Robonet.
Competitiveness Cluster in autonomous systems and robotics

Sectorial Operational Programme „Increasing Economic Competitiveness“
Co-funded from the European Regional Development Fund
„Investments for your future“
The Competitiveness Cluster in autonomous systems and robotics - Robonet is an association of legal entities proposing an integrated package of projects financed from the Sectoral Operational Program “Increase of Economic Competitiveness (SOP IEC) 2007-2013”, co-funded from the European Regional Development Fund - Priority Axis 1 “An innovative and eco-efficient productive system” Key area of intervention D1.3 “Sustainable entrepreneurship development” Operation “Development of business support structures of national and international dimension”

Implementation period of the project package: April 2014 – December 2015

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RobotX.
The brand of the Competitiveness Cluster in autonomous systems and robotics - Robonet

By means of a strong partnership, the Competitiveness Cluster is building the premises to integrate innovative technologies, such as autonomous systems, robots or the Internet of Things, in order to offer complex solutions in different industries, able to solve worldwide key issues.

Partners:
Teamnet | Autonomous | AFT Design | Teamnet World Professional Services | Teamnet Engineering | Expert One Research
AVITECH Co | Insoft Development&Consulting | Asesoft International | Asesoft Technologies | Romtek Business Solutions
Advisors | Connections Consult

RobotX is registered trademark of Robonet - The Competitiveness Cluster in autonomous systems and robotics
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RobotX description

RobotX – the brand of the “Competitiveness Cluster in autonomous systems and robotics - Robonet” - is an innovative initiative aimed to design, prototype and increase the production capacity in the field of autonomous systems and robotics. Through RobotX, the partners collaborate to implement a series of projects: research activities for autonomous unmanned aerial vehicles and unmanned maritime vehicles, building of a manufacturing facility, projects coordination and an informative campaign.

In order to achieve the objectives of RobotX, a strong partnership of private companies and academic institutions was established, with key, complementary competences in offering complex, end-to-end solutions in the following fields: research, development, system integration and manufacturing.

This initiative is of increasing importance in the context of robotics rapidly becoming one of the most important markets worldwide. Thus, the robotics growing market has a substantial impact, both in terms of transforming society and in terms of the number of jobs generated.

The future of Robotics

Reshaping industries


$ 2,7 billion on medical equipment and surgical robots in 2013

$ 8 billion is expected to be spent on military drones in 2015.

50% faster annual growth expected in consumer and commercial drone markets in 2015.
Investing in innovation

$2.2 billion
being spent by the US to develop industrial robots and advanced materials.

$2.2 billion
being pumped into the creation of "life companion" robots in the EU.

$2.5 billion
being spent by South Korea on rescue, healthcare and advanced manufacturing robots.

$850 million
pledged by Japan to robotics research this decade.

Sources
(1) Gartner Says Smart Machines Will Have Widespread and Deep Business Impact Through 2020
(2) Computerworld - One in three jobs will be taken by software or robots by 2025
(3) Tech Investing Daily - The Next Industrial Revolution
(4) Robotics Business Review - Japan Pledges $850M plus Deregulation of Robots to Spur Jobs
(5) MIT Technology Review - Is Google Cornering the Market on Deep Learning?
(6) IDC - Worldwide Wearable Computing Device 2014-2018 Forecast and Analysis
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(8) Robotics Business Review - 2014 Robot Orders Up 28% in Units, 19% in Dollars over 2013
(9) BBC Research - Medical Robotics and Computer-Assisted Surgery: The Global Market
(10) Wired - Almost 1 in 3 US warplanes is a robot
(11) BBC - CES 2015: Why the future of drones is up in the air
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(13) Market Watch - Global Medical Robotics Market Outlook 2018
(14) Robotics Business Review - China’s Industrial Robot Boom Amazes Experts

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Key Activities

The projects are:

- **Design mini-UAV** (unmanned aerial vehicle) – which has as a main outcome the research and the design of a competitive and innovative mini-UAV prototype.

- **Design UMV** (unmanned marine vehicle) – which has as a main outcome the research and the design of a competitive and innovative UMV prototype.

