

ITK ESD Sample boxes for photos

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HELMHOLTZ

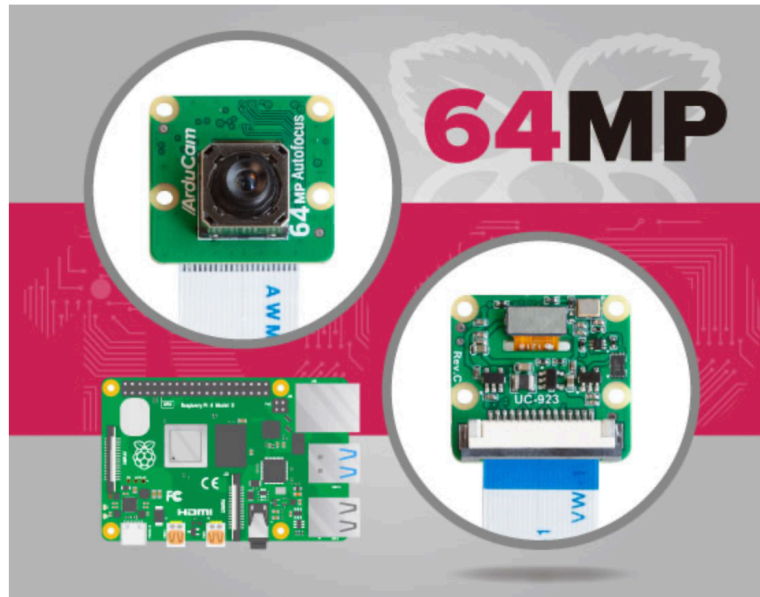
Task: box for sample photographing

Setting up a clean room safe box for petal/sample photography



Dortmund set up

64 MP Raspberry Pi Camera



64 MP Flagship Camera, Now for Flagship Pis.

We set the bar, and then we raised it ourselves. Just like these flagship phones, your Raspberry Pi now has an ultra high-res camera too. And just like them, your Pi can take still images at a breathtaking resolution (9152 x 6944) as well! Pi Hawk-eye is ready to make millions proud.

<https://www.arducam.com/64mp-ultra-high-res-camera-raspberry-pi/>

Field of View Angle of the camera

$$FoV = 2 \times \tan^{-1} \frac{D}{2F}$$

FoV (Field of View): The extent of the scene captured by the camera in angle

D: Image sensor diagonal

F: The focal length of the camera lens

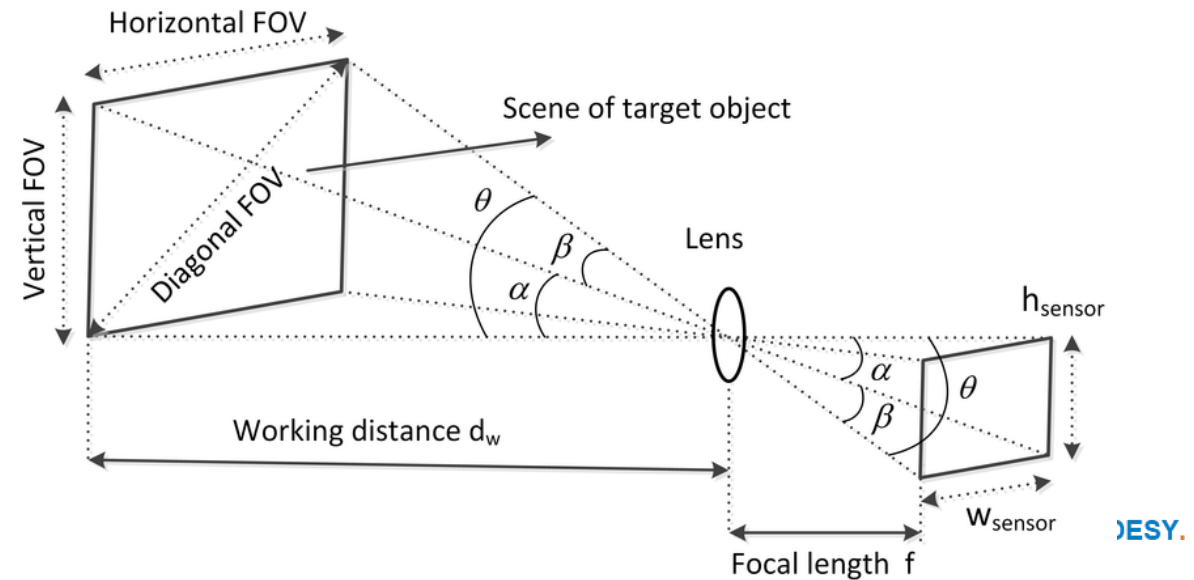
64MP Camera:

Focal length: 5.1mm

Diagonal: 9.25 mm

FoV Diagonal: 84.4 deg

From Specs: 72deg (H) x 54.4 deg(V)



Box dimension:

Minimal base size of the box is determined by the largest object size:

Largest sample area:

26 x 17 cm

Minimal height of the box

> Largest object Diagonally: 31.06 cm ; FOV=84.4 deg; max thickness =1cm

Diagonal H=35.2cm

$$H - thickness = \frac{D}{\tan(\frac{FOV}{2})}$$

Largest object vertically: 26cm ; FOV 72 deg; max thickness=1cm

Vertical H=37 cm

Largest object vertically: 17cm ; FOV 54.4 deg; max thickness=1cm


Horizontal = 34 cm

Therefore, we are restricted by the vertical dimension of the object, to capture the entire object, the minimum height we need is **37cm**.

