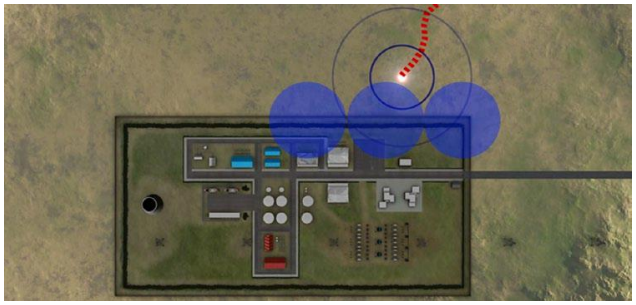


Figure 1. Example of a critical infrastructure.

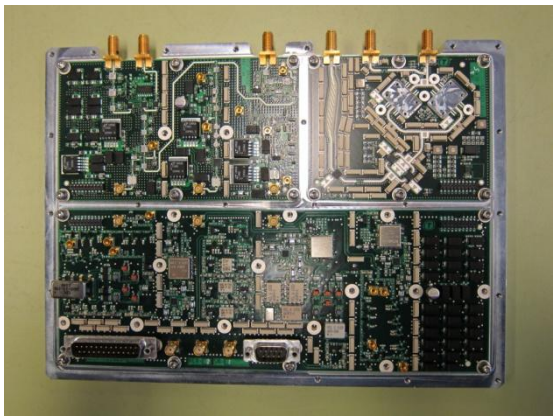


Figure 2 Transceiver Module electronic circuitry

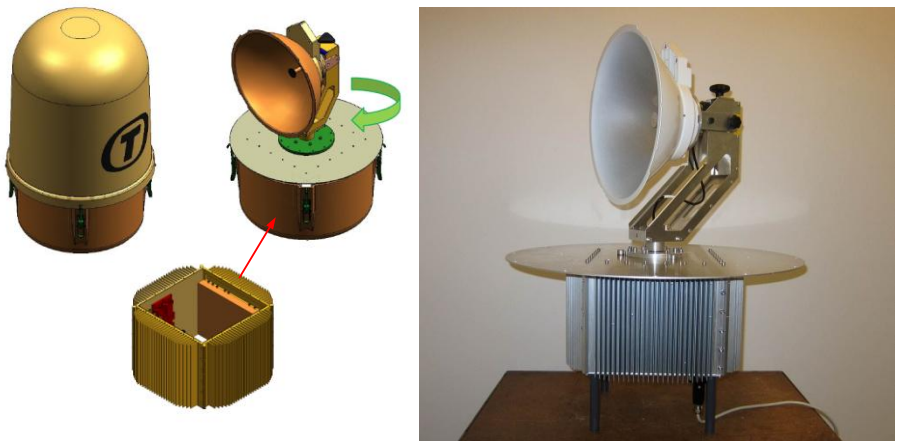
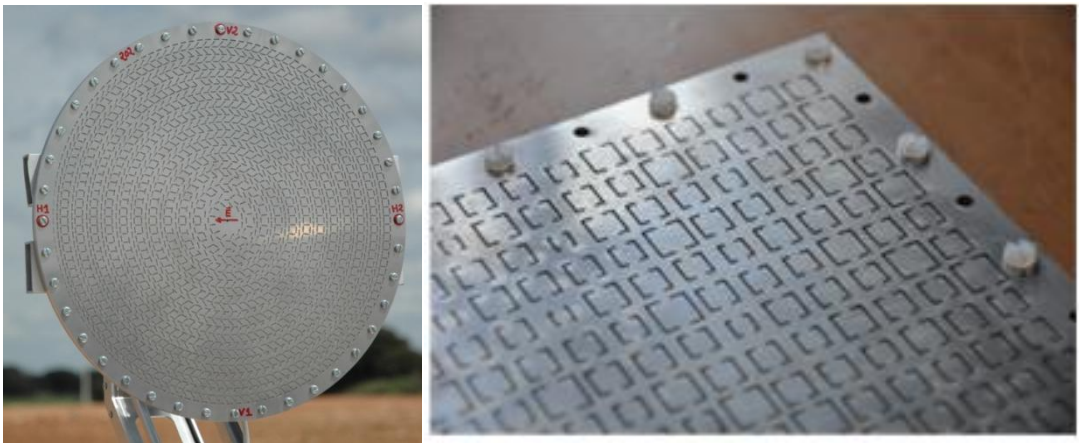


