MUNICIPAL COURT, CITY OF BOULDER, COLORADO Court Address: 1777 6th Street, Boulder, CO 80302 **PEOPLE OF THE CITY OF BOULDER, by and on behalf of, PEOPLE OF THE STATE OF COLORADO, Plaintiff,** **vs.** **SINGH, RAVINDER, Defendant**	Case Number: CR-2007-0014677-PE Courtroom.: Municipal Court
ORDER	

This matter comes before the Court on the City's request that the Court take judicial notice of the scientific reliability of the principles underlying the digital camera radar technology utilized by the City in detecting and documenting speeding violations in the City of Boulder. A hearing on this issue was conducted on February 20, 2008. Following the hearing, the Court took the matter under advisement. The Court now issues this Order.

The evidence that the City seeks to introduce in this case, which was obtained through the City's digital camera radar technology, is dependent on scientific principles. Specifically, it relies on doppler radar technology combined with digital photography and computer software applications.

As a preliminary matter, the Court notes that B.R.C. Section 7-4-74(e)(1) discusses the standard for the admissibility of camera radar technology in the municipal court. B.R.C. Section 7-4-74 (e) states:

> In any proceeding in municipal court to prosecute a violation of Section 7-4-58, "Speeding," B.R.C. 1981: (2) The image and related data produced by camera radar concerning the violation shall be admissible in court as prima facie evidence of a violation of such section, provided that the person who activated the camera radar prior to the image being taken testifies as to the placement of the camera radar and the accuracy of the scene depicted, and further testifies that the person tested the radar unit of the camera radar for proper calibration within a reasonable period of time both before and after the taking of the image.

Subsection (e) (3) goes on to state:

> It shall not be necessary that the same person who did the testing before the taking of the image be the person who testifies concerning the testing which occurs thereafter. Testing and operation in accordance with the manufacturer's specifications shall be, without limitation, sufficient foundation for introduction of the evidence.

Nevertheless, the Court is required to look beyond the Boulder Revised Code in determining the admissibility of evidence. The Constitution and laws of the United States and of the State of Colorado must also be heeded. See B.R.C. Section 2-6-4(e). More specifically, the Court must adhere to the Colorado Rules of Evidence, which apply to all courts in the State of Colorado. C.R.E. 101, 1101(a).

Although mindful of B.R.C. Sec. 7-4-74(e)(1), the Court concludes that the admissibility of this technology is controlled by C.R.E. 702 and *People v. Schreck*, 22 P.3d 68 (Colo. 2001).

Pursuant to *Schreck,* the inquiry surrounding the admissibility of scientific evidence should focus on the reliability of the scientific principles, the qualifications of the witness and the usefulness of the evidence to the trier of fact. In addressing these issues, the trial court may consider the factors set forth in *Daubert v. Merell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 593-94, 125 L. Ed. 2d 469, 113 S. Ct. 2786 (1993). *Id*. These factors include (1) whether the technique can and has been tested; (2) whether the technique has been subjected to peer review and publication; (3) the scientific technique's known or potential rate of error, and the existence and maintenance of standards controlling the technique's operation; (4) whether the technique has been generally accepted; (5) the relationship of the technique to more established modes of scientific analysis; (6) the existence of specialized literature dealing with the technique; (7) the non-judicial uses to which the technique are put; (8) the frequency and type of error generated by the technique; and (9) whether such evidence has been offered in previous cases to support or dispute the merits of a particular scientific procedure. *Schreck,* 22 P.3d at 77-78.

Summary of Evidence

During the hearing, the People called one witness: Mr. Todd Jackson, the Deputy Director of Engineering at Affiliated Computer Systems ("ACS"), the company that built, installed and now maintains the digital radar cameras used by the City of Boulder. Mr. Jackson has a Bachelors degree in Business Administration and has been involved with the camera radar and camera red-light technologies for the past five years.

During that time, he has participated in the implementation of these technologies for various governmental agencies, including the City of Boulder. Mr. Jackson has received training from Gatsometer, the manufacturer of the digital camera

radar technology and has been certified as an instructor for these technologies through the University of San Diego.

