

15 PhD Positions in the Horizon Europe Marie Curie Doctoral Network



Doctoral Network on Spectrum Analytics as a Service

Applications are invited for 15 PhD positions (“Doctoral Candidates”, DCs) to be funded by the Marie-Sklodowska-Curie Doctoral Network “Doctoral Network on Spectrum Analytics as a Service” within the Horizon Europe programme of the European Commission.

As 6G advances into new frequency bands, integrates terrestrial and non-terrestrial networks, and enables ambient Internet of Things (IoT), the ability to perform sustainable large-scale spectrum measurement and AI-empowered analysis in five dimensions (3D space, time, frequency) is becoming a highly sought-after skill. Unfortunately, there are not nearly enough specialists and experts to satisfy this growing need. With the support of the Marie Skłodowska-Curie Actions programme, the SpecX project will develop a high-level research programme, equipping doctoral candidates with crucial skills and knowledge on spectrum measurements, analyses, and applications. This will allow them to develop key breakthroughs across many sectors, fields, and services. The project will combine local and network-wide training, followed by hands-on training in coordination with non-academic partners.

The overall research goal of SpecX is to provide a high-level research programme and doctoral training to 15 Doctoral Candidates (DCs) in large-scale spectrum measurements, analysis, and applications in future telecom infrastructure. The goal is to create a research and innovation workforce in applied mathematics, radio hardware, cellular infrastructure, spectrum data collection, cloud architectures and integration with cellular networks, artificial intelligence, spectrum management methods, and business aspects, to assess and analyse big spectrum data, and provide innovative services and applications. Hands-on in-depth training will be strengthened with non-academic placements, as well as multidisciplinary, intersectoral, and international cooperation, boosting DCs' employability and the project's impact in the short- and long-term.

Key dates:

- Oct 30, 2025: Launch of 10 DC Positions
- **Jan 30, 2026: Deadline for online application**
- Feb 9, 2026: Shortlist (preselected) candidates and send interview invitations
- Feb 16 – March 8 2026: SpecX Recruitment Event (exact date to be decided)
- March 2026: Circulation list “recruited SpecX DCs” (within one week after the Recruitment Event)
- March 2026: Reopen any unfilled positions and follow a decentralised approach
- **Sept 1, 2026: Targeted starting date for DC contracts**

Key Information Background

Number of positions available

15 PhD Positions

Research Fields

Wireless communications – Mobile Networks – Signal Processing – Electronic Engineering – Computer Science

Keywords

Spectrum Sensing and measurements, AI-based analytics, Distributed processing, IoT-enabled sensing, and Spectrum sensing in non-terrestrial networks

Career State

Doctoral Candidate (DC) or 0-4 yrs (Post Graduate)

Benefits and salary

The successful candidates will receive an attractive salary in accordance with the MSCA regulations for DCs. **The fellowship will consist of a competitive salary**, with a country correction factor that depends on the cost of living in the different EU Member States, plus an additional allowance in case of family obligations, and an allocation for research and training costs. The exact salary (net) will be confirmed upon appointment and depends on local tax regulations. **The guaranteed PhD funding covered by the training network is for 36 months** (i.e., EC funding, additional funding is possible, depending on the local Supervisor, and in accordance with the regular PhD time in the country of the hiring host). In addition to their individual scientific projects, all fellows will benefit from further continuing education, which includes internships and secondments, a variety of training modules as well as transferable skills courses and active participation in workshops and conferences.

Online Recruitment Procedure (see Appendix 1 for full description)

All applications proceed through the online recruitment portal on the website. Candidates apply electronically for one to a maximum of three positions and indicate their preference. Candidates provide all requested information, including:

- A detailed CV - **Europass format obligatory** (with an explicit mention of the total average score in BSc and MSc studies)
- A motivation letter
- BSc and MSc degrees and transcripts
- During the registration, applicants will need to prove that they are eligible (cf. DC definition, mobility criteria, and English language proficiency).

The deadline for the online registration is **Jan 30th, 2026**.