Figure 3 New mechanical unit.



(a) (b)

Figure 4 The antenna LPRLSA prototype (a) and reflectarray prototype with cosecant square pattern (b)

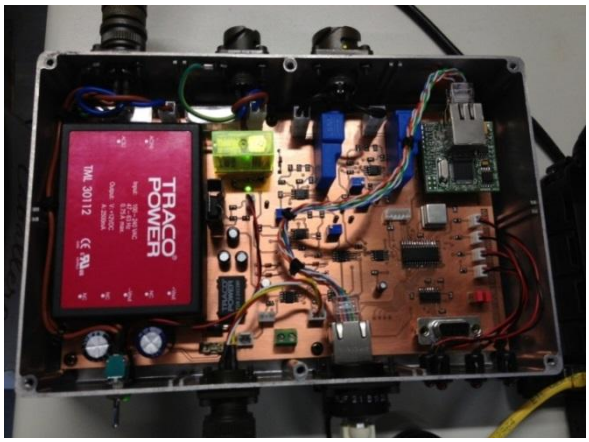


Figure 5. Supervision Board, with detail inside.

Figure 6. Detail of the LADAR telemeter position, elevated, during the initial trials.

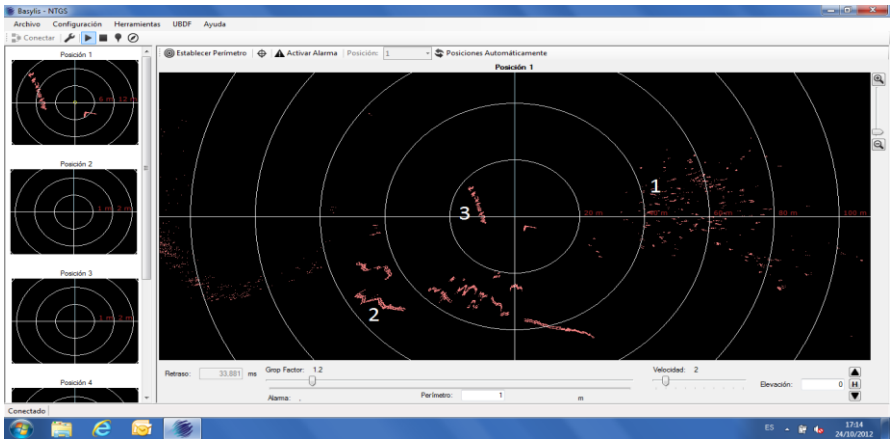


Figure 5. Shot of Ladar software details: group factor, velocity, elevation, etc.

