

SME Expertise and Skills in the 5G Domain





Who is going to give us the innovative thinking, the innovative solutions, the ones that will be combined and recombined to influence the [5G] architecture, and provide solutions for each specific domain?

The agile small and medium-sized enterprises.

MARIO CAMPOLARGO
Former Director, DG CNECT,
European Commission



SMEs are important stakeholders in the overall development chain towards future communication networks. In particular, the development of innovative applications for the support of vertical sectors requires SMEs. Therefore, the 5G Infrastructure Association is expecting a stronger involvement of SMEs in Horizon 2020 5G PPP Phases 2 and 3 projects for a faster adoption of 5G technology in the market.

WERNER MOHR
Chairman of the Board of Directors of the 5G
Infrastructure Association

Useful links

Find the SME you need

www.networld2020.eu/find-the-sme-you-need/

NetWorld2020 SME support

www.networld2020.eu/sme-support

NetWorld2020 European Technology Platform

www.networld2020.eu

5G Public-Private Partnership: www.5g-ppp.eu

EDITORIAL

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This brochure aims at showing the expertise and skills from selected European Small and Medium-sized Enterprises (SMEs) in 5G and related domains. It should be used by organisations from Europe and from all other continents seeking to cooperate with SMEs in 5G.

I am fully convinced that SMEs have a great added value in providing innovative concepts and solutions that could be used in various places of the 5G value chain. SMEs have the agility and flexibility that are required in a fast evolving technical and market landscape. They are willing to work with larger industrial companies and research organisations to develop leading 5G solutions for the global market.

I hope that this brochure can be an efficient means to engage into cooperation with SMEs -hopefully leading you to also consider SMEs as an important asset in the 5G landscape.

One of the challenges we are facing in SMEs is to make our expertise and skills known to larger organisations. With the NetWorld2020 SME Working Group, we are trying our best to simplify the life of large organisations looking for expertise, while increasing our visibility. We have come up with a "Find your SME" web page specifically dedicated to 5G, making the search for the most relevant SMEs as straightforward as possible in a given context (e.g. a 5G PPP Call and beyond e.g. bilateral collaboration).

I would like to thank all my colleagues in the SME Working Group for their contribution and their hard work during this past year, and I am looking forward to seeing more European SMEs cooperate with European and non-European partners in the near future, for the development of 5G.



JACQUES MAGEN
InterInnov
Chair of the SME Working Group



CONTENT

SME Expertise and Skills in the 5G Domain

AICO EDV-BERATUNG GMBH	5	NOUVEAUCOMM NETWORKS RESEARCH CENTRE	22
ARDIC	6	PLASMA ANTENNAS LIMITED	23
CITYPASSENGER	7	QUOBIS NETWORKS SL	24
COGNITIVE SYSTEMS CORPORATION	8	QUOTIENT ASSOCIATES LTD	25
HOLISTIC INNOVATION INSTITUTE, SLU (HI2)	9	RESEARCH FOR SCIENCE, ART AND TECHNOLOGY (RFSAT) LTD	26
INCITES CONSULTING SARL	10	SENCEPTION	27
INNOROUTE GMBH	11	SOFTWARE RADIO SYSTEMS	28
INTEGRASYS SA	12	SPECTRUM INSIGHT LTD	29
INTERINNOV	13	TELCARIA IDEAS S.L.	30
IQUADRAT INFORMATICA S.L.	14	TST	31
IS-WIRELESS	15	UBIWHERE	32
ITTI SP. Z O.O.	16	VISIONA INGENIERÍA DE PROYECTOS S.L.	33
JCP-CONNECT SAS	17	WEST AQUILA SRL	34
MAGISTER SOLUTIONS	18	WINGS ICT SOLUTIONS	35
MOLTOSENSO	19	WIRELESS INNOVATION	36
MONTIMAGE	20	ZEETTA NETWORKS	37
NEXTWORKS	21		

Company overview

AICO EDV-Beratung GmbH

Foundation year 1981

of employees 5

Website www.aico-software.at

Contact email info@aico-software.at

Expertise in 5G related domains

Long history in telecommunication software service, expertise in requirement assessment, performance analysis, and interoperability evaluation. Issues like distributed QoS fulfilment and evaluation of mechanisms used are in our focus. We offer algorithm/protocol analysis and implementation, routing/queueing/scheduling system-modelling and evaluation, down to embedded systems development.

Expertise in vertical sectors

AICO is a member in the IES (Integrating the Energy System Austria) project, adopting an established interoperability assessment methodology from the IHE (Integrating the Healthcare Enterprise – IHE.net) to Smart Grids, considering issues like secure meter access, supplier change, and Virtual Power Plants (VPP).

Interest in international cooperation

We welcome international cooperation as subcontractor and within R&D projects. Our contribution shall reside in the realm of SDN and NFV, predictive resource orchestration and smart QoS provisioning, including the topics and skills mentioned above. Also cooperation on car-to-X communication in the realm of CAN and MOST is welcome.

