ECHOES TECHNOLOGIES

Company introduction: radar technologies for sensing, monitoring and protecting

Dr. Daniele Staglianò
Chief Executive Officer

ECHOES s.r.l. is a new born spin-off of CNIT and UniPi

Mission:

- Innovative radar systems
- Low emission
- Small size
- Easy deployable
- Low Energy consumption
- Optimised radar signal processing tools

Team

Founders:

- **Daniele Staglianò**
- **Stefano Lischi**
- **Riccardo Massini**
- **Dario Petri**

Advisors & co-founders:

- 3 University professors
- 9 Post-Doc researchers
- CNIT

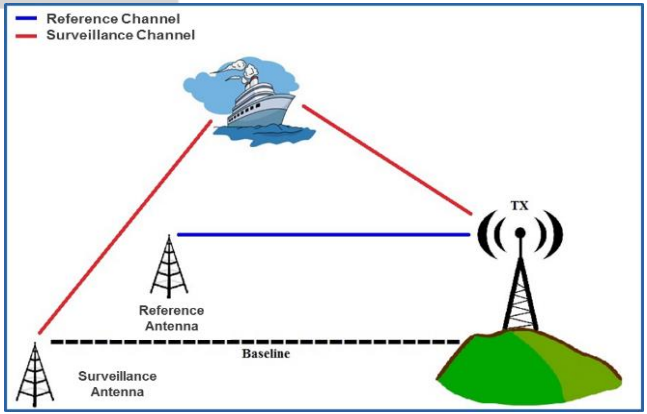
Expertise & Research Fields

- Radar Imaging (SAR, ISAR)
- Multichannel and Multistatic Systems
- Detection and Tracking
- Automatic Target Recognition
- Change Detection
- Interferometry
- Polarimetry

Products

…years of research and prototyping

GCK-e1000: multiband passive radar



Features

- No electromagnetic radiation
- No frequency band allocation
- Covert Surveillance of moving targets
- Light weight
- Low cost
- Low energy consumption

Waveform	Output Power	Dynamic Range	Range Coverage	Azimuth Coverage	Polarization
DVB-T/S UMTS LTE WiFi	No Emission	>80dB	<80km	<360°	Single Pol Dual Pol

Applications

- Maritime traffic surveillance
- Vehicular traffic monitoring
- Support to navigation close to the coast

