CHAPTER 3
LEGAL CONSIDERATIONS

Ever since the automobile appeared on the American scene, we have had problems with speed and speed regulations. In order to deal with these problems, law enforcement officers have continually sought to develop newer, more efficient methods to measure vehicle speed accurately.

Perhaps the earliest mechanical device for measuring speed was the stopwatch. Police officers would time a motorist over a measured distance and establish vehicle speed by calculating distance over elapsed time. If they found that the motorist was driving over the speed limit, they took action. However, in 1903 the major pursuit vehicle used by law enforcement was the bicycle; police officers found it rather difficult to pursue motor vehicles that were traveling at up to 40 mph.

To solve this problem, police in Westchester County, New York, introduced another application of the stopwatch. New York City Police Commissioner William McAdoo set up series of three dummy tree trunks at 1-mile intervals along the Hudson drive. A police officer equipped with a stopwatch and a telephone was concealed inside each fake tree. When a car sped past the first station, the police officer inside telephoned the exact time to the officer in the next tree. The second officer set his watch accordingly. When the car passed his post he computed its speed for the mile. If the speed was above the posted limit, he telephoned the officer in the third tree, who lowered a pole across the road and stopped the car.

The year 1910 saw the introduction of another new scientific advance in speed detection, the "Photo-Speed Recorded." It consisted of a camera synchronized with a stopwatch and operated by taking pictures of a speeding car at set times (for example, 3 seconds apart). The photographic image of a vehicle, of course, becomes smaller the farther away from the camera the vehicle goes. By taking pictures of a receding vehicle at specified intervals and then comparing the images in each photograph, a mathematical formula could be applied to determine the vehicle's speed. William S. Buxton was the first driver found guilty of violating the speed limit on the basis of evidence obtained through the use of a Photo-Speed Recorder.

Foundational Elements and Requirements for Introduction of Scientific Evidence

As just stated, evidence derived from complex mechanical devices is typically challenged by the defense as to its accuracy and reliability (Commonwealth v. Buxton). The burden then rests on the prosecution to demonstrate to the court that these devices are capable of performing their function accurately. To do this, the prosecution must introduce testimony by recognized experts in that particular field. Such expert testimony is required every time a case involving a new principle comes to court. The process of expert testimony is long and tedious, and often bogs down the judicial process.

The court can dispense with the need for expert testimony only if the scientific principle underlying the new device has been given judicial notice. Judicial notice indicates that a particular fact or principle is so generally known as to be familiar to all reasonably well-informed persons. When the courts feel that a particular principle is commonly understood and accepted, they will take judicial notice of it; thereafter, expert testimony is no longer required. This approach by the courts has in the past been applied to such (at the time) new principles as clocks, chronometers, motion pictures, x-rays, fingerprinting, and television.

Bear in mind that judicial notice extends only to the scientific accuracy of the principle upon which a particular device operates. It does not extend to the accuracy or efficiency of any given device designed to employ that principle. Judicial notice has also been taken of certain methods of techniques for determining the accuracy and reliability of a particular device.

Once the courts accept a certain scientific principle and take judicial notice of certain tests for the accuracy of devices that employ the principle, it must still be established that the individuals who used the device were qualified to do so and that the specific device used was operating properly at the time in question.

Fundamental Case Law Affecting Doppler RADAR

Below we will see how the courts have dealt with:

- Judicial notice of the scientific principle underlying Doppler RADAR.
- Judicial notice of the tests for the accuracy and reliability of devices employing the Doppler Principle.
- The qualification required of Doppler RADAR operators.

You should be aware that case laws, i.e., fundamental court rulings, apply directly only in the jurisdictions where they were handed down. However, a fundamental ruling in one State will often by offered as precedent in another State's court.

Judicial Notice of the RADAR Principle

Before June 1955, the soundness of the Doppler Principle was the central issue in virtually all court cases involving the admissibility of speed measurement evidence obtained by RADAR. The issues of the reliability and accuracy of RADAR devices were subsidiary questions. In case after case, the prosecution had to prove the Doppler Principle through the long, involved testimony of expert witnesses.