Company overview

ARDIC

Foundation year 2008
of employees 40

Website www.ardictech.com
Contact email sinan.ozmen@ardictech.com

Expertise in 5G related domains

Software Defined Networks, Internet of Things Platform, IoT Gateways, Cloud Computing, Edge Computing, Mobile Device Management

Expertise in vertical sectors

Smart City, Retail, eHealth, Education, Energy, Agriculture

Interest in international cooperation

We provide an IoT Platform (IoT Ignite) and we are looking for International partners and collaborations, including IoT service providers, developers and device manufacturers (gateways, sensors, cameras, RFID readers, digital scales, etc)

Company overview

CityPassenger

Foundation year 2001
of employees 30

Website www.citypassenger.com
Contact email projects@citypassenger.com

Expertise in 5G related domains

For several years, CityPassenger conducts researches about performance limitations of Linux/BSD operating systems cores facing visualization. We are particularly interested in network performances, specially regarding security of virtual network infrastructures. Our current works are focused on the implementation of hardware enhanced network functions in virtual environments. These researches aim to develop advanced network functions with more flexibility, reactivity, security and predictability despite infrastructures complexities.

Expertise in vertical sectors

CityPassenger relies on its business experience to address two kinds of vertical applications:

- Digital Retail (electronic points of sales, omnichannel retail, connectivities in shop, wireless cells proximity sensor)
- Transports (interconnection of the main actors of automotive business, mobile and wireless connectivities for public transport)

Interest in international cooperation

Involved in 14 collaborative projects these last 10 years, including half of EU projects.

Company overview

Cognitive Systems Corporation

Foundation year 2014

of employees 50

Website www.cognitivesystems.com

Contact email william.suriaputra@cognitivesystems.com

Expertise in 5G related domains

We are developing a custom radio processing architecture that allow for flexible and customizable processing on our sensor board. We have developed an ASIC solution board that has dual core high performance vector processing combined with dual core controller processor and a flexible FEC processor. Our products allow for multi-facets application from consumer level home automation to commercial level spectrum sensing application. Our sensor board is a low SWaP (size, weight, and power) solution that is scalable for mass deployment. Our sensors are also connected to a cloud based technology for sensor data fusion and control, which bring sensor management to modern standards and closer integration to 5G goals. Overall, our platform provides a framework for future cognitive radio technology development and scalability.

Expertise in vertical sectors

We are focusing on two different potential customers focus for both consumer and commercial. For consumer, we are working to develop home automation platform combined with a home security application that uses RF for motion detection. We are also looking at potential commercial application collaboration that uses RF technology to solve problems, which may include cyber security, spectrum analytics, and drone detection.

Interest in international cooperation

We are currently involved in more than 4 international partnership which includes IEEE standard development, industry alliance and industrial partnership.

Company overview

HOLISTIC INNOVATION INSTITUTE, SLU (HI2)

Foundation year	2011
# of employees	2 + Consultant researchers
Website	www.hi2.es
Contact email	jsesena@hi2.es

Expertise in 5G related domains

Regular participant in the ETSI, ITU, CEPT work for WRCon spectrum needs and spectrum sharing. Expertise on:

- TA1: 5G Wireless System Design
- TA2: Air Interface and Multi-Antenna, Multi-Service Air Interface
- TA3: New Spectrum and mm-Wave Air Interface for Access, Backhaul and Front-haul
- TA4 : Subsystems for 5G Platforms: Integration of Hardware and Software Aspects
- TA6: Seamless Integration of Satellites Networks and Air Platforms into 5G
- TA7: 5G for Future MTC Solutions
- TA23: Cooperation in Access Convergence 2

Expertise in vertical sectors

- Media. New mechanisms to broadcast content and provide personal TV. Assistant to ITU-D on supporting new advanced entertainment systems. Also, research analysis on new preferences of content viewers and comparison of efficiencies of different delivery platforms (satellite, cable, terrestrial over the air, OTT)
- Automotive. Designers and supporters of new solutions for Car2Car communications
- Public Safety. Involvement on the standardization processes for ICT solutions applicable to PPDR.

Interest in international cooperation

Widely involved in activities in Europe, Latin America and Africa. Assistance is regularly provided to Governments of Mexico, Colombia, Paraguay as well as ongoing activities in Africa.. HI2 interest in Morocco, Algeria, Tunisia, Egypt, Lebanon, Argentina, Chile, Brazil, Ecuador, Perú, Venezuela, Colombia, Panamá, Costa Rica, Honduras, Mexico.

Company overview

INCITES CONSULTING SARL

Foundation year 2013
of employees 2

Website www.incites.eu
Contact email info@incites.eu

Expertise in 5G related domains

INCITES CONSULTING offers consulting services related to technoeconomics and regulatory economics of 5G networks. In detail, its main activities include:

1. Techno-economic analysis (demand and prices modelling and forecasting, network dimensioning, modelling of funding schemes, evaluation of financial indices such as NPV, IRR, payback period) in order to assess the viability of potential deployments of 5G networks.
2. Consulting services on regulatory issues and economics such as resource and spectrum sharing, OTTs etc.
3. Research on new business models in the 5G ecosystem. Investigation of the role of new players and pricing schemes.

Expertise in vertical sectors

All

Interest in international cooperation

INCITES is now participating in three Horizon2020 projects: two 5G projects and one cybersecurity related project. INCITES is seeking cooperation in two directions: a) ICT H2020 projects and b) consulting to operators, NRAs and telecom companies on telecom investments and regulatory economics.

Company overview

InnoRoute GmbH

Foundation year 2010
of employees 10

Website www.innoroute.eu
Contact email foglar@innoroute.de

Expertise in 5G related domains

InnoRoute combines expertise in network protocols and HW design. Our experimental router “TrustNode” provides ultra-low latency forwarding ($<3\mu\text{s}$) for time-critical IoT applications. Its industry-proven FPGA core and the OpenWRT Linux processor are programmable for research-specific requirements. The architecture is scalable in throughput, number of ports and in number of (SDN) flows. A modular concept allows rapid prototyping of new functions. A novel HW-SW interface concept assures re-usable software. In addition, InnoRoute has innovative concepts for Routing, QoS control, OpenFlow and shared-media MAC protocols.

