.3. Lists training courses available in the specialty, identifies sources of the training, and provides the training medium.

1.4. Identifies major resource constraints that impact implementation of the desired career field training program.

2. Use of the CFETP. The CFETP is maintained by the Air Force Career Field Manager (AFCFM). MAJCOM Functional Managers and AETC review the plan annually to ensure currency and accuracy and forward recommended changes to the AFCFM. Using the list of courses in Part II, they determine whether duplicate training exists and take steps to eliminate/prevent duplicate efforts. Career field training managers at all levels use the plan to ensure a comprehensive and cohesive training program is available for each individual in the career ladder.

2.1. AETC training personnel develop/revise formal resident and exportable training based upon requirements established by the users and documented in the STS. They also develop procurement and acquisition strategies for obtaining resources needed to provide the identified training.

2.2. MAJCOM Functional Managers ensure their training programs complement the CFETP mandatory initial skill and upgrade requirements. They also identify the needed AFJQSs/AFQTPs to document unique upgrade and continuation training requirements. Requirements are satisfied through OJT, resident training, or exportable courseware/courses. MAJCOM developed training to support this AFSC must be identified for inclusion into this plan. Forward recommendations concerning this CFETP to your MAJCOM Functional Manager.

2.3. 81 TRSS Qualification Training Flight (Q-Flight) personnel develop AFJQSs/AFQTPs based on requests submitted by the MAJCOMs and according to the priorities assigned by the Communications-Electronics (C-E) Maintenance Training Advisory Group (MATAG) Working Group.

2.4. Unit level training managers and supervisors manage and control progression through the career field by ensuring individuals complete the mandatory training requirements for upgrade specified in this plan and supplemented by their MAJCOM. The list of courses in Part II is used as a reference for planning continuation or career enhancement training.

3. Coordination and Approval of the CFETP. The AFCFM is the approval authority. MAJCOM representatives and AETC training personnel coordinate on the career field training requirements. The AFCA executive agents review CFETPs for accuracy prior to submission for approval by the AFCFM.

Section B - Career Field Progression and Information

4. Specialty Description. This information supplements that presented in AFMAN 36-2108.

4.1. **Satellite, Wideband and Telemetry Systems Apprentice/Journeyman/Craftsman.**

4.1.1. Specialty Summary. Deploys, operates, and maintains ground based satellite and Beyond Line-of-Sight (BLOS) wideband communications, telemetry, and instrumentation systems. Sustains these systems through effective troubleshooting, repair, diagnostics and system performance analysis. Establishes strategic and theater connectivity via satellite and BLOS communications and information networks.

4.1.2. Duties and Responsibilities:

4.1.2.1. Performs predeployment operations and mobilization of theater deployable communications systems for transport by air, land or sea. Deploys satellite and BLOS systems and support equipment to support mission requirements. Establishes maintenance management procedures and agile logistics support channels to sustain continuous network operations. Coordinates and assist end-users and network controllers in isolating and eliminating communications connectivity problems. Remove, repair, and replace assemblies, subassemblies and electronic components to optimally sustain communications networks. Prepare systems for redeployment and equipment regeneration.

4.1.2.2. Operates, inspects, and sustains MILSTAR, Defense Satellite Communications Systems (DSCS) and Air Force Satellite Communications (AFSATCOM), Troposcatter radio, Defense Meteorological Satellite Program (DMSP), Defense Support Program (DSP), Global Positioning System (GPS), instrumentation, and telemetry systems in accordance with applicable directives and Defense Information Systems Agency (DISA) publications.

4.1.2.3. Assembles, installs, and sustains equipment used to measure performance of aircraft, spacecraft, missiles, satellites, biomedical, munitions and laser systems, and hardened facilities. Analyzes equipment limitations and modifies equipment to increase operational efficiency for specific missions.

4.1.2.4. Reviews technical instructions, plans, and installation drawings. Ensures conformance to standard installation practices. Plans and schedules communications and related equipment installations. Resolves installation and maintenance discrepancies using applicable directives, diagrams, and installation systems records. Inventories project and work order materials. Initiates and conducts system verification test to assess the capability and effectiveness of networks and communications systems.

4.1.2.5. Manages operations and maintenance activities. Establishes requirements for and sustains tools, support equipment, and technical documents. Establishes work standards, methods and controls. Ensures maintenance data collection documentation is correct. Implements and enforces safety standards for satellite**,** BLOS**,** instrumentation, and telemetry system operations.

4.1.3. Knowledge. Knowledge is mandatory of: Theory of basic electronics and computer principles to include solid state devices, fiber optics, high power radio frequency amplifiers, software applications, satellite tracking and servo drive mechanisms. Interprets publications, blueprints, logic diagrams, and schematics. Understand communications theory and principles of theater deployable and strategic systems and their operational procedures. Requires knowledge of data analysis procedures, test equipment and network analysis; principles of multiplexing, analog to digital conversion, and digital transmissions; networks associated with multi-channel equipment; installing and testing practices; atomic frequency generating devices; voice and data communications equipment using DISA technical and satellite control and testing procedures.

4.2. **Communications Systems Superintendent.**

4.2.1. Specialty Summary. Manages and directs communications systems maintenance facilities and resources. Included are functions of installing, maintaining, repairing, overhauling, deploying, and modifying. Systems and equipment include ground radar and radio, meteorological and navigation, combat camera, imagery, video, television, satellite, intrusion detection, space systems, telemetry, and microwave.

4.2.2. Duties and Responsibilities. This specialty “caps” at the Senior Master Sergeant level with those personnel that came up through the 2E0XX and 2E1XX career fields. Therefore, the duties and responsibilities defined below encompass the complete spectrum of this specialty.

4.2.2.1. Plans and organizes maintenance activities. Prepares and analyzes reports encompassing siting, deploying, maintaining, installing, repairing, and removing communications systems, combat camera equipment, imagery systems, and related equipment. Included are ground radio equipment; navigation and meteorological systems; satellite and microwave communications systems; video, television studio, and intrusion detection systems; combat camera space systems, telemetry and instrumentation missions, and imagery systems. Coordinates activities and resolves common problems.

4.2.2.2. Directs maintenance activities. Checks systems and equipment for proper siting, installation, and serviceability. Directs personnel employed in siting, deploying, inspecting, adjusting, removing, replacing, and repairing communication systems and related equipment. Directs overhaul and repair of ground radar and communication systems, combat camera equipment, telemetry systems, imagery systems, and related equipment. Ensures work standards are maintained. Determines extent and economy of repair, including disposition of malfunctioning equipment.

4.2.2.3. Inspects and evaluates maintenance actions. Interprets findings and recommends or initiates corrective action. Serves on or directs inspection teams to evaluate maintenance activities. Discusses inspection findings. Maintains liaison with users to ensure adequate services are being provided.

4.2.2.4. Supervises maintenance functions. Resolves problems with installing, maintaining, repairing, and overhauling systems and equipment. Establishes local maintenance procedures and policies. Performs research and development of new systems and equipment.

4.3. **Communications-Electronics Chief Enlisted Manager**. This specialty “caps” at the Chief Master Sergeant Level with those specialties that came up through the 2E0XX, 2E1XX, 2E2XX, and 2E6XX career ladders. Personnel attaining the rank of Chief are assigned broad ranging duties in directing and managing diverse functions such as activities that install, remove, relocate, repair, and maintain radar systems (air traffic control and aircraft control and warning), telephone systems, satellite, wideband and telemetry systems, ground radio systems, meteorological and navigation systems, visual, imagery and intrusion detection systems, computer, network, switching and cryptographic, and antenna and cable systems. Other challenges that these Chiefs face are assignments to the White House Communications Agency, Air Force Element at CENTCOM, the Air Force Communications Agency, Defense Information Systems Agency, NATO, etc.

4.4. The following are some of the more common missions you may encounter as a 2E1X1.

SATELLITE SYSTEMS

AN/GSC-52 Medium Satellite Communications Terminal

AN/TSC-100A Tactical Satellite Communications Terminal

AN/PSC-11 Single Channel Anti-Jam Manportable Terminal (SCAMP)

AN/TSC-152 Lightweight Multiband Satellite Terminal (LMST)

AN/TSC-154 Secure Mobile Anti-Jam Reliable Tactical Terminal (SMART-T)

AN/UMQ-13 MARK IVB Meteorological Data Station

WIDEBAND SYSTEMS

AN/TRC-170 Tropospheric Scatter Microwave Radio

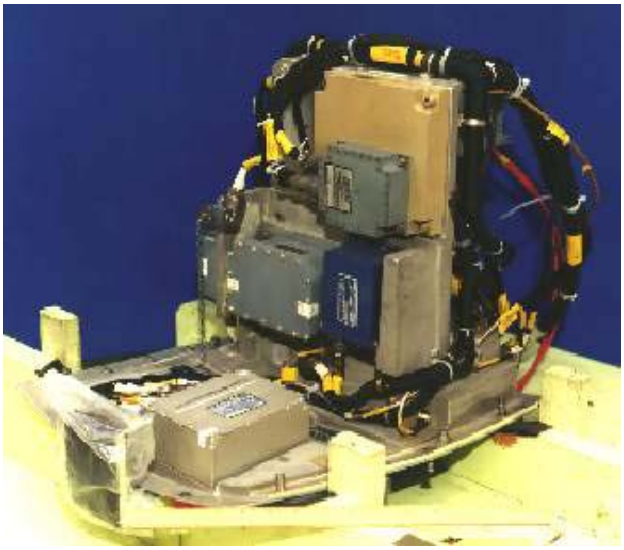
AN/GRC-239 Tropo Satellite Support Radio

TELEMETRY SYSTEMS

Telemetry Ground Support Facility

Telemetry Ground Station

Air Control Launch Missile Non-Tactical Instrumentation Kit



Minuteman Wafer

Peacekeeper Truss

Minuteman Test Launch

Starfire Optical Range

5. Skill/Career Progression. Adequate training and timely progression from the apprentice to superintendent skill levels play an important role in the Air Force's ability to accomplish its mission. It is essential that everyone involved in training do their part to plan, manage, and conduct an effective training program. The guidance provided in this part of the CFETP and the 2E1X1 Education and Training Path table will ensure individuals receive viable training at appropriate points in their careers.

Apprentice (3-Level) Training
Upon completion of initial skills training a trainee will work with a trainer to enhance their knowledge and skills.
Utilize CDCs, AFJQSs/AFQTPs, and other exportable courses to progress in the field.
Once task certified, a trainee may perform the task unsupervised.
Journeyman (5-Level) Training
Enter into continuation training to broaden experience base.
Five-levels may be assigned job positions such as team leader and shift supervisor.
Attend the Airman Leadership School (ALS) after serving 48 months in the Air Force or selection to rank of SSgt (active duty only). In-residence or correspondence course is required for Air National Guard/Air Force Reserve Command (ANG/AFRC) personnel.
Use CDCs and other references identified by the AFCFM to prepare for Weighted Airman Performance Systems (WAPS) testing.
Should continue pursuing a Community College of the Air Force (CCAF) degree.
Craftsman (7-Level) Training
A seven-level can expect to fill various supervisory and management positions such as shift leader, team chief, supervisor, or task certifier.
Seven-levels should take courses or obtain added knowledge on management of resources and personnel and attend the 7-level resident course.
Encouraged continuing academic education through CCAF and higher degree programs.
Attend the Noncommissioned Officer Academy (NCOA). In-residence or correspondence course is required for ANG/AFRC personnel.
Superintendent (9-Level) Training
A nine-level can be expected to fill positions such as flight chief, superintendents, and various staff positions.
Should pursue increased knowledge for budget, manpower, resources, and personnel management.
Recommend they pursue additional education and completion of courses outside of their AFS.
Chief Enlisted Manager (CEM) Training
Must be selected for CMSgt and possess qualifications in a feeder specialty (2E190, 2E291, and 2E690).
CEMs work in a variety of similar jobs and functional areas where general managerial and supervisory abilities can be most effectively used and challenged.
Resident graduation of the USAF Senior NCO Academy (SNCOA) is a prerequisite for CMSgt sew-on (active duty only). In-residence or correspondence course required for ANG/AFRC personnel.

6. Training Decisions. This CFETP was developed to encapsulate an entire spectrum of training requirements for the Satellite, Wideband and Telemetry Systems career field, using a building block approach (simple to complex). Included in this spectrum was the strategy of when, where, and how to meet the training requirements. The strategy must be apparent and affordable to reduce duplication of training and eliminate a disjointed approach to training. The following decisions were made by members of the 1-4 February 1999 Utilization and Training Workshop.

6.1. Five-Level Upgrade Requirements. Upgrade requirements were updated to include eight standardized areas common to all career fields. The following list identifies the major areas covered: test equipment, standardized maintenance practices, computer security, standard installation practices, communication principles, expeditionary communications principles, information transport concepts, and electrical power systems. Additionally, a review of CDCs resulted in future development being restricted to six volumes. Development of this single set of CDCs will include three volumes which will be used by all 2EXXX career fields. The following table outlines 5-level CDC contents.

VOLUME 1	Electronic Principles (Computer Based Training)
VOLUME 2	Test Equipment
VOLUME 3	Communication Principles
VOLUME 4	AFSC Specific Information
VOLUME 5	AFSC Specific Information
VOLUME 6	AFSC Specific Information

6.2. Seven-Level Upgrade Requirements. Seven-level CDCs were eliminated, however seven-level task training requirements were added to provide a common core of proficiency among all individuals in the 2EXXX arena. Training covers deployment concepts, system planning and implementation, and management principles.

6.3. Proficiency Training. This training is job qualification for an assigned duty position. Additional qualification training becomes necessary when personnel transfer to another duty position, the unit mission changes, a new personnel program comes on board, or any time changes in techniques or procedures occur.

6.4. Continuation Training: The purpose of the continuation training program is to provide additional advanced training, exceeding the minimum upgrade training requirements, with the emphasis on present and future duty positions. MAJCOMs may develop a continuation training program to ensure individuals in the career field receive the necessary training at the appropriate points in their careers. The training program will identify both mandatory and optional training requirements.

