

www.thekaleidoscopesystem.com

By Carolina Forensics, LLC

**Instructions for Spartan, Fusion, and Clarion
Bullet Trajectory Kits**

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INTRODUCTION

The Kaleidoscope Reconstruction System was designed for use primarily in mannequins, walls, doors, vehicles, etc. It is most commonly used to illustrate perforating gunshot wounds in the aforementioned mediums; however it can be useful for illustrating penetrating wounds as well. In comparison to traditional dowel reconstruction, an advantage of using The Kaleidoscope System is that it can be used with or without fog. However, fog is extremely helpful during setup to help site in lasers or during reconstruction to illuminate the laser beams.

The Kaleidoscope System methodology is grounded in the scientific method as it is applied to crime scene reconstruction. Adhering to traditional trajectory reconstructive theory, The Kaleidoscope System can also be used to build courtroom demonstratives or integrated with crime scene and autopsy photographs to create illustrious evidence.

The Kaleidoscope System is an advanced reconstruction system. Users should have a working knowledge of crime scene investigation, forensic pathology, shooting reconstruction, bloodstain pattern interpretation, etc. to use the Kaleidoscope System properly.

It is arguable that any crime scene reconstruction is an approximate estimate as best. It is appropriate to use this system in the field with the best information available during preliminary stages, but is recommended to coordinate and verify information with all agencies involved before any "conclusions" might be drawn or inferred (i.e., medical examiner, crime lab, etc.).







Please remember that The Kaleidoscope System requires practice to acquire proficiency. If you are interested in training, please contact The Kaleidoscope System Brand Manager, Alexis Pettler at (910) 393-8314.







**** Important Notes****





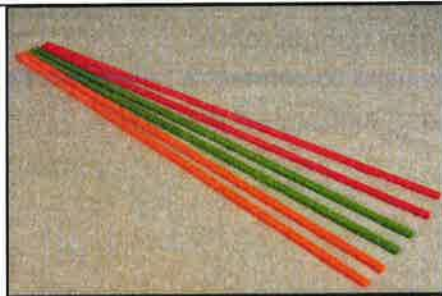

Be sure to fully document (notes, photos, sketch, measurements, etc.) all aspects of any defect or "hole" before inserting a tubular dowel into it. Bullet hole reagents are strongly recommended.



It is recommended to always wear protective eyewear when using lasers. For more information on other systems or upgrades for your system, please visit www.the.kaleidoscopesystem.com.

KIT MATERIALS INDEX

<p>Tool Box Stainless steel carrying case to store all materials of The Kaleidoscope System.</p>			
<p>Photographic Fog Canned photographic fog used to illuminate laser beams. For best results, use in low light. See www.thekaleidoscopesystem.com for the MSDS information.</p>			
<p>Digital Angle Finder Use the digital protractor to calculate the vertical angle of a defect in a substrate.</p>			
<p>Digital Protractor Use the digital protractor to calculate the horizontal angle (i.e., azimuth) of a defect in a substrate.</p>			
<p>Dowel O-Rings and Eye Hook Dowel o-rings are used to secure stabilizers onto a fiberglass or tubular dowel rod inside a Stabilizer another forensic apparatus.</p>			
<p>Plumb Line Use string to attach to the 5 oz. plumb bob in order to create a vertical line for photographing dowels. Also used for angle calculations</p>			

<p>String Masonry string used to attach to plumb line and eye hook.</p>			
<p>Kaleidoscope Laser Bases Solid resin base designed by Carolina Forensics for Kaleidoscope used to attach to tripod to secure a laser for demonstrating bullet trajectories with fiberglass and tubular dowels. Used for forward projection and back extrapolation.</p>			
<p>Kaleidoscope Dowel Stabilizers Solid resin dual-end part used to stabilize dowel in flat surface.</p>			
<p>Kaleidoscope Dowel Connectors Hard plastic tube used to connect two dowels together.</p>			
<p>Kaleidoscope Laser Connectors Soft plastic tube used to connect a Kaleidoscope Laser to the end of a fiberglass dowel rod.</p>			
<p>Green Kaleidoscope Lasers Green laser with specialty screw adaptation on the end used to attach to dowels.</p>			

<p>Red Kaleidoscope Lasers Red laser with specialty screw adaptation on the end used to attach to dowels.</p>			
<p>O-Ring Use the large 3/4 inch o-ring to secure the Kaleidoscope Laser to a Kaleidoscope Laser Base.</p>			
<p>Button Clip Use the white, PVC button clip to depress the laser button when the laser is adhered to a fiberglass or tubular dowel using the Kaleidoscope Laser Connector.</p>			
<p>Starter Rod Wooden dowel with sharpened end to insert into Styrofoam head or forensic mannequin. Tubular dowel is inserted around wooden dowel.</p>			
<p>Fiberglass Dowel Rods Solid fiberglass dowel rods used for forward projection and back extrapolation of bullet trajectories.</p>			
<p>Tubular Dowel Rods Clear, hollow acrylic dowel rods used for forward projection and back extrapolation of bullet trajectories.</p>			