Expertise in vertical sectors

InnoRoute’s expertise in basic technologies low latency packet processing and QoS primarily applies for Factories of the Future, but also for Automotive, Media & Entertainment and e-Health.

Interest in international cooperation

InnoRoute is convinced that advances in networking can only be achieved by international cooperation. Therefore, the company has successfully participated in FP7 GREENET, SMEINST and national projects. We are partners in 5G-PPP SELFNET and CHARISMA projects.

Company overview

Integrasys SA

Foundation year 1990
of employees 25

Website www.integrasys-sa.com
Contact email pedro.ruiz@integrasys-sa.com

Expertise in 5G related domains

IntegraSys is an SME engineering company specialized in the design, development and integration of Real Time software for network infrastructure (management, monitoring and control), service provisioning, and OSS in the area of wireless, aerospace and mobile communications. The company also develops solution for automated measurement and certification systems in the telecommunication field.

Expertise in vertical sectors

Integrasys provides solution in the following sectors:

- **Satellite:** Remote network monitoring and management, including own OSS tools with network virtualization. Integration with terrestrial network
- **Public Safety Communication:** Secured communication of emergency situation, fast deployment, interoperable communication among robotics vehicles.
- **Factories:** WSN for harsh environment, including Factories and Power Plants.
- **Media Delivery,** content aware video delivery, hybrid broadcast (DVB-Tx /-Sx) and broadband (LTE) based on DASH. Video surveillance (H264 over Sat/terrestrial)

Interest in international cooperation

Integrasys already commercializes their products at international level (America, EMEA, EU and Australia). We are willing to cooperate and establish new synergies both at commercial or R&D level (as H2020).

Company overview

InterInnov

Foundation year 2009
of employees 5

Website www.interinnov.eu
Contact email jmagen@interinnov.eu

Expertise in 5G related domains

CONNECT, DRIVE, COMMUNICATE -InterInnov provides services around community building and stakeholders' engagement, promotion and communication, dissemination, exploitation -and helps to find the right positioning within the 5G PPP and beyond.

Thanks to its strong involvement in the 5G Infrastructure Association and NetWorld2020, InterInnov also brings to 5G PPP projects additional expertise and experience for an efficient coordination within the 5G PPP governance and the various Working Groups where projects shall participate and contribute.

In addition, InterInnov has also initiated a specific partnership with a few "trusted partners" in order to offer additional technological expertise and more services including support to project management (incl. administrative and financial support) for the preparation of proposals and during the course of the project.

Expertise in vertical sectors

InterInnov brings years of experience in research & innovation activities related to international partnerships and collaborative projects, and a large network of contacts at European and international level in industry and public administrations, in various sectors of industry. Through the "trusted partnership" we also bring expertise in various vertical domains such as Media & Entertainment, Smart Cities, etc.

Interest in international cooperation

InterInnov is already cooperating with partners in the USA, Canada, Korea and China. We are looking at strengthening those partnerships as well as opening up to new countries.

Company overview

Iquadrat Informatica S.L.

Foundation year 1997

of employees 18

Website www.iquadrat.com/research-and-development

Contact email projects@iquadrat.com

Expertise in 5G related domains

Iquadrat has a focus on delivering System-Level evaluation tools for wireless networks. The company is currently active in three domains: Software development, consultancy primarily in planning wireless networks, and R&D in simulation & experimental methodologies for radio access technologies, including IEEE 802.15.4, 4G LTE RAN and beyond. The R&D department has extensive know-how in radio access technologies, wireless planning, cognitive radio, SDN, and is also active in the fast-growing IoT paradigm preparing a close-to-realistic IoT platform at the SLS.

Expertise in vertical sectors

Smart Metering in Energy Grids

Demand Response in Smart Grids

Energy monitoring in Smart Houses

Water management in Smart Cities

Interest in international cooperation

Iquadrat has been involved in many EU-funded research projects (1 ICT-FP7, 2 ENIAC, 1 ARTEMIS, 2 CELTIC, 1 CATRENE, 2 IAPP-MC, 4 ETN-MC, 2 RISE-MC, 1 ECSEL).

We are interested in international cooperation in H2020 projects in ICT-related research and innovation, such as networking research for 5G and beyond, IoT, tools for smart content in creative industries, etc.

Company overview

IS-Wireless

Foundation year 2006
of employees 15

Website www.is-wireless.com
Contact email info@is-wireless.com

Expertise in 5G related domains

Development of 5G Experimental Toolset (<https://www.is-wireless.com/5g-toolset/>) – a set of modelling tools for 4G and 5G systems

Development of Small Cell Protocols (<https://www.is-wireless.com/small-cells/>) – a software suite realizing functionalities of LTE small cell base station (eNB) but build around a 5G-ready architecture

Delivery of technical courses in the area of 4G and 5G (<http://is-wireless.com/training>)

Expertise in vertical sectors

Media: multiple projects realized with the goal to optimize system throughputs, support various QoS requirements.

Public safety: a large project realized with the goal to design and implement a special-purpose wireless access system.

Interest in international cooperation

We are looking for partners willing to collaborate on:

- Development of 5G Small Cell Protocols
- Development of 5G Experimental Toolset
- Delivery of 4G and 5G technical courses
- Application for R&D funds within EU programs.