7. Community College of the Air Force (CCAF) Academic Programs. Enrollment in CCAF occurs upon completion of basic military training. CCAF provides the opportunity for all enlisted members to obtain an Associate in Applied Science degree. The degree must be completed before the student separates from the Air Force, retires, or is commissioned as an officer. In addition to its associates degree program, CCAF offers the following:

7.1. Occupational Instructor Certification. The College offers the Occupational Instructor Certification to instructors teaching full time in a CCAF affiliated school. To qualify, instructors must complete an instructor course, a teaching practicum, have two years teaching experience, hold an associate or higher degree, and be recommended by their commander/commandant.

7.2. Trade Skill Certification. When a CCAF student separates or retires, a trade skill certification is awarded for the primary occupational specialty. The College uses a competency based assessment process for trade skill certification at one of four proficiency levels-Apprentice, Journeyman, Craftsman/Supervisor, or Master Craftsman/Manager. All are transcribed on the CCAF transcript.

7.3. The Electronic Systems Technology (4VHP) program applies to 2EXXX career fields.

7.3.1. Degree Requirements: Individuals must hold the 5-skill level at the time of program completion.

	Semester hours
Technical Education	24
Leadership, Management, and Military Studies	6
Physical Education	4
General Education	15
Program Electives	15
Total	64

7.3.2. Technical Education (24 semester hours): A minimum of 12 semester hours of Technical Core subjects and courses must be applied and the remaining semester hours will be applied from Technical Core/Technical Elective subjects and courses.

7.3.3. Leadership, Management, and Military Studies (6 semester hours): Professional military education and/or civilian management courses. See CCAF General Catalog for application of civilian management courses.

7.3.4. Physical Education (4 semester hours): Satisfied upon completion of basic military training.

7.3.5. General Education (15 semester hours): Courses must meet the criteria for application of courses to the General Education requirement and be in agreement with the definitions of applicable General Education subjects/courses as outlined in the CCAF General Catalog.

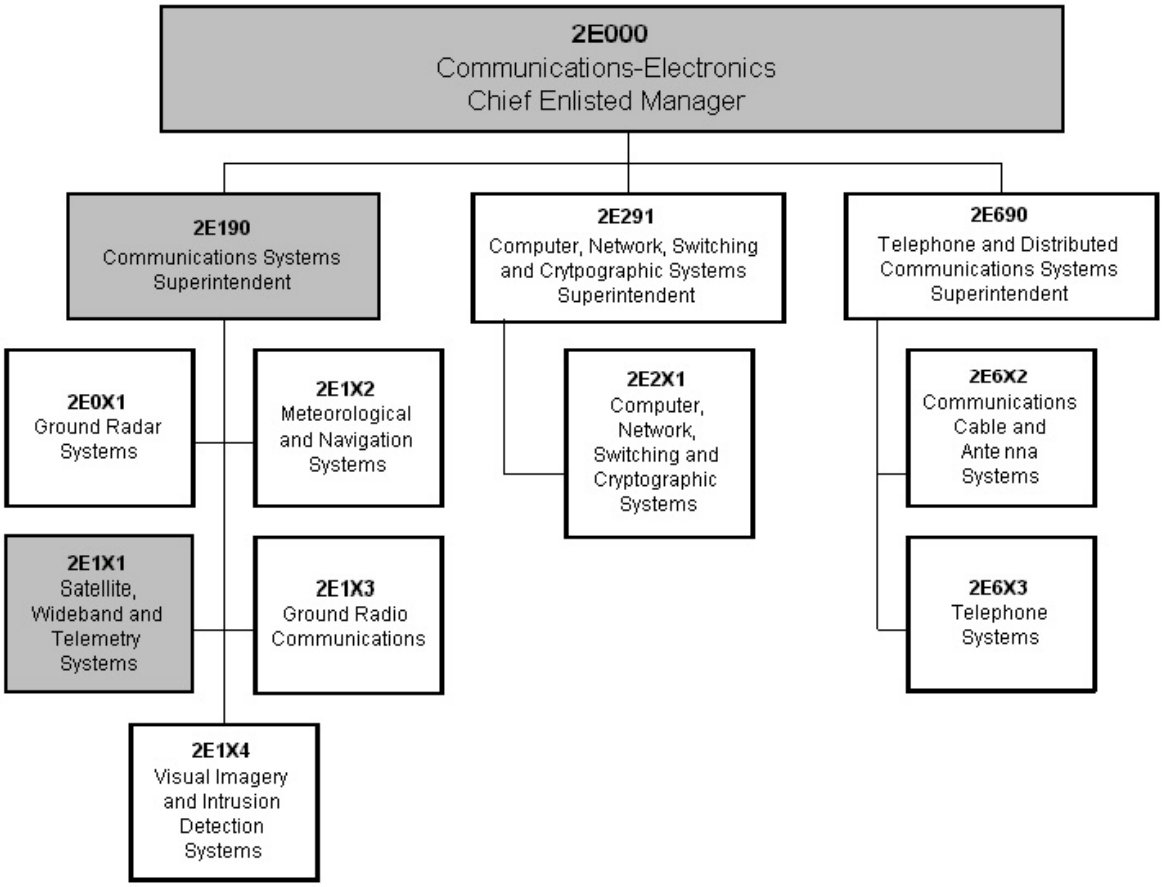
7.3.6. Program Elective (15 semester hours): Satisfied with applicable Technical Education; Leadership, Management, and Military Studies; or General Education courses, including natural science courses meeting General Education requirement application criteria. Six semester hours of CCAF degree applicable technical credit otherwise not applicable to this program may be applied.

7.4. See the current CCAF General Catalog for details regarding the Associates of Applied Science in Electronic Systems Technology. The catalog is available at your education officer or from http://www.au.af.mil/au/ccaf.

7.5. Additional off-duty education is a personal choice that is encouraged for all. Individuals desiring to become an AETC instructor should be actively pursuing an associate degree. A degreed faculty is necessary to maintain CCAF's accreditation through the Southern Association of Colleges and Schools.

8. Career Field Path. The following summarizes career progression and personnel allocations across the career ladder. 2E1XX and 2E0X1 personnel maintain their individual AFSC identifiers through the rank of MSgt. Upon promotion to SMSgt, AFSC 2E1X1, 2E1X2, 2E1X3, 2E1X4, and 2E0X1 merge to become a 2E190. At Chief, the 2E190 merges with other 2EXXX 9-level specialties to become a 2E000. Specific demographic information is available on the Web at http://www.afpc.randolph.af.mil/demographics/demograf/CAFSC.html.

2EXXX Career Field Progression



2E1X1 SATELLITE, WIDEBAND AND TELEMETRY SYSTEMS EDUCATION AND TRAINING PATH	
EDUCATION AND TRAINING REQUIREMENTS	AVERAGE SEW ON TIME AND COMMENTS
BASIC MILITARY TRAINING SCHOOL	
APPRENTICE TECHNICAL SCHOOL (3-SKILL LEVEL)	Airman..... 6 months
UPGRADE TO JOURNEYMAN (5-SKILL LEVEL) Minimum 15 months OJT training (9 months for retrainees). Completion of all 2E151 CTG core tasks and 5-Level CDCs.....Mandatory Specific AFJQSs/AFQTPs for equipment at assigned location. .....Mandatory Maintenance Management and Generic AFJQSs/AFQTPs for various unit level duties.....Mandatory AETC Supplemental training courses as determined by MAJCOM .....Optional AFETS/CFS/SMT training as determined by MAJCOM .....Optional	A1C ..... 16 months SrA ..... 3 years Earliest ..... 3 years HYT ..... 10 years
AIRMAN LEADERSHIP SCHOOL (ALS) Attendance is limited to SSgt selectees or those attaining 48 months Total Active Federal Military Service (TAFMS) or who have been selected for promotion to SSgt. Completion is mandatory before assuming the rank of SSgt. ANG/AFRC may complete by correspondence course. .....Mandatory	TRAINER: Qualified to perform the task to be trained; must attend the formal OJT Trainer Training; and appointed by the Commander. Refer to AFI 36-2201 Vol 3, Chap 6
UPGRADE TO CRAFTSMAN (7-SKILL LEVEL) Minimum rank of SSgt. 12 months OJT training (6 months for retrainees). Completion of all 2E171 CTG core tasks and AFQTP 2EXXX-201L, Communications-Electronics Work Center Manager's Handbook. Attendance at formal 7-level school. Must be 7-level to sew on TSgt.....Mandatory Maintenance Management and Generic AFJQSs/AFQTPs for various unit level duties.....Mandatory AETC Supplemental training courses as determined by MAJCOM.....Optional AFCA Systems Seminar at Scott AFB. Consult your MAJCOM for course quotas.....Optional AFETS/CFS/SMT training as determined by MAJCOM .....Optional	SSgt ..... 7.5 years Earliest ..... 3 years HYT ..... 20 years TSgt..... 12.5 years Earliest ..... 5 years HYT ..... 22 years CERTIFIER: Must be at least a SSgt (E-5) with a 5-skill level or civilian equivalent; attend the Air Force Training Course; be capable of evaluating the task being certified; evaluate training and certify qualifications. Refer to AFI 36-2201 Vol 3, Chap 6

2E1X1 SATELLITE, WIDEBAND AND TELEMETRY SYSTEMS EDUCATION AND TRAINING PATH	
EDUCATION AND TRAINING REQUIREMENTS	AVERAGE SEW ON TIME AND COMMENTS
NONCOMMISSIONED OFFICER ACADEMY (NCOA). Attendance is limited to TSgt and TSgt selectees. Completion is mandatory before assuming the rank of MSgt. ANG/AFRC may attend the in-residence as SSgt or TSgt or complete correspondence course. NCOA Correspondence Course.....Optional	MSgt..... 16 years Earliest ..... 8 years HYT ..... 24 years
USAF SENIOR NONCOMMISSIONED OFFICER ACADEMY (SNCOA) Attendance is limited to SMSgt, SMSgt selectees, and selected MSgts. Completion is mandatory before assuming the rank of CMSgt. .....Mandatory SNCOA Correspondence Course .....Optional ANG/AFRC may complete by correspondence course. ANG/AFRC MSgts may attend in-residence.....Mandatory	SMSgt ..... 19.2 years Earliest ..... 11 years HYT ..... 26 years
UPGRADE TO SUPERINTENDENT (9-SKILL LEVEL) Minimum rank of SMSgt. Complete AFQTP 2EXXX-201LB, Communications-Electronics Manager's Handbook. .....Mandatory Maintenance Management and Generic AFJQSs/AFQTPs for various unit level duties. .....Mandatory	CMSgt ..... 21.5 years Earliest ..... 14 years HYT ..... 30 years

NOTE 1: Published sew on times are Air Force averages. Refer to the Air Force Personnel Center's homepage to determine career field specific information: http://www.afpc.randolph.af.mil/eprom.

NOTE 2: See Part II, Section D for a list of AFJQSs/AFQTPs, AETC supplemental, and AFETS/CFS/SMT training.

Section C - Skill Level Training Requirements

9. Purpose. The various skill levels in the career field are defined in terms of tasks and knowledge requirements for each skill level in the Satellite, Wideband and Telemetry Systems career field of the Communications-Electronics Systems career ladder. They are stated in broad, general terms and establish the standards of performance. An all encompassing core task list has not been developed for this specialty because of the diversity of the missions supported and the equipment installed to meet mission requirements. Core tasks, knowledge items, and skill requirements for this specialty are identified in the STS, CDCs, AFJQSs/AFQTPs, etc. Completion of the mandatory 3-level skill awarding course, CDCs, 7-level course, and applicable AFJQSs/AFQTPs define the Air Force core tasks for this specialty.

10. Specialty Qualification Requirements.

10.1. **Apprentice (3-Level) Training.**

KNOWLEDGE	Application and theory of electronics including solid state components and digital techniques, integrated circuits, transistors, micro-miniature components, fiber optics, amplifiers, waveguide components, traveling wave tubes; Principles of computers, networks, cryogenics, spread spectrum techniques, and satellite tracking; theory of instrumentation and telemetry systems; pulse and continuous modulation, synchros; servo drives; high power transmission systems and associated environmental control systems; Space systems equipment operational procedures; data transmission; orbital mechanics; analog-to-digital and digital-to-analog conversion and hydraulics; Data analysis; interpreting publications, blueprints and schematics; communications theory; principles of wideband and satellite earth terminal systems and equipment, and their operational procedures; satellite orbital mechanics; test equipment and circuit analysis; Principles of multiplexing, digital data transmission; networks associated with multi-channel equipment; installing and testing practices; atomic frequency generating devices; voice and data communication equipment including Defense Information Systems Agency technical and satellite control and testing procedures and interpretation of technical data; military specifications and standards; and Air Force maintenance management and supply procedures; Application of mathematics, including algebraic formulas and physics to instrumentation and telemetry systems
EDUCATION	Completion of high school with courses in geometry, trigonometry, algebra, and physics.
TRAINING	Electronics Principles, course L3AQR2E131 481 (PDS Code PO1) (See Attachment 1 of the STS for course training standard) Satellite, Wideband and Telemetry Systems Apprentice, course E3ABP2E131 000 (PDS Code I18) (See Attachment 2 of the STS for course training standard)
EXPERIENCE	None required.

OTHER	Normal color vision is required for entry into this AFSC as defined by AFI 48-123, *Medical Examination and Standards*. Eligibility for a Secret security clearance according to AFI 31-501, *Personnel Security Program Management*, is mandatory for award and retention of this AFSC.
IMPLEMENTATION	Entry into training is accomplished by reserving a position in the career field upon entry into the Air Force.

10.2. **Journeyman (5-Level) Training.**

KNOWLEDGE	No additional knowledge requirements.
TRAINING	No AETC training requirement.
EXPERIENCE	Qualification and possession of AFSC 2E131 Experience in functions such as analyzing, testing, calibrating, or maintaining satellite systems equipment, assembly, installation, repair, modification, and operation of instrumentation and telemetry systems; adjusting and calibrating instrumentation components; replacing defective parts or repairing faulty components; installing, maintaining, repairing, modifying or operating wideband and satellite earth terminal communications systems. Completion of the 2E151 Career Development Course Completion of all 2E151 CTG core tasks (See Attachment 3 of the STS for career training guide) Completion of applicable equipment AFJQSs/AFQTPs Completion of all local tasks assigned for the duty position
OTHER	Eligibility for a Secret security clearance according to AFI 31-501, *Personnel Security Program Management*, is mandatory for award and retention of this AFSC.
IMPLEMENTATION	Entry into formal upgrade is initiated upon assignment to the individual's first duty station. Qualification training is initiated anytime individuals are assigned duties for which they are not qualified. Use CDCs and AFJQSs/AFQTPs concurrently to obtain the necessary qualification for refresher and cross-utilization training.

