MANAGING LARGE, OPEN-AIR EVENTS IN THE CITY
TECHNOLOGY SOLUTIONS FOR NOISE CONTROL, SECURITY AND USER EXPERIENCE
The MONICA Project is a large-scale demonstration of how cities can use IoT technologies to meet sound, noise and security challenges at big, open-air cultural and sport events, which attract and affect many people. Several applications are deployed at large events in six European cities from 2017 to 2020, involving more than 100,000 application users in total, out of which 10,000 will participate in the evaluation process.

**ENHANCE SOUND PERCEPTION AND REDUCE NOISE**

Sound zones are established at open-air concerts to enhance the sound experience for concertgoers and performers while at the same time mitigating the noise for neighbours. The sound levels are displayed for monitoring and control purposes.

People attending the concert or affected by it can also monitor the sound levels on their smartphone, whether it reflects a wish to move to a quieter spot or to assess compliance with noise regulations.

Internet of Things: Advanced wireless technologies connecting physical devices to the internet and making it possible to collect and exchange data and perform actions. Devices used in MONICA include smart wristbands, video cameras, loudspeakers, airships, smart glasses and mobile phones.
Applications involving the use of cameras, tethered airships and wearables will enable security personnel to capture real-time data about crowd size and density for the purpose of analysing, predicting and handling emerging incidents, while being compliant with personal privacy provisions and rights.

An operational picture of the security situation is displayed on a graphical user interface, notifying the staff of any unusual behaviour, providing decision support and enabling timely information-sharing between security staff members.

Communication to customers, crowds and citizens is improved by the use of mobile apps and IoT wristbands with value-adding features, enabling people to interact with and locate each other, informing visitors of the best place to park, the best way out or the bars with the shortest queue, and guiding participants to the nearest exit in case of an emergency. General data such as on sound levels are made accessible as open data on the hosting city’s websites for citizen engagement and innovation.

**STRENGTHEN CROWD SAFETY AND SECURITY**

Due to its central city location with residential neighbours, several challenges will be addressed in regard to improving sound management inside the park perimeter as well as security matters related to improving crowd management and safety.

**SIX CITIES, SIXTEEN EVENTS, SEVERAL APPLICATIONS**

**COPENHAGEN**

Tivoli Gardens is a world-famous amusement park and pleasure garden located in Copenhagen. The focus in the MONICA Project is on four out of +20 Friday Rock evening concerts which are held during the summer season, attracting a total of 500,000 guests.

**BONN**

Two major cultural events have been selected by the City of Bonn for trialling MONICA solutions. The first is the open-air festival *Rhine in Flames* with up to 90,000 visitors per day. With three performing stages, the primary aim is to achieve the best sound experience for the visitors and performers with due consideration of the neighbours. The second festival is the five-day *Pützchens Markt*, bringing together 1 million visitors in a residential area with narrow streets. Here, monitoring of crowd movement and prevention of critical situations is key.
HAMBURG

The Hamburg Port Anniversary and the DOM Festival are two well-attended open-air events that have been celebrated for years. During the Anniversary of Germany’s largest port, more than 1 million visitors join the exciting atmosphere generated by ships from all parts of the world. Besides the Open Ship attraction, the Anniversary offers live music, funfair and food stalls along the waterfront of the River Elbe. Hamburger DOM is Northern Germany’s biggest funfair with 7-10 million annual visitors during the 91 DOM days. The funfair takes place in the premises of the Heiligengeistfeld with a total of 251 attractions. For both events, crowd and noise management are important issues faced within MONICA.

LYON

Lyon hosts the famous light festival, Fête des Lumières, where the residents of Lyon celebrate the Virgin Mary for four days and the city fills up with performers and millions of visitors in the streets of the city centre. The second event involved in MONICA is Nuits Sonores: a huge electronic music festival which brings together DJs from France and from all over the world. For five days there are concerts, performances and shows in Lyon. Interest is in improving the tools for information sharing between security personnel and reducing noise complaints from citizens.

