SYnergy of integrated Sensors and Technologies for urban sEcured environMent

D10.5
Third Risk Review Report

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Abstract	The report assesses the tests conducted by project partners from ethical, safety, privacy, points of view. The analysis delves on a questionnaire administered to partners in charge of the tests. The analysis shows that, overall, the research activities do not pose risks to the rights and freedom of both research participants and citizens in general. Area deserving further attention is highlighted in the view of the next tests.
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Register of document versions

Partner acronym	Version number	Date	Suggested relevant changes	Notes
VUB	V1.0	15/01/2021	Questionnaire	Revised questionnaire
VUB	V1.1	28/01/2022	Questionnaire	Questionnaire sent
VUB	V1.2	15/02/2022	Part of answers received. Incoming tests	First draft version
VUB	V1.3	04/03/2022	Last answers received	Writing of the core text of the document
VUB	V1.3	08/03/2022	First draft	Writing of the core text of the document
VUB	V1.4	10/03/2022	Final submission	First draft complete
FORMIT	V2.0	11/03/2022	Review	Review version
FORMIT	V3.0	12/03/2022	Final version after quality check	Final version

Every information is updated to the date of issue of this document

This document is composed by 29 pages

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List of acronyms and abbreviations

CA	Consortium Agreement
DoA	Description of Action
EC	European Commission *or* Electrical Conductivity
ES	Exploitation Strategy
GA	Grant Agreement
GC-PID	Gas Chromatography - Photoionization Detector
LEA	Law Enforcing Agency
SME	Small and Medium Enterprise
UAV	Unmanned Aerial Vehicle

EXECUTIVE SUMMARY

This document constitutes the third and last risk review report of the SYSTEM project, which is part of the project's Work Package (WP) 10, the WP dedicated to identifying and mitigating the non-technological, viz. legal, social or ethical risks raised or emerging during SYSTEM's project activities.
During the period between October 2021 and January, 2022 tests were performed in Munich (DE, two tests session), Petržalka (SK), Idstein-Bauerbach (DE), Latina (IT), and Rome (IT, two tests sessions), Lavron (GR). As in previous tests, this third and last session of tests sought to enhance the process of technology development by verifying sensors' capacities, the quality of data collected from sensors, the communication with the monitoring centre. Specifically, this third set of tests includes the testing of sensors installed in solid waste trucks and on drones.
As in the previous reports, WP10 leader VUB circulated a questionnaire with questions concerning the impacts of the research activities from privacy, data protection and fundamental rights perspectives. The answers to the questionnaire as well as the analysis of the impacts of research activities in the light of the Legal, Ethical and Social Acceptance frameworks are reported in this document.
In general, the assessment indicates that the SYSTEM research activities performed during this period have been carried out in line with recognised standards and ethics in research, in line with the local rules and in respect of the rights and freedom of the persons who participated in the tests and citizens in general.
Specifically, research organisations and participants abided by safety protocols reducing risks of physical harm. As done in previous tests, partners followed safety measures (gloves, appropriate clothing and other safeguards), and employed only qualified personnel to conduct risk activities such as installation of sensors in the sewage, or the discharge of chemical samples. Third-party participants invited to the tests included employees of water companies, employees of sewage companies, or waste disposal utilities. Such participation was based on established formal collaboration with the partner or based on contract. As part of this cooperation, personnel from these companies had been fully informed about the purpose and the means of the tests themselves
No personal data has been collected. Data collected from sensors in the sewage network can in no way identify a natural person: they include measurements of the interaction of spilled compounds with sensors in the wastewater environment, flow data, data about pH and Electrical conductivity, etc. The use of sensors installed on drones or solid waste trucks did not pose any concern from privacy or personal data protection perspective either: in all tests, chemicals, vapour samples thermal images, were collected. These data did not in any way enable, let alone seek to enable, the identification of individuals.
As for the information to the public, partners have informed, and obtained the authorisation from local authorities to carry out the tests and, e.g., cordon off the streets, enter the manholes. As tests are carried out in the city, partners were prepared to answer questions posed by random citizens walking by the research sites.

INTRODUCTION

This document constitutes the third and last Risk review report of the SYSTEM project, which is part of the project's Work Package (WP) 10, the WP dedicated to identifying and mitigating the non-technological, viz. legal, social or ethical risks raised or emerging during SYSTEM's project activities.
As in the two previous risk reviews, the focus of this deliverable is on verifying whether the research activities have been carried out in line with ethical principles and with legislation during the whole life cycle of the project. The relevant legislation and the ethical principles to be taken into consideration have been defined and discussed at length in the Report on the Legal, Ethical and Social Acceptance aspects of the SYSTEM formed of (D10.1 (legal) + D10.8 (ethics and Social acceptance A)= D10.2).
As in the previous reports, WP10 leader VUB circulated a questionnaire with questions concerning the impacts of the research activities from privacy, data protection and fundamental rights perspectives. The answers to the questionnaire as well as the analysis of the impacts of research activities in the light of the Legal, Ethical and Social Acceptance frameworks are reported in this document.

