



ARENA

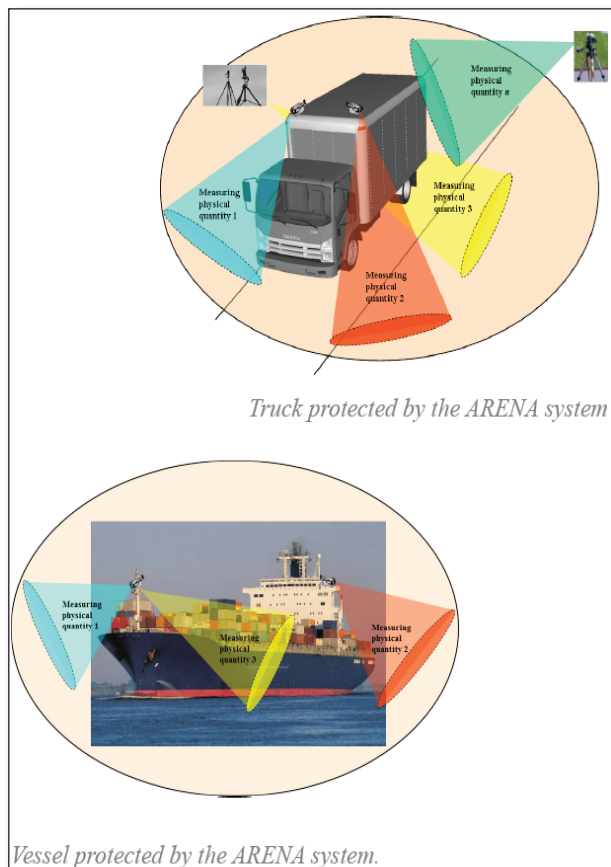


NEWSLETTER

Issue No 3, August 2014.

A BRIEF PRESENTATION

The EU FP7 project ARENA addresses the design of a flexible surveillance system for detection and recognition of threats towards deployment on mobile critical assets such as trucks, trains, vessels and oil rigs. The objective of ARENA is to develop methods for automatic detection and recognition of threats, based on multisensory data analysis.



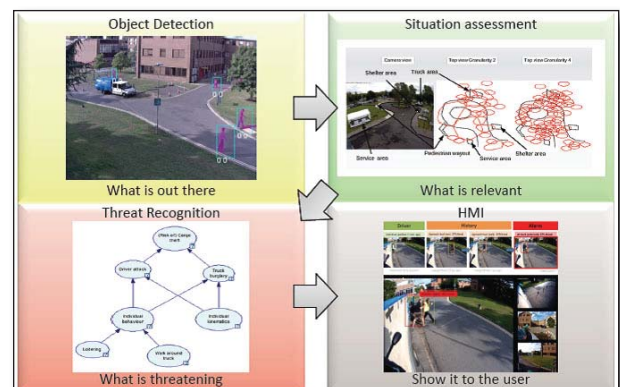
RESULTS AT THE END OF THE PROJECT

The ARENA project has come to an end. The project demonstrated the feasibility of the ARENA concept – a new system for automated situational awareness and threat detection – and its efficiency to protect mobile assets.

The concept was demonstrated through two focused examples:

- Protection of a truck parked on a parking lot against cargo or fuel theft and attacks against driver,
- Protection of a vessel at sea against piracy attacks.

The system is composed of a set of cameras and an on board computing platform, performing data processing and enabling automatic detection of threats. Algorithms were developed to detect moving objects or actors in the scene, to track their movement and behaviour and to discriminate normal/suspicious/threatening situations.



ARENA modules

The functioning of the processing chain was demonstrated on the truck and the vessel cases.

Real life demonstration on the truck parked case:

A test bed was deployed on a truck:

- A set of off-the-shelf cameras in visible and infrared spectrum, were selected and mounted on the truck to provide coverage surrounding the truck and day / night monitoring. An additional near infrared camera was installed inside the cab to test truck driver’s face recognition.
- A server performing the acquisition of the video and activating the processing was mounted inside the truck. Generated alerts and information necessary to understand the situation are sent to a Human-Machine Interface (HMI) .



Real life experimentation and evaluation were conducted in front of various scenarios. A set of data collected was used to train the system and other sets were used to evaluate.