<p>Carrying Ice Tube Plastic tube (CLARION and MOSAIC KITS ONLY) used to carry 36" Tubular Dowel Rods</p>			
<p>50" Tripods Use the 50" tripod (CLARION AND MOSAIC KITS ONLY) with Kaleidoscope Laser Bases, dowels, and/or lasers for forward projection.</p>			

INSTRUCTIONS

Basic Documentation

- Always photograph the scene from various perspectives before attempting to insert any dowel rod into a defect.
- Always record numerous measurements from the center of the defect to the floor, ceiling, corners of room or locations on a vehicle, etc.
- Always sketch the defect and surrounding area.
- It is best practice to label each defect independently.
- Measure the length and width of the interior of the defect, rounding when necessary, to calculate the approximate Angle of Impact.
- Always support measurements and photographs with written documentation of observed characteristics of the defect.

Using the Dowel Rods

- The Spartan Kit comes with solid Fiberglass Dowel Rods only.
- The Fusion, Clarion, and Mosaic kits come with both solid Fiberglass Dowel Rods and clear, hollow, Tubular Dowel Rods.

- Some of the clear, hollow Tubular Dowel Rods included in the Clarion Kit are 36" long and are intended for vehicle reconstruction, etc.
- Select a dowel rod of a contrasting color so the dowel will be visible in photographs.
- Both Fiberglass Dowels and Tubular Dowels can be used in walls, vehicles, forensic mannequins, etc.
- Tubular Dowels are especially useful for use with forensic mannequins and Styrofoam heads to illustrate approximate estimations of bullet trajectories when coupled with a tripod representing the shooter placed in a specific location.

Inserting the Dowel into the Defect

1. Begin by inserting a Dowel Stabilizer into the defect.
2. Ensure that the Dowel Stabilizer is resting against the lead edge of the defect and is secured into the defect.
3. Insert the dowel rod of your choice through the defect or reference point one and extend the dowel rod through reference point two.
4. Secure the dowel rod with a laser O-ring against the dowel stabilizer.

Dowel Stabilizer, Dowel and O-Ring

1. Calculate the vertical angle using the Digital Angle Finder.
2. Place the Angle Finder on top of the dowel rod closest to the defect and record the angle reading.
3. Calculate the horizontal angle of impact or the azimuth angle.
4. To calculate the azimuth angle or horizontal angle, place the protractor's zero mark centered beneath the dowel stabilizer and dowel.
5. View the protractor from overhead and record the horizontal angle of impact.
6. Repeat the process for all two reference point defects where dowel rods are inserted.
7. Be sure to take numerous photographs, but never placing the camera against the wall or surface.
8. Use a plumb line in the photographs to help illustrate the vertical angle of impact.

Attaching a Kaleidoscope Laser to a Dowel Rod

1. Insert an AAA battery into the laser and close.
2. Test by depressing button on laser. If laser does not turn on, take battery out and turn opposite way and reinsert.
3. Place a laser connector on the end of the dowel.

4. Slide the white button clip over the back of the laser. (Note: If you mount the laser on a laser base when using a Fusion or Clarion, use either the button clip to keep the laser mounted or simply rotate the laser in the base and secure it with an o-ring.)
5. Screw the laser into the threaded end of the laser connector.

Attaching a Kaleidoscope Laser to a Tripod

1. Insert an AAA battery into the laser and close.
2. Test by depressing button on laser. If laser does not turn on, take battery out and turn opposite way and reinsert.
3. Screw laser base onto 50" tripod.
4. Place laser in base with button facing upward.
5. Slide O-Ring onto back of laser.
6. Turn laser in base to depress button and secure with O-Ring.

Methods

The acronym **L.A.S.E.R.** stands for "Light Amplification by Simulated Emission of Radiation" It is highly recommended by Carolina Forensics and the inventors of The Kaleidoscope System that users wear Eye-Laser-Shields that meet the US Safety Standard throughout the reconstruction process. Never look directly into laser or point a laser at another person.

**** Green Kaleidoscope Lasers are extremely powerful.** If left one, they will consume batteries very quickly (1 hour or less typical AAA batteries). They can project a beam up to 6000 meters respectively in some cases. Laser light can be manipulated and adjusted for desired brightness and effect.

Circle Method- diffracting the laser's light through the Tubular Dowel to make a circle on the object where the trajectory ends. This method is good for short distances up to six feet from the victim to the object. Not ideal for long distances.

Dot Method- shooting the laser straight through the Tubular Dowel creating a dot on the object where the trajectory ends. This method is ideal for long distances more than six feet from the victim to the object and can be used indoors, outdoors or in place of the circle method.

Best case scenario, have the medical examiner mark the wound tracks on a forensic mannequin and/or Styrofoam head. Or, using the autopsy report, transpose the wound track measurements and precisely mark the entrance and exit wound on the mannequin. If the

medical examiner has provided wound locations in degrees it is recommended to request the wound locations in inches from the medical examiner to proceed.

Forensic Mannequin: Using a box-cutter or exact-o type knife, cut a small "x" on both marks. If reconstructing an exit wound only, do not cut a hole for an exit.

