



# F3EA

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## F3EA

*SI/EW Training and Support*

*Course Catalogue*

Updated: May 2021

## Background

F3EA is a provider of discrete mission support, security and training services including Special Operations specific requirements. We offer comprehensive programs including research and development, training, intelligence, and consulting strategies to support military, government agencies, police/SWAT, Homeland Security, and private corporations across the globe. As a provider of mission support, security, and training services; F3EA's core competency resides in providing full-spectrum support, development, and execution of interagency Emergency Deployment Readiness Exercises (EDREs) and Joint Full Mission Profile (FMP) exercises to enhance performance and improve operational capabilities both domestically and overseas. F3EA's respected position in the USSOCOM community is built on realistic, demanding, and cutting-edge exercise delivery with the expertise and experience to meet and exceed the performance requirements identified to support Joint Forces Commanders.

F3EA operates three SI/EW training facilities in San Diego, CA, Virginia Beach, VA, and Savannah, GA at F3EA headquarters. Our San Diego and Virginia Beach facilities can accommodate concurrent classes for classroom instruction, have labs set up for hands on instruction, and indoor garage workspaces with all the tools needed for vehicle-based equipment installations and operations.

We can also facilitate mobile training teams to provide training at desired customer locations. Our team is comprised of Subject Matter Experts (SME) with hundreds of years of combined tactical SIGINT and Electronic Warfare (SI/EW) experience and training supporting: United States Special Operations Command (USSOCOM) SI/EW missions, Five Eyes nations and other partners SOF SI/EW personnel, Federal Law Enforcement, and Intelligence Community customers in practical application of SIGINT and EW tactics, techniques, and procedures (TTP's).

F3EA was founded by a 160th Special Operations Aviation Regiment (SOAR) Officer and our employees are a wide array of Special Operations experts who bring a dynamic combination of management, expertise, and execution to each challenge. F3EA delivers long-term, cost-effective programs specifically tailored to meet customer needs.

F3EA is disabled veteran-owned business headquartered in Savannah, Georgia with an international client base.

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# 1. Basic Antenna Theory, Design, and Fabrication

## COURSE OVERVIEW

This course is focused on basic antenna theory, design, and fabrication to meet requirements for most field expedient applications. It is designed to give students an understanding of how different antenna types work and the ability to choose the best antenna to fit the wide array of tactical applications.

### 1.1 Antenna Theory

Provides an introduction or review of Radio Frequency fundamentals and the basics of how antennas work. Students will learn about common antenna designs such as Monopole, Dipole, J-Pole, and Yagi.

### 1.2 Antenna Design and Fabrication

Students will learn the various parameters used in designing and fabricating field expedient antennas. They will do practice calculating, measuring, cutting, assembling, and testing numerous field expedient antenna designs to fine-tune each antenna to meet specific signal collection requirements.

### 1.3 Coaxial Cable Basics

Teaches student to understand the different characteristics of the various types of coaxial cables, which coax cable type to use for different applications, and the proper procedures for building custom cables for various tactical applications.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

\*This course is fully customizable to each customer's specific requirements. While there is no specific course instruction length, it is designed to be no less than three days, and optimal instruction duration is designed to be five days in length.

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## 2. Power and Electricity Management

### COURSE OVERVIEW

This course will provide students a foundational knowledge in power and electricity focused on enabling the tactical operator to effectively supply power to equipment across in a wide variety of operational environments. Topics covered will include Alternating Current (AC), Direct Current (DC), proper use of inverters, multi-meter use, types of batteries, basic circuitry (12 and 24 volt), power calculations (Ohm's Law), electrical schematics, cable making, and vehicle installations.

#### 2.1 Electrical Theory and Circuitry

This module covers the fundamentals and theory of electricity and how basic circuits work.

#### 2.2 Power Calculations (Ohm's Law)

This module is designed to give students the ability to calculate power requirements for equipment and calculate battery requirements to use equipment in various tactical environments.

#### 2.3 Power Cable Construction

This module teaches students the basics of choosing the appropriate gauge of wire for various electrical applications and then how to build, install connectors and configure a basic power system for vehicle or battery-based equipment operation.

#### 2.4 Vehicle Installations

Covers the basics of how to run cables from the vehicle's battery to power various power management and collections equipment configurations. This course will cover a wide range of skills through both classroom instruction and practical applications. There will be extensive hands-on time for students to become proficient in installing 12V and 24V circuits in vehicles and conducting battery life calculations for specific equipment.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

\*This course is fully customizable to each customer's specific requirements. While there is no specific course instruction length, it is designed to be no less than two days, and optimal instruction duration is designed to be 3 days in length. This course is frequently paired with the Antenna Fabrication and Design Class.