Mr. Jackson testified that the digital camera system now in use in the City of Boulder works in much the same way as the analog version of the camera radar system worked in the past. Except for the fact that the photographs now generated by the system are now captured in digital, rather than “wet” film format, there are no significant changes to the system.

This Court has previously acknowledged the scientific reliability of camera radar technology. See *People v. Wehner, 2005-008915* (Order dated October 19, 2005). This court’s summary of the camera radar system is now incorporated into this Order and attached as Exhibit A.

Doppler radar, the technology utilized to determine vehicular speed, has been in existence for over one hundred fifty (150) years. Camera radar technology utilizes the same doppler radar technology that has been recognized by the Colorado Supreme Court as a reliable method to determine vehicular speed. *People v. Walker*, 199 Colo. 475, 610 P.2d 496 (1980). The system combines radar technology with photographic evidence to create an image of a vehicle and driver and then superimpose on that image electronic data that includes the speed of the vehicle in question.

The technology utilizes a radar processing unit that is integrated with two cameras through a fiber optic cable. When a vehicle passes through the radar beam, the radar unit performs a series of complex calculations at the rate of 200 to 300 calculations per second. If the speed of the vehicle detected is more than ten miles per hour greater than the posted speed limit, the radar unit sends a message to the primary high speed camera, directing the primary camera to take a photograph of the vehicle that has crossed into the photo radar beam. No photo is taken if the detected speed does not exceed the pre-set speed threshold. If the unit sends the photo command, the primary camera captures the image of the vehicle, which includes an image of the operator of the vehicle.

The radar unit transmits to a data box information regarding the speed of the vehicle, the date, time and location. A second camera is also connected to the system. The second camera is pre-positioned to take a photograph at a specific distance beyond the location of the photo radar beam. The radar unit directs the second camera to take a second photograph, which captures the rear license plate of the tracked vehicle.

The system utilizes an electronic oscillator or electronic tuning fork to test whether the radar unit is accurately determining speed. Pursuant to manufacturer’s specifications, this electronic oscillator is tested annually for accuracy by the metrology laboratory at the Colorado Department of Agriculture.

The digital camera radar system works in much the same way as the camera radar system described above. The one notable difference between the two systems is the way in which the photographic images are stored. With the analog version of the system, information generated by the doppler radar unit relating to the speed, date and location of the vehicle is transmitted to a data box and then superimposed through a reflected image in the camera control unit onto the upper corner of the photograph taken by the primary camera. With the digital radar system, the system creates one file at the time that the primary photo is generated and merges the data generated by the doppler radar with the digital photo file and then saves that file in the system. This file can only be opened through use of the manufacturer's proprietary software. The digital file is later downloaded into the City of Boulder Police Department server. According to Mr. Jackson, a software encryption process prevents any possibility that the digital file can be edited or manipulated.

Testing and Maintenance

The digital camera radar system is maintained and operated by technicians that have been trained by ACS. According to Mr. Jackson, these technicians are trained in accordance with the manufacturer's specifications. At each deployment, the operators are required to set-up and test the unit. People's Exhibit 2 depicts the deployment requirements established by the manufacturer. Before deployment, the operator goes through a series of inspections and tests and records on the deployment checklist the information gleaned from this testing protocol. Before deployment, among other things, the operator:

a. Aligns the camera radar vehicle parallel to the roadway;
b. Turns on the system, thereby initiating an internal test sequence for the system, which tests the radar unit, the camera and the internal timing mechanism;
c. Tests the unit to insure that the threshold speed set manually by the operator is the same speed as that which is reflected on the radar unit display;
d. Activates the electronic tuning fork test to insure that the tuning fork is operating according to manufacturer specifications (the test should result in a reading of 37 miles per hour, plus or minus one mile per hour); and
e. Activates the Radar System Self-Test and verifies two photo images are generated and saved to a file.

The system is fully tested at both the beginning and end of each deployment.