10.3. **Craftsman (7-Level) Training.**

KNOWLEDGE	No additional knowledge requirements.
TRAINING	Communications-Electronics Career Advancement Course (In-residence), E3ACR2EX7X 002 (PDS 7SI) [Active Duty only] Communications-Electronics Career Advancement Course (Distance learning), E6ADL2EX7X 000 (PDS Code 4VI) [Guard/Reserve only] Communications-Electronics Career Advancement Course (Self-paced), E6AZS2EX7X 006 (PDS X2J) [Prerequisite for Guard/Reserve members prior to attending the above distance learning course]
EXPERIENCE	Qualification and possession of AFSC 2E151 Experience performing or supervising satellite systems maintenance, instrumentation and telemetry systems, or wideband and satellite earth terminal communications systems. Also, experience in performing or supervising functions such as: assembly, installation, repair, modification, and operation of instrumentation and telemetry systems; repairing test equipment; adjusting and calibrating instrumentation components; replacing defective parts; or repairing faulty components. Completion of all 2E171 CTG core tasks (See Attachment 4 of the STS for career training guide) Completion of AFQTP 2EXXXX-201L, Communications-Electronics Work Center Manager's Handbook Completion of applicable equipment/unit management function AFJQSs/AFQTPs
OTHER	Eligibility for a Secret security clearance according to AFI 31-501, *Personnel Security Program Management*, is mandatory for award and retention of this AFSC.
IMPLEMENTATION	Entry into formal upgrade training is initiated when individuals obtain the necessary rank and skill level. Qualification training is initiated anytime an individual is assigned duties for which they are not qualified. Use CDCs and AFJQSs/AFQTPs concurrently to obtain the necessary qualification for refresher and cross-utilization training.

10.4. **Superintendent (9-Level) Training.**

KNOWLEDGE	Electronic principles theory and its application to ground radio, meteorological and navigation, combat camera, imagery, video, television, telemetry systems, space systems, intrusion detection, and satellite and microwave communications facilities, systems, and equipment; and their interoperability The communications and computer elements of a typical air base Interpretation of wiring and logic diagrams, blueprints, and technical orders
TRAINING	No AETC training requirement.
EXPERIENCE	Qualification and possession of AFSC 2E171 Experience is mandatory managing or directing functions such as installing, maintaining, repairing, or modifying the various systems and related equipment of the feeder specialties. AFQTP 2EXXXX-201LB, Communications-Electronics Manager's Handbook
OTHER	Eligibility for a Secret security clearance according to AFI 31-501, *Personnel Security Program Management*, is mandatory for award and retention of this AFSC.
IMPLEMENTATION	Entry into OJT is initiated when individuals are selected for the rank of SMSgt. Qualification training is initiated anytime individuals are assigned duties for which they are not qualified.

10.5. Training Sources.

10.5.1. Electronic Principles training - 338 TRS, Keesler AFB, MS at https://wwwmil.keesler.af.mil/.

10.5.2. AFSC specific training - 338 TRS, Det. 1, Fort Gordon, GA at https://wwwmil.keesler.af.mil/.

10.5.3. 2EX7X Communications-Electronics Career Advancement course (7-Level School) – 338 TRS, Keesler AFB, MS at https://wwwmil.keesler.af.mil/.

10.5.4. CDC 2E151 is available for upgrade purposes through the unit training manager. For individual qualification and cross-utilization training, CDCs are ordered through the unit training office.

10.5.5. AFJQSs/AFQTPs are Air Force publications and are mandatory for use in qualification training. They are developed by the 81 TRSS (Q-Flight), Keesler AFB, MS and may be downloaded from https://wwwmil.keesler.af.mil/81trss/qflight/WebPages/home.html. Procedures for requesting development of AFJQSs/AFQTPs are contained in AFI 36-2233 *Air Force On-the-Job Training Products for Communications-Electronics Enlisted Specialty Training*. AFJQSs/AFQTPs are listed in Part II, Section D, of this CFETP.

10.5.6. Air Force Engineering and Technical Service (AFETS) (course listing found at https://www.afca.scott.af.mil/c-e_maint/afets.htm), Contract Field Service (CFS), and Special Maintenance Team (SMT) training may be requested to provide on-site training. The AFETS program is outlined in AFI 21-110, *Engineering and Technical Services Management and Control*. Direct requests for AFETS, CFS, or SMT training to your MAJCOM.

Section D - Resource Constraints

11. Purpose. This section identifies known resource constraints that preclude optimal/desired training from being developed or conducted, including information such as part numbers, national stock numbers, number of units required, cost, manpower, etc. Included are narrative explanations of each resource constraint and an impact statement describing what effect each constraint has on training. Finally, this section includes actions required, OPR, and target completion date. Resource constraints will be, at a minimum, reviewed and updated annually.

12. Apprentice (3-Level) Training.

12.1. Constraints: None.

12.1.1. Impact. N/A

12.1.2. Resources Required. N/A

12.1.3. Action Required. N/A

12.2. OPR/Target Completion Date. N/A

13. Journeyman (5-Level) Training.

13.1. Constraints: None.

13.1.1. Impact. N/A

13.1.2. Resources Required. N/A

13.1.3. Action Required. N/A

13.2. OPR/Target Completion Date. N/A

14. Craftsman (7-Level) Training.

14.1. Constraints: None.

14.1.1. Impact. N/A

14.1.2. Resources Required. N/A

14.1.3. Action Required. N/A

14.2. OPR/Target Completion Date. N/A

Section E - Transition Training Guide

15. There are currently no transition training requirements. This area is reserved.

PART II

Section A - Specialty Training Standard

1. Implementation. The implementation of training in support of this STS is with the class beginning 20030107 and graduating 200300513.

2. Purpose. As prescribed in AFI 36-2201, this STS:

2.1. The Course Training Standards (CTS) at Attachments 1 and 2:

2.1.1. Establishes the training requirements for airmen to perform 3-skill level duties in the Satellite, Wideband and Telemetry Systems career ladder of the Airman Communications-Electronics Systems career field. The training tasks are based on an analysis of duties in AFMAN 36-2108 for AFSC 2E131.

2.1.2. Provides the basis for the development of more detailed training materials, training objectives, and training evaluation instruments for the course.

2.1.3. Shows formal training requirements. Attachment 1 lists the Electronic Principles requirements for this specialty and contains the proficiency code key pertaining to this attachment. Students receive this training through AETC course L3AQR2E131 481.

2.1.4. Attachment 2 contains a list of behavioral statements that describe knowledge and job performance requirements the graduate demonstrates on the job as a result of training received in course E3ABP2E131 001 as described in the Air Force Education and Training Course Announcements (ETCA) database (formerly AFCAT 36-2223, USAF Formal Schools Catalog). Part I, Section D, and the Preface to Attachment 2 explains constraints and/or guidelines to training. When notes or explanations describe constraints in the skill awarding course, they indicate that training on those items is restricted due to the limitation described.

2.2. The Five-Level Career Training Guide (CTG) at Attachment 3:

2.2.1. Provides a complete list of continuation training requirements for the award of AFSC 2E151. Attachment 3 contains the behavioral code key used to indicate the type of training provided by CDCs.

2.2.2. Identifies the mandatory task and knowledge training that is required for the 5-skill level in the Satellite, Wideband and Telemetry Systems career field of the Airman Communications-Electronic Systems career ladder. These are based on an analysis of duties and responsibilities as outlined in AFMAN 36-2108.

2.3. The Seven-Level Career Training Guide (CTG) at Attachment 4:

2.3.1. Provides a complete list of continuation training requirements for the award of AFSC 2E171. Attachment 4 contains the behavioral code key used to indicate the type of training that will be provided.

2.3.2. Identifies the mandatory task and knowledge training that is required for the 7-skill level in the Satellite, Wideband and Telemetry Systems career ladder of the Airman Communications-Electronics Systems career field. These are based on an analysis of duties and responsibilities as outlined in AFMAN 36-2108.

2.4. The CTGs at Attachments 3 and 4:

2.4.1. Provide OJT certification columns to record completion of task and knowledge training requirements. Use automated training management systems to document technician qualifications, if available. Task certification must show a start and stop date.

2.4.2. Become a job qualification standard for OJT when placed in AF Form 623, On-the-Job Training Record, and used according to AFI 36-2201. OJT tasks in column 1 are trained to the go/no go level. Go means the individual can perform the task without assistance and meet local requirements for accuracy, timeliness, and correct use of procedures.

2.4.2.1. Training Documentation. Document and certify completion of training. Identify duty position requirements by circling the subparagraph number next to the task statement. Complete the following columns in Part II of the CFETP:

2.4.2.1.1. Initial Certification. Evaluate qualifications and when verified, certify using:

2.4.2.1.1.1. Core/Critical Tasks. Start date, stop date, trainee's initials, trainer's initials, and certifier's initials.

2.4.2.1.1.2. Non-Core/Non-Critical Tasks. Start date, stop date, trainee's initials, and trainer's initials.

2.4.2.1.2. Transcribing from Old Document to CFETP. Evaluate current qualifications and when verified recertify using:

2.4.2.1.2.1. Tasks Previously Certified and Required in Current Duty Position (Core/Critical Tasks). Current date as completion date, trainee's initials, and certifier's initials.

2.4.2.1.2.2. Tasks Previously Certified and Required in Current Duty Position (Non-Core/Non-Critical Tasks). Current date as completion date, trainee's initials, and trainer's initials.

2.4.2.1.2.3. Tasks Previously Certified but Not Required in Current Duty Position. Carry forward only the previous completion date of certification (not the initials of another person). If and when transcribed tasks become duty position requirements, recertify using standard certification procedures.

2.4.2.1.2.4. The person whose initials appear in the trainer or certifier block during the transcription process must meet the requirements of their prescribed role.

2.4.2.1.2.5. Give the member the old CFETP upon completion of transcription.

2.4.2.1.3. Documenting Career Knowledge. When a CDC is not available: the supervisor identifies STS training references the trainee requires for career knowledge and ensures, as a minimum, that trainees cover the mandatory items in AFMAN 36-2108, *Developing, Managing, and Conducting Training*. For two time CDC course exam failures, supervisors identify all STS items corresponding to the areas covered by the CDC. The trainee completes study of the STS references, undergoes evaluation by the task certifier, and receives certification on the STS. NOTE: Career knowledge must be documented prior to submitting a CDC waiver.

2.4.2.1.4. Decertification and Recertification. When an airman is found to be unqualified on a task previously certified, the supervisor lines through the previous certification or deletes the previous certification when using an automated system. Appropriate remarks are entered on the AF Form 623A, On-The-Job Training Record Continuation Sheet, as to the reason for decertification. The individual is recertified using the normal certification process.

2.4.3. Indicates career knowledge provided in the 5-skill level CDCs. See Air Force Institute for Advanced Distributed Learning (AFIADL) catalog maintained by the unit OJT manager for current CDC listings or go to http://www.maxwell.af.mil/au/afiadl/

2.4.4. Are guides for development of promotion tests used in the Weighted Airman Promotion System (WAPS). Specialty Knowledge Tests (SKT) are developed at the USAF Occupational Measurement Squadron by senior NCOs with extensive practical experience in their career fields. The tests sample knowledge of CTG subject matter areas judged by test development team members to be most appropriate for promotion to higher grades. Questions are based upon study references listed in the WAPS catalog. Individual responsibilities are listed in chapter 1 of AFI 36-2605, *Air Force Military Personnel Testing System.* WAPS is not applicable to the Air National Guard or Air Reserve forces.

3. Recommendations. Comments and recommendations are invited concerning the quality of AETC training. A Training Feedback Hotline (TFH) has been installed for the supervisors' convenience. For a quick response to concerns, call our TFH at DSN 597-4566, fax us at DSN 597-3790, or e-mail us at, 81trg-tget@keesler.af.mil. Reference this CTS and identify the specific area of concern (paragraph, training standard element, etc).

BY ORDER OF THE SECRETARY OF THE AIR FORCE

OFFICIAL

MICHAEL E. ZETTLER, Lieutenant General, USAF
Deputy Chief of Staff /Installations & Logistics

Attachments:
1. Electronic Principles Course Training Standard
2. Course Training Standard, 2E131
3. Five-Level Career Training Guide, 2E151
4. Seven-Level Career Training Guide, 2E171

PREFACE

NOTE 1: Dashed items in this CTS are not part of the original CTS created at the August 1999 Electronic Principles U&TW however, they are the specific objectives taught in the Electronic Principles course designed to meet the CTS requirements.

NOTE 2: Unless otherwise stated, students may be allowed two assists from the instructor and still successfully achieve the proper level of proficiency. An instructor assist is anytime an instructor must intercede to provide guidance to a student which leads to a satisfactory completion of the objective or to prevent the student from continuing in a manner that will lead to an unsatisfactory conclusion, safety violation, or damage to equipment.

NOTE 3: All objectives are trained during wartime.

PROFICIENCY CODE KEY		
	SCALE VALUE	DEFINITION: The individual
Task Performance Levels	1	Can do simple parts of the task. Needs to be told or shown how to do most of the task. (EXTREMELY LIMITED)
	2	Can do most parts of the task. Needs help only on hardest parts. (PARTIALLY PROFICIENT)
	3	Can do all parts of the task. Needs only a spot check of completed work. (COMPETENT)
	4	Can do the complete task quickly and accurately. Can tell or show others how to do the task. HIGHLY PROFICIENT)
***Task Knowledge Levels**	a	Can name parts, tools, and simple facts about the task. (NOMENCLATURE)
	b	Can determine step-by-step procedures for doing the task. (PROCEDURES)
	c	Can identify why and when the task must be done and why each step is needed. (OPERATING PRINCIPLES)
	d	Can predict, isolate, and resolve problems about the task. (COMPLETE THEORY)
****Subject Knowledge Levels**	A	Can identify basic facts and terms about the subject. (FACTS)
	B	Can identify relationship of basic facts and state general principles about the subject. (PRINCIPLES)
	C	Can analyze facts and principles and draw conclusions about the subject. (ANALYSIS)
	D	Can evaluate conditions and make proper decisions about the subject. (EVALUATION)

EXPLANATIONS

* A task knowledge scale value may be used alone or with a task performance scale value to define a level of knowledge for a specific task. (Examples: b and 1b)

** A subject knowledge scale value is used alone to define a level of knowledge for a subject not directly related to any specific task or for a subject common to several tasks.