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## 3. Radio Wave Propagation (RF Theory)

### COURSE OVERVIEW

This course is a classroom lecture that covers the properties of an electromagnetic wave, the electromagnetic spectrum, and propagation of radio waves. Students will gain an understanding of the physics that produce electromagnetic waves as well as the values used to measure their characteristics.

#### 3.1 Electromagnetic Wave Properties

This module covers the history of wireless communication, basics of the Electromagnetic Spectrum, basics of the Radio Frequency (RF) Spectrum and basics of waveform modulation.

#### 3.2 Electromagnetic Spectrum Overview

This module covers basic radio wave propagation, identification of wave behaviors, discusses basic radio principle and identifies common measurements in RF theory.

#### 3.3 Intro to Antennas

This module will give the student an understanding of the theory that allow antennas to work and will identify the key components that make up an antenna.

#### 3.4 Basic Types of Antennas

This module will help the student become familiar with common antenna types, the use of antenna ground planes, and the basics of radiation patterns.

**COURSE LEVEL:** Beginner/Intermediate

**DESIGNED FOR:** Students of all skill and experience levels

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## 4. Analog and Digital Push-to-Talk (PTT)

### COURSE OVERVIEW

Course covers a full range of analog and digital push-to-talk operations including the intercept and prosecution of both analog and digital push-to-talk systems, using commercial and government solutions, and the geolocation of push-to-talk signals.

#### 4.1 Analog and Digital PTT Theory

This module will give the student a basic understanding of VHF and UHF, familiarization with modulation schemes, common uses for analog PTT, and common security techniques. The student will become familiar with common VHF and UHF bands in the United States and why bands are licensed and regulated. It also teaches students basic techniques to find signals of interest and how to scan known signals of interest. Module introduces Digital Mobile Radio (DMR), describes the basic features of DMR systems and its components. It also provides the student with a familiarization of the technical terminology used in the DMR specifications, the key characteristics of the DMR over-the-air protocol and the voice and data capabilities of DMR.

#### 4.2 Commercial solutions

Module focused on utilizing open-source and commercial solutions to identify and prosecute signals of interest. Students will learn the fundamentals of push-to-talk signals and how to identify analog and digital signals from specific sources. Course covers basic use of Linux for operation of software suites used in identification of signals of interest.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

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## 4. Analog and Digital Push-to-Talk (PTT) (Cont)

### COURSE OVERVIEW

Course covers a full range of analog and digital push-to-talk operations including the intercept and prosecution of both analog and digital push-to-talk systems, using commercial and government solutions, and the geolocation of push-to-talk signals.

#### 4.3 Government Solutions

Module teaches students best practices and techniques for operating popular government push-to-talk equipment. Additionally, students will learn the most efficient ways to integrate government solutions in both DTAAC and ODTAAC environments.

#### 4.4 Tactical Direction Finding and Geo-Location

Students will be taught the skills they need to go the “last mile” in finding the source of an analog or digital push-to-talk signal. F3EA has developed best practice tactics, techniques, and procedures for locating push-to-talk devices and repeaters used in push-to-talk networks. Students will learn tactics for use in both DTAAC and ODTAAC environments

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

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## 5. Global System for Mobile Communication (GSM)

### COURSE OVERVIEW

This course covers a full range of GSM operations. This includes basic GSM theory covering the architecture, radio interface, and network security, as well as passive and active operations on a GSM network using a variety of equipment.

#### 5.1 Theory

This module covers GSM theory that has been expertly distilled down to cover the most tactically relevant concepts of a GSM network. This course provides the core network terminology, infrastructure, and processes of a GSM network to enable the student to effectively conduct operations in GSM environments.

#### 5.2 Network Characterization

This module teaches a student how to identify the processes and parameters being employed by a GSM network. The unique tactics, techniques, and procedures taught by our SME instructors will enable students to optimize their efforts and more effectively conduct operations in a GSM network environment.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

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## 5. Global System for Mobile Communication (GSM) (Cont)

### COURSE OVERVIEW

This course covers a full range of GSM operations. This includes basic GSM theory covering the architecture, radio interface, and network security, as well as passive and active operations on a GSM network using a variety of equipment.

#### 5.3 Passive Collection

This module teaches students the most up to date techniques and procedures for passively operating in a GSM environment. Our course will help students understand their capabilities in encrypted and unencrypted GSM environments and how to integrate various hardware and software solutions for real-time collection or historical data analysis.

#### 5.4 Electronic Warfare and Precision Geo-location

This module teaches students best practices for acquisition and location of a GSM handset. This training involves the use of either government or commercial solutions in a variety of real-world scenarios and environments. Students are given numerous opportunities to practice these techniques in live network environments in basic and more complex scenarios.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

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## 6. CODE DIVISION MULTIPLE ACCESS (CDMA)

### COURSE OVERVIEW

This course covers a full range of CDMA operations. This includes basic CDMA theory covering the architecture, radio interface, and network security, as well as passive and active operations on a CDMA network using a variety of equipment.