IS-Wireless has been involved in FP7 and H2020 projects such as: 5GNOW, SOLDER, eWINE. International co-operators may include: customers, providers of complementary products or services, investors, idea creators and universities.

Company overview

ITTI Sp. z o.o.

Foundation year 1996
of employees 80

Website www.itti.com.pl
Contact email krzysztof.samp@itti.com.pl

Expertise in 5G related domains

- PHY: channel coding, modulation, signal processing, synchronisation
- MAC: admission control, congestion control optimization
- Cognitive resource control / service adaptation (cross-layer, context driven, machine learning based, QoE/QoS)
- Cyber security, critical infrastructure
- Test campaigns (e.g. video systems, mobile data services)
- Validation: system/link level simulators (LTE, WIMAX)

Expertise in vertical sectors

- eHealth: Medstar.co solution that offers telecare support for remote patients
- Energy: optimal control for smart cities (e.g. light control, energy management)
- Public Safety: economic evaluation of PPDR networks, social media usage in crisis management

Interest in international cooperation

ITTI has contributed to over 50 international R&D projects in the EC Framework Programmes (5FP, 6FP, 7FP, H2020), EDA programmes and ESA programmes.

Interest for collaboration in the area of 5G:

- Research in physical layer and MAC for 5G (e.g. massive MIMO, novel waveforms, spectrum sharing strategies, admission/congestion control)
- Development of cognitive controllers / service driven adaptations
- Contribution to validation/experiments in verticals

Company overview

JCP-Connect SAS

Foundation year 2002
of employees 10

Website www.jcp-consult.net
Contact email contact@jcp-connect.com

Expertise in 5G related domains

We developed a full mobile edge caching/pre-fetching system, using content delivery analysis and social algorithms. The system includes mobile router-server (MoBcache), virtual caches and a cache controller (as VNF) which can be deployed in an SDN environment.

This allows flexible use of the infrastructure resources (caches deployed at different levels in the network), increased scalability and provisioning of orchestrated end-to-end services. Thus operational and business models such as multi-tenancy can be supported through network slicing and virtualization

Our vision includes pushing caching to the edge, involve caching in QoS management of wireless network and integration of IoT.

Expertise in vertical sectors

Content delivery in events, education, boats and cruise ships, public transport, sensor data collection for IoT applications with extra security layer.

Interest in international cooperation

We are looking for collaboration with telecom operators and satellite service providers, system integrators and SMEs from EMEA. We are also interested in applied research on our topics of expertise.

Company overview

Magister Solutions

Foundation year 2005
of employees 30

Website www.magister.fi
Contact email info@magister.fi

Expertise in 5G related domains

Magister Solutions group offers business critical products and services for mobile, satellite and finance sectors. Services include simulators, testbeds, R&D services and software development. Magister Solutions is specialized in wireless systems research and development, especially in development of system simulators supporting product development and standardization activities. Technology competence includes mobile networks, fixed networks, satellite networks and positioning.

Expertise in vertical sectors

Magister Solutions group offers business critical products and services for mobile, satellite and finance sectors.

- Critical communication, emergency communication, alerting and situational awareness (<https://www.secapp.fi/?lang=en>)
- Crisis management (<https://www.secapp.fi/?lang=en>)
- Infrastructure and field work management (<http://web.mdo.fi/en/>)
- Real time location systems for health care

Interest in international cooperation

- Development of critical communication solutions and IoT solutions
- Development of system level simulators supporting 5G technology and product development
- Development of positioning technologies and location based services

Company overview

MOLTOSENSO

Foundation year 2009
of employees 6

Website www.moltosenso.com
Contact email info@moltosenso.com

Expertise in 5G related domains

Moltosenso has developed a unique versatile hardware/software platform in house, for fast and cost effective deployment of networked Smart Things. Versatility of moltosenso Plug&Play patented architecture has already been awarded through a European SME Instrument Phase 1 grant, recognized as one of the most promising ICT disruptive innovation in the Wireless Sensor Network (WSN) and Internet of Things (IoT) landscapes.

As ICT integrator, moltosenso owns expertise regarding IoT system design into complex and heterogeneous transmission environments (protocol stack and medium choice, data rate, allowed latency, system costs, energy consumption, data security, etc.)

5G will have to deal soon with requirements of millions of IoT devices, making moltosenso's compelling expertise essential.

Expertise in vertical sectors

Moltosenso has developed systems and services in the following vertical sectors:

- health-care (well-being, telemedicine);
- waste management (smart bins, trucks route optimization, bins positioning optimization);
- factory of the future (Big Data analysis);
- structural monitoring.

Interest in international cooperation

Moltosenso is looking for International collaborations to develop Internet-of-Things 5G-ready systems.

Company overview

MONTIMAGE

Foundation year 2004
of employees 12

Website www.montimage.com
Contact email edgardo.montesdeoca@montimage.com

Expertise in 5G related domains

Montimage's main area of expertise is in the analysis of network and application activity to detect, diagnose, mitigate and prevent security breaches and performance issues in the networks and services. It has developed a tool set called MMT (Montimage Monitoring Tool) for real-time analysis of network packets/sessions and application metadata based on complex event processing and machine learning techniques. It allows analysing virtualized SDN/NFV/Cloud-based dynamic environments for obtaining the awareness needed to guarantee their resiliency.

