Digiscoping-overview.docx
September 17, 2016

Digiscoping_000 ----------

Topic – Digiscoping
This is a work in progress, but I hope my efforts will spur interests of others in using this actually fairly simple technology.

Briefly, Digiscoping is nothing more than having a camera attached to your spotting scope, to record or view zoomed in images.

The camera can be anything from your smart phone, to a point and shoot camera, to a full blown DSLR high quality camera. There are various mounts for such applications. Again, anything from very simple and inexpensive, to complex and costly. It all depends on your needs and desires.

My initial reason for trying this was to be able to more easily monitor shooting targets at 100 and 200 yards. I'm at the TRIFOCAL stage of glasses in life, and it is a pain to get into an awkward position to squint through the scope. So I began researching this, how to hook up either a simple camera, OR my cell phone, to the scope.

Before going into detail, let's look at a simple example of what things look like, when doing this. See photos 001- through 007.

SCOPE – set at 40x zoom. CAMERA (Samsung Galaxy S3) set at 1x zoom to start, with 2 second delay for camera action (reason for this later)

001-scope-mounted-on-tripod
002-view-down-the-street
003-camera-mounted-to-bracket-and-scope
004-camera-photo-at-1x
005-camera-photo-at-2x
006-camera-photo-at-2x-panned
007-camera-photo-at-2x-panned

This series of photos show the scope, on the tripod, with the camera/phone mount at the rear. I then pointed this down the street, and focused on a mailbox, DISTANCE about 175 feet.
Photo 003 shows how all this looks, with the camera mounted to the bracket.

Photo 004 shows the actual camera picture, taken by the camera viewing through the scope. Notice that the viewed image is round; the camera is taking a rectangle picture, but since the circle of view of the scope does not totally fill the camera lens field, there is the darkness surrounding the circle.

Photo 005, 006, and 007 show what happens when you zoom in the camera, from the 1x, to the 2x. The camera magnifies the view; and if the scope was focused well, the camera focus will also attempt to keep the image clear, even as it zooms. AND, the outer dark circle disappears, because the camera zoom, in magnifying the view, is eliminating the outer area of view.

Notice how in photo 007, even the letters on the banners are readable.

Digiscoping_050 ----------

OK, let's review what equipment I am using. These were my personal choices. There are NUMEROUS other configurations that work. It is up to you what you use.

SCOPE - **Redfield Rampage 20x-60x scope**. Any scope will do, but you get what you pay for. The rampage is nice, in that it is clear optics, AND a smooth adjusting wheel to zoom in, and it is easily accessed.

Mount for Camera/Phone - **Orion SteadyPix Pro Universal Camera SmartPhone mount**. This device mounts onto the eyepiece of the spotting scope, and it can mount either a small point-and-shoot camera, OR a smartphone. It has horizontal and vertical adjustment screws to correctly align the camera lens to the spotting scope eyepiece.

Tripod - Vanguard Alta Ca 203AP tripod, with PH-33 Pan Head The advantage of this tripod is it is not expensive, and it has horizontal and vertical swivel adjusters for the mounted items, and it is NOT a pistol grip. My Pistol grip tripod was too difficult to adjust. Also, the small tripods that come with most spotting scopes are difficult to use in this application, and are not very stable.

With the above three items, plus your phone/camera, you can get started. But, read on, for the customization that I added.

Digiscoping_075 ----------

Camera/Phone Settings - many cameras and phones have an auto-off feature after "X" seconds. For digiscoping, it is beneficial to DISABLE this feature, so the phone or camera is ALWAYS ON ,with no screen blackout. This uses the battery more intensely, but eliminates the need to continually turn the unit ON if it has turned off.
Photos should be set to have a time delay of 1 or 2 seconds, because if you try and press the shutter button (camera) or screen (phone) to take the picture, there is slight wobble in the scope setup, and this gets magnified in the photo, thus blurring it. With the delay, the whole apparatus has a chance to settle down and stop the vibration. (EVEN ANY SMALL vibration, when zoomed at 40x-60x, at 200 yards, will cause blurring of the pictures, but the 2-second delay is AWESOME for clear pictures.)

