4. Network Organisation

Coordinators. *Domenico Giustiniano (IMDEA), General Coordinator (GC), with proved experience in coordination of EU, national and regional projects, is in charge of the overall supervision and management* (**Figure 1**). He links SpecX participants to the EC and executes the Grant and Consortium Agreements. The GC is responsible for monitoring the obligations of the SpecX participants. He collects, reviews, and reports the progress to the EC. With the assistance from the management support team, the GC prepares the agenda for SpecX and chairs the Supervisory Board meetings. The GC ensures the smooth running of the project based on his rich experiences on research and project management. *Sofie Pollin (KU Leuven), a well-known expert on spectrum sensing, is Scientific/Techical Coordinator (SC).* She leads the S/T training program for DCs and ensures the coherence among the research tracks. Q. Wang (TU Delft) and P. Casari (UNITN), replace the GC and the SC, respectively, during meetings in case of illness or unforeseen reasons.

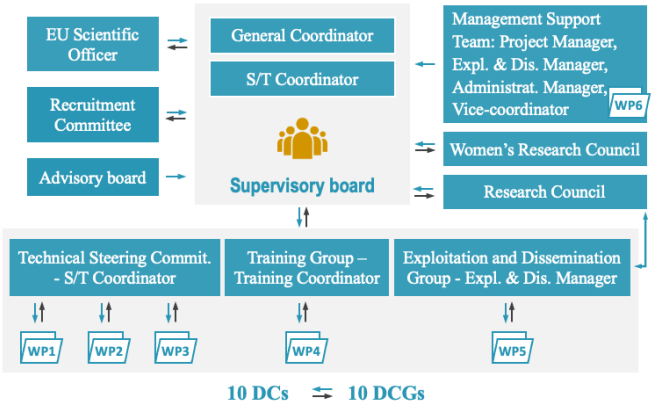

Figure 5. Schematic of the management structure.

Management Support Team (MST). The MST assists the GC for financial management, consolidation of report management, monitoring of expenses against budget allocations, and supporting the dissemination and exploitation of SpecX, e.g., project webpage and event management. The MST is staffed by an experienced project manager (J. Hervas, partially funded through the SpecX management budget), supported by the Project and Funds unit of IMDEA, and by the dissemination and exploitation manager (J. Widmer, IMDEA). The MST meets monthly to ensure the smooth execution of all tasks. IMDEA has gained top-level expertise in administrative, financial and legal management of EU projects through its several years of high-impact work and coordination, further offering professional advice about legal, technical as well as business-related issues. The GC will be advised and assisted by the above team for a number of actions, such as overall financial and administrative control, drafting and follow-up of the consortium agreement, follow-up of contractual issues, e.g. amendments to Annex-I or to the CA, managing overall legal and administrative issues, among others.

Supervisory Board (SB). The SB, the highest decision-making body, is also discussed in **Section 3.1.8**. The SB consists of the GC (D. Giustiniano), the SC (S. Pollin), the training chairs (A. Lutu and M. Petrova), the WP1-5 Leaders and one representative from each beneficiary. Each beneficiary has one vote in the SB. Each of the associated partners, the ReC, and the WRC also has one representative in the SB but without voting right. The GC chairs the SB. During the SB meetings, an overview of the technical quality, training, secondment, dissemination, exploitation, and reports from each DC is presented by the WP leaders, and an evaluation is conducted. Besides, it is responsible for the collection and implementation of external advices from the Advisory Board. A DC recruitment committee is assembled by the SB in **M1**. The SB meeting is organised twice a year along with the 7 network-wide events. An additional SB meeting takes place in **M48** without the network-wide workshop. The SB meeting are also organised for important and urgent decisions, and are carried out through conference calls. Decisions are preferentially made through a consensus procedure. If consensus cannot be made, decisions shall be taken by a majority of two-thirds (2/3) of the votes cast.

Recruitment Committee (RC). This committee involves the GC (D. Giustiniano), the SC (f, S. Pollin), and one representative from each of other beneficiaries (Q. Wang, M. Petrova (f), A. Lutu (f), P. Casari). The RC oversees the recruitment of DCs during the collective recruitment event. Besides, the RC follows up DC's training progress and career planning. The RC committee meets during network-wide events.

Researcher Council (ReC). The ReC consists of 10 DCs and meets in the workshops. It discusses issues related to project management and communicates to the SB through their representative. The quality of the overall training is discussed, and suggestions and concerns are communicated to the WP4 team and the SB. The ReC appoints a representative for the SB and **WP4**. The ReC co-plans social media and public engagement strategy.

Women Researchers Council (WRC). SpecX unites all female DCs (and additional female colleagues) in the WRC to promote cultural change in relation to gender balance in the involved organisations, and engages staff at all levels to improve the promotion of equality and diversity. The WRC appoints a representative for the SB and WP4. It interacts with organisations in ICT areas, e.g., Networking Women (n2women.comsoc.org).

WP Teams. The 4 S/T WP teams bring together the involved researchers and supervisors, and are led by one WP Leader. The WP leaders M. Petrova (RWTH; WP1), Q. Wang (TU Delft; WP2) and Davy Pissoort (KUL; WP3), and are responsible for having an overview of the S/T quality and report it to the SB. IMDEA is responsible for the training quality (WP4 leader), Dissemination and Exploitation (WP5 leader), and Management (WP6 leader). The training group includes a representative of the RC, the WRC and at least one supervisor per beneficiary. All WP teams meet on a regular basis (physical and teleconference meetings). They also meet (consecutively) during the first day of the network-wide workshops, during which DCs present their results to both WP Members and other participants (**Table 6**). This creates better interlinkage between individual WPs and DCs.

Technical Steering Committee (TSC). During the rotating workshops, the WP1-3 Leaders, the GC (supported by the MST) and the S/T Coordinator meet for an overall TSC meeting, where they check the general S/T progress and prepare for the SB meeting. The TSC is chaired by the S/T Coordinator. The S/T WP Leaders present a summary of the results obtained in their WP (building upon the results presented by the DCs during the first day of the event). The TSC takes decisions (through consensus) on WP-related S/T matters, with specific attention to the interactions of the WPs. To increase the involvement of all beneficiaries and associated partners, at least one supervisor per beneficiary and associated partner is present.

Conflict resolution. The participants will do their best to co-operate well, and will take decisions with the consent of all participants, after discussion of the facts and possible paths to follow. If there is a strong difference of opinion about the S/T work (**WPs 1-3**) or the training and dissemination/exploitation (**WPs 4-5**), or between WP Leaders and the majority of the other WP participants, the project manager organises a meeting (conference call) with the WP leaders, the S/T coordinator and the GC to develop proposals for solutions. If required, a vote is taken in the SB (2/3 majority required). SpecX uses an anonymous DC feedback mechanism to obtain (confidential) complaints, allowing swift remediation actions. Furthermore, an interpersonal communication skill is part of the soft-skill programme (see **Table 5**). Further details on the settlement of disputes will be included in the Consortium Agreement.

Project progress monitoring. We have presented the progress monitoring of individual projects in **Section 3.1.5** of Document **B1**. For completeness, we also include here some of the contents. SpecX has clearly identified the research objectives (**Table 1** in Document **B1**), deliverables (**Table 11**), milestones (**Table 12**), delivery dates (**Table 11** and **Table 12**), and exploitation routes (**Figure 4**). These details also enable the monitoring of the whole project by the MST, SB, the advisory board, as well as the EC. At each of the NWEs, the SC and each WP leader present with slides the progress of the whole project and each WP, respectively. The training chairs present the monitoring of the training activities at the consortium level, and the exploitation chairs introduce the finished/coming dissemination & outreach activities. During all these presentations, the ten DCs are also foreseen a genuine involvement in the project monitoring. Issues that affect affect the project progress will be identified, raised, and solutions will be discussed and executed by the MST and SB, with the inputs from the DCs. Effectiveness of the solutions will be assessed during the next NWEs.

Advisory Board (AB). To improve the quality control methods used by SpecX, at month **M1**, an AB will be named including world-renowned expert from the academia and industry. The AB will be tasked with providing external and independent advice on the training on a periodic basis.

5. Environmental aspects in light of the MSCA Green Charter

The SpecX project revolves around a sustainable vision from energy consumption point of view: that spectrum can be better monitored and dynamically used in future wireless networks, making it possible to dynamically optimize the usage of this limited resource. Through SpecX's training events, we will present the DCs with a unified vision that not only makes the best of the spectrum resources and jointly optimizes the spectrum analysis for different applications, but also promotes such a practice as a fundamental component towards the development of future devices. One of the training events will complement this by sensibilizing the DCs towards the minimization of the environmental impact of their research (e.g., reuse and sharing of experimental platforms, reduction of scientific paper and mail printing, minimization of traveling). The same event will specifically address the environmental impact of electronic waste and how to mitigate it through modularity and materials choice in electronics design.

In addition to the above, SpecX is committed to achieving a low carbon footprint. The number of meetings organized prudentially is 8 including kick-off and recruitment events. This balance will minimize traveling while still offering venues to form a more cohesive project team, create a sense of community, as well as participate to international conferences and workshops, when co-located. The consortium privileges meeting locations that can be reached by train or that are served by a major international hub, to reduce flight legs. Other meetings, when necessary, will be carried out using online teleconferencing/telepresence/coordination tools. IMDEA and KU Leuven will also leverage their recent and previous experience with MSCA ETNs to deploy DN management tools that minimize the use of paper and enable electronic tracking of progress, events, achievements, and milestone completion.