In 1955, the Supreme Court of New Jersey finally took judicial notice of the principle behind Doppler RADAR. The case in question, State v. Dantonio, proved a landmark. In deciding this case, the court drew a parallel between RADAR meter readings and those registered on more well-known instrumentation, such as fingerprints, x-rays, cardiographs, etc., saying:

> "The law does not hesitate to adopt scientific aids to the discovery of truth which have achieved such recognition...Since World War II members of the public have become generally aware of the widespread use of RADAR methods in detecting the presence of objects and their distance and speed..."

With this, the court affirmed that the RADAR concept was generally known and understood by all reasonably well-informed individuals: The court extended judicial notice.

Other States quickly followed suit. The Supreme Court of Arkansas, in Everight v. City of Little Rock, reaffirmed the New Jersey court's decision, saying:

> "We are of the opinion that the usefulness of RADAR equipment for testing (the) speed of vehicles has now become so well established that the testimony of an expert to prove the reliability of RADAR in this respect is not necessary. The courts will take judicial notice of such fact. Of course, it will always be necessary to prove the accuracy of the particular equipment used in testing the speed involved in the case being tried."

To repeat the important point emphasized by the Arkansas court: While judicial notice had been extended to the RADAR principle, it was still necessary to prove the accuracy of the particular device employing that principle.

Judicial Notice of Tests for Accuracy

The accuracy of a particular RADAR unit, as distinguished from the accuracy of the RADAR principle, is not a proper subject for judicial notice. No court can accept every RADAR device as always completely accurate. The prosecution must prove that a particular device functioned properly at the time in question.

What the court may do is take judicial notice of certain methods or techniques for determining accuracy. It can reasonably be assumed that if a particular device was checked for accuracy at various established intervals and through accepted methods, that devices' readings would be accepted as accurate. In a Virginia case, Royals v. Commonwealth, the court quoted with approval Dr. John M. Kopper, a recognized authority on electronics:

> "It is important to check the meter for accuracy each time it is set up for use; if the meter is to be

used at two sites in one morning then it should be checked at each site to avoid the contention that the meter was thrown out of adjustment during transit. The meter should be checked before the beginning of the period of observation of a highway and at the end of the period. In scientific work it is usual to assume that if a given instrument reads correctly at the beginning and end of a set of measurements, its readings during the interval were also correct. The check can be made by having a car with a calibrated speedometer run through the zone of the meter twice, once at the speed limit for the zone and once at a speed 10 or 15 mph greater. As the test car goes by the meter the driver can notify the operator of the meter what (the) speed is. If the difference between the speedometer reading and the RADAR meter reading is more than 2 miles per hour, steps should be taken to see why this is the case and to remedy the matter. Such a test naturally requires a periodic checking of the speedometer of the test car. If such a procedure is carried out each time the RADAR meter is set up, the check measurements made with the automobile speedometer become supporting evidence."

These steps, however, represented the extreme in precautionary testing. The courts tended to relax them as the use and understanding of RADAR increased. In Thomas v. City of Norfolk, the court indicated that it would be sufficient to test the RADAR unit at the beginning and end of each duty shift: If the unit tested properly at these times, it could be presumed to have functioned properly between times.

The court had now established guidelines for when RADAR equipment should be tested. However, the issue of the best method of testing remained.

An efficient, convenient, and popular method of testing a RADAR device's accuracy uses a tuning fork. The use of the tuning fork as a reliable test of accuracy was established by the Supreme Court of Connecticut in State v. Tomanelli. However, the court pointed out that the tuning fork's own accuracy may be questioned:

> "The operator relied, for his assurance of the accuracy of the instrument he was using, on tuning fork tests made before and after the defendant's speed was recorded. These tests, in brief, were made by activating what were described as 40, 60, and 80 mph tuning forks and by observing, in each test, that the speedometer and graphic recorder of the RADAR instrument indicated corresponding readings of 40, 60, and 80 mph. The theory of the test is that each tuning fork is set to emit a wave frequency corresponding to a mile-per-hour speed equivalent. It is obvious that the tuning forks themselves must be shown to be accurate if they are to be accepted as a valid test of the accuracy of the RADAR instrument. No attempt appears to have been made to establish the accuracy of the tuning forks. On the other hand, no effort was made by the defendant to attack the accuracy of the tuning forks...Under these circumstances the accuracy of the RADAR unit was unimpeached."

