

About us



Profile

Established in 1995 by experienced people, On AIR held the initial attitude about research and design of innovative solutions. Company headquarter is at **Palazzo del Melograno**, Piazza Campetto 2, in the historical centre of Genoa.

In the **Information and Communication Technology** market, On AIR mainly addresses the areas:

- **Recognition systems**
- **Dynamic optimisation systems**

On AIR effective solutions apply to a wide range of industrial applications, such as logistic, scheduling, traffic control and surveillance.

Since the establishment of the company, parts of On AIR resources have been devoted to **R&D** activities:

- participation, as Project Coordinator or Partner, in co-founded projects (EU – Italian MIUR – Italian Scientific Park)
- design and development of prototypes / demonstrators
- consulting activities

Collaborative R&D activities have been of crucial importance to set partnerships at international level and to be involved in the development of innovative solutions for application projects.



Technologies & know-how

The scientific know-how and the technological expertise of On AIR mainly concern the following areas:

- decision support systems
- dynamic optimisation models
- artificial vision
- recognition systems
- diagnostics and real-time control

Offer

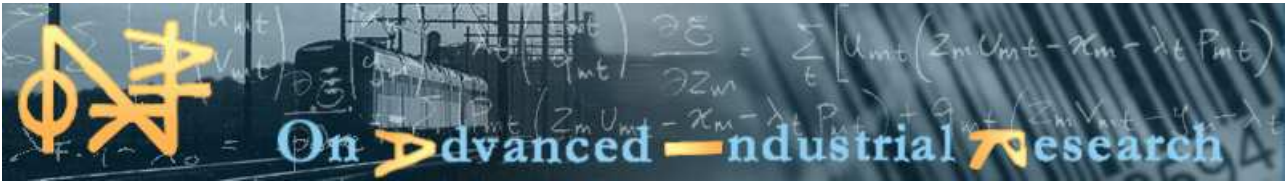
On AIR offers:

- specialist studies
- scientific consulting services
- research and experimental development in pilot projects
- prototyping
- ad-hoc solutions

and, generally, a wide range of solutions addressing specific application problems, reached through a process of customisation and integration of proprietary models and algorithms.

On AIR offer mainly addresses the following application sectors:

- rail traffic optimization
- urban traffic monitoring
- surveillance and access control
- automatic identification
- object recognition
- signal processing
- form and document processing
- image and video compression
- quality control



Research

Since the establishment of the company, parts of internal resources have been devoted to R&D activities, participating in EU and National research projects. To benefit from innovation results, the current or completed research activities are strongly related to the application areas of the company.

Among the most recent research projects:

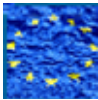


Recognition systems

3D reconstruction system for face recognition (MIUR)

Feasibility study for a behavioural analysis system in ski practice (PSTL)

Video processing and analysis system for sport events (PSTL)



Optimisation systems

COMBINE 2 project

Traffic Management System for real-time traffic optimisation in large railway networks equipped with fixed/moving block signalling systems

System for real-time control and management of logistics networks equipped with advanced multi-modal terminals.(PSTL)

Application development

On AIR offers a good knowledge and expertise in problem analysis, modelling and solution finding. The developed application projects mainly address innovation requirements in the critical parts of industrial systems. Possible outcomes of such activity are both studies and system components or complete systems.

On AIR also gained considerable experience in integration activities, both with external equipments and embedded systems



Recognition systems

On AIR can profit from its relevant background in producing software tools for computer vision applications. On AIR operates as a partner for industrial automation industries and services, devising and developing software tools tailored to the user needs. The developed products can be based on either vision methodologies provided by On AIR, or algorithms and methods provided by the users or the scientific international community.



Optimisation systems

On AIR acquired a vast experience in developing dynamic optimisation models, applied to decision support systems for industrial applications, traffic management and scheduling in complex logistic networks. Multi-disciplinary knowledge enables On AIR to select, tailor and integrate different methodologies and solutions, on the basis of process and market requirements.



Recognition systems



Technologies

The solutions developed by On AIR in the recognition field are based on the following technologies:

Signal processing

- Spectral analysis
- Noise cancellation
- Trend detection
- Directional analysis with multiple sensors

Artificial vision

- Image and video processing
- Shape recognition
- Character recognition (OCR and ICR)
- Motion detection and analysis
- Motion tracking on image sequences
- Abnormal behaviour detection and reporting
- Image enhancement
- 3D surface reconstruction
- Digital interferometry

Digital multimedia

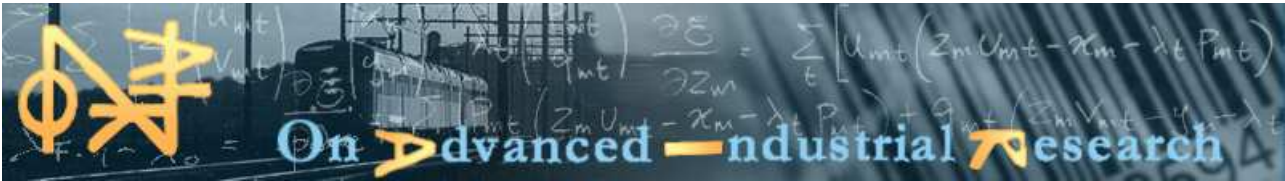
- Digital data compression (audio and video codecs)
- Optimised software for embedded platforms
- Objective image and video quality assessment
- Intelligent rescaling of digital data
- Watermarking
- 3D digital data representation