The SpecX Recruitment Committee selects between approximately 30 candidates for the Recruitment Event, which **will take place online via MS Teams (Feb 16 – March 8 2026)**. The selected candidates provide a 15-minute presentation and are interviewed by the Recruitment Committee. Candidates will be given a domain-relevant peer-reviewed paper (prior to the recruitment event) by their prioritised Supervisor and will be asked questions about this paper during the interview to check if the candidate has the right background/profile for the DC position. Prior to the recruitment event, MS Teams interviews between the Supervisors and the candidates are recommended, along with online personality tests. In the recruitment event supervisors and co-supervisors are expected to attend the interviews of their respective DC candidates. Other SpecX supervisors are welcome to join. The final decision on who to recruit is communicated within one week after the Recruitment Event (**March 2026**). The selected DCs are to start their research as quickly as possible (target: Before Sept. 1, 2026, and at the earliest, immediately after the recruitment event).

Applicants need to fully respect three eligibility criteria (to be demonstrated in the Europass CV):

Early-stage researchers (DCs) are those who are, at the time of recruitment by the host, in the first four years (full-time equivalent) of their research careers. This is measured from the date when they obtained the degree which formally entitles them to embark on a doctorate, either in the country in which the degree was obtained or in the country in which the research training is provided, irrespective of whether or not a doctorate was envisaged.

Conditions of international mobility of researchers:

Researchers are required to undertake trans-national mobility (i.e., move from one country to another) when taking up the appointment. At the time of selection by the host organisation, researchers must not have resided or carried out their main activity (work, studies, etc.) in the country of their host organisation for more than 12 months in the 3 years immediately prior to their recruitment. Short stays, such as holidays, are not taken into account.

English language: Network fellows (DCs) must demonstrate that their ability to understand and express themselves in both written and spoken English is sufficiently high for them to derive the full benefit from the network training.

The 15 available PhD positions (see Figure 2 for interactions between DCs/WPs)

DC1: Low-power IoT sensing at high frequency bands

Host: IMDEA Networks Institute, Madrid, Spain

Main supervisor: Prof. Joerg Widmer [IMDEA Networks]

Co-supervisors/mentors: Prof. M. Petrova [RWTH], Dr. T. Otim [IMDEA], and Dr. X. Costa-Perez [NEC]

Required profile: Telecommunication, Electrical Engineering, Computer Science

Desirable skills/interests: Signal processing, wireless communications, hands-on experience with hardware

Objectives: Low-power RF front-end design to monitor mm-wave spectrum for IoT communication and sensing applications with orders of magnitude less energy consumption than current solutions. Leverage large bandwidth at mm-wave to deploy several mm-wave IoT devices in dense deployments that can coexist for performing spectrum sensing.

DC2: Physics-Informed AI-empowered aerial and terrestrial distributed sensing

Host: KU Leuven, Belgium

Main supervisor: Prof. Hazem Sallouha [KUL]

Co-supervisors/mentors: Prof. M. Matinmikko-Blue [OULU], Dr. R. Martinez [KUL], and Dr. J. Buyse [Citymesh]

Required profile: Telecommunications, Electrical Engineering

Desirable skills/interests: Wireless communications, signal processing, optimisation, machine learning, as well as programming and implementation skills

Objectives:

To design sensors and a data acquisition system for the experimental 5D assessment of the spectrum (i.e., frequency, time, and 3D spatial measurement). The data acquisition system will coherently measure spectrum emitters in aerial or terrestrial wideband settings, boosted by AI-data augmentation for extrapolating spectrum patterns from multiple sources. To design a scalable computing framework using a physics-informed neural network for distributed spectrum analysis with sparse aerial and dense terrestrial sensors for enhanced 3D spectrum use prediction.

DC3: RF-sensing for ambient IoT devices and coexistence with legacy devices

Host: IMDEA Networks Institute, Madrid, Spain

Main supervisor: Prof. D. Giustiniano [IMDEA]

Co-supervisors/mentors: Prof. P. Casari [UNITN] & Dr. T. Otim [IMDEA], and Dr. A. Rahman [ISRDI]

Required profile: Electrical Engineering, Computer Science, and Embedded Systems.

Desirable skills, interests and background: Wireless communication, embedded systems, hardware design, signal processing

Objectives: To perform spectrum measurements in the radio access network that can identify spurious RF transmissions originating from low-cost Ambient IoT devices. To design spectrum allocation mechanisms that take into account these interference patterns to design new spectrum allocation schemes that allow for a large number of Ambient IoT devices to coexist with battery-powered wireless devices.