Scope Zoom – I set this to 60x, but it takes steady hands to get that lined up, and have the camera work for this. But with newer cameras / phones having 4 or 8x zoom (compared to my earlier galaxy 3 phone having 2x zoom), the 40x SCOPE zoom may work well. I am in process of experimenting.

Digiscoping_100 ----------

Custom Mounting Bracket - I then made an aluminum bracket for the spotting scope, to extend backwards, to allow centering of the whole apparatus onto the tripod, and to also allow additional mounting support for the Camera-Smartphone mount, so it was not just hanging in an unstable position off the spotting scope lens.
This bracket was just made from aluminum stock, 1 and 1 / 4 inch wide, and about 1 / 8 inch (+) thick), whatever home depot had. I used my trusty DREMEL DRILL, with a cutting wheel, to cut out two channels, (one in front, for mounting the spotting scope, and one in the middle, for

mounting the tripod mounting block), front one about 1 / 4 inch wide to accommodate the 1 / 4 inch bolt, and the middle one was about 5 / 16 inch wide to accommodate the sliding “T” nut described below, to mount the tripod mounting block to this bracket.

With this set up, and the SmartPhone mounted, I was able to zoom on targets at 200 YARDS and see very clearly ! It was amazing, with no squinting. And, with the camera ON, we could take pictures of each shot (or group of shots) if desired, to go backwards and see prior shots if we were not sure.

Digiscoping_200 ----------

Making BOLT for attaching the Bracket to the Scope
I needed a 1 / 4 inch bolt, similar to a camera mount bracket bolt, to mount the aluminum bracket to the spotting scope. They make these commercially, but those bolts have wings on them, and I needed something with a slim profile in it. So, I took 1 / 2 inch PVC water pipe, and the head of the 1 / 4 inch bolt will get pushed into there, and then the pvc cut to a short length. I screwed this in lightly to the bracket and scope, to size it, then removed it again. Silicone was placed in the BOTTOM of the PVC, (to keep epoxy from coming out), and then epoxy was placed in the UPPER part of the bolt, to glue in the hex head, and then a washer placed on top of the PVC.
After 24 hours, the bolt was ready, and it easily attached the bracket to the scope. NOTE – when finished, if the bolt needed cut down, light grinding to the top threads did not damage the epoxy bond.

Digiscoping_500 ----------

Spacer Addition, for mounting Scope to custom bracket
Throughout my initial directions, when making the bolt to mount the bracket to the scope, I was mounting the bracket directly to the scope. HOWEVER, when I placed this whole apparatus on the tripod, the back end of the camera bracket was interfering with the tripod adjustment handle. So I had to somehow raise the scope, and attached camera bracket, above that tripod handle.
I made a white spacer to insert between the bracket and scope, and then had to make a newer longer bolt, but these pictures show the before and after - see the white spacer between the bracket, and the scope, in the second picture.

Digiscoping_300 ----------

Making Bracket to hold the scope to the Tripod mount
I needed a custom nut, and plate, to allow the custom bracket to be mounted to the camera tripod mount, which has a 1 / 4 threaded bolt.
I used a 1 / 4 “T” nut, and made another small aluminum piece, same thickness as the custom bracket, so I could slide it back and forth in the bracket channel, for adjustment. The 1 / 4 “T” nut had to fit through both brackets, but not extend beyond, so a dremmel drill cutting wheel did a good job of shortening the “T” nut (I used a longer one to start, because the shorter 5 / 16 ones did not go through far enough to engage many of the tripod mount bolt threads.
I epoxied the finished “T” nut to the aluminum plate, and attached that plate, with string, to the bracket, so it does not get lost.
The final pictures in this series show now the black tripod camera mount plate is fastened to the bottom of my custom bracket.

Digiscoping_400 ----------

Adjusting the camera to line up with the eyepiece
Here, my Samsung galaxy S3 is in the bracket, and I am slowly moving horizontally and vertically with the adjustment screws, to get the lens to line up with the eye focus piece of the scope.

Digiscoping_600 ----------

Earlier digiscoping setup with camera
This was my earlier setup, prior tripod, and digital camera. It worked well, but that tripod was slightly unsteady, and the camera did not have an “ALWAYS-ON” function, but still worked well for pictures and short term use.