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Sewage monitoring system for tracking synthetic drug laboratories (microMole)

Background:

The threat of synthetic drugs is one of the most significant current drug problems worldwide. Amphetamine-Type Stimulants (ATS) are the second most widely used drugs. Since 1990, ATS manufacturing has been reported from more than 70 countries worldwide and the figure keeps rising. In 2008, 80 % of the amphetamine production facilities dismantled worldwide were located in Europe (UNODC, 2010) (EMCCDA, 2011). Organised Crime Groups are involved in ATS largescale production (Europol, 2007) (EMCDDA, 2009). Since 2011, the wide availability of pre-precursors (like APAAN) significantly lowered the price of the controlled precursor BMK and caused severe environmental problems, taking the problem to a greater dimension.

The presence of these substances in the sewage would constitute a specific marker to account for the location of illicit drug production lab on a given area, making the sewage system a very attractive place for chemicals monitoring and tracking of illegal manufacturing of ATS. However, the difficult of access to the sewage and the lack of knowledge of the time when substances are dumped to the sewage hinders sampling the sewage manually by LEA officers.

Objective:

The aim of this project is to design, develop and test a prototype of a system for legal recording, retrieving and monitoring operations of ATS and ATS precursor laboratories in urban areas. The sensor system will be installed within the sewage system and will track waste associated to ATS production. Criminal investigators and forensic specialists will use the system.

The µMole prototype will contain the following features: a) miniaturized system for 200 mm sewage pipes, b) robust housing taking into account sewage system environment, c) minimized power consumption, d) enhanced operation time supported by energy harvesting, e) high-specificity electro-chemical sensors, f) integrated micro-tanks for sample storage, and g) secure GSM and radio communications for remote monitoring. Analysis of privacy law, data protection and social acceptance will be carried on at different stages.

The tasks assigned to the Institute of Waterscience of the University of the Federal Armed Forces in Munich can be split up into four subprojects:

(1) Advising partner for wastewater composition as well as chemical and physical properties and sampling concepts in the sewer environment.

(2) Organisation, implementation and monitoring of tests of the (sub-)devices in real-life environment in cooperation with the Kompetenzzentrum Wasser Berlin (KWB) and the Berliner Wasserbetriebe (BWB).

(3) Sewer network modelling in cooperation with tandler.com (++Systems) in order to have a rough estimation of the drug waste concentration that can be expected at different sites in the sewer system downstream a given site of disposal.

(4) Preliminary study on temperature differences in the sewer system. Literature research and short-term on-site examination on the temperature range to be expected in the sewer system.

Project-consortium:

There are 11 consortium members within the project: Warsaw University of Technology (Poland), Central Forensic Laboratory of the Police (Poland), Federal Criminal Police Office (Germany), Blue Technolgies (Poland), CapSenze (Sweden), JGK Tech-Pipeferret (Iceland), Fraunhofer Gesellschaft (Germany), Tilburg University (the Netherlands), Ghent University (Belgium), Université Claude Bernard (France), Universität der Bundeswehr München (Germany). The microMole-project is funded by the European Union's Horizon 2020 research and innovation programme under the grant agreement No 653626.

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