

EXHIBIT L: PROJECT TRAINING

13. Exhibit L
Project training

TABLE OF CONTENTS

1. PROJECT TRAINING
1.1 CONTRACTOR INSTRUCTOR QUALIFICATIONS.....	1
1.2 INTENDED AUDIENCE	1
1.3 TRAINING FACILITIES.....	2
1.4 TRAINING HOURS.....	2
1.5 TRAINING MATERIALS AND EQUIPMENT.....	2
2. TECHNICAL TRAINING.....	3
3. SYSTEM MANAGEMENT TRAINING	3
4. USER TRAINING.....	4
4.1 DISPATCH OPERATIONS	4
4.2 FIELD OPERATIONS.....	5
5. INSTRUCTOR TRAINING	5
6. TRAINING CLASSES AND SIZES	5
6.1 TECHNICIAN TRAINING	5
6.2 SYSTEM MANAGEMENT TRAINING	5
6.3 USER TRAINING	6
7. MOTOROLA COURSE OUTLINES.....	8
7.1 SYSTEM MANAGEMENT SYSTEM	9
7.1.1 Smartzone System Watch II	9
7.2 MOSCAD FAULT MANAGEMENT SYSTEM.....	10
7.2.1 System Supervisory Training (Typical) Course Outline	10
7.2.2 Maintenance Training Course Outline	11
7.3 BI-DIRECTIONAL AMPLIFIER SYSTEM.....	12

EXHIBIT L: PROJECT TRAINING

TABLE OF CONTENTS

7.3.1	MicroFILL® Amplifier	12
7.3.2	PrismPlus™ Amplifier	14
7.3.3	MicroLite Amplifier	16
7.4	MICROWAVE TRANSMISSION SYSTEM	19
7.4.1	The Digital VersiTility Microwave—DVM18-45	19
7.5	TRUNKED RADIO SYSTEM.....	21
7.5.1	Trunked Central Controller and Repeater Control Circuitry	21
7.5.2	Trunked Digital Path Simulcast System	22
7.5.3	QUANTAR/QUANTRO Base Station Repeaters	23
7.5.4	MCS 2000 Mobile Radio	24
7.5.5	Astro Spectra Mobile	25
7.5.6	MTS 2000 Series Trunked Portable Radio Course Description and Objectives	26
7.5.7	Astro Saber Portable	27
7.5.8	XTS 3000 Portables	28
7.6	RADIO CONSOLE SYSTEM.....	29
7.6.1	CENTRACOM Elite Console	29

EXHIBIT L: PROJECT TRAINING

1. PROJECT TRAINING

Training sessions for mobile, portable, and control station radios shall be conducted in the City of San Francisco at a facility to be provided by Motorola except that Dispatch for Group 1 shall be on site at Group 1, at a City designated Group 1 location, and Group 2 shall be at CECC. Motorola shall conduct all infrastructure technical training and system management training at the appropriate City locations and utilize the CERS equipment for training purposes. Motorola's technical training is based on using provided equipment to support the training activities except for system management training. Motorola shall not be responsible for transportation to and from the training facility and shall not be providing meals. Training sessions shall be scheduled according to the approved contract schedule. Each department's user training shall not be scheduled more than forty-five days prior to cutover to the system. If 45 days does pass between training and City use Motorola shall supply on site remedial training covering each shift once, except if cause of delay is other than Motorola. It is intended that once the training sessions for a department begin, multiple sessions shall be conducted each day until completion of the program. Motorola shall not be responsible for scheduling City personnel to attend training sessions, nor shall Motorola be responsible for assuring attendance. Motorola shall provide an attendance sheet at each session for the purpose of recording the students' attendance. Copies of the attendance sheets shall be provided to the City at the completion of training. Specifics regarding the training classes to be offered are presented later in this document.

1.1 CONTRACTOR INSTRUCTOR QUALIFICATIONS

Instructors for the microwave transmission system and the bi-directional amplifier system shall be provided by the equipment manufacturer from their normal training staff. All other instructors shall be either qualified instructors from Motorola's Worldwide Technical Education group or professional training subcontractors retained by Motorola.