According to Mr. Jackson, if the operator follows the requirements set forth in People's Exhibit 2, the digital camera radar unit will accurately capture the speed of the vehicle and create two photographic images of that vehicle.

The tests described above are performed at the beginning and end of each deployment. Operators maintain a deployment log, pursuant to which test results and other pertinent data are documented for each deployment. See People's Exhibit 2.

Once the unit has been activated, the operator maintains surveillance of the system and traffic to insure that the system is operating properly. Operators are required to make visual estimates of the speeds of oncoming vehicles and confirm that the visual image (and speed) captured by the system is consistent with their visual estimates. No specific record of the operator's observations are recorded unless these observations indicate that the system is not operating properly . If such circumstance were to arise, the system would be taken out of operation and a notation of the problem would be recorded.

At the end of a deployment, the data obtained by the system is downloaded onto a City of Boulder server located at the Boulder Police Department.

Scientific Reliability

Mr. Jackson opined that if maintained and tested according to the manufacturer's specifications, the digital radar camera system would provide accurate images of speeding violations.

Mr. Jackson testified that digital camera technology is a widely used and generally accepted technology. According to Mr. Jackson, most police departments in the United States now rely on digital camera technology to photograph crime scenes and that the technology has been widely accepted in court systems throughout the United States and the world.

Digital camera radar systems have been accepted in a number of other jurisdictions, including courts in Washington, D.C., Cleveland, Ohio and the State of Illinois. Mr. Jackson was not aware of any court that had refused to acknowledge the scientific reliability of digital radar systems.

There is no known "error rate" for the digital camera system. According to Mr. Jackson, if there is a malfunction in the system, it will shut down and will not generate a photographic image. The digital camera radar unit will not operate unless it has passed all of the internal tests specified by the manufacturer. The operators of the digital camera radar system are required to follow a step-by-step deployment protocol that incorporates a series of internal tests. The unit will not operate if it fails any of these internal tests.

Applying the factors set forth in *Schreck* and *Daubert,* the Court concludes that the digital camera radar system is scientifically reliable and admissible in Boulder Municipal Court cases.

As is true with any admissible evidence, an adequate foundation for admissibility will be required in each case. Foundational elements required to introduce digital camera radar evidence include:

a. Proof of the training and certification of the equipment operator;
b. Proof of operation of the instrument in accordance with the operator's training and in conformance with the manufacturer's specifications for the instrument;
c. Proof of the instrument being in proper working order on the date in question;
d. Proof that the digital camera radar vehicle was parked at an angle no greater than seven degrees from being parallel to the roadway;
e. Proof of annual certification of the electronic oscillator (tuning fork) by the Colorado Department of Agriculture, metrology laboratory;
f. Proof that the threshold speed set by the operator on the date in question was the same speed reflected on the radar display;
g. Proof that on the date of the alleged violation, the electronic oscillator was operating at a frequency between 36 and 38 miles per hour;
h. Proof that the radar unit was set to detect the speed of approaching vehicles only;
i. Proof that the system passed the self-test, including proof that two photographic images were created and saved to the file at the end of the test; and
j. Proof that on the date in question, there was no traffic on a parallel roadway within the radar beam created by the system.

This order does not attempt to set forth the other proof necessary to establish a violation of B.R.C. Section 7-4-58.

DATED: Wednesday, February 27, 2008

BY THE COURT:

MUNICIPAL COURT JUDGE
P.O. Box 8015
Boulder, CO 80306
(303) 441-1842

EXHIBIT A

MUNICIPAL COURT, CITY OF BOULDER, COLORADO Court Address: 1777 6th Street, Boulder, CO 80302 **PEOPLE OF THE CITY OF BOULDER, by and on behalf of, PEOPLE OF THE STATE OF COLORADO, Plaintiff,** **vs.** **WEHNER, CHRISTOPHER W,** **SNEARY, CHRISTOPHER J.** **IVEY, DENA R.** **Defendant**	Case Number: CR-2005-0008915-PE CR-2005-009155-PE CR-2005-008623-PE Courtroom.: Municipal Court
ORDER 2005-1 IN RE JUDICIAL NOTICE OF CAMERA RADAR TECHNOLOGY	

This matter came on for hearing on October 12, 2005. The purpose of the hearing was to determine whether the Court would take judicial notice of the scientific principles underlying the City's camera radar technology.