- **Build Production Unit** – consists of building the manufacturing facility and installing the manufacturing equipment and IT equipment, which will ensure the mass production of robotics systems.

- **Projects Coordination** – coordination of all projects within the cluster, while maintaining a high standard for all deliverables and being compliant with European regulations.

- **Promotion** – increases the visibility of the Competitiveness Cluster and the products (systems) representativeness, on international markets.
The main asset of the initiative is represented by the deliverables of the research and development platform for designing competitive functions for the robotics systems.

The autonomous systems prototypes in this project are designed to be competitive internationally but also to lead to significant improvements in surveillance, precision agriculture, search and rescue and in urban maps.

Furthermore, the production factory is designed to support the production of 150 UAV and 95 UMV per year, which will enable a faster go-to-market. The production unit provides the link of the R&D deliverables with the industries benefiting from it in the form of integrated autonomous systems.
Addressability

The autonomous systems developed in RobotX have a wide addressability in civil applications, where they contribute to better surveillance, faster data capture from areas with low accessibility, improved precision in agriculture or more accurate land models.
The mix of competences and resources of the partners in RobotX, creates the premises for addressing new domains: the Internet of Things, autonomous systems, robotics etc. by gaining speed and agility in prototyping electronics, composite material and mechanics and by gaining capability in small series quality production. Finally, on a long term perspective, their collaborative endeavor offers important benefits for the society, enabling its communities to access new technologies in routine activities.
Partners in RobotX
Partners in RobotX

Teamnet

One of the most important IT&C integrators in the region, Teamnet uses advanced technologies, such as UAV (Unmanned Aerial Vehicle), GIS (Geographic Information System), Cloud, in delivering complex and innovative IT systems, while answering to specific business or public sector needs. Through magnitude projects, Teamnet offers solutions that improve performance, solve worldwide key governmental challenges and bring regional societies a step forward into the future. Since 2001, the group has gained expertise in many areas such as public services & government, environment, energy & utilities, transports, agriculture, public safety and healthcare. In addition, since 2006, the Group has been involved in over 30 R&D projects at national and international level.

AFT Design is specialized in industrial research and development and has a production unit specialized in manufacturing autonomous systems.

Autonomous Systems is a research and development company. Its team of experts conduct innovative projects in robotics, computer vision and artificial intelligence in a wide variety of domains.

University Politehnica of Bucharest is an innovation-driven institution, with a strong focus on scientific research with a powerful impact over society and technology in the context of its applications.

Teamnet World Professional Services designs and develops, though its international sales team, high magnitude projects and partnerships, both locally and internationally.

Teamnet Engineering is specialized in general contracting, design, technical support and project management, SCADA installation, construction and installation for roads, energy, transport, utilities and other industry sectors.

Expert One Research has over 10 years experience in integrated IT systems for document management, electronic archiving and data capture.
**AVITECH Co** covers the following domains: Security Systems, IT & C, Audio - Video & Video Conferencing and Service.

**Insoft Development & Consulting** develops a wide range of IT solutions for education, health and private sector.

**Asesoft International** is an important IT provider, with a rich background in offering integrated systems to over 100 clients, both in the private and public sector.

**Asesoft Technologies** is specialized in offering consultancy in the field of information technology.

**Romtek Business Solutions Advisors** offers a wide range of integrated solutions: from web programming to hardware infrastructure, network, IT security, audit etc.

**Connections Consult** is specialized in BPO (business process outsourcing) and IT services (IT maintenance, helpdesk, network administration etc.)
RobotX projects
RobotX projects

The success of the initiative is based on delivering five key projects, each one with an important contribution:
Project Coordination

Promotion
RobotX projects

3.1. Design UAV (Unmanned Aerial Vehicle)

Project Purpose

The project purpose is to develop an autonomous aerial platform of reduced dimensions which can be used in civil as well as military applications. By achieving this mini-UAV aerial autonomous system, the partners of the project provide a more varied and competitive range of products, which meet the needs of the potential clients with a very good value for money ratio and higher versatility.

