How is the process of capturing billions of Pixel photos?

In order to make a collage with a resolution of up to 1 billion pixels, not only expensive equipment but photographers have to spend a lot of time shooting and post-production.

Recently, the social network is buzzing with Asia's highest-resolution super-giant photo, 195 billion pixels, taking a panoramic view of Shanghai city. In the photo, viewers can view the whole city from a 230m high television tower or also zoom in close-up to see each person's face in the photo.

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Photographer Jeff Cremer, who made a 16.59 billion pixel resolution of the city of Quito, Ecuador, has shared his work history. Please follow us.

Collages from nearly 1,000 single photos

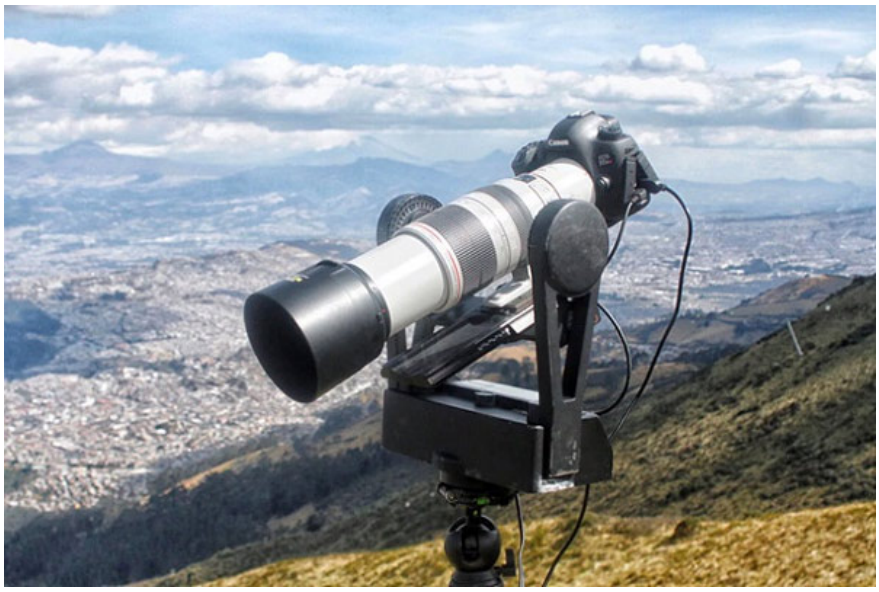
Cremer's super-resolution photo is a photograph of the city of Quito with the highest resolution ever, with a resolution of 16.59 billion pixels. This photo is composed of 960 single images taken in RAW format, taken at 50 megapixel resolution.

If you print this photo out, it is up to 6m long, all details are still extremely clear.

The picture of Jeff Cremer is still detailed in detail when zooming close.(Photo: PetaPixel).

The tool kit used by Cremer to implement this image includes:

1. Canon EOS 5DS R camera, with high resolution, capable of removing low-pass filter makes images sharper.
2. Canon 100-400mm f / 5.6 II Canon lens, compact, suitable in diameter to reduce aberration.
3. GigaPan Epic Pro automatic rotary head unit, applied technology from Carnegie Mellon University and NASA research team. The recorder automatically rotates the camera in frames and captures it at certain intervals when the user finishes selecting the corners of the image.
4. Computer MacBook Pro. The Cremer connects the camera to the MacBook and uses EOS Utility Canons software to save the photos directly to the computer's drive.

