

# Producing a Panorama

February 14, 2006 by Dave Herzstein

1. Setup the tripod
  - a. Place your tripod on **solid support**.
  - b. Be sure that there is an unobstructed view to your panorama subject.
  - c. Consider your ability to walk around the tripod to keep out of the scene and to shield the lens from direct sunlight.
  - d. **Level the center post** – it should be perpendicular to the horizon
2. Setup the camera
  - a. Determine the appropriate exposure and then **set the exposure on manual**
  - b. Determine the appropriate focus and then **set the focus on manual**
  - c. Determine the appropriate white balance and then **set white balance manually** (or shoot in RAW mode)
  - d. Mount the camera securely to the tripod and then **level the camera to the horizon**
3. Capture the images
  - a. Determine the beginning and ending points
  - b. Determine how many degrees per image
  - c. Shoot left-to-right
  - d. Shoot rapidly
4. Post-processing – assembling the panorama
  - a. Resize all of the images (*do not overwrite the original files*)
  - b. **Start with the left-most image and increase its canvas-size** to exceed the expected panorama dimensions
    - i. Add 10% to the top *and* bottom
    - ii. Add ample space to the right
    - iii. Save this panorama base image under a new name in your editor's native format (.PSD, .PSP, etc.)
    - iv. Set view magnification such that you can see the most detail (ideally 100% or "actual pixels")
  - c. **Open the next image**
    - i. Set view magnification to match the panorama image
    - ii. Over lap the images
    - iii. **Crop this image at close to half the overlap**
      1. avoid cropping near foreground subjects
    - iv. Adjust brightness to match the panorama base image \*\*
    - v. Copy the cropped image to the clipboard
    - vi. **Paste the cropped image onto the panorama image**
    - vii. **Move the image until its left edge matches the panorama image exactly**
    - viii. If the brightness of this image does not match that of the panorama base image, undo the paste and return to step 4.c.iv (\*\*) above.
    - ix. **Open the next image**
  - d. Final panorama base image
    - i. Change the view such that you can see the whole panorama image
    - ii. **Rotate the image to level the horizon** (typically 0.1°-2.0°)
    - iii. Use the crop tool to **crop the image**
      - e. Save the panorama image in your editor's native format

## Notes

### Equipment:

- A camera capable of manual focus, manual exposure, and manual white balance
- A tripod with adjustable legs
- A tripod with a built-in spirit level (helpful, but not required)
- A tripod head marked with degrees (helpful, but not required)
- A carpenter's level (helpful, but not required)
- A shoe-mount spirit level (helpful, but not required)
- A fast CF card (helpful, but not required)
- A camera shutter-release remote control (helpful, but not required)
- A "macro" slider (helpful, but not required)

### Technique:

- Shoot from left to right (or right to left, depending on what you're accustomed to)
- Place the camera in the vertical orientation (reduces sensor-heat distortion)
- Strive for 50% overlap of successive frames
- Shield the lens from direct sunlight

### Caveats:

- Let the camera "warm-up" or "cool-down" to operating temperature
- Avoid wind (water waves, moving foliage, moving clouds)
- Avoid the sun (lens flare, extreme exposure latitude)
- Don't use a polarizer
- Close foreground subjects require "discovering" and then rotating around the nodal point
- Frequently save your work when editing
- Shoot several "pans" since you've got it all set up
- Be willing to "undo" to correct a mistake