MONICA

MANAGING LARGE, OPEN-AIR EVENTS IN THE SMART CITY

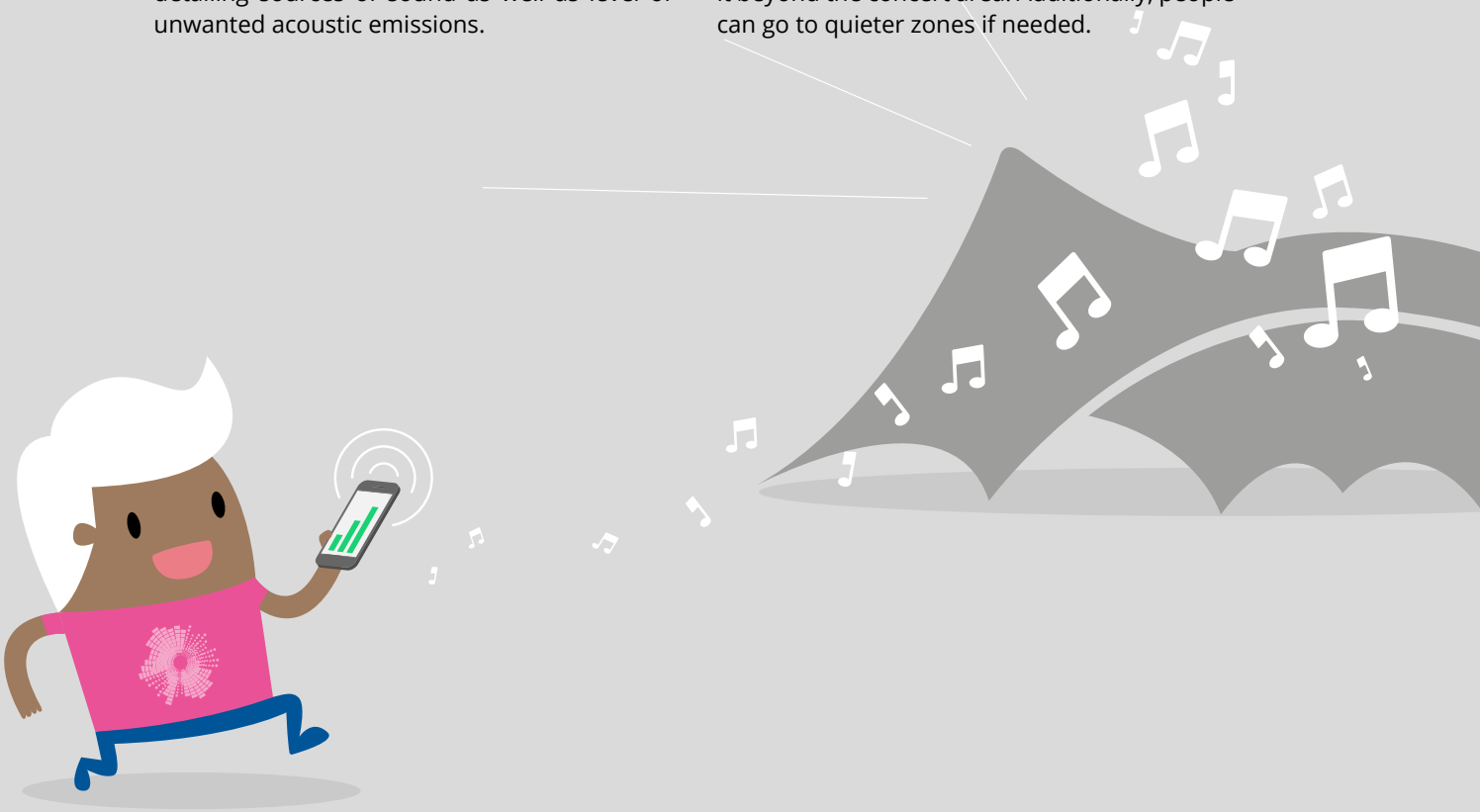
IOT TECHNOLOGY SOLUTIONS FOR SOUND MONITORING & CONTROL, CROWD SAFETY & SECURITY AND USER EXPERIENCE

The MONICA project is conducting large-scale demonstrations of IoT technologies that help cities meet sound and security challenges at big, open-air events. The events include amplified concerts, cultural festivals and sports matches which attract and affect a large number of people. Several applications are developed and deployed at events in six European cities during 2018 and 2019, involving thousands of users who test the novel MONICA applications.

