# Milestone M26 (M4.10)
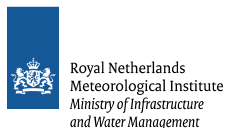## Detailed plan of the hotspot pilots

# RI URBANS

**RI-URBANS**

**Research Infrastructures Services Reinforcing Air Quality Monitoring Capacities in European Urban & Industrial AreaS (GA n. 101036245)**

**By**
**KNMI, INOE & CNR**

Royal Netherlands
Meteorological Institute
*Ministry of Infrastructure
and Water Management*

inoe 2000

National Research
Council of Italy

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## Milestone M26 (M4.10): Detailed plan of the hotspot pilots

Authors: Arnoud Apituley (KNMI), Doina Nicolae (INOE), Angela Marioni (CNR)

| Work package (WP) | WP4 - Pilot implementations for testing and demonstrating services |
|---|---|
| Milestone | M26 (M4.10) |
| Lead beneficiary | KNMI |
| Means of verification | plan available internally |
| Estimated delivery deadline | M11 (31/08/2022) |
| Actual delivery deadline | 30/08/2022 |
| Version | Final |
| Reviewed by | WP4 leaders |
| Accepted by | RI-URBANS Project Coordination Team |
| Comments | Report describing the plans for the pilots on hotspots and mapping of pollutants in Rotterdam-Amsterdam, Bucharest and Milano-Bologna (T4.5), which are representative areas in Europe. |

# Table of Contents

## 1. About this document

WP4 tackles SOJB2 to test and to demonstrate solutions for advanced urban AQ monitoring systems and evaluation of exposures (SP1, WPs 1-3) at representative areas and hot spots in Europe. Specifically, it will implement 5 testing and demonstration pilots in 9 cities (Athens, Barcelona, Birmingham, Bucharest, Helsinki, Milano, Paris, Rotterdam-Amsterdam and Zurich, with at least 3 cities in each pilot).

This milestone addresses T4.5 the pilot focusing on hot spots in the cities of Rotterdam-Amsterdam (The Netherlands), Bucharest (Romania) and Milano-Bologna (Italy).

This is a public document, available in the RI-URBANS website ([https://riurbans.eu/work-package-4/#milestones-wp4](https://riurbans.eu/work-package-4/#milestones-wp4)). The document will be distributed to all RI-URBANS partners for their use and submitted to European Commission as an RI-URBANS milestone M26 (M4.10).

## 2. Outline of the plans

This chapter outlines the plans for the pilots in Rotterdam-Amsterdam, Bucharest and Milano-Bologna.

### 2.1 Rotterdam-Amsterdam plans

In Rotterdam-Amsterdam, an observational campaign is planned in August-September 2022. For this city, a number of hot-spot areas has been defined in the harbour area (Figure 1), as well as in the domestic area.
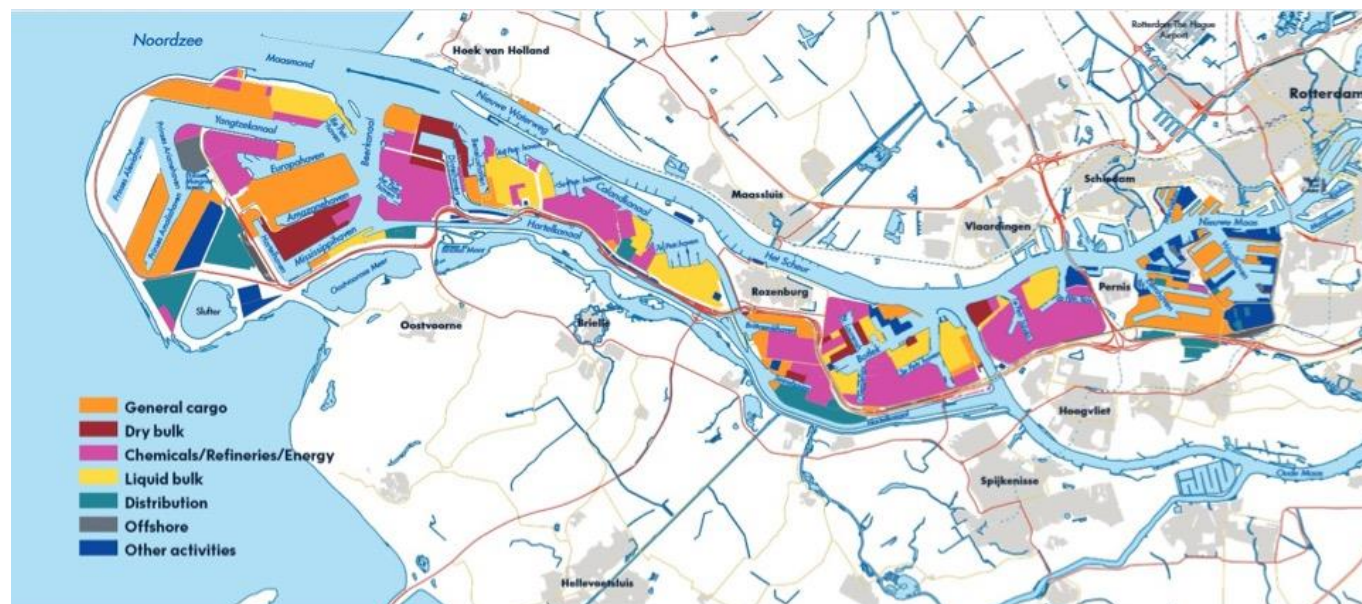


