

Management Of Networked IoT Wearables – Very Large Scale Demonstration of Cultural and Security Applications



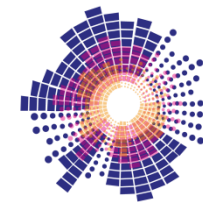
MONICA

Using wearable and IoT data to
create situational awareness

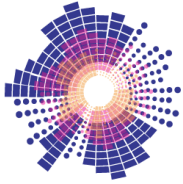
Peeter Kool Cnet
19 June 2019



Co-funded by the
European Union



MONICA

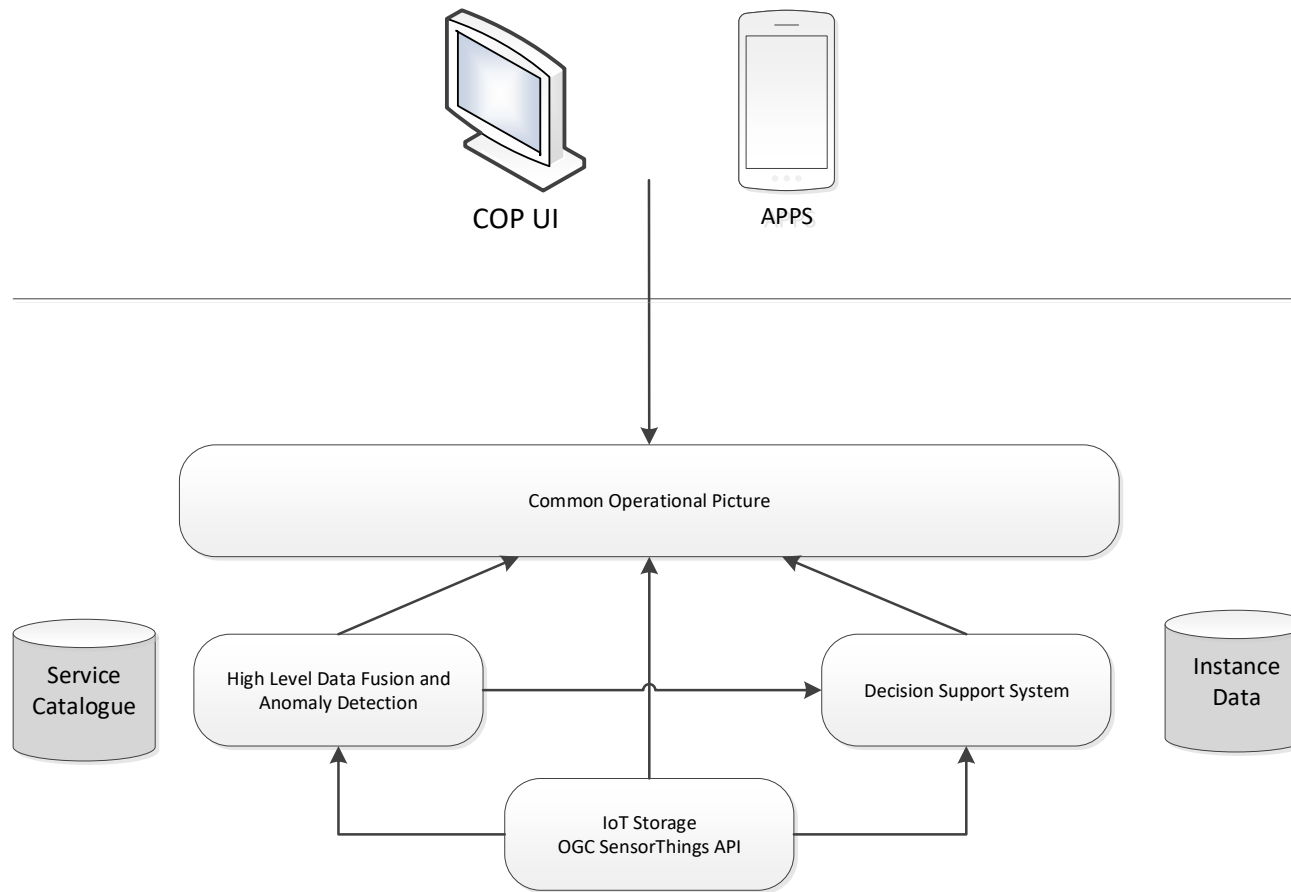


Using wearable and IoT data to create situational awareness

- Overview of components involved
 - Instance Data
- Common Operational Picture UI (COP)
 - Examples of visualisations