GCK-e1000: radar tracking

MMSI-247294700

MMSI-247334000

MMSI-247552000

MMSI-210090000

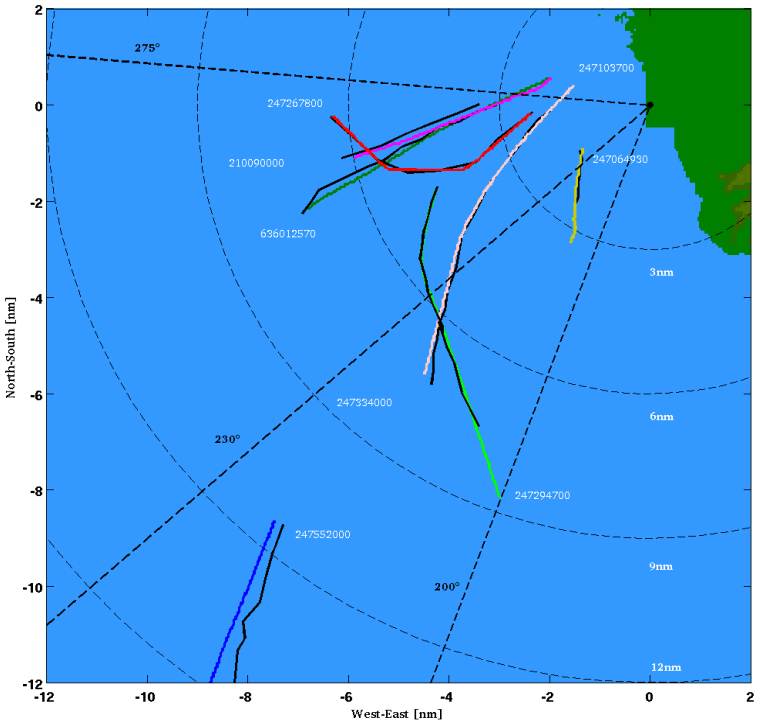
MMSI-636012570

MMSI-247064930

MMSI-247267800

MMSI-247103700

Radar tracks vs AIS data



MXI-e1000: 3D interferometric ISAR

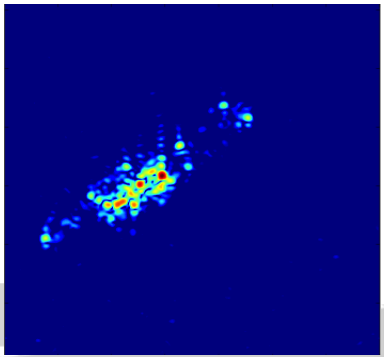
Features

- light weight
- small size
- easy deployable
- low power consumption
- very low electromagnetic emission
- deployable in a radar sensor network

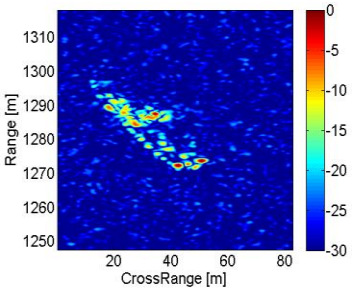
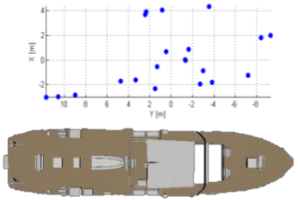
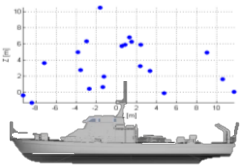
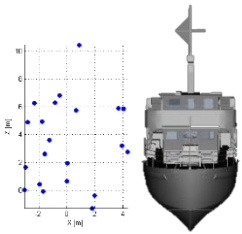
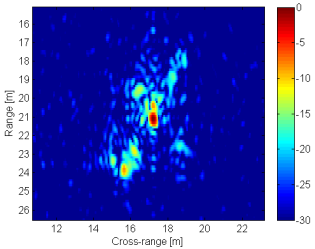
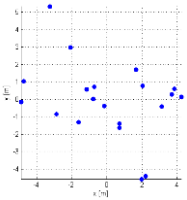
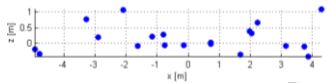
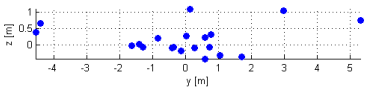
Waveform	Frequency	Chirp rate	Output Power	Minimum Detectable signal	Dynamic Range	Noise figure	Polarization
LFMCW	10.55-10.85 GHz	<1.5 THz/s	30dBm	-130dBm	>80dB	5dB	Linear V

Applications

- maritime traffic surveillance
- airport Surface Movement surveillance
- low flying aerial vehicles surveillance
- urban and rural area monitoring
- vehicular traffic monitoring
- automatic Target Recognition



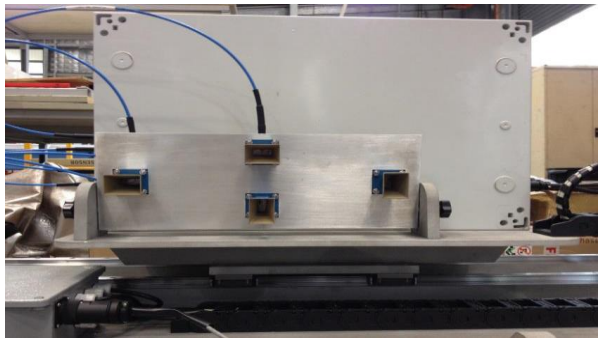
MXI-e1000: 2D and 3D reconstruction

2D Imaging	3D reconstruction	2D Imaging	3D reconstruction
 	  	 	     

GXI-e1000: Polarimetric ground-based SAR

Features

- easy deployable
- low power consumption
- very low electromagnetic emission
- deployable in a radar sensor network
- customizable according to user's needs