6. Participating Organisations

Beneficiary 1: IMDEA Networks Institute (IMDEA)	
General Description	**IMDEA Networks** is an international research institute located in Madrid, with the objective of performing world-class research, carrying out technology transfer, and attracting talented researchers to the region of Madrid, Spain. IMDEA is funded by the Regional Government of Madrid, other public bodies, and private institutions. Its key expertise broadly lies in the areas of wireless networking, networked systems and algorithms, and Network Measurements and Analytics. IMDEA Networks offers an interdisciplinary environment encompassing about 50 staff members, including faculty staff, postdocs, PhD students, Master's students, and research interns/engineers.
Role and Commitment of key persons (including supervisors)	**Dr. Domenico Giustiniano** [m] (*General Coordinator (GC), supervisor DC5, co-supervisor DC9*) [25% FTE] is a Research Associate Professor and leader of the Pervasive Wireless Systems group. He currently performs system-level research in wireless networks, mostly focusing on large-scale spectrum sensing systems, visible light communication networks and indoor localisation systems. He holds a PhD in Telecommunication Engineering from the University of Rome Tor Vergata (2008), and Executive Education from IE Business School on Management Fundamentals and Skills for Scientists and Researchers. He is coordinated/has coordinated projects at EU level (ITN ENLIGHT'EM), national level (PinPoint5G+, MAP-6G) and regional level (TAPIR-CM, CONTACT-CM)
	Dr. Joerg Widmer [m] (*Exploitation Manager, supervisor DC9*) [20% FTE] is Research Director and Research Professor at IMDEA Networks. His research focuses on wireless networks, from mmWave communications and MAC design to mobile network architectures. He authored about 150 papers, 3 IETF RFCs, and 14 patents. He serves/served on the editorial board of IEEE TMC, TCOM and the committees of major conferences. He received an ERC Consolidator Grant, the F. W. Bessel Award of the von Humboldt Foundation, and 8 best paper awards.
	Dr. Giuseppe Santaromita [m] (*co-supervisor DC5*) [20% FTE] is a postdoctoral researcher with expertise in embedded systems and localisation.
	Dr. Timothy Otim [m] (*co-supervisor DC9*) [20% FTE] is a postdoctoral researcher with theoretical and practical expertise in signal processing, localisation, and channel modelling.
Key Research Facilities, Infrastructure and Equipment	**IMDEA Networks'** facilities include laboratory and office spaces, workstations, shared high-performance simulation servers, IT services and infrastructure support, software-radio platforms, software licenses (e.g., MATLAB), as well as full access to relevant online resources such as the IEEE and ACM digital libraries. IMDEA hosts different testbeds based on a large number of spectrum sensing boards from low-end devices (such as RTL-SDR controlled by raspberry boards) to higher-end systems such as Ettus and WARP. IMDEA forms part of 5TONIC, an open research and innovation laboratory focusing on 5G and beyond technologies founded by Telefonica and IMDEA Networks based in Madrid. The objective of 5TONIC is to create a global open environment where members from industry and academia work together in specific research and innovation projects related to 5G technologies with a view to boost technology and business innovative ventures. IMDEA brings to the project the possibility to participate in demonstration activities within 5TONIC premises, and collaborate with its associated industrial partners in joint initiatives.
Status of Research Premises	All **IMDEA Networks** facilities are solely owned by IMDEA Networks. The institute has the research space and facilities required to host all ESRs according to the project workplan.
Previous Involvement in Research and Training Programmes, including H2020 ITN	**IMDEA** has developed strong international connections over the years, leading to the participation and direction of several European, Spanish and US R&D programmes. IMDEA researchers have participated and directed projects of several European R&D programs (including mmMAGIC, Flex5Gware, ESPRIT, RACE, ACTS, 1ST, CLAM, RACUN, DAIDALOS I and II, MEDIEVAL, FLAVIA, eCOUSIN, CROWD, iJOIN), Spanish R&D programs (including PLANBA, CICYT, PASO), US R&D programs (including NSF FIND, NSF ALT, NSF CNS, NSF ANI, US ARO), and in contracts with industry and public administrations (SPS SOCRATES).
Current Involvement in Research and Training Programmes, including H2020 ITN	**Dr. Giustiniano** and **Dr. Widmer** are currently involved in following EU projects: H2020 ENLIGHT'EM, SOMIRO, MINTS, DAEMON, LOCUS. National and regional projects: TAPIR-CM, RISC-6G, MAP-6G BRAIN. Industrial: Big-locator. The full updated list is available at https://networks.imdea.org/research/projects-and-collaborations/research-projects/
Relevant Publications/datasets/ softwares/ Innovation Products/ other achievements	G. Bielsa, J. Palacios, A. Loch, D. Steinmetzer, P. Casari, **J. Widmer**, Accurate Ubiquitous Localization with Off-the-Shelf IEEE802.11ac Devices, In *Proc. ACM Mobisys*, 2021.
	M. Rea, **D. Giustiniano**, "Location-aware Wireless Resource Allocation in Industrial-like Environment", In IEEE Transaction on Mobile Computing, 2021.
	R. Calvo-Palomino, H. Cordobés de la Calle, M. Engel, M. Fuchs, P. Jain, M. Liechti, S. Rajendran, M. Schäfer, B. Van den Bergh, S. Pollin, **D. Giustiniano**, V. Lenders, Electrosense+: Crowdsourcing Radio Spectrum Decoding using IoT Receivers, In *Elsevier Computer Networks*, 2020.
	J. Palacios, P. Casari, H. Assasa, **J. Widmer**, LEAP: Location Estimation and Predictive Handover with Consumer-Grade mmWave Devices, In Proc. *IEEE INFOCOM*, 2019.
	R. Calvo, H. Cordobés, F. Ricciato, **D. Giustiniano**, V. Lenders, Collaborative Wideband Signal Decoding using Non-coherent Receivers, In Proc. *IEEE/ACM IPSN*, 2019.

Beneficiary 2: KU Leuven	
General Description 	In Horizon 2020, KU Leuven was granted 669 projects (€ 378,5 million), ranking fourth HES institution with regard to number of signed grants. KU Leuven takes up the 14th place of European HES institutions hosting ERC grants (as first legal signatories of the grant agreement, ERC annual report 2021). The over 100 ERC grants since 2007 involving KU Leuven researchers, (including affiliates with VIB and IMEC) confirm that KU Leuven is a breeding ground and attractive destination for the world's best researchers. Its success in the Horizon 2020 Marie Sklodowska Curie Actions is a manifestation of the three pillars of KU Leuven: research, education and service to society. In Horizon 2020, we were involved in 126 Innovative Training Networks, ranking us first institution of higher education with regard to number of MSCA-ITNs.
Role and Commitment of key persons (including supervisors)	**Prof. Sofie Pollin** [f] (*Scientific Coordinator (SC), Supervisor DC1*) [25% FTE] leads the Networked System Group. Her interest is the analysis of wireless systems, incl. testbed verification. She is an editor for IEEE TWC. She has rich experience with research and project management. She supervises PhD students at IMEC, acting as a bridge between innovation, and engineering solutions.
	Prof. Davy Pissoort [m] (*WP3 leader, Supervisor DC10)* [20% FTE] Full Professor in the field of Dependable Electronics and Electromagnetic Compatibility. He coordinates multiple MSCA ITN projects like SAS, PETER and AUTOBarge.
	Dr. Tim Claeys [m] (*co-supervisor DC10*) [15% FTE] is an expert in techniques to measure EM fields in the near-field and the dependability of wireless communications. He is the Scientific Coordinator of the MSCA ETN PETER project and a supervisor of multiple PhDs in the MSCA ITN ETERNITY project and MSCA DN PARASOL.
	Dr. Rodney Martinez Alonso [m] (*co-supervisor DC1*) [15% FTE] is a research associate at the Networked Systems group, WaveCore, KU Leuven. He is an expert in dynamic spectrum access technologies. He is the scientific coordinator of a VLIR-UOS project on AI-based spectrum management. He has 10+ papers published at top venues such as IEEE ToB, Elsevier CN, Appl.Science, IEEE BMSB.
Key Research Facilities, Infrastructure and Equipment	**ESAT-WaveCoRe** has large 5G and IoT test facilities. Specifically, it has a massive MIMO SDR testbed consisting of 45 NI USRP-RIOs and has ample expertise in data-driven and deep learning. The group has a GPU server facility (NVIDIA RTX 2080Ti cores). The group also has several IoT testbeds, such as a 70 node BLE mesh testbed and a 36-node dense VLC testbed. **M-group** has 30 years+ of experience in Electromagnetic Compatibility. The research facilities consist out of a full pre-compliance laboratory for EMC testing. More specifically, a unique double coupled reverberation chamber to create harsh EM environments, an anechoic chamber for EMC pre-compliance measurements and research, etc.
Status of Research Premises	KUL owns all of its facilities and is wholly independent from other beneficiaries and/or partner organisations in the consortium.
Previous Involvement in Research and Training Programmes, including H2020 ITN	**Prof. Pollin** has been the PI of the Marie Curie International Outgoing Fellowships: UC Berkeley & IMEC, 2006-2009. She was also the scientific coordinator of the H2020-ICT13 ORCA project. She was engaged in, and was PI of, several national fundamental projects and cooperations with industry. **Prof. Pissoort** has been involved in various student exchange programmes, including multiple COST-actions and TEMPUS/Erasmus+ projects. He is the coordinator of technology-transfer projects ROBUSTEL, TDD4ES, NEATH, DfX-bridge, MCS4ES, and RELIM, and coordinated MSCA ETN SAS.
Current Involvement in Research and Training Programmes, including H2020 ITN	**Prof. Pollin** is the general coordinator of the H2020 MSCA-ITN MINTS, and is currently involved in the following EU research projects: H2020 MSCA-ITN Greenedge, H2020 R&I MARSAL, H2020 R&I REINDEER, H2020 R&I HERMES. Besides, she is involved in various nationally funded projects and is cooperating with industry in bilateral projects (e.g., Nokia, Proximus, Huawei, Armasuisse). **Prof. Pissoort** is a partner and WP leader of Erasmus+ project PHYSICS. He is project coordinator of technology-transfer CORNET project EEWISE and RESSIAR-MID, partner in Flemish Innovation Stimulation Projects VIS-SmartPro and VIS-INPROVOL, and coordinator of MSCA ETN PETER and MSCA ETN AUTOBarge, while also participating in MSCA ETN Eternity and MSCA DN PARASOL.
Relevant Publications/datasets/ softwares/ Innovation Products/ other achievements	**T. Claeys**, H. Tirmizi, H. Habib,D. Vanoost, G. Vandenbosch, **D. Pissoort**. A system's Perspective on the Use of EMI Detection and Correction Methods in Safety-Critical Systems, In *IEEE Symposium on EMC+ SIPI and EMC Europe*, 2021.
	B. Pang, K. T'Jonck, **T. Claeys, D. Pissoort,** H. Hallez, J. Boydens. Bluetooth Low Energy Interference Awareness Schema and Improved Channel Selection Algorithm for Connection Robustness, In *MDPI Sensors*, 2021.
	H. Sallouha, A. Chiumento and **S. Pollin**, Aerial Vehicles Tracking Using Noncoherent Crowdsourced Wireless Networks, In *IEEE Transactions on Vehicular Technology*, 2021.
	S. Rajendran, V. Lenders, W. Meert and **S. Pollin**. Crowdsourced wireless spectrum anomaly detection, In *IEEE Transactions on Cognitive Communications and Networking*, 2019.
	S. Rajendran, R. Calvo-Palomino, M. Fuchs, B. Bergh, H. Cordobes, D. Giustiniano, **S. Pollin**, V. Lenders. Electrosense: Open and Big Spectrum Data, In *IEEE Communications Magazine*, 2018.