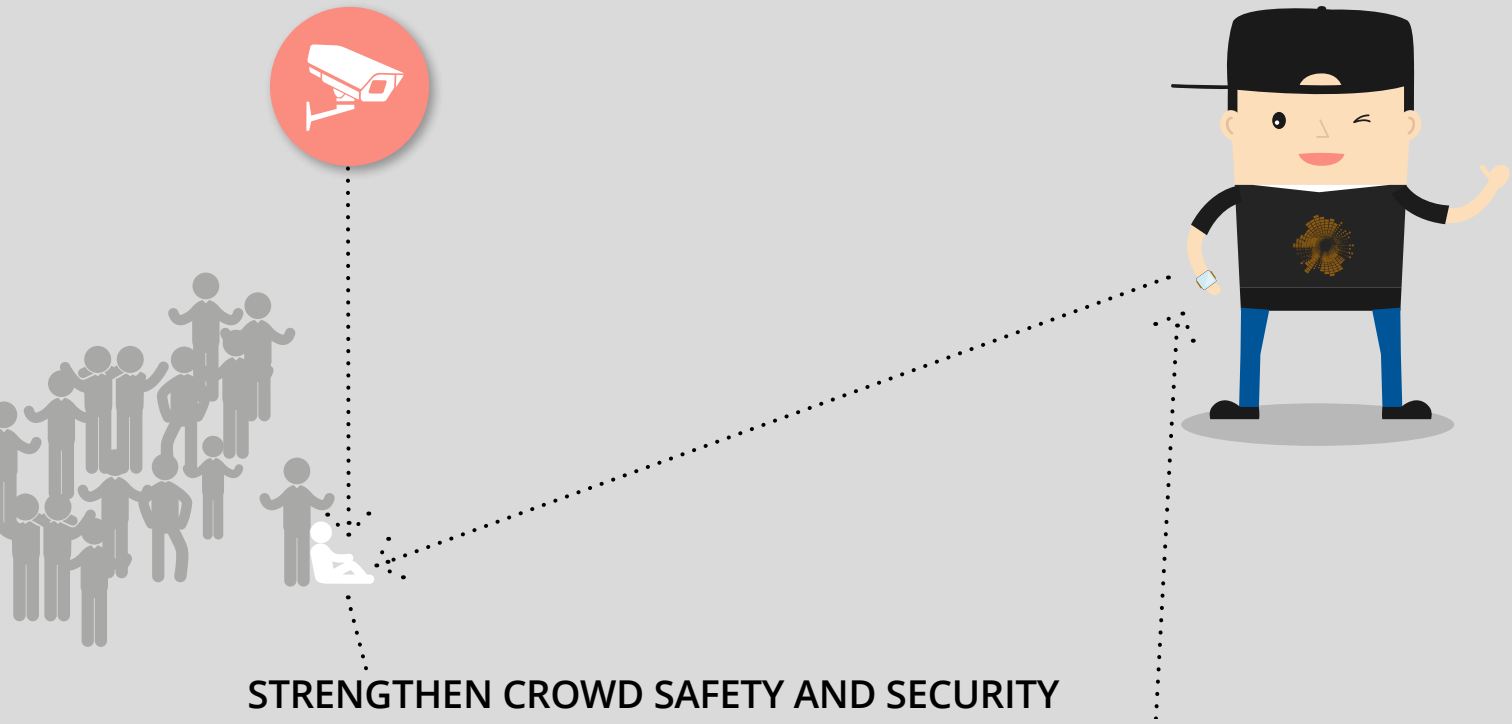
MONITOR SOUND, ENHANCE SOUND PERCEPTION AND REDUCE UNWANTED SOUND LEVELS

The MONICA sound applications provide real-time information about sound levels to help organisers of music events control the impact. A sound heat map of the venue is displayed, detailing sources of sound as well as level of unwanted acoustic emissions.

To enhance the sound experience for concert-goers and reduce the level for neighbours, MONICA establishes sound zones which optimise sound in front of the stage and attenuate it beyond the concert area. Additionally, people can go to quieter zones if needed.



IoT= 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 & trackers, video cameras, smart glasses, airships, loudspeakers, sound level meters, environmental sensors and smartphones.



STRENGTHEN CROWD SAFETY AND SECURITY

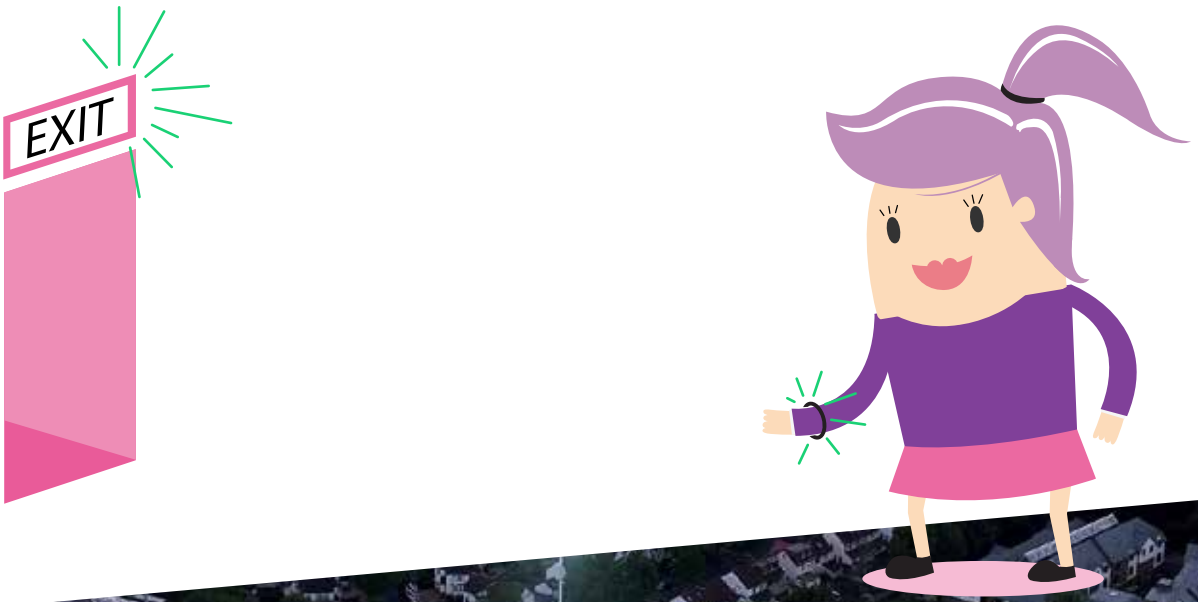
Applications involving the use of CCTV cameras, tethered airships and wearables enable security personnel to capture real-time data about crowd size and density for the purpose of analysing, predicting and handling emerging incidents, while being compliant with European personal privacy provisions and rights.