X This mark is used alone instead of a scale value to show that no proficiency training is provided in the course.

\- This mark is used alone in course columns to show that training is required, but not given, due to limitations in resources.

PROFICIENCY CODE

1. ELECTRONIC SUPPORT SUBJECTS.

1.1. Safety. B
- Identify safety precautions pertaining to electronics.

1.2. First Aid. B
- Identify first aid procedures for electrical injuries.

1.3. Electrostatic Discharge (ESD) Control. B
- Identify electrostatic discharge (ESD) sensitive device control methods.

1.4. Electromagnetic Effects (EMP/EMI). B
- Identify the techniques used to protect electronic equipment from the effects of electromagnetics (EMP/EMI).

1.5. Metric Notation.

1.5.1. Powers of Ten. B
- Convert decimal numbers to scientific notation and vice versa.
- Perform math operations of numbers expressed as scientific notation.

1.5.2. Electrical Prefixes. B
- Convert decimal numbers to electrical prefixes and vice versa.
- Convert electrical prefix values to other equivalent electrical prefix values.

2. TEST EQUIPMENT.

2.1. Analog Multimeter. 2b
- Identify the operating principles of the analog multimeter.
- Identify procedures for analog multimeter usage.
- Measure selected electrical values using analog and digital multimeters.

2.2. Digital Multimeter. 2b
- Identify the operating principles of the digital multimeter.
- Identify procedures for digital multimeter usage.
- Measure selected electrical values using analog and digital multimeters.

2.3. Oscilloscope. 2b
- Identify oscilloscope operating principles.
- Identify the procedures for oscilloscope usage.
- Measure selected electrical values using an oscilloscope and signal generator.

2.4. Signal Generator. 2b
- Identify the procedures for signal generator usage.
- Measure selected electrical values using an oscilloscope and signal generator.

PROFICIENCY CODE

3. BASIC CIRCUITS.

3.1. Direct Current (DC).

3.1.1. Terms. B
- Identify terms associated with direct current (DC) principles

3.1.2. Theory. B
- Identify circuit schematic symbols.
- Identify basic circuit operating principles.
- Determine the results of parameter changes on DC resistive circuits.
- Identify resistor voltage divider operating principles.

3.1.3. Calculations. B
- Calculate values for a series resistive DC circuit diagram.
- Calculate values for a parallel resistive DC circuit diagram.
- Calculate values for a series-parallel resistive DC circuit diagram.

3.2. Alternating Current (AC).

3.2.1. Terms. B
- Identify terms associated with AC principles.

3.2.2. Calculations. B
- Calculate AC voltage values.
- Calculate AC frequency/time values.

4. BASIC CIRCUIT COMPONENTS.

4.1. Resistors.

4.1.1. Theory. B
- Identify resistor characteristics.

4.1.2. Color Code. B
- Using resistor color code, determine the ohm/tolerance value of resistors.

4.1.3. Troubleshoot. 2b
- Troubleshoot a series-parallel resistive circuit to a faulty resistor.

4.2. Inductors.

4.2.1. Theory. B
- Identify characteristics of inductors.
- Identify inductor DC operating principles.
- Identify inductor AC operating principles.

4.2.2. Troubleshoot. 2b
- Troubleshoot a faulty inductor in a circuit.

PROFICIENCY CODE

4.3. Capacitors.

4.3.1. Theory. B
- Identify characteristics of capacitors.
- Identify capacitor DC operating principles.
- Identify capacitor AC operating principles.

4.3.2. Troubleshoot. 2b
- Troubleshoot a faulty capacitor in circuit.

4.4. Resistive-Capacitive-Inductive (RCL) Circuit Theory.

4.4.1. Basic. B
- Identify RCL circuit operating principles.

4.4.2. Resonant. B
- Identify resonant RCL circuit operating principles.

4.4.3. Frequency Sensitive Filter. B
- Identify frequency sensitive filter operating principles.

5. ELECTROMAGNETIC DEVICES.

5.1. Transformers.

5.1.1. Theory. B
- Identify characteristics of transformers.
- Identify transformer operating principles.

5.1.2. Troubleshoot. 2b
- Troubleshoot a faulty transformer.

5.2. Relays and Solenoids.

5.2.1. Theory. B
- Identify relay and solenoid operating principles.

5.2.2. Troubleshoot Relays. 2b
- Troubleshoot a faulty relay in a circuit.

5.3. Motor Theory.

5.3.1. Direct Current. B
- Identify DC motor operating principles.

5.3.2. Alternating Current. B
- Identify AC motor operating principles.

PROFICIENCY CODE

5.4. Generator Theory.

5.4.1. Direct Current. B
- Identify DC generator operating principles.

5.4.2. Alternating Current. B
- Identify AC generator operating principles.

5.5. Synchro/Servo.

5.5.1. Theory. B
- Identify servo/synchro operating principles.

5.5.2. Fault Isolate. 2b
- Identify servo/synchro fault isolation procedures.

5.6. Transducer Theory. B
- Identify transducer operating principles.

6. SOLID STATE DEVICES.

6.1. Diodes.

6.1.1. Theory. B
- Identify solid state diode operating principles.

6.1.2. Troubleshoot. 2b
- Identify diode fault isolation techniques.
- Troubleshoot a diode circuit.

6.2. Bipolar Junction Transistors.

6.2.1. Theory. B
- Identify bipolar transistor operating principles.

6.2.2. Troubleshoot. 2b
- Troubleshoot a bipolar junction transistor circuit.

6.3. Special Purpose Device Theory.

6.3.1. Zener Diode. B
- Identify zener diode operating principles.

6.3.2. Light Emitting Diode (LED). B
- Identify LED operating principles.

6.3.3. Liquid Crystal Display (LCD). B
- Identify LCD operating principles.

PROFICIENCY CODE

6.3.4. Integrated Circuits (IC). B
- Identify integrated circuit (IC) operating principles.

6.3.5. Metal Oxide Semiconductor Field Effect Transistor (MOSFET). B
- Identify MOSFET operating principles.

6.3.6. Operational Amplifier (OP AMP). B
- Identify OP AMP operating principles.

7. TRANSISTOR AMPLIFIER CIRCUITS.

7.1. Theory. B
- Identify the transistor amplifier configurations.
- Identify common emitter amplifier operating principles.
- Identify common collector amplifier operating principles.
- Identify common base amplifier operating principles.

7.2. Stabilization. B
- Identify transistor amplifier temperature stabilization operating principles.

7.3. Coupling. B
- Identify coupling circuit operating principles.

7.4. Troubleshoot. 2b
- Troubleshoot a transistor amplifier circuit to a faulty component.

8. POWER SUPPLY CIRCUITS.

8.1. Theory.

8.1.1. Rectifiers. B
- Identify power supply rectifier operating principles.

8.1.2. Filters. B
- Identify power supply filter operating principles.

8.1.3. Voltage Regulators. B
- Identify shunt regulator operating principles.
- Identify series electronic voltage regulator (EVR) operating principles.

8.2. Troubleshoot. 2b
- Identify types of malfunctions in a filtered power supply circuit.
- Troubleshoot a filtered power supply circuit to a faulty component.
- Troubleshoot a series EVR circuit to a faulty component.

PROFICIENCY CODE

9. WAVE GENERATING CIRCUITS.

9.1. Theory.

9.1.1. Oscillators. B
- Identify the characteristics of oscillator circuits.
- Identify LC oscillator operating principles.
- Identify crystal oscillator operating principles.

9.1.2. Multivibrators. B
- Identify astable multivibrator operating principles.
- Identify monostable multivibrator operating principles.
- Identify bistable multivibrator operating principles.

9.1.3. Waveshaping Circuits. B
- Identify RC integrating/differentiating circuit operating principles.
- Identify sawtooth generator operating principles.

9.2. Fault Isolate. 2b
- Fault isolate a wave generating circuit.

10. DIGITAL NUMBERING SYSTEMS.

10.1. Conversions.

10.1.1. Binary. B
- Identify principles of binary conversions.

10.1.2. Octal. B
- Identify principles of octal conversions.

10.1.3. Hexadecimal. B
- Identify principles of hexadecimal conversions.

10.1.4. Binary Coded Decimal. B
- Identify principles of binary coded decimal (BCD) conversions.

10.2. Binary Math Operations. B
- Determine the results of math operations.

11. DIGITAL LOGIC CIRCUITS.

11.1. Theory.

11.1.1. Gates. B
- Identify principles of logic gate operation.

11.1.2. Flip-Flops. B
- Identify principles of flip-flop operation.

PROFICIENCY CODE

11.1.3. Counters. B
- Identify operating principles of counters.

11.1.4. Registers. B
- Identify operating principles of registers.

11.1.5. Combinational Logic Circuits. B
- Identify operating principles of combinational logic circuits.

11.2. Troubleshoot. B
- Troubleshoot a combinational logic circuit.

11.3. Digital-to-Analog (D/A) and Analog-to-Digital (A/D) Converter Theory. B
- Identify operating principles of a digital-to-analog (D/A) converters.
- Identify operating principles of analog-to-digital (A/D) converters.

12. BASIC COMPUTER FUNDAMENTALS.

12.1. Computer Theory.

12.1.1. Hardware. B
- Identify computer hardware operating principles.

12.1.2. Software.

12.1.2.1. Operating Systems. B
- Identify computer operating systems principles.

12.1.2.2. Virus Protection. B
- Identify computer virus protection operating principles.

12.1.2.3. Diagnostics. B
- Identify computer diagnostics operating principles.

12.1.2.4. Applications. B
- Identify computer applications operating principles.

12.1.3. Peripherals. B
- Identify computer peripheral devices operating principles.

12.2. Network Theory.

12.2.1. Components. B
- Identify basic network hardware component operating principles.

12.2.2. Types. B
- Identify basic network communication system types.

12.2.3. Topologies. B
- Identify basic network physical topologies.

	PROFICIENCY CODE
12.2.4. Communication Mediums. – Identify network medium operating principles.	B
13. BASIC COMMUNICATIONS THEORY.	
13.1. Antenna. – Identify antenna operating principles.	B
13.2. Transmission Lines. – Identify transmission line theory of operation.	B
13.3. Waveguides. – Identify waveguide operating principles.	B
13.4. Transmitters.	
13.4.1. Amplitude Modulation (AM). – Identify AM transmitter operating principles.	B
13.4.2. Frequency Modulation (FM). – Identify FM transmitter operating principles.	B
13.5. Receivers.	
13.5.1. AM Receivers. – Identify AM receiver operating principles.	B
13.5.2. FM Receivers. – Identify FM receiver operating principles.	B
14. SOLDER AND DESOLDER.	
14.1. Terminal Connection. – Solder a wire to a terminal connector. – Desolder a wire from a terminal connector.	2b
14.2. Printed Circuit Board (PCB). – Solder three components to a PCB. – Desolder three components from a PCB.	2b
14.3. Multipin Connector. – Solder a tinned wire into a pin for use in a multipin connector. – Desolder a wire from a pin used in a multipin connector.	2b
14.4. Coaxial Connector. – Solder a coaxial connector center contact to a coaxial cable. – Desolder a coaxial connector center contact from a coaxial cable.	2b

PROFICIENCY CODE

15. ASSEMBLE SOLDERLESS CONNECTORS.

15.1. Crimped Connection. 2b
- Splice two wires together using a crimp connector.
- Crimp a terminal lug to a wire.

15.2. Coaxial Connector. 2b
- Assemble a solderless coaxial cable connector to a coaxial cable.

15.3. Multipin Connector. 2b
- Crimp a wire into a pin for use in a multipin connector.
- Assemble a multipin connector.

PREFACE

NOTE 1: In the event of data network or computer system failures, courses are authorized to use alternative methods of instruction to fulfill this CTS element.

NOTE 2: Unless otherwise stated in the objective, the student may be allowed two assists from the instructor and still successfully achieve the proper level of proficiency. An instructor assist is defined as anytime an instructor must intercede to provide guidance to a student which leads to a satisfactory completion of the objective or to prevent a student from continuing in a manner which will lead to an unsatisfactory conclusion, safety violation, or damage to the equipment. Successful students have performed the task to the satisfaction of the course; however, they may not be capable of meeting the field requirements for speed or accuracy.

NOTE 3: All equipment related objectives are performed by following procedures from technical orders, technical manuals, or student instructional material developed by the training facility. Test equipment used throughout the course includes:

Multimeter	Attenuators
Power Meter	Bit Error Rate Test Set
Signal\Sweep Generator	Built-in Test Equipment
Spectrum Analyzer	Oscilloscope
Frequency Counter	

NOTE 4: The equipment items identified below are used as training vehicles within the skill awarding course since it incorporates most of the basic principles and procedures found in the remainder of the AFSC's equipment inventory.

AN/TSC-85B(V)2	AN/TRC-170
AN/TSC-93B(V)2	AN/TSC-152A
AN/TSC-94A(V)1	TD-1234
AN/TSC-100A(V)1	TROPO Satellite Support Radio
Network Bandwidth Management Equipment (Promina)	

NOTE 5: All objective references are performed as terminal objectives. Knowledge required to perform CTS elements is inherent in each objective. This includes, but is not limited to, defining the capabilities, limitations, and theory of operation of the stated item.

NOTE 6: All objectives preceded by an “*” are trained during wartime.

1. GENERAL PRINCIPLES.

1.1. Standard Maintenance Practices.

1.1.1. Describe basic troubleshooting procedures.

*1.1.2. State facts relating to the theory and operation of local and remote loopbacks.

1.1.3. Locate information about AF maintenance practices (AFI 21-116).

*1.1.4. Describe how to locate system components using alphanumeric designator.

*1.1.5. Demonstrate use of technical publications.

