

Multi-Objective Tracking Applied to Bat Populations

(Rastreamento Multi-Objetivo Aplicado a Populações de Morcegos)

Symposium on Virtual and Augmented Reality – SVR 2016

Eduardo Rodrigues, João Marcelo Teixeira, Veronica Teichrieb, Enrico Bernard



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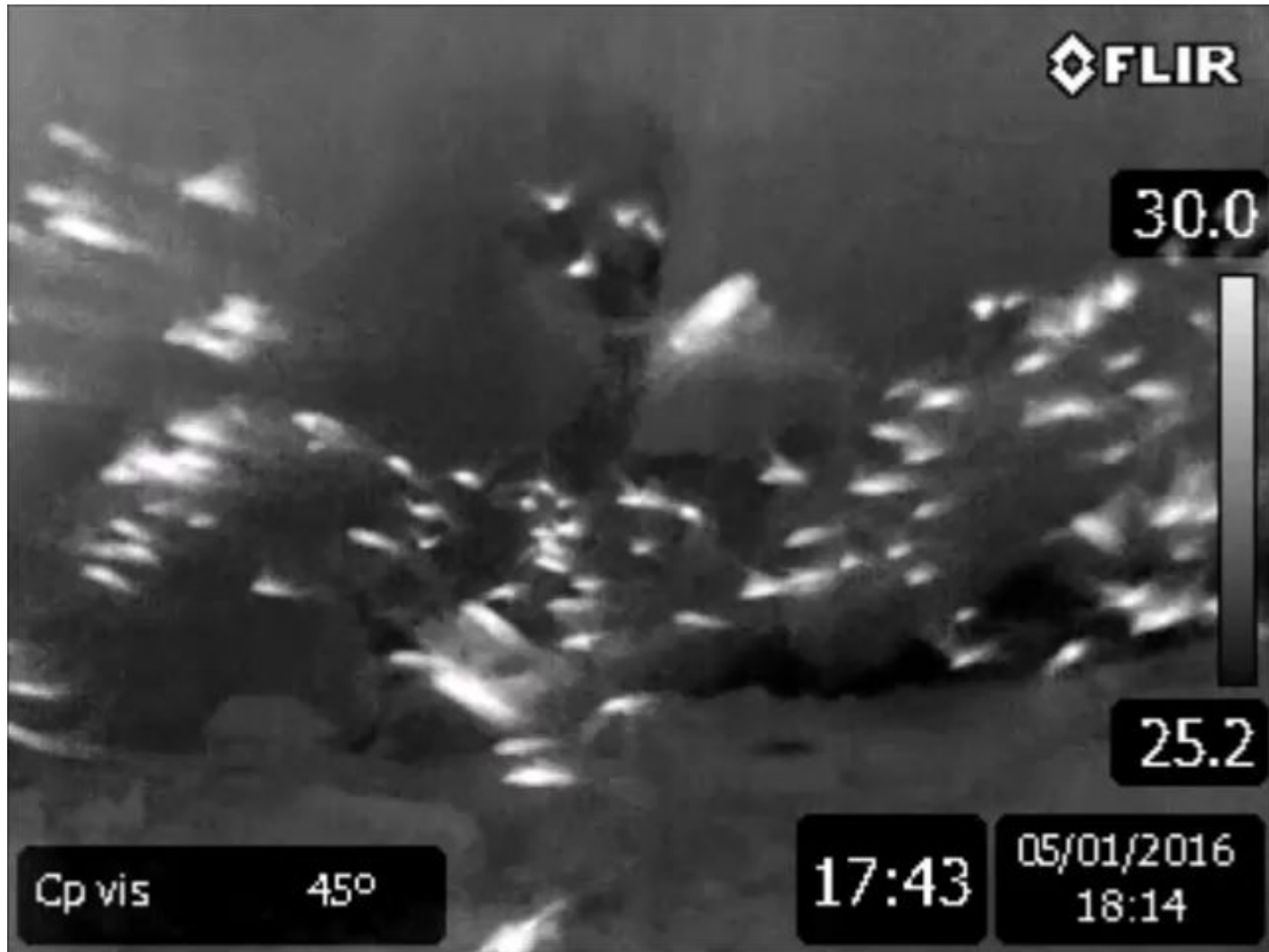