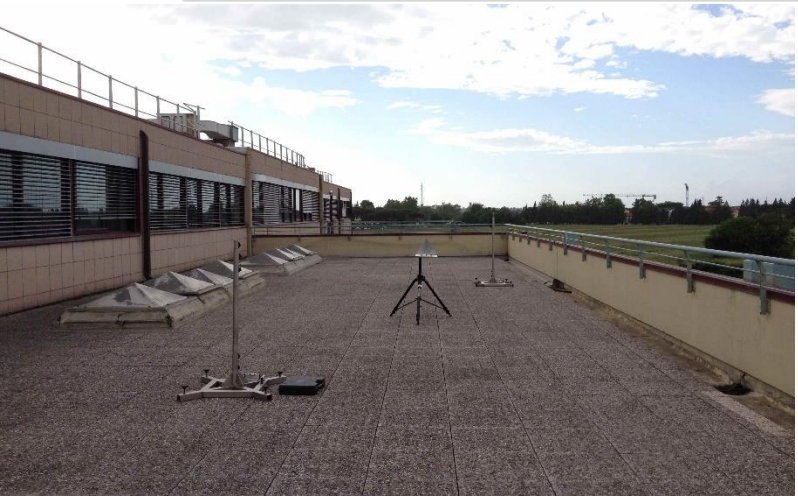


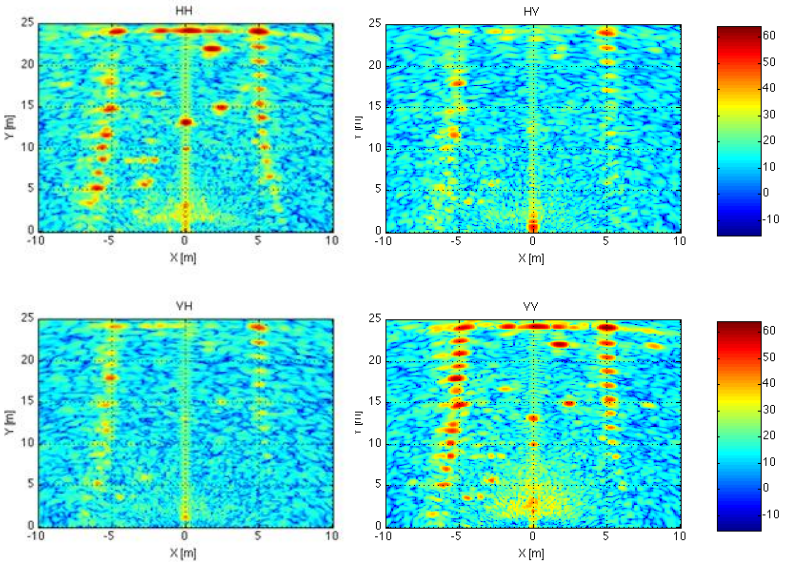
Waveform	Frequency	Chirp rate	Output Power	Minimum Detectable signal	Dynamic Range	Noise figure	Polarization
LFMCW	9.95-10.75 GHz	<1.5 THz/s	-4dBm	-130dBm	>80dB	5dB	Single Pol Full Pol

