	Class	Date of observation	Place of observation	Responsible for the expertise
	A	2004.06.12	Mount Olympus, Pieria Prefecture, Greece	Kalytyuk I.

Stavros Hatzopoulos: Good Morning to all
it arrived to my hands a photo taken in the vicinity of mount Olympus, showing a series of strange objects (shown in RED circles). The photo was taken on 12-06-2004 with a Digital camera. The photographer DID NOT SEE any of the objects, he was just taking photos of the landscape. Regarding the location (the witness had stopped a little bit before reaching it): The Monastery of Agios Dionysios in Olympus is a Greek Orthodox monastery on the slopes of Mount Olympus, the most important monastery in the Pieria Prefecture. It is located at the Enipeas ravine at an altitude of 850 m (40.094°N 22.429°E).

Any suggestions on the possible origin of the objects, from the experts in the Group ?

Warm Regards
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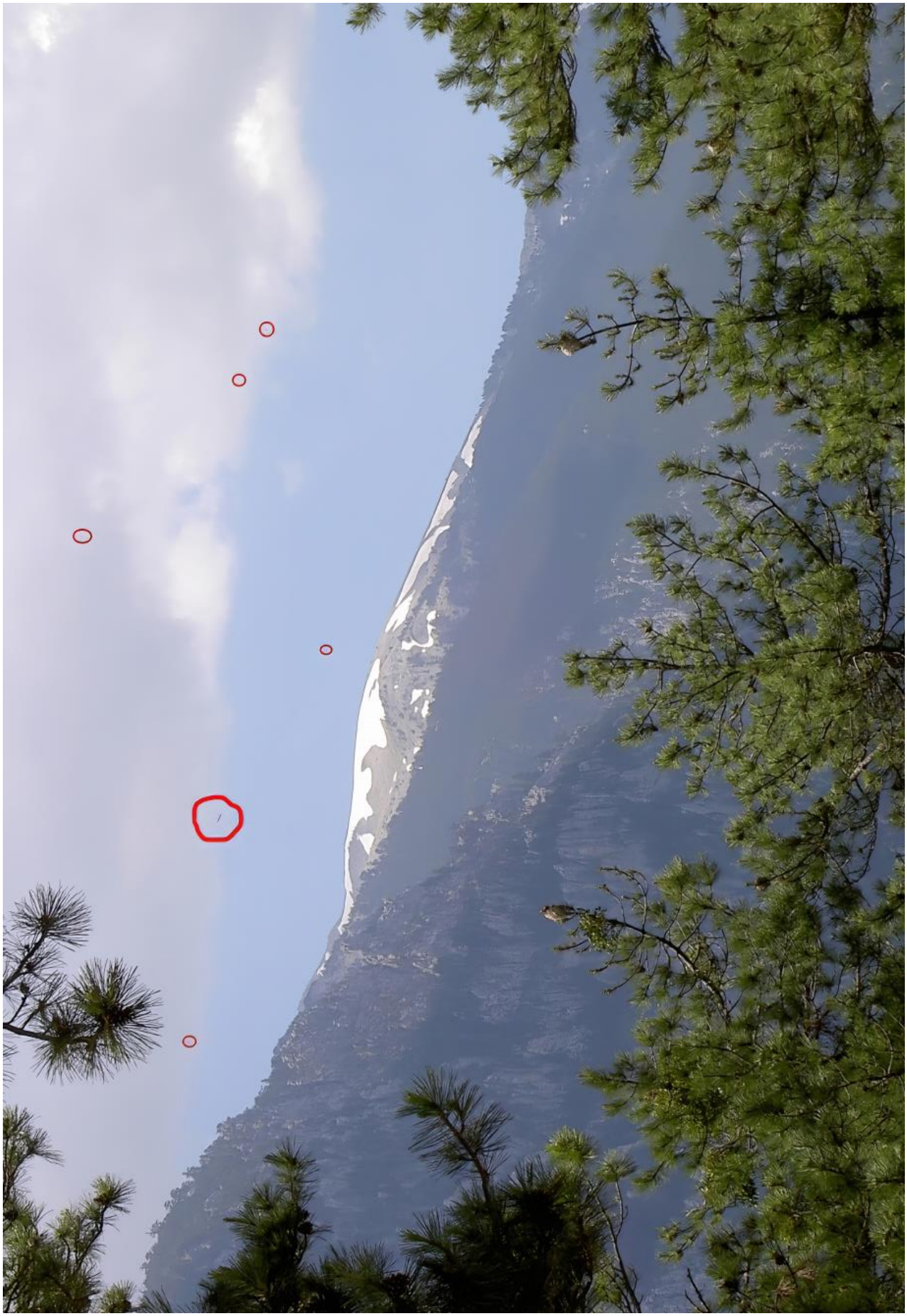
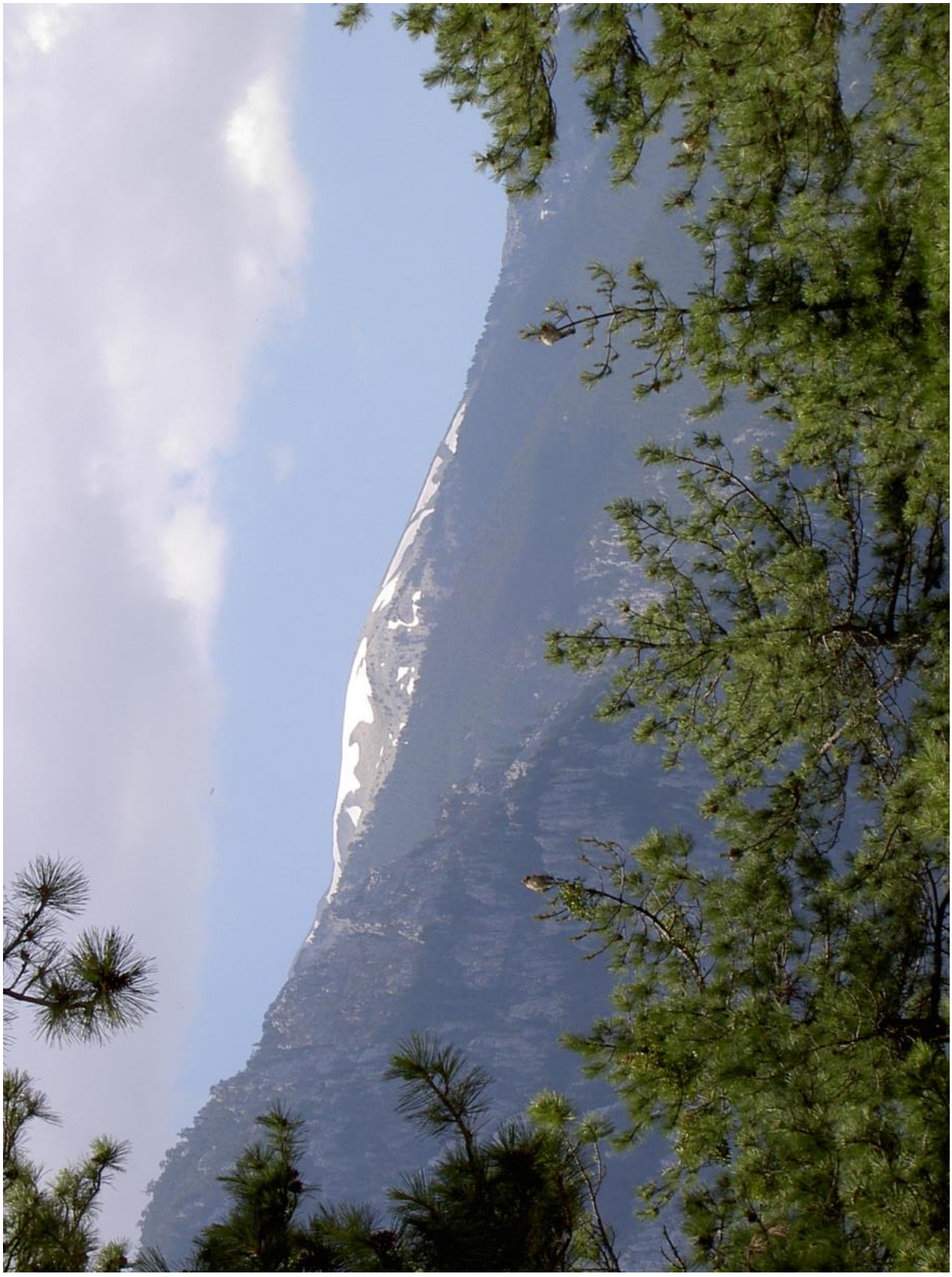
Otoacoustic Emissions Portal
http://www.otoemissions.org

EXIF data:

Filename - 01.JPG Make - Konica Corporation Model - Konica Digital Camera KD-310Z Orientation - Top left XResolution - 72 YResolution - 72 ResolutionUnit - Inch YCbCrPositioning - Centered Exif-IFD-Offset - 110 ExposureTime - 1/263.2 seconds FNumber - 8.30 ISOSpeedRatings - 100 ExifVersion - 0220 DateTimeOriginal - 2004:06:12 12:08:02 DateTimeDigitized - 2004:06:12 12:08:02 ComponentsConfiguration - YCbCr CompressedBitsPerPixel - 3.10 (bits/pixel) BrightnessValue - 9.20 ExposureBiasValue - 0.00 MaxApertureValue - F 2.83 MeteringMode - Center weighted average LightSource - Auto Flash - Flash not fired, compulsory flash mode FocalLength - 24.00 mm MakerNote-IFD-Offset - 782 FlashPixVersion - 0100 ColorSpace - sRGB ExifImageWidth - 2048 ExifImageHeight - 1536 InteroperabilityOffset - 500 CustomRendered - Normal process ExposureMode - Auto White Balance - Auto	DigitalZoomRatio - 0.00 x FocalLengthIn35mmFilm - 116 mm SceneCaptureType - Standard GainControl - None Contrast - Normal Saturation - Normal Sharpness - Normal SubjectDistanceRange - Unknown Maker Note (Vendor): - Thumbnail: - Compression - 6 (JPG) Orientation - Top left XResolution - 72 YResolution - 72 ResolutionUnit - Inch JpegIFOffset - 3764 JpegIFByteCount - 4769



