ReSilence

Retune the Soundscape of future cities through art and science collaboration

HORIZON - 101070278

D2.2

Design needs and challenges in orchestrating the future sounds and experiences of cities v2

Dissemination level:	Public
Contractual date of delivery:	Month 20, 30 April 2024
Actual date of delivery:	Month 20, 30 April 2024
Workpackage:	WP2 Art-Driven Experiments and societal needs
Task:	T2.1 ADE supporting and monitoring T2.2 Introducing ReSilence technologies to artists T2.3 Challenges in orchestrating the future sounds while building social trust/acceptance to technology solutions
Type:	Report
Approval Status:	Final Draft
Version:	1.0
Number of pages:	39
Filename:	D2.2_resilence_Design needs and challenges in orchestrating the future sounds and experiences of cities v2.docx
Abstract	

This deliverable reports the challenges that are addressed in the pilot use cases, as well as strategies to foster trust and acceptance surrounding AI and XR technologies. It also includes a description of the workshops to empower artists in R&D projects as well as the design thinking and participatory design process that will facilitate the acceptance of digital technologies.

funded by the European Union

History

Version	Date	Reason	Revised by
0.1	2 April 2024	ToC creation	MPIEA
0.2	16 April 2024	Integrated comments from task leader and distribution to ReSilence partners for input	MPIEA
0.3	22 April 2024	Integrated input from partners and submitted for internal review	CERTH
0.4	27 April 2024	Internal Review	AUTH
0.5	28 April 2024	Preparation of final draft	MPIEA
1.0	30 April 2024	Quality check and submission of the final draft	CERTH

Author list

Organisation	Name	Contact Information
MPIEA	Melanie Wald-Fuhrmann	melanie.wald-fuhrmann@ae.mpg.de
AUTH	Kalliopi Valsamidou	kalliopivals@gmail.com
CERTH	Nefeli Georgakopoulou	nefeli.valeria@iti.gr
CERTH	Paraskevi Kritopoulou	pakrito@iti.gr
CERTH	Eleftheria Layokapa	elagio@iti.gr
CERTH	Sotiris Diplaris	diplaris@iti.gr
MoBen	Maurice Benayoun	benayoun.maurice@gmail.com
TCH	Prodromos Monastiridis	pmonastiridis@tch.gr
TCH	Frosso Gaki	fgaki@tch.gr
FR	Harlan Levey	hblprojects@gmail.com
FR	Manuel Cirauqui	mcirauqui@eina.cat

Executive Summary

Deliverable 2.2 marks the progress in the pilot use cases (PUCs) introduced in Deliverable 2.1, as documented in the project proposal and the Description of Action (DoA). The PUC scenarios are presented and refined incorporating feedback from the consortium partners and the artists participating in the first and second open call.

This subsequent deliverable illustrates strategies to foster trust and acceptance surrounding AI and XR technologies. The project's approach is shaped by existing frameworks, identifying the main factors influencing the impact of art on acceptance issues. ReSilence aims to tackle societal challenges such as social inclusion, sustainability, and resilience in European cities through art-inspired technologies. These technologies intend to upgrade urban experiences and design through sound, with specific focus areas involving musical experiences, car sound design, urban soundscape design and full-body sound experiences.

The deliverable also outlines the evolution of art-driven methodology employed for the development and elaboration of the four pilot use cases. Each PUC is discussed in detail, addressing core challenges, the artistic vision shaping sub-challenges, the approach taken by ReSilence artists to tackle these challenges, the anticipated artworks/prototypes, the testing process, and the impact assessment/evaluation. The methodology of D2.2 implements a structured approach consisting of four phases: Define, Design, Deploy and Demo, to accommodate the dynamic collaboration between artists and the consortium, integrating the languages of art and technology. The expected contributions from artists who were successful in the open call are highlighted, along with a narrative explaining how the PUCs will be realised in real-life scenarios with the support of the consortium in accomplishing these initiatives.

ReSilence's main goal is to present research findings in a narrative format, making scientific concepts accessible to a wider audience. New tools developed within ReSilence aim to contribute to accessible and sustainable living environments, improving citizen well-being. Furthermore, these software tools are expected to attract stakeholders from industry, municipalities and civil society.

Abbreviations and Acronyms

AI	Artificial Intelligence
CERTH	Centre for Research and Technology Hellas
DoA	Description of Action
EEG	Electroencephalography
PUC	Pilot Use Case
UNIGE	University of Genoa
VR	Virtual Reality
WP	Work Package
XR	Extended Reality
FR	Fundamental Research

Table of Contents

1 INTRODUCTION

Sound plays a significant role in shaping our experience of the city. It influences our perception and our well-being. However, it is most of the time overlooked by city planners because it is ambiguous and unpredictable. Therefore, ReSilence focuses on sound as a creative tool for understanding and designing our future cities, a) exploring the borders between sound and silence in a changing world, b) producing acoustic awareness in urban spaces, c) offering new possibilities for social interactions, d) creating new types of urban-sonic experiences, e) Influencing the identity of a place, f) building trust around AI & XR technologies. In order to achieve this, we need to establish a relationship between artists, scientists, technology experts and society in ***research –creation*** ground. Through this we can achieve a change in our mindset, inclusion and diversity, practice and experimentation.

Section 2 presents the aim of the project to identify social challenges and foster trust and acceptance of emerging digital technologies through artistic interventions. The proposed frameworks on trust are examined, in order to understand and leverage the key factors influencing the impact of art on acceptance issues. The societal needs and challenges of each use case are investigated to define corresponding user requirements, ensuring the appropriate deployment of ReSilence's approach in each scenario for evaluation by end-users. In alignment with the EU AI Act, which aims to boost excellence in AI while ensuring trustworthiness through binding legislative measures applicable across EU Member States, the project indicates the integration of ethical principles and regulatory mandates into artistic processes.

In Section 3, the deliverable describes the art-driven methodology, which has been developed from the first open call until now. This process is being presented, depicting the methodology employed for developing the four pilot use cases and establishing collaborative groups comprising consortium partners and open call artists. These groups contribute to further elaborating the PUC scenarios and shaping future development based on user needs.

Finally, Section 4 introduces the initial four pilot use cases together with the respective artistic projects that belong to them: 1) citizen engagement in musical experiences, 2) redefining silence in mobility, 3) exploring urban soundscapes and acoustic perception, and 4) enhancing full body experiences for individuals. This deliverable (D2.2) marks the continuation of the pilot use cases initiated in D2.1 "*Design needs and challenges in orchestrating the future sounds and experiences of cities*". Building upon the foundations established in the previous deliverable, D2.2 incorporates insights from artists selected through the second open call.

2 FOSTER TRUST AND ACCEPTANCE AROUND AI AND XR TECHNOLOGIES

2.1 The basic idea: using the arts as potent(ial) mediators of trust and acceptance

Today, AI and XR technologies are probably the most important drivers of technological innovation with yet unforeseeable consequences for individuals and societies. It is therefore of the utmost importance that they are not only further developed technologically, but that societies reflect on their opportunities and risks and discuss future usage scenarios, areas of application, as well as the need for restrictions and regulation. This way, public trust and acceptance can be built and the transformative potentials of these technologies can be harvested.

In the quest to promote trust and acceptance around AI and XR technologies and to provide the possibility to discuss their opportunities and risks, the arts could play a special role. They have the capacity to bridge the gap between technological innovation, human understanding and public acceptance. The unique ability of art to evoke powerful emotional and immersive experiences, overcome barriers and elicit responses, makes it a potent mediator of such complex concepts. Through exhibitions, interactive installations and multimedia performances, artists can provide contact zones, create narratives and engage audiences in dialogues about the possibilities and ethical implications of AI and XR, facilitating trust and acceptance and consequently advocating innovation and progress.

The EU AI Act serves as a regulatory framework aimed at boosting excellence in AI while ensuring trustworthiness through binding legislative measures applicable across EU Member States. Based on the fundamental rights and freedoms incorporated in treaties and charters, such as Articles 2, 16, and 114 of the Treaty on European Union, the EU AI Act improves the functioning of the internal market, promotes the uptake of human-centric and trustworthy AI, ensures a high level of protection of health, safety and fundamental rights and supports innovation. By aligning artistic processes with these ethical principles and regulatory mandates, artists can leverage their creative skills to embody key requirements, such as human agency, robustness and safety, privacy, transparency, fairness, societal well-being and accountability.