1.2 INTENDED AUDIENCE

All students scheduled to receive mobile and portable radio training from Motorola will be considered user trainees. The students scheduled to receive Console Terminal Equipment (CTE) training from Motorola shall include both user trainees and instructor trainees. In regards to the professional trainers to be retained by the City, Motorola shall present the information to them in a professional manner, but will not evaluate their retention or their ability to deliver this information to others, and will not be responsible for their certification. The student training materials to be provided shall be an adequate guide for ongoing training. Any student attending a technical training class will be a qualified electronics technician, and therefore classes will not cover basic electronic circuit fundamentals.

EXHIBIT L: PROJECT TRAINING

1.3 TRAINING FACILITIES

Motorola shall provide a training facility for subscriber training located within the limits of the City of San Francisco. The training facility shall meet current building codes of the City, including requirements defined in the American With Disabilities Act of 1994. Motorola shall submit the training location information to the City for approval. At its' option, the City may require Motorola to conduct some field training operations at City facilities.

1.4 TRAINING HOURS

Training sessions for all City departments, with the exception of Police, Sheriff, and Public Health, shall be coordinated to match the department's normal daytime work schedule, not to exceed eight hours, and shall exclude legal holidays. Training sessions for the Police, Sheriff, and Public Health departments shall be coordinated to match the shift schedules for each department. The number of after-hours sessions shall be in accordance with the training requirements.

1.5 TRAINING MATERIALS AND EQUIPMENT

Motorola shall provide custom-designed operator manuals for portable radio and mobile radio training. The operator manuals shall be designed by extracting pertinent text, illustrations, and diagrams from the standard operator's manual, which describes the appropriate operation, functions and configuration of the unit being furnished to the City. Each manual shall be bound in a heavy bond paper cover. Non-standard features provided by Motorola shall be documented as attachments to the standard manuals. A sample of each manual shall be submitted to the City at least 14 days in advance for review and approval prior to use in training. The quantities of each manual to be supplied shall be in accordance with the total number of students for each type of training. Motorola shall provide an additional 25% of each type of manual to support future training needs. Motorola shall provide a quantity of control station operation manuals equal to the number of control stations provided, plus 25%.

EXHIBIT L: PROJECT TRAINING

2. TECHNICAL TRAINING

Motorola shall present the following technical training courses:

Course	Duration
SMARTNET Central Controller	3 days
Trunked Simulcast System, including AstroTac Comparator, Premysis Channel Bank, and secure operation	5 days
QUANTAR Repeaters	3 day
CENTRACOM GOLD Elite CRT console including Embassy Switch, CADI interface and Alias Database Manager	5 days
MCS2000 Mobile Radio and Control Station	4 days
XTS 3000 Portables	4 days
Astro Spectra Mobile	4 days
Astro Saber Portable	4 days
MTS2000 Portable Radio	4 days
MOSCAD Fault Management System	4 days
Microwave Transmission System	5 days
Bi-Directional Amplifier System	5 days

The technical training courses shall be presented in accordance with the equipment supplier's standard training outlines. Each student shall be provided with the appropriate training materials in accordance with the equipment supplier's normal training practices. Sample course outlines are provided in Section 7. These outlines are representative of the courses to be presented but are subject to some revision to accommodate equipment or system changes which may occur prior to final design. Two sessions of each technical training and system management course shall be presented with each session accommodating nine students.

3. SYSTEM MANAGEMENT TRAINING

Motorola shall present the following System Management Training courses:

Course	Duration
SmartZone System Management	3 days
MOSCAD Fault Management System	3 days

The System Management Training courses shall be presented in accordance with the equipment supplier's standard training outlines. Each student shall be provided with the appropriate

EXHIBIT L: PROJECT TRAINING

training materials in accordance with the equipment supplier's normal training practices. Sample course outlines are provided in Section 7. These outlines are representative of the courses to be presented, but are subject to some revision to accommodate equipment or system changes that may occur prior to detailed design.

4. USER TRAINING

Motorola shall provide training to City personnel who will in turn train other City personnel. Motorola shall present the following Operator Training courses:

Course	Duration
Mobile Radio(Field)	4 hours
Control Station (Field)	4 hours
Portable Radio (Field)	4 hours
CTE Operation (Instructor)	2 days
CTE Operation (Dispatcher)	8 hours

To simplify scheduling of personnel who need to attend both portable and mobile radio classes and to minimize impact on their work schedules, where feasible, the mobile radio and portable radio user training sessions shall be scheduled in consecutive time periods.