In effect, the courts have recognized the tuning fork as an accurate testing device. If no challenge is offered, the tuning fork's accuracy may be assumed, and therefore the accuracy of any RADAR device properly tested by that tuning fork.

Operator Qualifications

The courts seemed to have had little difficulty in outlining the RADAR operator's qualifications. In Honeycutt v. Commonwealth, the Kentucky Court of Appeals defined them clearly:

> "It is sufficient to qualify the operator that he have such knowledge and training as enables him to properly set up, test, and read the instrument; it is not required that he understand the scientific principles of RADAR or be able to explain its internal workings; a few hours' instruction normally should be enough to qualify an operator...In the instant case the policeman had received 13 weeks' training as a RADAR repairman and had operated RADAR equipment for almost 2 years. We think this was sufficient qualification to make his testimony competent. A reading of his testimony indicates that he understood how to operate the instrument."

The courts thus established that a RADAR operator need be neither technician nor physicist. Whether or not the operator fully understands all of a RADAR unit's internal workings is unimportant.

Vehicle Identification

As discussed in Units 2 and 3, certain elements of the speeding offense must be established for prosecution to the successful. Beyond establishing the vehicle's speed, the officer must also be able to prove that a particular speed law was violated; that the defendant was the driver of the vehicle at the time of the offense; and that the offense occurred on a public thoroughfare. In cases where RADAR has been used to obtain the speed measurement, the officer must also be able to identify the violator's vehicle.

Identifying a vehicle does not mean just saying that it was, for example, a yellow Mercedes (although physical descriptions are important). In cases involving RADAR, vehicle identification refers to the operator's ability to tell which vehicle's speed registered on the instrument.

For example: An officer on RADAR patrol is monitoring a section of highway at a time of moderate traffic flow (i.e., fairly steady). The officer discovers a speed violator and obtains a RADAR reading on that vehicle. Naturally, the defense will maintain that the officer couldn't possibly have singled out the defendant's vehicle form all the others on the road.

How then can the RADAR officer assume that the violator was properly identified? In Honeycutt v. Commonwealth, the Kentucky Court of Appeals dealt with this problem:

> "The RADAR device used in the instant case simply registered a speed reading on a speedometer dial. It did not show a "blip" on a screen or by any other means under take to show location or direction of a vehicle in its field. The testimony of the policeman was that he had set up the instrument to cover northbound traffic on the four-land, two-way street in question. He said that he observed, in the rearview mirror of the cruiser, several vehicles approaching from the south. One of them was passing the others. The RADAR speedometer registered an unstable reading, with a top of 50 mph. Directly, the reading stabilized at 50 mph and he observed in the mirror that one car had passed the others and was itself out in front of the others. The fact that the one car was by itself, away from the others, and closest to the RADAR unit, enabled the RADAR unit to make a stable reading of its speed. The policeman pursued the car in question, in his cruiser, and caused it to stop. The car was being driven by the appellant.
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> "The appellant argues that there was insufficient evidence that his car was the one which caused the RADAR unit to show a 50 mph reading; that a southbound car in the other lane could have caused it. In our opinion the reasonable import of the policeman's testimony is that he observed the appellant's car passing others at the same time the RADAR dial showed a fluctuating reading with a 50-mph maximum. When the dial stabilized at 50 mph the car was in front by itself, nearest to the unit. The policeman's estimate of its speed, by visual observation alone, was from 40 to 45 mph. This evidence reasonably points to the appellant's car as the offending vehicle, and we do not think that the evidence is reduced to worthlessness by the remote chance of coincidence that a southbound vehicle broke clear from a passing situation, at 50 mph, at the same moment that the appellant's car got out of the northbound lanes. Furthermore, the testimony indicates with reasonable certainty that a southbound car, when it entered the range field of the RADAR, would have been beyond the northbound cars and therefore would not have registered a stabilized reading."