TURIN

The focus of Turin is twofold: a first happening is the Movidia nightlife in the San Salvario District with bars, restaurants, shops and lively events. The aim here is to strike a balance between amusement, security and quality of public space.

The second happening is the summer festival Kappa FuturFestival that takes place every year with concerts and events in a residential area, attracting around 20,000 people with consequent problems of crowd management, security and noise propagation.

LEEDS

The iconic Headingley Carnegie Stadium in Leeds is home to Yorkshire County Cricket Club and Leeds Rugby, in 2016 attracting 158,000 and 258,000 visitors, respectively. In MONICA, the Stadium is looking to enhance the visitor experience at its matches through improved communication and day-to-day management of crowds.

THE TECHNICAL CONCEPT

To support the applications, MONICA deploys a cloud-based platform, wirelessly connecting and handling several IoT-enabled devices whether fixed, worn or moved around. Control systems monitor the data collected and can perform automated actions based on the information gathered. The platform also consists of components which analyse data and detect critical incidents, supporting operators in assessing the situation and making decisions. A strong toolbox for data security and trust management complements the platform.

The platform will be able to support multiple IoT applications for a smarter living and has a wide usage potential. Based on open standards and architectures, the platform can be reused across multiple use cases with only the application layer being specific to the deployment setting.

Features include:

- Integration of many different sensors, actuators, networks and data
- Open standards, protocols and architectures as well as Open Source
- Massive scale operation, demonstrated by 10,000 simultaneous end users
- Cost-efficient wearables and legacy smartphones
- Data Security, Privacy and Trust Framework, ensuring full data protection and privacy

MONICA WILL DEMONSTRATE THREE ECOSYSTEMS WHICH INVOLVE THE ENTIRE CHAIN OF STAKEHOLDERS AND THEIR NEEDS:

SECURITY ECOSYSTEM
Applications that can be used to monitor and manage security before, during and after an event

ACOUSTICS ECOSYSTEM
Applications that help monitor and manage the sound before, during and after a performance

INNOVATION ECOSYSTEM
Applications for public engagement and innovation based on open data and development tools
29 PARTNERS, NINE COUNTRIES
Fraunhofer Institute for Applied Information Technology, Germany
City of Lyon – Acoucit, France
Atos IT Solutions and Services, Slovakia
Briel & Kjaer Sound & Vibration Measurement A/S, Denmark
City of Bonn, Germany
CERTH Information Technologies Institute, Greece
CNet Svenska AB, Sweden
Dexels BV, Netherlands
DigiSky SRL UAV & Robotic Systems, Italy
Technical University of Denmark, Denmark
City of Hamburg, Germany
Hamburg University of Applied Science, Germany
HW Communications Ltd, UK
In-JeT ApS, Denmark
ISMB Istituto Superiore Mario Bella, Italy
City of Copenhagen, Denmark
Kingston University, UK
Leeds Beckett University, UK
Movement Entertainment Srl, Italy
Optinvent S.A., France
Praesidio Group ApS, Denmark
Ring Advocacy ApS, Denmark
Telecom Italia S.p.A., Italy
Tivoli A/S, Denmark
City of Torino, Italy
VCA Technology Ltd, UK
Vaeksthus Zealand, Denmark
Yorkshire County Cricket Club Ltd, UK
Leeds Rugby, UK

Managed by the European Commission under Grant Agreement No 732350. Project Coordinator and legal representative: Markus Eisenhauer, Fraunhofer FIT, markus.eisenhauer@fit.fraunhofer.de

Published in 2017 by the MONICA Project. All rights reserved. All copyright for this document is owned in full by the MONICA Project.

monica-project.eu
MonicaProject
MonicaloTforCities
MONICA Project

Funded by the European Union’s Horizon 2020 Research and Innovation Programme under Grant Agreement No 732350. Project Coordinator and legal representative: Markus Eisenhauer, Fraunhofer FIT, markus.eisenhauer@fit.fraunhofer.de