Beneficiary 3: Delft University of Technology (TU Delft)	
General Description 	**Delft University of Technology (TU Delft)** is the oldest and largest university of technology in the Netherlands. The university is ranked as the most prestigious institution of higher education in Netherlands (Top 50 worldwide in QS ranking 2020 and top 20 in the engineering and technology domain). The **Embedded and Networked Systems (ENS)** group, where this research will be performed, is composed of 6 faculty members and more than a dozen PhD candidates, all being active in the field of wireless communications and embedded systems. TU Delft has received the "HR Excellence in Research" Award.
Role and Commitment of key persons (including supervisors)	**Prof. Qing Wang** [m] (*Recruitment chair, WP2 leader, supervisor DC8 and co-supervisor DC4*) [25% FTE] leads wireless communication, sensing and embedded AI systems research in ENS. He is an expert on mobile networking systems, visible light communication and sensing, and embedded AI for the Internet of Things. He is a co-founder of the OpenVLC project and the Delft Embedded AI Lab. He has more than 20 papers published at top conferences, such as MobiCom, CoNEXT, SenSys, INFOOCM, etc., and top journals such as IEEE Transactions on Networking, IEEE Transactions on Wireless Communication, etc. His citation is over 3100 times.
	Prof. Koen Langendoen [m] (*supervisor of DC4*) [20% FTE] is a full professor of computer science with the EEMCS faculty of TU Delft. He holds the chair on Embedded and Networked Systems, and serves as the director of studies for the MSc on Embedded Systems. He has rich experience and an excellent track record in systems research, in particular, wireless networking protocols. He has participated as principal and co-principal investigator in numerous national (Dutch) and EU research projects, including D2S2, COMMIT, RELATE, WISEBED, CONET, and RELYonIT. Prof. Langendoen shares his expertise with industry by giving seminars and master classes at companies like Alten, CapGemini, and Nyenrode Business School.
	Prof. Fernando Kuipers [m] (*co-supervisor DC8*) [15% FTE] leads the Lab on Internet Science (LOIS) at TUD. In 2004, he obtained his Ph.D. degree cum laude, the highest possible distinction at TUD. His research addresses problems in Software-Defined Networking, Internet-of-Things, among others. His work on these subjects include distinguished papers at IEEE INFOCOM 2003, IFIP Networking 2008, ITC 2009, and EuroGP 2017. He is senior member of the IEEE, and is Vice-Chair of IFIP Working Group 6.2 on Network and Internetwork Architectures.
	Prof. Guohao Lan [m] (*co-supervisor DC4*) [15% FTE] is an Assistant Professor in the Embedded Systems Group at TU Delft. His research interests include pervasive computing, artificial intelligence of things, and machine learning. He has more than 20 papers published at top conferences, such as ACM MobiCom, SenSys, IPSN, USENIX Security, etc., and top journals such as IEEE Transactions on Mobile Computing and ACM Transactions on Sensor Networks, etc. He is a recipient of the Facebook Research Award 2021 and the 2020 ACM/IEEE IPSN Best Research Artifacts Award, among many others.
Key Research Facilities, Infrastructure and Equipment	**TU Delft** owns testbeds for visible light communication and sensing, such as sunlight for passive communication systems, SpiderWeb testbed for through-screen visible light communication, and LightDigit system for embedded AI research and sensing with visible light. **TU Delft** has developed systems for large-scale data management, including Apache Flink, the state-of-the-art stream processing system, and SocialGlass, for integration, enrichment, and sense-making of urban data. Additionally, ENS has access to a rich set of lab spaces, including an anechoic chamber, electronic and fabrication labs.
Status of Research Premises	TU Delft owns all of its facilities and is wholly independent from other beneficiaries and/or partner organisations in the consortium.
Previous Involvement in Research and Training Programmes	**Prof. Wang** had been the vice general coordinator of the H2020 MSCA-ITN MINTS. **Prof. Langendoen** had participated in D2S2, COMMIT, RELATE, WISEBED, CONET, and RELYonIT. **Dr. Kuipers** has participated in several EU Network-of-Excellence (E-Next, CONTENT, EINS) and COST (QoFIS, TMA) projects. Furthermore, he was board member of the section Telecommunication of the Royal Netherlands Society of Engineers (KIVI).
Current Involvement in Research and Training Programmes	**Prof. Wang** is currently leading the 4TU.NIRICT project on HaLow and is involved in the H2020 MSCA-ITN ENLIGHT'EM project. **Dr. Kuipers** is currently involved in (1) an EU COST action (RECODIS), (2) a joint project with the Indian Institute of Science, (3) a project with Dutch municipalities to set up a 5G field lab, and (4) three projects funded by industry (namely by SURFnet, KPN, and Cognizant). He is also executive committee member of the IEEE Benelux chapter on communications and vehicular technology.
Relevant Publications and/or Research / Innovation Product	H. Ye and **Q. Wang**, SpiderWeb: Enabling Through-Screen Visible Light Communication, In *ACM SenSys*, 2021.
	M. Cui, **Q. Wang** and J. Xiong, RadioInLight, Doubling the Data Rate of VLC Systems, In *ACM MobiCom*, 2021.
	S. Ghiasi, M. Zuniga and **K. Langendoen**, A Principled Design for Passive Light Communication, In *ACM MobiCom*, 2021.
	M. Cui, Y. Feng, **Q. Wang** and J. Xiong, Sniffing Visible Light Communication Through Walls, In *ACM MobiCom*, 2020.
	J. Oostenbrink , **F. Kuipers**, Going the Extra Mile with Disaster-Aware Network Augmentation, In *IEEE INFOCOM*, 2021.

Beneficiary 4: CNIT	
General Description 	**CNIT (National Inter-University Consortium for Telecommunications)** is a not-for-profit Consortium, bringing together 37 Italian Universities to foster research activity in the field of telecommunications, and provide facilities and clustering support to the Italian academic ICT research community. CNIT participated in hundreds of research projects, including EU coordinated projects, ERC grants and Italian nation-wide initiatives. It operates a satellite network, three national laboratories (Photonic Networks and Radar & Surveillance Systems, in Pisa, Multimedia Communications, in Naples) and 37 Research Units, one for each participating university. CNIT's contribution to this project will come from two research units: **University of Rome Tor Vergata (UNITV)** and **University of Trento (UNITN)**. These units provide specific skills and interests in the fields of wireless technologies, networking, sensing, programmable hardware, and machine learning. Such units have a large expertise in EU and NATO projects. Moreover, the involved CNIT units have a significant track of research accomplishments and top tier publications in IEEE and ACM conferences, as well as in top journals such as IEEE and ACM Transactions. In addition to scientific expertise, CNIT's team has the capability to build demonstrators and organize workshops and conferences, and is active in the editorial and technical boards of several major journals and conferences.
Role and Commitment of key persons (including supervisors)	**Prof. Stefania Bartoletti** [f] (*Supervisor DC2*) [25% FTE] is a tenure-track assistant professor at the Department of Electronic Engineering at the University of Roma Tor Vergata. Her research interests include theory and experimentation of location-aware wireless networks for multi-target tracking and physical behavior analysis. She was a researcher at the Institute of Electronics, Computer and Telecommunication Engineering (IEIIT) of the National Research Council of Italy where she co-supervised a Ph.D student in resource allocation aspects for vehicular communications.
	Prof. Paolo Casari [m] (*Supervisor DC7*) [25% FTE] is Associate Professor at the University of Trento, Italy. He is an expert in wireless communications, sensing, localization, channel-aware protocol design and machine learning. He is currently supervising a group including one PhD student, one postdoc, and several master and bachelor students. In the past, he has led a group of up to 8 researchers, postdocs and students during his previous appointment as a Research Assistant Professor at the IMDEA Networks Institute (Madrid, Spain).
Key Research Facilities, Infrastructure and Equipment	The **University of Rome Tor Vergata** will commit the key research facilities and equipment of the Electronic Engineering Department, where the networking group (http://netgroup.uniroma2.it/) is composed of 5 faculties, plus 4 post docs, 8 PhD students and 6 researchers and software developers hired on specific activities. The Electronic Department includes laboratories dedicated to Telecommunications Network, Sensors and Microsystems, Satellite Telecommunications and a Radar Laboratory. The **University of Trento** will commit high-performance computing clusters, dedicated simulation servers, as well as several types of software-defined radios to this project. This includes a large-scale testbed including about 20 mmWave routers installed in corridors and open spaces at the university for communications, localization and wireless sensing purposes, and a commercial 5G-standalone base station and core network.
Status of Research Premises	**CNIT's** research units own completely independent and large lab facilities. UNITN recently undergone a restructuring and extension of laboratory spaces thanks to the extra funding allotted by the Italian Ministry of Education, Universities and Research under their "Departments of Excellence" initiative.
Previous Involvement in Research and Training Programmes	**Dr. Bartoletti** has been involved in a number of international, multi-year projects funded by the EU FP7 and national Italian foundations (e.g., SELECT and GRETA). She was a MSCA Global Fellow within the Horizon 2020 European Framework for a research project with the Wireless Information & Network Science Laboratory of the Massachusetts Institute of Technology (MIT) and the University of Ferrara. **Prof. Casari** has been involved in a number of international, multi-year projects funded by the EU FP7 and H2020 programs (e.g., CLAM and RECAP), the European Defense Agency, the US ARO and ONR, as well as by national Italian foundations. He was the Scientific Manager of EU H2020 RECAP and SYMBIOSIS. He also took part in a number of national Spanish projects.
Current Involvement in Research and Training Programmes	**Dr. Bartoletti** is currently the PI of the H2020 project "LOCUS" and one of the ESR supervisors in the EU H2020 MSCA ITN "Meta Wireless". **Prof. Casari** is currently the PI of the NATO SPS project "SAFE-UComm", of the University of Trento-funded project COVID-Cons, and co-PI in the EU H2020 MSCA ETN "MINTS".
Relevant Publications and/or Research / Innovation Product	**S. Bartoletti**, A. Conti and M. Z. Win, "Device-Free Counting via Wideband Signals," in *IEEE Journal on Selected Areas in Communications*, May 2017.
	A. Conti, S. Mazuelas, **S. Bartoletti**, W. C. Lindsey and M. Z. Win, "Soft Information for Localization-of-Things," in *Proceedings of the IEEE*, 2019.
	A. Shastri, **P. Casari** *et al*., "A Review of Millimeter Wave Device-based Localization and Device-free Sensing Technologies and Applications," in *IEEE Communications Surveys and Tutorials*, 2022.
	C. Fiandrino, H. Assasa, **P. Casari**, J. Widmer, "Scaling Millimeter-Wave Networks to Dense Deployments and Dynamic Environments," in *Proceedings of the IEEE*, 2019.
	F. Granelli, R. Capraro, M. Lorandi, **P. Casari**, "Evaluating a Digital Twin of an IoT Resource Slice: an Emulation Study using the ELIoT Platform," in *IEEE Networking Letters*, 2021.