#### 6.1 Theory

CDMA theory that has been distilled down to cover the most tactically relevant concepts of a CDMA network without bogging the learner down with too much detail. This course provides the core network terminology, infrastructure, and processes of a CDMA network to enable the student to effectively conduct operations in CDMA environments.

#### 6.2 Network Characterization

This module teaches a student how to identify the unique processes and parameters being employed by a CDMA network. The unique tactics, techniques, and procedures taught by our expert instructors will enable students to optimize their efforts and more efficiently conduct operations in a CDMA network environment.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

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## 6. CODE DIVISION MULTIPLE ACCESS (CDMA) (Cont)

### COURSE OVERVIEW

This course covers a full range of CDMA operations. This includes basic CDMA theory covering the architecture, radio interface, and network security, as well as passive and active operations on a CDMA network using a variety of equipment.

#### 6.3 Passive Collection

This module teaches students the most up to date techniques and procedures for passively operating in a CDMA environment. Our course will help students understand their capabilities in CDMA environments and how to integrate various hardware and software solutions for real-time collection or historical data analysis.

#### 6.4 Electronic Warfare and Precision Geo-location

This module teaches students best practices for acquisition and location of a CDMA handset. This training involves the use of either government or commercial solutions in a variety of real-world scenarios and environments. Students are given numerous opportunities to practice these techniques in live network environments in basic and more complex scenarios.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

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## 7. Universal Mobile Telecommunications Systems (UMTS)

### COURSE OVERVIEW

This course covers a full range of UMTS operations. This includes basic UMTS theory covering the architecture, radio interface, and network security, as well as passive and active operations on a UMTS network using a variety of equipment.

#### 7.1 Theory

This course covers UMTS theory that has been expertly distilled down to cover the most tactically relevant concepts of a UMTS network in a one-day lecture. This includes UMTS development and evolution, UMTS architecture, the radio network interface, the function of each physical and logical channel, standard network organization, and UMTS authentication and encryption processes.

#### 7.2 Network Characterization

This module teaches a student how to identify the unique processes and parameters being employed by a UMTS network. The unique tactics, techniques, and procedures taught by our SME instructors will enable students to optimize their efforts and more efficiently conduct operations in a UMTS network environment.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

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## 7. Universal Mobile Telecommunications Systems (UMTS) (Cont)

### COURSE OVERVIEW

This course covers a full range of UMTS operations. This includes basic UMTS theory covering the architecture, radio interface, and network security, as well as passive and active operations on a UMTS network using a variety of equipment.

#### 7.3 Passive Collection

This module teaches students the most up to date techniques and procedures for passively operating in a UMTS environment. Our course will help students understand their capabilities in encrypted and unencrypted UMTS environments and how to integrate various hardware and software solutions for real-time collection or historical data analysis.

#### 7.4 Electronic Warfare and Precision Geo-location

This module teaches students best practices for acquisition and location of a UMTS handset. This training involves the use of either government or commercial solutions in a variety of real-world scenarios and environments. Students are given numerous opportunities to practice these techniques in live network environments in basic and more complex scenarios.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

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## 8. Long Term Evolution (LTE)

### COURSE OVERVIEW

F3EA has developed instruction for the full range of LTE operations. This includes basic LTE theory covering the architecture, radio interface, and network security, as well as passive and active operations on LTE network using a wide variety of equipment.

#### 8.1 Theory

Our LTE theory course consists of a one-day lecture that covers tactically relevant portions of the LTE protocol. This includes LTE development and evolution, LTE architecture, the radio network interface, the function of each physical and logical channel, standard network organization, and LTE authentication and encryption processes. Upon completion, students will be able to apply their understanding of LTE to more effectively operate and problem solve in LTE environments.

#### 8.2 Network Characterization

This module teaches a student how to identify the unique processes and parameters being employed by an LTE network. The unique tactics, techniques, and procedures taught by our expert instructors will enable students to optimize their efforts and more efficiently conduct operations in an LTE network environment.

#### 8.3 Electronic Warfare and Precision Geo-location

This module teaches students best practices for acquisition and location of an LTE handset. This training involves the use of either government or commercial solutions in a variety of real-world scenarios and environments. Students are given numerous opportunities to practice these techniques in live network environments in basic and more complex scenarios.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

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## 9. Wireless Networking and Collection

### COURSE OVERVIEW

This course provides a basics understanding of how wireless networks function and how to utilize government and commercial off the shelf equipment. This course covers a wide range of skills covered in both classroom lecture and practical application scenarios.

