

RI-URBANS

Tasks description of WP1

T1.1. Data survey and compilation of non-regulated pollutants.

Existing urban Air Quality (AQ) supersites from Air Quality Monitoring Networks (AQMNs) and Research Infrastructures (RIs) will provide data on new AQ metrics for new service development, such as nanoparticle particle number size distributions (PNSD), back carbon (BC), particulate matter (PM) chemical composition with high or low time resolution including major and trace elements, ions, organic species and organic mass spectra (for OA source apportionment); VOC species; and NH₃. For each variable, the measurement requirements (instrumental and operational conditions) will be evaluated according to existing guidelines and protocols, e.g. those from the European Committee for Standardization (CEN) for nanoparticles, ACTRIS, and data management from ACTRIS Data Centre (ACTRIS DC) complying with the FAIR principles. These will be provided to the pilots (WP4) and an inventory of existing long-term datasets (including metadata) on urban measurement sites in Europe will be provided. The data will be gathered (D1.1) and made accessible for the source apportionment (T1.2), health effect assessment (WP2), and improved emission inventories and modelling evaluation (WP3). A pilot near real time (NRT) tool for nanoparticle PNSD (harmonised with CAMS21a development and outcome) will be provided for demonstrations (T4.2 in SP2) and to define the roadmap of interoperable services (SP3). Finally, a Pan-European overview of the novel AQ metrics will be provided (D1.2).

T1.2. Developing and implementing advanced source apportionment STs.

This task aims at providing Service Tools (STs), based on best procedures and methodologies, to apportion novel health-related AQ metrics. We will evaluate and apply the most suited source apportionment receptor models for operational applications, taking into account previous work in FAIRMODE, EMEP and COLOSSAL (COST Action: Chemical On-Line cOmpoSition and Source Apportionment of fine aerosol). State-of-the-art source apportionment methodologies will be applied on nanoparticle PNSD, online and offline PM chemical speciation, BC and VOCs datasets from T1.1 to provide the source contributions to each of these in a harmonized way. This will offer a pan-European centralized source apportionment database (D1.3) required for compiling new exposure indicators for health effect studies (WP2) and datasets for inter-comparison with chemical transport models (WP3). This task will provide recommendations on best procedures and methodologies to apportion novel AQ variables. We will provide pilot NRT source apportionment functionalities (harmonised with CAMS21a development and outcome) (D1.4-D1.5), with operational requirements of the source apportionment software and data transfer/formatting STs for the novel NRT source apportionment of non-refractory aerosols (ACSM) and BC measurements data products, for modelling STs (WP3), pilot applications (WP4) and upscaling activities (WP5).

T1.3. Developing products and methods for AQ from profiling observations.

This task will develop STs for observations with vertical and/or horizontal scanning capability in and around urban environments from ACTRIS and IAGOS. Data on atmospheric boundary layer (ABL) height, 3-D wind profiles (Doppler LIDARs, Light Detection And Ranging), profiles of aerosol levels and pattern by Raman LIDARs in synergy with sun/sky photometers; aircraft measurements and horizontal variability of trace gases (NO₂, SO₂, O₃, formaldehyde) based on MaxDOAS (Multi-Axes Differential Optical Absorption Spectroscopy) and Pandora measurements will be used. Measurement requirements will be provided for the implementation in the pilots, observational and procedural methodologies for the use of these data for urban AQ purposes (D1.6). The data analysis techniques for the remote sensing will be tailored for application in urban AQ issues, and experimental tools will be provided (D1.7). Datasets will be used for characterization of urban dispersion (T3.1), pilots (T4.3-4.5) and upscaling (T5.1-T5.2).

T1.4. Synergy of tools and data developed in WP1 in support of WPs 2-3 and SPs 2-3.

This task will optimise the interaction of WP1 with WPs 2-4, and will integrate WP1 results (D1.8) to support the roadmap for upscaling STs (SP3, WPs 5-6) on the novel AQ metrics and source apportionment and spatially resolved information.