SenTech Srl

COMPANY ACTIVITIES AND COOPERATIONS

COMPANY PROFILE

Sentech Srl is an Italian company with 16 year of history in innovation in the embedded computing sector, in dedicated solutions for signal processing boards and special functions, in the design of complex components such as antennas and process/measurement controllers, in integration of complex systems and related sensors.

The Company is ISO 9001:2015 certified in SW and HW design and operates mainly in R&D and SW design and development for the Aerospace and Defense domain. It is specialized in the analysis and design of complex systems and related sensors using both high-level technical simulation SW (e.g. MATLAB/Simulink, CST, Solid Works, Ansys Fluent, Altium Designer) and programming language as C/C ++/C#, Python, LabVIEW, Java, Android and SQL.

Sentech is a member of AIAD (Federation of Italian Aerospace, Defense and Security Companies).

Company expertise covers the following activities:

1. Scenario Simulators for RF/Radar and Electro-Optical sensors for military scenarios;
2. Automatic Test Equipment design and implementation;
3. CV (Computer Vision) and AI (Artificial Intelligence) algorithms design and development (e.g. Automatic Target Recognition and Identification, Object detection and tracking, Change Detection;
4. RF algorithm design and implementation for Electronic Support Measures and Direction Finder Systems;
5. Embedded board RTOS/FPGA Algorithms design and programming and RTOS Control Systems;
6. DO 178 SW development, test and Documentation.
7. Research & Development for national and EU projects in military / aerospace domains

Radar Target Generator (RTG) and **Electronic Warfare Simulation System (EWSS)** are essential tools for testing and training RADAR and EW systems in real environment.

The SenTech RTG receives the radar pulses and in real time is able to respond with echoes simulating multiple air targets and/or missiles with phase Coherence and Doppler Shift. RTG response can include Electronic Counter Measures. The motions of the targets are realistic and varied (multiple targets, planes launching missiles, variations of all parameters such as position, speed, acceleration).

Among the three possible approaches for radar testing (radar test range, simulation, and pulse replication) the last one is the best solution because:

- allows testing in a controlled environment;
- could include intentional (Electronic Counter Measures) and unintentional interferers;
- can create e realistic scenario and do not require knowledge of the radar system architecture;
- has the capability to record the detected reaction from the radar under test;
- It is easily deployable.

RTG Main Panel

Generation of **synthetic datasets** and **complex scenarios** in the various optical bands (IR and VIS) through the use of latest generation graphics engines for training neural networks on classes / targets with unavailable datasets

Sentech creates military simulated scenario useful for the following purposes:

- Neural Networks training and testing
- Computer vision algorithms testing
- Feasibility study on military systems

Main Pros of simulated scenarios are also:

- Supports keyframe animations and SQF scripts
- Thousands of vehicles, equipment and scenarios available;
- Realistic graphic;
- Realistic and scriptable effects (Daylight, fog, rain, dust, explosions, etc.);
- Realistic IR models;
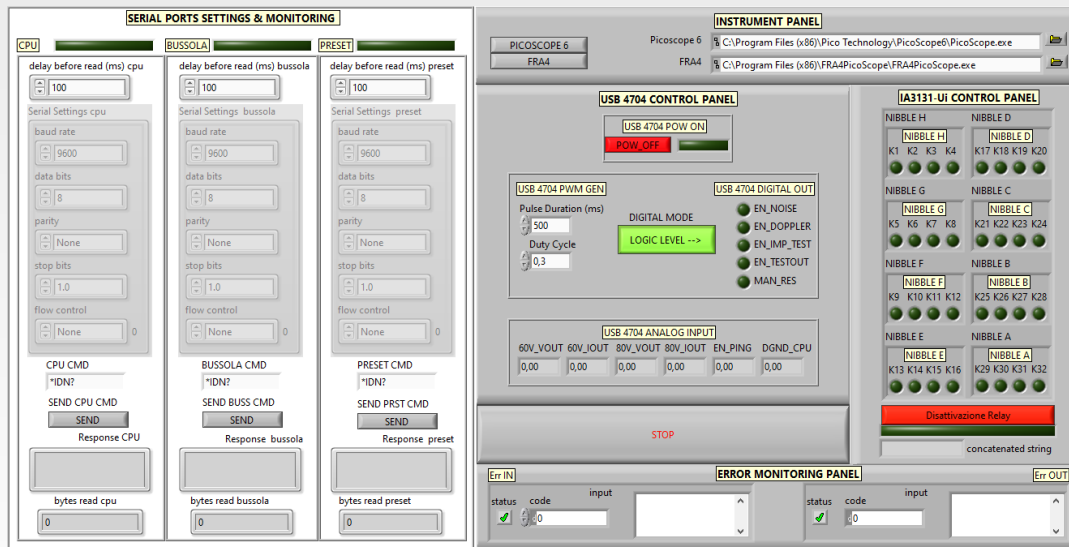- Simulated custom dataset generation.