Olympos!_134021.jpg



01.JPG

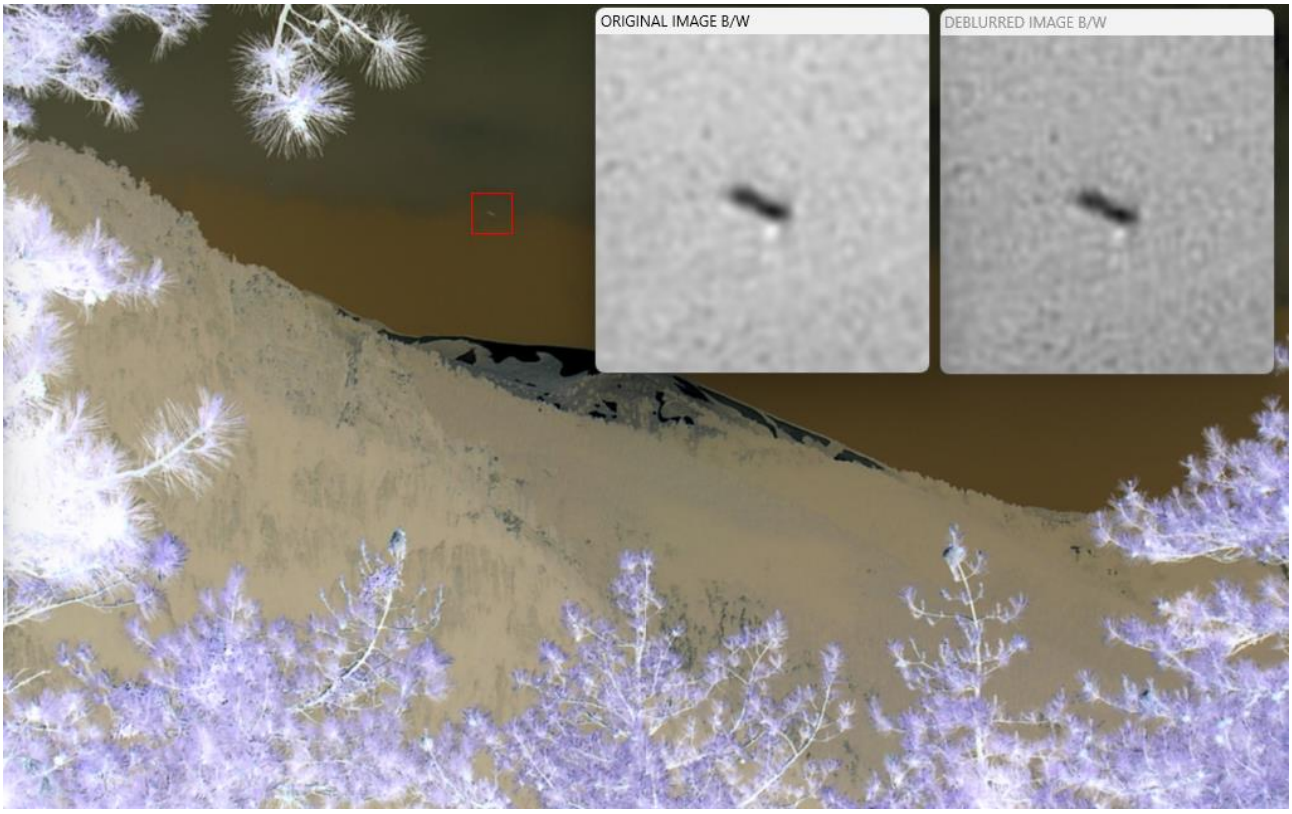


Fig.1 Inverse radiometry and photo motion deblurring B/W

Igor Kalytyuk: Dear Stavros, in this photo we are dealing with an out-of-focus insect.
Focus – is the point at which parallel rays intersect after passing through a collecting or diffusing system.
There are front and back foci (planes).

Fig.2 Focus

Fig.3 Out-of-focus insect

You can estimate the speed of an object by the blurriness of its boundaries.