ReSilence invites the thoughtful and transparent integration of AI and XR components into artworks and artistic performances as a means for societies to interact with these technologies in an exploratory, playful and aesthetically meaningful manner. Moreover, ReSilence emphasises the collaborative relationship between creators, technology and users. Artists using XR tools can visualise AI algorithms, making them accessible and comprehensible. That way, users become familiar with the technology and also get motivated to participate in its development. Involving users in the decision-making process, mitigates potential concerns

about the use of these tools and strengthens trust in AI and XR. The ReSilence webinar conducted on April 18th regarding the Ethical Use of AI Tools offered valuable feedback into the ethical considerations surrounding AI and how it intersects with ReSilence.

2.2 **Pitfalls and criticism**

Using the arts as mediators of trust and acceptance around ideological or technological topics often faces criticism. The particular powers of the arts are blind to the moral value of the contents they transport and can and have been used for both “good” and “bad” purposes throughout history. It is therefore particularly important to use the power of art to engage, move, entrain, and persuade people in a responsible way with works that do not seek to overwhelm people but to engage them in an open dialogue about the topics in question that is also open to different perspectives and interpretations, as well as to criticism.

In the case of AI and XR technologies, critics argue that the rush to adopt them often prioritises speed and convenience, leading to fears of job displacement and societal upheaval. Additionally, the lack of accountability mechanisms raises worries about perpetuating stereotypes, overshadowing human creativity and skills while also reinforcing existing societal inequalities and biases rather than challenging them. There is also uncertainty regarding how artistic interventions address fundamental issues of transparency, accountability and bias within AI systems.

However, there is an opportunity for ReSilence artists to engage in dialogue and critique, using platforms to provoke thought, raise awareness and promote the understanding of AI's role in society. By embracing diverse perspectives, the arts can contribute to building trust and acceptance in AI while promoting a more ethical and inclusive technological landscape. Only by confronting these criticisms directly will there be hope that innovation will be synonymous with inclusivity, transparency and societal well-being.

2.3 **Artists in ReSilence: fostering trust and acceptance around AI and XR**

ReSilence intends to adopt a holistic approach that considers the broader societal implications of AI and XR technologies. From concerns about bias and privacy to questions of accountability and sustainability, the issue is particularly complex and demands immediate attention to ensure the responsible deployment of AI technologies. Guided by inclusivity, transparency and accountability, ReSilence artists have been invited to integrate art into AI development. Inclusive design processes create AI systems that reflect the values of society. By embracing alternative design approaches, diversity and human well-being, ReSilence seeks to define a field where AI and XR technologies deserve and inspire trust and acceptance. In this context, the arts emerge as significant bridges, combining technology, reflection, ethics and humanity.

Artists in ReSilence are contributing to the fostering of trust and acceptance around AI and XR technologies through various innovative approaches. The following conclusions arise from the questionnaires provided to the artists for defining user requirements.

Abel Korinsky's project emphasises the benefits of new technologies, such as reducing noise pollution. He demonstrates their positive impact on daily life and the importance for the users becoming familiar with new technologies. Meanwhile, Lea Luka Sikau challenges the public to engage more critically with technological advancements, promoting a deeper understanding and awareness. Marcin Dudek uses new technologies to understand complex structures, enriching public understanding and appreciation. Guillem Serrahima's project aims to increase awareness of electromagnetism, giving individuals more control over their exposure to technology and encouraging informed decision-making.

Lugh O' Neill focuses on how technology can complement existing cultural practices with continuity and integration rather than replacing them. Similarly, Brigitta Muntendorf focuses on the role of technology as a facilitator, creating a relationship between technology and people. In the same context, Alexander Hackl's project centres on empowering people with agency rather than replacing them.

One crucial aspect of building trust in AI is transparency, as highlighted by Halsey Burgund. Transparency involves openly sharing information about the technologies being used, the data collected and the policies governing their usage, storage and protection. Halsey Burgund points out transparency and participation in tech projects as key factors in building public trust, leveraging art-based experiences to engage and educate.

Paul Louis highlights the fundamental trustworthy nature of sound and its subconscious potential to alert, enhance well-being, proposing innovative urban solutions. Kakhidze Alevtyna underscores the non-political nature of sound, suggesting its universal appeal as a tool for building trust.

Together, these artists are contributing to a more inclusive, informed and accepting discourse around AI and XR technologies, providing an opportunity for greater trust and integration into society.

2.3.1 **Ethical guidelines webinar**

A webinar on the ethical use of tools was scheduled for Thursday, April 18th, 2024, at 16:00 CET. This webinar, entitled "Artificial Intelligence and Ethical Use of AI Tools" provided valuable insights into the ethical considerations surrounding AI and how it intersects with ReSilence. The webinar session was conducted live and recorded for those who may not have been able to attend, ensuring accessibility for future reference.

The topics covered included:

1. Brief introduction in ethical considerations
2. Trustworthy AI framework
3. AI through thoughtful design
4. ReSilence and relevant legislation

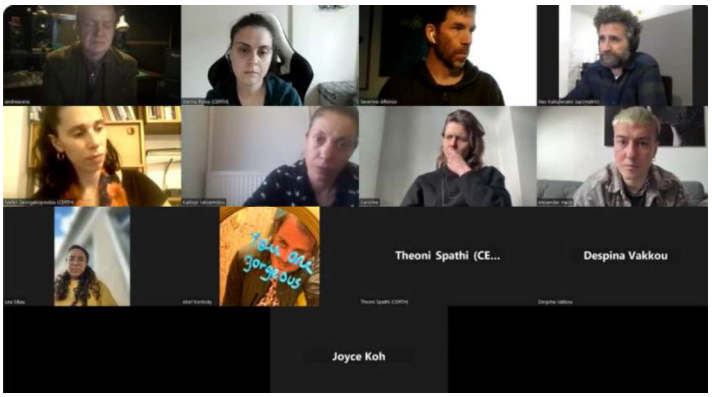

Figure 1: Screenshot of the AI and ethics meeting with the artists

Figure 2: Screenshot of the AI and ethics meeting with the artists

3 METHODOLOGY

3.1 Pilot Use case creation methodology

The creation of use cases during the proposal phase adhered to key criteria, including musical experience design, the new silence (sound and mobility), the sound of urban spaces, and full-body sound experience. These criteria defined the selection of specific scenarios for each of the four PUCs, leveraging the collective expertise of ReSilence partners. Subsequently, the elaboration of their scenarios from D2.1 to D2.2 has been shaped through ongoing discussions in regular bi-weekly video calls with consortium partners and contributions from the selected artists of the two open calls.

3.2 Art-driven experiments methodology

The methodology described in D2.1 concentrates on reshaping urban soundscapes and embodies a comprehensive approach to innovation within the S+T+ARTS toolkit[1] [app]. It synthesises a variety of disciplines, bringing together artists, architects, urban designers, scientists, engineers and researchers to explore the dynamic interplay between art, science, technology and society. Focusing on art-driven technology, it assesses technology based on capabilities while proactively addressing unintended consequences. Furthermore, it reflects the core values of the S+T+ARTS initiative, emphasising meaningful connections, pushing limits, and envisioning new possibilities for artistic expression.

Leveraging artistic experimentation with advanced technologies, ReSilence utilises sound as a creative tool to shape and speculate the future of cities. This approach opens up new ways for social interaction while enhancing the urban-sonic experiences. In order to achieve this ReSilence has created a methodology that merges design thinking with emergent thinking. Design thinking is a problem-solving framework that centres on understanding user needs and developing creative solutions through continuous iteration and feedback to refine and improve the outcomes. Emergent thinking, on the other hand, focuses on recognizing and leveraging unexpected patterns and insights that arise from complex interactions. It values adaptability and flexibility, allowing solutions to evolve as new information and behaviours emerge. ReSilence's methodology aims to define a collaboration model between artists, scientists and technology experts which gives time and space in the exploration/experimentation phase.

Building upon insights from D2.1, the methodology in D2.2 has evolved to feature four phases: Define, Design, Deploy, and Demo. This evolution responds to the need for a structured and iterative approach aligned with the dynamic nature of artistic and technological cooperation. The pilot use cases (PUCs) (Interpret – addressing the "how?" question) are analysed as means

[1] Collaboration toolkit, STARTS Ecosystem (H2020 CSA, GA No. 824950) Publication date: July, 2020 retrieved June 19th 2023 https://starts.eu/wp-content/uploads/starts-toolkit-13july2020.pdf

for tackling specific challenges (Vision – addressing the "what?" question), developing prototypes, followed by testing and evaluation.