Figure 6. UGS

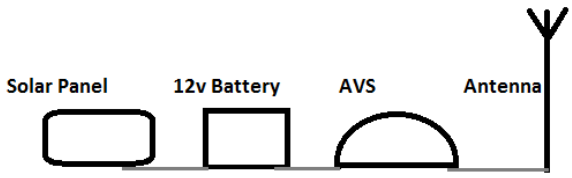


Figure 7. The block diagram of a UGS and extra equipment

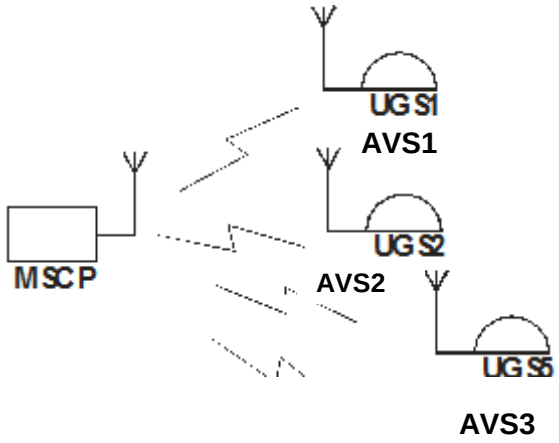


Figure 8. Mainstation communication software interface

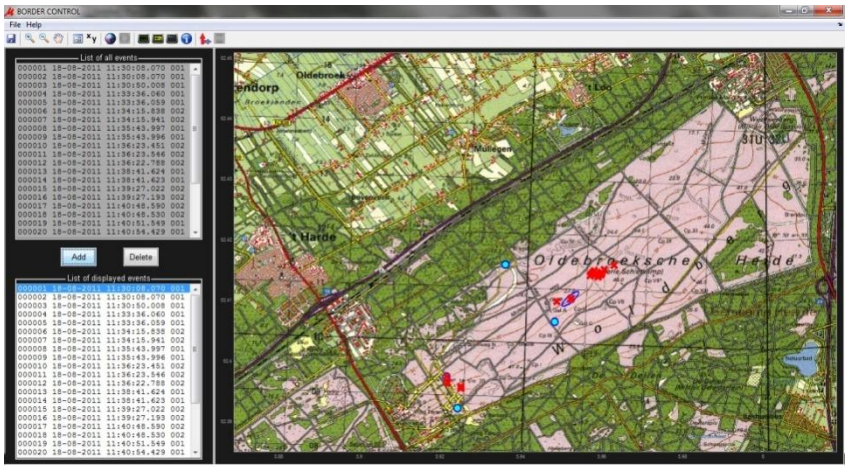


Figure 9. Localizations by the Acoustic Vector Sensors during a trial where two shots are tired at each shooting position.

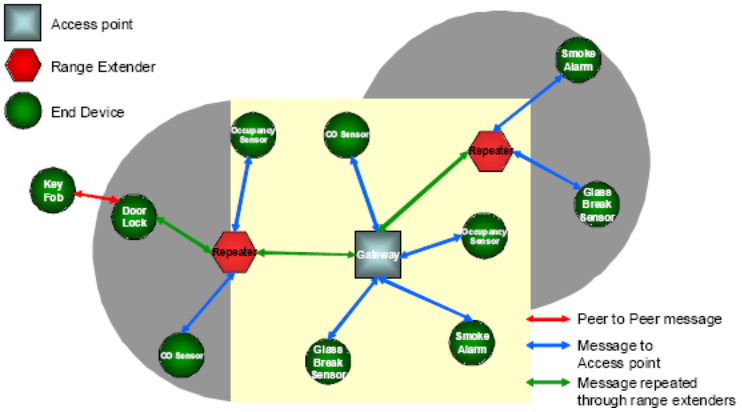


Figure 10. Bracelet and GPS Unit.

