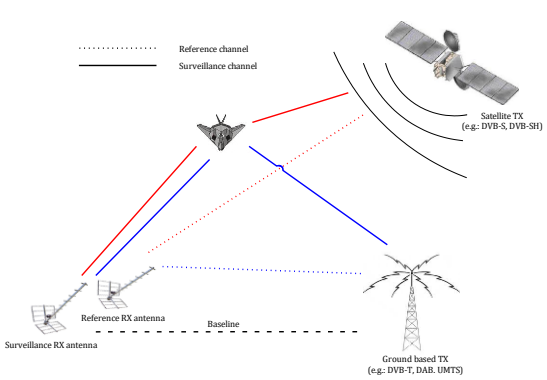
SMARP (Software-defined Multiband Array Passive Radar)

Funding institution
Italian Ministry of Defence

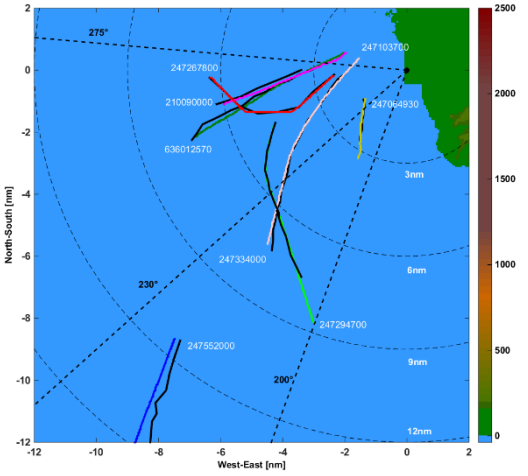
Project duration
July 2011 – December 2016

Project partners
CNIT - RaSS Lab

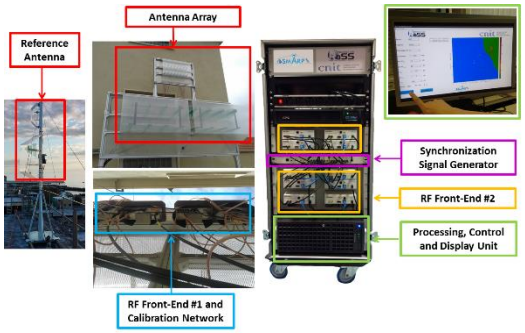
Involved countries
Italy



(a)



(b)



(c)

(d)

(a) Passive radar principle: this class of radars exploit existent non-cooperative transmitters to detect targets in areas of interest; (b) SMARP detection results with DVB-T signal (coloured lines: AIS data; black lines: radar detections); (c) SMARP system architecture; (d) SMARP antenna array

The objective of the project is to design and realize a multiband passive radar demonstrator based on software-defined solutions and oriented to coastal surveillance applications. In order to propose an innovative solution, the SMARP demonstrator architecture is going to present advances especially in:

- Multiband receiving array antenna (UHF and S band) with dual polarization reception;
- Software-defined multiband flexible receiver based on commercially available solutions;
- Digital array processing techniques and advanced radar signal processing algorithms implemented on COTS (Commercial Of The Shelf) processing architectures (multicore CPUs and GPUs);

The exploitation of digital illuminators of opportunity is a prerogative of this project; specifically, the DVB-T (digital terrestrial television), the UMTS (3G mobile system) and the DVB-SH (digital satellite broadcasting for handheld devices) signals emerged from comparative study due to their good radar range resolution, EIRP values and wide availability.

The SMARP demonstrator has been extensively tested at CSSN-ITE “Istituto Vallauri” in Livorno exploiting cooperative and non-cooperative vessels.