In the collaboration between the artists and the consortium members, a strategic integration of at least two distinct languages occurs, facilitating the synthesis of creative expression and technological innovation. Artists communicate through the languages of art, utilising sensory, metaphorical, symbolic and emotive elements to convey their concepts and narratives. Conversely, consortium partners delineate and operate within the framework of technical language, employing algorithms, data structures and principles to develop functional solutions. Through this partnership, they encounter challenges, deploying research, experimentation and testing to evolve their artistic concepts. The consortium offers resources and expertise to catalyse the realisation of artistic endeavours. Together, they navigate the intersection of art and technology, delivering immersive experiences.

In this methodology, the residencies begin with a defined structure. The timeline is managed to accommodate artists with varying residency durations – some with 12-month residencies (Figure 1) and others with 18-month residencies (Figure 2), and occasional exceptions for artists with different durations. Time is allocated accordingly to ensure equitable participation and to facilitate the collaborative process. The methodology diagrams serve as a visual roadmap outlining the different languages spoken by tech experts and artists. These graphical representations illustrate the key points of intersection where collaboration occurs during all the phases of the project. Technology, science and art engage in a dynamic dialogue, ensuring the transformative power of the collaborative process, that leads to the realisation of impactful outcomes.

DEFINE (synthesise the questions to be addressed): In the initial phase, the focus lies on defining the questions to be addressed throughout the residency period. Artists and consortium partners jointly identify and synthesise them, ensuring alignment between artistic vision and technological feasibility. This phase lays the foundation for the subsequent stages by establishing a clear plan for exploration and experimentation.

DESIGN (ideate and co-design art-driven experiments): Following the definition phase, specific requirements and challenges are identified, guiding the design phase. Artists and consortium partners engage in ideation and co-design processes to conceptualise innovative experiments that integrate artistic expression with technological innovation. This phase prioritises creative brainstorming and problem-solving, leading to the development of experimental prototypes and project plans.

DEPLOY (artistic practice and scientific analysis): With the experimental designs finalised, the focus redirects to the deployment phase, where artists immerse themselves in artistic practice, while consortium partners conduct scientific analysis. Artworks should be brought to life, while consortium partners gather data, develop experiments and analyse results.

DEMO (assessment trials and demos): As the residency period comes to a conclusion, the emphasis shifts to assessment trials and demos. Artists showcase their works-in-progress, allowing for feedback and evaluation from consortium partners and stakeholders. This phase serves as a critical opportunity to assess the feasibility, functionality and impact of the artistic experiments, informing further refinements and iterations.

After the end of the residencies, exhibition, evaluation and documentation provide opportunities for the public dissemination of outcomes and the assessment of the project's overall impact and success. The timeline ensures that these activities are seamlessly integrated into the residency process, providing a structured framework for coordinated ventures.

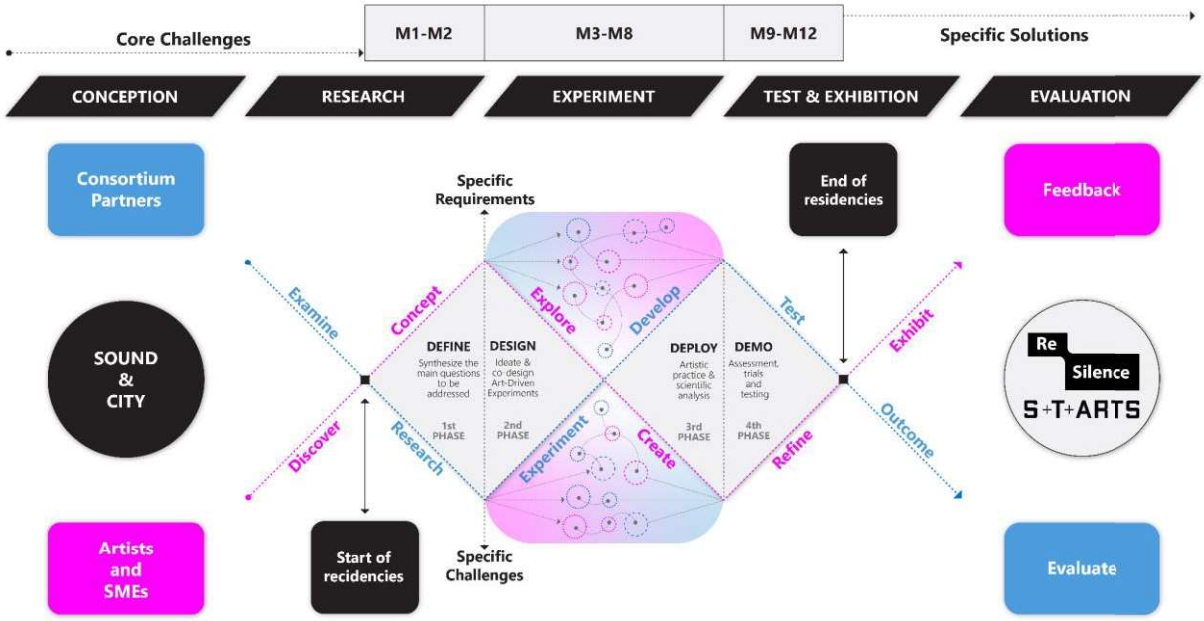

Figure 3: ReSilence methodology diagram (12M residency)

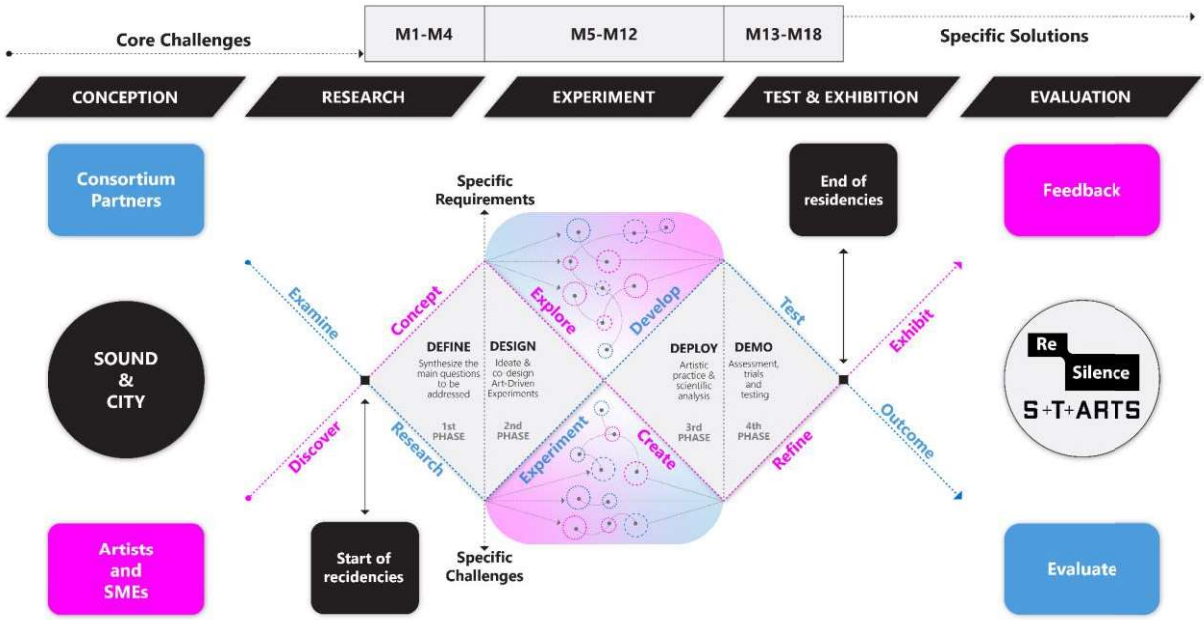

Figure 4: ReSilence methodology diagram (18M residency)

3.3 **Potential stakeholders and user groups**

In deliverable D2.1, we identified focus groups as potential stakeholders and contributors to the development and implementation of artistic projects. In this deliverable, while retaining the analysis of the first focus group as described in D2.1, we will refer to the three initial focus groups of: architecture professionals, performing art curators, and artists from the Open Calls, as potential stakeholders. In this deliverable we analyse and distinguish as user groups the targeted users that the artists are intending to engage with.

3.3.1 **Visitors and audiences**

Most artists prioritise engaging with their direct visitors and audience, each focusing on the distinct challenges outlined at the beginning of their project. Their primary objective revolves around evaluating the impact on audience guidance, facilitated by apps that gather insights into audience engagement as well as behavioural patterns within immersive environments. Additionally, artists will seek to understand and examine the public's response in the integration of advanced AI technologies into the artistic experience. While other artists seek to evoke and evaluate emotional responses, whether by connecting visitors with their internal sounds or by assessing the success of installations in enhancing empathy and fostering engaging experiences.