Figure 11. Panic Buttons

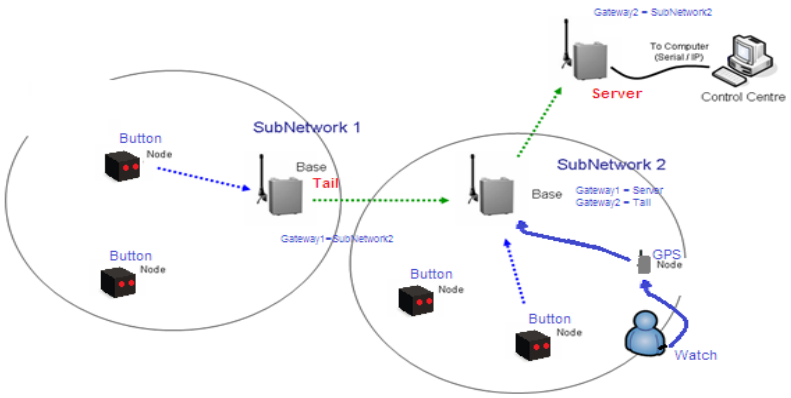


Figure 12. Communications network for personal security devices

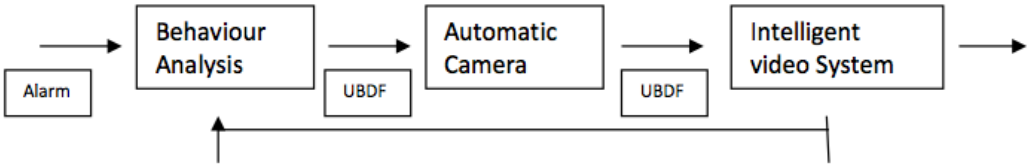
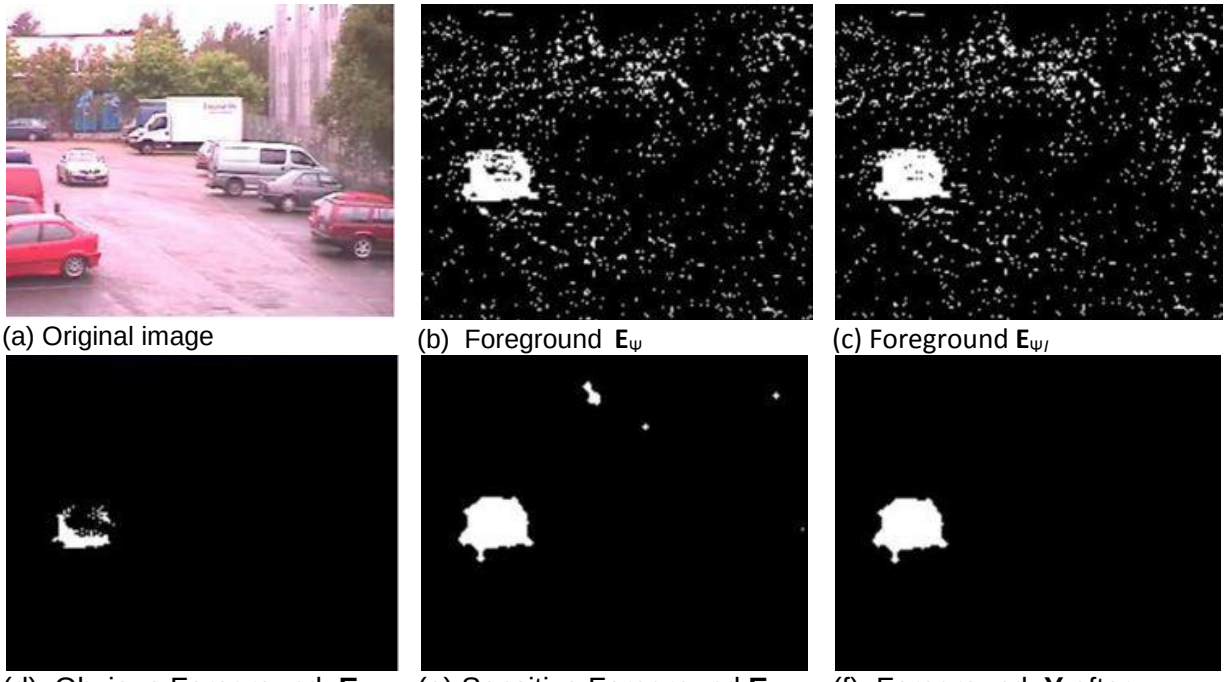


Figure 13. Module structure for target verification



(a) Original image (b) Foreground $\mathbf{E}_{\psi}$ (c) Foreground $\mathbf{E}_{\psi l}$