Montimage has contributed to the definition of future network architectures (SIGMONA & SENDATE Celtic Plus projects) publishing articles and book chapters related to SDN/NFV and performance & security monitoring.

Expertise in vertical sectors

Montimage has collaborated extensively with different industrials and administrations to adapt its techniques to improve their networks and applications in the area of: Automotive: securing communications, adHoc networks; Media: QoS/QoE monitoring; eHealth: protection of sensitive health data, robots for health; Smart cities: monitoring of IoT; and, Critical Infrastructures and Telecom: security and performance.

Interest in international cooperation

Montimage strongly believes that collaborative research are essential for developing its activity and bring innovations with positive impact and products adapted to needs of customers. Collaboration has facilitated technological transfer with academia, establishment of close ties with industry, better understanding of needs in different sectors, and setup of pilots & PoCs for speeding up exploitation of results.

Company overview

Nextworks

Foundation year 2002
of employees 40

Website www.nextworks.it
Contact email info@nextworks.it

Expertise in 5G related domains

- Open source SDN controllers (OpenDaylight), cloud platforms (OpenStack), and NFV MANO tools (OpenBaton, Open Source MANO)
- Long-term experience in developing solutions for SDN-based network control and orchestration of VNFs and Network Services in 5G environments; e.g.:
 - SDN controller for 5G integrated front/backhaul networks with heterogenous data plane techs and NFV management & orchestration
 - ETSI MANO compliant VNF management components for automated on-boarding and lifecycle operation of 5G oriented VNFs

Expertise in vertical sectors

- Products in technology domains related to Energy and FoF verticals
- Baseline product family: “Symphony”, a Building Management System and digital living platform
 - with an energy management subsystem offering measurement and monitoring over energy production and consumption in complex systems
- Now evolving Symphony subsystems to control and monitor Manufacturing Execution Facilities in FoF environments

Interest in international cooperation

- 9 projects in H2020, 18 in FP7, 1 in FP6
- Member of the 5G and BDVA PPPs, AIOTI, ETSI ISGs
- Cooperation with core players is key to build a business-focused technical know-how



Company overview

Nouveaucomm Networks Research Centre

Foundation year 2014
 # of employees 10

Website www.nouveaucomm.com
 Contact email contactus@nouveaucomm.com

Expertise in 5G related domains

We develop customized voice and data communication solutions helping customers to realize potential of existing networks, while providing innovative solutions in rapidly changing business and technical environment. Our team comprises of veterans in Telecom & Wireless Technology with experience leading R&D teams in the top global companies.

Technology	Architecture	Development	Test Services
<ul style="list-style-type: none"> • LTE – 3GPP • WiMAX– 802.16e • Wi-Fi – 802.11x • Small Cells • Cloud Computing • Tactical Communication • NMS Solutions • IoT • Web Design and Hosting Services 	<ul style="list-style-type: none"> • Roadmap definition for 3 to 5 years • End to End System Architecture • Flexible engagement model to develop joint IP 	<ul style="list-style-type: none"> • Software • Hardware • Design for manufacturability • Mechanical • Regulatory Compliances 	<ul style="list-style-type: none"> • Functional • Sub-system • Load & Stress • Performance • Interoperability • On Air • Regulatory Compliance • Certification • System Integration & Validation • Radio & Protocol Conformance • Service Assurance • Test Plan and Test Strategy • Test Automation

Expertise in vertical sectors

- Broadband Wireless systems for for Tactical Communication and public safety
- Real Time Location Systems for manufacturing and health care
- Web Design and hosting services (<http://www.nouveauwebhosting.com>)
- R&D Consultancy and Test Services

Interest in international cooperation

Involved in 4 collaborative projects including EU projects

Company overview

Plasma Antennas Limited

Foundation year 2000
of employees 5

Website www.plasmaantennas.com
Contact email pp@plasmaantennas.com



Expertise in 5G related domains

Antennas for access and backhaul



Expertise in vertical sectors

Mobile telecoms, tactical, defence, homeland security, public safety, oil and gas, satcoms



Interest in international cooperation

We collaborate with a number of mainly European academic and commercial organisations and would be interested in more.

Company overview

Quobis Networks SL

Foundation year 2006
of employees 27

Website www.quobis.com
Contact email yudani.riobo@quobis.com

Expertise in 5G related domains

Quobis has strong expertise on UC solutions based on SIP and WebRTC technologies:

- Testing and development of real time media-specific applications
- Development of multi-tenant application environments which can be connected to lower levels of 5G architecture
- Application of Cortical Learning Algorithms to Communication networks and Smart Grid networks
- Resource demand and QoS forecast with CLA-based techniques

Expertise in vertical sectors

Quobis can provide expertise in applications:

- Business processes communication (multi-conferencing, image and video sharing, data collection, emergencies support, push notifications, easy adoption by elderly people, call recording, video streaming)
- Telemedicine enablement
- Remote monitoring and control of devices (video & data)
- Smartgrid M2M protocols optimization for 5G networks and traffic patterns simulation

Interest in international cooperation

Quobis has broad experience working on international projects not funded by public agencies as is a key partner for some of the larger network integrators and service providers that see Quobis as the reference partner for projects with special needs in UC.

Company overview

Quotient Associates Ltd

Foundation year 2002

of employees 1-5

Website www.quotientassociates.com

Contact email steve.methley@quotientassociates.com

Expertise in 5G related domains

Wireless Technology, Regulation and Spectrum

As an example of recent work, we originally identified and proposed the set of 5G mmWave bands which were ultimately adopted for study at WRC-15. Other work examples include satellite co-existence, unlicensed access methods, wireless and fibre backhaul, spectrum sharing plus verticals studies on IoT, transport, media, location etc.