4.1 DISPATCH OPERATIONS

Motorola shall present the following Dispatch Operation Training course:

Course	Duration
CTE Operation	1 day

Upon completion of the course, the student will be able to:

- Identify the CENTRACOM Elite components
- Perform basic dispatch functions
- Work with configurations
- Communicate with radios and perform signaling
- Use the operator console features
- Work with telephone resources
- Work with auxiliary I/O
- Work with multiselect and patch groups
- Perform supervisory functions
- Operate / configure CAD interface functions
- Operate / configure PUC

EXHIBIT L: PROJECT TRAINING

4.2 FIELD OPERATIONS

Motorola shall provide training to instruct students in the operation of all mobile, portable, and control station radio types. The training shall be structured to give students the opportunity to operate the features of the radios as equipped and configured for delivery to their department. Instructions shall include the information necessary to enable the student to operate the radio in the modes necessary to support communications in the specialized coverage areas. The training shall not cover department operational procedures.

5. INSTRUCTOR TRAINING

Instructor training for professional trainers retained by the City shall only be provided for Console Terminal Equipment (CTE) equipment. The instruction shall cover the operation of the CTEs as described in Section 4.1. The primary difference between the CTE user training and the instructor training is the amount of time available for hands-on operation and for question-and-answer interaction with the instructor. Five copies of instructor training material shall be supplied to the City. The training shall cover the operation of the radio console as it is equipped and configured for the department for which the instructor is being trained. Motorola is not providing professional dispatcher training or training relative to City departmental dispatch procedures. This training shall not be included in the radio console training.

6. TRAINING CLASSES AND SIZES

Motorola's training sessions are presented in the sections that follow.

6.1 TECHNICIAN TRAINING

Two sessions of each of the technical training classes described shall be provided with each session accommodating nine students.

6.2 SYSTEM MANAGEMENT TRAINING

Motorola shall provide System Management Training for two City project management personnel. Since portions of system management training are subject to the final design review and the procurement of the project specific hardware and software, the schedule for this training shall be as soon as possible after notice to commence. In addition, two sessions of System Management Training shall be delivered at system cutover to City technicians with no more than 9 students per session.

EXHIBIT L: PROJECT TRAINING

6.3 USER TRAINING

Table 1 denotes how many of each type of user training sessions are to be provided for each department. A factor of 30% was used to determine the number of after-hours sessions for the Police, Sheriff and Public Health departments. All console instructor classes shall be delivered Monday through Friday during normal business hours, excluding all legal holidays.

Table 1 – Training Sessions					
Department	Portable	Mobile	Control Station	Console / User	Console/ Instructor
Police					
Day	10	10	10	5	3
After Hours	5	5	5	8	0
Fire	24	24	24	9	2
Sheriff					
Day	2	2	2	2	1
After Hours	1	1	1	1	0
DPH					
Day	2	2	2	4	2
After Hours	1	1	1	2	0
Water	3	0	0	2	2
Park & Rec	2	2	2	0	0
DES	2	0	0	0	0
DET	2	2	2	2	0
TOTAL	54	49	49	35	10

Table 2, below, lists the total number of students to be trained.

EXHIBIT L: PROJECT TRAINING

Table 2—User Training Requirements

DEPT	Type	Portable			Mobile			Consoles			
		Field Super	Field User	By Contractor	Field Super	Field User	By Contractor	Disp	Super	By Contractor	Prof Trainer
SFPD	Staff	230	2000	230	230	2000	230	145	20	165	14
	Max.	25	250	25	25	250	25	10	3	13	5
SFFD	Staff	350	1138	350	350	1138	350	16	10	26	8
	Max.	15	100	15	15	100	15	8	5	3	4
SD	Staff	125	700+	25	125	700+	25	50	125	10	1
	Max.	25	TBD	25	TBD	TBD	25	TBD	TBD	5	1
DPH	Staff	7	160	10	7	160	10	45	8	45	8
	Max.	7	10	5	7	10	5	10	8	10	4
DPT	Staff	22	280	22	12	81	12	21		21	1
	Max.	TBD	TBD	5	TBD	TBD	4	7		7	1
WD	Staff	7	46	23	0	0	0	5	1	6	0
	Max.	TBD	TBD	10	n/a	n/a	n/a	5	1	3	0
Rec-	Staff	18	94	18	10	61	10	n/a	n/a	0	0
Park	Max.	9	9	9	7	7	5	n/a	n/a	0	0
OES	Staff			10			0			0	0
	Max.			5							0
		Technicians									
DET	Staff	18		18	18		18	18		18	
	Max.	9		9	9		9	9		9	
TOTALS				706			655			291	32

Notes:

Staff = Total number of staff. Max. = Maximum number of students from the department that can be away from duties for training.