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

IMPROVE USER EXPERIENCE

Communication with visitors is improved by the use of visitor apps and IoT wristbands with value-adding features, enabling people to connect with and locate each other, interact with performers or organisers and receive event-related information.

Open data coming from sensors are accessible to the public and developers for awareness creation and innovation.



Headingly Carnegie Stadium / SWpix

BONN

Rhein in Flammen
Open-air festival
300,000 visitors

MAIN AIM
Achieve the best sound experience for visitors and performers with due consideration of neighbours

APPLICATIONS
- Sound monitoring
- Crowd & capacity monitoring
- Locate staff
- Incident detection
- Event information

Pützchens Markt
Open-air street festival
1 million visitors

Monitor crowd movement and prevent critical situations

- Crowd & capacity monitoring
- Locate staff
- Incident detection
- Event information

COPENHAGEN

Tivoli Gardens
Friday Rock concerts
500,000 visitors

MAIN AIM
Improve sound and crowd management

APPLICATIONS
- Sound monitoring & control
- Crowd & capacity monitoring
- Missing person
- Incident detection

HAMBURG

Hamburg Port Anniversary
Harbour festival
1 million visitors

MAIN AIM
Improve crowd management and safety

APPLICATIONS
- Incident detection

Hamburger DOM
City goose fair
8 million visitors

- Crowd & capacity monitoring
- Locate staff
- Incident detection

LEEDS

Emerald Headingley Stadium
Cricket and rugby games
+400,000 visitors

MAIN AIM
Enhance visitor experience through improved communication and day-to-day management of crowds

APPLICATIONS
- Crowd & capacity monitoring
- Locate staff
- Incident detection
- Event information

LYON

Nuits Sonores
Electronic music festival
+140,000 visitors

MAIN AIM
Improve the tools for information sharing between security personnel and reduce noise complaints from citizens

APPLICATIONS
- Sound monitoring
- Locate staff

Fête des Lumières
City light festival
1.8 million visitors

- Sound monitoring
- Crowd & capacity monitoring
- Missing person
- Locate staff
- Incident detection

TORINO

Kappa FuturFestival
Electronic music festival
50,000 visitors

MAIN AIM
Manage crowd, security and noise propagation

APPLICATIONS
- Sound monitoring & control
- Crowd & capacity monitoring
- Locate staff
- Incident detection
- Event information

MOVIDA
Nightlife in the centre
Thousands of visitors

Strike a balance between amusement, security and quality of public space

- Sound monitoring
- Crowd & capacity monitoring
- Incident detection
- Event information

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.

The platform can be incorporated with existing Smart City systems, be replicated to fit other settings or used to develop new Smart City applications.

Features include:

- Integration of many different interoperable sensors and actuators
- Use of open standards and architectures as well as open source software
- Large-scale operation design to enable large IoT deployments
- Seamless integration with external Smart City platforms using oneM2M
- Data Security, Privacy and Trust Framework, ensuring full data protection and privacy

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

SECURITY ECOSYSTEM
Applications that can be used to monitor crowds 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

Bundesstadt Bonn / Volker Lannert

MONICA

Management of Networked IoT Wearables
- Very Large Scale Demonstration of Cultural and Societal Applications

29 PROJECT PARTNERS, NINE COUNTRIES

Fraunhofer Institute for Applied Information Technology, Germany
Acoucité, City of Lyon, France
Atos IT Solutions and Services, Slovakia
Brüel & Kjær Sound & Vibration Measurement A/S, Denmark
CERTH Information Technologies Institute, Greece
City of Bonn, Germany
City of Copenhagen, Denmark
City of Hamburg, Germany
City of Torino, Italy
CNet Svenska AB, Sweden
Dexels BV, Netherlands
DigiSky SRL UAV & Robotic Systems, Italy
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In-JeT ApS, Denmark
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Leeds Beckett University, UK
Leeds Rugby, UK
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Movement Entertainment Srl, Italy
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Telecom Italia S.p.A., Italy
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