3.3.2 **General public**

On the other hand, numerous artists are striving to actively engage people within urban environments. They are leveraging apps and state-of-the-art technologies as means of engagement. One project envisions the creation of a system aimed at enhancing safety of pedestrians in urban spaces. In different cases artists aim to measure the effects of stadium fan dynamics and their influence on its broader urban surroundings at a city scale. At a similar scale another artistic project envisions fostering public collaboration and community building. Through innovative approaches and interactive installations, these projects aspire to reshape urban experiences, promote safety, and encourage community participation in shaping the public realm.

3.4 **Workshops and webinars**

Through a series of webinars and workshops, ReSilence facilitates the exchange of knowledge and insights between artists, technology providers, scientists and researchers. These sessions are designed to promote mutual understanding and collaboration by providing a platform for each side to comprehend the methodologies and perspectives of the other. Incorporating multidisciplinary approaches into the dialogue, ReSilence ensures that scientific advancements are integrated into the creative process and related to innovation at the intersection of art and technology.

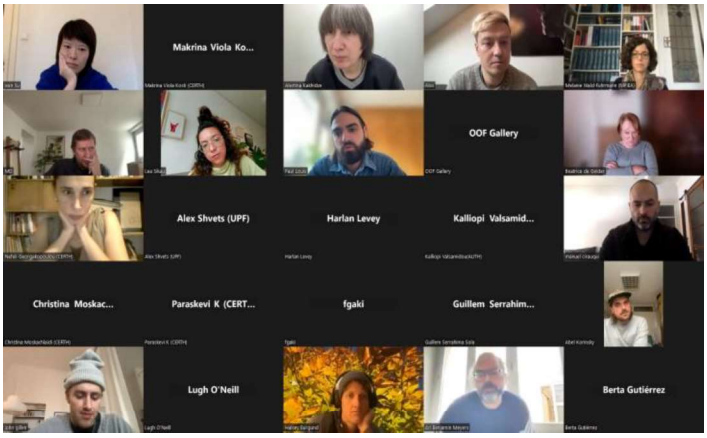

Figure 5: Screenshot of the second online meeting with the artists

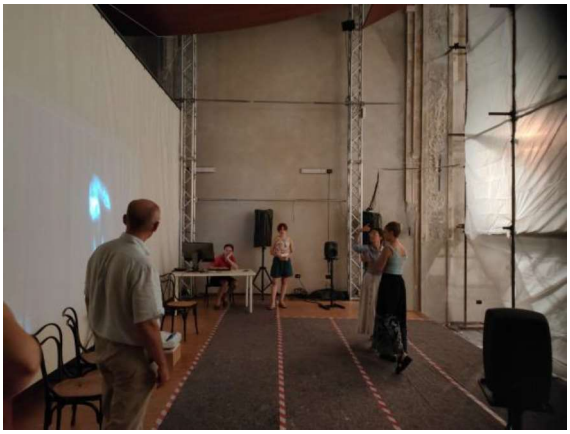

Figure 6: Photos from the first plenary meeting in Genoa

3.4.1 **Second online meeting with the artists**

On Friday, November 3rd, 2023, at 12:00 pm CET, the second online meeting convened the selected artists from the second ReSilence Open Call. The session brought together 9 accepted artists, SMEs and consortium members. Participating type A artists included Guillem Serrahima, Abel Korinsky, Lea Luka Tiziana Sikau, the collaborative team of Wen Liu and Alexander Hackl and Kakhidze Alevtyna. Additionally, type B artists were present alongside their collaborating SMEs, including Lugh Caoilte O'Neill and Temporary Pleasures LTD, Marcin Waldemar Dudek, Lieven Bertels, Mark Burman and OOF Gallery, Paul Hans Maximilian Louis and Impulse Audio Lab GmbH and Ari Benjamin Meyers & Halsey Solutions LLC.

Following the introductions by CERTH, the project coordinator, the consortium members were presented. The agenda outlined the schedule for the meeting, ensuring an organised and productive discussion. Each artist had a 10-minute slot to present their project, which was followed by a brief discussion. The meeting concluded with a discussion about the next steps and subsequent meeting to maintain progress. The online meeting was recorded for those who were unable to attend.

3.4.2 **Fundamental Research curatorial meetings for project development**

Fundamental Research (FR) and Manuel Cirauqui, the curator of ReSilence's final exhibition, have organised individual meetings with the artists to encourage smaller group discussions and collaborations with chosen project partners. The aim is to gain a deeper understanding of the artists' projects and facilitate suitable collaborations within the consortium.

The first round of these online studio visits and curatorial feedback took place from February 5th to 10th, 2024, with a second round having occurred in early April. Artists were introduced through initial calls and provided ongoing support and connections to both consortium and external partners as needed. Each artist or group of artists participated in hour-long online studio visits. During these visits curatorial feedback was provided, practical questions were answered and artists were assisted in developing roadmaps for the next phases of research.

A dossier detailing past work and ReSilence work intentions, along with transcripts of each conversation, was compiled. Subsequent to these meetings, the curatorial team remains in contact with each artist via email and phone calls. The curatorial team also updates the consortium on progress toward the eventual exhibition and venue. These interactions with the artists occur approximately every 8 weeks, allowing artists time to advance their projects before receiving further feedback.

3.4.3 **Art-tech monitoring**

Meetings between the artists and selected project partners play a vital role in supporting art-tech collaborations within the ReSilence project. These sessions bring together diverse perspectives from both the artistic and technological fields and facilitate the integration of innovative artistic concepts with technological expertise. Through collaborative dialogues and brainstorming, via emails and online sessions, artists and project partners identify opportunities to leverage technology in novel ways.

Additionally, artists are tasked with completing progress reports with a form that ensures clarity across all project phases. The artists can complete the fields that cover essential aspects related to their current phase and fill in the remaining fields at a later time. These reports include the following sections:

1. Project overview, where artists can highlight the key accomplishments and focus areas,
2. Main challenges to be addressed, encompassing research questions, collaborations in art-driven experiments and presenting their outcomes,
3. Exhibition and dissemination, describing art-driven stakeholder engagement and strategies for dissemination,
4. Evaluation process to measure the project’s effectiveness.

These interactions not only stimulate the development of innovative projects but also foster a culture of collaboration and interdisciplinary exchange, driving forward the collective vision of ReSilence.

3.4.4 First plenary meeting

The first plenary meeting was held in Genoa on July 20–21, 2023, marking a significant milestone in the ReSilence Open Call project. Organised by UNIGE / Casa Paganini-InfoMus, the meeting brought together selected artists and consortium members to delve deeper into the next steps of the process.

On the first day of the meeting, both the consortium and selected artists participated. The meeting began with a welcoming address from UNIGE officials, followed by a project presentation and press conference led by CERTH. Demos were showcased, engaging all attendees. The meeting explored use case scenarios and requirements. Data collection requirements and dissemination strategies were also discussed, emphasising the collaborative nature of the project. Artists also had the opportunity to present their work, setting the stage for further discussions.

The second day commenced with CERTH providing the consortium with a summary of the discussions from the previous day. Project progress and management (WP1) were reviewed, followed by discussions on the other work packages, including art-driven experiments and societal needs (WP2), ethics requirements (WP8), AI-based interactive technologies (WP3), technologies for soundscape experience assessment (WP4), art-driven experimentation toolkit development (WP5), use case scenarios and evaluation (WP6) and dissemination/exploitation (WP7). The SB meeting also took place. The meeting concluded with a summary of actions, outlining deliverables, next steps and future meetings.

The plenary meeting offered a forum for discussions, brainstorming and sharing of ideas. Artists presented their progress since the initial online meeting and received valuable feedback. Through workshops, breakout sessions and networking opportunities, the meeting aimed to enhance the overall development of each project.

3.4.5 Second plenary meeting

The second plenary meeting took place in Barcelona on March 21–22, 2024. Hosted by Pompeu Fabra University, the meeting assembled selected artists and consortium members.

On the first day, the meeting featured extensive discussions across the work packages, including project progress and management (WP1), art-driven experiments and societal needs (WP2), AI-based interactive technologies (WP3), technologies for soundscape experience assessment (WP4), art-driven experimentation toolkit development (WP5), use case scenarios and evaluation (WP6) and dissemination/exploitation (WP7). The meeting provided the consortium with the opportunity to summarise required actions, assign responsibilities, set deadlines and compile a to-do list. Additionally, it addressed the next set of deliverables and the scheduling of the next meeting. The day also included the SB meeting.