DC4: Drone-hosted mobile spectrum sensing and cells for 6G

Host: RWTH Aachen University, Germany

Main supervisor: Prof. M. Petrova [RWTH]

Co-supervisors/mentors: Joerg Widmer [IMDEA], Dr. L. Simić [RWTH], and Dr. A. Saavedra [NEC]

Required profile: Electrical Engineering, Telecommunications Engineering, Computer Science or equivalent disciplines

Desirable skills, interests and background: Wireless communication, embedded systems, signal processing, and fundamentals of networking.

Desirable skills/interests: To achieve on-device spectrum sensing using on-board sensors of mobile BSs, empowered by embedded deep learning algorithms; to propose an analytical model for the cell planning of drone-hosted mobile BSs based on user location and the coverage and interference map obtained from spectrum sensing. To study the trade-off between the physical adaptation of the BSs and the degradation of the system performance in mobile scenarios. To experimentally exploit drone-hosted mobile cells for 6G networks.

DC5: Anomaly analytics in geospatial spectrum data

Host: XYZT, Belgium

Main supervisor: Dr. B Adams [XYZT],

Co-supervisors/mentors: Prof. H. Sallouha [KUL], and Dr. R. Martinez [KUL]

Required profile: Telecommunications, Electrical Engineering, computer science

Desirable skills/interests: Data analysis, data and signal processing, optimisation, programming & implementation skills.

Objectives:

To improve state-of-the-art algorithms for feature extraction, anomaly detection, and classification. To study how to incorporate expert feedback into a semi-supervised learning model, and how to efficiently compress and run the model on embedded devices. To combine heterogeneous data streams for wideband and narrowband cooperative and non-cooperative sensors.

DC6: Spectrum sensing for edge resource analytics

Host: Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT), Italy

Main supervisor: Dr. I. Tinnirello [CNIT]

Co-supervisors/mentors: Prof. M. Petrova [RWTH], Dr. A. Rahman [ISRDI]

Required profile: Electrical Engineering, computer science, embedded systems

Desirable skills, interests and background: Wireless communication and signal processing, wireless networking and protocols, mathematical modelling and analysis, algorithm design, estimation theory, machine learning, embedded hardware.

Objectives:

Identification of the functions on the edge infrastructures (e.g., resource allocation, anomaly detection, traffic forecast, SW/HW components) that can benefit from the availability of spectrum sensing analytics. Design of techniques and methods to leverage sensing information for improving QoS. Integration of spectrum data analytics in edge infrastructure.

DC7: Sensing-capable disaggregated 6G radio traffic analytics

Host: RWTH Aachen University, Germany

Main supervisor: Prof. M. Petrova [RWTH]

Co-supervisors/mentors: Prof. S. Pollin [KUL] & Dr. L. Simić [RWTH], and Dr. B. Adams [XYZT]

Required profile: Electrical Engineering, Telecommunications Engineering, Computer Science or equivalent disciplines

Desirable skills/interests: Deep learning, machine learning, TensorFlow, embedded systems, wireless communications (the applicant should be proficient in at least two of the skills).

Objectives:

To study and identify enablers for realising and integrating a sensing functionality in the future RAN and disaggregated components. Study techniques for both data-driven and predictive dynamic spectrum allocation and sharing. To identify how to integrate spectrum sensing mechanisms in telecom edge infrastructure.

DC8: Spectrum resource allocation for integrated communication and sensing

Host: Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT), Italy

Main supervisor: Prof. S. Bartoletti [CNIT]

Co-supervisors/mentors: Prof. S. Mazuelas [BCAM] & Prof. G. Bianchi [UNITV], and Dr. A. Saavedra [NEC]

Required profile: Telecommunications, Electrical Engineering, Computer Science

Desirable skills/interests: Wireless communication, statistical signal processing, algorithm design, optimization and estimation theory, hands-on experience or interest in measurement/test equipment.

Objectives:

To study and develop strategies for allocating spectrum resources in integrated sensing and communication. Spectrum resource allocation should consider both the accuracy, efficiency and robustness of sensing jointly with communication performance.