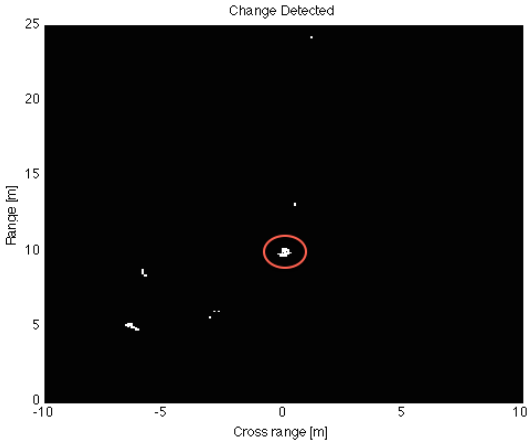
Applications

- environmental monitoring
- infrastructural monitoring (buildings, bridges,…)
- urban and rural area monitoring

GXI-e1000: change detection results







Ad-hoc solutions

We offer ad-hoc solutions for the customer's needs:

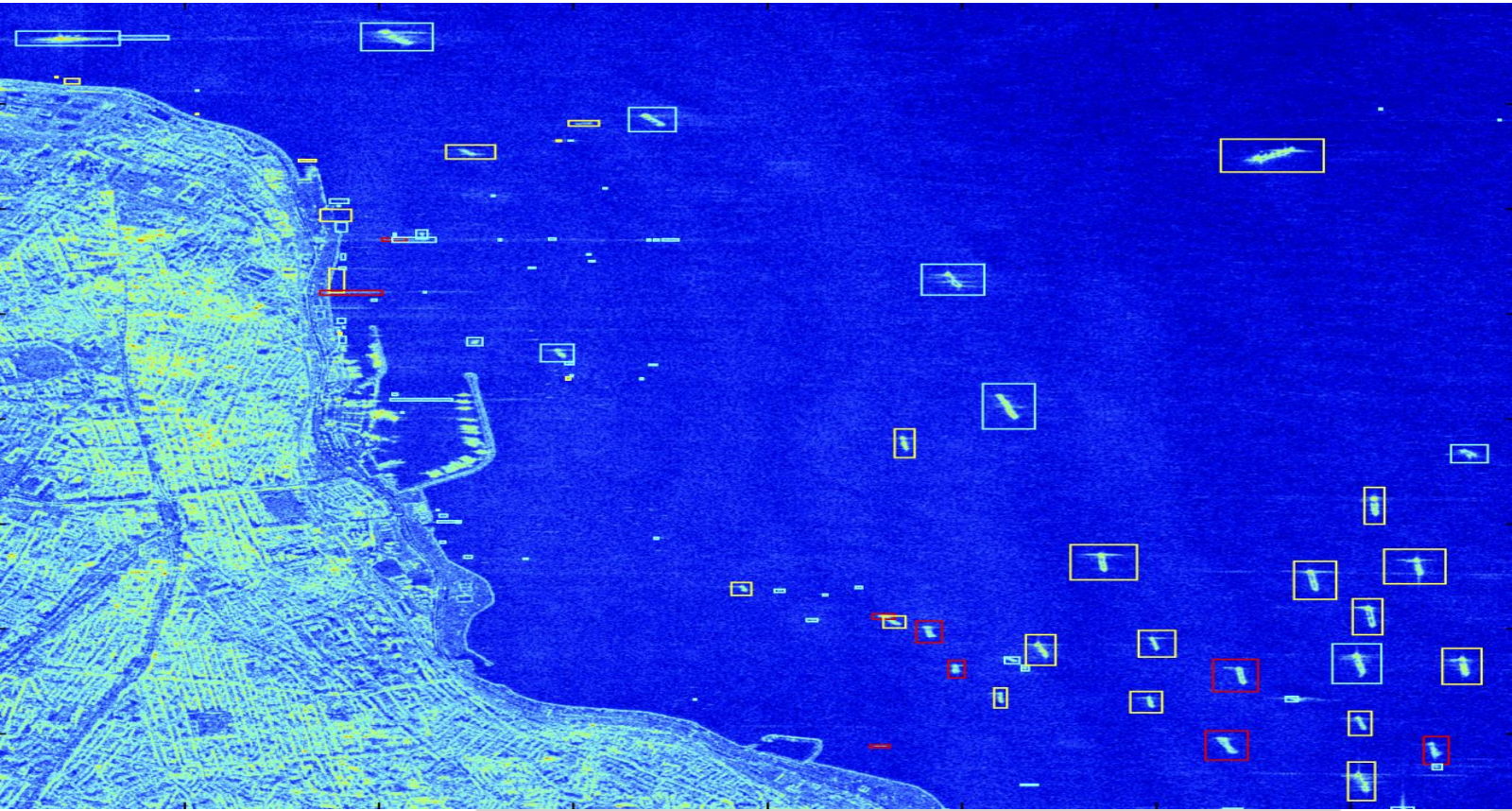
- Project proposal
- Feasibility study
- Prototype development
- Test on field
- Delivery
- Post-sale support