QUESTIONNAIRE ABOUT LEGAL AND ETHICAL IMPACTS OF TESTS IN NON-CONTROLLED ENVIRONMENTS

This questionnaire is an adapted version of the questionnaire used in the previous risk reviews. The replies received in the most recent review, D10.3, and the analysis suggested minor changes. The first part, titled "general information", asks partners to describe in layman language the test the environment, the object of the research, the duration. Under the area of ethical issues, partners are asked to specify any risk situation for human health and to indicate the safety measures adopted. Partners are also asked to indicate who participate in the tests, in particular, if third persons, not directly affiliated with the research partners, participate, on which basis and for what purpose. The questions related to additional risks or to incidental findings have been removed, as suggested by the response received in previous iterations. In previous reviews, the risks corresponded to the known risks related to the research activities (biohazards, manhole, sewage environment). Under "Transparency of research activities", partners are asked to indicate which public authorities have been informed about the tests and/or have authorised the tests. Furthermore, we ask how research partners react to questions being asked by people passing by when tests take place in public cordoned off areas. The questions related to data processing activities ask partners to inform which types of data is collected in the tests, such as data from sensors, images from thermal cameras, about Ph or electric conductivity. Partners are explicitly asked to indicate whether the data collected in the test can be considered directly or indirectly as relating to an identified or identifiable individual (personal data). Partners are asked to confirm that a Data Protection Officer is in office at the time of the test.
The complete template of the questionnaire is available in Annex I.

SUMMARY OF TESTS IN NON-CONTROLLED ENVIRONMENTS

As in previous tests, this third and last session of tests sought to enhance the process of technology development by verifying sensors' capacities, the quality of data collected from sensors, the communication with the monitoring centre. Specifically, this third set of tests includes the testing of sensors installed in solid waste trucks and on drones. During the period between October 2021 and January 2022 tests were performed in Munich (DE, two tests session), Petržalka (SK), Idstein-Bauerbach (DE), Latina (IT), and Rome (IT, two tests sessions), Lavron (GR). The tests are described

and organised in WP8. The COVID-19 pandemic has affected the organisation of the tests; thus some tests have been postponed (see SYSTEM Contingency Plan).

STRUCTURE OF THIS DELIVERABLE

The deliverable's structure revolves around two main sections: in the first section, we report the answers received by partners in each test site, Munich (two tests), Petržalka, Idstein-Beuerbach, Latina-Borgo Piave, and Rome (two tests). A specific chapter of this section is dedicated to sensor technologies installed on solid waste trucks and drones (Tests involving T4i technology). Subsequently, in section two, we analyse the answers received and offer a few conclusions.

ANSWERS TO THE QUESTIONNAIRE PROVIDED BY PARTNERS IN CHARGE OF THE TESTS

This section reports the answers received by partners. The order of the questions (and answers) reflects the structure of the questionnaire. Only minor issues (typos, errors) have been amended. When possible, the replies have been reported verbatim. In other instances where the interpretation was clear but the dictum obscure, the authors have used indirect discourse. The questionnaires are available upon request to eugenio.mantovani@vub.be .

MUNICH

The research activities in Munich, under the supervision or in cooperation with host partner UnibwM, were performed in two rounds between 11-22 October 2021 and between 13 and 16 December 2021.
During the first round, T4i performed a test using a drone. The review of this test is provided in a separated section below “Tests involving T4i technology”.

MUNICH I

GENERAL INFORMATION

Institution hosting the test	UniBWM
Date of the test and duration	23.08.2021 – 27.08.2021
Location	Munich, a residential neighbourhood in the area called Hasenbergl.
Envisaged activities	A cordoned-off area covering six manholes. The purpose: to install sensors in the sewage (micromole sensors) and perform communication tests with the local server and RESI server. In the meantime, the deployment of the T4I Dover (device comprising a GC-PID and a thermal camera) fixed on a UAV took place at the grounds of the UniBwM. The application of the T4I Dover to detect volatile organic compounds in the air was tested under real-life conditions. The test also comprised the communication with the monitoring centre. (See section T4i)

AREA OF ETHICAL ISSUES

HEALTH AND SAFETY PROCEDURES

As in previous tests, only known risks are incumbent. No other relevant risks were reported. The substances introduced in the manhole was saltwater, acids diluted by water and amphetamine waste diluted by water. Amphetamine wastes were only handled by a person eligible to do so.
Persons included in the discharge activities wore protective gear like goggles and gloves.
The drone was flown on the grounds of the university (UniBwM) by certified drone pilots of the company S.A.S. technology, subcontracted T4I.