DC9: Adaptive algorithms for object detection in JCAS

Host: Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT), Italy

Main supervisor: Prof. Paolo Casari [UNITN]

Co-supervisors/mentors: Prof. K. S. Yildirim [UNITN], Dr. Gianluca Verin [APEIROON]

Required profile: Electrical Engineering, Telecommunications, Computer Science

Desirable skills/interests: Wireless networking, signal/array processing, machine learning, optimization, hands-on experience with hardware and systems.

Objectives:

To infer the status of distributed, heterogeneous massive IoT deployments based on the joint analysis of spectral information. To implement orchestration policies for computation task allocation with Ambient IoT nature of IoT devices, optimising the performance of status inference, using principles of network virtualisation, computing task placement, and machine learning.

DC10: Network management solutions for Public Protection and disaster relief scenarios

Host: APEIROON, Italy

Main supervisor: Prof. F. Granelli [UNITN]

Co-supervisors/mentors: Mr. Antonio Fin [APEIROON], Prof. M. Matinmikko-Blue [OULU]

Required profile: Telecommunication engineering, applied mathematics, electrical engineering, and computer science.

Desirable skills/interests: Signal processing, machine learning, applied optimisation, wireless network management, and interest in robotic communication systems or networked autonomous systems for public safety.

Objectives:

To investigate the prioritisation and reliability network hardening strategies for PPDR scenarios, including heterogeneous communication environments integrating both human and robotic agents. To propose a network orchestration framework coordinated with the spectrum slicing protocols for efficient provisioning

of network slices that can dynamically support mission-critical users and networks of autonomous robots (e.g., drones, ground units) assisting in emergency and disaster-relief operations.

DC11: Positioning of non-cooperative transmitters and their pattern of movements

Host: IMDEA Networks Institute, Madrid, Spain

Main supervisor: Prof. D. Giustiniano [IMDEA]

Co-supervisors/mentors: Prof. M. Zheleva [AlbanyU] & Dr. G. Santaromita [IMDEA], and B. Adams [XYZT]

Required profile: Electrical Engineering, Computer Science, and Embedded Systems.

Desirable skills/interests: : Signal processing, localization theory, machine learning, applied optimisation

Objectives:

Feature extraction and distributed algorithms to localise any wireless transmitter in mobile environments that does not collaborate (passive positioning), and its implementation in 5G cellular infrastructure. Extraction of analytics from multiple target users.

DC12: Network management solutions for Public Protection and disaster relief scenarios

Host: Telefonica I+D, Spain

Main supervisor: Dr. A. Lutu [TID]

Co-supervisors/mentors: Prof. P. Serrano [UC3M], Prof. I. Tinnirello [CNIT]

Required profile: Telecommunication engineering, applied mathematics, electrical engineering, and computer science.

Desirable skills/interests: Signal processing, machine learning, applied optimisation.

Objectives:

To analyse large-scale data that is reliable and collected from spectrum sensing methods. To contrast network-side planned radio coverage with the actual experience of the end-users and build anomaly detection approaches, traffic and user patterns forecast, answer what-if questions regarding the network deployment, etc., to help radio planning teams.

DC13: Spectrum-awareness empowered wireless systems for safety-critical applications

Host: KU Leuven Campus Bruges, Belgium

Main supervisor: Prof. T. Claeys [KUL]

Co-supervisors/mentors: Joerg Widmer [IMDEA], Prof. D. Pissoort [KUL], and Dr. J. Buysse [Citymesh]

Required profile: Telecommunication engineering, applied mathematics, electrical engineering, and computer science.

Desirable skills/interests: Signal analysis, telecommunication, applied optimisation, safety-critical engineering

Objectives:

To identify the possible risks and threats of using wireless connections for safety-critical applications, such as those used in Industry 4.0 and drone operations. To develop a systematic and spectrum-aware approach for detecting and reacting to anomalies, with a particular focus on sensing and mitigating intentional or unintentional jamming in the wireless spectrum. To design and implement adaptive avoidance techniques that ensure reliable communication under adverse spectral conditions. To apply and validate the developed methods in industry-oriented case studies.

