

RI-URBANS

The concept - extended

The overall strategy in RI-URBANS recognises that scientific and technological improvements are still needed to efficiently address the provision of sustained long-term, harmonised, high quality data that document the complex inter-linkages between ambient levels of air pollutants, their emission sources and their impact on human health. Developing, testing and proposing cost-effective tools that complement and support the current activities of Air Quality Monitoring Networks (AQMNs) is, therefore, essential in RI-URBANS.

RI-URBANS recognises the value of co-designing a strategy that may lead to evolving air quality and health policies in Europe in a harmonised way, involving all actors, including citizens. Delivering strategic guidance in RI-URBANS is therefore based on close collaboration at all levels in the project with national, regional and local administrations, and policy-related bodies such as EEA, UNECE and WHO.

With the overarching goal of demonstrating how Service Tools (STs) from atmospheric Research Infrastructures (RIs) can be adapted and enhanced to better address the challenges and societal needs concerning air quality and associated health effects in European cities and anthropogenic hotspots, RI-URBANS is organized into 3 different strategic pillars (SPs), supported by an additional one related to efficient communication, dissemination and project management.

SP1: Identifying gaps and providing STs for advanced Air Quality (AQ) observation and forecasting considering AQ policy and health impact requirements.

Based on combined aerosols science, AQ and health effects scientific approaches, methods for measurements and source apportionment RI-URBANS addresses the development of ST1-12 (see below). These intend the characterisation of aerosols and precursors, including advanced (surface, 3D, remote, stationary and mobile, online and offline) measurements and modelling, source contributions, PM components and their precursors, nanoparticles (equivalent to ultrafine particles, UFP or particles <100 nm) and black carbon. Based on the outcome of existing initiatives, SP1 investigates which observations are most useful to assess impacts on human health, also including citizen's science experiences, and integrated into modelling tools. SP1 develops the most suitable procedure for defining exposure maps with models validated with stationary and mobile measurements and carries out specific health effects analysis for specific PM components, nanoparticles and other complex pollutants.

SP2: Demonstrating the feasibility and added value of RI-URBANS Service Tools (STs) through a series of pilot implementation projects in different European cities.

RI-URBANS focuses on urban areas because they are hotspots of pollution and anthropogenic emissions, including industries, harbours, airports, and other relevant emission sources. The vertical and horizontal distribution of pollution, a comparison of urban and regional pollution, and the long-range atmospheric transport contributions will be also included based on the key ACTRIS and IAGOS RIs contributions, in addition to the advanced instrumental measurements and modelling. ST1 to ST12 devised in SP1 will be demonstrated in 5 pilots by involving 9 cities that applied to an open call issued in November 2021. Each pilot study will involve at least 3 cities.

SP3: Providing guidance for implementing RI-URBANS STs at a wider scale.

Based on the outcome of SP1 and SP2, SP3 addresses how the different actors (RI, AQMNs, city authorities and aerosol and health scientists) will join forces to trigger the decision-making process leading to the upgrade of existing infrastructure for air quality monitoring. To this end, roadmaps will be devised to implement the provided STs by RI-AQMN associations in a sustainable and interoperable way, and to provide a roadmap to implement instrumental and modelling tools, mobile measurements, citizens' science, data management and the involvement of stakeholders and training. SP3 provides the necessary guidance to different stakeholders at the city scale for implementation of these innovative STs, and more generally for improving the use of resources across Europe through the common development and optimization of operations as well as through securing interoperability of data and data streams with FAIR principles. Information provided by the RI-URBANS' STs will be the basis of advanced assessment to major agencies and administrations in Europe with respect to air quality and citizens' health for further policies, new monitoring guidelines, or agreements. SP3 will also engage and steer actors and public and private stakeholders through co-development of the project. RI-URBANS links ESFRI European RIs (ACTRIS and IAGOS) and other national, regional and urban infrastructures on air quality using advanced measurements (at surface and 3D) and modelling tools (Copernicus services, such as CAMS), to complement the existing observations from AQMNs.

SP4: Supporting project development, implementation, communication, dissemination and exploitation.

SP4 provides coordination and management and facilitates capacity building pertinent to novel analysis developed in SP1 and pilot implementation and replication in SP2 as well as upscaling in SP3. SP4 also fosters outreach activities of the project results to key stakeholders through supporting training actions and workshops from SP3, as well as the overall communication and dissemination actions and meetings.

In addition to these four strategic pillars, RI-URBANS has 4 cross-cutting actions:

- Exploiting past and current initiatives to develop advanced tools for monitoring air pollution also involving citizens, to effectively engage them in efficient analysis of requirements from and for air quality policies.
- Implementing feedback mechanisms involving all Work Packages to ensure the proposed guidance has been sufficiently tested and is supported by the relevant user and stakeholder groups.
- Ensuring a wide and complete ethical framework in all activities including equal opportunities for gender and young scientists.
- Ensuring that all data produced in the project follow clear QA/QC and FAIR procedures.