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Populations are biological indicators



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Automated Tool for Tracking Multiples Targets

- **Video capture**
 - Thermal camera
- **System development**
 - Segmentation
 - Validation
 - Association
 - Update and estimation

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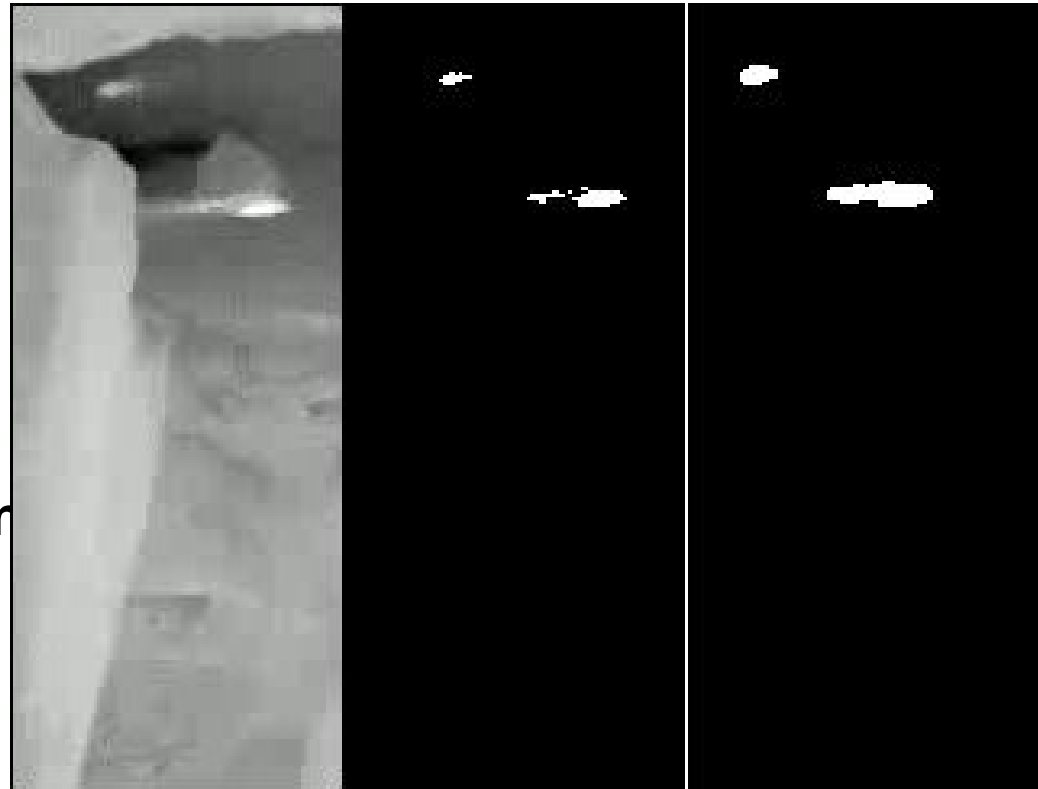
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Final System



LL: 2 LR: 1 LU: 0 LD: 0 LDS: 0
RL: 3 RR: 0 RU: 0 RD: 0 RDS: 0
UL: 0 UR: 0 UU: 0 UD: 0 UDS: 0
DL: 0 DR: 0 DU: 0 DD: 0 DDS: 0
DSL: 0 DSR: 0 DSU: 0 DSD: 0 DSDS: 0
Total de morcegos detectados na tela (Total - desaparecidos) = 6
Total Saindo (Left -> Right) = 1
Total Entrando (Right -> Left) = 3
Porcentagem Execucao: 25
Total Detectado: 6