Seeker view (up left) Military targets (up right) and scenario (down)
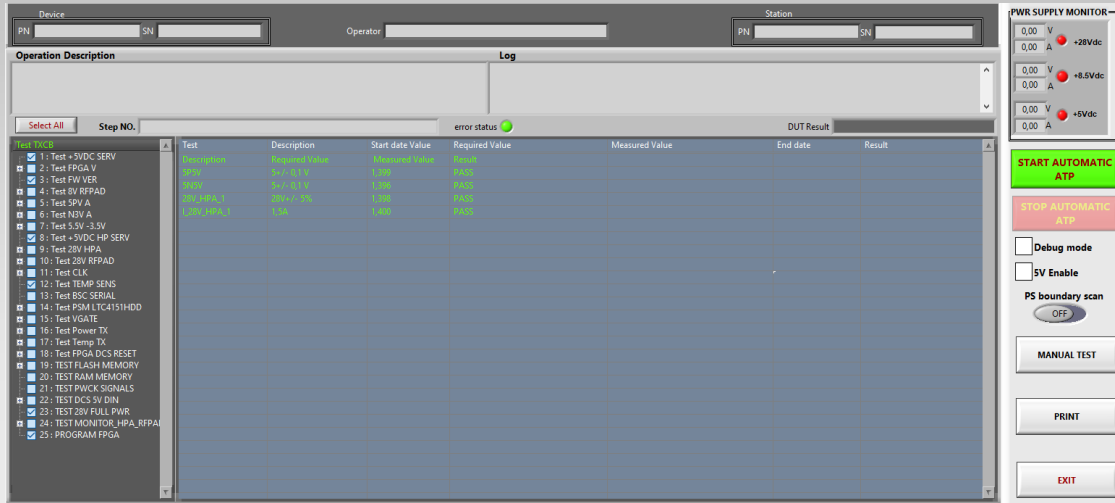
ATE Main Panel

ATE Manual Panel

Sentech design and develop **custom made ATE** with the following characteristics:

- Automatic execution of the entire test chain or or test groups/single test selection;

- Automatic generation of Test Data Report on custom templates (Word, Excel, Xml, Others);

- Manual Panel;

- Debug Mode

- Instrument management (oscilloscopes, relay cards, COM boards, other peripherals/instruments);

- Error and error log management;

- Management of different communication protocols (Canbus, Canopen, EtherCat, others);

- Easy Installer with all needed library included;

- Auxiliary file management for automatic parameter settings, measurement offset;

- User Friendly interfaces.

Design and implementation of complex multi-domain CV & AI systems for Terrestrial, UAV and aerospace platforms:

- Change Detection on Lidar Point Cloud and Electro-optical data;

- Object Detection on Lidar Point Cloud and Electro-optical data;

- Object Classifiers;

- Integration with ESRI GIS;

- Neural Networks Training and Testing on custom specs and dataset;