(d) Obvious Foreground $\mathbf{E}_{V}$ (e) Sensitive Foreground $\mathbf{E}_{H}$ (f) Foreground **Y** after reconstruction

Figure 14. Phases of the TR Motion Detection Algorithm

Human dataset:

(A)	Car	Human	Other
Car	1323	0	79
Human	0	2586	230

(B)	Human	Other
Human	2586	230
Other	225	69775

(C)	Car	Other
Car	1321	81
Other	1100	68900

Figure 15. Confusion matrixes for Car and Human detection

Figure 16. Car and Human detection and classification results displayed on Mirasys Spotter User Interface using the BASYLIS plug-in module

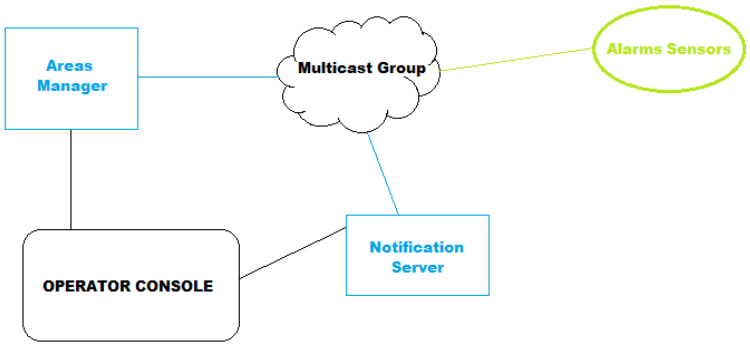


Figure 17. Systems global design

Figure 18. Operator´s console

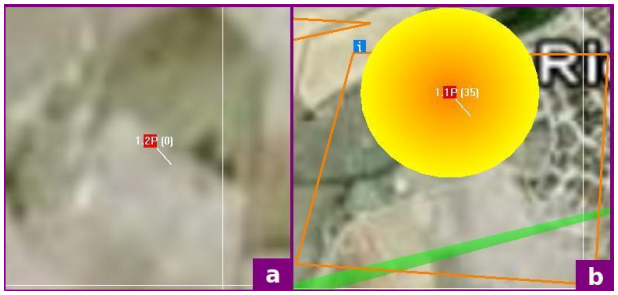


Figure 19. a) track and b) intrusion in an alarm area.

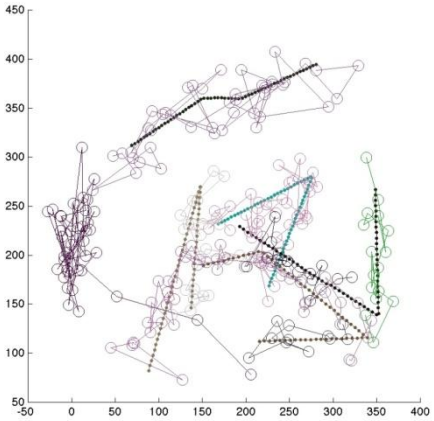


Figure 20: Example output of the simulator. The ground truth tracks are the solid lines. The circles denote radar reports, which are corrupted by noise and track breakages. Different colours indicate different track IDs.