DC14: AI-embedded sensing for E-field exposure assessment

Host: KU Leuven, Belgium

Main supervisor: Prof. S. Pollin [KUL]

Co-supervisors/mentors: Prof. S. Bartoletti [CNIT], Dr. R. Martinez [KUL], and Dr. J. Suárez-Varela [TID]

Required profile: Telecommunication engineering, applied mathematics, electrical engineering, and computer science.

Desirable skills/interests: Signal processing, wireless communication, machine learning, electromagnetic propagation.

Objectives:

To assess the E-field exposure of new-generation radios using software-defined-radio data acquisition systems and embedded AI analytics. To design low-complexity AI algorithms that can work with limited IQ signals data, and accurately extrapolate the total exposure in massive MIMO mobile networks, where time multiplexing and beamforming create complex exposure patterns that deviate from the mean exposure in traditional cellular networks. To experimentally test the proposed solution on embedded devices.

DC15: Spectrum management addressing policy-making and business stakeholders' claims

Host: University of Oulu, Finland

Main supervisor: Adj. Prof. M. Matinmikko-Blue [OULU]

Co-supervisors/mentors: Prof. S. Mazuelas [BCAM] & Dr. A. w [OULU], and Dr. A. Lutu [TID]

Required profile: Telecommunication engineering, electrical engineering.

Desirable skills/interests: Wireless communications, telecommunication regulation, business ecosystems,

Objectives:

To study and develop a spectrum management framework that incorporates spectrum analytics as a service and considers requirements from spectrum policy-making and conflicting business stakeholders' agendas. To develop spectrum management techniques that make use of spectrum analytics to allow local 6G networks to access the radio spectrum on a shared basis. To translate research findings into relevant knowledge for regulatory bodies for policy making.

SpecX project abstract and key project information

The Radio Frequency (RF) spectrum is a crucial but finite resource for modern society. Similar to water and air, the spectrum is a shared resource that needs to be used efficiently and sustainably to ensure future generations can make use of it effectively. The radio spectrum is used for a wide range of applications, going from communications (4G, 5G and Wi-Fi) to radar applications, radio astronomy, as well as for monitoring of weather and climate change. As radio technology has developed and expanded at a rapid pace, the spectrum has become highly saturated in many parts of the world. Nonetheless, there are also parts of the world where there is a great need for more radio communication. Large parts of the world and a large part of the world's population today do not have access to the Internet. To use the spectrum better, both in saturated regions and regions without good coverage, constant research and innovation are needed towards better forms of spectrum use, regulation, and management. To ensure trust between many stakeholders, it is moreover imperative to train multidisciplinary engineers who can navigate technology and policy, as well as multiple spectrum usage domains.