*Figure 1. Map showing industrial activities in the Rotterdam harbour area.*

The observations will be collected by:

- permanent installations from RIVM (national air quality monitoring network) and DCMR (municipal monitoring);

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- temporary fixed stations in various locations in the city aimed at collecting in-situ data on air pollution, and particulate matter, including remote sensing observations of vertical profiles of aerosols and wind;
- mobile observations for sampling air pollution and particulate matter;
- airborne mapping of air pollution with remote sensing;
- citizen science contributions for measuring air pollution.

Geographical locations and types of observations are shown in Figure 2, except for the airborne observations. Note that the harbour area extends to the west into the North Sea. In the harbour area number of major emission sources exists in the petrochemical industry and (coal fired) power plants.

The campaign is carried out in collaboration with the H2020-PAUL project and the national Ruisdael Observatory.
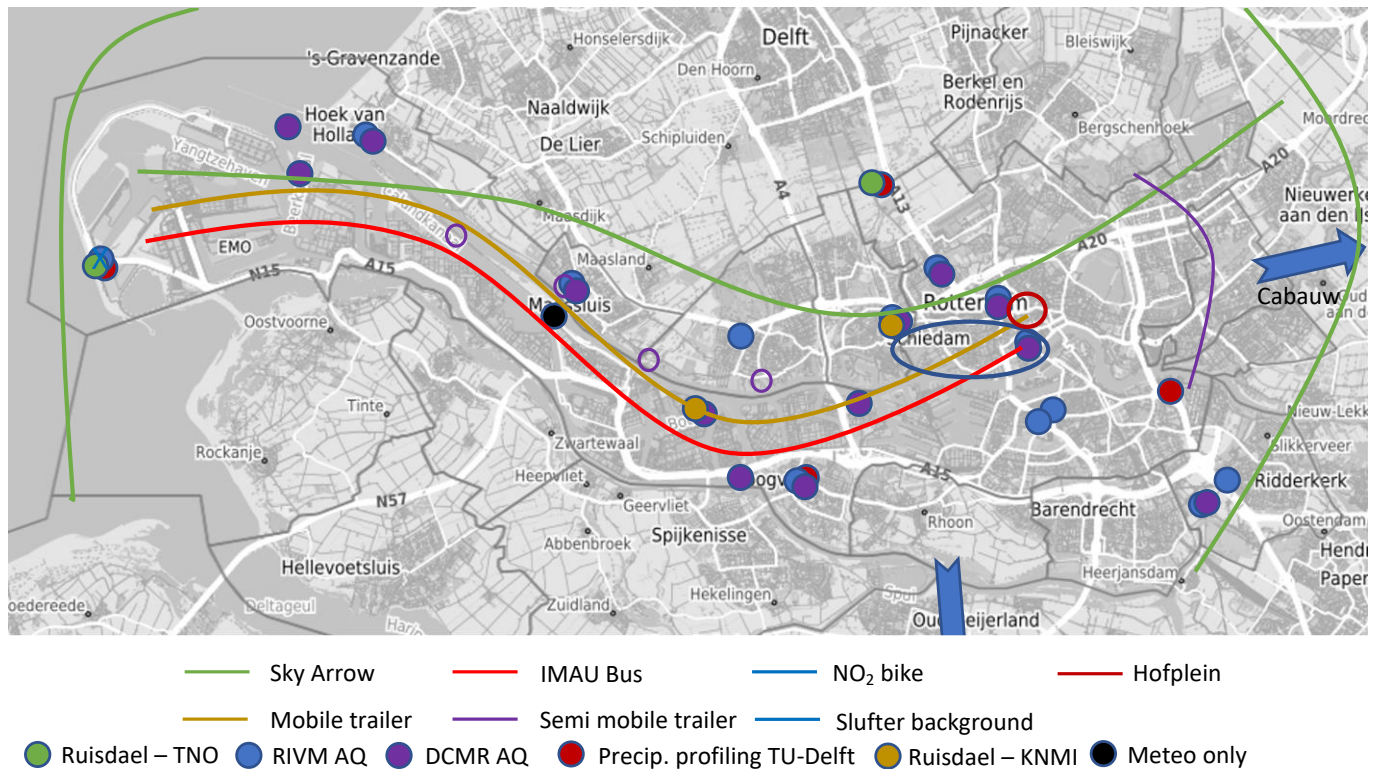