Objectives

The specific objectives of the mini-UAV design component are:

- Increasing the research–development–innovation capacity of the partners in a period of 21 months by developing an innovative product – an aerial autonomous system of the mini-UAV type – enabling the Cluster members to compete on the national and international markets;

- Strengthening the cooperation oriented towards innovation and technological transfer, for a horizon of 21 months, between the private sector and the academia and the scientific sector, through the participation of the University “Politehnica” of Bucharest as partner in this project;

- Modernizing the business infrastructure to the benefit of the project partners, members of the Competitiveness Cluster, in a 21 month–horizon, by purchasing raw material and through the know-how needed to achieve the prototype of the aerial autonomous system of the mini-UAV type;

- Increasing the access to the members of the Competitiveness Cluster, to research–development–innovation, by intensifying the cooperation with the University “Politehnica” of Bucharest, partner in this project, for a horizon of 21 months;

- Increasing the portfolio of project partners, during a period of 21 months, by developing an innovative product of high added value, competitive on the national and international markets – autonomous aerial system of the mini-UAV type, with improved technical features and applicability in a wide range of activity fields in the civil sector.
RobotX projects

Project Description

The main outcome of the present project is a small scale pilotless airborne vehicle (miniUAV), characterized by significant functional improvements, as compared to the equipment currently used in the field – the device resulted has significantly reduced dimensions as compared to other UAV-type of equipment, designed up to now and existing at national level, having higher flight efficiency, reduced weight of the entire assembly, and, at the same time, offers the possibility to carry a relatively large payload as compared to the size of the drone.

Thus, a high efficiency of the equipment is ensured, as a consequence of the quality of the functionalities achieved. As a direct outcome, there is obtained a high performance which successfully adds up to the product portfolio of the Competitiveness Cluster members, by diversifying it and by increasing the level of quality in research-development-innovation activities.
The aerial autonomous mini-UAV system has the following composition:

- Unmanned aerial platform (AV) equipped with specific aircraft systems, Data Link and payload;
- Ground Control Station (GCS) consisting of specific entities for mission and payload control;
- Terrestrial Data Link Terminal and antenna management system;
- Automatic Launcher;
- Logistics.
RobotX projects

Aerial platform

The Aerial platform is made of composite materials (glass fiber, carbon fiber) and will have an easily assembled / disassembled modular structure composed of: wings, winglets, power module and propulsion system.

The payload is equipped with sensors for day and night view, two gyrostabilizers, interchangeable and retractable axes.

Ground Control Station

Ground Control Station will provide the following functions:
- Mission planning;
- Mission transmission aboard the unmanned platform;
- Launching;
- Mission monitoring;
- Mission changing during the flight;
- Reception and storage of specific mission data (orders, control data, video data);
- Offline mission analysis for debriefing.

Ground Control Station will be built in a lightweight, shock resistant case.

Propulsion electric

4000 mm
Ground Data Terminal

Ground Data Terminal will provide:
- Onboard transmission of mission and ground controls;
- Control data reception;
- Data transmission for payload control;
- Analog or digital video data reception;
- Automatic orientation of the antenna on platform azimuth.
- Range: min 15 km;
- Real time video data transmission / reception;
- Real time transmission / reception of flight parameters;

Launcher

The launch of the platform is made using an automated catapult;
The launcher is equipped with an active safety system during the release;
The construction is modular.

Logistics

The mini-UAV system is equipped with power supply (batteries) for Ground Control Station and Data Link system that provides an autonomy of at least 200 minutes. Supply voltage 24 VDC + 10%, -15%.
The system is equipped with specific tool kits and accessories: charging station batteries, spare parts and maintenance materials.
RobotX projects

3.2. Design UMV (Unmanned Marine Vehicle)

Project Purpose

The project purpose is to develop a small-sized autonomous marine platform, which can be used in civil as well as military applications. By achieving this autonomous marine system, the members of the project offer a wider range of products which answer to the requests of the potential clients through a very good value for money ratio and higher versatility.