- Registration and Data Fusion Algorithms
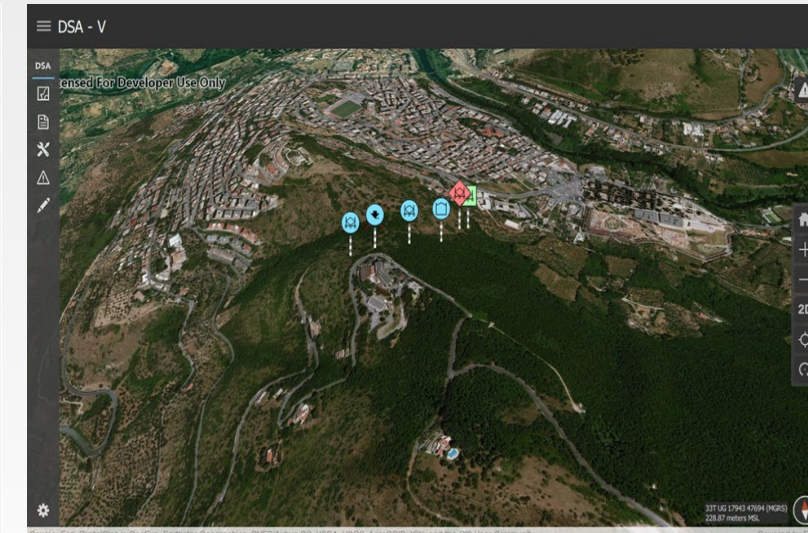
- Data Augmentation for training Datasets

Object Detection on Vis and IR Data
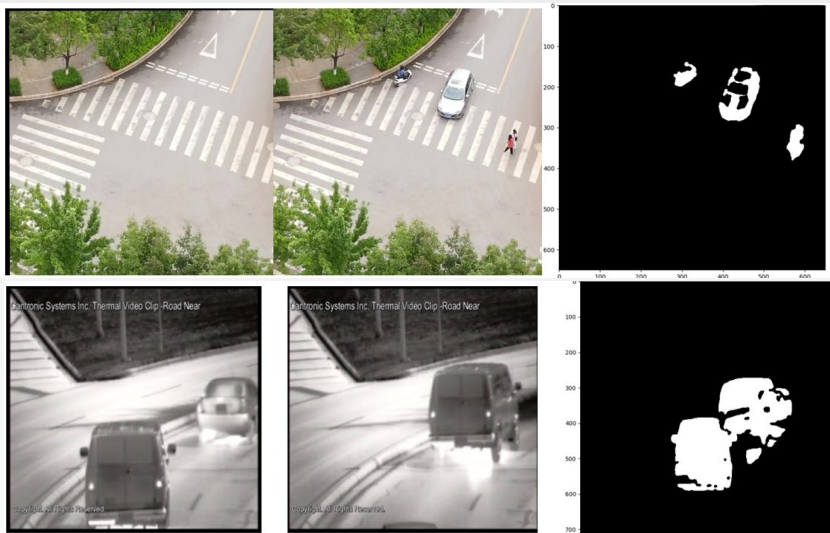
Change Detection on Vis and IR Data
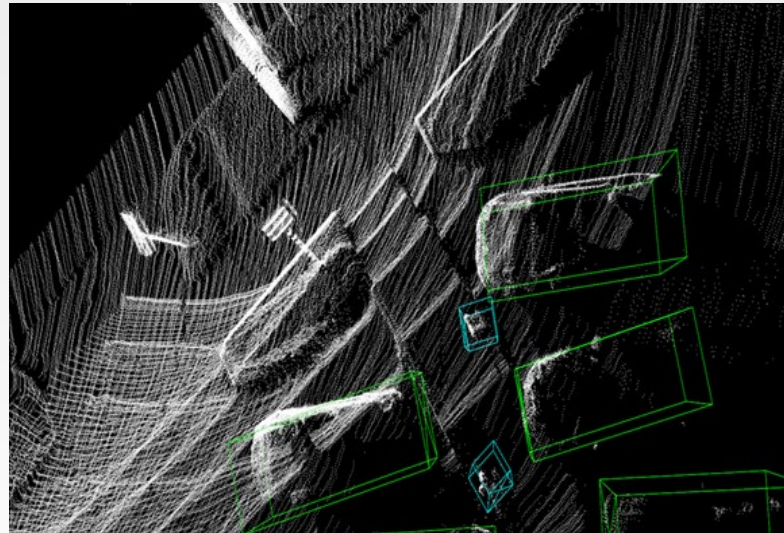
Object Detector on Lidar Data