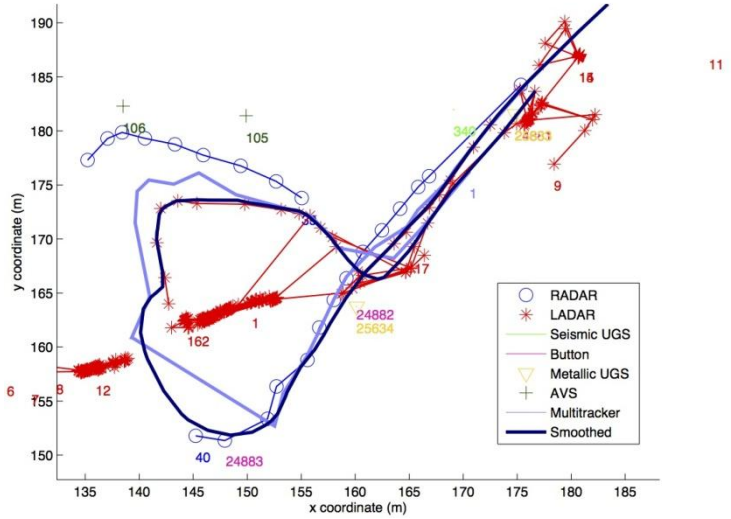


Figure 21: The fused trajectory from Trial 1.1. The diagram shows the raw sensor returns together with the filtered and smoothed estimate. The single entity track combines the different sensors together. This provides fuller coverage over the full sensing region, and annotates the tracks with additional information such as the gunshots.

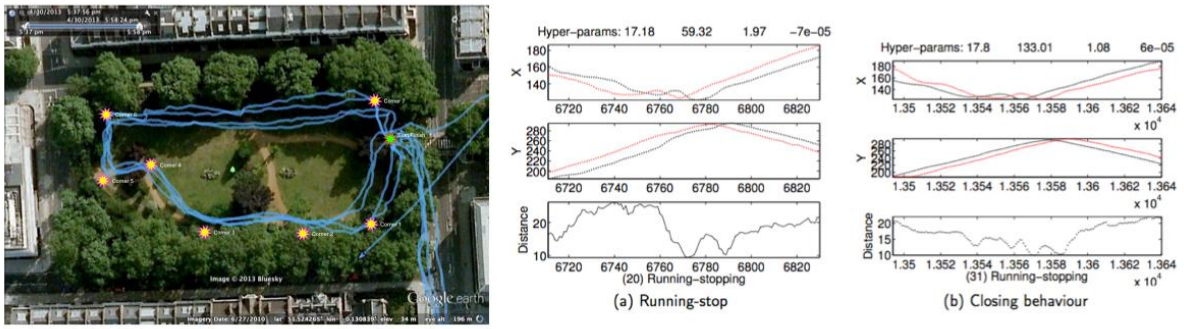


Figure 22: The second experimenal trial, and figures of the running-stop and closing behaviours.

Figure 23. Enagas facilites

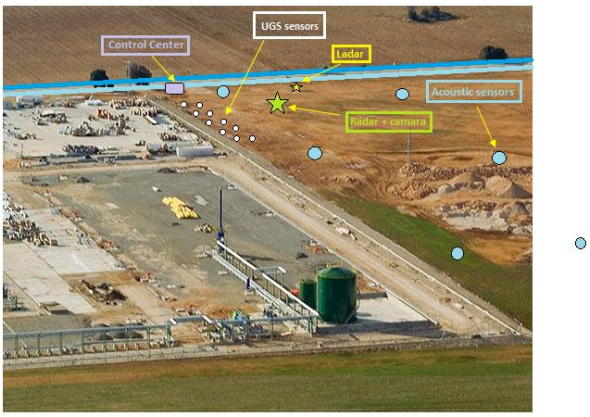


Figure 24. Location of the sensors in the October trials.