Min box dimension

37 x 26 x 17 cm

Height 40 cm boxes

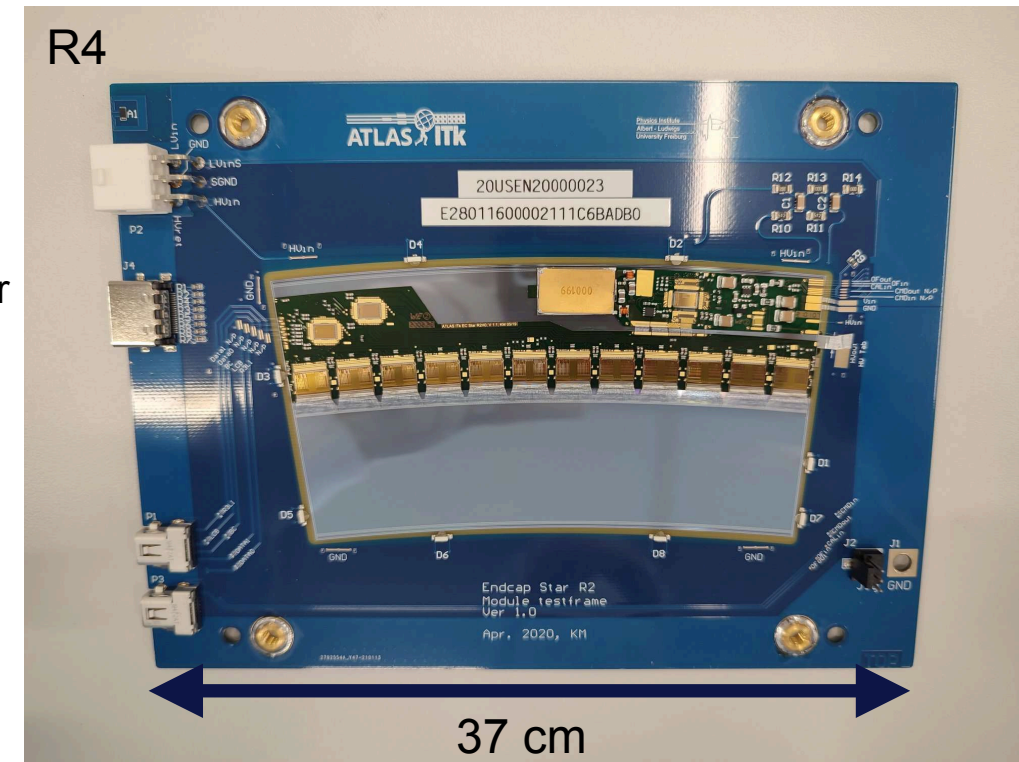
 We care about the **inner dimension** of the box, the minimum box size that would fit is a box of an outer dimension of 40x 30 x23.5.

Company	Dimension(cm)	Inner dimension(cm)	Price	With tax
Auer 1	40 x 30 x 23.5	37 x 27 x 19,7		22.45
Auer 2	40 x 30 x 28.5	37 x 27 x 24,7		23.98
Auer 3	40 x 30 x 33.5	37 x 27 x 29,7		25.62
Rieger 1	40 x 30 x 23.5	37 x 27 x 19,7	18.18	21.63
Rieger 2	40 x 30 x 28,5	37 x 27 x 24,7	19.35	23.02
Rieger 3	40 x 30 x 33,5	37 x 27 x 29,7	20.63	24.54

Auer Rieger

Summary

- The recommended dimension is 40 x 30 x 23.5 cm
- Entry of object into the box: Quite a loose fit
- Height of the box determine the "field of vision": quite a tight fit for our largest object. (37cm required height vs 37 inner dimension of box)
 - We may not be able to see the whole vertical length of our largest sample. But it doesn't seem like we care to see the whole length of R4.
- Since the next size is 60 cm in height, it may be an overkill. (See back up for dimensions)
- If we aren't pressed for time, it is best if we do the measurement with a clamp and the camera before purchasing. Would allow for taking the actual field of vision/camera thickness into account.
- Camera has arrived, we are waiting for the Raspberry Pi.



Back up

ESD boxes 60cm in height

Company	Dimension(cm)	Price	With tax
Auer 1	60x40x23.5	35E	
Auer 2	60x40x23.5	35E	
Auer 3	60x40x 43.5	45.27 E	
Auer 4	40x 30 x 23.5	21.63 E	
Rieger	60 x 40 x 23,5	25.67 E	30.7 E
Rieger	60 x 40 x 28,5	28.55 E	33.7 E
Rieger	60 x 40 x 33.5	29.41 E	34.7 E