#### 9.1 Theory

This module focuses on introducing the basics of IEEE 802.11 (WiFi) networking, the network structure, characteristics, and data flow. This course provides the core network terminology, infrastructure, and processes of a WiFi network to enable the student to effectively conduct operations against WiFi targets.

#### 9.2 Network Characterization

This module teaches a student how to conduct surveys for 802.11 signals and how to analyze collected data for identification or exploitation. The tactics, techniques, and procedures will enable students to optimize their efforts and conduct operations targeting 802.11 networks.

#### 9.3 Commercial Solutions

Module is focused on utilizing open-source and commercial solutions to identify and prosecute 802.11 signals of interest.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

\*This course is fully customizable to each customer's specific requirements. While there is no specific course instruction length, it is designed to be no less than two days, and optimal instruction duration is designed to be 3 days in length.

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## 9. Wireless Networking and Collection (Cont)

### COURSE OVERVIEW

This course provides a basics understanding of how wireless networks function and how to utilize government and commercial off the shelf equipment. This course covers a wide range of skills covered in both classroom lecture and practical application scenarios.

#### 9.4 Government Solutions

Module teaches students best practices and techniques for operating government developed and fielded 802.11 collection and targeting equipment.

#### 9.5 Precision Geo-location

Our experts teach students best practices for acquisition and location of an 802.11 device. This training involves government or commercial solutions in real-world scenarios and environments. Students are given numerous opportunities to practice these techniques in live network environments in basic and more complex scenarios.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

\*This course is fully customizable to each customer's specific requirements. While there is no specific course instruction length, it is designed to be no less than two days, and optimal instruction duration is designed to be 3 days in length.

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## 10. Basic Rover

### COURSE OVERVIEW

This course teaches the basic functions of Rover and how to integrate it into missions utilizing various data collection and exploitation systems.

**\*\*\* Recommended equipment for this course: DRT (1301C+, 1183, 1201, 3300), active boxes, and cellular survey tools.**

#### 10.1 Rover installation and Operational Configuration

This module covers installing Rover with the proper license keys, adding imagery files, data management, and using Team Connect over a virtual private network for multi-team missions.

#### 10.2 Network Characterization

This module of instruction teaches the student to use Rover tools to analyze and describe the parameters active in a communications network. Student will be shown the tools and then conduct network characterization using live or pre-collected data in practical exercises.

#### 10.3 Hardware Integration

Students will be taught to connect, configure, and integrate their own equipment into Rover and utilize it to conduct active and passive targeting operations.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

\*This course is fully customizable to each customer's specific requirements. While there is no specific course instruction length, it is designed to be no less than three days, and optimal instruction duration is designed to be five days in length, depending on the amount of equipment desired to be covered.

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## 10. Basic Rover (Cont)

### COURSE OVERVIEW

This course teaches the basic functions of Rover and how to integrate it into missions utilizing various data collection and exploitation systems.

**\*\*\* Recommended equipment for this course: DRT (1301C+, 1183, 1201, 3300), active boxes, and survey tools capable of modes 1-3, 5, and 6.**

#### 10.4 Passive and Active Geo-location

This module teaches the student how to utilize both passive and active systems and Rover's tools to narrow down the location of a target. Students will be taught the tools in a classroom setting and then use the tools in live training ranging from basic to complex scenarios.

#### 10.5 Wifi Dashboard

This module covers the Wifi Dashboard tool that can be used to analyze, display, and interact with 802.11 data, including both emitter data and drive test data.

#### 10.6 Mobile Emitter Analysis

This module teaches the student to use the Mobile Emitter Analysis tool to identify selectors that are common over multiple collection geographical areas and time periods.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

\*This course is fully customizable to each customer's specific requirements. While there is no specific course instruction length, it is designed to be no less than three days, and optimal instruction duration is designed to be five days in length, depending on the amount of equipment desired to be covered.

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## 11. Maritime Tracking and Analysis

### COURSE OVERVIEW

This course provides students with the tools and experiences for operating in a maritime environment. All topics in this course will be covered in a classroom setting prior to being put into practice on the water.

#### 11.1 Introduction to Maritime

Students will have the opportunity to become familiar with Maritime Communication Systems such as VHF, SATCOM, Cellular, Wi-Fi, Bluetooth, and Automatic Identification System (AIS).

There will be ample time to become familiar with installing and operating equipment on vessels and instruction on how water affects the RF environment and the advantages/disadvantages associated with maritime operations.

#### 11.2 Vessel Tracking – Commercial, Fishing, Government/Military

Students will learn methods and resources for tracking of commercial vessels, fishing vessels, and military vessels utilizing open-source methods and Software Defined Radios (SDRs).