HUMAN PARTICIPANTS

Human participants in the tests are invited members of the SYSTEM consortium and workers from S.A.S. technology company (subcontractor of T4I) and the Blasy + Mader GmbH company. The participation of Blasy & Mader was according to the terms stipulated in the subcontract with UniBWM.
Employees of „Münchner Stadtentwässerung and employees of "Blasy + Mader GmbH" were fully informed about the test's purpose, means, risks and safety instructions before the test.
A list of participants has been drawn.

TRANSPARENCY OF RESEARCH ACTIVITIES

INFORMATION TO PUBLIC AUTHORITIES

The city of Munich is informed about the test week through its wastewater company "Münchner Stadtentwässerung".

INFORMATION TO THE PASSER-BY

Reply to the passer-by:
"Within the scope of an EU project, we are testing sensing equipment and strategies to identify indirect and illegal wastewater discharges."
This answer pays respect to the curiosity of the passer-by, as well as to the confidential aspects of the project.

AREA OF DATA PROCESSING ACTIVITIES

DATA COLLECTED DURING REAL-LIFE PILOT

Sensor data:

- pH
- electric conductivity
- GC-PID data
- Thermal images

DATA PROTECTION SAFEGUARDS AND REQUIREMENTS (CONFIRM THE CONTACT DETAILS OF THE DATA PROTECTION OFFICER OF YOUR ORGANISATION)

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MUNICH II

GENERAL INFORMATION

Institution hosting the test	UniBwM
Date of the test and duration	13.12.2021 – 17.12.2021
Location	Munich
Envisaged activities	A residential neighbourhood in Munich, in the area

	called 'Hasenbergl'. A cordoned-off area covering six manholes. The purpose: to install sensors in the sewage (micromole sensors) and perform communication tests with the local server and RESI server. The sampling process was triggered by the GENESI monitoring centre.

AREA OF ETHICAL ISSUES

HEALTH AND SAFETY PROCEDURES

Specify procedures have been adopted through the previous testbed sessions. Each of the participants was trained in the applicable health and safety measures rules.
The installation of the equipment (rings, gateways, ORI sampler) in the sewage pipes have been done by an external company (Blasy Mader).
Everyone was obligated to use gloves, safety glasses and use disinfection.
After de-installation equipment was carefully cleaned and disinfected.

The substances introduced in the manhole was saltwater, acids diluted by water and amphetamine waste diluted by water. Amphetamine wastes were only handled by the person eligible to do so.
Persons included in the discharge activities wore protective gear like goggles and gloves.

HUMAN PARTICIPANTS

Human participants in the tests are invited members of the SYSTEM consortium and workers from the Blasy + Mader GmbH company. The participation of Blasy & Mader was according to the terms stipulated in the subcontract with UniBWM. A list of participants has been drawn.

The subcontract is on a legal basis. Employees of „Münchner Stadtentwässerung and employees of „Blasy + Mader GmbH" have been fully informed about the test's purpose, means, risks and safety instructions before the test. Blasy Mader was in charge of installing the equipment in the sewage system.

TRANSPARENCY OF RESEARCH ACTIVITIES

INFORMATION TO PUBLIC AUTHORITIES

The city of Munich is informed about the test week through its wastewater company "Münchner Stadtentwässerung", which authorised the installation of the device.

INFORMATION TO THE PASSER-BY

During the installation, de-installation and discharges in the places where SYSTEM researchers were working information posters has been placed. During the testbed sessions, a few persons were asking about ongoing work. SYSTEM researchers ensured that a person speaking the local language was present in the area of testing so that they could provide an answer for asked questions. If the person could not answer in a satisfactory manner, the team is always ready to provide needed help. The reply followed the lines of "Within the scope of an EU project, we are testing sensing equipment and strategies to identify indirect and illegal wastewater discharges." As mentioned

earlier (Munich I, above), this answer pays respect to the curiosity of the passer-by, as well as to the confidential aspects of the project.

AREA OF DATA PROCESSING ACTIVITIES

DATA COLLECTED DURING REAL-LIFE PILOT

Sensor data:

- pH;
- electric conductivity.

Used Micromole Rings was equipped with pH and Conductivity modules that measured pH and conductivity of the wastewater in chosen places of the sewage system. Measured data were collected on the internal SD card and sent to the Monitoring Center.