Services

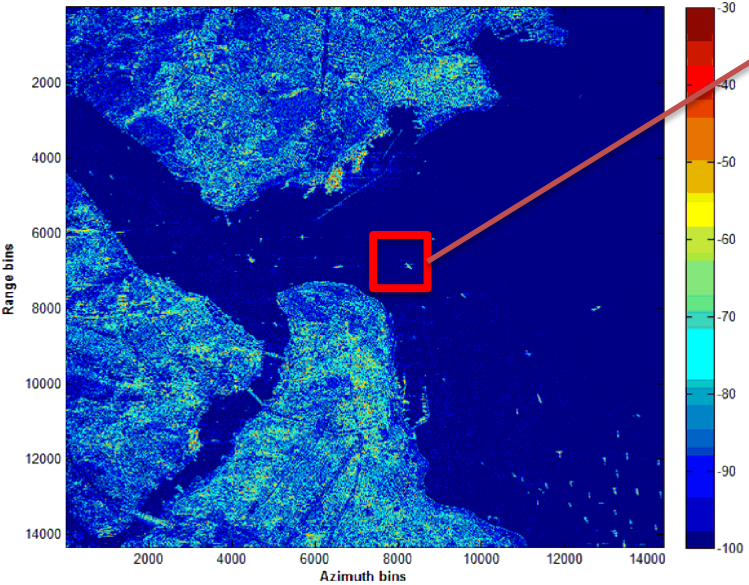
…sensing, monitoring, protecting

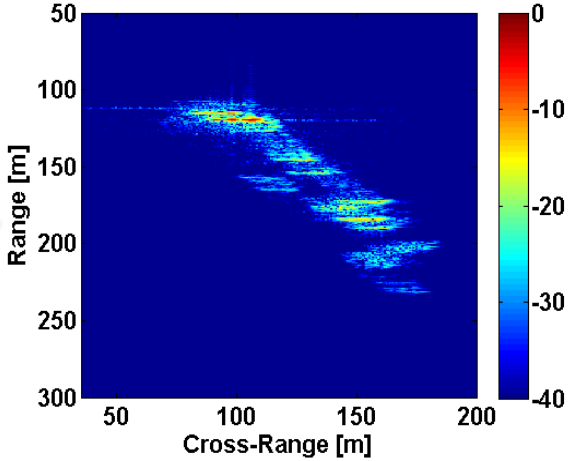
Harbor surveillance

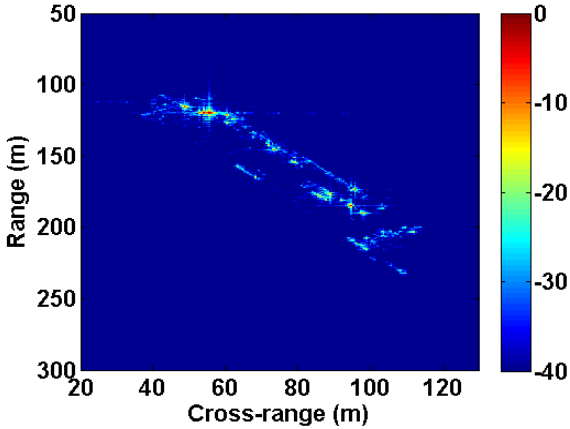
Advanced signal processing from SAR



Moving target refocusing

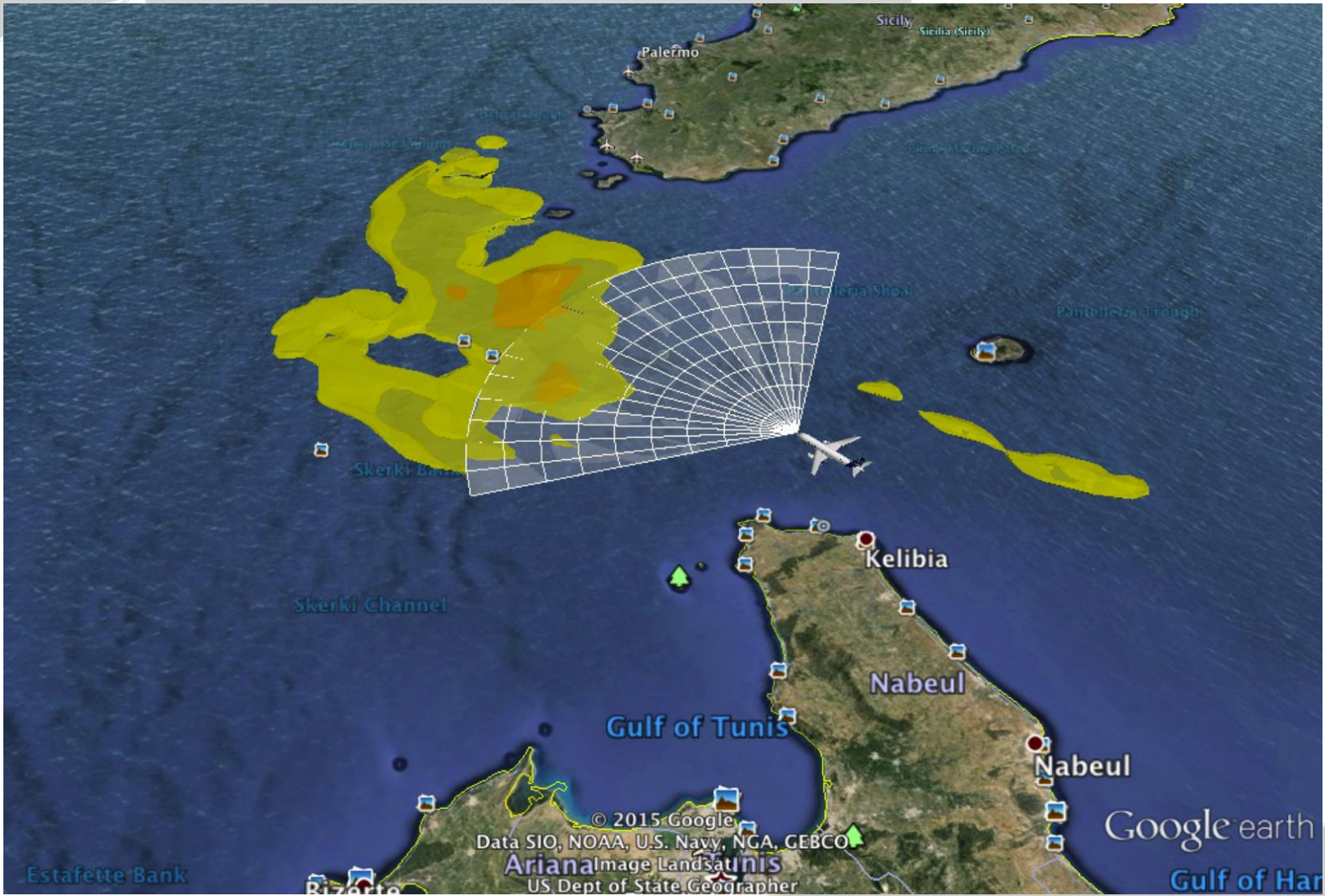






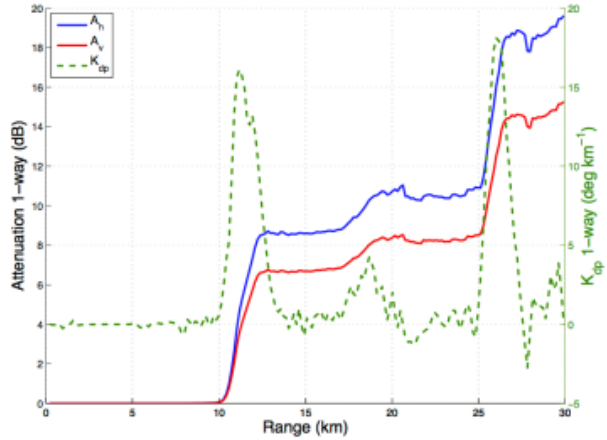
Environmental monitoring

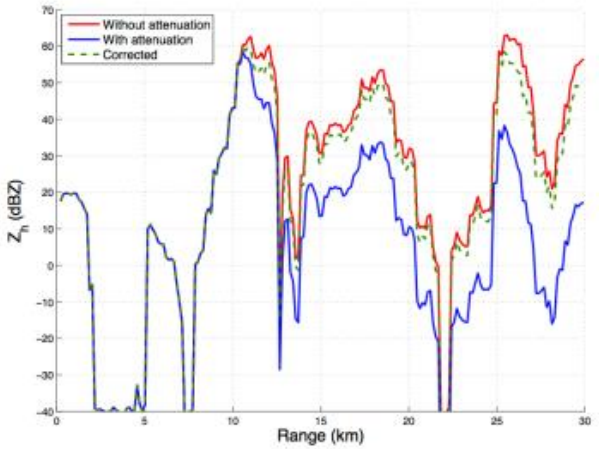
Advanced weather radar simulation



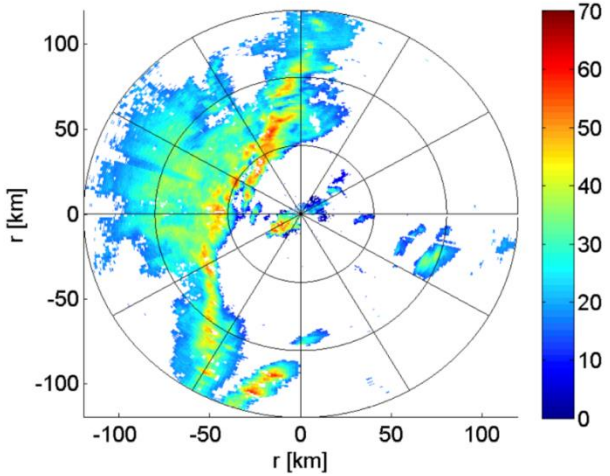
Advanced weather processing