#### 11.3 Maritime Law, Communications, and Etiquette

This module introduces the students to basic maritime law, maritime etiquette, and how vessels at sea utilize various communications equipment and techniques.

#### 11.4 SIGINT/EW Maritime TTPs

This module will introduce and allow the student to practice in real world scenarios to become proficient in a variety of proven maritime SIGINT/EW Tactics, Techniques, and Procedures

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

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## 12. Tactical Precision Geo-Location

### COURSE OVERVIEW

This course enhances the speed and precision of the tactical operator while conducting geo-location operations in permissive, semi-permissive and non-permissive environments.

#### 12.1 Targeting best practices and TTPs

This course utilizes basic and advanced techniques for geo-locating cellular and PTT devices.

#### 12.2 Precision Geo-Location (PGL) fundamentals

This instruction focuses on giving the student an in-depth understanding of the fundamentals of how PGL works. Our classroom instruction is followed by basic in house PGL practice and then PGL in a live network in scenarios of increasing complexity.

#### 12.3 Equipment setup and utilization in a tactical environment

Operators will be taught how to best setup and utilize their equipment while maintaining a tactical posture. Our instructors will teach students the basics of setting PGL equipment up in vehicles and in body worn or man packable configurations to meet a wide variety of tactical missions in DTAAC and ODTAAC environments.

#### 12.4 Scenario-based tactical direction-finding lanes (Crawl, walk, run)

Operators will be given numerous real-world scenarios to navigate while encountering hostile contact. Each course is designed around the student's understanding of basic geo-location fundamentals. Beginner level courses will begin with a review of Direction-Finding characteristics. A "crawl, walk and run" approach is used during practice runs to ensure student proficiency prior to conducting full mission profile scenarios.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

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## 13. Traveler Safety

### COURSE OVERVIEW

This course provides students with a broad understanding of the many vulnerabilities associated with different technologies. Demonstrations of each vulnerability will be given and thoroughly explained. Upon completion of this course, students will understand how to secure their devices, data and communications while working in a foreign nation.

#### *13.1 Overview of Vulnerabilities associated with foreign travel*

This module covers a wide variety of common vulnerabilities to include but not limited to: Wi-Fi, cellular, networking, device operating systems and telematics.

#### *13.2 Risk mitigation techniques during travel*

Students will understand how they are vulnerable when they travel and how to mitigate these risks.

#### *13.3 Commercial and Governmental threats*

This module introduces students to both commercial and government threats associated with their devices and communications.

#### *13.4 Securing devices and communications*

Students will learn various techniques and tools that will allow them to secure their devices and establish secure means of communication to conduct their missions.

#### *13.5 Scenario-based exercises*

After the tools and technique are taught in a classroom setting, students will apply their knowledge in a scenario-based culmination exercise.

**COURSE LEVEL:** Beginner/Intermediate

**DESIGNED FOR:** Students of all skill and experience levels

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## 14. Basic computer, networking, and Wireshark fundamentals

### COURSE OVERVIEW

This course will teach students a basic understanding of protocols used for transmitting data between electronic devices within the Open Systems Connection (OSI) and Transmission Control Protocol/Internet Protocol (TCP/IP) Models and the use of Wireshark for network analysis.

#### 14.1 Basic Wireshark analysis fundamentals

This module will introduce the student to the fundamentals of Wireshark and how to use the widely used network protocol analyzer to see what is happening on a network at a microscopic level.

#### 14.2 Data transmission rules and procedures (OSI and TCP/IP)

This module will introduce or review basic networking fundamentals to ensure the student understands and can use the Wireshark tool to conduct protocol analysis and network characterization.

#### 14.3 Network characterization with Wireshark

This module teaches the student to use Wireshark tools to identify key network parameters that can be utilized to conduct operations.

#### 14.4 Practical exercises and practice

Students will practice using various Wireshark tools and will complete practical exercises to reinforce their understanding and ability to utilize Wireshark to conduct tactical operations.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

\*This course is fully customizable to each customer's specific requirements. While there is no specific course instruction length, it is designed to be no less than two days, and optimal instruction duration is designed to be 3 days in length.

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## 15. Full Mission Profile and Scenario Development

### COURSE OVERVIEW

F3EA has a robust capability to generate a wide variety of Full Mission Profile (FMP) training scenarios tailored to specific needs. Scenarios can be developed anywhere in the United States and our cadre of experts will conduct thorough research and characterization of the RF environment to ensure customer requirements are fully met. Students will be evaluated on each skill set being utilized and the unit's leadership will be provided a full report and evaluation, as well as recommendations for corrective actions if desired.

#### 15.1 Targeting scenarios for Modes 0-6

Our subject matter experts can build and facilitate any level of targeting scenario based on customer's needs, from simple single mode to multi-mode multi-location scenarios.

