TRAINING PROGRAM OF INSTRUCTION (TPI)

FOR

DINFOS-BRTSM

BROADCAST RADIO AND TELEVISION SYSTEM MAINTENANCE COURSE

Approved by:

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Commandant,
Defense Information School
Supersedes TPI dated 2 May 2013

BROADCAST RADIO AND TELEVISION
SYSTEM MAINTENANCE COURSE

TRAINING PROGRAM OF INSTRUCTION

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TRAINING PROGRAM OF INSTRUCTION

Preface

TRAINING PROGRAM OF INSTRUCTION FILE NUMBER (TPFN): DINFOS-BRTSM

TITLE: Broadcast Radio and Television System Maintenance Course

TRAINING LOCATION: Defense Information School, Fort Meade, MD

PURPOSE: The purpose of this course is to provide students with the required skills to perform and fulfill the duties and responsibilities of a technician-level radio and television systems engineer. The training course design targets building knowledge and skills necessary to support multimedia production and broadcast missions of the Department of Defense (DOD) and the Defense Media Activity (DMA).

TRAINING METHODOLOGY: Resident

COURSE DESCRIPTION: The course develops the professional broadcast radio and television maintenance specialist from an apprentice to journeyman level of competence. This advanced course of instruction is designed to provide in-depth exploration of the principles and hands-on application in the following functional areas: computers and networking, fundamentals of television, cameras and media storage to include non-linear editing, audio, conference room maintenance, studios and transmission systems.

SERVICE PREREQUISITES:

Service	Prerequisites:	Notes:
USA		
Officer	N/A	
Enlisted	25R20 and above	
Civilian	N/A	
USAF		
Officer	N/A	
Enlisted	AFSC – 3D1X2	
Civilian	N/A	
USN		
Officer	N/A	
Enlisted	NEC – 4746	NEC 4743 with a waiver approved through the Navy DMA representative and approved by the DINFOS Commandant
Civilian	N/A	
USMC		
Officer	N/A	
Enlisted	N/A	
Civilian	N/A	
USCG		

Officer	N/A	
Enlisted	N/A	
Civilian	N/A	
International		
International students attending this course will be from the defense ministries of nations operating within the SATFA framework. Students must have an English Comprehension Level (ECL) of 75. Students must have normal color vision and cannot have acrophobia, be claustrophobic or have vertigo.		
Interagency		
Not available		

COURSE PREREQUISITES: See Army Training Requirements and Resources System (ATRRS) website (https://www.atrrs.army.mil/atrrscc/). Use school code 212.

CLASS SIZE:

Maximum	8 students
Minimum	3 students
Annual capacity	22 students

COURSE LENGTH:

Academic Hours	555 hours
Administrative Hours	13 hours
Total Course Length	568 hours, 71 days

TYPE/METHOD OF INSTRUCTION:

Lecture (L)	150 hours
Demonstration (D)	25 hours
Performance Exercise (PE)	269 hours
Exam Performance (EP)	88 hours
Written Exam (EW)	23 hours
Administrative (AD)	13 hours

COURSE MEASUREMENT PLAN: Located in the Course Training Standard.

TRAINING START DATE: 31 October 2016

ENVIRONMENTAL IMPACT: No environmental impact.

MANPOWER: The Inter-service Training Review Organization (ITRO) formula was used to determine the number of instructors required. The Course Design Resource Estimate (CDRE) contains this information.

EQUIPMENT AND FACILITIES: The Course Design Resource Estimate (CDRE) contains this information.

TRAINING DEVELOPMENT PROPONENT: Defense Information School, Directorate of Training, Fort George G. Meade, MD 20755

REFERENCES: Located in the last section of this TPI.

SAFETY FACTORS: Routine.

POC: Nichole Meade, nichole.s.meade.civ@mail.mil, (301) 677-4257.

FUNCTIONAL AREA 1

COMPUTER SYSTEMS

TRAINING OUTCOMES:

UNIT 001 CONSTRUCT A MULTIMEDIA LOCAL AREA NETWORK: Students will construct a local area network by configuring a work station and file server, developing a domain, connecting devices to networks, constructing LAN cables, and calculating power requirements to select appropriate UPS**.** Students will identify computer principles including computer components, input/output devices, drives and storage functions, different operating systems, file maintenance and management, and preventative maintenance measures.

UNIT 002 MAINTAIN A MULTIMEDIA LOCAL AREA NETWORK: Students will maintain a multimedia local area network by troubleshooting networks, discussing preventative maintenance, and configuring client devices. They will identify network concepts such as topologies, transmission mediums, and isochronous and asynchronous transmissions. Students will identify concepts of network management including server configurations, IP management, and security fundamentals.

