

Horizon 2020

Societal Challenge: Improving the air quality and reducing the carbon footprint of European cities



ICARUS

Project: 690105 – ICARUS

Full project title:

Integrated Climate forcing and Air pollution Reduction in Urban Systems

MS10: Validated requirements for the ICARUS DSS

WP7: Motivating citizens towards the vision

Lead beneficiary: UPCOM



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Methodology

A set of questions was prepared in order to be included in the questionnaire survey using the Delphi methodology and distributed via email to the key stakeholders identified. These stakeholders included local public authorities responsible for urban resilience, air pollution and environmental management, local health operators, industry, local and regional/national academia, international organizations (e.g. WHO, EEA) NGOs active in urban resilience issues and in environmental health and well-being, as well citizen associations.

The questionnaire focused on the main functionalities, data requirements and data storage needs. Specifically, questions on the scientific content and expected results as well as software interaction styles, design criteria, user input, DSS outputs, status info, errors and rollback, documentation features, data persistence features, internet browser preference (for compatibility issues) were formulated based on a grade rating system from 1 to 5 (1 for least important, 5 for most). In cases where further explanation was needed, in accordance with the Delphi procedure, repeated Delphi panels comprising different stakeholders were consulted under the responsibility of the project coordinator. The final results of all panels were synthesized and they are reported in summary below. According to the feedback received the user requirements should comprise the following:

- Use ICARUS DSS as a tool for developing environmental management and policy decisions to ensure protection of public health.
- Aid to the organization of Action Plans aiming at reducing the exposure of local population to ambient air pollution focusing on the most toxic components thereof, such as particulate matter, ozone, NO_x and black carbon.
- Design of a user-friendly and readily accessible Web-based air quality and carbon footprint information service.
- Possibility to communicate the resulting data in the form of maps, tables, and time series diagrams.
- Include some basic analysis and geospatial tools for data processing
- Low operational cost to the users and ease to use (on-line help and guidance at all times).
- Supply of appropriate staff training to local users.

Poor environmental decision information can imply later reconstruction or introducing other measures in order to achieve necessary air quality standards. Such costs by far exceed the costs for an appropriate environmental planning tool in the early stages of an urban planning process. Getting as much "value for money" as possible is a political topic and a real necessity in many cities in Europe. Consequently, the ICARUS DSS should be primarily designed to support the urban planning activities and environment and health studies.

In addition, the need for cost effectiveness is also applicable for the air quality management system itself. Therefore, it is important to find the best cost-effective monitoring techniques and modelling tools.

Other key requirements expressed by stakeholders included:



- Existing spatial databases at the cities level must be readily importable to the ICARUS DSS and data management system to render it readily operational
- Assessment of contribution of different emission sources (including natural sources) to the total concentrations of different pollutants (i.e. source apportionment).
- The possibility of getting results from the simulation of different policy options and technological measures (how they will impact on the AQ and CF levels)
- A guided procedure for future scenario design to allow users to formulate their own scenarios for various parameters should be incorporating in the system.
- Identification of hot spot areas where policy-makers need to focus to improve AQ
- Download of data
- Flexibility: the ICARUS DSS should be a modular, multi-user and multitask system. To this end it is of vital importance that:
 - It can support the simultaneous use of a high number of users
 - the covering geographical area can be modified/extended for a better transferability of the system
 - complementary methods and modeling tools can be seamlessly added at a later stage if needed

In addition, other stakeholders identified specific functionalities which they think would be extremely useful if through this project some or the total of the following could be produced on an operational basis:

- Daily monitoring of air quality.
- Frequency of annual exceedances of limit values.
- Optimisation of the monitoring network.
- Fundamental research on atmospheric pollution phenomena in particular PM generation and diffusion.

Definition of the user requirements of the ICARUS DSS

There are multiple stakeholders in ICARUS with various needs and interests. ICARUS intends to satisfy these needs and offer a new, integrated approach for urban impact assessment in support of air quality and climate change governance. The majority of local authorities and industries are interested in receiving the data produced by the DSS. They consider that these data will contribute in improving the reliability of the services they provide in terms of air pollution control.

They also expect to use the DSS in order to design more efficient policies for improving air quality in their jurisdictions. Several industries are interested in getting information on the environmental impact of the solutions they design and propose. City partners need to have a clear image of urban air quality in real time and in better resolution than stable measurement stations can offer. City partners and citizens are interested in having a tool that will notify them in case of pollution limits exceedance and also see periodic statistics on how often this happens.



Key stakeholders need to access this information in a human-friendly and easily understandable way. Seeing data on interactive maps using layers with different colors and textures will help them easily perceive the presented information. More specialized users need to access also numeric and geospatial data in high accuracy; for the latter, numeric tables must be also used, as well as the possibility to import and export data in several file formats has been requested.

The majority of local authorities and industries are interested in receiving the data produce by the DSS and they consider that these data will contribute to:

- Better design environmental policies and measures, by being able to simulate them and see their estimated impact
- Study the aforementioned impact in several different sectors, starting from emissions and pollutant concentrations, down to population exposure, public health and economic costs
- Keep track of the implementation of those measures and evaluate their results

A brief presentation of the stakeholders is presented hereafter, before presenting the functional and non-functional user requirements in higher detail.

This milestone was used to draft deliverable D7.1 “Technical report on user requirements and functional specifications of ICARUS DSS”.