SACRAMENTO POLICE DEPARTMENT - 2320
RADAR – LASER OPERATOR (LIDAR) COURSE - 23320
POST Certification II / Reimbursement Plan IV / 32 hours
EXPANDED COURSE OUTLINE

Statement of Purpose: Speed violations are one of the leading causes of injury and fatal traffic collisions. Enforcement of speed laws has been shown to reduce injury and fatal collisions. The purpose of this course is to provide students the knowledge and skills needed to operate traffic RADAR and LIDAR devices for use in enforcing traffic speed laws. This course was created in compliance with and to meet the requirements in 40802 VC.

Course Outline

I. Introduction
   A. Classroom familiarization
      1. Facility rules
      2. Break areas
   B. Course breakdown and schedule
      1. Course topics
      2. Hour allotment

II. Purpose of speed enforcement
   A. Collisions
      1. Primary collision factors
      2. Prevention
   B. Complaints
      1. Public input
   C. Why Radar?
      1. Supplemental enforcement tool

III. Speed offenses
   A. Maximums
      1. 22349 VC
      2. 22356 VC
      3. 22406 VC
   B. Prima facie
      1. 22352 VC
      2. 22350 VC

IV. History of radar
   A. General history
      1. Types of radar
   B. SPD history
      1. Past
      2. Future of radar in the Department

V. Physical properties of radar
- A. Radio waves
  1. Microwave radiation
  2. Speed
  3. Frequency
     a. K, Ka
  4. Wavelength
- B. Beam characteristics
  1. Conical
  2. 85% directed forward
  3. Side lobes
  4. Operational range
  5. Transmitted beam angle
  6. Beam width calculations
- C. Doppler principle - stationary
  1. Doppler shift
  2. Cycles per second
- D. Doppler principle – moving
  1. Closing rate speed

VI. Equipment Operation
- A. ABCs
  1. Equipment connections
- B. Mounting requirements
  1. Safety
- C. Individual equipment operation
  1. Applied Concepts Stalker Dual
  2. Decatur Genesis
  3. Operational safety
  4. Microwave exposure

VII. Effects
- A. Cosine (stationary)
- B. Cosine (moving)
- C. Shadow
- D. Nichols
- E. Billboard
- F. Scanning
- G. Harmonics
- H. Weather
- I. Mirrors/reflection
- J. Batching

K. Other interference
L. Old technology effects
    1. Feedback/panning
    2. Auto gain
    3. Power-on or power surge
    4. Radio frequency interference (RFI)
M. Recognizing effects
    1. Momentary in nature
    2. No supportive evidence
N. Tracking history
    1. Visual estimation
    2. Target in beam
    3. Doppler Tone
    4. Reading on radar unit
    5. Speedometer check (moving mode only)
O. Target acquisition
    1. Reflective capability
    2. Speed
    3. Distance
    4. Position
    5. Relative size to distance

VIII. Patrol techniques and tactics
A. Safety
    1. Turns and entering traffic
    2. Multitasking
    3. Relation of your patrol vehicle to other vehicles
    4. Showing violator speed readings
B. Tactics
    1. Position in line of traffic
    2. Geography
    3. Environmental
    4. Using RF hold

IX. Traffic surveys and speed traps
A. Surveys
    1. Process
    2. City Traffic Engineer
    3. 85% percentile or critical speed
B. Speed traps
    1. 40802 VC
    2. Radar enforcement without survey

3. Timing vehicle over distance

X. LIDAR: Scientific Principles of Lidar Speed Measurement
- A. Lidar
  1. Definition
  2. Laser energy
  3. How Lidar works
  4. Health considerations
- B. Characteristics of the Lidar Signal
  1. Signal speed
  2. Wavelength
  3. Frequency
- C. Behaviors of Lidar
  1. Reflected, refracted, absorbed
  2. Cosine Effect
- D. Lidar vs. Other Speed Measurement
  1. Beam With

XI. LIDAR Effects
- A. RFI
  1. Electrical Interference
  2. Other Interference
- B. Low Voltage
- C. Panning
- D. Cosine Angular Effect

XII. LIDAR Operation
- A. Inspection
- B. Transportation
- C. Calibration Checks
  1. Internal Accuracy Check
  2. Sight Alignment Check
  3. Range Accuracy Check
- D. Devices
  1. Kustom Signals Pro-Lite+ Lidar Log
  2. Laser Tech, Inc. Ultra Lyte LTI 20-20 Log
  3. Applied Concepts, Inc. Stalker XS

XIII. LIDAR Deployment
- A. Location Considerations
  1. Site Considerations
  2. Roadway Considerations
  3. Weather Considerations
- B. Enforcement Issues

1. Tracking History
2. Target Selection

C. Care and Handling

XIV. Case Law

A. Validity of the Doppler principle
   1. State v. Dantonio (New Jersey)

B. Operator training and qualifications
   1. Honeycutt v. Kentucky
   2. Florida v. Aguilera
   3. People v. Hanson

C. Surveys
   1. People v. DiFiore
   2. People v. Goulet

D. Accuracy
   1. State v. Tomanelli

E. Additional Case Law
   1. Lidar Case Law

XV. Additional radar information

A. Distance calculations
B. Departmental FCC license
C. Radar/Lidar jammers
   1. Types
   2. Laws regarding use

XVI. Practical exercise

A. Safety (See safety policy for more details)
   1. Location selection (closed course)
   2. Safety briefing
   3. Secure student staging area
   4. Secure driving area

B. Equipment operation
   1. Familiarization with Radar Equipment
   2. Familiarization with Lidar Equipment

C. Visual speed and range determinations
   1. Practice
      a. Stationary Speed Estimations
      b. Stationary Distance Estimation
   2. Stationary
      a. Eight Speed Estimations
      b. Eight Distance Estimations
   3. Moving

a. Eight Speed Estimations
b. Eight Distance Estimations

Students will demonstrate proficiency by performing the above activities accurately

XVII. Radar Evidence
- A. Subpoenas
- B. Standard documents
  1. Operator certificate
  2. Speedometer calibration
  3. Vehicle information
  4. Radar Calibration Certificate
  5. Speed Surveys

XVIII. Courtroom testimony
- A. Officer's notes
- B. Testimony
- C. Mock trial

XIX. Review

XX. Final Examination

Students will demonstrate their proficiency with the course material by successfully passing final written examination and demonstrating proficiency by performing the above mentioned topics. Students will also be assessed by verbal quizzing throughout course.