Law

As a preliminary matter, the People contend that B.R.C. Section 7-4-74(e) governs the admissibility of camera radar technology. B.R.C. Section 7-4-74 (e) states:

> In any proceeding in municipal court to prosecute a violation of Section 7-4-58, "Speeding," B.R.C. 1981: (1) The image and related data produced by camera radar concerning the violation shall be admissible in court as prima facie evidence of the speed of the vehicle depicted in the image, provided that the person who activated the camera radar prior to the image being taken testifies as to the placement of the camera radar and the accuracy of the scene depicted, and further testifies that the person tested the radar unit of the camera radar for proper calibration within a reasonable period of time both before and after the taking of the image.

The People argue that this ordinance disposes of the requirement that the court conduct an inquiry into the scientific reliability of the camera radar technology. See *People v. Bowers,* 716 P.2d 471 (Colo. 1986). The Court

recognizes the legal principle established in *Bowers,* but believes that a reliability inquiry is still required.

In *Bowers,* the statute at issue specifically stated that the testing methods and design of the devices used to determine blood alcohol levels must be certified by the department of health. *Id.* The *Bowers* court noted that "the purpose of section 42-4-1202(3)(b) is to delegate authority to the State Board of health to prescribe scientifically valid procedures for chemical testing that will not only ensure the safety in the testing process but, as important here, will provide sufficient reliability to the testing method as to avoid the necessity of formal evidentiary proof on this aspect of the testing process." *Id at 474.* Although judicial notice of the testing method and devices was mandated by the statute, it was done with the expectation that the department of health would establish guidelines that would be followed before the mandate would take effect.

Unlike the statute at issue in *Bowers*, B.R.C. section 7-7-74(e) sets no criteria regarding the testing or design of the camera radar equipment and the ordinance does not define what is meant by "proper calibration." Moreover, the reliability inquiry has not been delegated to another government agency with relevant scientific expertise. Therefore, *Bowers* is distinguishable.

Further, the Court is required to look beyond the Boulder Revised Code in determining the admissibility of evidence. The Constitution and laws of the United States and of the State of Colorado must also be heeded. See B.R.C. Section 2-6-4(e). More specifically, the Court must adhere to the Colorado Rules of Evidence, which apply to all courts in the State of Colorado. C.R.E. 101, 1101(a).

The Colorado Rules of Evidence provide that the admissibility of evidence shall be determined by the court. C.R.E. 104(a). Implicit in this rule is the notion that the admissibility of evidence can be raised by the judge, and is not dependent on an objection to the evidence by one of the parties.

The evidence in these cases, which was obtained through camera radar technology, is dependent on scientific principles. Specifically, it relies on doppler radar technology combined with photography. Consequently, its admissibility is controlled by C.R.E. 702 and *People v. Schreck*, 22 P.3d 68 (Colo. 2001), not simply B.R.C. Section 7-4-74(e). Applying C.R.E. 702 and the holding of *Schreck* to these cases, the Court now finds that camera radar technology is scientifically reliable and is therefore admissible.

Summary of Evidence

The People called one witness, Mr. Benjamin MacDonald. Mr. MacDonald is a Senior Systems Consulting Analyst with ACS, the company that provides the camera radar technology to the City of Boulder. Mr. MacDonald is retired Air Force, with over twenty years experience using and supervising the use of radar technology to track military aircraft. Mr. MacDonald's private experience includes work as an Air Traffic Controller and as a field engineer for GM Hughes. Mr. MacDonald has been with ACS since 1999 and participated in the building, testing and training of the camera radar equipment utilized by the City. Mr. MacDonald is also a certified camera radar instructor. The Court finds that Mr. MacDonald is qualified to offer expert opinions regarding the scientific properties underlying this technology.