Beneficiary 5: RWTH Aachen University (RWTH)	
General Description 	**RWTH Aachen University** is one of Europe's leading technical and engineering universities, as well as one of Germany's Universities of Excellence, which entails the highest quality in teaching and world-class research. It is Germany's largest technical university and home to more than 47,000 students, out of which more than 12,000 are international students from 130 countries around the world.
Role and Commitment of key persons (including supervisors)	**Prof. Marina Petrova** [f] (*Training co-chair, supervisor of DC3*) [25% FTE] is a professor at the Faculty of Electrical Engineering and Information Technologies at RWTH and the head of the Mobile Communications and Computing Group. Moreover, she is a Visiting professor at the Division of Communications Systems (COS) at KTH Royal Institute of Technology, Stockholm. In 2019 Prof. Petrova was named Wallenberg Academy Fellow and in 2020 she was awarded the SSF Future Research Leaders grant from the Swedish Foundation for Strategic Research.
	Dr. Pradyumna Kumar Bishoy [m] is a postdoctoral researcher with experience in performance modeling and analysis, resource allocation, distributed optimization and game theory
Key Research Facilities, Infrastructure and Equipment	The grop has the needed expertise and facilities to successfully carry out the DN. The group has a lab facility comprising, SDR platforms, Raspberry Pi nodes and also standard measurement equipment. MCC has extensive expertise in wireless technologies, software-defined radios and communication networks, and has rich connections and active collaborations with industry.
Status of Research Premises	The group has all the necessary facilities and infrastructure to execute this doctoral training network, including equipment and office space as well as access to high performance computing clusters. The group owns all of its facilities and is wholly independent from other beneficiaries and/or partner organisations in the consortium.
Previous Involvement in Research and Training Programmes	**Prof. Petrova** has actively participated and has taken the role of WP leader in a number of collaborative EU projects. Those include FP7 projects ARAGORN FARAMIR, QUASAR to name a few.
Current Involvement in Research and Training Programmes	**Prof. Petrova** is part of the Open6GHub, a collaborative research hub in the area of 6G communication technologies funded by the German Ministry for Education and Research (BMBF). She is also involved in a Swedish national project funded by the Swedish Foundation for Strategic Research in cooperation with Ericsson on Ultra-high reliability and resilience for cyber-physical systems. Related to *localisation and sensing for the future intelligent and Gbps networks*, she was awarded a prestigious grant from the Wallenberg Foundation in 2019.
Relevant Publications and/or Research / Innovation Product	A. M. Voicu, L. Simić and **M. Petrova**, "Modelling Broadband Wireless Technology Coexistence in the Unlicensed Bands," In *2021 IEEE 22nd International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM)*, 2021.
	S. Khosravi, H. Shokri-Ghadikolaei and **M. Petrova**, "Learning-Based Handover in Mobile Millimeter-Wave Networks," In *IEEE Transactions on Cognitive Communications and Networking*, 2021.
	P. Ren, A. Munari, **M. Petrova,** "Performance Tradeoffs of Joint Radar-Communication Networks," In *IEEE Wireless Communication Letters*, 2019.
	B. Bojovic, E. Meshkova, N. Baldo, J. Riihijärvi, **M. Petrova**, "Machine Learning based Dynamic Frequency and Bandwidth Allocation in Self-Organised LTE Dense Small Cell Deployments," In *EURASIP Journal on Wireless Communications and Networking*, 2016.
	A. M. Voicu, L. Simić, **M. Petrova**, "Inter-Technology Coexistence in a Spectrum Commons: A Case Study of Wi-Fi and LTE in the 5 GHz Unlicensed Band," In *IEEE Journal of Selected Areas in Communication*, 2016.

Beneficiary 6: Telefonica I+D (TID)	
General Description 	**Telefónica I+D**, the research and development company of the Telefónica Group, was founded in 1988 and its mission is to contribute to the Group's competitiveness and modernity through technological innovation. With this aim, the company applies new ideas, concepts and practices in addition to developing products and advanced services. Telefónica I+D is one of the first private R&D centers in Spain as regards activity and resources and is the first company on the continent by number of European research projects in which it participates. The main asset of Telefónica I+D is its staff, which is 97% composed of university graduates from 18 nationalities. It currently collaborates with technological leaders and many organisations from 40 countries; among which figure more than 150 universities around the world.
Role and Commitment of key persons (including supervisors)	**Andra Lutu** [f] (*Training co-chair, supervisor DC6, co-supervisor DC9 and DC10*) [25% FTE] is a Researcher at Telefonica Research in Barcelona, Spain. Her main research interests lie in the areas of network measurements, traffic engineering, interdomain routing and mobile networks. After receiving her PhD at UC3M and IMDEA Networks Institute in Spain, Madrid, she worked as a Postdoc Fellow at Simula Research Laboratory, where she was a main contributor to the MONROE project, building the first open European hardware infrastructure to perform measurements in operational mobile networks. She will participate as PhD advisor.
	José Suárez-Varela [m] (*co-supervisor DC6)* is an Associate Researcher at Telefonica Research. Prior to this, he was a postdoctoral researcher at the Barcelona Neural Networking center (BNN-UPC). He holds a Ph.D. in Computer Science from the Universitat Politècnica de Catalunya (UPC) in 2020. He was co-Principal Investigator of the EU-funded project IGNNITION (H2020 NGI POINTER program), where they developed a framework for fast prototyping of Graph Neural Networks applied to communication networks (https://ignnition.org). His main research interests are in the field of AI for network control and management, traffic measurement and analysis, and cybersecurity.
Key Research Facilities, Infrastructure and Equipment	**TID** research centers in Spain with access to HW/SW resources for simulation and experiments. Pool of processing servers (i.e, cluster) with CPU, GPU and large memory capabilities. Radio testbed spanning across different sites in Spain offering a unique framework for testing diverse edge and radio applications. The testbed is composed of generic purpose server pools with virtual core networks and virtual BaseBand Unit (vBBU), hosted in the form of virtual machines or a container with open-source proprietary RAN SW/HW equipment. To provide the management and automation of the equipment, the testbed leverages a set of open source SW tools for fast prototyping, automation, and testing. Research group composed of more than 10 researchers with background on networking, machine learning and HCI. Telefonica Universitas can host events as part of the training network.
Status of Research Premises	TID owns all of its facilities and is wholly independent from other beneficiaries and/or partner organisations in the consortium.
Previous Involvement in Research and Training Programmes, including H2020 ITN	**METRICS** (ITN-607728): Measurement for Europe: Training and Research for Internet Communications Science. **PROTASIS** (RISE-690972): Restoring Trust in the cyber-space: a Systems Security Proposal. Besides these training programmes TID research team has been involved in other collaborative project as TYPES, RECRED, MPLANE.
Current Involvement in Research and Training Programmes, including H2020 ITN	**INCOGNITO** (RISE- 824015): IdeNtity verifiCatiOn with privacy-preservinG credeNtIals for anonymous access To Online services. **ENCASE** (RISE-691025): EnhaNcing seCurity And privacy in the Social wEb: a user centered approach for the protection of minors. **METAWIRELESS** (H2020-MSCA-ITN-2020): Future Wireless Communication Empowered by Reconfigurable Intelligent Meta-Surfaces. **APROPOS** (H2020-MSCA-ITN-2020) associate partners: Approximate computing for Power ad Energy Optimisation **MINTS** (H2020-MSCA-ITN-2020) associate partner: Millimiter-wave Netwroking and Sensing for Beyond 5G.Besides these training programmes TID research team is involved in other collaborative project as ACCORDION, PIMCITY, IBIDAAS, CONCORDIA, DAEMON, SPATIAL.
Relevant Publications/datasets/ softwares/ Innovation Products/ other achievements	**D. Perino**, X. Yang, J. Serra, **A. Lutu**, and I. Leontiadis, "Experience: advanced network operations in (Un)-connected remote communities," In *Proceedings of ACM MOBICOM*, 2020.
	Ö. Alay, A. **Lutu**, M. Peón-Quirós, V. Mancuso, T. Hirsch, K. Evensen, A. Hansen, S. Alfredsson, J. Karlsson, A. Brunstrom, A. S. Khatouni, M. Mellia and M. A. Marsan, "Experience, An Open Platform for Experimentation with Commercial Mobile Broadband Networks," In *Proceedings of ACM MOBICOM*, 2017.
	M. Fida, A. **Lutu**, M.K. Marina, and Ö. Alay, "ZipWeave: Towards Efficient and Reliable Measurement based Mobile Coverage Maps," In *INFOCOM – IEEE Conference on Computer Communications*, 2017.
	H. Kolamunna, Y. Hu, D. **Perino**, K. Thilakarathna, D. Makaroff, X. Guan, A. Seneviratne, "AFV: enabling application function virtualisation and scheduling in wearable networks," In *ACM UBICOMP*, 2016.
	A. Lutu, D. Perino, M. Bagnulo, F. Bustamante (2021), "Insights from Operating an IP eXchage Provider," In *Proceedings of the ACM SIGCOMM*, 2021.