San Francisco Police Department will have the Watch Sergeants train the field users assigned to their detail.

The shaded areas indicate actual numbers of students to be trained by the Contractor.

SFPD, SFFD, SD, and DPH on 24-hour shifts. The following indicates the % of the students that will need training after normal business hours: SFPD: 30%, SFFD: 0%, SD: 30%, and DPH: 30%. SFPD console user training is 40% day, 30% swing, 30% midnight

EXHIBIT L: PROJECT TRAINING

7. MOTOROLA COURSE OUTLINES

The course outlines that follow are representative of the courses to be presented, but are subject to revision in accordance with the final system design.

1. **System Management System**
 - a. SmartZone Zone Watch Grid
2. **MOSCAD Fault Management System**
 - a. System Supervisory Training (Typical)
 - b. Maintenance Training Course
3. **Bi-Directional Amplifier System**
 - a. MicroFILL Amplifier
 - b. PrismPlus Amplifier
 - c. MicroLite Amplifier
4. **Microwave Transmission System**
 - a. The Digital Versatility Microwave—DVM18-45
5. **Trunked Radio System**
 - a. Trunked Central Controller and Repeater Control Circuitry
 - b. Trunked Digital Path Simulcast System
 - c. QUANTAR Base Station Repeaters
 - d. MCS 2000 Mobile Radio
 - e. Astro Spectra Mobile
 - f. MTS 2000 Portable Radio
 - g. Astro Saber Portable
 - h. XTS 3000 Portables
6. **Radio Console System**
 - a. CENTRACOM Elite Console System Management System

EXHIBIT L: PROJECT TRAINING

7.1 SYSTEM MANAGEMENT SYSTEM

7.1.1 Smartzone Zone Watch Grid

Course Length

One day

Recommended Prerequisites

A basic understanding of radio communications and the trunking environment

Course Description

This course will introduce the students to the Motorola Trunked Radio System principles as monitored by the SystemWatch II product, and will provide in-depth, hands-on training for SystemWatch II features and capabilities, when the necessary equipment and software are provided.

The instructor will in all cases communicate to the class any and all safety issues related to the subject equipment.

Course Objective

This course is designed to train the students in the operation of the SystemWatch II Trunking Terminal System and to prepare them to operate the system on a daily basis.

Class Size

Nine students.

EXHIBIT L: PROJECT TRAINING

7.2 MOSCAD FAULT MANAGEMENT SYSTEM

7.2.1 System Supervisory Training (Typical) Course Outline

Getting Started

Loading the application

First display

System title window

Help windows

Log In

System Operations

Screen navigation

Maps

Alarm states

Unacknowledged

Acknowledged

Return to normal prior to acknowledge

Alarm history

Alarm summary

Alarm history file archiving

Manual interrogation

Auto interrogation

Change of State (COS) transmissions: RTU origin

System Security

System Manager

System health/status information

System diagnostics

Setting MOSCAD time and date

Resetting system diagnostic stats

Auto-interrogation timing

System Overview/Walkthru

RTU messaging

Central interrogations

Communication media

System I/O

Protocols and data rates

EXHIBIT L: PROJECT TRAINING

MOSCAD Fault Management System

7.2.2 Maintenance Training Course Outline

This training is targeted for the maintenance personnel responsible for maintaining the system. This training would cover end-to-end system infrastructure components. Included would be the use of the MOSCAD ToolBox application for MOSCAD diagnostic information and uploading/downloading MOSCAD applications and configurations. Each participant would be provided with or have access to the System Documentation Manual, the Toolbox application manual, the WonderWare InTouch application manual, and the MOSCAD service manual set. The items typically covered are as follows:

Operator Training Review

System Overview/Walkthru

RTU messaging

Central interrogations

Communication media

System I/O

Protocols and data rates

Hardware Components

MOSCAD CPU

MOSCAD site RTU

MOSCAD FIU

Operator work station

Software

MOSCAD toolbox application

Site configuration

Application upload/download

Diagnostics

WonderWare/InTouch application

Installing

General review

Resident software components

MOSCAD RTU applications

MOSCAD database

WonderWare central database

EXHIBIT L: PROJECT TRAINING

7.3 BI-DIRECTIONAL AMPLIFIER SYSTEM

7.3.1 MicroFILL® Amplifier

Introduction

About this manual

Contents

Terminology

About the MicroFILL system

System overview

System components

About the amplifier enclosure

Amplifier enclosure components

RF path

Frequency allocation

Equipment characteristics

Amplifier specifications

Compliance with standards

Reliability

Preliminary Decisions

Electrical service

RF requirements

Mounting surface and location

Space requirements

Installing the Amplifier Enclosure

Checking the site

Checking the equipment

Mounting the adapter plate assembly

Mounting the amplifier enclosure

Connecting the coaxial cables

Connecting power

Securing the door

Setting Up for Initial Operation

Powering up the unit

Adjusting the alarm and peak limit detectors

Adjusting gain

Alarm System (Optional)

Alarm system design

Alarm system components

RF path

EXHIBIT L: PROJECT TRAINING

System alarms

Initial startup

Troubleshooting

Getting help

Basic troubleshooting tips

Loss of communications (both directions)

Loss of communications (one direction)

Troubleshooting the alarm-equipped amplifier

EXHIBIT L: PROJECT TRAINING

Bi-Directional Amplifier System

7.3.2 PrismPlus™ Amplifier

Introduction

About this manual

Contents

Important terminology

Model identification

About the PrismPlus

PrismPlus overview

Features

PrismPlus operation

Subassemblies

Power supply

Preamplifier

Power amplifier

Fan and heatsink

Peak limiter board and alarm

Preliminary Decisions

Introduction

Selecting the site

Antenna placement

Placement of the PrismPlus unit

Installing the Equipment

Introduction

Unpacking the equipment

Identifying the controls

Installing the equipment

Mounting the donor antenna

Mounting the reradiating antenna

Placing the PrismPlus

Connecting the unit to the antennas

Converting the power supply

Setting Up for Operation

Introduction

Order of setup procedures

Required equipment

Test preparation of the equipment

Adjusting downlink power output

Uplink adjustment with a signal generator

EXHIBIT L: PROJECT TRAINING

PrismPlus Options

Introduction

Alarm system for the PrismPlus

Weather resistant version of the PrismPlus

Troubleshooting

Introduction

Troubleshooting procedures

Troubleshooting steps

Specifications

EXHIBIT L: PROJECT TRAINING

Bi-Directional Amplifier System

7.3.3 MicroLite Amplifier

Introduction to the Course

- Instructor preparation
- Introduction to MicroLite training
- Training program materials
- Before getting started
- Review agenda
- Technical support numbers

Lesson 1: Microcell Overview

- Instructor preparation
- Lesson objectives
- Lesson introduction
- MicroLite system overview
- Microcell concepts
- MicroLite hardware components
- MicroLite system options
- Summary

Lesson 2: The Fiber Link

- Instructor preparation
- Lesson objectives
- Lesson introduction
- Fiber optic system
- Fiber optic transmission
- Benefits of optical transmission
- Safe handling of fiber optic cables
- Measuring optical signal loss
- Summary

EXHIBIT L: PROJECT TRAINING

Lesson 3A: Hardware Identification—Basic MicroLite

Instructor preparation
Lesson objectives
Lesson introduction
Lesson organization
Front panel layout
General hardware layout
Functional component layout
Summary

Lesson 3B: Hardware Identification—MicroLite Plus

Instructor preparation
Lesson objectives
Lesson introduction
Front panel layout
General hardware layout
Functional component layout
Summary

Lesson 3C: Hardware Identification—MicroLite Plus with WDM

Instructor preparation
Lesson objectives
Lesson introduction
Front panel layout
General hardware layout
Functional component layout
Summary

Lesson 4: MicroLite Installation

Instructor preparation
Lesson objectives
Lesson introduction
Physical installation overview
Overview of the installation process
Part I: Installation at the donor cell site
PART II: Installation at the remote antenna site
Summary

EXHIBIT L: PROJECT TRAINING

Lesson 5: MicroLite System Setup

Instructor preparation
Lesson objectives
Lesson introduction
System setup overview
Overview of the system setup process
System setup procedures
Additional system procedures
Summary

Lesson 6: Alarm System Operation

Instructor preparation
Lesson objectives
Lesson introduction
MicroLite alarm system components
Alarm conditions
Remote alarm monitoring setup
Summary