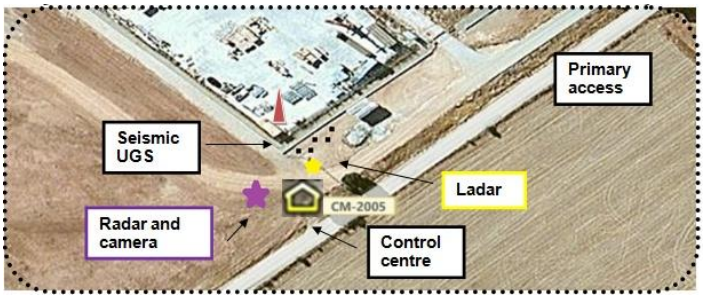


Figure 25. Sensor Location

Figure 26. Trials performed

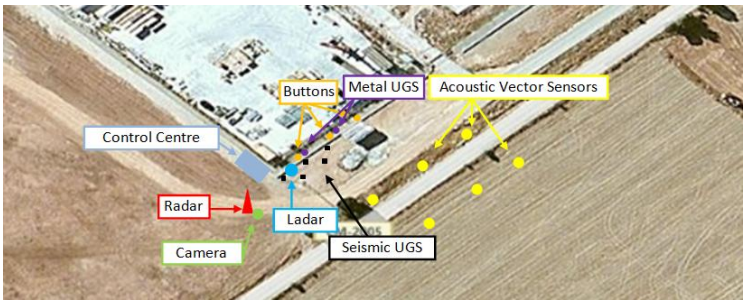
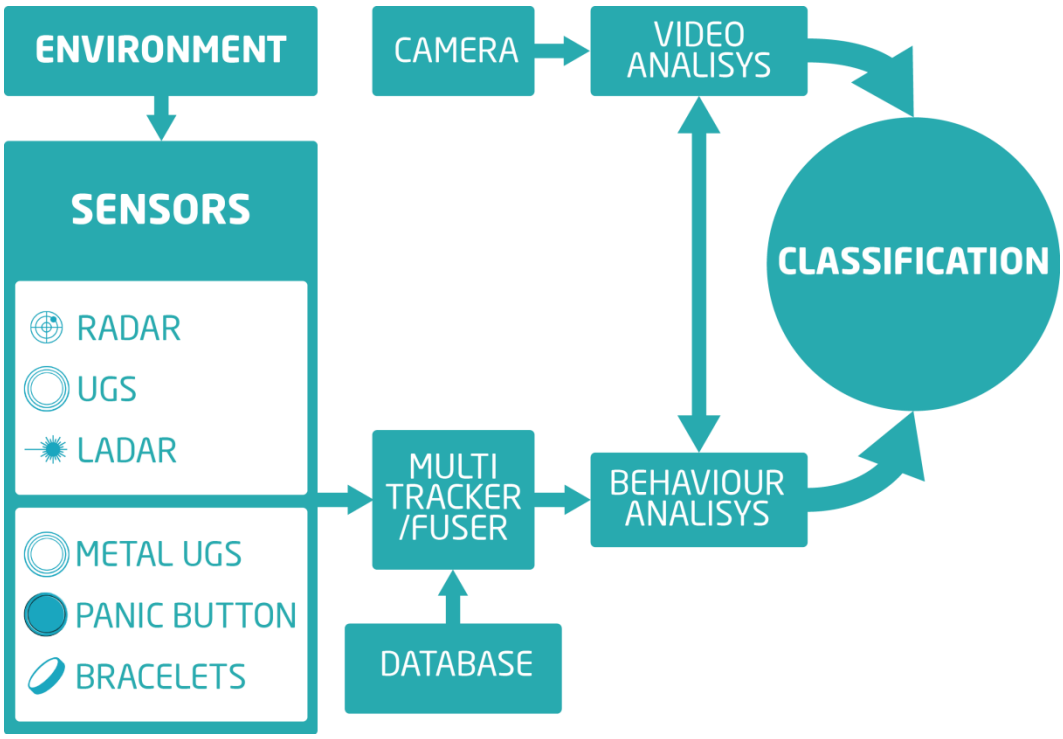