FUNCTIONAL AREA 2
FUNDAMENTALS OF TELEVISION

TRAINING OUTCOMES:

UNIT 001 PERFORM VIDEO SIGNAL MEASUREMENTS: Students will perform video signal measurements using test equipment such as waveform monitors, vectorscopes, and o-scopes. They will identify video signal characteristics and video standards to include bit and error rate testing, analog and digital video, analog and digital signals, aspect ratios, and composite and component video. Students will identify principles of colorimetry such as hue saturation, brightness, color spectrum, and color space. Students will identify required test equipment and identify digital compression techniques such as compression formats, lossy and lossless compression, and interframe and intraframe compression.

FUNCTIONAL AREA 3

CAMERAS AND MEDIA STORAGE

TRAINING OUTCOMES:

UNIT 001 MAINTAIN A CAMERA SYSTEM: Students will maintain a camera system to include cleaning lenses, maintaining files, loading firmware, performing operational checks and alignments, and discussing the video capabilities of DSLR cameras. They will also identify principles of optical systems such as characteristics of light, lens system characteristics, aberrations, and the parts of a lens system. Students will identify principles and capabilities of camera systems to include the basic signal flow of a camera system.

UNIT 002 MAINTAIN MEDIA STORAGE: Students will identify characteristics of media storage to include operations and diagnostic checks, file maintenance, and format types.

UNIT 003 MAINTAIN NON-LINEAR EDITORS: Students will maintain non-linear editors including interfacing with peripheral equipment and networks, transferring and storing media files, performing operational checks, troubleshooting audio and video editing systems, and identifying the configuration of non-linear editors. They will also identify principles of non-linear editors such as the process of ingesting media, the NLE components for hardware and software, the requirements for dual and single monitors, the NLE software functions and closed captioning and transcoding software. Students will operate a non-linear editor and create a video product using timelines, projects, bins and clips.

FUNCTIONAL AREA 4

AUDIO

TRAINING OUTCOMES:

UNIT 001 MAINTAIN A RADIO STUDIO: Students will learn to maintain a radio studio by configuring AudioVAULT software, configuring audio consoles and distribution systems, troubleshooting audio distribution systems, and performing operation checks on a digital audio editor. They will identify principles of broadcast audio and engineering standards and identify the principles of analog and digital audio. Students will identify principles of audio consoles and peripheral equipment such as radio remote concepts, audio distribution and digital audio editors. They will identify principles of audio automation and be able to discuss the operation and configuration of audio automation, AudioVault installation and troubleshooting, and the principles of audio voice tracking.

FUNCTIONAL AREA 5

CONFERENCE ROOM MAINTENANCE

TRAINING OUTCOMES:

UNIT 001 MAINTAIN A MULTIMEDIA CONFERENCE ROOM: Students will maintain a multimedia conference room using multimedia systems such as cameras, lighting, microphones, video displays, and control systems. They will also identify procedures for adjustments and alignments and identify different types of display devices including projectors, flat panels, and other emerging technologies. Students will set-up, operate, and maintain a video teleconferencing system according to operation manuals and be able to identify the principles of VTC and collaboration software, different types of VTC transmission methods, assemble equipment, establish a VTC across a network, monitor VTC equipment during operation, and resolve connectivity issues.

FUNCTIONAL AREA 6

STUDIO

TRAINING OUTCOMES:

UNIT 001 DESIGN, INSTALL, AND MAINTAIN A STUDIO: Students will design, install, and maintain a studio by troubleshooting and performing operational checks on television graphics and digital video effects equipment, planning the interconnection of broadcast systems, documenting the facility design, and identifying project management considerations and design standardization . They will also identify principles of switchers and peripheral equipment including workflow concepts and principles of studio timing.

UNIT 002 PERFORM STUDIO PREPARATION: Students will perform studio preparation by discussing acoustic principles in studio applications, identifying principles of television and lighting systems, and performing set-up and color balance on studio camera systems.

FUNCTIONAL AREA 7

TRANSMISSION

TRAINING OUTCOMES:

UNIT 001 OPERATE AND MAINTAIN A TRANSMISSION SYSTEM: Students will operate and maintain a transmission system by performing an operational check of a transmitter, utilizing transmission test equipment, setting frequency and output power, troubleshooting transmitter systems, recording readings into maintenance logs, calculating effective radiated power and voltage, performing field-strength measurements, and performing transmitter alignments. They will also identify principles of transmission including principles of analog and digital RF transmission, transmission system test equipment, block diagrams, radiation hazard standards, principles and types of studio transmitter links, different types of antenna systems and applications, RF transmission lines and connections, principles of amplitude and frequency modulation, and microwave and studio transmitter links.

UNIT 002 SET-UP AND TROUBLESHOOT A MULTI-CHANNEL CABLE DISTRIBUTION SYSTEM: Students will set-up and troubleshoot a multi-channel cable distribution system by performing tap measurements using a spectrum analyzer, terminating fiber with connectors, performing loss checks, and constructing a cable headend. They will identify principles of multi-channel cable distribution systems including principles of fiber-optic transmission, DRM, HDCP and conditional access, and principles of IPTV.

