RI-URBANS

Advanced Service Tools (STs) for air quality

- **ST1:** Measurement of ambient concentrations of **nano Particle Number Size Distributions (PNSD)**, with recommendations on the instrumentation, the size spectrum to be measured, the operational conditions and data management, **including NRT data access for PNSD**. This will provide nanoparticle concentrations in different size ranges that can be used for evaluating their source contributions.

- **ST2**: **Online and offline Particulate Matter (PM) speciation** tools, with recommendations on (i) instrumentation and (ii) analysis to be implemented for organic and inorganic PM components to allow advanced source apportionment.

- **ST3:** Measurements of ambient **Black Carbon (BC)** with instrumental and operational settings to determine the source contributions from biomass burning and road traffic.

- **ST4:** Measurements of ambient concentrations of **Volatile Organic Compounds (VOCs)**, with instrumental and operational guidance and recommended species to be analysed to study O_3 and SOA precursors.

- **ST5:** Measurements of ambient concentrations of **urban ammonia (NH$_3$)** with instrumental and operational settings to measure this very relevant SIA PM precursor.

- **ST6:** A variety of **advanced source apportionment tools** will be provided, including those applied to **PNSD for nanoparticles, offline PM speciation, online NRT PM source apportionment, and BC and VOCs** source apportionment. These will include guidance on instrumentation and modelling tools, methods and protocols to follow in each case for a harmonised implementation of both analytical and source apportionment approaches.

- **ST7:** Measuring **vertical and horizontal variability (3D measurements)** of specific pollutants and key meteorological parameters (such as the atmospheric planetary boundary), using surface remote sensing instrumentation, to better support the spatial origin of the contributions to urban pollutants. This will include instrumental and operational set up and link with the modelling tools.

- **ST8: Mapping urban outdoor concentrations of nanoparticles and other pollutants by using mobile measurements, urban scale modelling and citizen's science (smart sensors)** to obtain the high spatial resolution variability of urban exposure.

- **ST9: Evaluating the health effects of the novel AQ metrics and source contributions from ST1 to ST6 by means of epidemiological and oxidative potential approaches**. Heath and oxidative potential data and analysis will be used to demonstrate the added value of source apportionment and AQ new

metrics. This is a key evaluation because, based on the results of these analyses, the novel AQ metrics to be implemented will be suggested and provided in SP3.

- **ST10: Engaging citizens in urban AQ observatories** in an efficient and sustainable way, allowing them to participate in AQ monitoring and increasing their awareness. This will include instruments, protocols (how to calibrate the instruments, monitor the reliability of measurements and integrate them with AQMNs official data) and the strategies to involve them. To this end, the experience of the most advanced EU cities on these observatories will be gathered, evaluated and tested to provide guidance.

- **ST11: Improved regional scale modelling tools** (1x1 km^2 in the region of the city and with some zooms over cities and 6x6 km^2 in the European domain) will be provided by assimilating the data provided from ST1-8. These are key tools to obtain data on secondary (both SOA and SIA) PM and nanoparticle components, and to provide the urban background and the regional and external contributions to their ambient urban concentrations, which cannot be obtained by urban modelling.

- **ST12:** Tools to **improve urban emission inventories** with high spatial resolution will be provided by integrating ST1-ST9 data into urban modelling and implementing sensitivity analysis with experimental data.