The second day of the plenary meeting started with a welcome address and project presentation led by CERTH to both the consortium partners and the artists. A session

dedicated to S+T+ARTS residencies talk was held and discussions on dissemination and evaluation highlighted venues for exhibition scouting and addressed open questions and issues. The day continued with artists' presentations, where Caroline Claus, Gustavo Maggio, Wendy Chua, Joyce Koh (collective), Guillem Serrahima, Lea Luka Tiziana Sikau, Wen Liu, Alexander Hackl (collective), and Paul Hans Maximilian Louis shared insights into their respective projects. Side meetings between the artists and selected project partners in smaller clusters allowed for focused dialogues and effective collaboration. The day concluded with a presentation on ethics guidelines in research and a comprehensive summary of actions, ensuring alignment and progress towards project objectives.

4 USE CASE SCENARIOS

As already analysed in D2.1, Figure 7 presents a structured overview of the primary challenges associated with the within the Urbanism/Mobility sector in relation to soundscapes. It identifies the key individuals or collectives (listed under "WHO?") to tackle each challenge, along with their specific projects or research themes (under "WHAT?). Additionally, it defines the collaborative partnerships (listed under "HOW?") that will be employed to approach these challenges.

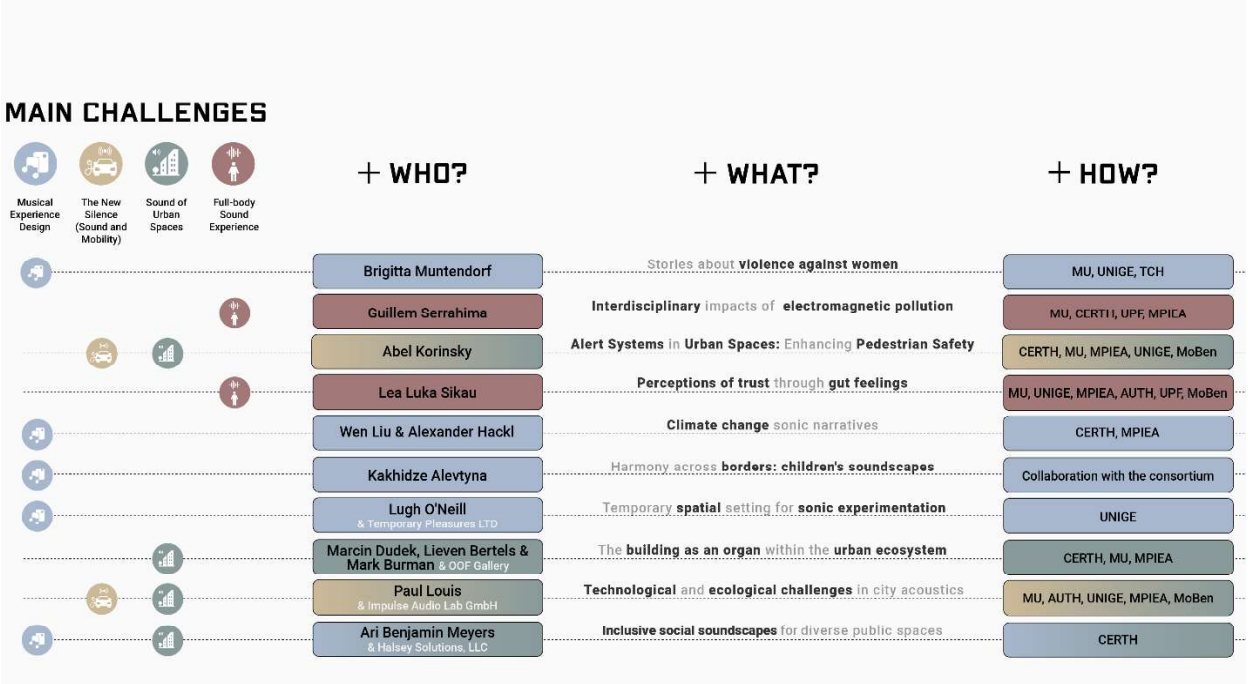

Figure 7: Diagram showing primary challenges

A more detailed description of the challenges that each artist is working on can be found in the following section.

4.1 PUC1 – Musical experience design

4.1.1 Core challenges

The four projects addressing this use case examine how emerging technologies have the potential to redefine conventional music experiences and performances by incorporating technology-enabled audience interaction. The objective is to generate music and dance performances, and interactive environments that break away from the conventional. Collaboration among artists, technologists, scientists, architects, and designers is essential to realise innovative artistic visions. Through this core challenge, the goal is to reimagine the connection between performers, audiences and their environments, offering new

perspectives in both physical and virtual music experiences. This approach stems from the notion that the public perception of AI and XR technologies can be positively influenced by thoughtfully integrating these technologies into artistic works.

4.1.2 **Artistic approach: Brigitta Muntendorf**

4.1.2.1 **Sub-challenges / Vision**

One of the central challenges addressed by project HABITAT is the issue of **violence in society**. By allowing the audience to enact various configurations of violence, positioning themselves differently to each other in the space and evoking familiar images of violence. By utilising the latest advancements in digital technology, specifically AI voice clones and 3D audio spatialisation techniques, the project envisions to redefine the roles of both performers and spectators. This innovative approach not only challenges conventional storytelling but also seeks to blur the lines between creator and observer, inviting individuals to engage into a collective entity within the immersive sonic landscape.

Within this ambitious vision lies an exploration of the intersection between art, technology, and human experience. HABITAT aspires to leverage abstract imagery and thematic elements drawn from science fiction literature to provoke dialogue. Audiences will be encouraged to navigate and interpret the sonic narrative landscape, facilitating a deeper understanding of the complexities inherent in human interaction.

4.1.2.2 **Addressing the challenges / Interpret**

The project will work musically on a very differentiated level with immersion in the form of 3D audio. It will utilise special spatial-musical narratives that allow for new forms of musical storytelling. The project will also use artificial voices as singing voices and make the difference between flesh, blood and machine disappear. The project will enable the audience to have a performative role in order to turn the only physicality in the space into a projection surface. The artist is articulating a shared artistic experience based on group intelligence and cooperation to create the various constellations in the space that create temporary communities.

4.1.2.3 **Expected artwork / Prototype**

HABITAT will employ sensory stimuli such as light, sound, text, and spatialisation techniques. Combined, these elements will create a rich and immersive environment where participants can actively shape their own experiences. By integrating AI voice clones and multiple communication channels, the project offers a dynamic platform for artistic expression and audience interaction.

4.1.2.4 **Story / Test**

HABITAT will open to the public at the Ultraschall Festival in Berlin in January 2025 for real-world testing and refinement. Here, the project's creators will assess audience guidance mechanisms and the reception of AI voice clones in a live performance setting. Furthermore, variations of the experience proposed for classical concert and opera stages will offer opportunities to explore different modes of audience participation and storytelling.

4.1.2.5 **Impact assessment / Evaluation**

The primary focus lies on comprehensively assessing HABITAT's impact on audience guidance and behaviour within a technologically immersive environment. The evaluation aims to gain insights into the reception of AI voice clones and the integration of such advanced technologies into the artistic experience. Furthermore, the artist plans to introduce a variant of HABITAT tailored for traditional concert or opera settings, presenting a unique opportunity to assess audience response in contrasting performance environments. By incorporating a hybrid format where a part of the audience actively participates on stage while others observe it from an auditorium, this adaptation aims to explore novel dynamics of spectatorship and interaction within the immersive 3D audio space. Through meticulous observation and analysis, the evaluation aims to provide valuable insights into the versatility and adaptability of HABITAT across diverse artistic contexts.

4.1.3 **Artistic approach: Wen Liu & Alexander Hackl**

4.1.3.1 **Sub-challenges / Vision**

The primary challenge of 'Uncanny Reverie' extends beyond simply addressing climate change—it also seeks to communicate its implications effectively without overwhelming or alienating the audience. The project aspires to create a **musical composition** that resonates deeply with **environmental themes**. By blending artistic expression, AI-generated music, scientific visualisation, and environmental narratives, the project aims to simplify and communicate scientific complexity and enhance public understanding of climate change.

4.1.3.2 **Addressing the challenges / Interpret**

The project envisions the creation of an innovative interactive music concert-exhibition, designed to forge a direct and intimate connection between audiences and environmental data. Through state-of-the-art technological integration, the project aims to translate raw environmental data into captivating and immersive audio-visual experiences. Attendees will not only observe or passively absorb information but will actively participate and transform sensory-rich environments.