*Figure 2. Schematic overview of the location of ground-based fixed (circles) and mobile (lines) observations in the Rotterdam area for the campaign in September 2022.*

## 2.2 Bucharest plans

Route (Figure 3):

- Approx. 8h (8:30-17:00), including rush hours.
- Main traffic roads.
- Residential areas.
- Industrial and commercial areas.

Model: ESCAPE Land Use Regression models + RLUR tool +QGIS:

- Road segments: ~250 m; midpoint coordinates.
- Dependent variables: average concentration of pollutant per road segment (UFP, PM10, PM2.5, PM1).
- GIS predictors variables: Corine CLC2018 Land use (industry, urban, green) in buffers of 100, 500, 1000, 5000 m, traffic variables (including traffic intensity and road lengths variables) in buffers from 50 to 5000 m, and population density in buffers from 100 to 5000 m.
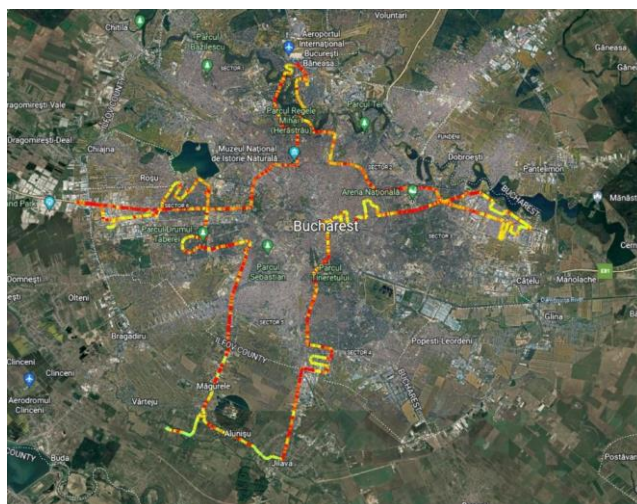


*Figure 2*. *Measurement routes in the Bucharest area for the campaign in the campaigns of 2022 and 2023.*

Summer campaign:

- April 2022 – tests & pre-campaign.
- 04 – 29 May + 13 June-8 July.
    o One day per week (Wednesday / Thursday).
- 30 May – 10 June. Coincident with the Hotspot campaign.
    o Each day (incl. weekends).

Winter campaign:

- 2022-2023.
- Based on results from first campaign.
- Similar timeframe (subject to updates).

Nano-particle counter:

- Number, Surface, Volume concentration, UFP mass range PM0.3.

Mobile PM counter:

- Mass concentration of PM10, PM2.5, PM1.

GPS unit.

## 2.3 Milano-Bologna plans

A field campaign will be carried out in Bologna with a transect of particles number concentration and size distribution observation points at different distances from the airport. Interactions are in progress with the municipality in order to install instrumentation on the people mover Marconi Express (Figure 4).

In addition, fixed observations (aethalometer, condensation particles counter (CPC), nephelometer) and mobile observations will be carried out.

The field campaign is foreseen in spring 2023, duration 3 months.

Negotiations are underway for an agreement with the bike delivery company «Urban by messenger» in Milano (Figure 5). Microaethalometers MA200 will be installed on 10 bikes for black carbon (BC) mapping during their delivery trips in the eastern part of the city. This campaign will be carried out in winter 2022/23, during about 3 months.



*Figure 4. Marconi Express - monorail route connecting airport with the Bologna city center.*



*Figure 5. Details of the mobile measurement units and measurements transects in the Milano campaigns.*

## 3. Summary

The pilot studies for observations of hot spots in Rotterdam-Amsterdam, Bucharest and Bologna-Milano have been defined in detail. Planned campaigns in the different cities will be carried out independently, in 2022 and 2023.

Data collected and processed as datasets will be shared with the modellers in WP3.

Possibly, from lessons learned during the RI-URBANS pilots in T4.5, additional experiments might be planned in the future.