Associated Partner Legal Name: NEC Laboratories Europe GmbH	
General description 	**NEC Corporation** produces tailored solutions for the core technologies and services required in a networked world, ranging from advanced semiconductor solutions, to large-scale mission-critical systems, systems integration, and broadband and mobile technologies. The NEC group employs more than 100,000 people with a multi-billion dollar sales volume worldwide. NEC began business in Europe in the early 1970s. Today, NEC has 19 affiliated companies in Europe alone. NEC Europe Ltd., which is wholly owned by NEC Corporation, was established in London in 1993. As a research unit wholly owned by NEC Europe Ltd., the **NEC Laboratories Europe GmbH (NLE)** will be involved in the SpecX project. With the focus on R&D for the next generation mobile and fixed networks, and the Future Internet, a special emphasis lies on developing and proposing solutions that meet the market needs of NEC's European customers.
Key Persons and Expertise	**Dr. Andres Garcia-Saavedra** [m] (*Secondment supervisor DC7 and DC8*) received his MSc and PhD from University Carlos III of Madrid (UC3M) in 2010 and 2013, respectively. He then joined the Hamilton Institute, Ireland, as a Research Fellow till the end of 2014 when he moved to Trinity College Dublin (TCD). Since 2015 he is working at NEC Laboratories Europe where he is currently a Principal Research Scientist.
Key Research Facilities, Infrastructure and Equipment	NEC has a 4G/5G testbed comprised of different pieces of equipment that will be upgraded as 5G equipment becomes available. The system is end-to-end, including UEs, base stations, transport/backhaul equipment, computing infrastructure, mobile core components and a hierarchical orchestration system in the control plane comprised of different NFV/SDN technologies for E2E network slicing.
Previous and current Involvement in Research and Training	**Dr. Andres Garcia Saavedra** has been PI and has been actively involved in a number of European Projects in the umbrella of H2020 5GPPP such as 5G-Crosshaul, 5G-TRANSFORMER, 5GROWTH, or DAEMON, They have participated in projects such as Spotlight, MetaWireless, or MINTS.
Relevant Publications and/or Research / Innovation Product	G. Garcia-Aviles, **A. Garcia-Saavedra**, M. Gramaglia, X. Costa-Perez, P. Serrano, A. Banchs, "Nuberu: Reliable RAN Virtualization in Shared Platforms," In *ACM MobiCom*, 2021.
	J. A. Ayala-Romero, **A. Garcia-Saavedra**, X. Costa-Perez, G. Iosifidis, "EdgeBOL: Automating Energy-savings for Mobile Edge AI," In *ACM CoNEXT*, 2021.
	J. A. Ayala-Romero, **A. Garcia-Saavedra**, X. Costa-Perez, G. Iosifidis, "Bayesian Online Learning for Energy-Aware Resource Orchestration in Virtualized RAN," In *IEEE INFOCOM*, 2021.

Associated Partner Legal Name: Ericsson GmbH	
General description ERICSSON	Ericsson enables communications service providers to capture the full value of connectivity. The company's portfolio spans Networks, Digital Services, Managed Services, and Emerging Business and is designed to help our customers go digital, increase efficiency and find new revenue streams. The Ericsson Eurolab in Herzogenrath close to Aachen is part of Ericsson GmbH in Germany and one of the main Ericsson R&D centres outside of Sweden. Ericsson Eurolab hosts a well-established wireless research team belonging to the Corporate Research. The group has been and is heavily involved in developing concepts and standards for 5G evolution and 6G.
Key Persons and Expertise	**Dr. Andra Voicu** received the PhD degree in Electrical Engineering and Information Technology from RWTH Aachen University in 2020. She is currently an Experienced Researcher at Ericsson Research, Ericsson GmbH. Her work focuses on 6G concepts for Radio Access Networks and 3GPP RAN standardization for XR services. Prior to joining Ericsson she was a postdoctoral researcher at RWTH Aachen University. She served as a TPC member for IEEE ICC Workshop on Spectrum Sharing Technology for Next Generation Communications 2021 and IEEE WiSEE 2021, 2022.
	Dr. Michael Meyer leads the Radio Network Concepts within Ericsson Research. He has a broad experience on mobile communications due to his work on 2G, 3G, 4G and 5G. His current research interests are in the areas of 5G for industry verticals, 5G evolution and 6G, and applications of machine learning and AI for wireless communications.
Key Research Facilities, Infrastructure and Equipment	Access to advanced system level simulation tools. Access to mobile communication testbed facilities.
Previous and current Involvement in Research and Training Programmes	In the past Ericsson Research was involved in various FP7 and H2020 projects. Ericsson GmbH was involved in the EU projects 5GCroCo, 5G-SMART, 5G-RECORDS.

	Currently, Ericsson Research is involved in several EU H2020 projects. Ericsson GmbH participates in the EU projects Deterministic E2E communication with 6G and SPIRIT. On national level we are engaged in AI4Mobile, 6G-ANNA, and KOMSENS-6G.
Relevant Publications and/or Research / Innovation Product	**A. Palaios**, P. Geuer *et al.*, "Network under control: Multi-vehicle E2E measurements for AI-based QoS prediction," IEEE PIMRC, Sep. 2021.
	R. Zhohov, **A. Palaios**, and P. Geuer, "Learning from large-scale commercial networks: challenges and knowledge extraction towards machine learning use cases", in Proc. 5G-MeMU, Aug. 2021.
	J. Biosca Caro, J. Ansari, J. Sachs, P. de Bruin, S. Sivri, L. Grosjean, N. König, R. H. Schmitt, "Empirical study on 5G NR cochannel coexistence", MDPI Electronics, May 2022.
	J. Ansari *et al.*, "Performance of 5G trials for industrial automation", MDPI Electronics, Jan. 2022.
	G. Wikström *et al.*, "6G – Connecting a cyber-physical world", white paper, Feb. 2022, online available: https://www.ericsson.com/en/reports-and-papers/white-papers/a-research-outlook-towards-6g

Associated Partner Legal Name: Electrosense	
General description	Electrosense (electrosense.org) is a non-profit association that has been has established in 2016 with the objective of providing a more efficient, safer and more reliable use of the electromagnetic space by improving the accessibility of spectrum data for the general public. Electrosense organises events such as workshops, datathons to can foster discussions and provide input for future development and research around Electrosense. As part of its core activities, Electrosense collects and process spectrum data for targeting verticals such as spectrum anomaly detection, spectrum monitoring and electrosmog. Following the crowdsourcing model, people contribute by sharing their data to the association and on the other hand receive processed data back.
Key Persons and Expertise	**Dr. Vincent Lenders** [m] (*Secondment supervisor DC5 and DC6*) president of the Electrosense association. Dr. Lenders earned his Ph.D degree (2006) and M.sc (2001) in electrical engineering and information technology both at ETH Zurich, Switzerland. He was also postdoctoral research faculty at Princeton University in the USA. Dr. Lenders is also the Director of the newly created Cyber-Defence Campus and of the Cyber Security and Data Science Division at armasuisse Science and Technology.
Key Research Facilities, Infrastructure and Equipment	ELECTROSENSE owns several servers that runs 2 x 12 Core Intel Xeon Silver 4116 2.1GHz Processor. Several of the spectrum sensors deployed at users' location are also owned by Electrosense, although users have also access to the toolkit to deploy their own sensors.
Previous and current Involvement in Research and Training	Electrosense was involved in the SOCRATES project funded by NATO Science for Peace and Security Programme the under grant G5461. Furthermore, Electrosense collaborates actively with KU Leuven and IMDEA networks in direct collaboration activities, as well as industry partners across Europe.
Relevant Publications and/or Research / Innovation Product	**V. Lenders**, et al., "Electrosense+: Crowdsourcing Radio Spectrum Decoding using IoT Receivers", In *Elsevier Journal on Computer Networks*, 2020.
	S. Rajendran, R. Calvo-Palomino, M. Fuchs, B. Van den Bergh, H. Cordobés, D. Giustiniano, S. Pollin, **V. Lenders**, "Electrosense: Open and Big Spectrum Data," In *IEEE Communications Magazine*, 2018.
	R. Calvo, D. Giustiniano, **V. Lenders** and A. Fakhreddine, "Crowdsourcing Spectrum Data Decoding," In *IEEE International Conference on Computer Communications*, 2017.

Associated Partner Legal Name: Accelleran	
General description	**Accelleran N.V.** is a scaleup SME based in Belgium. Accelleran is a leading provider of Open RAN software solutions for 4G/5G networks. Accelleran dRAX™ implements the key control and resource management functions of the RAN, including Service Orchestration, RIC, CU-CP, and CU-UP. Comprising proven, cloud-native and microservice-based software components, dRAX™ enables real-world deployment of multi-vendor, disaggregated Open RAN, aligned with open standards such as the O-RAN Alliance. The dRAX™ RIC offers a production-ready Open RAN development platform, enabling real-time RAN data to be leveraged to create AI-based xApps and enhanced RAN intelligence and automation. Accelleran also provides 4G/5G RAN integration services and system solutions for 5G MNOs, Neutral Host providers, Private Network owners and research facilities.
Key Persons and Expertise	**Dr. Trevor Moore** [m] (*Secondment supervisor DC4*) is CTO and co-founder of Accelleran. Trevor is the Accelleran lead in numerous H.2020 projects and will be supervising the research of the PhD student, together with members of his system group (currently a team of 4 experienced system engineers) who will be assigned for daily follow-up and mentoring.