#### 15.2 Network Development

Our team of experts will design a custom network development scenario to meet your unique needs. We will set custom networks to enable tactical network development for operators to exercise a full spectrum of network-based operations.

#### 15.3 Passive collection

Our experts will utilize their deep understanding of communication networks to design and facilitate passive collection FMPs and scenarios tailored to meet customer requirements.

**COURSE LEVEL:** Beginner/Intermediate/Advanced  
**DESIGNED FOR:** Students of all skill and experience levels

\*This course is fully customizable to each customer's specific requirements. While there is no specific course instruction length, it is designed to be no less than five days, and optimal scenario duration is designed to be ten days in length, depending on the needs of the command

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## 15. Full Mission Profile and Scenario Development (Cont)

### COURSE OVERVIEW

F3EA has a robust capability to generate a wide variety of Full Mission Profile (FMP) training scenarios tailored to specific needs. Scenarios can be developed anywhere in the United States and our cadre of experts will conduct thorough research and characterization of the RF environment to ensure customer requirements are fully met. Students will be evaluated on each skill set being utilized and the unit's leadership will be provided a full report and evaluation, as well as recommendations for corrective actions if desired.

#### 15.4 Active EW operations

Our experts can design and execute a wide variety of FMP and scenario-based training incorporating Active EW operations. We will conduct thorough pre-exercise analysis and network characterization, utilize appropriate target selectors to ensure smooth execution of the scenario.

#### 15.5 Mission planning and data management

Our FMPs and scenarios can be custom built to include either simple or extensive mission planning requirements. We can also incorporate common intelligence community requirements and standards for data management within scenarios.

**COURSE LEVEL:** Beginner/Intermediate/Advanced  
**DESIGNED FOR:** Students of all skill and experience levels

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## 16. Multi-Protocol Digital Receiver Technology (DRT)

### COURSE OVERVIEW

This course gives students dedicated hands-on training utilizing DRT across a variety of form factors and exploring the system's full range of capabilities. In addition to DRT operations, students will receive data management strategies and basic command line functions to conduct on-site analysis of chronologs and event logs.

\*\*\* Recommended equipment for this course includes DRT (1301C+, 1183, 1201, 3300) with all necessary cables, controller laptops, antennas for multiple bands, MILSPEC batteries and battery cables.

#### 16.1 DRT capabilities overview

Students will receive comprehensive instruction on DRT hardware and software utilization to survey, detect, and characterize active communications networks.

#### 16.2 DRT hardware setup and IP configuration

Students will receive detailed training on the physical setup of each form factor to include cable management and power management for both shore and battery power. Students will perform basic IP configuration and networking of DRT equipment for use with a PC and learn more advanced techniques such as networking multiple DRTs for robust collection operations. Students will receive practical instruction on how DRT systems can be deployed on multiple mission platforms to include fixed wing aircraft (both manned and unmanned), rotary wing aircraft, man-packable, man-portable, vehicular, maritime, submarine, or fixed site installations.

**COURSE LEVEL:** Beginner/Intermediate/Advanced  
**DESIGNED FOR:** Students of all skill and experience levels

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## 16. Multi-Protocol Digital Receiver Technology (DRT) (Cont)

### COURSE OVERVIEW

This course gives students dedicated hands-on training utilizing DRT across a variety of form factors and exploring the system's full range of capabilities. In addition to DRT operations, students will receive data management strategies and basic command line functions to conduct on-site analysis of chronologs and event logs.

\*\*\* Recommended equipment for this course includes DRT (1301C+, 1183, 1201, 3300) with all necessary cables, controller laptops, antennas for multiple bands, MILSPEC batteries and battery cables.

#### 16.3 Mission setup

Super General Purpose Receiver (SGPR) service will be utilized to perform search, collection, and Direction Finding (DF) against Push-to-Talk radios.

#### 16.4 Command line functions for analysis and data management

Students will receive data management strategies and basic command line functions to conduct on-site analysis of chronologs and event logs.

#### 16.5 Antenna set-up and collection site optimization

Radio Frequency theory will be discussed as it relates to collection strategies, resource management, and proper antenna usage. Student will receive in-depth instruction on antenna types along with proper configuration and utilization of each.

**COURSE LEVEL:** Beginner/Intermediate/Advanced  
**DESIGNED FOR:** Students of all skill and experience levels

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## 16. Multi-Protocol Digital Receiver Technology (DRT) (Cont)

### COURSE OVERVIEW

This course gives students dedicated hands-on training utilizing DRT across a variety of form factors and exploring the system's full range of capabilities. In addition to DRT operations, students will receive data management strategies and basic command line functions to conduct on-site analysis of chronologs and event logs.