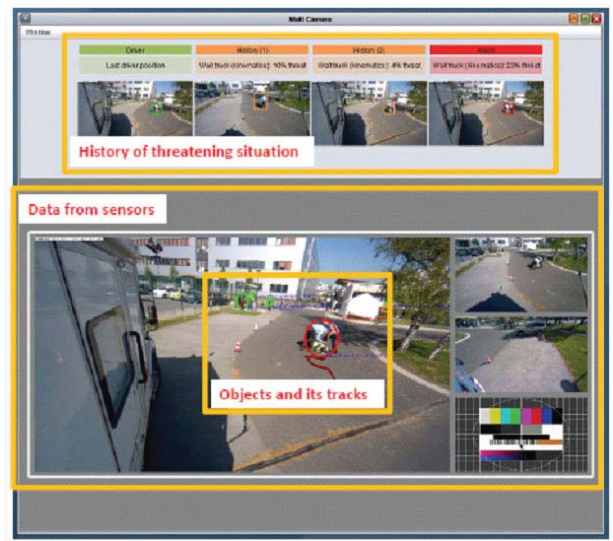
Normal behaviour	Something is wrong	Potentially criminal behaviour	Criminal behaviour
<ul style="list-style-type: none"> • Normal background activity • Truck driver normal activity 	<ul style="list-style-type: none"> • Waiting for someone • Jogging/Running • Meeting the driver • Police vehicle inspection • Object underneath truck • Driver falls on floor 	<ul style="list-style-type: none"> • Leaving a pamphlet • Attempt to open truck • Someone runs into truck driver • Standing against truck • Another passenger travelling 	<ul style="list-style-type: none"> • Steal something • Attack to driver outside truck • Attack to driver inside truck

Two versions of HMI were developed:

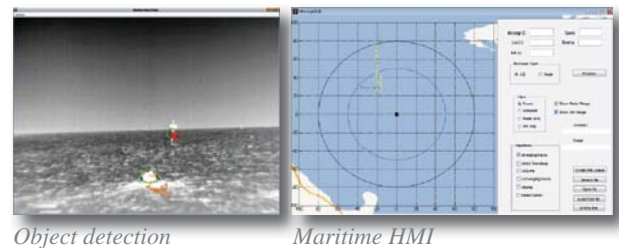
- One mobile HMI on a smart phone, for the driver.



- An office-based system, allowing the visualization of the videos from all cameras, the overlays of results of the processing and the access to history.



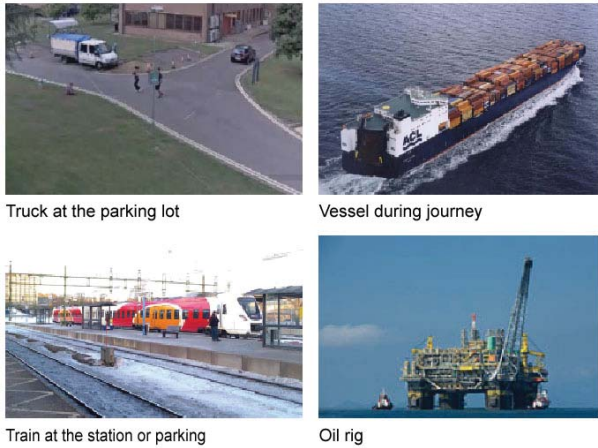
Play back results on the maritime case (on prerecorded video data and on simulated radar and AIS data):



AIMED FUTURE PRODUCTS

ARENA project demonstrate that a common architecture can be adapted to several assets: sensors network, an on board computer, real time processing and transmission links to communicate with remote MMI.

Several future applications were considered:



Work plan towards development of the products:

In ARENA, the main focus was on the truck case. A new European project (IPATCH) will allow further works on the maritime case. For each application, some remaining steps can be defined to reach the maturity required for product commercialization:

- Optimization of the algorithms, for real time processing
- Further characterization of “threatening situations” (especially for not yet examined applications)
- Specific optimization of the sensors selection and deployment for each platform
- Development and experimentation of a prototype for each application
- Establishment of industrial definition file and manufacturing processes
- Definition of sales and support processes

FEED BACKS EXPECTED FROM STAKEHOLDERS

Which platform is in your area of interest ?

What is your feeling on such a product ?

Would you give us advice to improve the system ?

Are you ready to experiment this kind of system on a real platform, for further development and training ?

Would you promote the development of a real time prototype ?

Would you support the development of a real time prototype ?

What could be the reasonable cost for a product / service?

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