Warning Generation on ESRI GIS

SenTech **CD & ATR** (Change Detection & Automatic Target Recognition) system in the SAR field includes the following Functions:

ATR Pipeline Functions

Pre-screening: Despeckling Filter and CFAR (Constant False Alarm Rate) Methods (in-house development of innovative methods e.g. Seg-CFAR, Seg-KDE)

LLC (Low Level Classifier): Elimination of Natural and Non Clutter residues + Chip candidate selection for the next stage

HLC (High Level Classifier):Target classification using AI techniques (Both Machine Learning (ML) and Deep Learning (DL))

CD Methods

- Coherent Change Detection (CCD);
- Non - Coherent Change Detection (NCCD);
- Maximum Likelihood Estimate (MLE);
- Universal Image Quality Index (Q Index): Q1, Q2 and Q3;
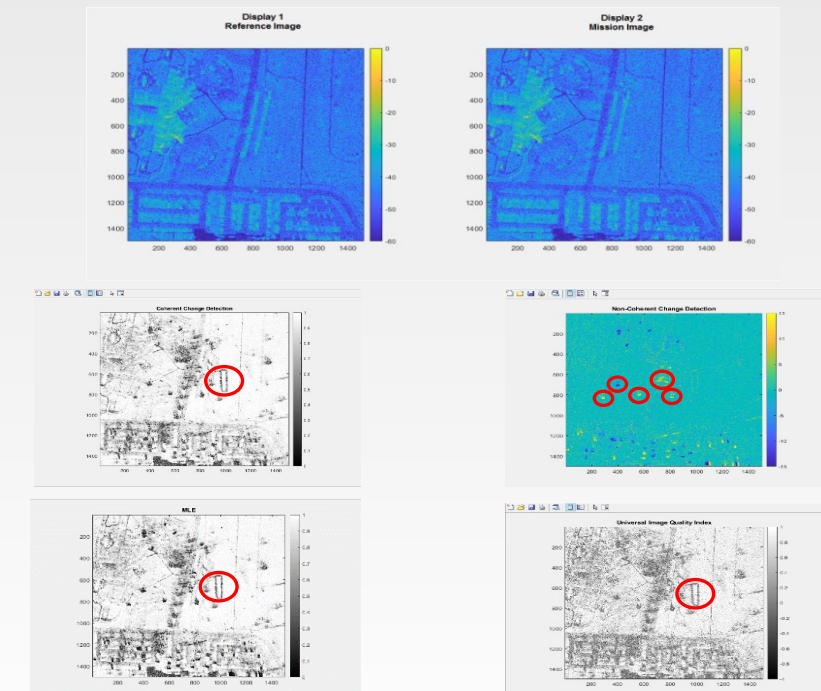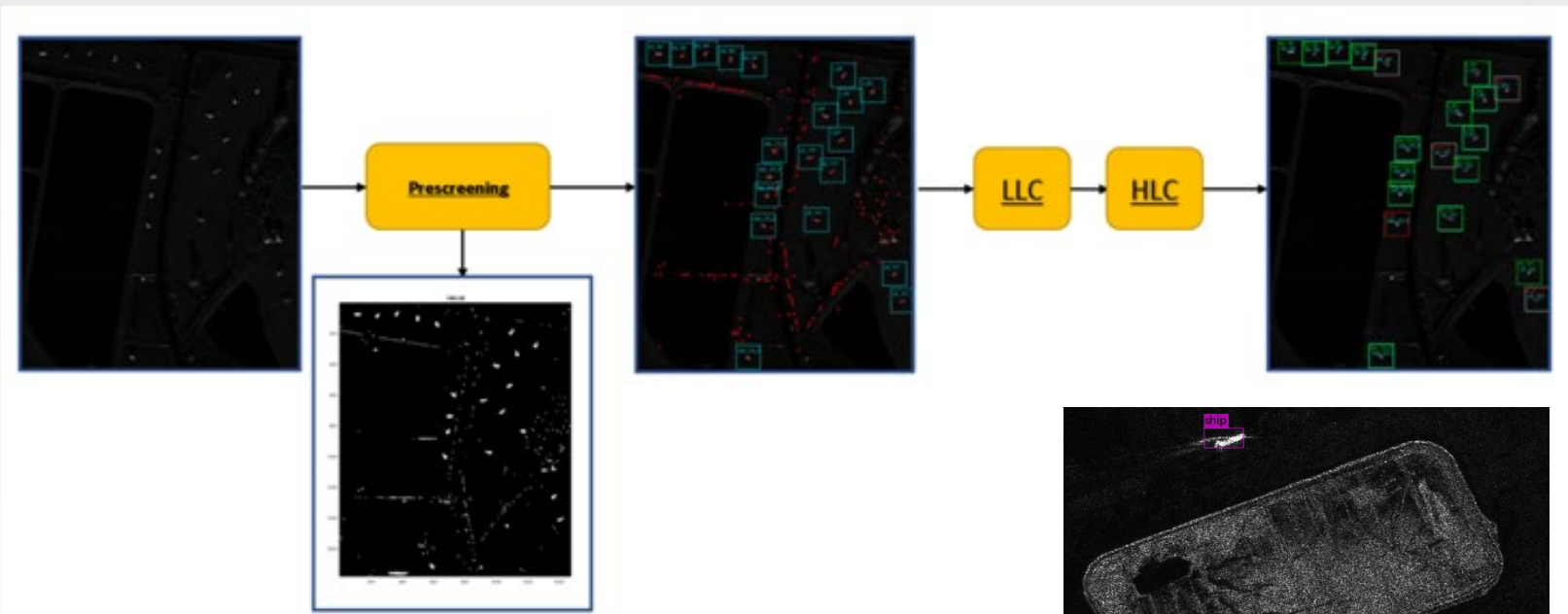
SenTech
Systems and Energy Technologies