4.1.3.3 **Expected artwork / Prototype**

The expected prototype will be a live, interactive AI music generator that creates real-time audiovisual projections and music scores for each musician, based on audience voting data.

An accompanying App facilitates live audience participation and voting, adjusting the performance narratives with each round of votes. Moreover, an AI-generated voice acts as the moderator throughout the performance. The live performance will be played with the following instruments: flute, clarinet, electric organ, percussion, and violin.

4.1.3.4 **Story / Test**

The overall story of 'Uncanny Reverie' is divided into three chapters. Firstly, Theatrical Composition: This composition will be shaped by audience input, an AI generator, a climate-focused storyline, and the original creativity of the artists. This dynamic will result in a unique theatrical experience. Secondly Audience Engagement: The audience will actively shape the performance through live voting and responding to questions using a dedicated App. Real-time data collection and analysis of audience responses will determine the direction of the narrative and trigger subsequent questions, effectively steering the overall storyline. Additionally, voting outcomes decide which pre-composed collage score is next displayed on each musician's iPad, thus influencing the live music dynamically. This interactive system will ensure that each performance offers a unique narrative and musical experience, distinctly moulded by the audience's choices. Lastly Theatrical Climate Storyline: The overarching narrative is centred on climate change, evolving in response to the audience's understanding and choices. This approach will allow the storyline to adapt and reflect the collective input of the audience.

4.1.3.5 **Impact assessment / Evaluation**

During the performance, aggregated interaction data will be collected in order to gather insights into the engagement of the audience. The artists are interested in evaluating the curve of engagement over the duration of the performance. The main questions hereby are to see the learning curve over the first interactions and if interest decreases over the duration of the performance. All collected data will be pseudonymised and communicated as such.

4.1.4 **Artistic approach: Kakhidze Alevtyna**

4.1.4.1 **Sub-challenges / Vision**

Beginning her residency in May 2024, the artist intends to explore the **relationship between colour and sound**, in order to create innovative **sound navigation systems** tailored for the visually impaired. These systems will utilise colour recognition technology to enhance accessibility and independence for individuals with visual limitations.

4.1.4.2 **Addressing the challenges / Interpret**

Through collaborative efforts between artists, scientists, and local youth, innovative methods will be employed to convert colour data into sound, underscoring the key role of sound in portraying environmental and urban attributes. This approach not only fosters creative exploration but also deepens understanding of the auditory dimension in urban spaces.

4.1.4.3 **Expected artwork / Prototype**

The project aims to create soundtracks based on colour data collected by local youth, showcasing the unique sonic signatures of different locations and buildings. Additionally, it seeks to develop sound navigation systems for the visually impaired, enhancing accessibility through innovative use of sound and colour recognition technology.

4.1.4.4 **Story / Test**

The dissemination of the project will involve showcasing results at exhibitions and events in the Netherlands, Belgium, and Ukraine. The engagement of local youth in data collection and the creation of soundscapes will be highlighted, ensuring ongoing collaboration and refinement of the project's outcomes through regular workshops with participants.

4.1.4.5 **Impact assessment / Evaluation**

The evaluation process will assess the impact of the project's outcomes, including the development of sound navigation systems for the visually impaired, the creation of innovative soundtracks based on colour data, and the engagement of local youth in data collection and collaborative workshops.

4.1.5 **Artistic approach: Lugh O'Neill**

4.1.5.1 **Sub-challenges / Vision**

The project aims to develop **spatial formats for music** and other auditory experiences that engage with individuals' sense of self and identity within sonic landscapes. The artists and SME intend to do so by presenting a new format where participants can experience sound and musical events in novel ways, and in which artists are able to create work and diffuse audio in novel settings and formats.

4.1.5.2 **Addressing the challenges / Interpret**

The collaboration between Temporary Pleasure and Lugh O'Neill will lead to the creation of architectural models dedicated to musical works beyond conventional constraints. By undoing the separation between audience and performers, and reintroducing spatial sound, the project aims to foster active audience participation and immersive musical experiences.

4.1.5.3 **Expected artwork / Prototype**

The collaboration will result in the design and creation of a space for versatile musical and auditory experiences – Lugh O'Neill bringing a spatial sound-system and his knowledge of that field, and Temporary Pleasure bringing their expertise in architecture and a team which is prepared for the realisation of such a project. The space will host an artwork by Lugh O'Neill which explores a narrative reflection of the context of the project, introducing topics of spatiality, engagement with acoustic landscape and DIY approaches to music device making and hacking. The space will also host a series of concerts and versatile audio events which will

showcase the broad and multi-disciplinary potential of this novel architecture for spatial music formats.

4.1.5.4 **Story / Test**

The project will involve community engagement in the creation of inclusive and shared physical experiences. The project will hold architectural/spatial sound installations, music events and versatile participatory auditory experiences. A novel design and space for musicians will be presented and performing artists will be encouraged to perform their work within it, adapting to the architecture and diffusing their audio through the spatial sound-system, providing assistance where needed.

4.1.5.5 **Impact assessment / Evaluation**

Audience engagement, behaviour, and feedback will be the primary form of assessment and evaluation of the results. Another key outcome is the artist's ability to engage with and use the new spatial design for the diffusion of their work and the creation of performance. The idea is that space should enable and foster artistic expression which escapes the confines of the formats enabled by existing concert venues, and should allow them to escape the confines of the standard stereo audio format, so another key evaluation will be to measure how successfully that is carried out.

4.2 PUC2 – The New Silence (Sound and Mobility)

4.2.1 Core Challenges

The rise of the industrial revolution led the way to a new era dominated by machinery, sparking a revolution characterised by the motion of mechanics. Within this transformative landscape, the concept of sound design emerged as a user-centric initiative, where functional sounds can evolve into catalysts for artistic innovation. The realm of electric vehicles presents a novel challenge previously unheard of in auditory landscapes, simultaneously offering the vehicle itself as a canvas for dynamic performance art. In such an approach, drivers possess the dual role of composer and performer, shaping the sonic environment as they navigate.

Furthermore, the reflective properties of surfaces play a pivotal role in redefining urban spaces and influencing material choices in construction. Architects and artists delve into the realm of indoor acoustic design, exploring the resonance of sound and its interaction with spatial dynamics. Building upon this knowledge, it becomes imperative to extend such principles to public domains like restaurants, subway stations and train terminals, treating them as potential musical instruments ready for enhancement through deliberate design interventions. The acoustic properties of these environments, including sound absorption and reflection can ultimately shape the overall experience of individuals within these spaces.

4.2.2 Artistic approach: Abel Korinsky (Also PUC 3: Sound of Urban Spaces)

4.2.2.1 Sub-challenges / Vision

“Resonance” focuses on **sound-based information** dissemination and **alert systems for urban spaces**, including mobility. Based on research and datasets, it will simulate an urban environment equipped with ultrasound directional speakers that respond to people's movements and nearby obstacles individually. The project aims to focus on soundscape technology, enhancing safety, reducing noise pollution and providing an immersive audio experience through personalised sound.

4.2.2.2 Addressing challenges / Interpret

In response to the project’s set challenges, "resonance" adopts a proactive approach aiming to address the complexities of urban environments. By leveraging technologies such as ultrasound directional speakers and Open MV AI cameras, the project envisions tackling issues related to safety, noise pollution, and immersive urban experiences. Through the implementation of sound-based information dissemination and alert systems, "resonance" seeks to enhance pedestrian safety by providing personalised alerts and guidance tailored to individuals' movements and specific urban image surroundings.

4.2.2.3 Expected artwork / Prototype

“Resonance” will be presented as an installation, using Open MV AI cameras and LiDAR sensors, providing a safe solution for pedestrians while in a simulated indoor urban environment. The project will use ultrasonic speakers to create directional sound beams that track individuals in space.

4.2.2.4 Story / Test

For the exhibition a surround sound system (Ambisonics) that immerses visitors in a virtual urban soundscape will be used. Imaginary and futuristic renderings/animations are displayed on the walls, demonstrating how information dissemination and alert systems interact with inhabitants and showing an abstract interconnectivity. Cameras (how it is often imagined in dystopian future scenarios) are being replaced through speakers which are strategically placed throughout the space, serving as a field of information and alert systems to create a safer urban city space.

