DEVELOPING BREAKTHROUGH TECHNOLOGIES FOR SCIENCE AND SOCIETY

SNIFFDRONE PROJECT

Drone-based Environmental Odour Monitoring

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THE CHALLENGE

Malodours produced by wastewater treatment plants (WWTPs) are an expanding concern as cities surround these facilities. Malodours lower citizens' quality of life by undesired odour exposure and nuisance, and may negatively impact tourism. Odours are the main cause of pollution perception, together with dust and noise.

In particular, WWTPs produce gaseous emissions that might be olfactory annoying to the surrounding population. Current odour assessment methodologies use costly and infrequent olfactometry measurements involving human panels and continuous monitoring of few gases using fixed gas detectors installed on the plant. This leads to odour measurements with low temporal and spatial resolutions that do not allow for accurate characterization of the odour emission events. In consequence, current state-of-the-art does not allow proper monitoring of the plant from an odour management point of view.

OUR SOLUTION

SNIFFDRONE project main purpose is the co-creation of a drone with olfaction capabilities able to provide spatially dense odour measurements and autonomously localize the source of odour nuisances in WWTPs, leading to a drastic improvement in plant management compared to current practices. This development will involve facing a number of research challenges, namely: (i) To design an electronic system that predicts odour intensity from sensor readings in complex and time-varying odourous gas mixtures using machine learning algorithms, (ii) To produce 3D maps of time-averaged odour distribution, despite of the well-known complexity of concentration distribution in turbulent plumes. **In Patent Process.**

ENVISIONED IMPACT

SNIFFDRONE will represent a significant leap forward in several aspects: i) up to now, odour robots have been tested towards single odourant chemical sources in relatively simple scenarios, (ii) most research in odour robots has been based in terrestrial robots, (iii) novel understanding of flying strategies will be implemented and tested in real, large scale complex scenarios.

SNIFFDRONE will encourage implementation possibilities of artificial olfaction systems in broader areas, meaning with a strong impact in environmental monitoring and assessment research. Providing real-time odour information to managers will help to make fast decisions and to apply actions pre-empting potential inconveniences. In a medium term future, monitoring of odour emissions from a variety of sources like WWTP, landfills or composting plants, using autonomous flying robots with olfaction capabilities will largely improve plant management and it will lead to high societal impact improving drastically the quality of life of people living in proximity.

AKNOWLEDGEMENTS

SNIFFDRONE PROJECT has received funding from the ATTRACT project funded by the EC under Grant Agreement 777222. Authors of this report gratefully acknowledge the cooperation of ESAMUR (Entidad Regional de Saneamiento y Depuración de Murcia).