Overview of Components for Situational Awareness





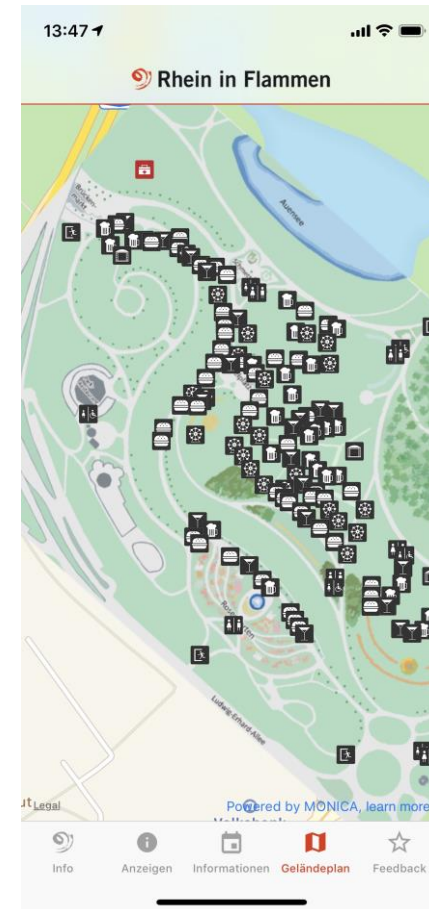
Overview of Components for Situational Awareness

- High Level Data Fusion and Anomaly detection
 - Fuse data from different sources, e.g. people heatmap
 - Detecting anomalies such as "High risk queues"
- Decision Support System
 - intervention strategies for incidents of different types
 - No automatic resolvment of incidents
- Common Operational Picture COP
 - Maintains the current state of the event
- Service Catalogue
 - Implemented on top of OGC SensorThings API
 - Most high-level services act as data streams



Instance Data: Event specific information

- Limits
 - Sound / people density
- Intervention plans
- POIs
 - Sensor positions
 - Event POIs
 - Stalls, toilets, rides et c.
- Areas of interest
 - Exclusion zones
 - Camera coverage areas