Objectives

The UMV Design project aims at increasing the competitiveness of the Cluster members, by developing a research-development-innovation platform in the field of maritime autonomous systems, capable to compete on national and international markets;

The specific UMV design component objectives were:

- Strengthening the cooperation oriented towards innovation and technological transfer, for a 2 year-horizon, between the project partners and the academia and the scientific field, through the participation of the University “Politehnica” of Bucharest, as project partner;

- Modernizing the business infrastructure for the Competitiveness Cluster members, for a horizon of 2 years, by purchasing equipment, technologies, licenses, know-how in line with the technological progress;

- Increasing the access of partners from the private sector to research-development-innovation by increasing the cooperation with the University “Politehnica” of Bucharest, partner in the project, for a period of 21 months;

- Increasing the portfolio of innovative products of the Competitiveness Cluster members, during a period of 21 months, by developing an innovative product of high added value, competitive on national and international markets – autonomous maritime system.

21 months

Increasing the partners research-development-innovation capacity during a period of 21 months, by developing an innovative product – a maritime autonomous system – allowing the Cluster members to compete on national and international markets;
**Project Description**

The main outcome of the present project is a small-scale marine vehicle, characterized by significant improvements from a functional point of view, in relation to the equipment currently used in the field. The innovative product consists of an unmanned marine vehicle (UMV), of higher navigation efficiency, reduced weight of the entire assembly, and offer the possibility to transport a relatively large payload as compared to the size of the system. As a direct outcome, a high performance technology adds up to the product portfolio of the Competitiveness Cluster members.
3.3. **Build Production Unit**

**Project Purpose**

The building of a production unit contributes to increasing the productivity of robotic systems of higher autonomous capacity by providing the logistic support needed for the Cluster members to develop research-development-innovation activities in the area of autonomous systems and robotics.

The investment project consists of setting up a production and research unit in which Teamnet International, AFT Design and Autonomous Systems can build aerial and marine autonomous systems at similar standards as the international contenders, but of much reduced costs.

The general objective of this project consists in building a business structure in the field of autonomous systems and robotics by creating a production and research unit with the purpose of developing competitive products at national and international level.

The achievement of the project facilitates the access to an adequate logistic infrastructure, in line with the technological progress, but also with the physical space needed for the development and porting of a prototype of artificial intelligence algorithms on host platforms, which is installed on the board of the marine and aerial autonomous systems.

The present project is in line with the project partners strategy to develop new information technologies in high-tech areas, by providing a work space and the logistic infrastructure needed to collaborate with companies with a wide experience in fields generating added value. The construction aims at increasing the production capacity and modernizing the production line in order to access new markets by supplying the autonomous systems developed.
The specific objectives of the construction component of the production unit were:

1. Diversifying the portfolio of innovative services and products during a period of 21 months.

2. Developing, for a period of 21 months, a production facility in the field of autonomous systems and robotics.

3. Creating an efficient and innovative productive flow, in a timeframe of 2 years, by purchasing next-generation equipment and installations.

4. Increasing the economic efficiency of the partnership by keeping costs at a rational level and increasing work productivity in a timeframe of at least 12 years.

Project Description

The present project, helps implement the results of the industrial research and experimental development of mini-UAV and marine systems. This project also consists in making available for the members of the Competitiveness Cluster of a space equipped and fitted with the equipments, installations, computer technology, information applications and specific software needed to implement the research-development-innovation projects. The construction of the factory actively contributes to increasing the production capacity in the field of autonomous systems and robotics.
The purpose of this project is to ensure the coordination of all the projects implemented in the Competitiveness Cluster in autonomous systems and robotics, in order to reach the objectives of the Cluster development strategy. Meeting the objectives of this project provides a solid development and expansion basis for the Cluster, in order to attract new members.

**Objectives**

The general objective of the project consists in developing and increasing the productivity and the competitiveness of the initiative, by conducting activities of coordination, monitoring and reporting. These activities contribute to the implementation of the Competitiveness Cluster development strategy in the field of autonomous systems and robotics, and to the national and community regulations on equal opportunities, environmental protection and state aids.
The specific objectives of project coordination are:

1. Increasing the administrative capacity of the cluster by optimizing the processes for coordinating, monitoring and reporting of project activities, inclusively using a software application of the Integrated Management Software type. This tool contributes to facilitate the monitoring of the evolution of indexes, respecting the schedules, generating reports at strategic level, facilitating access to information for all Cluster members, by storing all documents and facilitating communication between the members of the Cluster and those of the Management Authority.