Gently insert the wooden starter dowel rod through the X hole or on the point on the Styrofoam head, pointed side towards the mannequin to begin to make the hole. Remember, it is necessary to aim for the exit wound if there is an exit wound, or to stay on the track indicated by the medical examiner's report if there is no exit wound. It is recommended to practice on a practice Styrofoam head first.

Stop when approaching the exit wound. Shore the mannequin or Styrofoam head against a hard object before beginning to puncture the exit wound. Without shoring the mannequin or the head, it is possible that a large piece of foam will protrude through the mannequin or break off around the exit from the Styrofoam head.

Very gently push the starter dowel through the X on the exit wound.

Slide the Tubular Dowel over the starter rod, then slide the Tubular Dowel through the wound track.

Push the Tubular Dowel out of the exit wound minimizing foam protrusion and/or Styrofoam breakage.

Slide the starter rod out of the wound track only, leaving the Tubular Dowel in the wound track.

Center the Tubular Dowel along the wound track so both sides have the same length of Tubular Dowel extending.

Place the mannequin in the hypothesized position to be tested. It is recommended to test multiple hypotheses for the reconstruction to be thorough.

OR insert a Tubular Dowel into the impaction point made by the projectile in the wall, car door, windshield, etc.

Attach a laser base to a tripod. Any standard tripod can be used.

Lay a laser in the track of a laser base and secure with O-Rings.

Place the tripod in the hypothesized location representing the shooter.

Twist the laser, so the laser button is depressed by the laser base turning the laser on or use the button clip. Using photographic fog and/or an angle finder and/or string, adjust the tripod until the laser shoots into the tubular dowel. Use the angle of the laser or use the string to connect them temporarily to know where to place the tripod. Document photographically and in notes.

Select Circle or Dot method and position the laser in the approximate position to create desired effect.

Check the object behind the forensic mannequin to ensure desired effect by the laser method.

If desired effect is observable, then do not adjust the tripod further. If desired effect is not achieved, continue to adjust the tripod to achieve desired effect.

The reconstruction is complete when the desired effect is achieved and the trajectory beginning with the shooter, passes through the victim, any intermediate objects, and ends on the impaction point of the projectile.

Check, photograph and create written documentation of all measurements, angles, etc. and the all sides of the reconstruction are accurate ensuring the lasers are sighted as desired through the Tubular Dowels.

Recommended Literature

Several of the following texts are required reading for the International Association for Identification's Crime Scene Reconstructionist Certification Examination:

Bevel, T., & Gardner, R. M. (2008). *Bloodstain pattern analysis: With an introduction to crime scene reconstruction* (3rd ed.). Boca Raton, FL. CRC Press.

Bevel, T., & Gardner, R. M. (2009). *Practical crime scene analysis and reconstruction*. Boca Raton, FL. CRC Press.

Haag, L. (2011). *Shooting incident reconstruction* (2nd ed.). New York: Elsevier Academic Press.

Hueske, E. (2006). *Practical analysis and reconstruction of shooting incidents*. Boca Raton, FL: CRC Press.

James, S. H., Kish, P., & Sutton, T. P. (2005). *Principles of bloodstain pattern analysis*. Boca Raton, FL: CRC Press.

Pettler, L. (2015). *Crime scene staging dynamics in homicide cases*. Boca Raton, FL: CRC Press.

Walton, R. H., (2006). *Cold case homicides: Practical investigative techniques*. Boca Raton, FL: CRC Press.

TECHNICAL SPECS

The most successful practitioners of bullet trajectory reconstruction and Tubular Dowel Crime Scene Reconstruction are those who have extensive training in Crime Scene Investigation, Crime Scene Reconstruction, Forensic Photography, Chemical Processing of Bloodstain Pattern Analysis, and who have experience reconstructing shootings. Tubular Dowel™ kits are not recommended for practitioners who have completed a 40-hour Crime Scene Reconstruction course and/or who may be starting out in the field. Our kits are designed for use by the experienced, well trained, well-educated forensic practitioner.

Green and Red Kaleidoscope Laser Specs:

We recommend using Laser Safety Goggles of your choice when using lasers. Never point lasers towards anyone for any reason as laser beam light can be damaging to the eyes.

- Battery: 1 AAA
- Dimensions: 1.5 x 8.5cm
- Gross Weight: 5 (approximate) ounces without batteries
- Technical Parameter: Continuous wave, fixed focus dot, lifetime usage approximately over 5000 hours.
- Output Wavelength: 532nm
- Output Power: 5-150mw

- Beam Distance: 500-6000m
- Working Voltage: DC=3.2V
- Trigger Voltage: DC=2.8V
- Warmup Time: 3 minutes approximately
- Storage Temperature: 32-122 degrees F
- Working Temperature: 32-104 degrees F
- Warranty: 90 days Manufacturer Warranty

REPLACEMENT PARTS

If you have any questions, concerns, need replacement parts or are interested in training, please contact Alexis Q. Pettler, Kaleidoscope System Brand Manager, at Carolina Forensics (the manufacturer).

Email: alexis@thekaleidoscopesystem.com

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