DATA PROTECTION SAFEGUARDS AND REQUIREMENTS (CONFIRM THE CONTACT DETAILS OF THE DATA PROTECTION OFFICER OF YOUR ORGANISATION)

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PETRŽALKA

GENERAL INFORMATION

Institution hosting the test	BVS
Date of the test and duration	26-27 January 2022
Location	Petrzalka
Envisaged activities	Test conducted in the sewage network with the SmartCable Water. The aim is to test the sensor and to send the information to the GENESI monitoring centre.

AREA OF ETHICAL ISSUES

HEALTH AND SAFETY PROCEDURES

The team involved in the demonstrations uses protective coveralls and masks while manipulating the hazardous testing samples.

HUMAN PARTICIPANTS

No external people have been invited, apart from the BVS personnel that have been involved.

TRANSPARENCY OF RESEARCH ACTIVITIES

INFORMATION TO PUBLIC AUTHORITIES

The police station near the test have been informed of the test and gives help and supervision.

INFORMATION TO THE "PASSER-BY"

People give us strange looks, but no questions arise. In general, we answer by saying that we are testing sensors for the analyses of sewage water.

AREA OF DATA PROCESSING ACTIVITIES

DATA COLLECTED DURING THE REAL-LIFE PILOT

Data from sensors are collected.
No personal data is collected.

DATA PROTECTION SAFEGUARDS AND REQUIREMENTS (CONFIRM THE CONTACT DETAILS OF THE DATA PROTECTION OFFICER OF YOUR ORGANISATION)

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IDSTEIN-BEUERBACH

The research activities in Idstein-Beuerbach, under the responsibility of Hochschule Fresenius gem. GmbH (HSF), was performed in three rounds in November 2021.
During the last round partner, T4i performed a test in which it installed a sensor (T4i ARMA) on a solid waste truck made available by the local utility company in cooperation with HSF. On this test see section "Tests involving T4i technology" below.

GENERAL INFORMATION

Institution hosting the test	Hochschule Fresenius gem. GmbH (HSF)
Date of the test and duration	November, 08th – 12th (first week); November, 15th – 19th (second week); November, 22nd – 26th (third week)
Location	Idstein-Beuerbach
Envisaged activities	During these three visits, it was the first time all sensors, passive samplers and commercial samplers related to the sewage were deployed and tested in combination. Additionally, sensors and passive samplers were deployed and tested for the solid waste scenario that allowed a data fusion between the sewage and solid waste scenario. The expected outcome was to use the sensors in both scenarios to narrow down the area around the site of a possible illegal discharge. The following sensors were deployed for a certain timeframe: LC-MS and µMole for the total timeframe of three weeks (a week is equal to five working days, weekends are not included), passive sampler for two weeks, the ORI sampler for three consecutive days in the third week, smart cable water and smart cable air for three consecutive days in the first week as well as the T4i ARMA and Dyna for four consecutive days in the third week. The monitoring center (GENESI) was also always included in the visits. Aim of the last week test was to to share the data from the sensors to the GENESI monitoring centre, and to start the data fusion algorithm

AREA OF ETHICAL ISSUES

HEALTH AND SAFETY PROCEDURES

The health and safety measures were adopted from previous tests and visits. Due to the Covid-19 situation, the number of persons that attended the visits was reduced to the minimum and the

control and documentation of the vaccination status, recovery after infection and test results was tightened on the basis of the federal and state resolutions in Germany.

HUMAN PARTICIPANTS

Besides SYSTEM partners, only employees of the sewage company were involved in the installation and dismantling of the sensors.

TRANSPARENCY OF RESEARCH ACTIVITIES

INFORMATION TO PUBLIC AUTHORITIES

The manager of the sewage plant as well as the manager of the sewage system of the city of Idstein was informed personally and supported the consortium in every aspect.

INFORMATION TO THE "PASSER-BY"

Every person that passed our test activities and asked what we were doing were informed that we work together with the sewage company and the city of Idstein to check the physicochemical properties of the wastewater. Every person appreciated our kind replies and information and wished us good luck.

AREA OF DATA PROCESSING ACTIVITIES

DATA COLLECTED DURING REAL-LIFE PILOT

The following data from sensors were collected:

- LC-MS: Organic micropollutants in wastewater related to production wastes of clandestine amphetamine synthesis and their products.
- µMole: pH and conductivity of the wastewater
- Passive Sampler: Organic micropollutants in wastewater and solid waste related to production wastes of clandestine amphetamine synthesis and their products.
- Ori Sampler: pH and Conductivity of wastewater
- Smart Cable Water and Smart Cable Air: Chemicals in wastewater and air
- T4i ARMA: Chemicals in solid waste

No personal information was recorded during the visits.