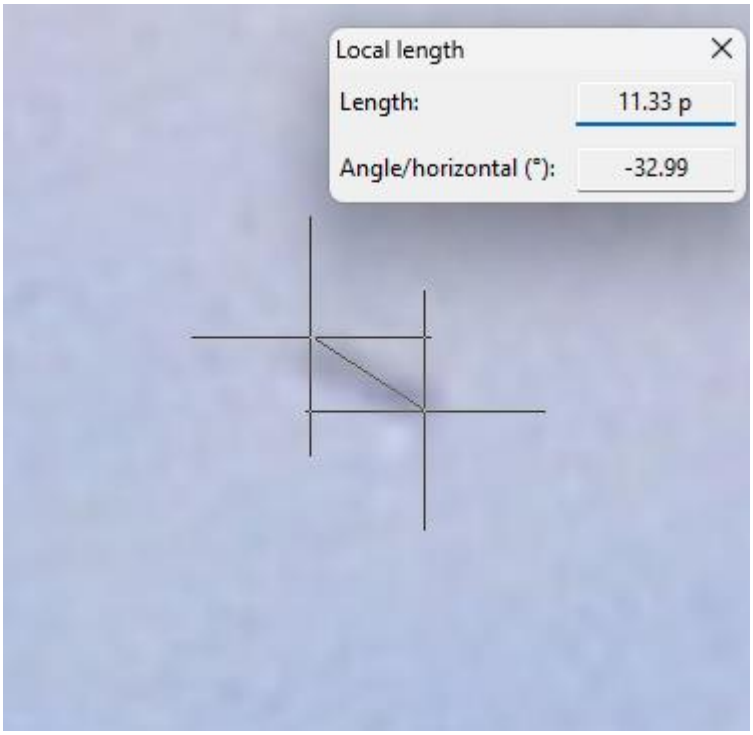


Fig.4 Local length

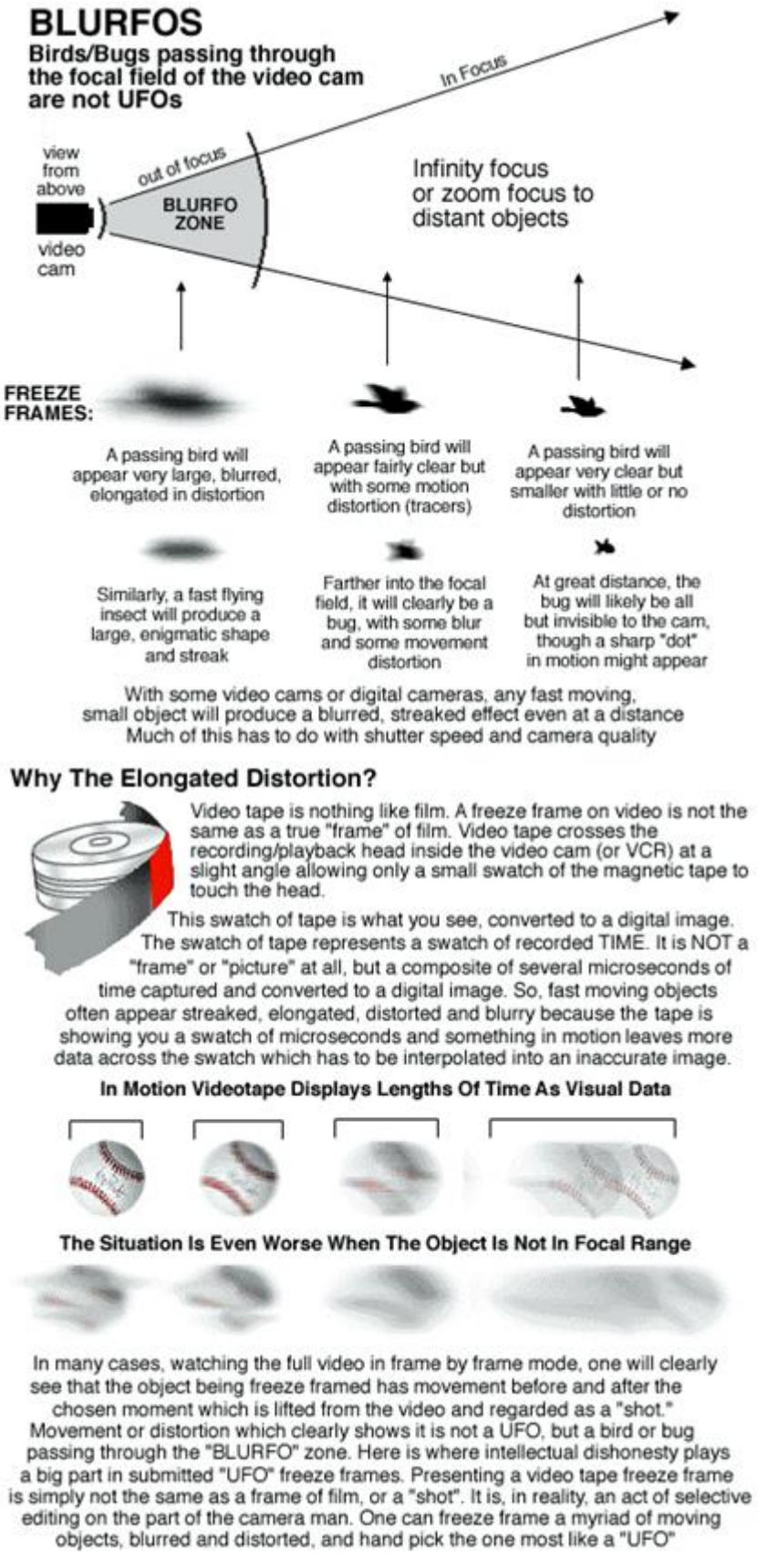


Fig.5 Bugs passing through the focal field of the camera

Key Parameters from the EXIF Data

- Exposure Time (T): 1/263.2 seconds ≈0.0038 s.
- Blur Length: 11.33 pixels.
- Equivalent Focal Length: 116 mm (in 35mm film).
- Image Width: 2048 pixels.
- Distance to the Object (R): This parameter is listed as 'Unknown' in the EXIF data, which means we'll have to assume a value to get a specific speed.

The Calculation Process:

1.Calculate the Field of View (FOV)

The FOV can be determined from the equivalent focal length. The standard width of a 35mm film frame is 36 mm.

- $FOV = 2 \times \arctan\left(\frac{\text{35mm frame width}}{2 \times \text{equivalent focal length}}\right)$
- $FOV = 2 \times \arctan\left(\frac{36\text{ mm}}{2 \times 116\text{ mm}}\right) \approx 0.309$ radians, or $\approx 17.7^\circ$.

2.Calculate the Angular Displacement (θ)

The object's angular displacement is the fraction of the total FOV that the blur occupies.

- $\theta = FOV \times \frac{\text{blur length in pixels}}{\text{image width in pixels}}$
- $\theta = 0.309\text{ rad} \times \frac{11.33\text{ px}}{2048\text{ px}} \approx 0.00171$ radians.
    - This is approximately 0.098°.

3.Calculate the Linear Speed (V)

Since the distance to the object is unknown, we can express the speed as a function of that distance. For small angles, we can use the approximation V≈R×θ/T.

- $V = \frac{R \times 0.00171\text{ rad}}{0.0038\text{ s}} \approx R \times 0.45\frac{\text{m/s}}{\text{m}}$

This means the object's speed is 0.45 m/s for every meter of distance it was from the camera.

Conclusion

To get a specific speed, you need to plug in a reasonable estimate for the object's distance.

- For example, if the object was 10 meters away, its speed was approximately: V=10 m×0.45≈4.5 m/s, or about 16.2 km/h.
- If the distance was 50 meters, the speed would have been: V=50 m×0.45≈22.5 m/s, or about 81 km/h.

Igor Kalytyuk
Ukraine