1.2. Maintenance Data Collection (MDC).

1.2.1. Describe the purpose and importance of documenting the maintenance Data.

1.2.2. Input maintenance data using an automated maintenance data collection system. Note 1

1.2.3. State facts about the purpose and use of the material deficiency reporting system.

1.2.4. State facts about the purpose and use of preventive maintenance inspection and equipment status reporting.

1.2.5. Identify the procedures used to process and control materiel.

1.2.6. Research parts information using applicable manuals.

*1.3. Perform power measurement calculations.

1.4. Identify basic facts of the 2E1X1 career field.

*1.5. Identify security concerns of the 2E1X1 career field.

*1.6. Operational Risk Management (ORM).

1.6.1. State hazards associated with the AFSC.

1.6.2. State basic facts and terms about AFOSH standards for the AFSC.

1.6.3. Practice safety precautions during maintenance actions.

1.7. Agile logistics (supply, inventory management).

1.7.1. State facts about agile logistics.

1.7.2. Describe the flow of parts (depot/commercial vendor).

1.7.3. Describe the technician’s role in agile logistics.

1.8. Identify the purposes of equipment associated with the 2E1X1 career field.

1.9. Test Range Mission – In this subject area, the student shall:

1.9.1. Identify purposes and principles of Research and Development.

1.9.2. Identify purposes and principles of Operational Test and Evaluation.

1.9.3. Identify purposes and principles of Instrumentation Systems.

1.9.4. Identify purposes and principles of Telemetry Systems.

1.9.5. Identify purposes and principles of Range Commander's Council.

1.9.6. Identify purposes and principles of Applicable Range Standards.

1.9.7. Identify purposes and principles of Test Range Functions.

1.10. Space Systems and Equipment.

1.10.1. Identify principles pertaining to the Defense Support Program (DSP) Satellite Ground Station (SGS).

1.10.1.1. Identify principles pertaining to the Satellite Readout Station Upgrade (SRSU).

1.10.1.2. Identify principles pertaining to the Data Reduction Center.

1.10.1.3. Identify principles pertaining to the Satellite Operations Center.

1.10.2. Identify principles pertaining to the AN/MSQ-118 System.

1.10.3. Identify principles pertaining to the Simplified Processing Station Replacement (SPSR/U).

1.10.4. Identify principles pertaining to the MARK IVB Meteorological Data Station (MDS).

1.10.5. Identify principles pertaining to the Global Positioning System (GPS).

*2. TEST EQUIPMENT.

2.1. Know the purposes of selected types of equipment used in the 2E1X1 career field.

2.2. Know the principles, capabilities, and limitations of the test equipment listed in Note 3.

2.3. Operate the test equipment listed in Note 3.

*3. DIGITAL MULTIPLEXER EQUIPMENT.

3.1. Identify principles, capabilities, and limitations of time division multiplexing equipment.

3.2. Perform an operational check of a time division multiplexer.

3.3. Configure a time division multiplexer for operation.

3.4. Troubleshoot and repair a time division multiplexer.

*4. MODULATION EQUIPMENT.

4.1. Identify principles, capabilities, and limitations of modulation equipment.

4.2. Identify principles, capabilities and limitations of digital MODEMS.

4.2.1. Spread Spectrum Multiple Access (SSMA) digital modem.

4.2.2. Time Division Multiple Access (TDMA) digital modem.

4.2.3. Demand Access Multiple Assigned (DAMA) digital modem.

4.3. Perform an operational check on a Digital MODEM.

4.4. Troubleshoot and repair a digital MODEM.

*5. FREQUENCY GENERATION AND CONVERSION EQUIPMENT.

5.1. Identify principles, capabilities, and limitations of frequency conversion and generation equipment.

5.2. Perform an operational check of a frequency standard.

5.3. Perform an operational check on an up-converter.

5.4. Configure an upconverter.

5.5. Troubleshoot and repair an upconverter.

5.6. Perform operational checks on a downconverter.

5.7. Configure a downconverter.

5.8. Troubleshoot and repair a downconverter.

*6. LOW NOISE AMPLIFIER (LNA)

6.1. Identify principles, capabilities, and limitations of a LNA.

6.2. Perform an operational check on LNA

6.3. Troubleshoot and repair an LNA

*7. TIMING AND SYNCHRONIZATION.

7.1. Identify principles, capabilities, and limitations of timing and synchronization.

7.2. Troubleshoot and repair timing and synchronization equipment.

*8. LINE-OF-SIGHT (LOS) SYSTEMS.

8.1. Identify principles, capabilities, and limitations of LOS systems.

8.2. Perform operational checks on a digital LOS radio.

8.3. Troubleshoot and repair a digital LOS radio.

*9. AN/TRC-170 TROPOSPHERIC SCATTER SYSTEMS.

9.1. Identify principles, capabilities, and limitations of a Tropospheric Scatter radio system.

9.2. Perform an operational check of Tropospheric Scatter digital multiplexer equipment.

9.3. Configure an Tropospheric Scatter digital multiplexer.

9.4. Perform an operational check of a Tropospheric Scatter equipment modem.

9.5. Configure an Tropospheric Scatter equipment modem.

9.6. Perform an operational check of a Tropospheric equipment radio subsystem.

9.7. Configure an Tropospheric Scatter equipment radio subsystem.

9.8. Identify principles and capabilities of control orderwires.

9.9. Configure the patch panels for operation.

9.10. Identify principles and capabilities of power distribution.

9.11. Identify principles and capabilities of system monitoring.

9.12. Perform system testing of Tropospheric Scatter equipment.

9.13. Troubleshoot the Tropospheric Scatter radio set.

9.14. Monitor circuit link quality on the Tropospheric Scatter radio equipment.

9.15. Perform an operational check of the Tropospheric Scatter equipment communications link.

9.16. Configure an Tropospheric Scatter equipment system to establish a communications link.

10. Identify principles capabilities and limitations of satellite tracking systems.

*11. DEPLOYABLE SHF SATELLITE SYSTEMS.

11.1. Identify principles of operations of SHF satellite systems.

11.2. Perform an operational check of a SHF tactical satellite equipment digital multiplexer.

11.3. Configure a SHF tactical satellite equipment digital multiplexer.

11.4. Perform an operational check of a SHF tactical satellite equipment modem.

11.5. Configure a SHF tactical satellite equipment modem.

11.6. Perform an operational check of a SHF tactical satellite equipment radio subsystem.

11.7. Configure a SHF tactical satellite equipment radio subsystem.

11.8. Perform an operational check of SHF tactical satellite antenna control equipment.

11.9. Troubleshoot and repair SHF tactical satellite antenna control equipment.

11.10. Identify principles and capabilities of control orderwires.

11.11. Identify principles and capabilities of power distribution.

11.12. Identify principles and capabilities of system monitoring.

11.13. Perform system testing of SHF tactical satellite equipment.

11.14. Troubleshoot and repair a SHF tactical satellite equipment system.

11.15. Monitor circuit link quality on SHF tactical satellite equipment.

11.16. Acquire and track a satellite using SHF tactical satellite equipment.

11.17. Perform an operational check of a SHF tactical satellite equipment communications link.

11.18. Configure a SHF tactical satellite equipment system to establish a communications link.

*12. ANCILLARY EQUIPMENT.

12.1. Perform an operational check on cryptographic equipment.

12.2. Configure a TROPO Satellite Support Radio (TSSR) to establish a communications link.

12.3. Configure a TD-1234 Remote Mulitplexer Combiner (RMC).

*13. DEPLOYABLE MULTI-BAND SYSTEMS.

13.1. Identify principles, capabilities, and limitations of operations of multi-band systems.

13.2. Perform an operational check of digital multiplexer equipment.

13.3. Configure a digital multiplexer.

13.4. Perform an operational check of an equipment modem.

13.5. Configure an equipment modem.

13.6. Perform an operational check of an equipment radio subsystem.

13.7. Configure the equipment radio sub-system.

13.8. Identify principles and capabilities of control orderwires.

13.9. Configure the patch panels for operation.

13.10. Identify principles and capabilities of power distribution.

13.11. Identify principles and capabilities of system monitoring.

13.12. Identify principles and capabilities of antenna control system.

*14. NETWORK BANDWIDTH MANAGEMENT EQUIPMENT.

14.1. Identify principles, capabilities, and limitations of network bandwidth management equipment

14.2. Identify principles, capabilities, and limitations of network transport infrastructures.

14.3. Perform operational check and configure network bandwidth management equipment. .

15. STANDARD INSTALLATION PRACTICES.

15.1. State facts related to standard installation practices.

15.2. Describe the importance of cable labeling and installation documentation.

15.3. Describe wire color coding standards.

15.4. Describe fiber optics installation concepts.

*15.5. Describe the concepts of:

15.5.1. Grounding.

15.5.2. Bonding.

15.5.3. Shielding.

15.6. Identify procedures to construct and terminate cables with the following connectors:

15.6.1. Multi-pin.

15.6.2. Modular.

15.6.3. Coaxial.

16. Perform cable transmission line measurements.

17. Identify general principles of mission planning procedures and processes.

BEHAVIORAL FORMAT CTG CODING SYSTEM

Each CTG element is written as a behavioral statement. The detail of the statement and verb selection reflects the level of training provided.

Code	Definition
A	Subject Knowledge Level - Can identify basic facts and terms about the subject. (FACTS)
B	Subject Knowledge Level - Can identify relationship of basic facts and state general principles about the subject. (PRINCIPLES)
C	Subject Knowledge Level - Can analyze facts and principles and draw conclusions about the subject. (ANALYSIS)
D	Subject Knowledge Level - Can evaluate conditions and make proper decisions about the subject. (EVALUATION)
-	When this code is used in the OJT Upgrade Column it indicates that the certification or qualification on this task is a local determination. When this code is used in the CDC Column it indicates that no training for this subject is provided in the CDCs.
X	When this code is used in the OJT Upgrade Column it indicates that the individual must be trained and certified on this task before they can be upgraded to the appropriate skill level. This code indicates that training to satisfy this requirement is either provided through OJT, CDCs, or a combination of OJT and CDCs.
X*	When this code is used in the OJT Upgrade Column it indicates that the individual must be trained and certified on this task before they can be upgraded to the appropriate skill level if the assigned duty position is responsible to maintain/operate the equipment or system indicated as assigned by the local work center supervisor. This code indicates that training to satisfy this requirement is normally provided through OJT.

CDC column. The use of proficiency coding indicates the level of knowledge training provided by the CDCs, The CDC column will now identify the subject knowledge level covered in the CDC. The “K” will no longer be used to identify the knowledge covered in the CDC. Information pertaining to the meaning of the code can be located in the CTG coding system table.

CFETP versus AFJQS task coding. AFJQSs/AFQTPs annotated in the CFETP with an “X” denotes the AFJQS is mandatory. Within the AFJQS are individual tasks that are coded either “X” or “X*”. If the tasks are coded “X,” they are mandatory. If coded “X*,” they are duty position specific.

The identification blocks listed below are to be used when the trainer is other than the trainee's immediate supervisor.

THIS BLOCK IS FOR IDENTIFICATION PURPOSES ONLY Personal Data - Privacy Act of 1974		
PRINTED NAME OF TRAINEE *(Last, First, Middle Initial)*	INITIALS *(Written)*	SSAN
PRINTED NAME OF TRAINER AND CERTIFYING OFFICIAL AND WRITTEN INITIALS		
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	

PREFACE

NOTE 1: Users are responsible for annotating technical references to identify current references pending CTG revision.

NOTE 2: AFJQS 2EXXX-200B, 2EXXX C-E Enlisted Specialty Training is mandatory for use in conjunction with this CTG. It sets the Air Force standard for qualification and certification for the following subject areas:

Career Progression Information
Information Security (INFOSEC)
Communications Security (COMSEC)
Protect MAJCOM/FOA Critical Mission Information
Physical Security
Electronic Emission Security (TEMPEST)
Electronic Warfare
Operational Risk Management
Training
Work Center Administration
Operator Care of Assigned Government Vehicles
Supply
Technical Orders (TO) and Technical Publications
Supervision
C-E Equipment Maintenance Management
C-E Equipment Maintenance System Inspecting, Reporting, and Forms

NOTE 3: Equipment/system knowledge and/or performance tasks are defined in the AFJQS. AFJQS items set the standard for qualification and certification and are mandatory for use in conjunction with this CTG. AFQTPs listed in the CTG are generally handbooks which do not have task listings, therefore tracking through the Core Automated Maintenance System (CAMS) is not possible. Annotate completion of these products on AF Form 623A.

NOTE 4: When an AFJQS is loaded into CAMS, letters in the AFJQS identifier are converted to the number representing each letter's alphabetical position (e.g., 200B would be loaded as 200.2). To save space, individual AFJQS tasks are not normally listed within the CTG. However, if a CTG task is closely related to an AFJQS task or area, the AFJQS task/heading is listed (e.g., 200.2.12) and the related CTG task is listed under it (e.g., 200.2.12.75). To prevent potential task numbering conflicts between AFJQS tasks and subordinate CTG tasks, subordinate CTG tasks start with the number 75. This creates gaps in the final task numbering sequence, but integrates related CTG and AFJQS tasks so they will be listed on your training documents in the same area and in order.

NOTE 5: When loading AFJQS tasks into the CAMS database, tasks are loaded as STS not 797 items.