DATA PROTECTION SAFEGUARDS AND REQUIREMENTS (CONFIRM THE CONTACT DETAILS OF THE DATA PROTECTION OFFICER OF YOUR ORGANISATION)

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LATINA – BORGO PIAVE

GENERAL INFORMATION

Institution hosting the test	Acqualatina
Date of the test and duration	Three sessions of 1 day each in 2021
Location	Borgo Piave
Envisaged activities	Tests were performed at a wastewater treatment plant, outside the urban area of Borgo Piave. The activity involved spilling different chemicals inside a manhole located 60 meters away from the measurement point, a large sink, where sensors were installed. A few of these spills were performed for a total duration of the session of about 8 hours.

AREA OF ETHICAL ISSUES

HEALTH AND SAFETY PROCEDURES

Some of the chemicals are toxic or flammable. Safety involved wearing a filtration mask and gloves for the operator that had to handle the chemicals. There was also a rotation among 3 different operators in spilling the chemicals. All tests were performed in the open air.
Sensichips operators never got in touch with wastewater, which constitutes a biohazard, and such activity was instead delegated to Acqualatina personnel.

HUMAN PARTICIPANTS

No individuals external to the consortium were involved in the session.
Four sewage operators from Acqualatina were involved in each of the test sessions.

TRANSPARENCY OF RESEARCH ACTIVITIES

INFORMATION TO PUBLIC AUTHORITIES

Acqualatina, the sewage utility and owner of the test plant, was in charge to contact local authorities.

INFORMATION TO THE "PASSER-BY"

No person was passing by during the tests.

AREA OF DATA PROCESSING ACTIVITIES

DATA COLLECTED DURING REAL-LIFE PILOT

Sensichips collected data from sensors, along with some pictures and short videos to document the tests. Only Sensichips and Acqualatina personnel ap-peared in the photos and videos.

DATA PROTECTION SAFEGUARDS AND REQUIREMENTS (CONFIRM THE CONTACT DETAILS OF THE DATA PROTECTION OFFICER OF YOUR ORGANISATION)

The data protection officer of our company was present during all sessions.

ROME

The research activities in Rome, under the supervision of AMA SpA – Roma Capitale and ACEA S.p.A. were performed in two rounds on 2-5 November 2021 and on 15 December 2021.
During the last round partner, T4i performed a test in which it installed a sensor (T4i ARMA) on a solid waste truck made available by AMA Spa. On this test see section "Tests involving T4i technology" below.

ROME I

GENERAL INFORMATION

Institution hosting the test	AMA SpA – Roma Capitale
Date of the test and duration	02-05/11/2021
Location	Rome
Envisaged activities	The test aims at demonstrating the reliability of the T4iDover® and the SmartCable Air in solid-waste and air environments. The T4iDover® has been installed in a solid-waste truck, while the SmartCable Air has been tested in the solid-waste bins. The activities have been carried out in one of the ACEA maintenance areas, which was a private space, where only authorized people can enter. -

AREA OF ETHICAL ISSUES

HEALTH AND SAFETY PROCEDURES

The procedures for testing near the waste truck have been prepared by ACEA S.p.A. responsible for the truck. The person coming from T4iEng always wears gloves and a protective suit. The waste truck has been moved only by personnel from ACEA S.p.A.
The people from RESI that use hazardous substances wear gloves.

HUMAN PARTICIPANTS

No external people have been invited.
Employees from the solid-waste company have been involved in the movement of the truck.

TRANSPARENCY OF RESEARCH ACTIVITIES

INFORMATION TO PUBLIC AUTHORITIES

As mentioned above (general information), tests activities were carried out in one of the ACEA maintenance areas under eh supervision of ACEA itself. This private area belongs to Acea Group, controlled by the holding Acea Spa, controlled by Roma Capitale (51%).

Information to the “passer-by”
Not applicable

AREA OF DATA PROCESSING ACTIVITIES

DATA COLLECTED DURING REAL-LIFE PILOT

Data from sensors only
No personal data is collected or processed

DATA PROTECTION SAFEGUARDS AND REQUIREMENTS (CONFIRM THE CONTACT DETAILS OF THE DATA PROTECTION OFFICER OF YOUR ORGANISATION)

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ROME II

GENERAL INFORMATION

Institution hosting the test	ACEA S.p.A.
Date of the test and duration	15 December 2021
Location	Rome
Envisaged activities	In Rome, environment was explored with Smart Cable Water and Smart Cable Air. The demonstration aims to test the data fusion algorithm.

AREA OF ETHICAL ISSUES

HEALTH AND SAFETY PROCEDURES

The procedures were developed by ACEA S.p.A. for the installation of the sensors. The use of the hazardous substances has been carried out by people wearing gloves, under the supervision of Carabinieri.