\*\*\* Recommended equipment for this course includes DRT (1301C+, 1183, 1201, 3300) with all necessary cables, controller laptops, antennas for multiple bands, MILSPEC batteries and battery cables.

### 16.6 Practical application and small-scale scenario exercises

This module will provide the students the opportunity to apply all skills learned through practical application exercises. Instruction will be tailored to the customer's specific needs and determined by the equipment available to the students. Additionally, students will receive instruction and perform practical exercises utilizing Alaska, Yukon, Hawaii, site survey, target list, event logs, call logs, bands, tuners, channel ID, active call window, and multiple service set up.

**COURSE LEVEL:** Beginner/Intermediate/Advanced  
**DESIGNED FOR:** Students of all skill and experience levels

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## 17. *Electronic Surveillance and Detection*

### *COURSE OVERVIEW*

This course introduces the student to the theory, tactics, techniques, and procedures used to conduct tactical Electronic Surveillance and Detection. It is focused on how to track targets and collect information primary through the local cellular network and teach the student how to utilize the same equipment to detect if electronic surveillance is being used against him/her.

#### *17.1 Electronic Surveillance and Detection*

This module introduces the student to the basics of how electronic surveillance is done to develop information on a target. This includes how Electronic Surveillance is used by adversaries to collect intelligence information.

#### *17.2 Cellular Theory*

This module can be specifically tailored to cover the relevant cellular theory to meet customer needs from basic to advanced. This gives the student the required knowledge of cellular theory to understand how to conduct both passive and active electronic surveillance.

#### *17.3 Passive electronic surveillance*

This module teaches student to utilize various commercial off the shelf (COTS) and government off the shelf (GOTS) hardware and software tools to conduct passive cellular tracking. Students will be taught how to use various passive surveillance tools such as DRT, Tetley Scanner, and Rover in both classroom and live on network practical exercises.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

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## 17. *Electronic Surveillance and Detection (Cont)*

### **COURSE OVERVIEW**

This course introduces the student to the theory, tactics, techniques, and procedures used to conduct tactical Electronic Surveillance and Detection. It is focused on how to track targets and collect information primary through the local cellular network and teach the student how to utilize the same equipment to detect if electronic surveillance is being used against him/her.

#### *17.4 Active electronic surveillance*

This module teaches student to utilize various hardware and software tools to conduct active cellular tracking. Students will be taught how to use various COTS and GOTS active surveillance tools in classroom and live on network practical exercises. Training will be tailored based on specific equipment customer has available.

#### *17.5 Surveillance Detection*

Introduces students to techniques and tools various cellular based applications to detect if an adversary is conducting electronic surveillance on them.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

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## 18. Passive Geo-Location

### COURSE OVERVIEW

This course is designed to teach the student to conduct passive cellular geolocation for use when network signature must be minimized or to greatly reduce search areas for follow on active geolocation operations. This course will have classroom instruction with extensive practical application exercises utilizing live cellular networks.

\*\*\* Recommended equipment for this course: DRT (1301C+, 1183, 1201, 3300), and survey tools capable against customer defined cellular protocols.

#### 18.1 Cellular Theory

This module can cover one or more cellular protocols based on customer requirements and can be tailored to any experience level. This module will teach the student the key parameters of a cellular network required for passive geo-location operations.

#### 18.2 Cellular network characterization and survey techniques

This module will teach the student to use hardware and software solutions to collect cellular network parameters and then analyze the network for optimized collection areas and opportunities.

#### 18.3 Passive equipment tactics, techniques, and procedures (TTPs)

This module teaches the student to use mapping programs like Rover and Seraph to gather and analyze cellular network traffic and then produce detailed products to identify locations for further collection or for focused start points for follow on operations.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** Students of all skill and experience levels

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## 19. Introduction to Software Defined Radio (SDR)

### COURSE OVERVIEW

This course provides an introduction to the world of Software Defined Radios and how they are used. Upon completion of the course, students will understand how to operate Receive Only and Half-Duplex SDR's using various software and antenna configurations.

Each course is designed around the student's understanding of basic Radio Frequency fundamentals. Beginner level courses will begin with a review of Radio Wave properties, propagation, and application to ensure successful comprehension of Radio Frequency theory.

#### 19.1 Commercial SDR introduction

This module introduces a variety of common commercial off the shelf SDR and how they can be used by the tactical operator.

#### 19.2 SDR Software and Programming

This module covers the basics of setup and programming of commonly used and openly available SDR applications.

#### 19.3 Scanning target frequencies

Students will learn how to setup and use SDR's for scanning and logging information on mission specific frequencies of interest.

#### 19.4 Automatic Identification System (AIS) / Automatic Dependent Surveillance – Broadcast (ADS-B) tracking

Students will learn how to setup and use SDR's for AIS and ADS-B tracking to support specific mission requirements.