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
1. ELECTRONIC PRINCIPLES (EP). TR: EP CBT and TO 31-1-141							
1.1. Identify principles and capabilities of electronic devices and circuits	-	B					
2. TEST EQUIPMENT. TR: TO 33K-1-100, Applicable test equipment technical orders							
2.1. Identify principles, capabilities, and limitations of the following test equipment items:							
2.1.1. Analog oscilloscope.	-	B					
2.1.2. Digital oscilloscope.	-	B					
2.1.3. Spectrum analyzer.	-	B					
2.1.4. Analog multimeter.	-	B					
2.1.5. Digital multimeter.	-	B					
2.1.6. Power meter.	-	B					
2.1.7. Optical time domain reflectometer (OTDR).	-	B					
2.1.8. Time domain reflectometer (TDR).	-	B					
2.1.9. Bit error rate test set.	-	B					
2.1.10. RF signal generator.	-	B					
2.1.11. Frequency counter.	-	B					
2.1.12. Pulse/function generator.	-	B					
2.1.13. Storage oscilloscope.	-	B					
2.1.14. Fiber optic test set.	-	B					
2.2. Perform equipment maintenance using the following test equipment/devices:							
2.2.1. Analog Multimeter.	X*	-					
2.2.2. Digital Multimeter	X*	-					
2.2.3. Vibraground.	X*	-					
2.2.4. RF generator.	X*	-					
2.2.5. Pulse/function generator.	X*	-					
2.2.6. Oscilloscope.	X*	-					
2.2.7. RF power meter.	X*	-					
2.2.8. Fiber optic power meter.	X*	-					
2.2.9. Frequency counter.	X*	-					
2.2.10. Spectrum analyzer.	X*	-					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
2.2.11. Bit error rate test set.	X*	-					
2.2.12. Fiber optic test set.	X*	-					
2.2.13. Noise test set.	X*	-					
3. STANDARD MAINTENANCE PRACTICES.							
3.1. Describe basic troubleshooting procedures.	X*	-					
3.2. Interpret results of diagnostic programs.	X*	-					
3.3. Interpret diagrams for fault isolation.	X*	-					
3.4. Locate elements such as unit, module, row, column, component, pin, connector, or test point using alphanumeric designator.	X*	-					
3.5. Solder and desolder electronic equipment components.	X*	-					
4. COMPUTER SECURITY (COMPUSEC). TR: AFI 33-202 and AFQTP 2EXXX-202D							
4.1. Define COMPUSEC.	X	-					
4.2. Identify vulnerabilities and incidents.	X	-					
4.3. Describe data protection techniques.	X	-					
4.4. Describe basic countermeasures.	X	-					
4.5. Describe reporting procedures.	X	-					
4.6. Explain malicious logic.	X	-					
4.7. Describe methods of malicious logic protection.	X	-					
4.8. Describe TEMPEST suppression techniques.	X*	-					
4.9. Perform TEMPEST maintenance.	X*	-					
5. STANDARD INSTALLATION PRACTICES. TR: TOs 31-10-7, 31-10-11, 31-10-13, 31-10-24, 31W-3-6, 31W-1-102, 31W2-4-330 series, and 31W3-10-20; TIA/EIA-568A & 569; AFI 32-1065; AFJQS 2EXXX-202B							
5.1. State facts related to the following practices:							
5.1.1. Installation.	X	A					
5.1.2. Configuration.	X	A					
5.1.3. Interconnection.	X	A					
5.1.4. Inspection.	X	A					
5.2. Explain the importance of cable labeling and installation documentation.	X	B					
5.3. Describe wire color coding standards.	X*	B					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
5.4. Describe fiber optics installation concepts.	X*	B					
5.5. Describe the concepts of:							
5.5.1. Grounding.	X	B					
5.5.2. Bonding.	X	B					
5.5.3. Shielding.	X	B					
5.5.4. Lightning protection.	X	B					
5.6. Remove or install equipment grounds.	X*	-					
5.7. Check quality of equipment grounds.	X*	-					
5.8. Identify procedures to terminate multi-conductor cables.	X*	-					
5.9. Construct the following cable connectors:							
5.9.1. Multi pin.	X*	-					
5.9.2. Modular.	X*	-					
5.9.3. Coaxial.	X*	-					
5.9.4. Fiber.	X*	-					
5.10. Isolate and repair malfunctions in cable assemblies.	X*	-					
6. COMMUNICATIONS PRINCIPLES. TR: TO 31-1-141 Series							
6.1. State facts relating to the following:							
6.1.1. Amplitude modulation (AM).	-	B					
6.1.2. Frequency modulation (FM).	-	B					
6.1.3. Phase modulation (PM).	-	B					
6.1.4. Pulse code modulation (PCM).	-	B					
6.1.5. Bandwidth.	-	B					
6.1.6. Lightwave communications.	-	B					
6.1.7. Asynchronous/synchronous communication modes.	-	B					
6.1.8. Error detection and correction.	-	B					
6.2. State facts relating to the theory of operation of the following interface standards and protocols:							
6.2.1. EIA/RS-232C.	-	B					
6.2.2. Identify characteristics of IEEE-488 parallel buss.							
6.2.3. EIA/RS-449.	-	B					
6.2.4. EIA/RS-422.	-	B					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
6.2.5. EIA/RS-423.	-	B					
6.2.6. EIA-530.	-	B					
6.2.7. EIA-568.	-	B					
6.2.8. V.35.	-	B					
6.2.9. MIL STD 188-114A.	-	B					
6.2.10. TCP/IP. TR: CBT Volume--Microsoft TCP/IP on Windows NT 4.0: Introduction to TCP/IP and IP Addressing http://afcbt.den.disa.mil	-	-					
6.2.11. X.25/1822.	-	-					
6.2.1. GOSIP.	-	-					
6.3. State facts relating to the theory of operation of communication protocols/addressing. TR: CBT Volume--Internetworking Essentials: Introduction to Common Networking Protocols and Internetworking Overview http://afcbt.den.disa.mil	-	-					
6.4. State facts relating to the following switching methods: TR: CBT Volume--WAN Technologies http://afcbt.den.disa.mil							
6.4.1. Circuit.	-	-					
6.4.2. Message.	-	-					
6.4.3. Packet.	-	-					
6.4.4. Asynchronous transfer mode (ATM). TR: CBT Volume--WAN Technologies: ATM Principles http://afcbt.den.disa.mil	-	-					
6.5. State facts relating to the following multiplexing methods: TR: CBT Volume--Internetworking Essentials: 1) Data Communications: Signals and Systems 2) WAN Technologies http://afcbt.den.disa.mil							
6.6.1. Frequency division multiplexing (FDM).	-	-					
6.5.2. Time division multiplexing (TDM).	-	-					
6.5.3. T1 rate and higher.	-	-					
6.6. State facts relating to the following cryptology methods:							
6.6.1. Secret key/symmetrical (traditional cryptographic equipment).	-	-					
6.6.2. Public key/asymmetrical (FORTEZZA).	-	-					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
7. INFORMATION TRANSPORT CONCEPTS.							
7.1. State facts relating to the theory of operation of the following network configurations: TR: CBT Volume--Novell Networking Technologies: Concepts and Services; CBT Volume--Internetworking Essentials: LAN Fundamentals; and CBT Volume--LAN Technologies: LAN Topologies and Techniques at http://afcbt.den.disa.mil							
7.1.1. Network topologies (Star, Ring, Bus, etc.).	X	-					
7.1.2. Network types (LAN, WAN, VPN).	X	-					
7.2. State facts relating to the theory of operation of the following information transport devices: TR: CBT Volume--Internetworking Essentials: Fundamentals of Internetworking; CBT Volume--LAN Technologies: LAN Media and Components http://afcbt.den.disa.mil							
7.2.1. Routers.	X	-					
7.2.2. Hubs (concentrators).	X	-					
7.2.3. Bridges.	X	-					
7.2.4. Gateways.	X	-					
7.2.5. Switches.	X	-					
7.2.6. Data terminal equipment (DTE).	X	-					
7.2.7. Data communications equipment (DCE).							
7.2.7.1. Modems.	X	-					
7.2.7.2. Data Service Units/Channel Service Units (DSU/CSU).	X	-					
7.2.8. Multiplexers.	X	-					
7.2.9. Network Interface card	X	-					
7.2.10. Common encryption devices used in AF and DOD communication networks.	X	-					
7.2.11. Integrated Digital Network Exchange (IDNX).	X	B					
8. EXPEDITIONARY COMMUNICATIONS CONCEPTS. TR: https://aefcenter.acc.af.mil/aefonline/							
8.1. Identify basic concepts of the Aerospace Expeditionary Force (AEF) deployment process. TR: AFI 10-400, Chap 1 thru 3	X	B					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
8.2. Explain basic concepts of Unit Type Codes (UTC) and Force Packaging as it relates to the AEF tasking process. TR: AFMAN 10-401, Chap 4 thru 6; http://www.fas.org/man/dod-101/usaf/docs/cwpc/4200-FO.htm	X	B					
8.3. Describe deployment procedures. TR: AFMAN 10-100; MAJCOM and Local Directives							
8.3.1. Pre-deployment.	X	B					
8.3.2. Employment.	X	B					
8.3.3. Post deployment.	X	B					
8.3.4. Recovery.	X	B					
8.4. Identify deployable communications systems associated with this AFSC.	X	A					
8.5. Accomplish the following mobility procedures: TR: Applicable MAJCOM directives; TOs 00-20-series							
8.5.1. Pre-deployment inspections.	X*	-					
8.5.2. Air mobility equipment preparation.	X*	-					
8.5.3. Road mobility equipment preparation.	X*	-					
8.5.4. Post-deployment turn around.	X*	-					
9. ELECTRICAL POWER SYSTEMS.							
9.1. Describe the application of the following types of uninterruptible power supplies:							
9.1.1. Batteries. TR: AFJQS 3E0X2-214D, Module 1	X*	-					
9.1.2. Switched electrical power systems. TR: AFQTP 3E0X2-213YA, Modules 1 and 2	X*	-					
9.2. Describe the application of the following types of generators:							
9.2.1. Fixed.	X*	-					
9.2.2. Mobile/tactical.	X*	-					
9.2.3. 60 Hertz.	X*	-					
9.2.4. 400 Hertz.	X*	-					
9.3. Describe commercial power requirements.	X*	-					
9.4. Describe power-phasing requirements.	X*	-					
10. 2E1X1 CAREER FIELD MISSIONS.							

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
10.1. Defense Satellite Communications System (DSCS).							
10.1.1. Identify the purpose, capabilities, and limitations of the DSCS. TR: DISA Circular 800-70-1, Chap 3 and https://www.patrick.af.mil/tenants/2SOPS/index.htm	X	B					
10.1.2. Identify the purpose of the Satellite Segment. TR: DISA Circular 800-70-1, Chap 3	X*	B					
10.1.3. Identify the capabilities and limitations of the Fixed Ground Segment. TR: DISA Circular 800-70-1, Chap 3	X*	B					
10.1.4. Identify the capabilities and limitations of the Tactical Ground Segment. TR: DISA Circular 800-70-1, Chap 16	X*	B					
10.2. Identify the purpose, capabilities, and limitations of the Defense Meteorological Satellite Program (DMSP). TR: http://www.ngdc.noaa.gov/dmsp/dmsp.html	X	B					
10.3. Defense Support Program (DSP).		B					
10.3.1. Identify the general characteristics of the DSP. TR: http://www.af.mil/news/factsheets/Defense_Support_Program_Satel.html; http://www.milnet.com/milnet/dsp.htm; and http://www.schriever.af.mil/fact_sheets/dsp/index.htm	X	B					
10.3.2. Identify general characteristics of the Large Processing Station (LPS) – Satellite Tracking Set AN/GKC1. TR: See 31Z1-5-01, Ground Data System LOAP, for publications	X*	-					
10.3.3. Identify general characteristics of the Simplified Processing Station/Replacement (SPS/R). TR: See System Level Technical Document 146A601/58691 for publications	X*	-					
10.3.4. Identify general characteristics of the Mobile Ground Station (MGS). TR: See 31Z1-5-01, Ground Data System LOAP, for publications	X*	-					
10.4. Test Range Mission.							

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
10.4.1. Identify principles of the Test Range Mission. TR: TO 31-1-141-13, applicable TOs and manuals, Range Commanders Council (RCC) Document 106 (Current)	X	B					
10.4.2. Identify principles of instrumentation and telemetry systems. TR: http://www.dtepi.mil/tm/index.html	X	B					
10.4.3. Identify principles of computer-based instrument control and data acquisition.	X*	-					
10.4.4. Identify principles of test range organization and function.	X*	-					
10.4.5. Identify applicable standards for instrumentation and telemetry systems.	X*	-					
10.4.6. Identify the characteristics of MIL STD 1553 avionics buss.	X	B					
10.5. Identify general concepts of of MILSTAR. TR: https://www.patrick.af.mil/tenants/2SOPS/index.htm	X	B					
10.6. Global Positioning System/NAVSTAR Program (GPS). TR: See 31S1-2FSQ141-01 GPS LOAP for publications; https://www.patrick.af.mil/tenants/2SOPS/index.htm							
10.6.1. Identify the principles, capabilities, and limitations of the Master Control Station (MCS).	X*	-					
10.6.2. Identify the principles, capabilities, and limitations of the Monitor Station.	X*	-					
10.6.3. Identify the principles, capabilities, and limitations of the Ground Antenna.	X*	-					
11. COMMON 2E1X1 PRINCIPLES.							
11.1. Identify the principles of orbital mechanics.	X	B					
11.2. Identify the principles of RF transmission theory.	X	B					
11.3. Satellite System Segments.							
11.3.1. Identify the principles, capabilities, and limitations of a Space Segment.	X	B					
11.3.2. Identify the principles, capabilities, and limitations of a Command and Control Segment.	X	B					
11.3.3. Identify the principles, capabilities, and limitations of a User Segment.	X	B					
11.4. Identify the principles of acquisition and tracking.	X	B					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
11.5. Identify the principles of satellite look angle calculations.	X*	B					
11.6. Identify the principles of protecting electronic systems from effects of electromagnetic interference (EMI).	X	B					
11.7. Identify the principles, capabilities, and limitations of distribution frames.	-	-					
11.8. Identify the principles, capabilities, and limitations of airborne antenna systems.	X*	B					
11.9. Identify the principles, capabilities, and limitations of ground antenna systems.	X	B					
11.10. Tracking Systems. TR: Applicable TOs and manuals							
11.10.1. Identify the principles, capabilities, and limitations of the tracking feed system.	X*	B					
11.10.2. Identify the principles, capabilities, and limitations of the scanner.	X*	B					
11.10.3. Identify the principles, capabilities, and limitations of the tracking downconverter.	X*	B					
11.10.4. Identify the principles, capabilities, and limitations of the antenna position control and indicators.	X*	B					
11.10.5. Identify the principles, capabilities, and limitations of antenna drive systems.	X*	B					
11.11. Identify principles, capabilities, and limitations of control, monitoring, and alarm equipment.	X*	B					
11.12. Transmit Systems. TR: Applicable TOs or manuals							
11.12.1. Identify the principles, capabilities, and limitations of transmit systems.	X	B					
11.12.2. Identify the principles, capabilities, and limitations of upconverters.	X*	B					
11.12.3. Identify principles, capabilities, and limitations of power amplifiers (PA).	X*	B					
11.13. Receive Systems. TR: Applicable TOs or manuals							
11.13.1. Identify the principles, capabilities, and limitations of receive systems.	X*	B					
11.13.2. Identify the principles, capabilities, and limitations of low noise amplifiers (LNA).	X*	B					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
11.13.3. Identify the principles, capabilities, and limitations of downconverters.	X*	B					
11.14. Information Processing.							
11.14.2. Identify principles, capabilities, and uses of magnetic tape recorders.	X*	B					
11.14.3. Identify principles, capabilities, and uses of bit synchronizer (BIT SYNC).	X*	B					
11.14.4. Identify principles, capabilities, and limitations of decomutators.	-	B					
11.14.5. Identify principles, capabilities, and limitations of modems.	X	B					
11.14.6. State general principles of fiber optic theory.	X	B					
11.14.7. Identify the principles, capabilities, and limitations of fiber optic multiplexers.	-	B					
11.14.8. Identify the principles, capabilities, and limitations of fiber optic modems.	-	B					
11.15. Timing and Frequency Standards.							
11.15.1. Identify the principles, capabilities, and limitations of timing and frequency distribution systems.	X	B					
11.15.2. Identify the principles, capabilities, and limitations of timing receivers.	X*	B					
11.15.3. Identify the principles, capabilities, and limitations of time code generator/translator.	X*	B					
12. 2E1X1 SYSTEMS AND EQUIPMENT. TR: http://www.army.mil/ciog6/references/armysat.html							
12.1. Satellite Equipment.							
12.1.1. Identify the principles, capabilities, and limitations of SHF Satellite terminals.	X*	B					
12.1.2. Identify the principles, capabilities, and limitations of UHF Satellite terminals.	X*	B					
12.1.3. Identify principles, capabilities, and limitations of EHF Satellite terminals.	X*	B					
12.1.4. Identify principles, capabilities, and limitations of commercial satellite systems.	X*	B					
12.2. Instrumentation and Telemetry Equipment.							
12.2.1. Identify the principles, capabilities, and limitations of instrumentation and telemetry equipment.	X*	B					
12.3. Wideband Equipment. TR: http://www.army.mil/ciog6/references/armysat.html							