HUMAN PARTICIPANTS

No external people have been invited. Sewage company people were involved for managing the manholes and the sensor.

TRANSPARENCY OF RESEARCH ACTIVITIES

INFORMATION TO PUBLIC AUTHORITIES

For the realization of the demonstration, we alerted the police station nearest to the test site.

Information to the “passer-by”
We inform the people that we were testing some sensors for the quality of the sewage water. People were more interested to their problems related to the sewage companies and their bills.

AREA OF DATA PROCESSING ACTIVITIES

DATA COLLECTED DURING REAL-LIFE PILOT

Data from sensors only
No personal data is collected or processed

DATA PROTECTION SAFEGUARDS AND REQUIREMENTS (CONFIRM THE CONTACT DETAILS OF THE DATA PROTECTION OFFICER OF YOUR ORGANISATION)

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TESTS INVOLVING T4I TECHNOLOGY

Partner T4i has been involved in four tests at different locations in the period between October 2021 and December 2021. The technologies utilised, T4i Dover and T4i ARMA, were installed on drones and waste trucks, respectively.

GENERAL INFORMATION

A1	
Institution hosting the test	UniBW
Date of the test and duration	18 – 22 October 2021
Location	Munich, Germany (UniBW campus)
Envisaged activities	In this visit, T4i DOVER was tested in a real environment. It was mounted on a drone and had to fly over a simulated landfill where specific chemicals were released. The objective of this test session was to detect the evolved target chemicals, trigger a time-stamped and geo-referenced alarm, which should be transferred in real-time to RESI Monitoring Centre, whilst ensuring a safe flight. Despite the harsh weather conditions that hindered the drone flight-ability, T4i DOVER successfully detected the target compounds and triggered alarms, when appropriate.
A2	
Institution hosting the test	ROMA/AMA
Date of the test and duration	2 – 5 November 2021
Location	Rome, Italy
Envisaged activities	In this visit, T4i ARMA was installed on a solid waste truck, offered by AMA utility operator and tested against target chemicals found in the solid waste environment. The main objective of this visit was to ensure a safe and robust installation of T4i ARMA on the truck and detect the target chemicals, within an analytically complex waste background. Detection was successful and alarms were transmitted to RESI Monitoring Centre.
A3	
Institution hosting the test	HSF
Date of the test and duration	22 – 25 November 2021
Location	Idstein/Beuerbach, Germany
Envisaged activities	In this visit, T4i ARMA was installed on a solid waste truck, offered by REMONDIS utility operator and tested against target chemicals found in the solid

	waste environment. Similarly with the previous session, the main objective of this visit was to ensure a safe and robust installation of T4i ARMA on the new type of truck and detect the target chemicals. In parallel, T4i Dyna was used to collecting vapour samples for lab analysis. Detection was successful and alarms were transmitted to RESI Monitoring Centre, showing the route of the waste truck in the wider area.
A4	
Institution hosting the test	T4i
Date of the test and duration	13 – 16 December 2021
Location	Lavrion, Greece
Envisaged activities	Similarly to the Munich visit, T4i DOVER was tested in a real environment. It was mounted on a drone and had to fly over a simulated landfill where specific chemicals were released. The objective of this test session was to detect the evolved target chemicals, trigger a time-stamped and geo-referenced alarm. Strong winds during the test period made it difficult for the drone to fly in the vapour plume. However, T4i DOVER was able to detect target compounds and trigger alarms, that were automatically transmitted to RESI Monitoring Centre and visualized.

AREA OF ETHICAL ISSUES

HEALTH AND SAFETY PROCEDURES

T4i applies strict health and safety protocols in all field tests and demonstrations, where they participate. Furthermore, COVID-19 safety protocols have also been applied to T4i personnel (self-tests, masks and/or vaccination). Although only non-toxic, non-hazardous chemicals are used in their tests, personnel safety is a top priority for their operation. Special training and preparation of the people involved in the tests are performed before every demonstration to ensure the safe operation of their equipment and the welfare of the operators/participants. A detailed safety briefing to all participants is the starting point on every demonstration day.

HUMAN PARTICIPANTS

In all four recent field tests carried out in SYSTEM project, no external visitors were invited to participate. In Munich and Lavrion a drone provider was subcontracted by the project to fly T4i DOVER; two pilots were present during the field tests, specifically trained for such operations.