Key Research Facilities, Infrastructure and Equipment	Accelleran labs integrate and host 5G SNPNs with 3rd party Radios (commercial RUs and SDR USRPs), 5GC (commercial and open-source) and UE/CPE (commercial units and simulator/test tools) to configure and run 4G & 5G private networks with RIC and Edge computing capabilities to develop, deploy and test applications including AI/ML algorithms for advanced research into RAN optimisation and automated operation. Accelleran owns and operates its research labs in the main Antwerp office. The labs are continually growing to integrate and validate 3GPP Rel-16 5G SNPN use-cases, in addition to existing 4G and Rel-15 5G standalone test capabilities.
Previous and current Involvement in Research and Training Programmes	Accelleran is very active in H.2020 5GPPP RIA/IA projects (such as completed 5GCity & 5G-Enhance, active 5G-Clarity, 5G-COMPLETE, Affordable5G, 5G-RECORDS, MARSAL – together with KULeuven, Unicore, FTI 5GaaS) but has not yet participated in MSCA/ITN type training programs. Accelleran participates in the Industrial Advisory Board of the Flemish FWO SBO S003921N VERI-END.com project with the University of Gent, Belgium.
Relevant Publications and/or Research / Innovation Product	Accelleran commercialises the dRAX™ 4G/5G Open RAN product line. These Cloud-Native components deliver reliable, cost-effective and scalable solutions for both and 4G and 5G networks. Accelleran was recently nominated for Deloitte's 2021 Technology Fast 50 (link).

Associated Partner Legal Name: University Carlos III of Madrid	
General description	University Carlos III of Madrid (UC3M) was founded in 1989 with the objective of providing an efficient, high quality public undergraduate and graduate education. In 2016, UC3M ranks 20 in the QS ranking of the top 50 universities world-wide under 50. The Telematics Department of UC3M is involved in education and research on broadband networks, mobile networks, advanced Internet networking and applications.
Key Persons and Expertise	**Dr. Pablo Serrano** [m] (co-*supervisor DC6*) got his Telecommunication Engineering degree and his PhD from UC3M in 2002 and 2006, respectively. He has been with the Telematics Department of UC3M since 2002, where he currently holds the position of Associate Professor. He has over 100 scientific papers in peer-reviewed international journals and conferences. **Dr. Albert Banchs** received his Telecommunications Engineering and PhD degree from the Universitat Politècnica de Catalunya. He was a visiting researcher at ICSI, Berkeley, CA, in 1997, worked for Telefonica I+D, Spain, in 1998, and for the Network Laboratories of NEC Europe Ltd., Germany. A. Banchs is the Deputy Director of IMDEA Networks and Full Professor at the Telematics Department of the Universidad Carlos III de Madrid, Spain.
Key Research Facilities, Infrastructure and Equipment	UC3M forms part of 5TONIC (https://www.5tonic.org/) an open research and innovation laboratory focusing on 5G technologies based in Madrid. The objective of 5TONIC is to create a global open environment where members from industry and academia work together.
Previous and current Involvement in Research and Training Programmes	Measurement for Europe: Training and Research for Internet Communications Science (METRICS) METRICS provided the right instruments for continuous large-scale measurements, developed data analysis and privacy protection mechanisms, and designed sample applications that make effective use of the measurement infrastructure.
Relevant Publications and/or Research / Innovation Product	G. Garcia-Aviles, A. Garcia-Saavedra, M. Gramaglia, X. Costa-Perez, **P. Serrano**, A. Banchs, "Nuberu: Reliable RAN Virtualization in Shared Platforms," In *ACM Mobicom*, 2022.
	F. Gringoli, P. Patras, C. Donato, **P. Serrano**, Yan Grunenberger, "Performance Assessment of Open Software Platforms for 5G Prototyping," In *IEEE Wireless Communications Magazine, Special Issue on 5G Testing and Field Trials*, 2018.
	I. Gomez-Miguelez, A. Garcia-Saavedra, P. D. Sutton, **P. Serrano**, C. Cano, D. J. Leith, "srsLTE: An Open-Source Platform for LTE Evolution and Experimentation," In *ACM WiNTECH*, 2016 (**Best paper award**).

Associated Partner Legal Name: UNITV	
General Description	The University of Rome Tor Vergata (**UNITV**) was founded in 1982, rapidly becoming one of the most important Italian universities. It hosts more than 40,000 students, who can choose among 120 degree programs, plus PhDs and specialization courses. Within University of Rome Tor Vergata, the Department of Electronic Engineering brings together a wide range of experts in analogue and digital electronics and in different areas of Information and Communications Technology. The Department has 52 faculties.
Role and Commitment of key persons (including supervisors)	**Dr. Stefania Bartoletti** [f] (vice-SC, Supervisor DC2[25% FTE] is a tenure-track assistant professor at the Department of Electronic Engineering at UNITV. She serves on the editorial board of the IEEE Commmun. Letters. She was Chair of the TPC for the IEEE Workshop on Advances in Network Localization and Navigation (2017-2021) and of the Workshop on Synergies of Communication, Localization, and Sensing Towards 6G (2022-2023) within IEEE Globecom and ICC.

	Prof. Giuseppe Bianchi [m] (Co-supervisor DC2) [15% FTE] is Full Professor of Networking at UNITV. His research activity includes programmable network systems, wireless networks, network security, and performance modeling and is documented in about 300 peer-reviewed international journal and conference papers, with more than 20.000 citations (source: Google Scholar). He has coordinated six large scale EU projects, and has been (or still is) editor for several journals in his field, including IEEE/ACM Trans. on Networking, IEEE Trans. on Wireless Communications, IEEE Trans. on Network and Service Management, and Elsevier Computer Communications.
Key Research Facilities, Infrastructure and Equipment	**UNITV** own completely independent and large lab facilities. The Electronic Department includes laboratories dedicated to Telecommunications Network, Sensors and Microsystems, Satellite Telecommunications and a Radar Laboratory.
Previous Involvement in Research and Training Programmes	The faculties of the networking group have a large expertise in EU projects; they coordinated 11 EU projects worth 48Me, and obtained grants for their group worth about 11 Me; they have been evaluators for many EU research proposals and projects. **Dr. Bartoletti** was a Marie-Skłodowska Curie Global Fellow within H2020 and PI of the H2020 LOCUS. **Prof. Bianchi** has held coordinating positions for 6 European Projects, has chaired the PhD programme in Electronics and Telecommunications Engineering.
Relevant Publications and/or Research / Innovation Product	**S. Bartoletti**, A. Conti and M. Z. Win, "Device-Free Counting via Wideband Signals," in IEEE Journal on Selected Areas in Communications, May 2017.
	A. Conti, S. Mazuelas, **S. Bartoletti**, W. C. Lindsey and M. Z. Win, "Soft Information for Localization-of-Things," in Proceedings of the IEEE, 2019.

Associated Partner Legal Name: UNITN	
General Description 	UNITN has a long-standing history of scientific excellence and ranked 36th in "The European Teaching Ranking 2018" (1st among Italian Universities), and 5th among Italian Universities in the World University Rankings 2018. The Department of Information Engineering and Computer Science has been recently awarded excellence funding from the Italian government to develop and expand research and teaching laboratories, resulting in new freely accessible spaces for experimental activities for all students.
Key persons and expertise	**Prof. Paolo Casari [**m] (vice-SC, Supervisor DC7) [25% FTE] is associate professor at the Department of Information Engineering and Computer Science of UNITN. He published about 150 papers in peer-reviewed international journal and conferences. He is an IEEE Senior Member and serves on the editorial board of the IEEE Trans. on Wireless Communications and of the IEEE Trans. on Mobile Computing, besides participating to the TPC of many conferences. He received two best paper awards.
	Prof. Fabrizio Granelli [m] (Co-supervisor DC7) [15% FTE] is full professor at the Department of Information Engineering and Computer Science of UNITN, where he also served as Dean of Education from 2015 to 2017. He advised more than 80 thesis students and 8 Ph.D. students. For IEEE ComSoc, he served as a Distinguished Lecturer (2012-15 and 2021-22), as Director of Online Content (2016-17) and as Director for Educational Services (2018-19). He authored more than 200 papers.
Key Research Facilities, Infrastructure and Equipment	**UNITN** has full ownership of their facilities, including laboratories, classes, rooms, and specific wireless communication testbeds, and a department-wide testbed with software-defined and UWB radios, recently enriched with mmWave communication and localisation capabilities. These testbeds are available for the SpecX DCs to use, along with software licences to operate them (e.g., MATLAB, NI LabView).
Previous and Current Involvement in Research and Training Programmes	**Prof. Casari** was PI of the NATO SPS project ThreatDetect, and Scientific Manager of the H2020 RECAP and SYMBIOSIS projects. He participated in EU FP7 and EDA projects, is currently PI of the NATO SPS project SAFE-UComm and of the UNITN project COVID-Cons, and co-PI of the EU H2020 MSCA ETN MINTS. **Prof. Granelli** was the PI of the NATO SPS project DAVOSS, and is now the PI of the HORSE project, funded by EC in the framework of the Horizon Europe call Horizon-JU-SNS-2022.
Relevant Publications/datasets/ softwares/ Innovation Products/ other achievements	C. Fiandrino, H. Assasa, **P. Casari**, J. Widmer, "Scaling Millimeter-Wave Networks to Dense Deployments and Dynamic Environments," in *Proceedings of the IEEE*, 2019.
	S. T. Arzo, R. Bassoli, **F. Granelli**, F. H. P. Fitzek, Multi-Agent Based Autonomic Network Management Architecture," in *IEEE Transactions on Network and Service Management*, 2021.
	J. Palacios, **P. Casari**, H. Assasa, J. Widmer, "LEAP: Location Estimation and Predictive Handover with Consumer-Grade mmWave Devices," in *Proc. IEEE INFOCOM*, 2019.