4.2.2.5 Impact assessment / Evaluation

The evaluation process will focus on the effectiveness of how to address, alert, and inform people in urban spaces. The sound system will provide personalised information as individuals approach obstacles or interact with others nearby. Technically, audience members will be tracked and followed by sound. The goal is to create an immersive experience that reflects the atmosphere of a futuristic cityscape. Within this the main impact is a re-thinking of urban space and its sound-based information dissemination and alert systems for urban spaces, including mobility

4.2.3 Artistic approach: Paul Louis (Also PUC 3: Sound of Urban Spaces)

4.2.3.1 Sub-challenges / Vision

The project will leverage IoT technologies, sensors, and cutting-edge sound algorithms to **orchestrate a symphony of connectivity among vehicles** (orbs within installations). By facilitating seamless communication and operation within specific frequency ranges, the initiative envisions cultivating a harmonious acoustic environment within vibrant urban landscapes. Through this innovative integration of technology, the project aims to mitigate the auditory cacophony of cities while promoting more pleasant urban sounds instead.

4.2.3.2 Addressing the challenges / Interpret

By collaborating with project partners UNIGE and AUTH, the project will develop a prototype algorithm and design the accompanying orbs. By fusing technological and ecological mindfulness, the initiative adopts a holistic approach to urban sound management. Through this multidisciplinary collaboration, the project seeks to lay the groundwork for a transformative paradigm shift in urban soundscapes, guided by principles of innovation, sustainability, and societal well-being.

4.2.3.3 Expected artwork / Prototype

The project envisions the creation of a biomimetic network sound algorithm, brought to life through immersive and interactive experiences tailored for diverse sectors. From captivating art installations to cutting-edge technological showcases, from musical compositions to innovative automotive applications, and from urban cityscapes to futuristic soundscapes, the project's prototype promises to captivate and inspire audiences across many domains.

4.2.3.4 Story / Test

The project's narrative will unfold in several renowned events such as ZKM in Karlsruhe, Sonar in Barcelona and the Science Festival in Genoa (Casa Paganini). Establishing partnerships with local businesses and organisations, the initiative invites participants to immerse themselves in transformative experiences, blurring the boundaries between art and technology.

4.2.3.5 Impact assessment / Evaluation

Prior to the inaugural installation, a test at a designated venue will be conducted as an experiment showcasing the soothing and health-promoting impact of its sound algorithm, validated through rigorous scientific methodologies in collaboration with MPIEA. Additionally, tracking of visitor engagement, solicitation of feedback, and analysis of social media interactions will serve as vital tools for assessing the exhibition's impact and reception.

4.3 PUC3 – Sound of urban spaces

4.3.1 Core Challenges

In urban areas, noise pollution is a significant concern that affects the well-being of its residents and visitors. As cities continue to grow and become more crowded, finding ways to manage and shape the soundscape of such environments has become increasingly important. While there's been growing interest in incorporating soundscape design into city planning, there's still a need for effective methods that address noise pollution. This involves developing innovative tools and techniques that architects and urban designers can use to create more pleasant and harmonious auditory environments.

The primary challenge in this use case lies in creating methods and tools that empower architects and urban planners to combat noise pollution, placing a special focus on concepts that draw inspiration from sound artists. Such an approach will involve the use of simulations and prototypes deployed in localised areas of urban landscapes, initially engaging a select group of individuals and progressively broadening to include wider cityscapes and communities.

4.3.2 Artistic approach: Marcin Dudek, Lieven Bertels & Mark Buman

4.3.2.1 Sub-challenges / Vision

The project intends to analyse **football match chants as a social phenomenon**, exploring the collective dynamics of stadium crowds. It aims to investigate the relationship between audience sound production and emotional response. The project will harness data from large-scale events, such as football matches in stadiums, to comprehend and manipulate the intricate acoustic environments of urban landscapes. With a focus on understanding crowd dynamics and emotional response, the vision extends to a holistic exploration of the stadium's impact on its urban surroundings. This involves delving into the interplay between human movement, emotional responses, and architectural structures, aiming to transform soundscapes into tangible and interactive experiences.

4.3.2.2 Addressing the challenges / Interpret

Through the collaboration between the Steps and Marches Collective the project will conduct workshops and record samples at Tottenham Hotspur Stadium. By measuring vocal and physiological reactions, the team will examine the transformation of individuals into a unified crowd and map emotional responses to match events. Through detailed analyses of crowd patterns and emotional cues, the project seeks to gain insights into human behaviour and stadium dynamics. Leveraging sound analysis techniques from CERTH, the team envisions transplanting sound into objects, offering novel ways to perceive and interact with the urban environment.

4.3.2.3 **Expected artwork / Prototype**

The project will produce sound recordings and VR simulations of crowd chants, exploring their impact on individuals. Data, combined with field research at Tottenham Stadium, will inform artistic reflections on the social implications of stadium architecture in relation to crowd behaviour. The anticipated outcome will include immersive and interactive sonic experiences that transcend traditional boundaries of perception. By sonifying human movement and emotions, the project aims to build a narrative that resonates with the choreography of fans and the pulse/vibrations of the stadium. Through innovative use of microphones and strategic positioning, the team seeks to capture the diverse soundscape of the stadium, from the vibrations of steel beams to the absorption of sounds by glass fences. Ultimately, the prototype envisions to provide a comprehensive understanding of the stadium's acoustic anatomy and its broader impact on the surrounding urban environment.

4.3.2.4 **Story / Test**

Dissemination will occur through OOF Gallery's Winter 2024 exhibition program, located within Tottenham Hotspur Stadium. The gallery's extensive network and in-stadium promotion will ensure widespread visibility. The project will perform rigorous testing at the Tottenham Hotspur Stadium, a venue vibrating with the energy of approximately 65,000 football fans. Recording sessions, overseen by Mark Bergman, will capture the crowd behaviour and its impact on stadium architecture highlighting the intricate relationship between sound, emotion, and space. Through discussions with stakeholders and considerations of research ethics, the project navigates the complexities of data collection, ensuring respect for privacy and regulatory compliance. As insights emerge from the recordings, the team will translate raw data into compelling narratives, exploring the symbiotic relationship between stadium activities and its surrounding urban environment.

4.3.2.5 **Impact assessment / Evaluation**

Following the data collection phase, the project will undergo an evaluation process to assess its effectiveness and societal implications not only between the crowd and the stadium but also with its surrounding urban environment. Analysis of crowd patterns, emotional reactions in combination to their impact on architectural components and materials will offer valuable insights into urban soundscapes, human behaviour and community building inside and outside of the stadium.

4.3.3 **Artistic approach: Ari Benjamin Meyers (Also PUC 1: Musical experience design)**

4.3.3.1 **Sub-challenges / Vision**

“Invisible choir” involves breaking down the challenge of redefining urban sound design into manageable components. The aim is to explore how technology, such as AI and XR, can facilitate new forms of interaction in public spaces. It envisions creating immersive sonic experiences that transcend traditional gallery spaces, reaching a diverse audience. The project

aims to utilise **AI and participatory composition** to **foster collaboration** between artists, the public and machine intelligence.

4.3.3.2 **Addressing the challenges / Interpret**

To meet these objectives, the project will use technical infrastructure necessary for both indoor and outdoor exhibitions. This includes setting up directional speaker arrays, providing recording booths for participant input, and AI models for audio analysis and generation. By conducting technical experiments and collaborating with experts in AI, music analysis, and neuroscience, the project seeks to explore novel approaches to sound creation and audience engagement.

4.3.3.3 **Expected artwork / Prototype**

The anticipated outcome is a series of interactive installations that intertwine art, technology, and human creativity. By incorporating AI-driven audio classifiers, pattern recognition algorithms, and voice cloning techniques, the project seeks to create dynamic compositions that evolve in response to participant input. The use of web-based platforms and mobile applications expands the reach of the project, allowing for widespread audience engagement and feedback collection.

4.3.3.4 **Story / Test**

The project's narrative will be articulated through experimentation and collaboration with experts in various fields. From AI-driven audio analysis to participatory composition workshops, the project will explore the intersection of art, technology, and human perception. By engaging with stakeholders and assessing audience feedback, the project iteratively refines its approach, aiming to create meaningful connections between participants, artwork, and machine intelligence.

4.3.3.5 **Impact assessment / Evaluation**

The project aims to reach a broad audience, including museum visitors and smartphone users outdoors through apps. Through post-experience questionnaires and technical assessments, the project will evaluate the success of its installations in fostering collaboration, increasing empathy, and delivering consistent and engaging experiences.

