

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL LAW ENFORCEMENT TRAINING CENTER
OFFICE OF TRAINING OPERATIONS
TECHNICAL OPERATIONS DIVISION



Homeland Security

LESSON PLAN

MAPPING AND TRACKING

3264

SEP/10

~~WARNING~~

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LP updated as follows:

Division Title changed from CFI to TOD, and FOUO/LES markings added.

There were no changes to the TPO or EPOs

(Template Revised SEP/10)

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SYLLABUS

COURSE TITLE: MAPPING AND TRACKING

COURSE NUMBER: 3264

COURSE DATE: SEP/10

LENGTH OF PRESENTATION:

LECTURE	LAB	P.E.	TOTAL	PROGRAM	OPTION
1	1		2	MDIP	

DESCRIPTION:

Several unique technical features of the cell phone industry provide the investigator with powerful tools for identifying locations and movements of subjects who have powered on cell phones. Two general techniques are discussed in this course: mapping and tracking. Each will be discussed separately with techniques and legal requirements for each.

TERMINAL PERFORMANCE OBJECTIVE (TPO):

Given a potential investigative scenario involving cellular telephones and location information provided by the Cellular Service Provider, the learner will map the location of the subject on specific dates and times in order successfully complete the assigned investigation.

ENABLING PERFORMANCE OBJECTIVES (EPO):

EPO #1: Define the term “cell phone mapping” and use appropriate mapping techniques to determine subject locations at specific dates and times.

EPO #2: Define the term “cell phone tracking” and describe appropriate tracking techniques to locate an investigative subject in real-time.

STUDENT SPECIAL REQUIREMENTS:

NONE

METHOD OF EVALUATION:

Completion of course.

INSTRUCTOR GUIDE

METHODOLOGIES:

1. Lecture with questions
2. Discussion

TRAINING AIDS/EQUIPMENT:

1. Instructor:
 - a. Computer with PowerPoint and Projector.
 - b. Internet connectivity with access to personal Google account.
 - c. Copy of laboratory mapping exercise.
 - d. Writing surface.
2. Student:
 - a. Laboratory exercise (provided by instructor).
 - b. Computer with Internet connectivity.

INSTRUCTOR SPECIAL REQUIREMENTS:

Comprehensive understanding of Google Maps and ability to plot using GPS coordinates

OUTLINE OF INSTRUCTION

I. INTRODUCTION

A. RAPPORT AND OPENING STATEMENT

1. Cellular technology can provide invaluable mapping and tracking tools for the criminal investigator. This course instructs how to do each, and also informs the legal requirements for each.
2. Because of the complexity of the cellular industry, Cell Service Providers (CSP's) need to know for all client connections where the subscriber call was made from. This is for billing purposes since many calls are connected by other CSP's using other cell networks. Since the CSP records all such calls, this information is available, under certain constraints, to law enforcement.
3. Also, since the CSP needs to know the current physical location of each subscriber (so that the subscriber can be reached if someone is calling), computer databases maintain location information for every subscriber phone that is powered on.
4. This course describes the process of using the mapping and tracking features of cell phone technology and the roles each plays in the investigative process.

B. LESSON PLAN OVERVIEW

1. Terminal Performance Objective (TPO)
Given a potential investigative scenario involving cellular telephones and location information provided by the Cellular Service Provider, the learner will map the location of the subject on specific dates and times in order successfully complete the assigned investigation.
2. ENABLING PERFORMANCE OBJECTIVES (EPO)
EPO #1: Define the term "cell phone mapping" and use appropriate mapping techniques to determine subject locations at specific dates and times.
EPO #2: Define the term "cell phone tracking" and describe appropriate tracking techniques to locate an investigative subject in real-time.

II. PRESENTATION

- #### A. EPO#1: DEFINE THE TERM "CELL PHONE MAPPING" AND USE APPROPRIATE MAPPING TECHNIQUES TO DETERMINE SUBJECT LOCATIONS AT SPECIFIC DATES AND TIMES.

5.

6.

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7.

8.

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9.

(b)(7)e

b.

(b)(7)e

10. Techniques of mapping.

a.

b.

c.

(b)(7)e

d.

(b)(7)e

B. EPO#2: DEFINE THE TERM “CELL PHONE TRACKING” AND DESCRIBE APPROPRIATE TRACKING TECHNIQUES TO LOCATE AN INVESTIGATIVE SUBJECT IN REAL-TIME.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

(b)(7)e

d.

e.

f.

g.