We are very familiar with co-ordinating multi-disciplinary teams based around the world.

Expertise in vertical sectors

- Access technologies
- Air Interface Innovations
- Automotive Sector solutions
- Backhaul solutions
- eHealth Sector solutions
- Energy Sector solutions
- Factories Sector solutions
- Media & Entertainment Sector solutions
- mm-Wave Air Interface
- Novel Radio System Architecture
- Satellites Networks for 5G
- Spectrum for 5G
- Wireless Innovations for 5G

Interest in international cooperation

Quotient is an international strategy, technology and economics consultancy to the radio communications industry specialising in wireless communications and spectrum regulation and management.

We are independent, impartial and objective;

We have demonstrated a strong and consistent track record in technology foresight, understanding and interpretation;

We understand the business drivers and the market environment;

We employ accredited project management and quality techniques;

We are very familiar with the H2020 process, including co-ordination.

Company overview

Research for Science, Art and Technology (RFSAT) Ltd

Foundation year 2008

of employees 10-25

Website www.rfsat.com

Contact email RTD@rfsat.com

Expertise in 5G related domains

RFSAT Ltd is a private Research & Development (R&D) active SME company offering consultancy and development services as well as pursuing funded research projects in diverse ICT areas, and with regards to 5G Future Mobile Communications focussing specifically on Future Internet Service Architectures and network Technologies. Experience of its staff dates back to 1999 when they were involved in the first UMTS basestation development under FP5 program. Since then RFSAT has been established as a means of pursuing further developments in this area, currently going deeper into the design of future 5G transceivers enabling mesh-like networking of citizens' mobile devices integrating multiple network transports, with establishing of respective new types of network sharing business models. Furthermore, RFSAT develops ultra-low-power miniaturised Sensing & Control (S&C) enablers for powering and Smart-enabling everyday objects, suitable for Smart Energy, Environmental monitoring and/or Safety and Security systems. RFSAT is also involved in cyber physical prevention of attacks against e.g. critical infrastructures, devising ways of detecting, preventing and tracking attacks.

Expertise in vertical sectors

- Future Internet: mesh 5G mobile networking among end users and related business models
- Crisis Management: autonomous aerial surveillance via (potentially) 5G mobile networks
- e-Health (Wellbeing & Tele assistance): remote monitoring and tele-rehabilitation over 5G
- Smart Metering/Energy Grids: security of residential/industrial sensing & control systems
- Building Management Systems: distributed wireless sensor & control infrastructures

Interest in international cooperation

RFSAT has participated in four (4) funded research projects as partner and over other funded R&D projects ten (10) as an SME stakeholder and solution provider. As part of the SME group under NetWorld 2020 platform, RFSAT is interested in further pursuing applied funded research and development in Horizon'2020 in ICT & Security domains. Topics of direct interest include:

- ICT-04-2017: Smart Anything Everywhere Initiative
- ICT-05-2017: Customised and low energy computing (including Low power processor technologies)
- ICT-07-2017: 5G PPP Research and Validation of critical technologies and systems
- ICT-08-2017: 5G PPP Convergent Technologies (RIA)
- ICT-09-2017: Networking research beyond 5G
- ICT-19-2017: Media and content convergence
- ICT-20-2017: Tools for smart digital content in the creative industries
- ICT-41-2017: Next Generation Internet

Company overview

Senception

Foundation year 2013
of employees 1-10

Website www.senception.com
Contact email info@senception.com



Expertise in 5G related domains

Wireless data mining



Expertise in vertical sectors

Ehealth; smart cities; public safety



Interest in international cooperation

Senception is a portuguese SME focused on developing technological solutions to improve the daily routine of citizens. We cherish the vision of improving the daily routine of citizens via the development of user-friendly technology. We build such vision via the mission of designing and producing pervasive technology that assists the capture and the inference of interactions among people, and their surroundings.

Senception's products have as value-add non-intrusive behavior tracking and inference of user preferences as well as of social roaming habits. Our solutions are software-based, and available in the most used operating systems.

Senception incorporates a team that is strongly based on industrial research, being currently involved in several industrial research activities.

Company overview

Software Radio Systems

Foundation year 2012
of employees 6

Website www.softwareradiosystems.com
Contact email paul@softwareradiosystems.com

Expertise in 5G related domains

Software Radio Systems specializes in high-performance software for wireless systems including LTE/LTE-Advanced/NB-IoT and DVB-S2/RCS2. We are an Irish company providing modular, portable L1, L2 and L3 software implementations for a range of wireless technologies. Our software-defined radio approach targets commodity processing hardware and flexible RF front-ends to deliver cutting-edge wireless solutions.

Expertise in vertical sectors

SRS is active across multiple vertical sectors including automotive, media, factories of the future, public safety, smart-city and smart-agri. In the automotive sector, we develop and test prototype software radio systems for LTE with leading manufacturers. In the media sector, we provide solutions for LTE broadcast (eMBMS), satellite broadcast (DVB-S2/RCS2) and hybrid satellite/terrestrial systems. In the public safety sector, we offer private LTE/LTE-A infrastructure solutions. In the smart-city and smart-agri sectors, we provide M2M solutions based on LTE NB-IoT.