Results



Video1



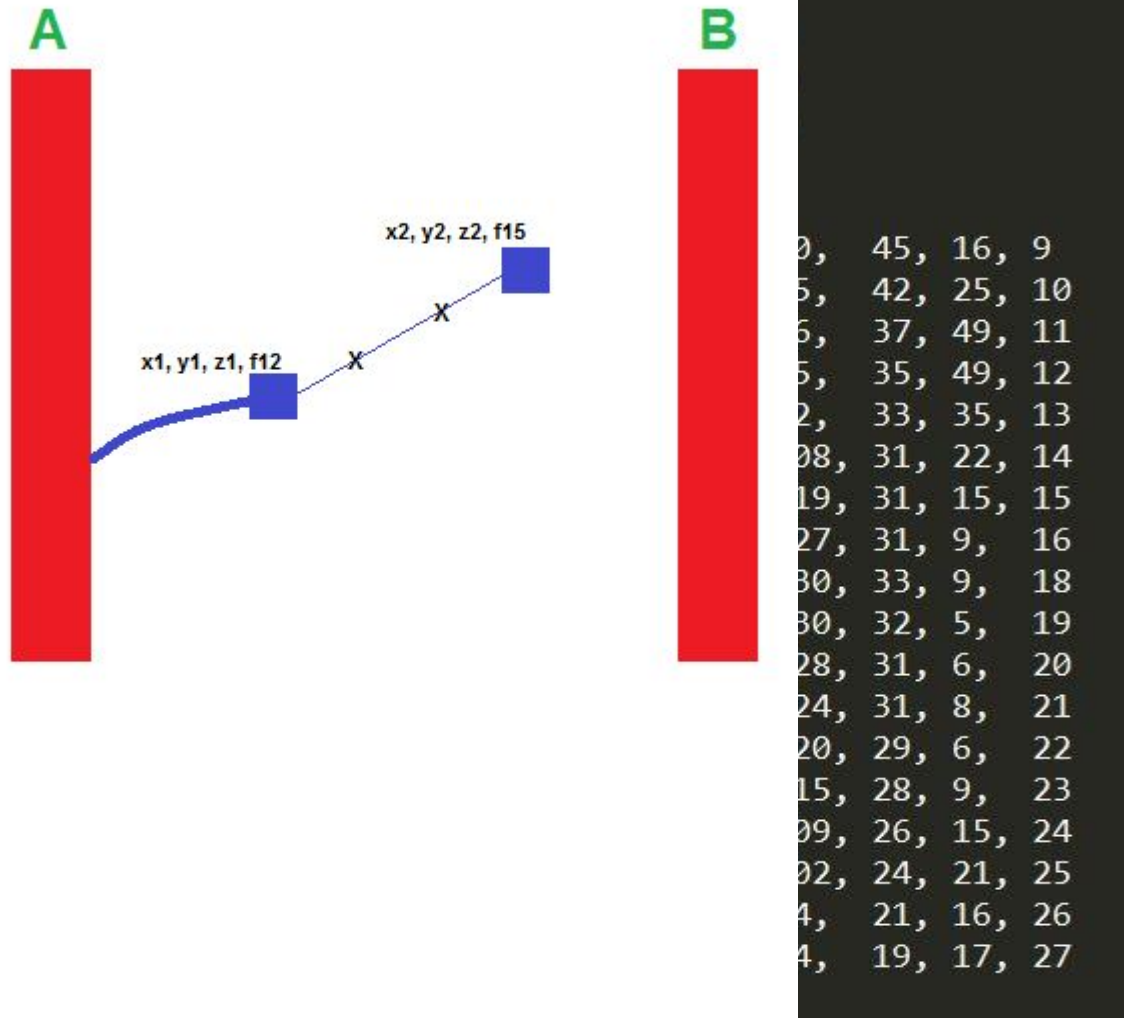
Video2



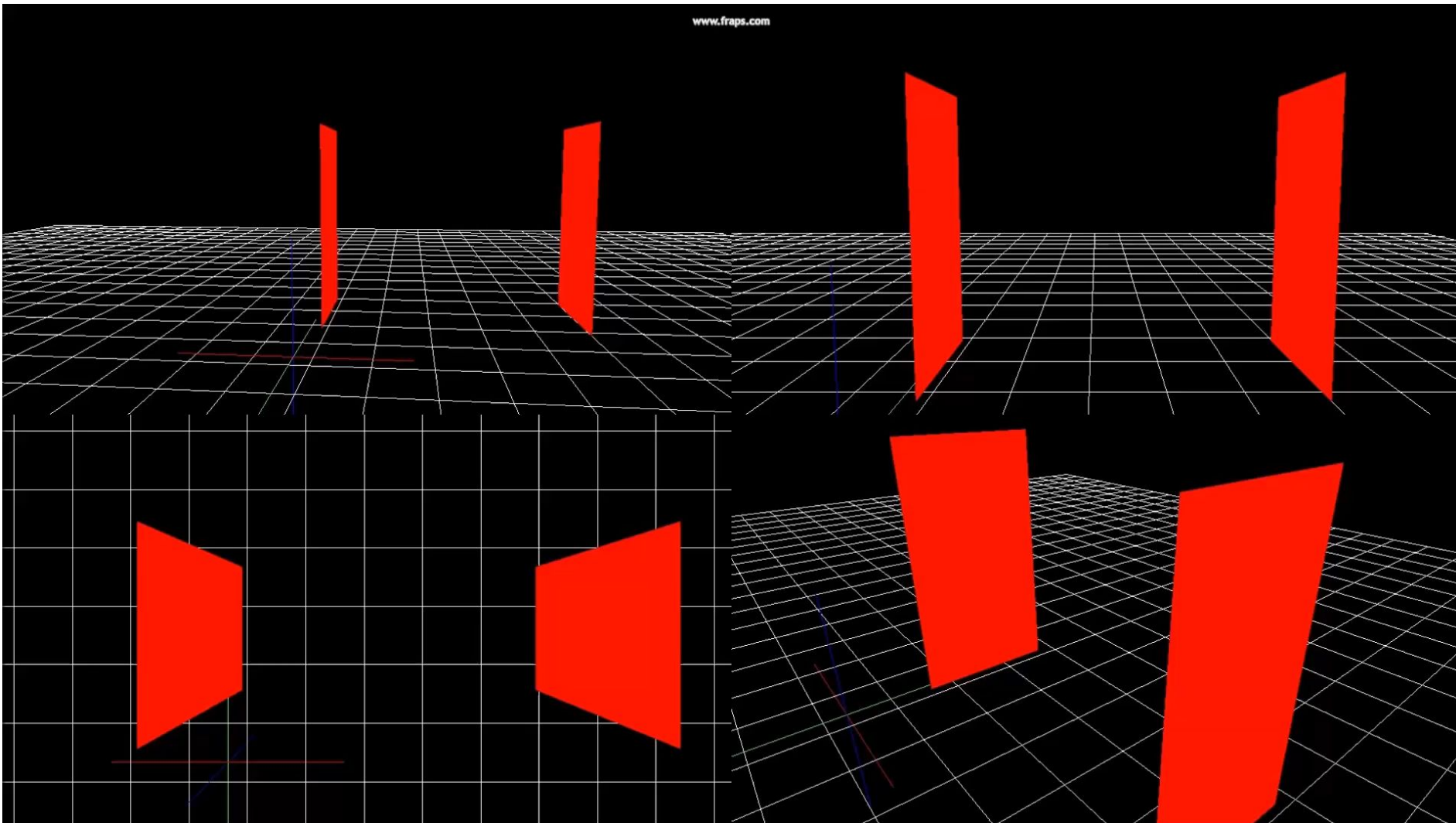
Video3

	Duration	Manual Count	Automatic Count	Error %	Error #
Video 1	60s	25	24	4%	1
Video 2	60s	144	136	5.56%	8
Video 3	60s	487	475	2.47%	12
Total	180s	656	635	3.21%	21

