European Commission

HORIZON 2020

Snapshot spEctral imagEr for cost effective IR Surveillance

Reporting

Project Information

SEERS

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Project website

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EU contribution
€ 3 750 535

Coordinated by
ASOCIACION DE INVESTIGACION METALURGICA DEL NOROESTE
Spain

Periodic Reporting for period 2 - SEERS (Snapshot spEctral imagEr for cost effective IR Surveillance)

Reporting period: 2016-02-01 to 2017-01-31

Summary of the context and overall objectives of the project

SEERS proposes a breakthrough approach to multispectral imaging in a broad band of the infrared domain. Video surveillance for safety and security is targeted for demonstration.
The overall objective of SEERS project is to develop a compact snapshot multispectral imaging system in the range 0.7-14 µm wavelength based on three uncooled and low cost FPA technologies (PbSe, CMOS-based microbolometers, CMOS).
Firstly, a snapshot multispectral imager in the IR domain will be developed. Secondly, an embedded approach will be adopted for image reconstruction, cognitive image fusion, video pre-processing and

event-driven operation. Thirdly, the benefits of a novel video analytics solution (VAS) for smart networked operation will be demonstrated in terms of performance and persistence, thanks to multispectral imaging.

With this aim, research and development at different levels will be addressed:

• Microbolometer (FPA) re-design adapted to multi-aperture imaging requirements

• Development of multi-aperture sensor arrays for multispectral and super-resolution imaging

• Embedded processing for: image reconstruction based on computational imaging, cognitive image fusion, spectral measurements, and video pre-processing

• Persistent video analytics based on pre-processed multispectral video

Overall, SEERS approach will enable robust intelligent surveillance with event-driven and smart performance. Remarkable capabilities will be robustness to variable visibility conditions (e.g. fog, rain, fumes), gas discrimination and level determination, spill detection, fire and burst imaging with accurate temperature measurement. Demonstration will be addressed in real operational conditions for two different scenarios: coastal and tunnel surveillance.

Work performed from the beginning of the project to the end of the period covered by the report and main results achieved so far

The first two years of SEERS project have produced the first working results of the project:

• A detailed specification of end user needs, describing scenarios and current needs in terms of e.g. types of targets, dimensions, visibility and operational conditions

• A first prototype of multi aperture imager -using low cost monolithic FPAs that work in the MWIR and LWIR range- has been integrated and is currently up and running and ready for testing

• Image reconstruction algorithms adapted to the IR range have been developed and tested, with positive results both in the LWIR and the MWIR ranges

• Embedded software for system control has been developed, and advanced embedded functionalities like temperature measurement and active imaging have been implemented and tested

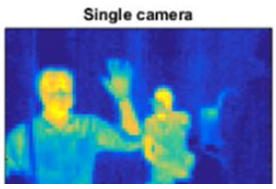
• Initial steps have been made towards multi spectral video analytics

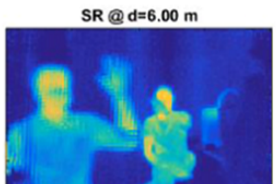
Progress beyond the state of the art and expected potential impact (including the socio-economic impact and the wider societal implications of the project so far)

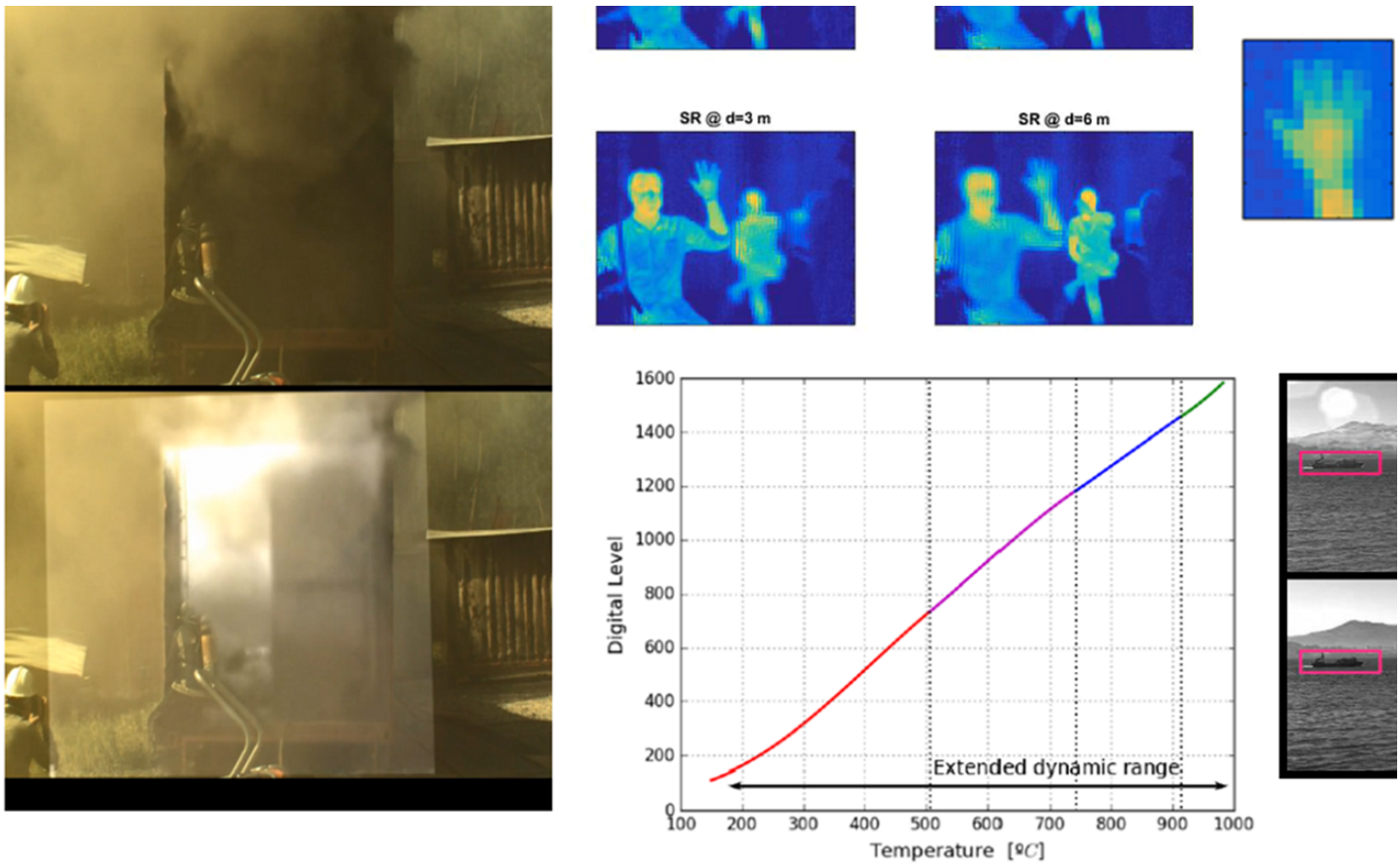
During this period, a first prototype of a novel multi aperture and multi spectral imager that covers a wide spectral range from 0.4 to 14 microns wavelength (visible, NIR, SWIR, MWIR, and LWIR) has been developed using unique uncooled monolithic infrared FPAs.

Image reconstruction has been developed adapted to the infrared range, and initial tests have shown positive results with both MWIR and LWIR images.

The system developed has an embedded control capable to perform complex operations from image reconstruction and image correction, to temperature measurement to active imaging.







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