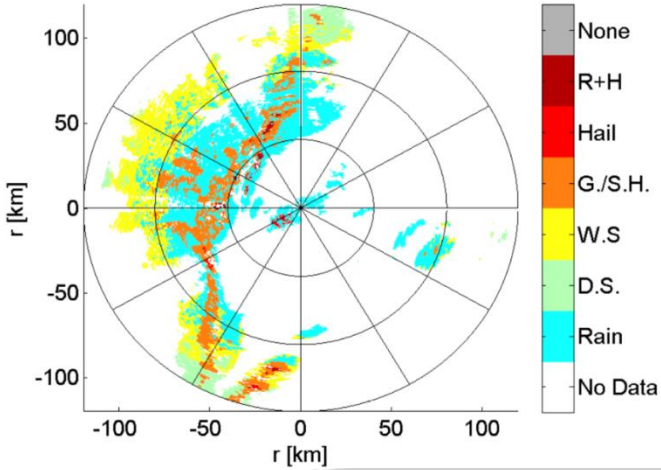
Rainfall attenuation correction



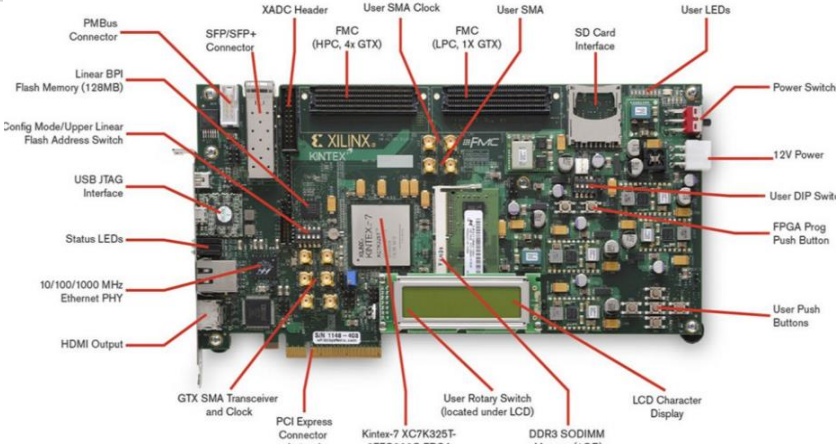


Hydrometeors classification



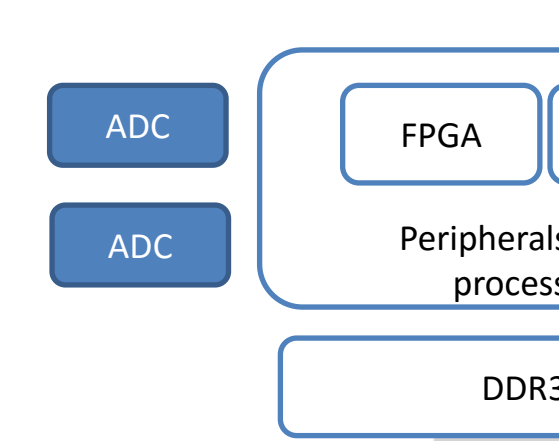


Embedded Boards



Evaluation Board Kintex 7

ADC 8 Channels



Board SoC

Signal Processing

Algorithms :

- Cross Correlation: 1D, 2D
- Discrete Fourier transform
- FIR filters
- DDC : Digital Down Converter
- DUC : Digital Up Converter
- Adatptive filters: LMS, NLMS etc
- Array processing: MUSIC, CAPON, Conventional Beamforming etc

SDSoC™ Environment

VIVADO™

Argomenti di Tesi

- **Sistemi di generazione di segnale FMCW in banda Ku a larga banda e basso rumore per applicazioni radar (stato dell'arte, scelta di un'architettura, progetto, costruzione di un dimostratore)**
- **Progetto, simulazione e realizzazione di un VCO a basso rumore in banda Ku a componenti discreti**
- **Sviluppo di una scheda mixed-signal di acquisizione dati da sensori radar, basata su FPGA**

- Studio e analisi di algoritmi per stima delle correnti marine da radar coerenti ad alta risoluzione
- Human-gait recognition and classification by micro-Doppler analysis
- Detection and recognition for drones by ground-based high resolution radar
- Studio e analisi di fattibilità (con possibilità di sviluppo di dimostratore) di un bistatic passive SAR su nanosatellite
- Polarimetric Interferometric SAR analysis for structural and environmental monitoring.

How to get in touch

http://www.echoes-tech.it/

+39 050 3820810

info@echoes-tech.it

echoestech

Galleria G. B. Gerace 18,
56124 Pisa, Italy