3D Viewer



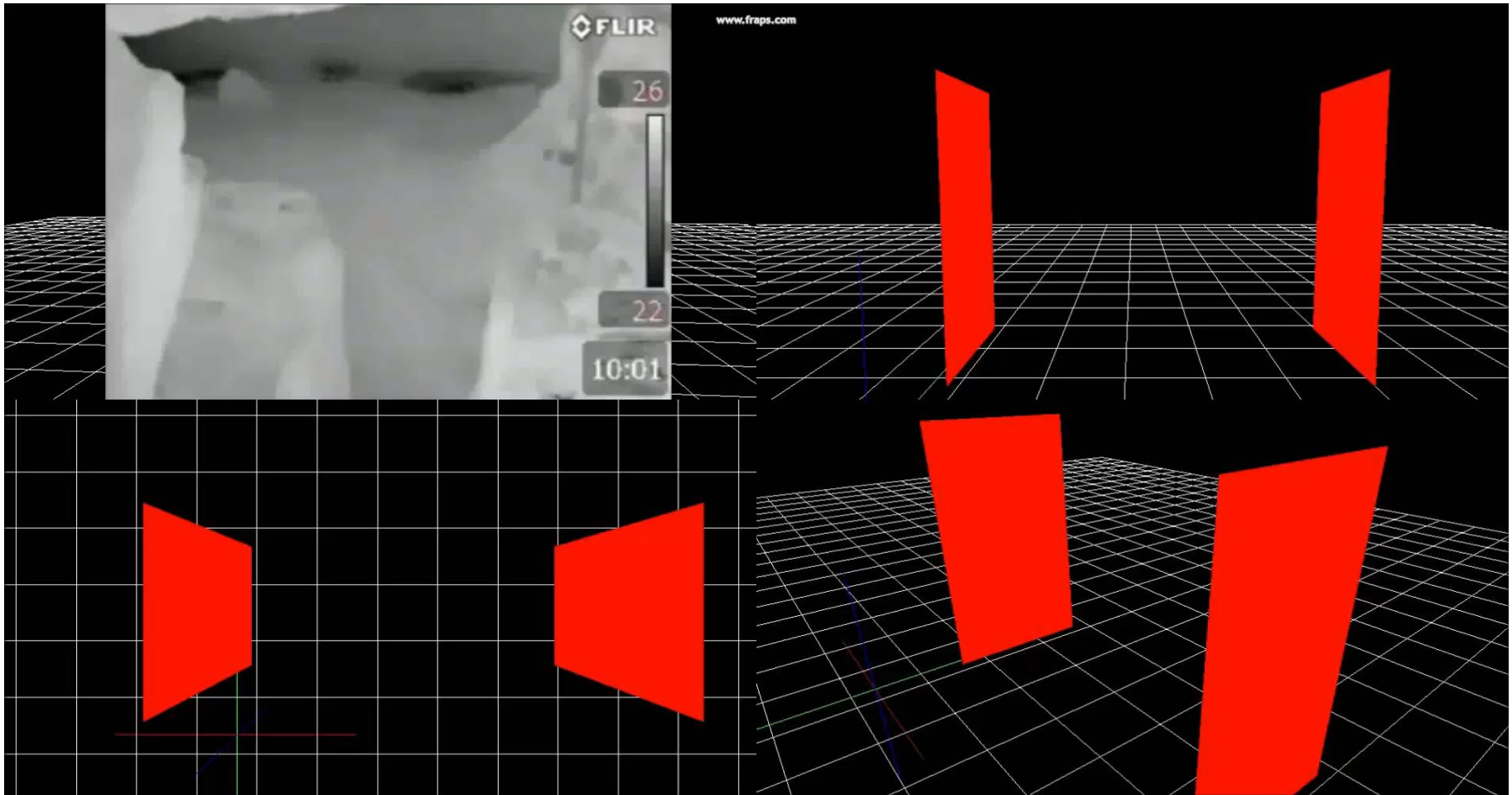
3D Viewer



Conclusion and Future Work

- **Despite the limitations, good results have been achieved**
- **Better politics for the conservation of caves**
- **Collaborative system**
- **Define validation metrics**
- **Validate the system in different caves**

Questions?



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