TRANSPARENCY OF RESEARCH ACTIVITIES

INFORMATION TO PUBLIC AUTHORITIES

In Munich, Rome and Lavrion visits, the tests were carried out in controlled areas, i.e. UniBW campus, AMA premises and T4i premises respectively. Site managers were informed about the activities planned in all three visits and kindly offered their support to T4i tests. In Idstein/Beuerbach, most tests were carried out at the wastewater treatment plant (controlled area) and the city of Idstein, where special arrangements were made by the hosting organization, HSF.

INFORMATION TO THE "PASSER-BY"

Not applicable

AREA OF DATA PROCESSING ACTIVITIES

DATA COLLECTED DURING REAL-LIFE PILOT

In all four deployment visits, T4i collected chemical data from their detection systems, namely T4i DOVER, ARMA and Dyna. In addition, thermal images exclusively of the simulated landfill scenery were recorded during the T4i DOVER tests in Munich and Lavrion.

DATA PROTECTION SAFEGUARDS AND REQUIREMENTS (CONFIRM THE CONTACT DETAILS OF THE DATA PROTECTION OFFICER OF YOUR ORGANISATION)

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ASSESSMENT OF THE IMPACTS OF TESTS IN NON-CONTROLLED ENVIRONMENTS

This section provides an assessment of the SYSTEM research activities during the last phase of tests with the view of assessing their impacts against the benchmarks established by the project in SYSTEM Baseline report on the LESA frameworks (legal, ethical, and social acceptance, D10.2).

As far as the area of ethical issues is concerned, given the nature of the research activities, the focus has been placed on the safety of researchers and health hazards connected to the detection of precursors. Also in this series of tests, as previously done, the partners took the appropriate protective measures (gloves, appropriate clothing and other safeguards), and only qualified personnel was allowed to conduct risky activities such as installation of sensors in the sewage, or the discharge of chemical were performed. Health and safety were further mitigated by the fact that only a restricted number of specialised persons, in addition to SYSTEM partners' researchers, took part in the tests. Specifically, "third parties" invited to the tests included water companies' employees, sewage companies, of waste disposal utilities. Participation was based on formal collaboration on specific, ad hoc, contracts, meaning that all human participants involved in the tests had been fully informed about the purpose and the means of the tests themselves.

As for the impacts of the research activities on legal frameworks, it was expected, at the beginning of the project, that they would encroach upon the personal data protection legal framework. Similarly to previous tests, however, also this session indicates that not a single test surveyed can be said to have collected or processed any personal data. The data collected from sensors in the sewage network can in no way identify a natural person: they include measurements of the interaction of spilled compounds with sensors in the wastewater environment, flow data, data about pH and Electrical conductivity, etc. As for the tests on the solid waste truck, the collection or the processing of personal data, for instance of truck drivers, was not part of the research purpose (testing the T4i ARMA sensor), nor were data about the truck driver in any way, directly or indirectly, collected. The purpose of the research was in fact to ensure a safe and robust installation of T4i ARMA on the new type of truck and detect the target chemicals and, in parallel, collect vapour samples for lab analysis. Similarly, the data collected from the drones, including thermal images, did not in any way enable, let alone seek, the identification of individuals, because a. drones were flown in protected areas (landfills, precincts) and b. the purpose of the test, i.e., to fly over a simulated landfill where specific chemicals were released - detect the evolved target chemicals - trigger a time-stamped and geo-referenced alarm. The fact that no personal data is collected or processed is also reflected in the rather low-security safeguards that the partners, including the LEAs, adopt. Partners did not adopt extra security measures for storage of the data collected, judging the data not vulnerable to any misuse or likely to be stolen or leaked with adverse consequences for data subjects. However, all partners have confirmed that a DPO is in place at the partner institution in charge of the tests.

As far as social acceptance is concerned, the record is mixed. For social acceptance, it is intended the reaction (acceptance, hesitation, suspicion, rejection etc.) of citizens witnessing or becoming aware that SYSTEM technology is being installed and employed in an urban environment. As discussed in our baseline report D10.2, the project must balance, on the one hand, the secrecy required by police investigation and, on the other, the right of citizens to be informed about activities that, despite not collecting any personal data, are surveillance activities, thus infringing on the individual perception that privacy is endangered and potentially affecting trust between LEAs and citizens. In general, the project ensured a degree of public oversight over its research activities.