Mr. MacDonald testified that doppler radar, the technology utilized to determine vehicular speed, has been in existence for over one hundred fifty (150) years. Camera radar technology utilizes the same doppler radar technology that has been recognized by the Colorado Supreme Court as a reliable method to determine vehicular speed. *People v. Walker*, 199 Colo. 475, 610 P.2d 496 (1980). The system combines radar technology with photographic evidence to create an image of a vehicle and driver and then superimpose on that image electronic data that includes the speed of the vehicle in question.

Mr. MacDonald testified that the camera radar technology utilizes a radar processing unit that is integrated with two cameras through a fiber optic cable. When a vehicle passes through the radar beam, the radar unit performs a series of complex calculations at the rate of 200 to 300 calculations per second. If the speed of the vehicle detected is more than ten miles per hour greater than the posted speed limit, the radar unit sends a message to the primary high speed camera, directing the primary camera to take a photograph of the vehicle that has crossed into the photo radar beam. No photo is taken if the detected speed does not exceed the pre-set speed threshold. If the unit sends the photo command, the primary camera captures the image of the vehicle, which includes an image of the operator of the vehicle.

The radar unit transmits to a data box information regarding the speed of the vehicle, the date, time and location. The information from the data box is then superimposed through a reflected image in the camera control unit onto the upper corner of the photograph taken by the primary camera. This electronic information is also stored in a memory card that is retrieved by the camera radar technicians that test and maintain the camera radar unit.

A second camera is also connected to the system. The second camera is pre-positioned to take a photograph at a specific distance beyond the location of the photo radar beam. The radar unit directs the second camera to take a second photograph, which captures the rear license plate of the tracked vehicle.

The camera radar system utilizes an electronic oscillator or electronic tuning fork to test whether the radar unit is accurately determining speed. Pursuant to manufacturer's specifications, this electronic oscillator is tested annually for accuracy by the metrology laboratory at the Colorado Department of Agriculture.

Mr. MacDonald testified that this technology has been tested for accuracy by several different agencies, including the National Institute of Standards and Technology ("NIST") and the International Association of Chiefs of Police ("IACP"). In his testimony, Mr. MacDonald discussed three different accuracy tests.

Mr. MacDonald testified that the NIST testing involved comparison of speed readings using the camera radar technology with speed readings using NIST's radar system at speeds ranging from 13 to 154 miles per hour. According to Mr. MacDonald, the camera radar system "passed" this accuracy testing within the one mile per hour tolerance level set by NIST.

Mr. MacDonald also testified that the camera radar system was tested in December of 2004 at Michigan State University and "passed" the accuracy testing at that time. The camera radar unit was again tested for accuracy in July of 2005 at San Diego State University in conjunction with the IACP. In that testing, the speed detected by the camera radar unit was compared with the speed determined by laser technology. According to Mr. MacDonald, the camera radar unit "passed" this accuracy test.

Mr. MacDonald testified that there is a great deal of literature surrounding camera radar technology, much of which can be accessed on the IACP website or websites of the various camera radar manufacturers.

According to Mr. MacDonald, there is no potential for error for the system. The radar unit will not operate unless it has passed all of the internal tests specified by the manufacturer. The operators of the camera radar system are required to follow a step-by-step deployment protocol that incorporates a series of internal tests. The unit will not operate if it fails any of these internal tests.

Camera radar operators employed by the City of Boulder are trained by Mr. MacDonald in accordance with the manufacturer's specifications. At each deployment, the operators are required to set-up and test the unit. People's Exhibits 1 and 2 depict the pre-deployment requirements established by the manufacturer. Before deployment, the operator goes through a series of inspections and tests and records on the deployment log the information gleaned from this testing protocol. Before deployment, among other things, the operator:

a. Aligns the camera radar vehicle parallel to the roadway;