Lesson 7: Troubleshooting Concepts

Instructor preparation
Lesson objectives
Lesson introduction
Troubleshooting overview
Troubleshooting sequence
Summary

Conclusion of the Course

Conclusion of MicroLite training

EXHIBIT L: PROJECT TRAINING

7.4 MICROWAVE TRANSMISSION SYSTEM

7.4.1 The Digital Versatility Microwave—DVM18-45

Day 1

Introduction

Application

Single terminal

Dual terminal

Regenerator

Repeater

Repeater hybrid

Instruction Manual

Installation, alignment, and operation

Maintenance and troubleshooting

General information

 Mechanical description

 Theory of operation

 System control and alarm network

Appendices

Factory test records

Farion wiring list

System assembly drawing

Day 2

Signal Flow

With multiplexer shelf

With DS-3 interface shelf

Day 3

Protection

Protection alarm unit

Protection control unit

I/O expanders

Internal communication

External communication

Operations

Installation

Operation flow chart

EXHIBIT L: PROJECT TRAINING

Day 4

Discussion of Alignment Procedures

Alignment Lab

Day 5

Discuss Troubleshooting Procedures

Troubleshooting Lab

EXHIBIT L: PROJECT TRAINING

7.5 TRUNKED RADIO SYSTEM

7.5.1 Trunked Central Controller and Repeater Control Circuitry

Course Length

Three days, from 8:00 a.m. to 4:00 p.m. daily

Recommended Prerequisites

It is especially important that the student have a good understanding of basic logic circuits, digital techniques, and basic microprocessor theory before attending this course.

Course Description

The course begins with an in-depth discussion of trunking features and signaling concepts. This is followed by Central Controller operation and maintenance theory, and SMARTNET trunking characteristics. Also included will be a section on the System Manager Terminal.

All control circuitry located in the trunked repeater and used by the Central Controller will be covered. No repeater RF circuitry will be included.

Class Size

Nine

EXHIBIT L: PROJECT TRAINING

Trunked Radio System

7.5.2 Trunked Digital Path Simulcast System

Program Length: 40 hours

Delivery Method: Instructor led

Target Audience

Experienced electronic technicians who are directly involved with the maintenance of Motorola two-way FM communication system products.

Prerequisites

An understanding of the following is recommended: 1) Trunked Central Controller, 2) Trunked CENTRACOM Series II Console, 3) Digital MSF 6000 Repeater, and 4) a Trunked Mobile or Portable course.

Overview

This course covers the features, operation, and infrastructure of Motorola's Trunked Digital Path Simulcast two-way radio system, including system control, audio processing, and alignments. System components will be covered to the board level except for those covered in the recommended prerequisite courses, which are noted above.

Course Topics

- Trunked analog voting and simulcast concepts
- Simulcast prime and remote site controllers
- Simulcast configurations, functions, and alignment of the Transmit audio processing equipment
- Premisys ImaCS 800 and Siemens 9004B channel banks
- MSF 5000 base station
- Digitac comparator
- Simulcast system alignments and optimization

Upon completion, the participant will be able to

- Use terminology of a trunked digital path simulcast system to describe its normal operation
- Describe the functions of the components used in a trunked digital path simulcast system
- Describe the control data paths of a trunked digital path simulcast system
- Describe the audio paths of a trunked digital path simulcast system
- Align and optimize a trunked digital path simulcast system

EXHIBIT L: PROJECT TRAINING

Trunked Radio System

7.5.3 QUANTAR/QUANTRO Base Station Repeaters

Course Length

This course is two and one-half days, from 8:00 a.m. to 4:00 p.m. daily.

Recommended Prerequisites

The student should have an understanding of communication electronics. This should include a good working knowledge of FM theory and usage of common communication test equipment.

Course Description

This course is designed to give the service technician the ability to align, troubleshoot, and repair the QUANTAR or QUANTRO base station repeaters. Operation of the QUANTAR/QUANTRO radio service software will also be covered. The instructor will in all cases communicate to the class any and all safety issues to the subject equipment.

Course Objectives

At the completion of this course, the student will

Demonstrate a working knowledge of the features and capabilities of the QUANTAR/QUANTRO base station repeaters.

Verify proper operation of a QUANTAR/QUANTRO base station repeater.

Efficiently troubleshoot a QUANTAR/QUANTRO base station repeater to a faulty field replaceable unit.