Sentech has the capabilities to

- Design and construction of **custom direction finding antennas** for special applications
- Study, design and implementation of **advanced Direction Finder algorithms** such as Super Resolution, Multipath Signals DOA, Low Signal Noise Ratio DOA;
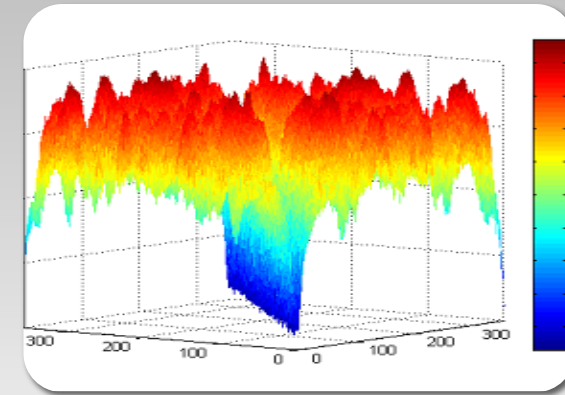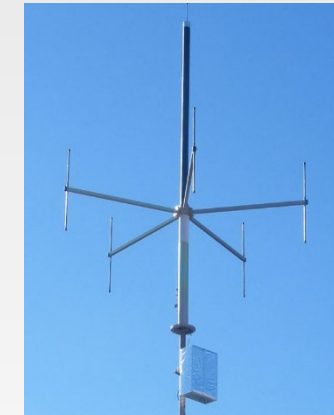