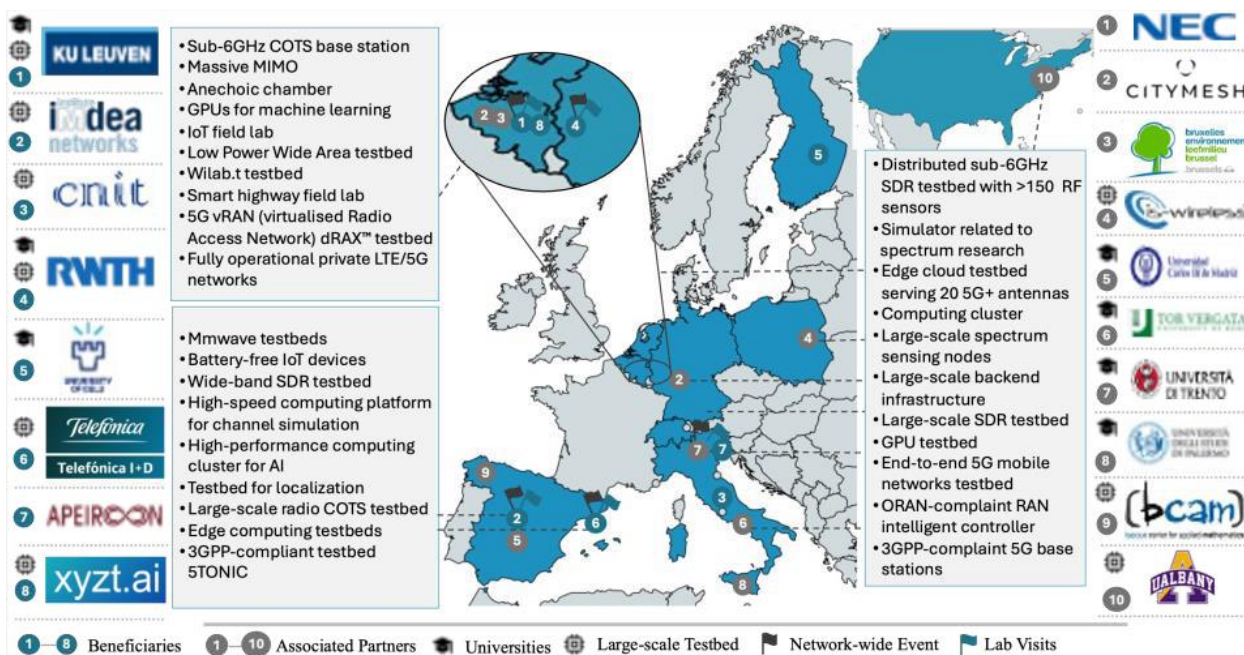


Figure 1. SpecX Consortium

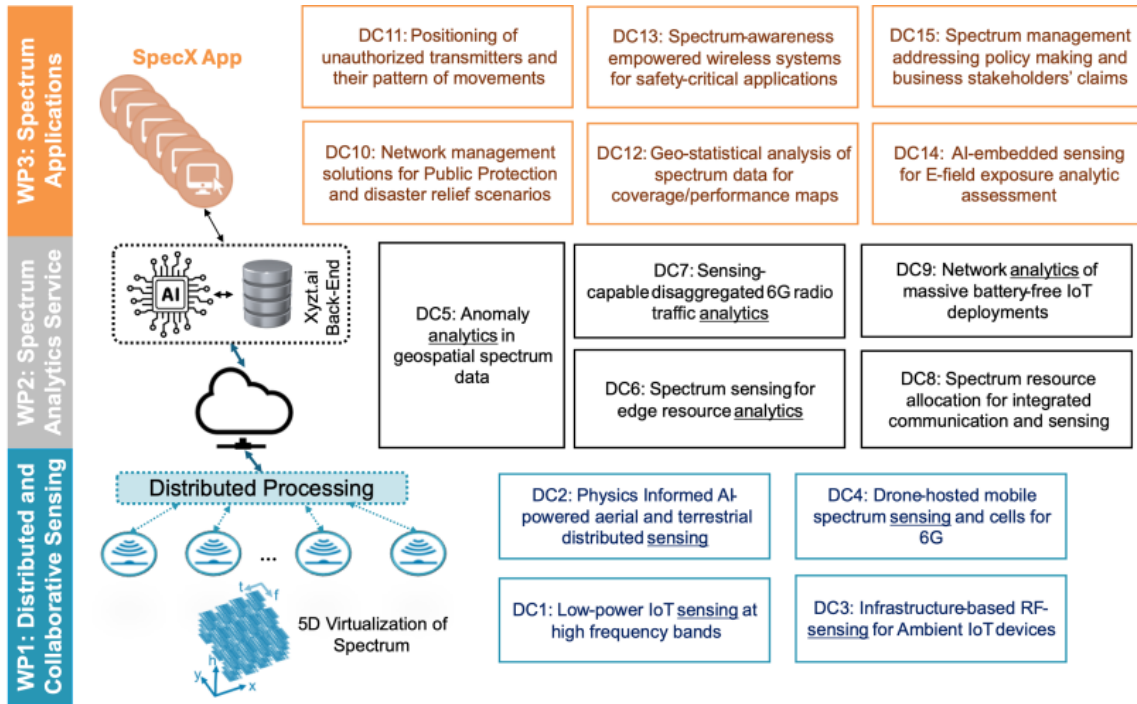


Figure 2. SpecX WPs and DCs

We have organised SpecX into three research work packages, as shown in Figure 2. The work packages follow the high-level objectives: sense – analyse – use. We have designed 15 DC projects to achieve the SpecX overall research goals. The specific science/technology (S/T) objectives are summarised in, with each DC leading the contribution to one S/T objective of the overall project. Integration and contribution of individual projects into the overall SpecX concept. As shown in Figure 2, the 15 DC projects are organised in three research work packages: SpecX introduces a bottom-up architecture for distributed and collaborative spectrum sensing in WP1, novel AI-native spectrum data analytics in WP2, and applications of spectrum analytics in WP3 (e.g., for dynamic radio resource allocation, network self-optimisation, safety, policies and monitoring of spectrum regulation compliance). The 15 DCs will synergistically delve into the key scientific gaps for 1) developing efficient, real-time processing for