Associated Partner Legal Name: University at Albany – SUNY	
General description 	The State University of New York at Albany is a public research university founded in 1844, and is part of the State University of New York (SUNY) system. The University enrolls more than 17,300 undergraduate, graduate, and professional students. The UbiNET Lab at University at Albany is a part of the Computer Science Department and is directed by Dr. Mariya Zheleva. The lab conducts research in next generation mobile wireless networks, focusing on autonomous spectrum measurement and dynamic access and resource allocation, architectures, measurement infrastructures and networked system design, integration and in-situ deployment. The lab has background in field-deployed research in rural Africa and the U.S.

Key Persons and Expertise	**Mariya Zheleva** [f] (*Secondment supervisor DC4*) is an Assistant Professor in Computer Science at University at Albany – SUNY. She graduated with her PhD in Computer Science from University of California Santa Barbara in 2014 Dr. Zheleva is the recipient of the NSF CAREER award, the Dynamic Spectrum Alliance 2019 Award for University Research on New Opportunities for Dynamic Spectrum Access and the University at Albany 2019 President's Award for Exemplary Public Engagement.
Key Research Facilities, Infrastructure and Equipment	The lab is equipped with state-of-the-art student workstations. The PI's laboratory also features a set of research equipment including software-defined radios, hosts, work stations, a power meter and commercial software-defined radio networks (such as a TVWS campus network managed by the lab).
Previous and current Involvement in Research and Training Programmes	The UbiNET Lab has so far hosted one PhD student from KU Leuven in Spring 2020 through the NGI Explorers program. This visit resulted in a paper publication and an ongoing collaboration between the UbiNET Lab and the Electrosense project at KU Leuven. The research tackled modulation recognition of wireless signals that have not been observed in training.
Relevant Publications and/or Research / Innovation Product	E. Perenda, S. Rajendran, G. Bovet, S. Pollin, **M. Zheleva**, "Learning the unknown: Improving modulation classification performance in unseen scenarios," In *IEEE INFOCOM*, 2021.
	W. Xiong, L. Zhang, M. McNeil, P. Bogdanov, **M. Zheleva**, "SYMMeTRy: Exploiting Self-Similarity for Under-Determined MIMO Modulation Recognition," In *IEEE TMC*, 2021.
	W. Xiong, P. Bogdanov, **M. Zheleva**, "Robust and Efficient Modulation Recognition Based on Local Sequential IQ Features," In *IEEE International Conference on Computer Communications IEEE INFOCOM*, 2019.

Associated Partner Legal Name: St. Louis University	
General description 	Founded in 1818, St. Louis University is the oldest university west of the Mississippi River, and maintains campuses in St. Louis, (MO, USA) and in Madrid (Spain). Students represent more than 82 foreign countries. A prime research establishment in the area, the University has been selected as a top workplace in for women by the Women's Foundation of Greater St. Louis (2020, 2021).
Key Persons and Expertise	**Prof. Flavio Esposito** [m] (*Secondment supervisor DC7*) is Associate Professor at the Department of Computer Science of SLU. He received his PhD in computer science at Boston University in 2013. His research interests include network management, network virtualisation and distributed systems. Prior to joining SLU, Flavio worked at Exegy, St.Louis and at Alcatel-Lucent, Italy. He interned at Bell Laboratories, at Raytheon BBN Technologies, and at EURECOM, France, and was a visiting researcher at the Center for Wireless Communications, Finland.
Key Research Facilities, Infrastructure and Equipment	SLU has comprehensive facilities and laboratories for the SpecX DC seconded there to conduct their research smoothly. Besides open spaces for students, key laboratory infrastructure include a computing cluster, numerous software-defined radios of different types, and an edge cloud testbed serving 20 5G antennas that are available for multiple experiments on software-defined networking, virtualisation, radio sensing and signal detection.
Previous and current Involvement in Research and Training Programmes	US-NSF project US Ignite (Collaborative Research, Focus Area 2): Resilient Virtual Path Management for Scalable Data-intensive Computing at Network-Edges. US-NSF project ICE-T RI: A Knowledge-Defined Platform for Real-Time Management of Transmissions and Computations at Network Edge. US-NSF project (Core: Small: Collaborative Research); HEECMA: A Hybrid Elastic Edge-Cloud Application Management Architecture.
Relevant Publications and/or Research / Innovation Product	N. Akhtar, I. Matta, A. Raza, L. Goratti, B. Torsten, **F. Esposito**, "Managing Chains of Application Functions Over Multi-Technology Edge Networks", In *IEEE Transactions on Network and Service Management*, 2021.
	A. Sacco, **F. Esposito**, G. Marchetto, "An Architecture for Adaptive Data-Driven Routing Prediction at the Edge," In *IEEE Transactions on Network and Service Management*, 2020.
	A. Sacco, **F. Esposito**, G. Marchetto, "Owl: Congestion Control with Partially Invisible Networks via Reinforcement Learning," In *Proc. IEEE INFOCOM*, 2019.

7. Letters of Commitment

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November 7, 2022

Letter of Commitment – DN Associated Partner

I undersigned Roberto Baldessari, in my quality of General Manager Administration of NEC Laboratories Europe GmbH, confirm the intention of our organization to set up the necessary provisions to participate as associated partner in the proposal *SpecX* submitted within the call H2020-MSCA-DN-2022, should the proposal be funded.

On behalf of NEC Laboratories Europe GmbH, I also confirm that we intend to participate and contribute to the research, innovation and training activities as planned in this project.

In particular, NEC Laboratories Europe GmbH intends to be involved in:

- Providing **research training** on O-RAN and Smart Surfaces during the secondments of DC7 and DC8.
- Participating in the **supervisory board** and co-supervising DC7 and DC8
- Hosting **secondments** (DC7, DC8)
- Collaborating to the **SpecX Summer School**

I hereby declare that I am entitled to represent into this process NEC Laboratories Europe GmbH.

Name: Roberto Baldessari, General Manager Administration

Date: November 3, 2022

Signature:

NEC Laboratories Europe GmbH
Geschäftsführer: Dr. Jürgen Quittek
Amtsgericht Mannheim HRB 728558
Bank: HSBC Trinkaus & Burkhardt AG, IBAN: DE53 3003 0880 0014 4480 04, BIC: TUBDDEDD

DocuSign Envelope ID: B691106C-53E3-4D62-9D2D-C9D059A9D9A2

ERICSSON

Unser Zeichen:
Datum: 2022-11-11
Bearbeiter: Michael Meyer

Ihr Zeichen:
Ihr Datum: 2022-11-11

Ericsson GmbH, Ericsson Allee 1, 52134 Herzogenrath

SpecX Commitment Letter

Dear Sirs,

I undersigned Michael Meyer, in my quality as the research department manager, commit to set up all necessary provisions to participate as associated partner in the proposal SpecX submitted within the call HORIZON-MSCA-2022-DN-SpecX should the proposal be funded.

On behalf of Ericsson GmbH, I also confirm that we will participate and contribute to the research, innovation and training activities as planned in this project. In particular, Ericsson GmbH will be involved in

- Providing research training on analysis and modelling for coexistence of networks based on cellular technologies, and sensing-based resource allocation scheme. These actions will occur during the secondment of DC1 and DC3.
- Cooperating to the SpecX Summer School
- Participating in the supervisory board and co-supervising DC1 and DC3.
- Hosting secondments (DC1, DC3)

I hereby declare that I am entitled to commit into this process the entity I represent.

Best regards

DocuSigned by:
E6C9F579294A41B...
ppa. Jan-Peter Meyer-Kahlen

Vice President, Site Manager, Ericsson Eurolab

DocuSigned by:
B63B1DF91F1848C...
i.V. Dr. Michael Meyer

Research Manager, Ericsson Eurolab

Ericsson GmbH
Eurolab - Unternehmensbereich Forschung und Entwicklung

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Geschäftsführer · Presidents
Stefan Koetz (Vors.)
Daniel Leimbach
Bernd Mellinghaus

Aufsichtsrat · Supervisory Board
Jörgen Heilborn (Vors.)

Registrierungsnummern
Registration Numbers
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WEEE: DE32508425

HORIZON-MSCA-2022-DN-SpecX

Letter of Commitment – DN Associated Partner

I undersigned Vincent Lenders, in my quality of President of Electrosense, commit to set up all necessary provisions to participate as associated partner in the proposal *SpecX* submitted within the call HORIZON-MSCA-2022-DN should the proposal be funded.
On behalf of Electrosense, I also confirm that we will participate and contribute to the research, innovation and training activities as planned in this project. In particular, Electrosense will be involved in

- Providing **research training** on fundamental knowledge of sensing and communication related to the Internet of Things. These actions will occur during the secondment of DC5 and DC6.
- Delivering **S/T training** "Prototyping and building up spectrum sensing testbeds"
- Cooperating to the **SpecX Summer School**
- Participating in the **supervisory board** and co-supervising DC5 and DC6.
- Hosting **secondments** (DC5, DC6)

I hereby declare that I am entitled to commit into this process the entity I represent.

Name: Vincent Lenders

Date: 7/11/2022

Signature:

Electrosense Association
Eyzälg 23, 3400 Burgorf, Switzerland
email: vincent.lenders@electrosense.org

HORIZON-MSCA-2022-DN-SpecX

Letter of Commitment – DN Associated Partner

On headed paper of the entity

I undersigned Stan Claes, in my quality of CEO of Accelleran, commit to set up all necessary provisions to participate as associated partner in the proposal *SpecX* submitted within the call H2020-MSCA-DN-2022 should the proposal be funded.

On behalf of Acceleran, I also confirm that we will participate and contribute to the research, innovation and training activities as planned in this project. In particular, Acceleran will be involved in

- Providing **research training** on localization, edge infrastructure, RAN/O-RAN and wireless communications. These actions will occur during the secondment of DC2 and DC4.
- Participating in the **supervisory board** and co-supervising **DC2** and **DC4**.
- Hosting **secondments** (DC2, DC4)
- Cooperating to **Soft skill training 7**
- Cooperating to the **SpecX Summer School**

I hereby declare that I am entitled to commit into this process the entity I represent.