Direction Finding Algorithm Study, Simulation and implementation
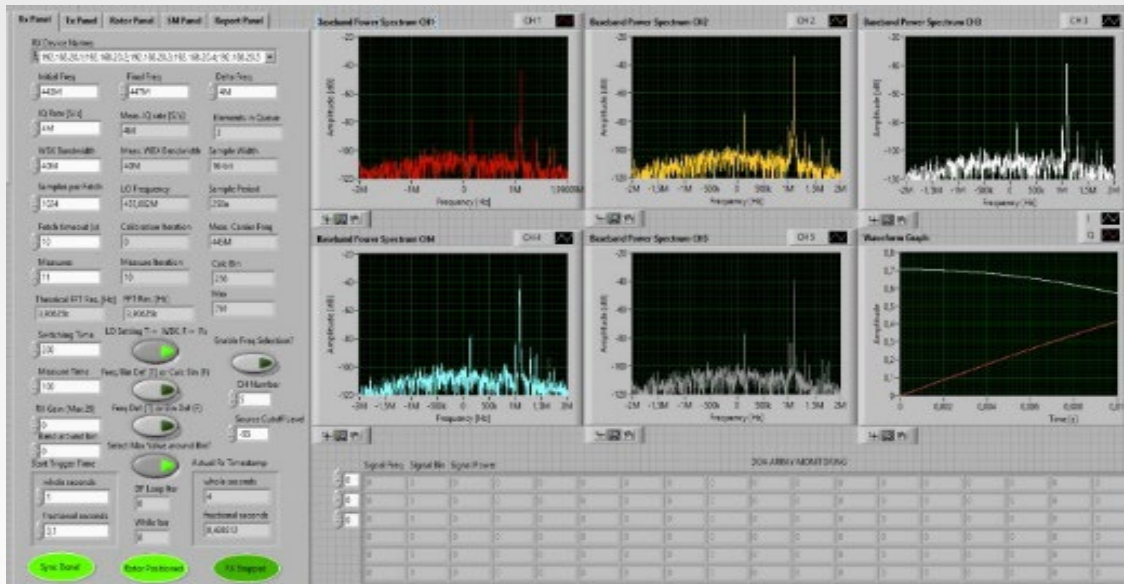
Direction Finding System HMI

High accuracy Antenna 20-3400 MHz frequency range

DF Antenna with lightening pole 100-400 MHz frequency range

DF Antenna 100-3400 MHz frequency range

We design and develop **Control Boards for complex systems**. Here an example of a microturbine generator where we worked on the complete simulator of the control system and power converter (model of the microturbine implemented with the University of Florence). Implementation of the Control and Shut Down System including starting drive and booster converter.

Drive for PMSG (Permanent Magnet Synchronous Generator) with both Starter and Generator Functions

Battery booster converter with 12 kw 540/280 high frequency three-phase autotransformer with feedback card and six-phase bridge.
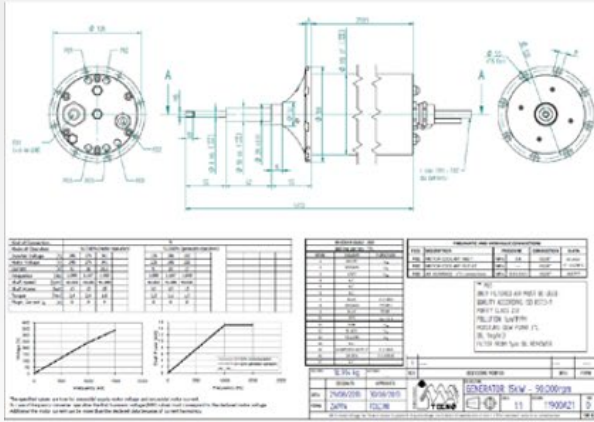
Microturbine control logic and actuation