Interest in international cooperation

SRS already works closely with partners across Europe and North America through FP7, Horizon 2020 and European Space Agency programs as well as through commercial joint partnerships. We are always interested in working with new partners and exploring new opportunities.

Company overview

Spectrum Insight Ltd

Foundation year 2009
of employees 3

Website www.spectrum-insight.com
Contact email keith@spectrum-insight.com
paul@tamum.com

Expertise in 5G related domains

Keith Edwards (Spectrum Insight) and Paul Simmons (Tamum) both have considerable experience in the development and implementation of telecommunications standards including: GSM, UMTS, and LTE access and core network technology, spectrum aspects (CEPT) and standards setting process (ETSI/3GPP).

Themes of particular interest in 5G are: Connected Objects (Internet of Things), PPDR/ Broadband PPDR, network slicing, satellite communications, 3GPP – 5G radio protocols in 3GPP.

ETSI membership and 3GPP attendance possible through Tamum Consulting (www.tamum.com).

Expertise in vertical sectors

Energy Sector including Connected Home/ Smart Home
Public safety (wireless communications including satellite),
Smart City

Interest in international cooperation

Spectrum Insight Ltd has a collaboration relationship with Tamum Consulting SARL in order to offer expertise to the widest possible audience.

We are interested in collaboration projects with Companies and Universities worldwide who are seeking a partner that can bring wireless, network, spectrum and standardisation expertise to their consortium project. Prospective partners can choose Tamum Consulting SARL (a company registered in France) or Spectrum Insight Ltd (a company registered in England) as the lead partner.

Company overview

Telcaria Ideas S.L.

Foundation year 2014
of employees 8

Website www.telcaria.com
Contact email info@telcaria.com

Expertise in 5G related domains

The main expertise of Telcaria is SDN/NFV technologies, but also communication protocols, data center and wireless networks. Therefore, our expertise includes:

TA11: Converged 5G FlexHaul Network

TA12: Foundations for Software Networks

TA19: End-to-End NFV and SDN Holistic Operational Model

TA25: EUJ-01-2016 – 5G SDN/NFV Platform Assessment (RIA)

Expertise in vertical sectors

Our expertise mainly covers tailored SDN/NFV designs for network operators. We design and implement disruptive approaches for their current network deployments. Therefore, our expertise includes:

Media: Studios, Broadcasters, Content providers

Smart city enablers

Interest in international cooperation

In Telcaria, we consider research is the cornerstone of the quality of our services. Thus we are always looking for collaborations in research projects and international cooperation, which we believe will boost our potential.

Currently we are already collaborating in two European projects (FP7-NetIDE and H2020-Superfluidity), but we are open to new opportunities.

Company overview

TST

Foundation year 2007
of employees 20

Website www.tst-sistemas.es
Contact email asanz@tst-sistemas.es



Expertise in 5G related domains

- IoT networks and devices: Hardware design, network and device management, sensor integration.
- Wireless communications technologies: 3GPP, LPWA, Wi-Fi, Bluetooth, ZigBee / DigiMesh.
- Software design and development on multiple platforms: Desktop&Web, server and mobile apps.
- System integration and validation



Expertise in vertical sectors

- Waste management in Smart Cities
- Environment monitoring in Smart Cities
- Light control and energy efficiency in Smart Cities
- Smart Agriculture



Interest in international cooperation

Involved in 12 EU-funded research projects related to IoT, smart services and future networks (4 ICT-FP7, 2 ICT-CIP, 3 ICT-H2020, 1 ENIAC, 2 CELTIC).

Company overview

Ubiwhere

Foundation year 2007
of employees 35

Website www.ubiwhere.com/en/
Contact email info@ubiwhere.com

Expertise in 5G related domains

With knowledge that ranges from the LTE core to the complex MANO of the 5G networks and its security implications, and also the knowledge on monitoring techniques and system design, Ubiwhere is useful on every step of a project, from the design to the exploitation of results and potential standardization, creating valuable intellectual property.

Expertise in vertical sectors

Ubiwhere has a strong presence in smart cities vertical, with a wide array of solutions from parking and waste management to bike sharing and tourism. In the vision of the service provider, Ubiwhere brings insight on the requirements those services and also has the ability to design and implement a ready production system, in order to be an international reference in Smart Cities and Future Internet.

Interest in international cooperation

Based in Portugal, Ubiwhere develop innovative and user-centered software solutions. Thus, is actively searching both for R&I partnerships as well as joint ventures. Our dynamic team is improving every day and can bring value to the consortium both as a vertical service supplier and as a technology provider.

Company overview

VISIONA INGENIERÍA DE PROYECTOS S.L.

Foundation year 2006

of employees 8

Website www.visiona-ip.es

Contact email nsanchez@visiona-ip.es

Expertise in 5G related domains

Visiona is participant in the H2020 5G-Crosshaul project where has participated in the definition of the Broadcasting TV service within the Media Distribution use case. This includes the compilation of functional and technical requirements, synchronization, virtualization of infrastructure for the media content distribution and the coordination between broadcasting, multicasting and CDN: joint backhaul/fronthaul optimization (routing, scheduling, load balancing, etc. according to QoS criteria), dynamic network configuration, etc.

Expertise in vertical sectors

Visiona Ingeniería de Proyectos is a cutting edge Information Technology company. It has a solid experience on designing, developing and deploying systems and projects on the client side, working together and for them. Visiona works with audiovisual technologies throughout all the media value chain, from content production to final user applications. Broadcast solutions, video processing, media analysis, coding, mobile live streaming and hyper-personalization are already in Visiona's portfolio. Additionally, Visiona has provided video-based developments for improving mobility in smart cities and other applications in the field of business intelligence.