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
12.4. Identify principles, capabilities, and limitations of line-of-sight radio systems.	X*	B					
12.5. Identify principles, capabilities, and limitations of troposcatter radio systems.	X*	B					
13. PERFORMANCE ASSESSMENT. TR: DISA Circulars 300-175-9, 310-70-1, and 310-70-75; MIL-STD-188-100; Applicable circuit/system standards							
13.1. Identify circuit and link performance standards.	-	-					
13.2. Perform system testing.	-	-					
13.3. Compile systems test data.	-	-					
13.4. Evaluate systems test data.	-	-					
13.5. Perform c/kt measurement.	-	-					
13.6. Monitor circuit and link quality.	-	-					
14. OPERATIONS. TR: Army Space Command (ASC) 1, Applicable DISA Circulars, CJCSI 6250.01, TOs, manuals, and System Control and Operational Concepts (SCOC)							
14.1. Identify the principles of establishing a communications link.	-	B					
14.2. Identify the principles of Counter-Counter Measures.	-	-					
14.3. Identify general principles of the Satellite Access Request (SAR) process.	-	B					
14.4. Identify After Action Report procedures.	X*	-					
14.5. Maintain station logs.	X*	-					
14.6. Accomplish the following DISA report requirements: TR: DISA Circulars 270-A85-1, 800-70-1, and 310-55-1							
14.6.1. SATCOM Equipment Reports (SERS).	X*	-					
14.6.2. HAZCON reports.	X*	-					
14.6.3. Voice and data orderwire reporting.	X*	-					
200. AIR FORCE JOB QUALIFICATION STANDARDS APPLICABLE TO AFSC 2E151. TR: AFI 21-116, 36-2233, CFETP 2E1X1 (See Notes 3 and 4)							
200.2. AFJQS 2EXXX-200B, 2EXXX C-E Enlisted Specialty Training. (See Note 2)	X						

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
200.4. AFJQS XXXXX-200D, Aerospace Expeditionary Force (AEF) Qualification Training.	X*						
201.3. AFJQS 2EXXX-201C, Corrosion Prevention and Control.	X						
201.5. AFJQS 2EXXX-201E, Communications-Electronics (C-E) Core Automated Maintenance System (CAMS).	X*						
201.7. AFJQS 2EXXX-201G, Maintenance Support.	X*						
201.8. AFJQS 2EXXX-201H, Work Center Deficiency/Discrepancy Reporting.	X*						
201.10. AFJQS 2EXXX-201J, Maintenance Training Program.	X*						
201.12. AFQTP 2EXXX-201L, C-E Work Center Managers Handbook.	X*						
201.16. AFJQS 2EXXX-201P, Work Center Test Equipment Management.	X*						
201.22. AFJQS 2E1X1-201V, AN/FCC-100(V) Multiplexer Set.	X*						
201.23. AFJQS XXXXX-201W, Integrated Digital Network Exchange (IDNX 90).	X*						
201.24. AFJQS 2EXXX-201X, E & I Quality Assurance.	X*						
202.1. AFQTP 2EXXX-202A, Electrostatic Discharge Familiarization Handbook.	X*						
202.2. AFJQS 2EXXX-202B, SIPT Electronics and Inside Plant (E&I).	X*						
202.4. AFQTP 2EXXX-202D, EI Tempest Installation Handbook.	X*						
203.7. AFQTP 2E1X1-203G, Digital European Backbone (DEB) Familiarization Package.	X*						
203.7.1. AFJQS 2E1X1-203GA, AN/FCC-99(V) Multiplexer Set.	X*						
203.7.2. AFJQS 2E1X1-203GB, AN/GSQ-215(V) Frequency Control Set Maintenance.	X*						
203.8. AFJQS 2E1X1-203H, AN/FRC-170/171/173 Radio Sets.	X*						
203.20. AN/TRC-170 Radio Set. Supplemental Course: E3AZP2E151 000							
203.20.1. AFJQS 2E1X1-203TA, AN/TRC-170(V2) & (V3) Mobile Tropo Radio Set.	X*						

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
203.20.2. AFJQS 2E1X1-203TB, TER-170 Tropo Satellite Support Radio.	X*						
203.20.3. AFJQS 2E1X1-203TC, AN/GRC-239, Tropo Satellite Support Radio.	X*						
203.21. AFJQS 2E1X1-203U, AN/TSC-129 Hammer Rick Satellite Transceiver System.	X*						
203.22. AFJQS 2E1X1-203V, AN/PSC-5 Spitfire.	X*						
203.23. AFJQS 2E1X1-203W, AN/TSQ-146 Multiplexer Van.	X*						
204.14. AFJQS 2EXXX-204N, AN/WSC-3(V)9 Satellite Communications Set.	X*						
204.22. AFJQS 2E1X1-204V, AN/FCC-100(V)7 Multiplexer Set.	X*						
205.1. AFJQS 2E1X1-205A, AN/TSC-152 Lightweight Multi-band Satellite Terminal (Trailer).	X*						
205.2. AFJQS 2E1X1-205B, AN/USC-59 Lightweight Multi-band Satellite Terminal (Transit Case).	X*						
206.25. AFJQS 2EXXX-206Y, AN/GSC-42(V) AFSATCOM Terminal.	X*						
207.13. AFJQS 2E1X1-207M, AN/GSC-49 Satellite Terminal.	X*						
207.14. Ground Mobile Forces (GMF) Satellite Terminals. Supplemental Course: E3AZP2E151 001							
207.14.1. AFQTP 2E1X1-207NA, GMF Satellite Terminal Familiarization.	X*						
207.14.2. AFJQS 2E1X1-207NB, AN/TSC-94A(V)1/2 & AN/TSC-100(V)1/2 Ground Mobile Forces Satellite Communications Terminal.	X*						
207.14.3. AFJQS 2E1X1-207NC, AN/TSC-85B(V)2 & AN/TSC-93B(V)2 NABS Terminals.	X*						
207.19.1. AFQTP 2E1X1-207SA, Defense Communications Subsystem (DCSS) Functional Analysis.	X*						
207.19.2. AFJQS 2E1X1-207SB, AN/USC-28(V) Satellite Communications Set. Supplemental Course: E5AZA2E151 039	X*						
207.19.4. AFJQS 2E1X1-207SD, AN/GSC-24 Multiplexer Set. Supplemental Course: E5AZA2E151 016	X*						
207.19.6. AFJQS 2E1X1-207SF, DCSS/GMF Gateway.	X*						

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	5-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
208.3. AFJQS 2E1X1-208C, AN/GSC-44 AFSATCOM Terminal.	X*						
208.5. AFJQS 2E1X1-208E, AN/FRC-175 Peace Keeper AFSATCOM System.	X*						
208.6. AFJQS 2E1X1-208F, AN/FRC-175 Minuteman AFSATCOM System.	X*						
208.25. AFJQS 2EXXX-208Y, UXC-7 Lightweight Tactical Facsimile.	X*						
209.2. AFJQS 2E1X1-209B, DCS Voice Orderwire.	X*						
209.4. AFJQS 2EXXX-209D, 6KNZE: C-E SATCOM /Wide-Band Augmentation	X*						
209.5.4. AFJQS 2EXXX-209ED, Air Force Mission Support System (AFMSS).	X*						
209.25. AFJQS 2E4X1-209Y, AN/UMQ-13 MARK IVB TACTERM System.	X*						
210.23. AFQTP 2E1X3-210W, Base Land Mobile Radio Management.	X*						
213.21. AFJQS XXXXX-213U, Tactical Generator Operation for Non Power Production Personnel.	X*						
213.22. AFJQS XXXXX-213V, Power Plant Operation for Non-Power Production AFSCs.	X*						
215.6. AFJQS 2E1X1-215F, AN/FSC-97 Single Channel Transponder Injection System (SCTIS).	X*						
215.10. AFJQS 2E1X1-215J, AN/GSC-52 Medium Satellite Communications Terminal. Supplemental Course: E3AZA2E151 051	X*						
215.13. AFJQS 2E1X1-215M, AN/FSC-111 ICBM SHF Satellite Terminal (ISST).	X*						
215.14. AFJQS 2E1X1-215N, AN/FRC-181 (V)1,2,3 MILSTAR Terminals. Supplemental Course: E3AZP2E151 007	X*						

BEHAVIORAL FORMAT CTG CODING SYSTEM

Each CTG element is written as a behavioral statement. The detail of the statement and verb selection reflects the level of training provided.

Code	Definition
A	Subject Knowledge Level - Can identify basic facts and terms about the subject. (FACTS)
B	Subject Knowledge Level - Can identify relationship of basic facts and state general principles about the subject. (PRINCIPLES)
C	Subject Knowledge Level - Can analyze facts and principles and draw conclusions about the subject. (ANALYSIS)
D	Subject Knowledge Level - Can evaluate conditions and make proper decisions about the subject. (EVALUATION)
-	When this code is used in the OJT Upgrade Column it indicates that the certification or qualification on this task is a local determination. When this code is used in the CDC Column it indicates that no training for this subject is provided in the CDCs.
X	When this code is used in the OJT Upgrade Column it indicates that the individual must be trained and certified on this task before they can be upgraded to the appropriate skill level. This code indicates that training to satisfy this requirement is either provided through OJT, CDCs, or a combination of OJT and CDCs.
X*	When this code is used in the OJT Upgrade Column it indicates that the individual must be trained and certified on this task before they can be upgraded to the appropriate skill level if the assigned duty position is responsible to maintain/operate the equipment or system indicated as assigned by the local work center supervisor. This code indicates that training to satisfy this requirement is normally provided through OJT.

CDC column. The use of proficiency coding indicates the level of knowledge training provided by the CDCs, The CDC column will now identify the subject knowledge level covered in the CDC. The “K” will no longer be used to identify the knowledge covered in the CDC. Information pertaining to the meaning of the code can be located in the CTG coding system table.

CFETP versus AFJQS task coding. AFJQSs/AFQTPs annotated in the CFETP with an “X” denotes the AFJQS is mandatory. Within the AFJQS are individual tasks that are coded either “X” or “X*”. If the tasks are coded “X,” they are mandatory. If coded “X*,” they are duty position specific.

The identification blocks listed below are to be used when the trainer is other than the trainee's immediate supervisor.

THIS BLOCK IS FOR IDENTIFICATION PURPOSES ONLY Personal Data - Privacy Act of 1974		
PRINTED NAME OF TRAINEE *(Last, First, Middle Initial)*	INITIALS *(Written)*	SSAN
PRINTED NAME OF TRAINER AND CERTIFYING OFFICIAL AND WRITTEN INITIALS		
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	
N/I	N/I	

PREFACE

NOTE 1: Users are responsible for annotating technical references to identify current references pending CTG revision.