b. Checks the camera system to make sure that the camera has no visible damage;
c. Takes a test photo of the primary camera and advances the camera frame to a ”000” reading;
d. Inserts the memory card and insures that the card is firmly in place;
e. Advances the screen to operation mode;
f. Tests the motor for the primary camera;
g. Tests the motor for the secondary camera;
h. Tests the unit to insure that the threshold speed set manually by the operator is the same speed as that which is reflected on the radar unit display);
i. Initiates a four second self-test in which the unit simulates an approaching vehicle and tests whether the radar antennae are operating correctly;
j. Insures that the radar range is set at the most sensitive range and sets the direction of the radar to detect the speed of approaching vehicles;
k. Activates the electronic tuning fork test to insure that the tuning fork is operating according to manufacturer specifications; and
l. Activates the complete system test and verifies a camera flash at the end of the test.

According to Mr. MacDonald, if the operator follows the requirements set forth in People’s Exhibit 2, the camera radar unit will accurately capture the speed of the vehicle and create a photographic image of that vehicle.

Mr. MacDonald testified that this technology is similar to camera radar technology used in a number of other jurisdictions within the State of Colorado including Fort Collins and Denver. In addition, the system is utilized in other states and around the world, including Arizona, Oregon, the District of Columbia and Canada. Mr. MacDonald was not asked and did not state if any court in these jurisdictions had taken judicial notice of the technology.

Defense Evidence

The Court appointed Ms. Ann England of the University of Colorado School of Law’s Legal Aid and Defender Program as amicus counsel. The named defendants were notified of the hearing, but none chose to participate. Ms. England cross-examined Mr. MacDonald. No witnesses were called for the defense.

During cross-examination, Mr. MacDonald acknowledged, in theory, the potential for the system to erroneously attribute a speed to a vehicle that was generated by another vehicle traveling in the same direction. Mr. MacDonald opined that although this was theoretically possible, it was extremely unlikely.

According to Mr. MacDonald, the system will only direct the camera to take a photograph if the frequency generated by the radar (speed) remains constant during the calculation period. For the radar frequency to remain constant, the two vehicles would have to be the same size and shape, would have to be close enough that they were both in the radar beam at the same time and would have to be traveling at the *exact* same speed.

At the distances employed by the City, the radar beam is only a few feet wide at the location where the beam crosses the roadway. Hence, for a second vehicle to be in the beam at the same time as the first vehicle, it would need to be within a few feet of the first vehicle's rear bumper. The two vehicles would have to be of the same size and shape. According to Mr. MacDonald, even if these requirements were met, as long as the vehicles were traveling at speeds that differed by .01 miles per hour or more, the unit would recognize that the speed it was detecting was not constant and would not issue the photo command.

Mr. MacDonald acknowledged that the radar beam generated by the system could capture the speed of vehicles in other lanes of traffic on the roadway. Mr. MacDonald indicated that the City of Boulder operates this system on roadways that have just one lane of traffic for each direction. By setting the system to capture only approaching traffic, the operator eliminates the possibility that the unit will inadvertently capture the speed of vehicles traveling away from the radar unit but within the radar beam.

Mr. MacDonald admitted that it is conceivable that a vehicle traveling on a roadway adjacent to the target roadway and in the same direction as the traffic targeted by the radar beam could be captured in the radar beam. Hence, it is possible that the radar unit could detect the speed of such a vehicle and attribute that speed to the vehicle depicted in the photograph.

Mr. MacDonald also acknowledged that the speed calculation generated by the camera radar system could be off as much as 3.5 miles per hour if the camera radar vehicle is parked more than seven degrees off of parallel from the roadway. According to Mr. MacDonald, for such a parking error to occur, the front wheels of the camera radar vehicle would have to be on the curb and the back wheels would have to be on the street or vice versa.

Mr. MacDonald also acknowledged that the doppler radar transmission may receive interference from a variety of sources. Technologies utilizing microwave transmissions such as cellular radios or cordless phones may interfere with the radar transmission. Mechanical interference may also occur such as when an engine fan is operated within the path of the radar beam. Electromagnetic interference ("EMI") and radio frequency interference ("RFI") may also interfere with the radar transmission. According to Mr. MacDonald, the system is designed to prevent a photograph from being taken in these situations because the system will not receive a constant and consistent frequency reading. In such

a circumstance, an error message would be displayed and no photo would be taken.