Name: Stan Claes

14/11/2022,

Signature:

Doc ID: 126e8cf31569e2a18ce2f0baa1c1c85553fa510a

HORIZON-MSCA-2022-DN-SpecX

Letter of Commitment – DN Associated Partner

I undersigned Carmen Guerrero in my quality of Director of the Ph.D Program on Telematics Enginering of Universidad Carlos III de Madrid, commit to set up all necessary provisions to participate as associated partner in the proposal *SpecX* submitted within the call HORIZON-MSCA-2022-DN should the proposal be funded.

On behalf of [Universidad Carlos III de Madrid], I also confirm that we will participate and contribute to the research, innovation and training activities as planned in this project. In particular, [Universidad Carlos III de Madrid] will be involved in

- **Enrolling DC5, DC6, and DC9** in the Doctoral School of the University
- Providing **research training** on wireless communication, mobile networking, execution of experiments. These actions will occur during the secondment of DC6.
- Participating in the **supervisory board** and co-supervising DC6
- Hosting **secondments** (DC6)

I hereby declare that I am entitled to commit into this process the entity I represent.

Name: Carmen Guerrero

November 7 2022

Firmado por GUERRERO LOPEZ MARIA CARMEN – ***2016** el día 07/11/2022 con un certificado emitido por AC FNMT Usuarios

Signature:

Università di Roma Tor Vergata

Dipartimento di Ingegneria Elettronica

To whom it may concern

Object: Letter of Commitment – DN Associated Partner

I undersigned Corrado Di Natale, in my quality of Coordinator of the PhD course in Electronic Engineering, commit to set up all necessary provisions to participate, as associated partner, in the proposal *SpecX* submitted within the call HORIZON-MSCA-2022-DN should the proposal be funded.

On behalf of University of Rome Tor Vergata, I also confirm that we will participate and contribute to the research, innovation and training activities as planned in this project. In particular, University of Rome Tor Vergata, will participate as a component of the Italian inter-university consortium for telecommunications (CNIT), and will be involved in

- Providing research training: enroll DC2 to the doctoral program in Electronics Engineering of University of Rome Tor Vergata.
- Scientific participation to the organisation of one network-wide event and summer school in the region of Trento, Italy.
- Participating in the supervisory board.

I hereby declare that I am entitled to commit into this process the entity I represent.

Rome, 7 Nov 2022

Professor Corrado Di Natale

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UNIVERSITÀ DI TRENTO
Dipartimento di Ingegneria e Scienza dell'Informazione

HORIZON-MSCA-2022-DN-SpecX

Letter of Commitment – DN Associated Partner

I, the undersigned Prof. Elisa Ricci, in my capacity as the Director of the PhD school in Information Engineering and Computer Science of the University of Trento, commit to set up all necessary provisions to participate as associated partner in the proposal SpecX submitted within the call HORIZON-MSCA-2022-DN should the proposal be funded.

On behalf of the Department of Information Engineering and Computer Science of the University of Trento, I also confirm that we will participate and contribute to the research, innovation and training activities as planned in this project. In particular, the University of Trento will participate as a component of the Italian inter-university consortium for telecommunications (CNIT), and will be involved in

- **Providing research training**: enroll DC7 in the doctoral program in Information Engineering and Computer Science of the University of Trento, Italy;
- **Co-organisation of one network-wide event and summer school** in the region of Trento, Italy;
- Participating in the **supervisory board**.

I hereby declare that I am entitled to commit into this process the entity I represent.

Name: **Elisa Ricci**, Director, PhD school in Information Engineering and Computer Science, University of Trento

Trento, 12/11/2022

Signature: 

Via Sommarive, 9 – 38123 Trento, Italy - Tel. +39 0461/283966, Fax +39 0461/283166, disi@disi.unitn.it

UNIVERSITY AT ALBANY
State University of New York

College of Engineering and Applied Sciences
Computer Science Department

HORIZON-MSCA-2022-DN-SpecX

Letter of Commitment – DN Associated Partner

I undersigned Mariya Zheleva, in my quality of Associate Professor in Computer Science at University at Albany, commit to set up all necessary provisions to participate as associated partner in the proposal *SpecX* submitted within the call HORIZON-MSCA-2022-DN should the proposal be funded.

On behalf of University at Albany, I also confirm that we will participate and contribute to the research, innovation and training activities as planned in this project. In particular, University at Albany will be involved in

- Providing **research training** on next generation wireless networking, training in research methodology, algorithm development, testbed setup and experimentation, paper writing and technical presentations. These actions will occur during the secondment of DC4
- Participating in the **supervisory board**.
- Hosting **secondments** (DC4)

I hereby declare that I am entitled to commit into this process the entity I represent.

Name: Mariya Zheleva,

11/07/2022,

Signature: 

UAB400
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Flavio Esposito
Associate Professor
flavio.esposito@slu.edu

November 7, 2022

Dear Colleagues,

I undersigned Flavio Esposito, in my quality of Associate Professor of Computer Science at Saint Louis University, commit to set up all necessary provisions to participate as associated partner in the proposal SpecX submitted within the call HORIZON-MSCA-2022-DN, should the proposal be funded.

On behalf of Saint Louis University, I also confirm that we will participate and contribute to the research, innovation, and training activities as planned in this project. In particular, Saint Louis University will be involved in

- Providing research training on computer networks, network measurements, and networking data processing. These actions will occur during the secondment of DC7
- Participating in the supervisory board
- Hosting secondments (DC7)

I hereby declare that I am entitled to commit into this process the entity I represent.

With regard,

Flavio Esposito

Higher purpose. Greater good.

Appendix I: Ethics Self-Assessment

I1. Ethical dimension of the objectives, methodology and likely impact

There are no critical ethics issues related to the SpecX project, as indicated in the ethical issues checklist in Part A of the proposal. Therefore, we believe that the ethics-related risks are rather low.

Data collection and protection: While we aim to use spectrum data, we don't log personal data. As we don't transmit but only receive signals, we are also not subject to environment radiation norms. To make sure we for continuously protect personal data and protect the environment and apply export regulation and comply with ethics related to AI, we will take following actions as detailed int he next section.

Artificial Intelligence: We are working on machine learning algorithms, but the intention is to mainly use existing techniques and adapt them to the SpecX context. When using and adapting existing algorithms, there are not really ethical issues.

Misuse: Related to Dual Use, any cross-border activities will comply with all applicable international, EU and national law (in particular, the EU Export Control Regulation No 428/2009).

I2. Compliance with ethical principles and relevant legislations

Protection of personal data

Assessment: In SpecX we will collect and use data regarding spectrum use, including signal strength, noise, and so on. All the data will be stored on IMDEA data repositories or similar places. We do not collect any sensitive personal data such as health (respiration, heartbeat, etc.), and the impact of people's presence on the measured radiation patterns is only implicit. It is also not our intention to track people or get insights about crowd mobility from the gathered datasets. Nevertheless, we should ensure the data is also stored in such a way that it cannot be misused in the future.

Action: There will be specialised training on "Good research practice and data management" (A. Lutu of TID, M13) and privacy-enhancing technologies (C. Diaz of KU Leuven, M13) to make sure DCs are sufficiently aware of privacy issues when doing their research and experiments.We ensure that all data that is processed will be limited to the research activities of the DCs in SpecX. We will not create generic datasets and make them available for activity or anomaly detection beyond the targeted activities. To access the data, credentials are needed, and access will only be given after approval of a 'data license agreement'. To double-check the validity of our approach and make it concrete, we will contact the IMDEA Ethics Committee that evaluates research for ethical approval. Evaluation by this committee will, at the same time, allow an evaluation of the processing of personal data by the IMDEA Data Protection Officer (DPO).

Non-EU countries (and Dual-Use)

Assessment: As this project does not have a military finality, is not part of a sensitive call, or does not have a sensitive partner or end-user, there is no need for ethics approval by the IMDEA Ethics Committee, and by extrapolation, we also did not raise an Ethics issue in Part A. We are aware of the European regulation 428/2009 related to dual-use items for which export licenses are required. At the moment of submission, the planned secondments in Switzerland and USA do not require an agreement, but we will keep monitoring the research progress with respect to the European regulation and ensure we at all times comply with the European export regulation. The reason why there are currently no dual-use export regulation issues, is the fact that regulation 428/2009 focusing on digitally controlled radio receivers (5A001.b.5) is specifically targeting wideband (more than 1.000 channel) radio technology. The secondments to Electrosense or the USA partners are related to narrowband radio (for instance, Electrosense uses the 2 MHz RTL-SDR for sensing).

Action: We will keep track of the European regulation 428/2009 and ensure all our actions are compliant to EU law. IMDEA and KU Leuven have several years of in-house expertise to make sure that when necessary, the required authorisation/license(s) will be obtained from the national authorities. A training with the title "Dual-use/export license training" by KU Leuven is planned in M13.

Environment, health and safety

Assessment: Cellular technology is subject to environmental radiation norms for non-ionising radiation. The data collected in SpecX could help monitor the effective exposure of the environments to electromagnetic radiation caused by telecommunication systems. As there is no focus on transmitters in SpecX, there is no risk of causing excessive radiation.

Artificial Intelligence

Assessment: We are working on machine learning algorithms, but the intention is to mainly use existing techniques and adapt them to the SpecX context. When using and adapting existing algorithms, there are not really ethical issues. In our understanding, we will use data-driven methods to better understand spectrum use. While that better understanding can help to make better use of the spectrum and enable new applications, these applications will not be derived by the machine learning tools. It is the team of 10 DC that will drive the applications.

Action: By striving for a diverse team of 10 DC (gender, north/south, east/west) we hope that the applications are ethical following worldwide ethical standards. Ethics and research integrity is a mandatory training for IMDEA researchers, and it will be offered to the 10 SpecX DC during the first event with title "Responsible Research and Innovation (RRI), open access, ethics, scientific integrity, and gender bias ".

END PAGE

MARIE SKŁODOWSKA-CURIE ACTIONS

Doctoral Networks (DN)
Call: HORIZON-MSCA-DN-2022

PART B

SpecX

Doctoral Network on
Spectrum Analytics as a Service

This proposal is to be evaluated as:

[DN]