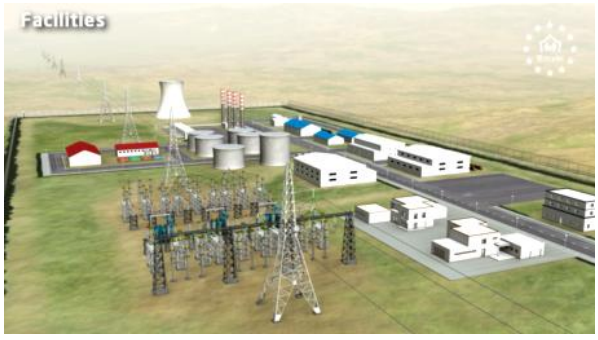
Figure 27. Sensors location

Basylis



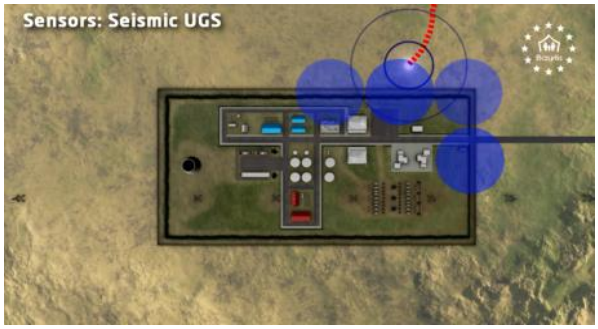
Basylis

mobile, Autonomous and affordable System
to increase security in Large unpredictable environments BASYLIS

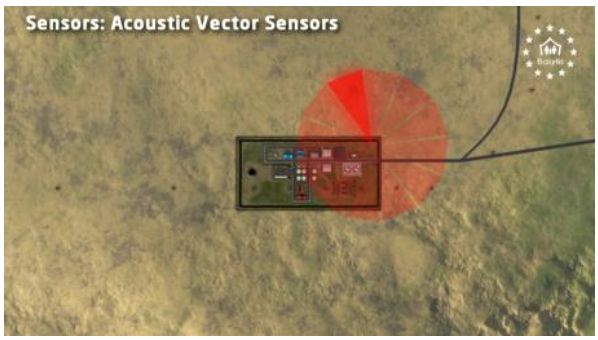



Sensors: Radar
Data Fusion

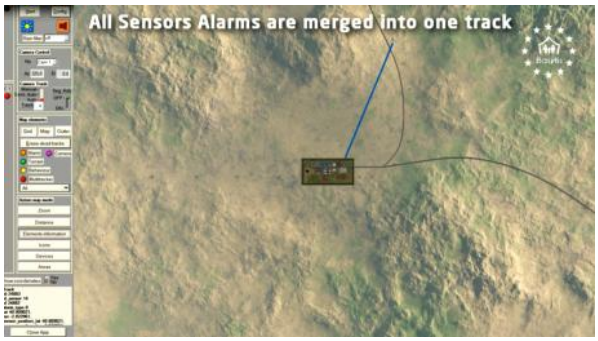

Sensors: Ladar
Data Fusion


Sensors: Seismic UGS

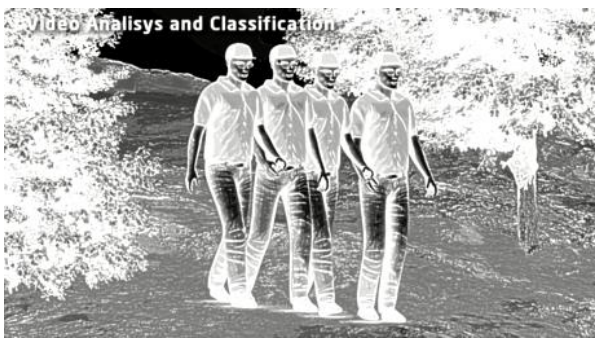

Sensors: Metal UGS


Sensors: Acoustic Vector Sensors


Bracelets & Buttons Locations


All Sensors Alarms are merged into one track


Sensors: Camera


Video Analisys and Classification


Security Control Center
ALARM: A person running with erratic motion
has been detected trying to access in the facilities


POLITÉCNICA
indra
TERMA
MIRASYS
SEVENTH FRAMEWORK PROGRAMME
UCL
CNPIC
NTGS
Microflown AVISA