4.4 PUC4 – Full-body sound experience

4.4.1 Core Challenges

This use case delves into the transformative potential of vibration and tactile sensation in reshaping how we perceive both sound and visual stimuli. It highlights the importance of adopting a holistic approach to music and sound, one that engages not just the ears but the entire body and explores the concept of transforming physical objects into dynamic soundscapes and tactile experiences, drawing inspiration from artists such as Christine Sun Kim.

Central to this exploration is the focus on individuals with hearing or visual impairments, seeking to repurpose technology to enhance sensory capabilities. By bypassing the impaired sensory organs, such as the eyes or ears, the aim is to redirect and redistribute sound and visual information through alternative pathways. Expanding on this vision, the project aims to develop innovative technologies and techniques that utilise vibration and tactile feedback to alternatively convey both auditory and visual content. Through interdisciplinary collaboration and experimentation, the goal is to create immersive environments where individuals can engage with sound and visual elements in novel and meaningful ways.

4.4.2 **Artistic approach: Guillem Serrahima (Also PUC 3: Sound of urban spaces)**

4.4.2.1 **Sub-challenges / Vision**

In urban landscapes, there is a growing concern regarding the spread of electromagnetic frequencies, a phenomenon accompanied by a corresponding surge in information and noise. This escalating presence poses multifaceted challenges, not only for the human population but also for non-human species in these environments. The overwhelming amount of electromagnetic signals and information overload can lead to sensory overload and cognitive strain, potentially impacting the well-being of individuals and ecosystems alike. Moreover, there is a heightened awareness of the potential hypersensitivity of various species to these artificial frequencies, raising questions about their broader ecological implications. The correlation between electromagnetic exposure and health challenges, such as disorientation and physiological disruptions, highlights the urgency of addressing this issue. Furthermore, the interference caused by these frequencies presents a significant obstacle to scientific research, particularly in fields reliant on precise listening technologies like radio astronomy. “Ubiquitous Noise” aims to explore the **psychosomatic and biological impacts of electromagnetic pollution**.

4.4.2.2 **Addressing the challenges / Interpret**

Through the collaboration with scientists the project seeks to deepen the understanding of the impact of artificial electromagnetism, striving to clarify its effects on urban residents who exhibit sensitivities to electromagnetic exposure. Moreover, it seeks to engage experts in discussions regarding the potential influence of electromagnetism on animal and bird behaviour. Through these interdisciplinary efforts, the aim is to construct a comprehensive understanding of how this phenomenon interacts with and shapes our urban environments.

4.4.2.3 **Expected artwork/Prototype**

The artwork will be presented as a multi-channel audiovisual installation designed to captivate the spectator's senses. It aims to shed light on the intricate relationship between heightened synchronisation and increased disorientation. The installation aims to capture instances of hypersensitivity, providing a clearer understanding of the profound impact of artificial electromagnetism on human perception and non-human experience. The plan

includes creating a movie with different concepts each time, with sound driving the montage and determining the sequence of visuals. By utilising abstract sounds, correlations can be drawn to illustrate the impact of electromagnetic pollution in a nuanced manner.

4.4.2.4 **Story / Test**

Collaborating with scientists from the Green Bank Observatory who conduct research in an environment free of artificial electromagnetism will clarify the impact of the absence of artificial electromagnetic frequencies on scientific research. Simultaneously, real-life instances of reactions and sensitivities to artificial electromagnetism among urban residents will be examined through surveys conducted in European cities. The project will use three datasets: 1. data from the astronomical observatory, 2. existing collected data, 3. data from experiments with people with disorders. Additionally, research efforts will extend to investigating potential effects on non-human species, drawing upon expertise from zoologists, ornithologists, and entomologists. This approach aims to deepen our understanding of multifaceted interactions between artificial electromagnetism and various aspects of urban life, informing strategies for mitigating its potential adverse effects and fostering healthier environments for both human and non-human inhabitants.

4.4.2.5 **Impact assessment / Evaluation**

The project envisions to raise awareness about the necessity for regulating exposure to artificial electromagnetic noise pollution in both public and private spaces, the assessment and evaluation process will involve measuring the effectiveness of the project's efforts in igniting tangible change. Furthermore, it will explore whether individuals reproducing such sounds also experience suffering.

4.4.3 **Artistic approach: Lea Luka Sikau**

4.4.3.1 **Sub-challenges / Vision**

Trusting our guts means being in tune with our intuitions, this project envisions **reconnecting with our innate intuitions** and bodily sensations, recognizing the silent guidance they offer in navigating our everyday lives. Despite their significance, we remain inattentive to their voices leading to a disconnect from our own bodies. The project explores the varied auditory expressions of **intestinal sounds** through their vibrations, tones, smells, and visual representations.

4.4.3.2 **Addressing challenges / Interpret**

To address these questions, the project will employ sensor technologies and motion capture to create a multisensory and interactive installation. The installation, resembling a biomorphic sculpture made of inflatables, will facilitate real-time, dialogical communication centred on gut sensations. By allowing audiences to touch and interact with the sculpture, the installation will provide an immersive experience of the body's soundscape, enhancing the connection with internal bodily processes.

4.4.3.3 **Expected artwork / Prototype**

"The gut rehearses to tell you something," will be a multi-sensory, interactive fountain sculpture. This innovative piece will give voice to intestinal motions when interacted with, transforming typically muted bodily experiences into tangible, audible expressions. Through the integration of inflatables and water layers, the installation will invite audience members to engage in a network of multi-organ communication and tactile entanglements, offering a unique perspective on the inner workings of the body.

4.4.3.4 **Story / Test**

The project aims to cause a shift in audience perceptions regarding their internal bodily relationships while destigmatizing gut sounds. It plans to conduct a study at the MPIEA ArtLab and host a prototyping session for the interaction design at Casa Paganini.

4.4.3.5 **Impact assessment / Evaluation**

The artist has conducted several exploratory studies to assess how individuals respond to gut sounds and bodily sensations. Through surveys, it was found that a significant portion of participants noticed their gastric signals after listening to gut sounds for a brief period. Additionally, emotions such as shame, disorientation, and comfort were commonly associated with gut sounds, highlighting the complex interplay between bodily sensations and emotional responses. These findings will inform the ongoing development and assessment of the project and its potential impact on audience perceptions and attitudes towards bodily experiences.

5 CONCLUSIONS

This deliverable presents a refined and expanded version of the pilot use cases and the art-driven methodology, building upon the framework established in D2.1. The methodology, evolving from the first open call to the present, addresses challenges related to facilitating new forms of participation and creative engagement in live performances, whether on-site or remotely. Moreover, sound design is approached as a user-centric experience, considering aspects of connection, communication, and navigation in urban mobility, as well as the psychological and behavioural consequences of the acoustic qualities of cityscapes. Also, full-body experiences in music and sound are explored to find new, technology-supported ways for everyday inclusion and aesthetic experiences. Collaborative efforts aim to further elaborate the PUC scenarios and shape future development based on user requirements.

Additionally, D2.2 delves into the role of art in alleviating scepticism and advancing AI and XR technologies, fostering trust among the public. By offering interactive and immersive experiences through artistic installations or performances utilising AI and XR technologies, as well as by providing audiences with co-creation and artistic agency, technology-enhanced artworks can promote a more positive attitude towards these innovations. Furthermore, the creation of focus groups and workshops, along with the discussion on each PUC's core challenges and artistic vision, illustrates the diverse approaches embraced in this project. Through ongoing interactions between consortium members, artists, and technology experts, the use case scenarios are expected to be enriched and refined.

Lastly, D2.2 highlights the significance of various meeting types, such as the online meetings with artists, webinars on several topics, fundamental research curatorial meetings, and plenary meetings, in facilitating collaboration, sharing insights and addressing project milestones. These sessions underscore the commitment of ReSilence towards achieving its objectives and stimulating innovation at the intersection of art and technology.

6 REFERENCES

Brey, P., & Dainow, B. 2023. *"Ethics by design for artificial intelligence",* AI and Ethics, p.1-13.

Gillespie, N., Lockey, S., Curtis, C., Pool, J., & Akbari, A. 2023. "Trust in artificial intelligence: A global study", The University of Queensland & KPMG Australia: Brisbane, Australia.

Leslie, D., Rincon, C., Briggs, M., Perini, A., Jayadeva, S., Borda, A., ... & Fischer, C. 2024. *"AI Ethics and Governance in Practice: An Introduction"*, arXiv preprint arXiv:2403.15403.

A. APPENDIX

Collaboration toolkit, STARTS Ecosystem (H2020 CSA, GA No. 824950) Publication date: July, 2020 retrieved June 19th 2023 https://starts.eu/wp-content/uploads/starts-toolkit-13july2020.pdf