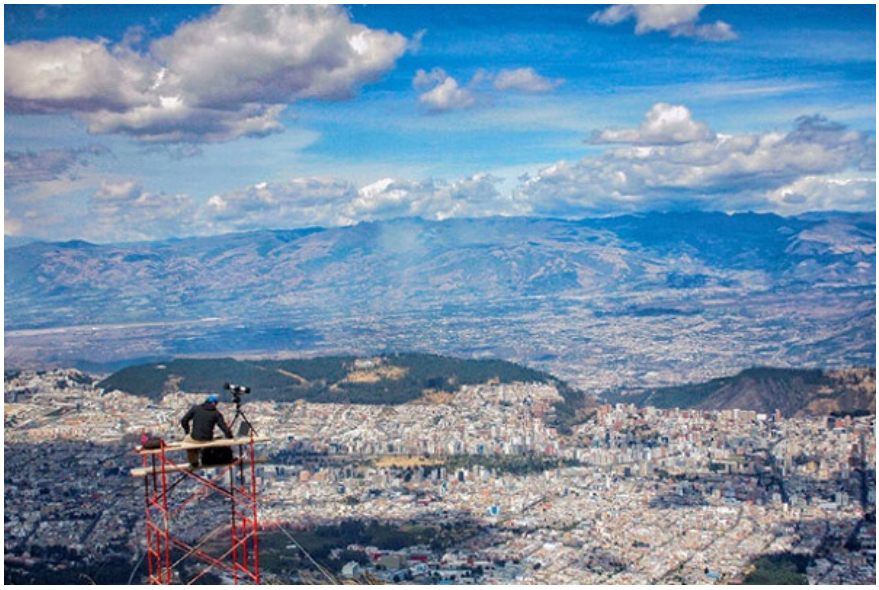


The photographer's toolkit.(Photo: PetaPixel).

Choosing a location is not easy

After a period of searching, Cremer chose a location to capture a panoramic picture that met all requirements including high, wide-angle, easy-to-access furniture. It is a point near the peak of the Pichincha volcano, which is 4,500 meters above sea level. But when he got there, Cremer realized that if taken here, the image would not be detailed enough because it was a bit far from the city. So Cremer had to move all the furniture down to a lower position.

After selecting the location, Cremer has to build a small scaffold to place the capture device to get the widest viewing angle. And to power the swivel and computer, he also had to carry a generator.



Cremer erected scaffolding at the selected location to have the best shooting angle.(Photo: PetaPixel).

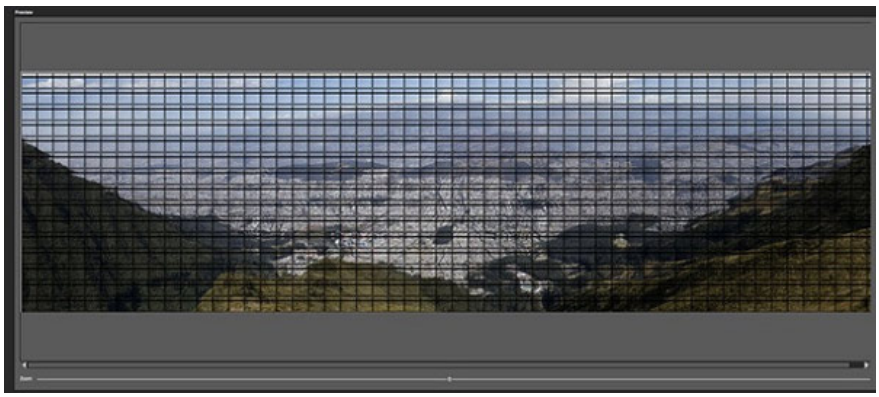
After choosing a good location and a nice day to take a picture, there were still a few factors that affected the picture that day. For example, the smoke in the city comes from a few fires and smoke from the Cotopaxi volcano in the distance. These elements will take a lot of processing time to stitch thousands of photos into a perfect picture.

The editing process lasts

It took Cremer two days to capture 960 photos. On the first day, he chose to take the entire city by the horizon and the volcanoes in the distance covered by clouds. On the second day, when the sky was more airy than he took part in the horizon.

In order to pair the captured images together, Cremer uses software called Autopano Giga, which is capable of combining relevant parts between photos.

However, the Cremer still had to intervene to complete the image, such as correcting compound errors, causing the object in the image to appear twice or missing parts or adjusting the overall light.



The complete photo is cut into more than 174,000 small photos for uploading, to ensure it can be viewed through

the website.(Photo: PetaPixel).
Cremer also notes that storage drives play an extremely important role in image processing, rather than processors and RAM. He had to upgrade a 500 GB SSD drive to a 1 TB drive, which was enough capacity and speed for image processing because the size of the image was too large.

Next, Cremer uses a software to divide the assembled photo into tens of thousands of smaller images, which can be uploaded to the photo viewer page. In order to ensure the fastest download speed for viewers, he has divided his photo into over 174,000 small photos.

This project led Cremer to spend several days completing it. But it is still shorter than the two-month period for the team to make a photo of Shanghai city. In return, the group had a "life" work that helped many people have the opportunity to travel to distant places through photos, with extremely high detail.

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1. Explore the city of London through a timelapse image with resolutions up to 7,300 MP, clearly visible from 8 km away
2. Experience the terrible zoom capabilities of 125x lenses on the Nikon P1000, illuminating the entire Moon if desired