Weather, such as wind that causes a sign to vibrate and create a speed frequency, could conceivably create a speed reading that is attributed to a vehicle.

Conclusion and Order

Pursuant to *Schreck v. People*, 22 P.3d 68, 70 (Colo. 2001), the inquiry surrounding the admissibility of scientific evidence should focus on the reliability of the scientific principles, the qualifications of the witness and the usefulness of the evidence to the trier of fact. In addressing these issues, the trial court may consider the factors set forth in *Daubert v. Merell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 593-94, 125 L. Ed. 2d 469, 113 S. Ct. 2786 (1993). *Id*. These factors include (1) whether the technique can and has been tested; (2) whether the technique has been subjected to peer review and publication; (3) the scientific technique's known or potential rate of error, and the existence and maintenance of standards controlling the technique's operation; (4) whether the technique has been generally accepted; (5) the relationship of the technique to more established modes of scientific analysis; the existence of specialized literature dealing with the technique; (6) the non-judicial uses to which the technique are put; (7) the frequency and type of error generated by the technique; and (8) whether such evidence has been offered in previous cases to support or dispute the merits of a particular scientific procedure. *Schreck,* 22 P.3d at 77-78.

Camera radar technology has undergone extensive testing. In each testing process, the technology has been determined to be an accurate method for determining vehicular speed. The standards put in place by the manufacturer of the system include four separate internal tests that prevent the unit from creating an image of a vehicle in error. The system is utilized in a number of other jurisdictions. No evidence was presented to suggest that any jurisdiction has declined to admit evidence created by the camera radar system. The system is a combination of two technologies, photography and radar, both of which have longstanding recognition in Colorado courts. See *People v. Walker, supra* and *Mow v. People,* 72 P. 1069, 1072 (Colo. 1903). In addition, Boulder's City Council has indicated its intent that the evidence created by the technology be admissible in municipal court proceedings. For all of these reasons, the Court concludes that camera radar technology is scientifically reliable and admissible in Boulder Municipal Court cases.

The issues raised during cross-examination of Mr. MacDonald generally go to the weight and not the admissibility of the evidence generated by the camera radar technology. As is true with any admissible evidence, an adequate foundation for admissibility will be required in each case. Foundational elements required to introduce camera radar evidence include:

a. Proof of the training and certification of the equipment operator;
b. Proof of operation of the instrument in accordance with the operator's training and in conformance with the manufacturer's specifications for the instrument;
c. Proof of the instrument being in proper working order on the date in question;
d. Proof that the camera radar vehicle was parked at an angle no greater than seven degrees from being parallel to the roadway;
e. Proof that the primary camera system was operated in accord with the manufacturer's specifications, including proof that the film was advanced to frame number "000", that the memory card was inserted firmly and that the "red light" was not flashing following such insertion;
f. Proof that the secondary camera was working properly;
g. Proof of annual certification of the electronic oscillator by the Colorado Department of Agriculture, metrology laboratory;
h. Proof that the threshold speed set by the operator on the date in question was the same speed reflected on the radar display);
i. Proof that on the date of the alleged violation, the electronic oscillator was operating at a frequency between 36 and 38 miles per hour;
j. Proof that on the date of the alleged violation, the unit's "four second" self-test indicated that the radar unit's antennae were operating correctly;
k. Proof that the radar unit was set to detect the speed of approaching vehicles only;
l. Proof that the system performed its "complete system" test, including proof that the camera flash occurred at the end of this internal test; and
m. Proof that on the date in question, there was no traffic on a parallel roadway within the radar beam created by the system.

This order does not attempt to set forth the other proof necessary to establish a violation of B.R.C. Section 7-4-58.

DATED: Wednesday, October 19, 2005

BY THE COURT:

MUNICIPAL COURT JUDGE
P.O. Box 8015
Boulder, CO 80306
(303) 441-1842