UNIT 003 ESTABLISH AND MAINTAIN A REMOTE DOWNLINK AND DISTRIBUTION SYSTEM: Students will establish and maintain a remote downlink and distribution system by setting up the satellite receiving site and signal decoders, performing system calculations for uplink/downlink design, acquiring DMA satellite signal, discussing interconnecting antennas, aligning and troubleshooting contingency systems, and establishing uplink satellite communications. They will also explain satellite antenna theory and system design including combined L-Band and RF distribution systems, satellite acquisition techniques, and comparing and contrasting the DMA worldwide feed.

UNIT 004 BRIEF EMERGING TECHNOLOGIES IN MULTIMEDIA APPLICATIONS: Students will research and present a briefing on emerging technologies in broadcast operations including its military applications.

UNIT 005 DETERMINE PRE-DEPLOYMENT REQUIREMENTS: Students will determine pre-deployment requirements by evaluating the site and determining power requirements.

FUNCTIONAL AREA 8

COURSE ADMINISTRATION

TRAINING OUTCOMES:

UNIT 001 COURSE ADMINISTRATION: During this time students records will be created, updated, and archived. Students perform in-processing and out-processing that includes receiving a course and school orientation, receiving information assurance training for proper computer and network use, completing a mid and an end-of-course survey, and the course culminates with a graduation ceremony.

REFERENCES

Adobe Systems Incorporated. (2004). *ADOBE Audition 1.15 User's Guide*. http://download.adobe.com/pub/Adobe%20Audition%201.5%20Guide.pdf

Armed Forces Radio and Television Service (AFRTS). (2010). *AFRTS Broadcast Center Satellite Handbook. V.3.26*. Defense Media Activity, Fort Meade, MD.

Armed Forces Radio and Television Service (AFRTS). (2010). *Handbook of Engineering Standards and Practices*. Defense Media Activity, Fort Meade, MD.

Avid Technology, Inc. (2008). *Media Composer, Basic Guide. Avid Technology Inc*. Peachpit Press, CA.

Avid Technology, Inc. (2004). *Avid Xpress™ Pro 4.3 for the Windows® XP Operating System*. Peachpit Press, CA.

Avid Technology, Inc. (2010). *Editing with Avid Media Composer 5: Avid Official Curriculum*. Peachpit Press, CA.

Browne, S.E. (1998). *Nonlinear Editing Basics: A Primer on Electronic Film and Video Editing*. Focal Press, MA.

Corning Incorporated ©. (2008). *Optical Fiber Tutorial*. Corning Incorporated. http://www.corning.com/opticalfiber/

Defense Information School (DINFOS). (2011). *DINFOS Policy and Procedures Manual*. Chapter 6-2. Fort Meade, MD.

Department of the Air Force. (1993). *Technical Manual, Tm 9-215-252-24, and Air Force Technical Order 38G1-92-2, Unit, Direct Support and General Support Maintenance Instructions, Diesel Engine*. HQ Department of the Army and Department of the Air Force, Washington D.C.

Department of the Army. (1993). *Department of the Army Technical Manual Tm 9-6115-659-13 and Operator, Unit, and Direct Support Maintenance Manual (Including Repair Parts and Special Tools List) POWER UNITS 15 October 1993*. HQ Department of the Army, Washington D.C.

Department of the Army. (1990). *Battle Focused Training, FM 25-101*. HQ Department of the Army, Washington D.C.

Department of the Army. (2009). *Technical Bulletin, TB 9-6115-641-24, Warranty Program for Generator Set, Tactical Quiet*. HQ Department of the Army Washington D.C.

Department of Homeland Security (DHS). (2003, March), *Management Directive 2230 PA Management Structure*. Management Directives System Homeland Security Digital Library, http://www.hsdl.org.

Frenzel, L. (2007). *Principles of Electronic Communication Systems*. McGraw-Hill Companies, NY.

Grass Valley Group (GVG). (2011). *Grass Valley Group Fiber-Optic Tutorial*, http://www.grassvalley.com/

Hucaby, D., & McQuerry, S. (2002). *CISCO® Field Manual*. John Wait [Publisher], CA.

Kauffmann, S., (2009). *Avid Editing, Fourth Edition: A Guide for Beginning and Intermediate Users*. Focal Press, Burlington, MA.

Microsoft Corporation. (2003). *Microsoft® Windows® Professional Resource Kit, Second Edition*. Microsoft Press, WA.

Myers, M. (2007). *CompTIA A+ Certification Study Guide, 6th Edition*. McGraw Hill, NY.

Mueller, S. (2011). *Upgrading and repairing PCs*. Que [Publisher], IN.

National Television System Committee (NTSC). (2007). *National Television System Committee (NTSC) Standards*, Washington D.C.

Roman, R. (2011). *Master the Art, Technology and Business of Video Production*. Retrieved 30 August 2011 from http://www.videouniversity.com/

Rosch, W. (2003). *The Winn L. Rosch Hardware Bible, 6th Edition*. Que [Publisher], IN.

Williams, E. (Ed). (2007). *National Association of Broadcasters Engineering Handbook - 10th Edition*. Focal Press, Burlington, MA.