San Bernardino County Sheriff's Department
Basic Laser Training
Expanded Outline

1. Orientation and Introductions
    a. Instructor and class Introductions
    b. Registration
    c. Materials (Binder)

2. History and Theory of Laser
    1. Einstein
        a. 1917 Theory
        b. Energized molecules give light
        c. Small portion of light spectrum

    3. Gould
        a. 1957 Invented first Laser
        b. 1990 First used for speed detection
        c. Light measured in nanometers
        d. Visible light 750 – 400 nm
        e. Measured in wavelength distance not frequency
        f. Light travels at 186,000 miles per second
        g. LIDAR – **LI**ght **D**etection and **R**anging
        h. transmits pulsed light to measure target range

3. Laser Basics
    a. Light source between two mirrors
    b. Light sent to first mirror
    c. Light sent back to original source
    d. Light sent to second mirror
    e. Light amplification

4. Basic Characteristics
    a. Manmade
    b. Monochromatic light
    c. Average beam is 3 ½ feet in diameter at 1000 feet
    d. Does not measure speed
    e. Measures (TOF) Time Of Flight
    f. Speed = Distance / Time
    g. Time is divided in half

5. Laser in Action
    a. Kustom ProLaser II
        1. Sends out 238 pulses per second
    b. Distance and ½ TOF determine
        1. The object is stationary or in motion
        2. The distance of the object
        3. The objects direction of travel

6. Lidar Operations
    a. Calibration
        1. The average of least squares
    b. Laser pulses
        1. Not reflected back
        2. Different points on car – different distance
        3. Minimum 70 pulses returned
    c. Run Self-Test / Internal to Lidar
    d. Check beam sight alignment
    e. Check range
    f. Target selection, color, size or shape of vehicle
    g. Target range optimum 200' to 2000'
    h. Tracking
        1. Visual estimation
        2. Target acquisition
        3. Audio tone – NOT A DOPPLER TONE
        4. Digital read-out display

7. Weather
    a. Effects range not accuracy

8. Problems
    a. Cosine Effect
    b. RFI
    c. Sweeping
        1. Panning
    d. Interference
        1. Signal interrupted
    e. Bright lights
    f. Scanning
    g. Range
        1. Two points of same car

9. Case Law
    a. State of Calif. Vs Beamer (1955)
    b. State of Calif. Vs Halopoff (1967)
    c. State of Calif. Vs Maclaird (1969)
    d. State of Calif. Vs Johnson (1972)
    e. State of Calif. Vs Echols (1975)
    f. State of Calif. Vs Steritt (1976)
    g. State of Calif. Vs Flaxman (1977)
    h. State of Calif. Vs Miller (1979)

10. CVC Codes
1. Legal Aspects
- a. CVC 40800
  1. Vehicle and uniformed officer
- b. CVC 40801
  1. Speed Trap Prohibition
- c. CVC 40802
  1. Speed Traps
- d. CVC 40802(b)(1)
  1. Local Streets and Roads
- e. CVC 40803
  1. Speed Trap Evidence

2. Posted Speed
- a. CVC 22358(a)
  1. Decrease of Local Speed Limits
- b. CVC 41100
  1. Speed Restriction Signs
- c. CVC 22348
  1. Excessive Speed
- d. CVC 22349
  1. Maximum Speed Limit
- e. CVC 22350
  1. Basic Speed Law
- f. CVC 22352
  1. Prima Facie Speed Limits

3. Engineering and Traffic Survey
- a. CVC 627
  1. Prevailing Speeds
  2. Accident Records
  3. Highway, traffic and roadside conditions

11. Open Discussion and Final Review

12. Final Examination
a. Written Test

13. Evaluation

14. Certificates