Figura 45: Schema generale della macchina termica
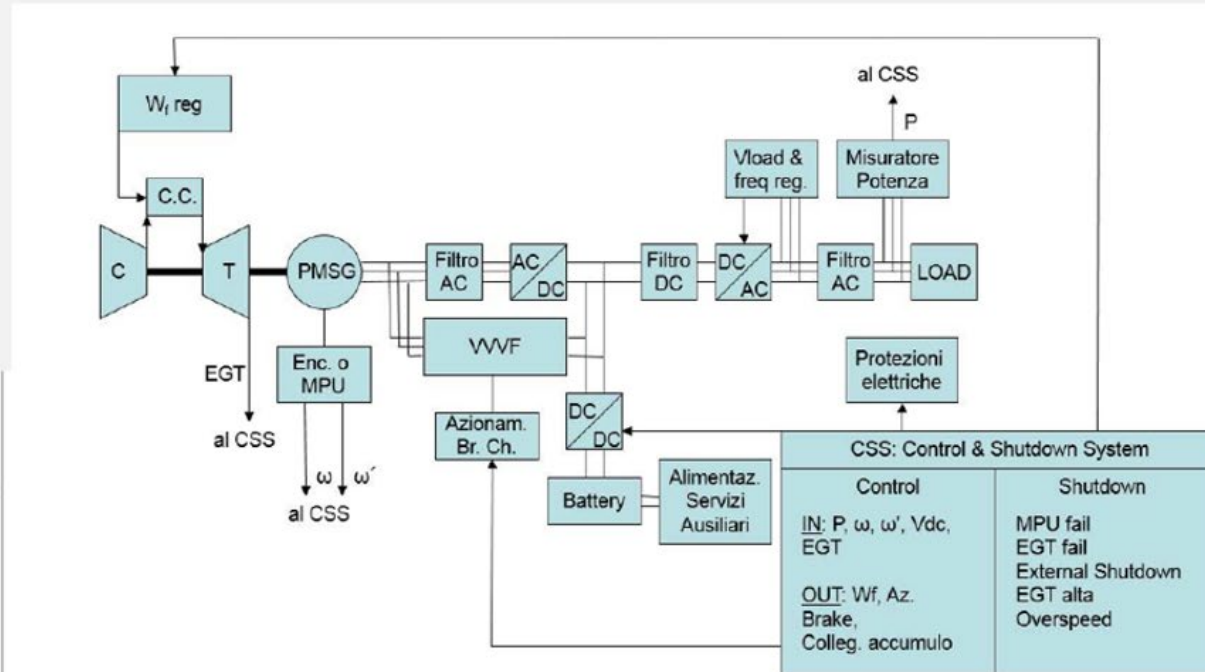
Figura 47: Schema generale componenti sistema di controllo ed elettronica di potenza

SenTech develops **avionic software** as per the **DO178C standard**:

- DAL-A for one of the major Italian Defence company;
- DAL-C for a foreign Defence company.

DO178 SenTech Activities

- Equipment specification analysis.
- High level software requirements redaction.
- Low level software requirements redaction.
- Software interface requirement.
- Coding (C language MISRA).
- Software verification and testing.
- Code coverage.
- Software release.

- DO178C DAL (Design Assurance Level)
  - DAL-A: Software failure determines catastrophic failure condition for the system
    - ✓ Statement Coverage
    - ✓ Decision Coverage
    - ✓ MC/DC Coverage
  - DAL-C: Software failure determines major failure condition for the system
    - ✓ Statement Coverage
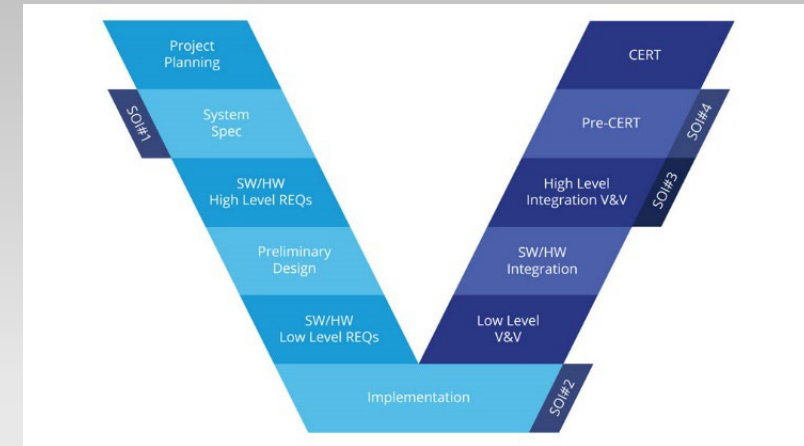
Sentech is a beneficiary in the following **PNRM projects** admitted to financing by IT MoD:

RC-EDS (Route Clearance Early Detection System)

TOTAL COST: 2,5 M

Coordinator: SENTECH

Others Main Partners: ESRI ITALIA, FALCONOPS

ACIED (Advanced Counter - Improvised Explosive Device)

TOTAL COST: 3,4 M

Coordinator: ELETTRONICA

MINISAR (Mini Synthetic Aperture Radar)

TOTAL COST: 3,5 M

Coordinator: METASENSING

SVOANA (System for Autonomous or Remotely Controlled Exploration of High-Risk Environments; Vision, Obstacle Avoidance, Autonomous Navigation and Aiming for UGV)

TOTAL COST: 2,7 M

Coordinator: INFO SOLUTION

OTHER R&D PROJECTS…

Sentech is a beneficiary in the following **EDF projects** admitted to financing by the EC:

EDF 21 - SHOLFEA - SHoulder Launched Family for European Armies

TOTAL COST: 2,5 M

Coordinator: GAHN

Others Main Partners: INSTALAZA, GELCO, STARTIUN, Others

Sentech Activities: EO/IR Missile Seeker SW and FW

EDF 21 - ARTURO - Advanced Radar Technology in eUROpe

TOTAL COST: 20 M

Coordinator: LEONARDO

Others Main Partners: AIRBUS DEFENCE AND SPACE, HENSOLDT SENSORS, INDRA SISTEMAS, THALES FRANCE, Others

Sentech Activities: Responsive complex Radar Target Generator and Electronic Warfare Countermeasure

EDF 22 - REACTII - Responsive Electronic Attack for Cooperation Tasks II

TOTAL COST: 69,7 M

Coordinator: INDRA SISTEMAS

Others Main Partners: ELETTRONICA, HENSOLDT SENSORS, THALES FRANCE, UNIVERSIDAD POLITECNICA DE MADRID, Others

Sentech Activities: Complex DES (Digital Environment Simulator) made up by Radar Emulator and a Scenario Generator capable of generating interfering signals (Comm, Radar).

EDF 22 - TIRESYAS - Technology Innovation for Radar European System ApplicationS

TOTAL COST: 15 M

Coordinator: LEONARDO

Others Main Partners: AIRBUS DEFENCE AND SPACE, ELETTRONICA, HENSOLDT SENSORS, INDRA SISTEMAS, MBDA, Others

Sentech Activities: Generating the inputs (e.g. signals and disturbances received from both the radar and the EW apparatus) for the Radar Digital Twin implemented by Leonardo

EDF 23 -MARTE Main ARmoured Tank of Europe

TOTAL COST: 20,225 M

Coordinator: MARTE ARGE GbR

Sentech Activities: EO/IR/LPC AI SW for ATR/Change Detection

Others Main Partners: LEONARDO, Rheinmetall Landsysteme GmbH, INDRA, OTHERS

EDF 23 -SDAM4PRD SATELLITE DETECTION, ANALYSIS AND MEASUREMENTS SYSTEM FOR PROACTIVE AND REACTIVE DEFENCE

TOTAL COST: 7.377 M

Coordinator: INTEGRASYS SA

Sentech Activities: Sat Interference/jamming simulation and localization

Others Main Partners: AICOX SOLUCIONES SA, ECLIPTIC DEFENCE AND SPACE LTD, EXUS SOFTWARE

Customers

Ministero della Difesa - TERRARM

Ministero della Difesa - TELEDIFE

Ministero della Difesa - NAVARM

Ministero della Difesa - ARMAEREO

Ministero della Difesa - COMMISERVIZI

Elettronica S.p.A.

GELCO S.p.A.

LEAT S.p.A.

Oral Engineering S.r.l.

CELDES S.r.l.

Inalca S.p.A.

Industrial Cooperations

Elettronica S.p.A.

Leonardo S.p.A.

ESRI Italia S.p.A.

Expert System S.p.A.

MetaSensing S.r.l.

Dune S.r.l.

Sigma Consulting S.r.l.

Azienda Ospedaliera San Camillo Forlanini

Università La Sapienza

Università Tor Vergata

Campus biomedico

Giacomo Maria Russo
CEO

gmrusso@sentech.it
+39 0633610644
+39 3245646663

www.sentech.it
PEC: Sentech@pec.it

Via di Quarto Peperino, 35
Via di Quarto Peperino, 35, 00188 Roma RM

Directions

View larger map