In dealing with the question of vehicle identification, the courts have in effect outlines the proper procedures to be employed. The officer must first establish that a vehicle's speed represents a potential violation through direct visual observation. This initial estimate is next verified by checking the speed displayed on the RADAR unit. If these two pieces of evidence agree, the operator has sufficient cause to believe the target vehicle is the violator. The visual estimate must be considered the primary evidence, with the RADAR speed reading secondary and supportive. The operator should watch the vehicle as long as possible and get a complete tracking history before taking enforcement action. Using the audio Doppler feature available on many RADAR devices can provide strong supportive evidence. While not mandated by case law, its use is strongly recommended as an integral part of tracking history.

Special Requirements of Moving RADAR

Moving RADAR presents special problems in vehicle identification because the speed of the patrol car itself enters the picture. In effect, when moving RADAR is used the courts demand that the officer verify both the defendant's vehicle speed and that of the patrol car at the time of the violation.

In 1978, in the landmark case of State v. Hanson, the Wisconsin Court addressed several issues on the use of moving RADAR. As with earlier case law, Hanson affirmed that:

- The operator must have sufficient training and experience in the operation of moving RADAR.
- The moving RADAR instrument must have been in proper working condition when the violation took place.

Of major interest was the court's ruling that the officer must establish that:

- The moving RADAR device was used where road conditions would distort readings as little as possible.
- The patrol car's speed was verified.
- The instrument's accuracy was tested within a reasonable time before and after the arrest.

Texas Court Rulings and Opinions

While Court rulings from other States are important in staking out legal paths and ascertaining judicial trends, they are not binding upon Texas Courts. Three important Texas cases that directly affect our RADAR operation are:

Wilson vs. State (328 SW2nd 311)

This is our most important case and addressed three issues: (1) RADAR equipment, (2) Training and experience of operator and (3) Calibration checks for accuracy.

1) **Equipment**. The Court broadly directs that the RADAR apparatus must be of a type accepted as dependable for the purpose by the profession concerned in that branch of science or its related art. Furthermore, the equipment must be one constructed according to accepted type and in good operating condition for accurate work. A reputable manufacturer producing quality equipment from sound physical and electronic principles are implied in this wording. Proper maintenance is also required.

2) **Training and Experience of Operator**. This decision states that the witness using RADAR equipment as source for his testimony must be qualified for its use by **training and experience**. No minimum of training or experience is specifically stated. However, the most celebrated RADAR case, New Jersey vs. Wojtkowiak, stated that three hours classroom instruction, two or three hours practical instruction and eighty hours of experience is sufficient.

DPS policy is in comfortable compliance by requiring seven hours classroom instruction, sixty days of practical training and experience under the oversight of a certified operator, followed by a practical proficiency examination.

3) **Calibration checks for accuracy**. The Appellate Court's decision in this case is the basis for our regulations on operational accuracy checks and must be complied with. They are:

A. Tuning fork(s) and internal calibration check performed when the RADAR operation is begun.

B. Internal calibration check after each arrest on location.

C. Tuning fork(s) and internal calibration checks are performed when RADAR operation is ended.

D. Frequent calibrated speedometer checks are also advisable.

It should be noted that our policy as stated in the TLE Manual requires external calibration checks at the beginning and end of shifts rather than the phrase "radar operation." Proper external calibration includes procedure for both stationary (one tuning fork) and moving (two tuning forks) modes in a moving RADAR set. It also includes both antennas in a dual antenna set.

Holley vs. State (36 SW2nd 570)

The importance of this case is that the Courts recognized the Texas Highway Patrolman as qualified to present "expert" testimony regarding operation of the RADAR and held it sufficient in this case.

Cromer vs. State (374 SW2nd 884)

This case put aside the defense contention of RADAR operation being illegal because of the officer's "lying in wait" and reaffirmed a previous holding that Article 803a, P.C. (Lying in wait statute) is unconstitutional.

Also the holding indirectly accepted principles of RADAR for measuring speeds by admitting evidence of accuracy that a tuning fork was used prior to and after use; and comparing speedometer readings with the RADAR unit.