Partners duly informed the local authorities and obtained authorisation as well as cooperation in cordoning off streets, opening manholes, installing sewage sensors. Partners in Istein-Beuerbach, Latina, Rome, Petržalka and Munich have informed the public by reaching out to the local authorities, water companies, sewage companies, police authorities. Specifically, for what concerns the relationship with citizens, the record is mixed. As stated in the previous risk report, partners were asked to be prepared to address the questions of passers-by walking by the research sites. Overall, none of the partners shied away from expressing what, in substance, tests were about: detecting dangerous and illegal substances in the sewage network. In some cases, as in Munich, posters were attached to the research site. Whilst all partners had occasion to explain to layman citizens the scope of SYSTEM and of the activities they were undertaking, the reaction of citizens differed. In Idstein and Munich, people asked questions, listened to the answers and walk away; in some cases, wishing a good look. In Rome, people did ask questions, listened to answers and, reportedly, seized the occasion to lay complaints about problems with the sewage system or with the sewage companies and utility bills. In Petržalka, researchers tended to be very succinct about explanations and reportedly received “strange looks” from the random passer buyer. The rationale behind the requirement of transparency (inform public authorities, inform citizens) is avoiding creating a chilling effect on citizens, who may fear that something is going on about them, “under” them quite literally, to their unbeknownst. We must avoid creating this chilling effect. However, one must also take into account that the history and the level of trust between LEAs and citizens differ across the states and the cities involved in the project.

In conclusion, the assessment indicates that the SYSTEM research activities in non-controlled environments have been carried out in line with recognised standards and ethics in research, in line with the local rules and in respect of the rights and freedom of the persons who participated in the tests and citizens in general. Participants abided by safety protocols reducing risks of physical harm. No personal data has been collected. Information to the public has been provided by means of information to city authorities.

ANNEX I SYSTEM QUESTIONNAIRE FOR TESTS AND DEMONSTRATIONS IN NON-CONTROLLED ENVIRONMENTS

SYSTEM QUESTIONNAIRE FOR TESTS AND DEMONSTRATIONS
IN NON-CONTROLLED ENVIROMENTS

January 2022

SYSTEM "*Questionnaire for tests and demonstrations in non-controlled environments*" is part of SYSTEM's ethics management strategy, described in WP10 and in Section 5.1, Proposal 787128 - SYSTEM - Part B Annex 1.

This is the third round of questions designed to assess the risks to legal and ethical frameworks (so-called LESA framework) and the mitigating measures put in place to ensure the tests are conducted in an ethically and legally sound fashion.
The present third questionnaire considers the finding of the previous questionnaire and is therefore much shorter and focused on fewer selected issues than its previous iterations.
Partners are asked to take the time and reply to the questions in detail and, when possible, on laymen's terms. A succinct explanation is added to some questions.

The answers received will be analysed and systematised in the final Risk Review Report. In case you think that a question is not relevant, you have doubts or do not have enough information if you are prevented from sharing information to respect confidentiality obligations, please state so.

A) TEST AND DEMONSTRATION GENERAL INFORMATION

Institution hosting the test	
Date of the test and duration	
Location	
Envisaged activities	Please describe in layman language what you are doing in this test. Please indicate how this test is different from previous tests by describing the **environment**, the **object** of the research, the **duration**, and the **expected** outcome (purpose, what you want to test) ….

B) AREA OF ETHICAL ISSUES	
0. Health and safety risks	Specify if there are any procedures, situations or material that may be hazardous, and what precautions are taken to ensure the safety of researchers and participants. In the event internal protocols will be used please mention them. If the health and safety measures are the same adopted in the previous tests, please state so.
1. Human participants	Please indicate if Individuals, or groups of individuals external to the consortium have been invited to the tests. Please indicate whether employees (e.g., of sewage companies or of urban waste companies) are involved. Remember that if you want to take images (pictures, videos) of individuals who are external to the consortium, you need to obtain his or her consent. This rule does not apply to project partners.

C) TRANSPARENCY OF RESEARCH ACTIVITIES	
0. Information to the public authorities	As detailed in D10.3, in the event a test or demonstration in urban areas, SYSTEM researchers should obtain authorization from local authorities. Please indicate which authorities and channels you use to inform the citizens or the authorities about SYSTEM research activities in urban settings. and how. If you do not plan to inform about your activities, please motivate your decision.
1. Information to the "passer-by"	As mentioned in D10.3, SYSTEM researchers should be ready to answers questions coming from persons who happen to pass by the area of testing. The p*asser-by, a person walking the dog, neighbors may be legitimately curious when they see you around a manhole located in urban spaces.* Please describe how you react, *how would or do you deal with questions from people passing by?*

D) AREA OF DATA PROCESSING ACTIVITIES	
0. Data collected during real-life pilot	Please indicate which data you are collecting in this test - Example: - Data from sensors (Readings from utility networks; air emissions) - Images from thermal cameras Add as many rows as data sets you need If you collect or the test leads to the collection of personal data, i.e. information leading to a identified or identifiable individual, please state so.
1. Data protection safeguards and requirements	Please confirm the contact details of the data protection officer of your organization

Please add any comment if you wish to make