2. Streamlining the process of implementing the Cluster Development Strategy, and the projects respectively, by ensuring the participation to the training sessions of the representatives of the project partners; the training areas aimed at are the following: project management, reporting and communication, procurement, risk management, from the perspective of correctly and efficiently using European funding.

3. Consolidating the position on the local and international market of partner companies raising the innovation level and the access to technology transfer, by achieving exchanges of experience in the field organizing study visits and exchanges of experience with other projects abroad in order to identify the best practices to be adopted and implemented when developing the Competitiveness Cluster in the field of autonomous systems and robotics.
3.5. Promotion

Project Purpose

The Promotion project is an important component of the Competitiveness Cluster, which ensures the kind of exposure for the project that enables market penetration, and the successful shift towards commercializing and implementing the products in a large range of industries: law enforcement, agriculture, etc.

Objective

The general objective of this project consists of developing the Competitiveness Cluster by increasing the visibility and representativeness of the products (systems) developed under RobotX, in the field of autonomous systems and robotics, on national and international markets.
The specific objectives of the Project were:

Increase the visibility of the Competitiveness Cluster and the products (systems) awareness and mindshare within national and international markets;

Increase the number of suppliers and customers through product promotion activities conducted on national and international markets.

Increasing turnover with 17% at the Competitiveness POL level in 2 years after the project.

In addition, through this project, the partners gain a strategic position from which they can address new domains: Internet of Things, autonomous systems, robotics.

Project Description

The project consists of an information and awareness campaign on the activities of the project, which will help achieve the Cluster objectives. The consistency in all communication activities related to the actions in this Cluster, will lead to a high degree of integration and convergence of the efforts and skills for all the partners involved. This ensures the durability and stability needed for the further development of the Pol.

Based on the activities in the Visibility Project, the "Competitiveness Cluster in autonomous systems and robotics" is promoted in national press conferences, online, in three relevant fairs in Europe and in a European subject matter symposium.

The main resource generated in this project is a powerful, competitive brand in robotics, RobotX, designed to increase visibility and representativeness of the developed products (systems), in domestic and foreign markets. The extended value of the brand is given by the continuity in bringing together key partners in robotics and generating innovative products, with transforming results over society.
RobotX projects

RobotX Overview

Partners’ current resources and skills

- Research and development
- Project management
- Innovation in advanced technologies (computer vision, artificial intelligence, robotics)
- Manufacturing
- System integration
Key Assets

Production Unit fully equipped for producing over 150 UAV and 95 UMV/year

Competitive mini-UAV (Unmanned Aerial Vehicle)

Competitive UMV (Unmanned Marine Vehicle)

Management Information System designed for a business model delivering end-to-end, solutions in robotics

The innovative - research and development platform

Gained competences

Increase knowledge in industrial research and development

Cover all phases of launching innovative technologies: from R&D to integration in a end-to-end solution

Capability to address innovative technologies, such as autonomous systems, robots or the Internet of Things

Speed and agility in prototyping electronics, composite material and mechanics

Capability in small series quality production
Next step: Our contribution to building a better future.

We are committed to the development of the highest quality robotics systems

Based on the deliverables of the first set of projects, we, the partners have the premises to continue adding value through product enhancements, integration in complex system, related services and customization for solving specific problems in a wide range of domains: agriculture, border surveillance, urban development, emergency situations and beyond. Also, we are determined to generate new projects contributing to the achievement of the objectives of the Competitiveness Cluster.

The UAV and UMV systems (plane, sensors, ground control station, data terminal, launcher, logistics)

A platform for innovation in
Environment monitoring (radiation, air quality)
Agriculture (vegetation index)
Wild life monitoring

Integrated autonomous systems (Mobile Command truck, GIS, Cloud, Field Crew, Data Processing Units, Security infrastructure, border surveillance systems, law enforcement ISR systems etc.)

Additional services for a meaningful use of autonomous and robotic systems
Training center
Support and maintenance
Operating services
For more details about the project contact us at www.robotx.io.
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