Sacramento Police Department – 2320
RADAR/LASER OPERATOR (LIDAR) Course – 23320

Statement of Purpose: This purpose of this 32 hour course is to certify peace officers in the proper use of RADAR/LIDAR in the Sacramento Police Department.

I. Introduction
- a. Classroom familiarization
  - i. Facility rules
  - ii. Break areas
- b. Course breakdown and schedule
  - i. Course topics
  - ii. Hour allotment

II. Purpose of speed enforcement
- a. Collisions
  - i. Primary collision factors
  - ii. Prevention
- b. Complaints
  - i. Public input
- c. Why Radar?
  - i. Supplemental enforcement tool

III. Speed offenses
- a. Maximums
  - i. 22349 VC
  - ii. 22356 VC
  - iii. 22406 VC
- b. Prima facie
  - i. 22352 VC
  - ii. 22350 VC

IV. History of radar
- a. General history
  - i. Types of radar
- b. SPD history
  - i. Past
  - ii. Future of radar in the Department

V. Physical properties of radar
- a. Radio waves
  - i. Microwave radiation
  - ii. Speed
  - iii. Frequency
    1. K, Ka
  - iv. Wavelength
- b. Beam characteristics
  - i. Conical
  - ii. 85% directed forward

iii. Side lobes
iv. Operational range
v. Transmitted beam angle
vi. Beam width calculations

c. Doppler principle - stationary
i. Doppler shift
ii. Cycles per second

d. Doppler principle – moving
i. Closing rate speed

VI. Equipment Operation
a. ABCs
i. Equipment connections

b. Mounting requirements
i. Safety

c. Individual equipment operation
i. Applied Concepts Stalker Dual
ii. Decatur Genesis
iii. Operational safety
iv. 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
i. Feedback/panning
ii. Auto gain
iii. Power-on or power surge
iv. Radio frequency interference (RFI)

m. Recognizing effects
i. Momentary in nature
ii. No supportive evidence

n. Tracking history
i. Visual estimation
ii. Target in beam
iii. Doppler Tone
iv. Reading on radar unit

v. Speedometer check (moving mode only)
o. Target acquisition
i. Reflective capability
ii. Speed
iii. Distance
iv. Position
v. Relative size to distance

VIII. Patrol techniques and tactics
a. Safety
i. Turns and entering traffic
ii. Multitasking
iii. Relation of your patrol vehicle to other vehicles
iv. Showing violator speed readings
b. Tactics
i. Position in line of traffic
ii. Geography
iii. Environmental
iv. Using RF hold

IX. Traffic surveys and speed traps
a. Surveys
i. Process
ii. City Traffic Engineer
iii. 85% percentile or critical speed
b. Speed traps
i. 40802 VC
ii. Radar enforcement without survey
iii. Timing vehicle over distance

X. LIDAR: Scientific Principles of Lidar Speed Measurement
a. Lidar
i. Definition
ii. Laser energy
iii. How Lidar works
iv. Health considerations
b. Characteristics of the Lidar Signal
i. Signal speed
ii. Wavelength
iii. Frequency
c. Behaviors of Lidar
i. Reflected, refracted, absorbed
ii. Cosine Effect
d. Lidar vs. Other Speed Measurement
i. Beam Width

XI. LIDAR Effects
- a. RFI
  - i. Electrical Interference
  - ii. Other Interference
- b. Low Voltage
- c. Panning
- d. Cosine Angular Effect

XII. LIDAR Operation
- a. Inspection
- b. Transportation
- c. Calibration Checks
  - i. Internal Accuracy Check
  - ii. Sight Alignment Check
  - iii. Range Accuracy Check
- d. Devices
  - i. Kustom Signals Pro-Lite+ Lidar Log
  - ii. Laser Tech, Inc. Ultra Lyte LTI 20-20 Log
  - iii. Applied Concepts, Inc. Stalker XS

XIII. LIDAR Deployment
- a. Location Considerations
  - i. Site Considerations
  - ii. Roadway Considerations
  - iii. Weather Considerations
- b. Enforcement Issues
  - i. Tracking History
  - ii. Target Selection
- c. Care and Handling

XIV. Case Law
- a. Validity of the Doppler principle
  - i. State v. D'Antonio (New Jersey)
- b. Operator training and qualifications
  - i. Honeycutt v. Kentucky
  - ii. Florida v. Aguilera
  - iii. People v. Hanson
- c. Surveys
  - i. People v. DiFiore
  - ii. People v. Goulet
- d. Accuracy
  - i. State v. Tomanelli
- e. Additional Case Law
  - i. Lidar Case Law

XV. Additional radar information

a. Distance calculations
b. Departmental FCC license
c. Radar/Lidar jammers
    i. Types
    ii. Laws regarding use

XVI. Practical exercise
a. Safety (See safety policy for more details)
    i. Location selection (closed course)
    ii. Safety briefing
    iii. Secure student staging area
    iv. Secure driving area
b. Equipment operation
    i. Familiarization with Radar Equipment
    ii. Familiarization with Lidar Equipment
c. Visual speed and range determinations
    i. Practice
        1. Stationary Speed Estimations
        2. Stationary Distance Estimation
    ii. Stationary
        1. Eight Speed Estimations
        2. Eight Distance Estimations
    iii. Moving
        1. Eight Speed Estimations
        2. Eight Distance Estimations

XVII. Radar Evidence
a. Subpoenas
b. Standard documents
    i. Operator certificate
    ii. Speedometer calibration
    iii. Vehicle information
    iv. Radar Calibration Certificate
    v. Speed Surveys

XVIII. Courtroom testimony
a. Officer's notes
b. Testimony
c. Mock trial

XIX. Review

XX. Final Examination