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- Technical and management consulting activities in computer vision applications: state of the art,, make or buy analysis, definition of possible solution for specific application problems
- Study, design, development and testing of algorithms for computer vision applications
- Optimisation and integration of software modules, on the basis of special platforms requirements
- Evaluation and customisation of industrial software tools for image processing applications
- In-house training courses about computer vision in industrial applications

Application fields:

- surveillance and access control
- traffic monitoring
- automatic identification
- object recognition
- form and document processing
- image and video compression
- performance analysis in sport
- quality control
- cultural heritage



Optimisation systems



Technologies

On AIR addresses a large part of industrial applications applying innovative methodologies for dynamic optimisation:

Basic methodologies

- Graph modelling and optimisation
- Shortest path algorithms
- Dynamic programming algorithms
- Constraint programming
- Evolutive Programming Algorithms (e.g. genetic algorithms)
- Statistical classification
- Neural networks and neuro fuzzy
- Interpolation and extrapolation methods

Applications in Railways

- Railway Dynamic Traffic Management
- Conflict detection and resolution
- Optimisation of routes on a complex network
- Speed optimisation for equipped trains
- Timetabling
- Rolling stock and crew scheduling

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Consulting

- optimisation / capacity planning and verification
- scheduling
- monitoring of dynamic systems

Components and products

- real-time Conflict Detection & Resolution systems
- real-time components for continuous regulation of dynamic systems
- decision support systems (DSS)

In the fields

- flexible manufacturing
- logistics
- diagnostics
- traffic control

On AIR can also provide remarkable experience in process integration and dynamic communication problems, as well as testing methodologies and statistical analysis of results.



Projects

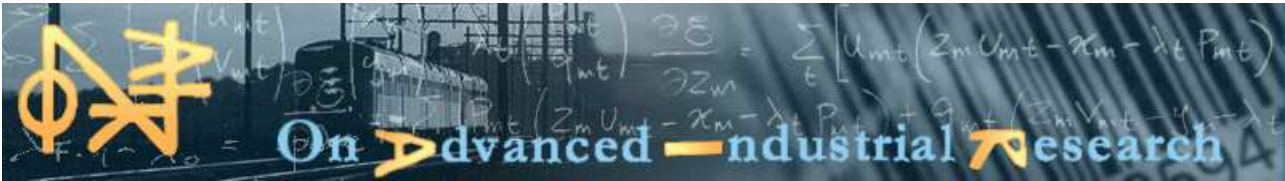


Recognition systems

- *2D barcode reader*
Development of an embedded software module for 2D barcode reading on low-cost CPU (Intel StrongArm) without any performance decrease
- *H264 video codec*
Development of a H264 codec library for surveillance and access control applications
- *Image-based quality control*
Development of image processing methodologies for real-time quality control
- *3D surface reconstruction*
Development of an active vision 3D surface reconstruction module based on structured light projection
- *Motion detector*
Development of a video-based semi-automatic tracking system for sport players
- *Traffic control*
Development of motion analysis functions able to provide information about traffic conditions and generate alarms in case of abnormal behaviours
- *License plate recognition*
Development of on-line modules for plate location, OCR and alarm generation with black/white lists
- *Complex document reading*
Development of processing modules for data extracting in highly complex documents (e.g. cheques, flight coupons)
- *Address Block Location*
Development of new algorithms for address block location over complex mail pieces (magazines, parcels, etc.)
- *Automatic container ISO code recognition*
Development of sw modules for detection and recognition of the ISO code of containers

Optimisation systems

- *Traffic Management System (TMS)*
Design and development of an advanced TMS for real-time traffic optimisation and control on a complex railway network
- *De Groene Golf*
Pilot project to integrate and test in practice the complete TMS in Breda railway node (NL)
- *Schiphol 2007*
Development of a model and a method to increase the throughput of rail traffic in the Schiphol bottleneck (NL), making a more efficient use of the existing infrastructure.
- *High Level Architecture - IEEE standard 1516-2000 (HLA)*
Integration of TMS in a dynamic reconfigurable adaptive software architecture for federate in HLA standard.



Most recent research projects



Parco Scientifico e Tecnologico Liguria 2007-2008

- **Feasibility study for a behavioural analysis system in ski practice:**
 - Video sequence acquisition – provides the data needed for the analysis
 - Video processing for trajectory evaluation – automatically detects the trajectory of the skier
 - Trajectory analysis – quantitative evaluation of the trajectory
 - Video calibration – allow the conversion between image and 3D co-ordinate systems

- **Video processing and analysis system for sport events:**
 - Video quality optimisation under several causes of degradation
 - Image warping over the ground, to provide a panoramic view of the whole event
 - Segmentation between play and pause phases
 - Management of several semiautomatic and interactive video indexing levels in clips
 - Statistical evaluation of the team disposition on the ground
 - High quality digital zoom in complex play phases
 - Assisted search in available video clips based on predefined access keys

- **System for real-time control and management of logistics networks equipped with advanced multi-modal terminals (Metrocargo):**
 - On-line monitoring and management of an intermodal transportation network for goods containers
 - off-line planning
 - on-line planning
 - local optimisation.