Interest in international cooperation

Experience in participation in R&D innovation collaboration projects at European and international level.

Company overview

WEST Aquila srl

Foundation year 2004
of employees 10

Website www.westaquila.com
Contact email info@westaquila.com

Expertise in 5G related domains

5G wireless system design; Subsystems for 5G Platforms: Integration of Hardware and Software Aspects; Security, Privacy, Resilience, and High Availability

Expertise in vertical sectors

eHealth: Regulators, Health companies/industry, Users ; Energy: Regulators, policy makers (green energy), power companies.

Interest in international cooperation

The co-founders of WEST Aquila have played leading roles in several EU projects, e.g. FP5-IST-COLUMBUS, FP6-HYCON NoE, FP7-HYCON2 NoE, ESSOR, etc. WEST Aquila has been directly involved in several EU projects as well, including Greenet (an Initial Training Network (ITN) Marie Curie project that is focused on the analysis, design, and optimisation of energy efficient wireless communication systems and networks) and WSN4QoL (Wireless Sensor Networks for Quality of Life, "FP7 - People - Industry-Academia Partnerships and Pathways", <http://www.wsn4qol.eu>). WEST is currently involved in SmartNRG ("FP7 - People - Industry-Academia Partnerships and Pathways", <http://gain.di.uoa.gr/smart-nrg>) and CASPER ("Marie Skłodowska-Curie Research and Innovation Staff Exchange (RISE)", <http://gain.di.uoa.gr/casper>).

Company overview

WINGS ICT Solutions

Foundation year 2012
of employees 50

Website www.wings-ict-solutions.eu
Contact email info@wings-ict-solutions.eu
ktsagk@wings-ict-solutions.eu
kritikou@wings-ict-solutions.eu

Expertise in 5G related domains

WINGS' portfolio of expertise includes (but is not limited to) the following 5G related domains: Smart Wireless Access (Air Interfaces&Multi Antennas, Cognitive Network Management, Hardware/software platforms for 5G network elements and devices, Quality of Service Provision, Capacity Expansion, Quality of Experience), Cloud Continuum (Internet of Things, porting intelligence to micro and nano levels, applications), Software Networks, Big Data Analytics (enhanced algorithms for new applications), Security/ Cybersecurity.

Expertise in vertical sectors

WINGS' portfolio of expertise in vertical sectors includes: Health, Energy, Water, Finance, Factories of the Future, Automotive, Media, Smart City enablers, Public Safety, Digital Retail, SMART AGRI, Travel & transport and Education.

Interest in international cooperation

WINGS ICT Solutions is a fast growing SME which focuses on conducting R&D activities and providing consulting services in all areas related to 5G related domains. WINGS is interested in international cooperation in the abovementioned areas. Such cooperation may be supported by the company members' long expertise in international projects.

Company overview

Wireless Innovation

Foundation year 2016

of employees 4

Website www.wireless-innovation.eu

Contact email fotis@wireless-innovation.eu

Expertise in 5G related domains

Wireless Innovation is developing and updating a 4G/5G platform to consult each customers for better technology benchmarking by 2020. Our solutions are be listed below:

1. New 5G building blocks development and performance evaluation through experiments.
2. Standardization supporting activities.
3. Innovation in wireless communications for new paradigms beyond 5G.

Expertise in vertical sectors

Expertise in several sectors, like security, energy and automotive.

Interest in international cooperation

Wireless innovation is interested to participate to the new H200 calls and to collaborate closely with universities and companies under other type of frameworks.

Company overview

ZEETTA NETWORKS

Foundation year 2015
of employees 12

Website www.zeetta.com
Contact email vassilis@zeetta.com

Expertise in 5G related domains

Zeetta Networks offers Open Networking solutions for heterogeneous networks (i.e. networks made of optical, wireless, packet-switched or IoT network elements) based on patented SDN and Network Virtualization and Slicing technologies originally developed by the University of Bristol. Zeetta's scalable SDN technology can manage not only large access networks (e.g. city-wide Wi-Fi) but also aggregate traffic in a network edge/core for a complete end-to-end provisioning and orchestration of services.

Zeetta targets 5G networks and especially large scale vertical markets (e.g. Smart Cities) and Mobile-CORD applications (Central Office Re-architect as a Datacenter).

Expertise in vertical sectors

Zeetta has early wins in the following vertical markets:

- Deployment of a SDN-controlled High-Density Wi-Fi access network in 30k-seat Ashton Gate Stadium
- Funded partner to REPLICATE, one of the largest (€25m) European Smart City Horizon2020 projects
- Underpinning 'Bristol Is Open' the first programmable Smart City based on Open Networking SDN principles

Interest in international cooperation

We are interested in H2020 projects in M-CORD, Smart Cities and other large 5G vertical market deployments and demonstrators.

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In the 5G PPP, we want to include stakeholders from the vertical sectors, and we also want to live up to our promise to include at least 20% SMEs. Phase 3 of the 5G PPP is more development-oriented, and when we move to the development stage, the possibility of involving SMEs tends to be higher.

BERNARD BARANI
Deputy Head of Unit, DG CNECT,
European Commission



THE 2ND GLOBAL 5G EVENT

- ENABLING THE 5G ECOSPHERE -

9-10 NOVEMBER 2016, ROME, ITALY

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