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Appendix 1: Recruitment Procedure and Principles

Advertisement Process: the search for suitable candidates starts by internationally publishing ads in platforms such as Euraxess, ResearchGate, LinkedIn, and mailing lists such as those from IEEE ComSoc. Special efforts will be made to attract female researchers by aiming at recruiting at least one-third female DCs, through target advertising (e.g., IEEE Women in Engineering, European Platform of Women Scientists). The pre- and final selection will be made in a collective process led by the Recruitment Committee (RC), formed by experts with significant prior experience in research recruitment at their groups/institutions. The RC has members of both genders and considers the promotion of equal opportunities and gender balance as part of the recruitment strategy.

Selection Process: The RC selects the DCs following an open, transparent, impartial and equitable recruitment procedure on the basis of:

- (1) their scientific skills and the relevance of their research experience;
- (2) motivation for research;
- (3) the impact of the proposed training on their careers;
- (4) the expected benefit of research exchange between the DC's home countries, the institutions and the host of the secondments;
- (5) in accordance to gender equality and minority rights.

Each applicant can apply for up to three DC openings in order of preference. During the pre-selection stage, up to 30 candidates will be selected based on the above strategy. Then, they are interviewed in face-to-face meetings (if in EU; the recruiting institution provides travelling and accommodation support), and by conference calls if they are outside of EU. The candidates are ranked, and a collective decision is made, accounting for the order of preference. In this way, a complementary pool of DCs can be selected.

All recruitments are in line with the Code of Conduct for the Recruitment of Researchers, ensuring that the selection procedures are transparent and fair. For example, merit should not be measured based only on the researcher's grades but rather based on a complete range of evaluation criteria, such as teamwork, interdisciplinary knowledge, independent thinking, soft skills and awareness of the impact of research. The RC will ensure that no conflict of interest arises from the recruitment. All DCs are employed on full-time contracts and are enrolled as PhD candidates. The DCs are entitled to pension contributions, paid holidays, and other employment benefits as governed by the beneficiaries.

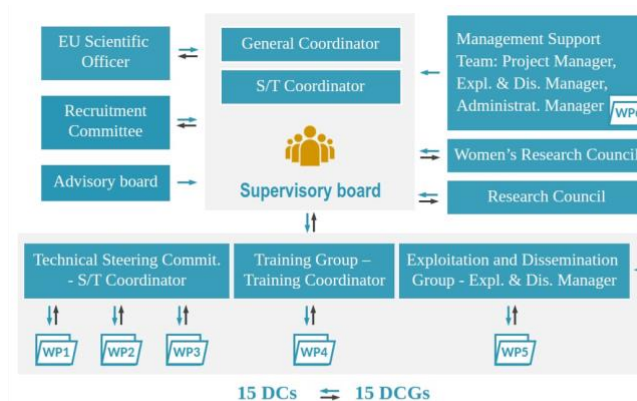


Figure 5. Schematic of the management structure of the network.

Figure 3. SpecX Management Structure

Supervisory Board (SB): The SB, the highest decision-making body, is formed at M1, and it consists of the GC (S. Pollin), the VC (H. Sallouha), the SC (S. Giustiniano), and 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 and the Researcher Council also has one representative in the SB but without voting rights.

Recruitment Committee: A DC recruitment committee is assembled by the SB in M1. This committee involves the GC (S. Pollin), the SC (D. Giustiniano), and one representative from each of the other beneficiaries (B. Adams, M. Petrova, A. Lutu, S. Bartoletti, G. Verin, Matinmikko-Blue). The RC oversees the recruitment of DCs during the collective recruitment event. Besides, the RC follows up on DC's training progress and career planning. The RC committee meets during network-wide events.