COURSE LEVEL: Beginner/Intermediate

DESIGNED FOR: Students of all skill and experience levels

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## 20. Networking and 802.11 Fundamentals

### COURSE OVERVIEW

This course provides students with network and 802.11 fundamentals training, designed to provide a basic understanding of network architecture, network flow, and 802.11 technologies.

#### 20.1 Network Theory

Course will cover basics of: Network theory, network implementation, basic network concepts, HTTP, DNS, SMTP, Web email, SFTP, TCP, UDP, IP packets, IP CIDR, DHCP, routing protocols, ICMP, MAC addresses, Address Resolution Protocol, Link Layer Broadcast Channels, Link Layer P2P communication links, Ethernet Access Protocols, Ethernet Frame Structure and physical data storage.

#### 20.2 802.11 Theory

Course will cover basics of 802.11 protocol including: Wireless theory, different topologies and hardware, 802.11 standards, 802.11 MAC protocol, IEEE 802.11 Frame, transmissions, channels, authentication, wireless enterprise solutions, wireless network design issues, 802.11 vulnerabilities, network security components, and network management tools.

**COURSE LEVEL:** Beginner/Intermediate  
**DESIGNED FOR:** This course is designed for individuals with little to some experience with Wireshark, Open Source WiFi tools, and radio communications theory

\*This course is fully customizable to each customer's specific requirements. While there is no specific course instruction length, it is designed to be no less than three days, and optimal instruction duration is designed to be five days in length.

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## 21. Network Traffic Analysis

### COURSE OVERVIEW

This course provides students with skills necessary to be proficient in the operation and employment of Wireshark and TShark, 802.11 traffic analysis, reconstructing network activity, conducting open-source research, and ping, traceroute, nmap & SNMP queries. The Network Traffic Analysis course prepares students to conduct 802.11 collection and analysis, remote collections and analysis, and quickly parse through large quantities of network packet captures.

### 21.1 Network Traffic Analysis Tools and Techniques

The scope of this course encompasses the following learning objectives: Navigating Wireshark and TShark, capture and display filtering TCP/IP headers, 802.11 in Wireshark/TShark, overview of common protocols with an emphasis on Ethernet I/II, Point-to-Point protocol, PPP-over-Ethernet, IPv4/IPv6, ARP, TCP, UDP, DNS, DHCP, HTTP(S), NetBIOS, SMP, VOIP protocols (SIP/H.323), SSH, SSL/TLS, SFTP, VPN, L2TP, and PPTP, reconstructing network activity, internet-based open-source research, with an emphasis on IANA/registrar databases, whois, looking glass sites, dig and nslookup, active research using ping, traceroute, nmap & SNMP queries, how to identify and process encoding types, non-dissected protocols analysis, traffic analysis in an encrypted environment, HTTP header analytics and cookie tracking.

**COURSE LEVEL:** Beginner/Intermediate

**DESIGNED FOR:** This course is designed for individuals with little to some experience with Wireshark, Open Source WiFi tools, and radio communications theory

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## 22. Close Access Analysis

### COURSE OVERVIEW

The emphasis for the course will be to provide students a basic understanding of networking fundamentals, to ensure their successful knowledge execution in future intermediate cyber courses. By the end of the course, students will have a rudimentary understanding how to capture and analyze network data through multiple mediums with COTS and GOTS tools to include: Typical network architectures Wireless Packets (802.11) Cracking wireless encryption methods (WEP, WPA) Linux command line, Kali Linux, Kismet, and Wireshark.

**Planning and Preparation:** Determine the scope of the assessment, gather information about the network and its components, and prepare the necessary tools and equipment.

**Site Survey:** Conduct a physical survey of the network infrastructure and assess the wireless coverage and signal strength.

**Network Scanning:** Scan the network to identify all wireless devices and access points and collect information about their configurations and security settings.

**Vulnerability Assessment:** Identify potential security vulnerabilities in the network, such as weak passwords, unencrypted data, or outdated software.

**Penetration Testing:** Simulate real-world attacks to determine the network's ability to resist and recover from security breaches.

**Reporting and Remediation:** Compile the results of the assessment into a report and provide recommendations for addressing any issues identified.

This class will incorporate multiple practical labs and conclude with a comprehensive test ensuring the students can perform all tasks related to this course.

**COURSE LEVEL:** Beginner/Intermediate

**DESIGNED FOR:** This course is designed for individuals with little to some experience with Wireshark, Open Source WiFi tools, and radio communications theory

\* This course is fully customizable to each customer's specific requirements. While there is no specific course instruction length, it is designed to be no less than three days, and optimal instruction duration is designed to be five days in length.

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