Use the Radio Service Software to troubleshoot, align, and calibrate the station.

Using the radio service software, configure a QUANTAR or QUANTRO to customer's specifications.

Class Size

Nine

EXHIBIT L: PROJECT TRAINING

Trunked Radio System

7.5.4 MCS 2000 Mobile Radio

Course Length

This course is four and one-half days, from 8:00 a.m. to 4:00 p.m. daily, ending at approximately 11:30 a.m. on Friday.

Recommended Prerequisites

An understanding of communications electronics is recommended. This should include a good working knowledge of FM theory and usage of common communications equipment.

Course Description

This course is designed to give the service technician the ability to configure, align, troubleshoot, and repair the MCS 2000 Mobile Radio. Operation, Physical Layout, and Radio Service Software will also be covered. The instructor will in all cases communicate to the class any and all safety issues associated with the subject equipment.

Course Objectives

At the completion of this course, the student will

Demonstrate a working knowledge of the features and capabilities of the MCS 2000 Mobile Radio.

Verify proper operation of the MCS 2000 Mobile Radio.

Efficiently troubleshoot the MCS 2000 Mobile Radio to a faulty unit, board, and/or component.

Use Radio Service Software to perform diagnostics and troubleshooting, alignment and calibration, and configure to customer specification.

Class Size

Nine

EXHIBIT L: PROJECT TRAINING

7.5.5 Astro Spectra Mobile

To be included later.

EXHIBIT L: PROJECT TRAINING

Trunked Radio System

7.5.6 MTS 2000 Series Trunked Portable Radio Course Description and Objectives

Course Title

MTS 2000 Series Trunked Portable Radio

Course Length

This course is three and one-half days long, beginning on Tuesday and ending approximately at noon on Friday.

Recommended Prerequisites

An understanding of communications electronics. This should include a good working knowledge of digital logic circuits as well as FM theory and usage of common communications test equipment.

Course Description

This course provides the technician with circuit theory of operation, testing procedures, programming, maintenance, and repair of the MTS 2000 Series trunked portable radio. Coupling the circuit theory to active, "hands-on" testing is emphasized and ample bench time is provided. The instructor will in all cases communicate to the class any and all safety issues related to the subject equipment.

Course Objective

To derive an understanding of the theory of operation, programming, and maintenance of the MTS 2000 Series trunked portable radio. Refer to the detailed course objectives below.

Class Size

Nine

Course Objectives

When the student completes this course, they will be able to diagnose and repair the MTS 2000 portable radio.

To accomplish this task, the student will

Be able to identify the MTS 2000 portable radio and determine the models and options associated with the radio.

Learn how to disassemble the radio, conforming to proper procedures.

Have knowledge of how the receiver, transmitter, and controller circuitry operates within the radio.

Perform the necessary checks on the radio to ensure the radio is working within published specifications.

Align the radio, using a computer, the proper service aids, and test equipment.

Diagnose a problem in the radio and demonstrate the correct procedure for troubleshooting down to the component level.

Repair the MTS 2000 portable radio utilizing Motorola-recommended equipment and procedures.

EXHIBIT L: PROJECT TRAINING

7.5.7 Astro Saber Portable

To be included later.

EXHIBIT L: PROJECT TRAINING

7.5.8 XTS 3000 Portables

To be included later.

EXHIBIT L: PROJECT TRAINING

7.6 RADIO CONSOLE SYSTEM

Course Title

7.6.1 CENTRACOM Elite Console

Course length

Four and one-half days

Recommended Prerequisites

An understanding of communication electronics, including a good working knowledge of digital logic circuits, microprocessors, and troubleshooting concepts. Some experience with CENTRACOM systems, Base stations, and LAN and mobile or portable radios would be beneficial.

Course Description

This course covers CENTRACOM Gold Installation procedures, "As-Built" documentation, various console types, LAN System Architecture, Central Electronics Bank modules, Maintenance and Diagnostics, and Troubleshooting the CENTRACOM SERIES II system. The instructor will in all cases communicate to the class any and all safety issues related to the subject equipment.

GUI dispatch and GUI admin

Console database manager (CDM)

Alias database manager (ADM)

LAN

CEB power supply

Console operator interface module (COIM)

Upgrading to Gold Series

Course Objective

Understand the theory of installation, technical operation, maintenance requirements, and equipment testing procedures of the CENTRACOM Gold Series product line.

Class Size

Nine