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	7-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
70. DEPLOYMENT CONCEPTS.							
70.1. Deployment Plans. TR: AFI 10-401, MAJCOM directives							
70.1.1. Describe the purpose of the following:							
70.1.1.1. OPLAN communications requirements.	X	-					
70.1.1.2. Time Phased Force Deployment Document (TPFDD).	X	-					
70.1.1.3. Unit readiness reporting (e.g. Status of Resources and Training System, AEF Reporting Tool).	X	-					
70.2. Unit Type Code (UTC) Development and Reporting. TR: AFMAN 10-401							
70.2.1. Identify UTC development process.	X	-					
70.2.2. Identify UTC adjustment procedures.	X	-					
70.2.3. Report UTC status to command authorities.	X	-					
70.3. Deployment Procedures. TR: AFIs 10-403, 21-109, and 33-211; AFMAN 23-110; TO 00-20 series; Applicable MAJCOM directives							
70.3.1. Develop load plan.	X*	-					
70.3.2. Explain pallet build-up procedures.	X*	-					
70.3.3. Explain hazardous cargo preparation.	X*	-					
70.3.4. Prepare documentation.	X*	-					
70.3.5. Determine site selection requirements.	X*	-					
70.3.6. Determine site preparation requirements.	X*	-					
70.3.7. Determine site configuration requirements.	X*	-					
70.3.8. Determine requirements for constructing deployment site utility grids.	X*	-					
70.3.9. Describe control of COMSEC material.	X*	-					
70.4. Accomplish the following site engineering tasks: TR: ASC-1, CJCSI 6250.01							
70.4.1. Develop crew assignment sheets.	X*	-					
70.4.2. Satellite access request.	X*	-					
70.4.3. Path profile.	X*	-					
70.4.4. Siting of equipment.	X*	-					
70.4.5. Equipment grounding.	X*	-					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	7-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
71. SYSTEM PLANNING AND IMPLEMENTATION. TR: AFI 33-104 and AFI 21-404; TO 32-series; AFQTP 2EXXX-202B							
71.1. Identify systems support requirements for new or modified systems.	X	-					
71.2. Describe how to manage planning and implementation of new systems.	X	-					
72. State facts relating to the following work center management principles. TR: AFQTP 2EXXX-201L							
72.1. Principles of management.	X						
72.2. Training.	X						
72.3. Supply.	X						
72.4. Core Automated Maintenance System (CAMS).	X						
72.5. Work center management.	X						
72.6. Safety and security.	X						
72.7. Maintenance standards.	X						
72.8. Performance reports.	X						
72.9. Awards and recognition.	X						
72.10. Mobility/deployment.	X						
72.11. Manpower.	X						
72.12. Financial management.	X						
72.13. Publications management.	X						
73. Describe the infrastructures and levels of responsibility in MILSATCOM to include commercial satellite communications. TR: CJCSI 6250.01	X	-					
74. GENERAL CONCEPTS.							
74.1. Explain the principles, capabilities, and limitations of the following types of satellites (space segment): TR: Joint Pub 6-02, Chap 4							
74.1.1. Defense Satellite Communications System (DSCS) TR: DISAC 800-70-1, Chap 18	X	-					
74.1.2. MILSTAR.	X	-					
74.1.3. UHF Follow On (UFO).	X	-					
74.1.4. Commercial C, Ka, and Ku band.	X	-					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	7-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
74.1.5. Commercial L band. TR: https://www.afca.scott.af.mil/mss/; http://www.iridium.com; http://www.inmarsat.com/about2/index.html	X	-					
74.2. Principles of Spectrum Interference. TR: AFI 10-707; CJCSI 3320.02A; AFSPC Pamphlet 15--2							
74.2.1. Explain different types of interference.	X	-					
74.2.2. Describe Identification methods.	X	-					
74.2.3. Identify Countermeasures.	X	-					
74.2.4. Explain Reporting procedures.	X	-					
74.3. Explain the capabilities, limitations, and integration of the following types of systems (ground segment): TR: AFIs 10-403 and 25-101; AFMAN 23-110							
74.3.1. Satellite systems and equipment. TR: Applicable Technical Manuals, Commercial Manuals, and DISA Circulars							
74.3.1.1. DSCS.	X*	-					
74.3.1.2. MILSTAR.	X*	-					
74.3.1.3. UFO.	X*	-					
74.3.1.4. Commercial C, Ka, and Ku band systems.	X*	-					
74.3.1.5. Commercial L band systems.	X*	-					
74.3.2. Terrestrial systems and equipment.							
74.3.2.1. Troposcatter.	X*	-					
74.3.2.2. Fixed microwave.	X*	-					
74.3.2.3. Tactical microwave.	X*	-					
75. SYSTEM CONCEPTS TR: System Control and Operational Concept							
75.1. Explain the functions of the following satellite and communication systems:							
75.1.1. DEB.	-	-					
75.1.2. DSCS (STEP, Gateway, Reachback, JRSC).	-	-					
75.1.4. MILSTAR.	-	-					
75.1.5. Theater Deployable Communications (TDC).	-	-					
75.1.6. Global Information Grid.	-	-					
75.1.7. Global Command and Control System (GCCS).	-	-					
75.1.8. AFSATCOM/SCTS.	-	-					

TASKS, KNOWLEDGE AND TECHNICAL REFERENCES	7-LEVEL		OJT CERTIFICATION				
	OJT Upgrade	CDC	Start Date	Stop Date	Trainee Initials	Trainer Initials	Certifier Initials
75.1.9. UHF DAMA.	-	-					
75.3. System Control and Reporting. TR: DISAC 310-70-1							
75.3.1. Explain the DISA system hierarchy	X*	-					
75.3.2. Explain DISA reporting procedures.	X*	-					
75.3.3. Explain circuit activation procedures	X*	-					

Section B - Course Objective List

4. This section not used.

Section C - Support Materials

5. The following is a list of available support materials.

5.1. **Computer Based Training Products.** Air Force computer based training products can be found at http://afcbt.den.disa.mil.

5.2. **Air Force Job Qualification Standards and Air Force Qualification Training Packages**

5.2.1. Refer to AFIND8, Numerical Index of Specialty Education/Training Publications, for the list of published AFJQSs/AFQTPs or download these products from https://wwwmil.keesler.af.mil/81trss/qflight/welcome.html. Refer to AFI 36-2233, *Air Force On-the-Job Training Products for Communications-Electronics Enlisted Specialty Training*, for information on how to request development of AFJQSs/AFQTPs.

5.2.2. AFJQSs/AFQTPs applicable to AFSC 2E1X1:

Publication No.	Pseudo Code	Publication Title
AFJQS 2EXXX-201V	2EXXX-201.22	AN/FCC-100 (V) Multiplexer Set
AFQTP 2E1X1-203G	2E1X1-203.7	Digital European Backbone (DEB) Familiarization Package
AFJQS 2E1X1-203GA	2E1X1-203.7.1	AN/FCC-99(V) Multiplexer Set
AFJQS 2E1X1-203GB	2E1X1-203.72	AN/GSQ-215(V) Frequency Control Set Maintenance
AFJQS 2E1X1-203H	2E1X1-203.8	AN/FRC-170/171/173 Radio Sets
AFJQS 2E1X1-203TA	2E1X1-20320.1	AN/TRC-170 (V2) & (V3) Mobile Tropo Radio Set
AFJQS 2E1X1-203TB	2E1X1-203.20.2	TER-170 Tropo Satellite Support Radio
AFJQS 2E1X1-203TC	2E1X1-203.20.3	AN/GRC-239 Tropo Satellite Support Radio
AFJQS 2E1X1-203U	2E1X1-203.21	AN/TSC-129 Hammer Rick Satellite System
AFJQS 2E1X1-203V	2E1X1-203.22	AN/PSC-5 Spitfire
AFJQS 2E1X1-203W	2E1X1-203.23	AN/TSQ-146 Multiplexer Van
AFJQS 2EXXX-204N	2EXXX-204.14	AN/WSC-3 (V)9 Satellite Communications Set
AFJQS 2E1X1-204V	2E1X1-204.22	AN/FCC-100 (V)7 Multiplexer Set
AFJQS 2E1X1-205A	2E1X1-205.1	AN/TSC-152 Lightweight Multi-band Satellite Terminal (Trailer)
AFJQS 2E1X1-205B	2E1X1-205.2	AN/USC-59 Lightweight Multi-band Satellite Terminal (Transit Case)
AFJQS 2EXXX-206Y	2EXXX-206.25	AN/GSC-42(V) AFSATCOM Terminal
AFJQS 2EX1-207M	2EX1-207.13	AN/GSC-49 Satellite Terminal
AFJQS 2E1X1-207NA	2E1X1-207.14.1	Ground Mobile Forces Satellite Terminal Familiarization
AFJQS 2E1X1-207NB	2E1X1-207.14.2	AN/TSC-94A (V)1/2 & AN/TSC-100A (V)1/2 Ground Mobile Forces Satellite Communications Terminal
AFJQS 2E1X1-207NC	2E1X1-207.14.3	AN/TSC-85B (V)2 & AN/TSC-93B NABS Terminals
AFJQS 2E1X1-207SA	2E1X1-207.19.1	Defense Communications Subsystem (DCSS) Functional Analysis
AFJQS 2E1X1-207SB	2E1X1-207.19.2	AN/USC-28(V) Satellite Communications Set
AFJQS 2E1X1-207SD	2E1X1-207.19.4	AN/GSC-24 Multiplexer Set
AFJQS 2E1X1-207SF	2E1X1-207.19.6	DCSS/GMF Gateway
AFJQS 2E1X1-208C	2E1X1-208.3	AN/GSC-44 Communications Terminal
AFJQS 2E1X1-208E	2E1X1-208.5	AN/FRC-175 Peace Keeper AFSATCOM System
AFJQS 2E1X1-208F	2E1X1-208.6	AN/FRC-175 Minuteman AFSATCOM System
AFJQS 2E1X1-209B	2E1X1-209.2	Defense Communication System (DCS) Orderwire

Publication No.	Pseudo Code	Publication Title
AFJQS 2EXXX-209D	2EXXX-209.4.	6KNZE: C-E SATCOM/Wideband Augmentation
AFJQS 2E4X1-209Y	2E4X1-209.25	AN/UMQ-13 MARK IVB TACTERM System
AFJQS 2E1X1-215F	2E1X1-215.6	AN/FSC-97 Single Channel Transponder Injection System(SCTIS)
AFJQS 2E1X1-215J	2E1X1-215.9	An/GSC-52 Medium Satellite Communications Terminal
AFJQS 2E1X1-215M	2E1X1-215.13	AN/FSC-11 ICBM SHF Satellite Communications Terminal (ISST)
AFJQS 2E1X1-215N	2E1X1-215.14	AN/FRC-181 (V)1, 2, 3 Milstar Terminal
.AFJQS 2E1X1-216A	2E1X1-216.1	Instrumentation and Telemetry Handbook
AFJQS 2E1X1-215A	2E1X1-215.A	AN\PSC-11 Single Channel Anti-Jam Manportable Table

5.2.3. Additional AFJQS/AFQTP maintenance management and generic training products applicable to this specialty.

Publication No.	Pseudo Code	Publication Title
AFJQS 2EXXX-200B	2EXXX-200.2	2EXXX C-E Enlisted Specialty Training
AFJQS XXXXX-200D	XXXXX-200.4	Aerospace Expeditionary Force (AEF) Qualification Training
AFJQS 2EXXX-201C	2EXXX-201.3	Corrosion Prevention and Control
AFJQS 2EXXX-201E	2EXXX-201.5	Communications-Electronics (C-E) Core Automated Maintenance System
AFJQS 2EXXX-201G	2EXXX-201.7	Maintenance Support
AFJQS 2EXXX-201H	2EXXX-201.8	Work Center Deficiency/Discrepancy Reporting
AFJQS 2EXXX-201J	2EXXX-201.10	Maintenance Training Program
AFQTP 2EXXX-201L	2EXXX-201.12	Communications-Electronics (C-E) Work Center Manager's Handbook
AFQTP 2EXXX-201LB	2EXXX-201.12.2	Communications-Electronic (C-E) Manager's Handbook
AFJQS 2EXXX-201P	2EXXX-201.16	Work Center Test Equipment Management
AFJQS 2EXXX-201X	2EXXX-201.24	Engineering Installation (EI) Quality Assurance
AFQTP 2EXXX-202A	2EXXX-202.1	Electrostatic Discharge Familiarization Handbook
AFJQS 2EXXX-202B	2EXXX-202.2	SIPT Electronics and Inside Plant (E&I)
AFQTP 2EXXX-202D	N/A	EI Tempest Installation Handbook
AFJQS 2EXXX-209C	2EXXX-209.3	6KNZF: C-E Airfield and Weather Systems Support
AFJQS 2EXXX-209L	2EXXX-209.12	6KNZL: C-E METNAV Operations Maintenance
AFJQS 2EXXX-209P	2EXXX-209.16	6KNZG: C-E C-2 Radio System Support
AFJQS 2EXXX-209Q	2EXXX-209.17	6KNZN: C-E Personal Wireless Communications (PWCS) Support
AFJQS 2EXXX-209W	2EXXX-209.	6KNZK: C-E Tactical Telephone Switching Systems Support
AFJQS 2EXXX-210S	2EXXX-210.19	6KNZ7: C-E Base Communications Systems Support
AFJQS 2EXXX-209C	2EXXX-209.3	6KNZP: C-E Airfield and Weather Systems Support
AFJQS XXXXX-213U	XXXXX-213.21	Tactical Generator Operation For Non Power Production Personnel
AFJQS XXXXX-213V	XXXXX-213.22	Power Plant Operation for Non-Power Production AFSCs
AFQTP 3E0X2-213YA	N/A	Solid State Uninterruptible Power System Principles

Section D - Training Course Index

6. The following is a list of the available Air Force in-residence, field, and/or exportable training courses.

6.1. **Air Force In-Residence Courses.** For information on all formal courses, refer to the Air Force Education and Training Course Announcements (ETCA) database, formerly AFCAT 36-2223, USAF Formal Schools Catalog at https://etca.randolph.af.mil/.

Course Number	Course Title	Location
E3ABP2E131 000	Satellite, Wideband and Telemetry Systems Apprentice	Ft Gordon
E3AZP2E151 000	AN/TRC-170 O/I Maintenance	Ft Gordon
E3AZP2E151 001	Tactical Satellite Communications O/I Maintenance	Ft Gordon
E3AZP2E151 008	Lightweight Multiband Satellite Terminal O/I Maintenance	Ft Gordon
E3AZP2E151 009	MILSTAR Organizational Maintenance	Ft Gordon
E5AZA2E151 016	DCSS Refresher	Ft Gordon
E5AZA2E151 039	AN/USC-28 I/O Terminal	Ft Gordon
E5AZA2E151 051	SATCOM Terminal AN/GSC-52(V)	Ft Gordon
E5AZA2E151 056	Survivable Secure Communications Network (SSCN)	Ft Gordon
E5AZA2E151 059	Joint Task Force Systems	Ft Gordon
E5AZA2E151 060	SMART-T Terminal Operator/Maintainer	Ft Gordon
E3AZR2E151 011	MARK IVB System Operator/Maintainer	Keesler
E5ASN2E151 000	Commercial Satellite Equipment Maintenance	Corry Station

6.2. **Air Force Engineering Technical Services (AFETS) Training.** For a listing of AFETS courses, refer to the *Catalog of Communications-Electronics Air Force Engineering and Technical Services Courses.* This catalog is revised annually and is available through your MAJCOM's C-E MATAG Working Group representative or can be downloaded from https://www.afca.scott.af.mil/c-e_maint/afets.htm.

Section E - MAJCOM Unique Requirements

There are currently no MAJCOM unique requirements. This area is reserved.