(b)(7)e

7. Application of triangulation has a high overhead of work but can yield critical results. In order to track cell location as herein described requires, beforehand:

a.

b.

c.

d.

(b)(7)e

8. Some situations in which tracking might be appropriate:

a.

b.

c.

d.

(b)(7)e

III. SUMMARY

A. REVIEW OF PERFORMANCE OBJECTIVES

EPO #1: Define the term “cell phone mapping” and use appropriate mapping techniques to determine subject locations at specific

dates and times.

EPO #2: Define the term “cell phone tracking” and describe appropriate tracking techniques to locate an investigative subject in real-time.

B. REVIEW OF TEACHING POINTS

1. Cell phone technology provides some hitherto unavailable tools for law enforcement.
2. Mapping allows the law enforcement review of enhanced Call Detail Reports to determine the general physical location of investigative subjects. However, plotted locations are more general than specific. This data is relatively easy to generate, requiring only a subpoena for the records.
3. Tracking is more sophisticated, requiring a court order, special equipment and highly trained staff. However, the information is current and far more specific.

IV. APPLICATION

A. LABORATORY

Attachment 2 is a laboratory exercise for this course.

B. PRACTICAL EXERCISE

None

REFERENCES

Stetz, Penelope; The Cell Phone Handbook; 2nd Ed.; FindTech, Ltd.; Cleveland, OH; 2002.

Bedell, Paul; Wireless Crash Course; McGraw Hill; New York; 2001.

Layton, Julia, Marshall Brain and Jeff Tyson. "How Cell Phones Work." 14 November 2000. HowStuffWorks.com. <<http://electronics.howstuffworks.com/cell-phone.htm>> 03 April 2008.

Unaccredited article. "Wireless 101"; 19 May, 2008. Cellular Technology Industry Association. http://www.ctia.org/consumer_info/service/index.cfm/AID/10319.

BIBLIOGRAPHY

None

ATTACHMENTS

Cell Phone Mapping Laboratory Exercise

Attachment
Cell Phone Mapping Laboratory Exercise

Pages 16 through 17 redacted for the following reasons:

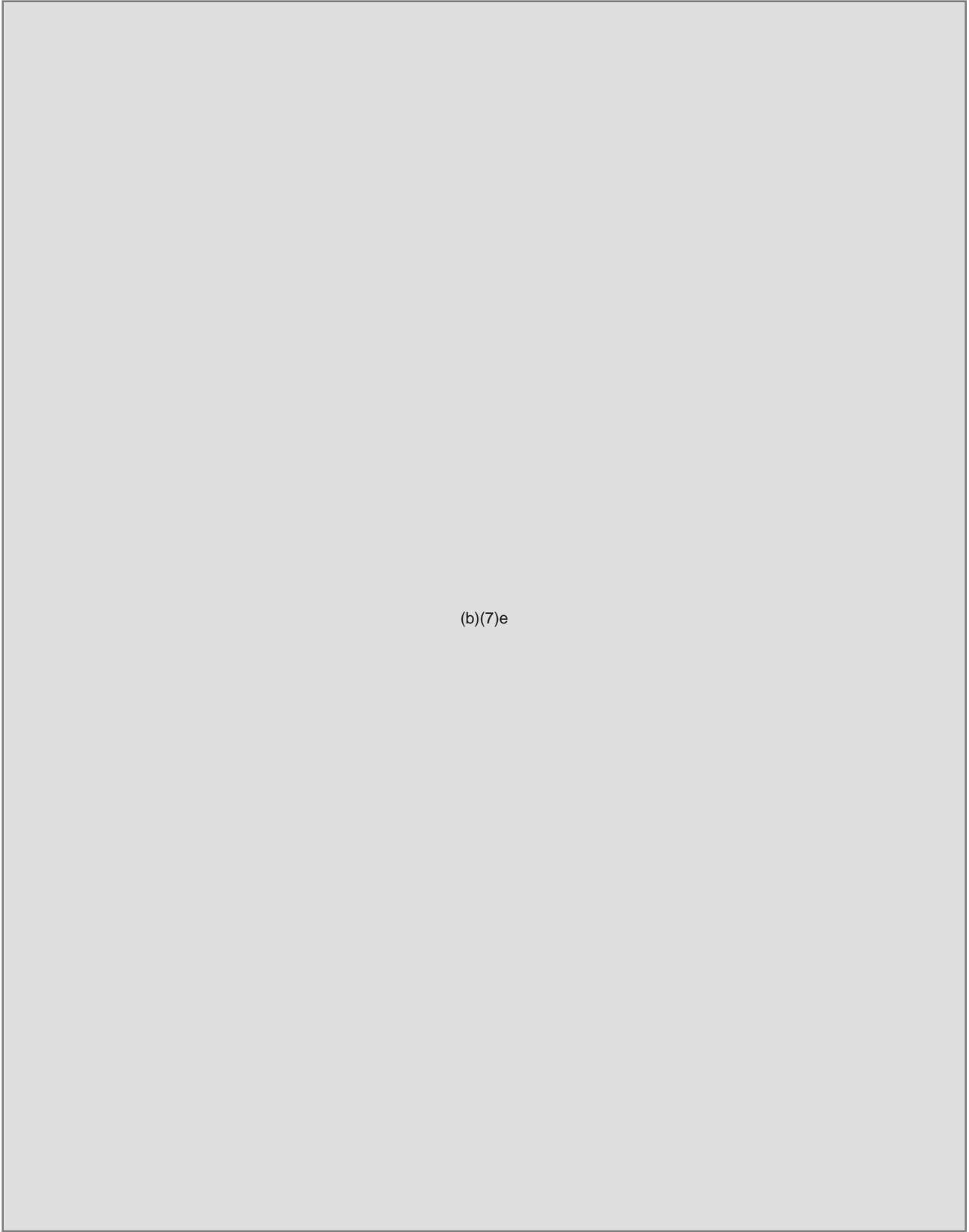
(b) (7)e

Mobile Device Investigations Program (MDIP)

Cell Phone Mapping Exercise

Objective: Given a series of GPS coordinates, representing the position of several cell phone towers as indicated in a relevant Call Detail Report, and Using Google Maps, plot the path taken by a suspect on a specified date.

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(b)(7)e

Conclusion

This exercise presented several challenging and very useful principals. You have:

- Created (or accessed a previously created) personal Google account;
- Used Google Maps to chart coordinates of a series of cell towers;
- Saved your map for future reference;
- Forwarded the map via email to your supervisor;
- Used the information to develop investigative leads.

These capabilities can serve you well in the future in a variety of investigative applications.

Partial Call Detail Report of Suspect "Keith A. Wilkes"
(Provided by Transnational Cell Service Corp.)

MSN: 912-266-6723
ESN: E311S564
Subscriber: Keith A. Wilkes

Date: October 7, 2007
(all times: CDT)

Time	Activity	Roaming	TowerNo	Lat.	Lng.	Remarks
07:16:25	I	Y	78736	33.9363	-85.6126	Power On
07:23:41	R	Y	78736	33.9363	-85.6126	Ping
07:29:12	R	Y	78736	33.9363	-85.6126	Ping
07:31:52	H	Y	54552	33.8956	-85.6643	Handoff
07:37:31	H	Y	54567	33.8488	-85.7636	Handoff
07:41:02	H	Y	54614	33.8372	-85.7330	Handoff
07:47:38	R	Y	54614	33.8372	-85.7330	Ping
07:50:26	H	Y	53117	33.7978	-85.7730	Handoff
07:55:31	H	Y	53124	33.7594	-85.8036	Handoff
08:02:40	R	Y	53124	33.7594	-85.8036	Ping
08:04:14	H	Y	53221	33.6783	-85.8524	Handoff
08:10:26	R	Y	53221	33.6783	-85.8524	Ping
08:15:11	R	Y	53221	33.6783	-85.8524	Ping
08:17:51	H	Y	54712	33.6083	-85.8363	Handoff
08:24:37	R	Y	54712	33.6083	-85.8363	Ping
08:27:07	H	Y	53309	33.5936	-85.9551	Handoff
08:34:42	H	Y	53356	33.5799	-85.9941	Handoff
08:40:51	H	Y	54819	33.5680	-86.0561	Handoff
08:47:12	R	Y	54819	33.5680	-86.0561	Ping

08:55:23	R	Y	54819	33.5680	-86.0561	Ping
09:02:51	R	Y	54819	33.5680	-86.0561	Ping
09:11:12	R	Y	54819	33.5680	-86.0561	Ping
09:18:24	R	Y	54819	33.5680	-86.0561	Ping
09:27:53	R	Y	54819	33.5680	-86.0561	Ping
(23 identical and time sequential records except for 'Time')						
12:25:14	R	Y	54819	33.5680	-86.0561	Ping
12:34:32	R	Y	54819	33.5680	-86.0561	Ping
12:42:49	R	Y	54819	33.5680	-86.0561	Ping
12:50:11	R	Y	54819	33.5680	-86.0561	Ping

Activity Code Key:

