



Campaigns

SCIPPER objectives are achieved in five real-world experimental campaigns, involving actual vessels and the largest ports in the EU. A mirror activity in Asia has been scheduled to validate results obtained in the EU.

C1 Marseille (FR)
Pre global Sulphur standards comparison of remote monitoring and UAS.

C2 Gothenburg (SE) to Kiel (DE)
Use of on-board sensors, various remote sensing systems, UAS on single ship in actual service.

C3 Hamburg (DE)
Use of remote sensing systems, sniffers, UAS, satellite at the port on several passing-by ships.

C4 Marseille (FR)
Post global Sulphur standards plume dispersion and chemical transformation, use of sniffers, UAS and on-board sensors.

C5 Western English Channel (EN)
Use of sniffers, UAS, and satellite imaging on several passing-by ships.

Main Outputs

Sensors will be developed and/or tested for conducting on-board emissions monitoring.

Techniques will be deployed for the remote monitoring of shipping emissions, including sniffers, optical remote sensors and satellites.

Environmental sensing UAS will be demonstrated, using latest sensor packages to measure an enhanced range of pollutants.

New communication protocols between ship and shore for signal transmission involving satellite communications will be materialized.

An environmental shipping monitoring centre (ESMC) will be established, utilizing the new communication protocols, to demonstrate real-time environmental information from ships in operation.

Advanced algorithms with the possibility for single ship (or ship groups) detection from space observation will be elaborated.

Emission factors for estimating in-port ship emissions and advanced emission inventorying tools will be developed for estimating pan-EU and global contributions of ships to air pollution.

A first-of-kind ship plume ageing module will be developed and integrated in urban and regional dispersion air quality models.

New dispersion models, based on computational fluid dynamics, will be created, to simulate in detail how ship plume disperses in the port area and over the neighboring urban area.

Guidelines and policy recommendations, will be drafted, so as planning and enforcement authorities and policy makers can have access to innovative tools to deliver much better policy and regulations addressing the environmental consequences of shipping.

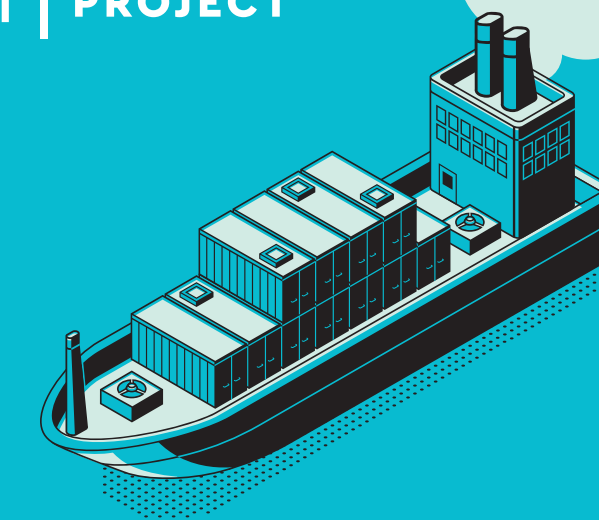


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Shipping Contributions to Inland Pollution Push for the Enforcement of Regulations



THE SCIPPER PROJECT



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Background

While vessels exhibit comparatively low fuel consumption per unit of cargo-distance, they produce high specific emissions of nitrogen oxides (NO_x), sulphur oxides (SO_x) and particulate matter (PM).

The regulation of the International Maritime Organization (IMO) requires from 1 January 2020 a maximum equivalent fuel Sulphur content (FSC) of 0.5% m/m to be globally enforced. In the Sulphur Emission Control Areas (SECAs) and the EU, additional requirements for ferries and ships at berth are also applied. This creates requirements to monitor the compliance of ships with Sulphur regulations separately in port areas and in the open-seas.

Further to SO_x, vessels built after 1 January 2016 sailing in the North

American ECA and after 1 January 2021 sailing in the North and Baltic Seas ECA, need to comply with Tier III NO_x standards.

Ships also emit primary PM, in the form of Black Carbon (BC), Organic Carbon (OC), ash and metallic aerosol. PM from vessels is currently not regulated but BC control is under discussion within the IMO, due to its potent impacts on climate. Secondary aerosol, through the photooxidation of SO_x, NO_x and OC, also has consequences to coastal air quality (AQ). Better understanding of ship PM and its speciation is required for introducing effective regulatory measures.

Nevertheless, the regulations and initiatives for emissions reductions can only be effective when vessels are regularly checked for compliance.

The Scipper Project

SCIPPER is a European funded project by the Horizon 2020 program, which aims at deploying state-of-art and next-generation measurement techniques to monitor emissions of vessels under their normal operation.

The main objectives of SCIPPER are:

- To provide evidence on the performance and capacity of different techniques for shipping emissions monitoring and regulations' enforcement.
- To assess the impacts of shipping emissions on air quality, under different regulatory enforcement scenarios.

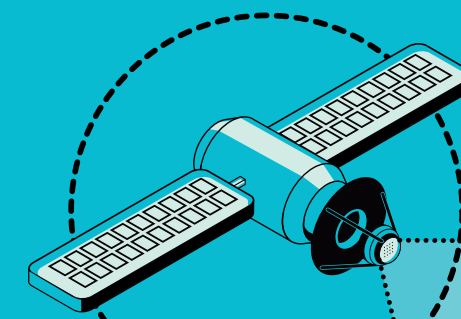


THE SCIPPER PROJECT

Concept

In order to address the many and largely unexplored problems related to vessels emissions monitoring, SCIPPER aims at deploying state-of-art and next-generation measurement techniques to monitor emissions of vessels under their normal operation, such as on-board sensors, sniffers, optical remote techniques, Unmanned Aerial Systems (UAS), satellite systems.

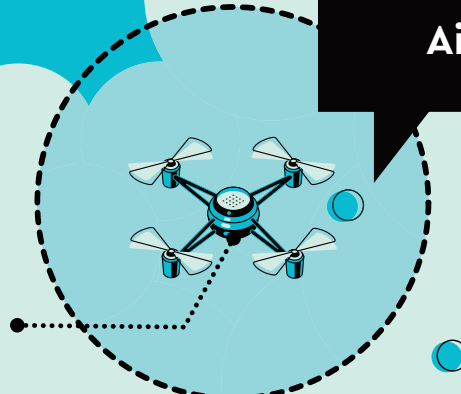
Experimental ship emission measurements will be combined with advanced plume dispersion and chemical transport models (CTMs) to estimate current ship-induced air pollution and predict the impact of various degrees of compliance to major port areas in the EU.



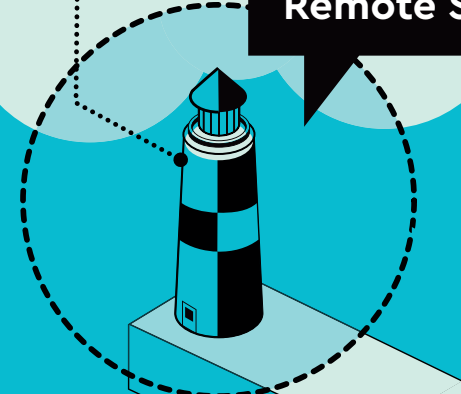
Satellite Monitoring



On Board Funnel & Plume



Airborne



Sniffer & Optical Remote Sensing



Plume-to City Dispersion & Chemistry Modelling

