

From: Paul McGill <mcgill@mbari.org>
Subject: **Re: Camera tripod resolution**
Date: January 29, 2014 11:02:19 AM PST
To: Alana Sherman <alana@mbari.org>

No, I haven't figured this out but I suppose I could. I'm even going to document it here so we don't have to figure it out again later.

Of course the answer depends on how far away the object is. Here's all the info we need from my camera calibration work:

H image size = 4368 pixels
V image size = 2912 pixels
H field of view = 48 deg
V field of view = 34 deg
Distances to centerline of image at
 Bottom = 2.3 m
 Center = 4.3 m
 Top = 10.5 m

Now we can calculate:

H angular resolution is $48 \text{ deg} / 4368 \text{ pixels} = 0.011 \text{ deg}$
V angular resolution is $34 \text{ deg} / 2912 \text{ pixels} = 0.012 \text{ deg}$

Let's just use the H angular resolution because they're almost the same. To find the size of an object with that angular size, just multiply the tangent of the angle by the distance from the camera:

Size of object on centerline of image at
 Bottom is $\tan(0.011 \text{ deg}) \times 2.3 \text{ m} = 0.44 \text{ mm}$
 Center is $\tan(0.011 \text{ deg}) \times 4.3 \text{ m} = 0.83 \text{ mm}$
 Top is $\tan(0.011 \text{ deg}) \times 10.5 \text{ m} = 2.0 \text{ mm}$

I'm sure your eyes have glazed over by now and you're skipping to the bottom for the answer. Given the added effects of light scattering in the water and lens distortion, I would say that our resolution is "a couple of millimeters."

Hope that helps,
Paul

On Jan 29, 2014, at 10:29 AM, Alana Sherman wrote:

Hi Paul, Crissy

I think one of you figured this out already but what is the on bottom resolution we can claim with the camera tripod- i.e. the smallest thing we could resolve on the seafloor??

Thanks

Alana

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