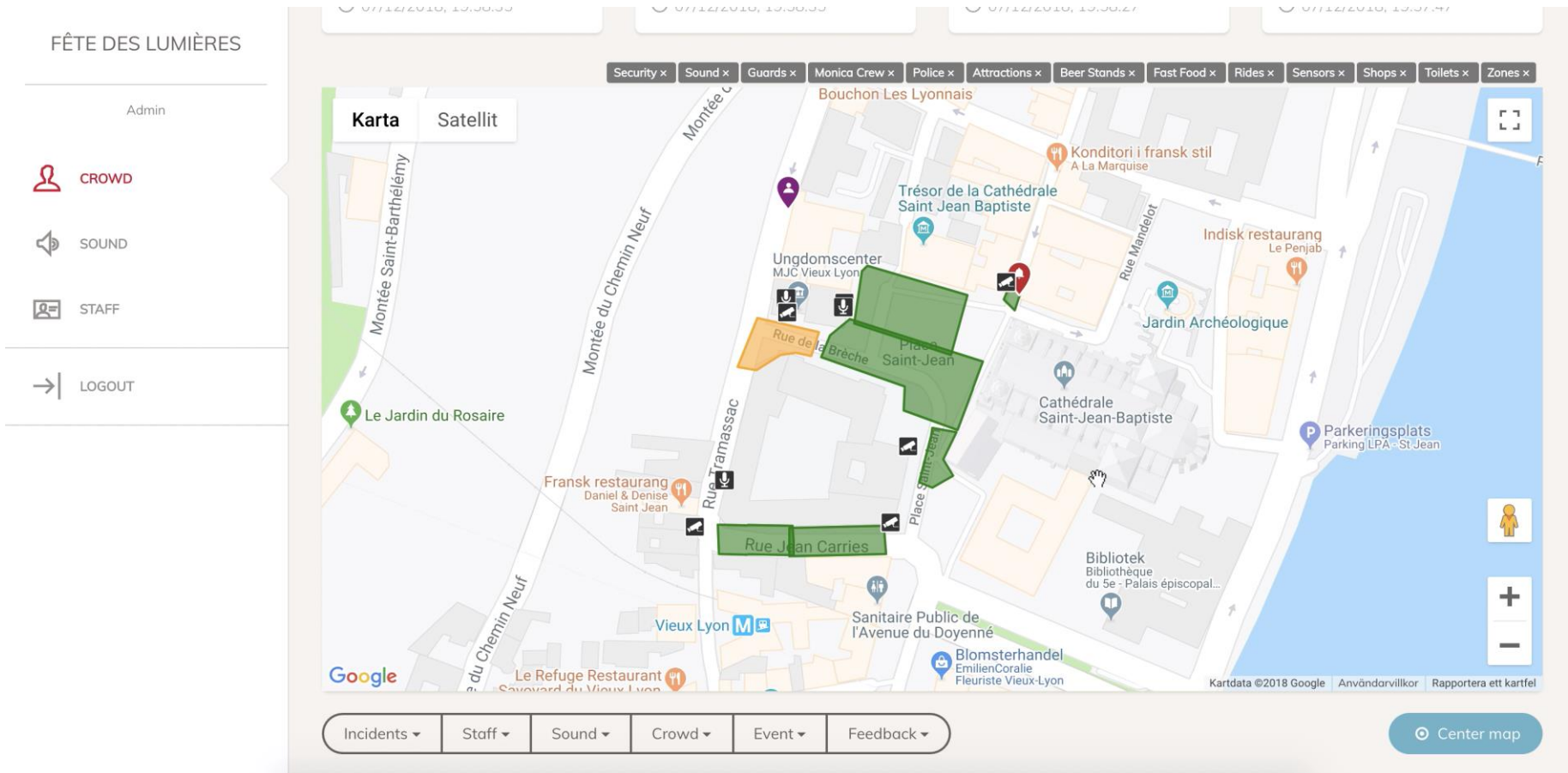


Common Operational Picture User Interface

- Goals
 - Give an overview of the status of the event
 - Provide more detailed information when needed
 - Indicate problems/incidents and provide support for resolving them
- Two main flavours
 - Crowd and Security
 - Focus on security incidents
 - Crowd monitoring
 - Staff tracking
 - Sound
 - Sound monitoring
 - Sound incidents (Both over threshold and sound quality problems)



Crowd Counting Visualization





Crowd Counting Visualization

FÊTE DES LUMIÈRES

Admin



CROWD



SOUND



STAFF



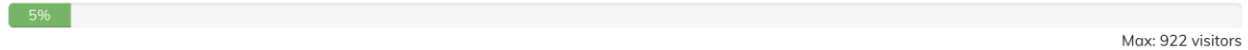
LOGOUT

Zone Capacity

All zones with active people count

LYON_163 (49 visitors)

Dec 7, 2018, 7:59:29 PM



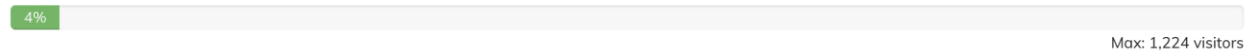
LYON_161 (238 visitors)

Dec 7, 2018, 7:59:29 PM



LYON_162 (45 visitors)

Dec 7, 2018, 7:59:29 PM



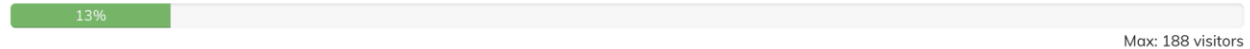
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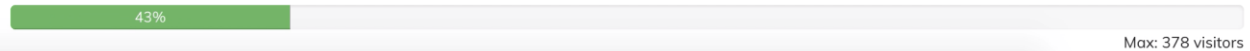
LYON_165 (24 visitors)

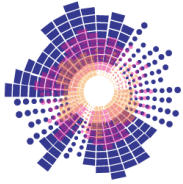
Dec 7, 2018, 7:59:29 PM



LYON_166 (164 visitors)

Dec 7, 2018, 7:59:29 PM





Points of interest

RHEIN IN FLAMMEN

Admin

 CROWD

 SOUND

 ALERTS

 STAFF

 LOGOUT

Search in map

[Clear search](#)

Karta

Satellit

Guards x

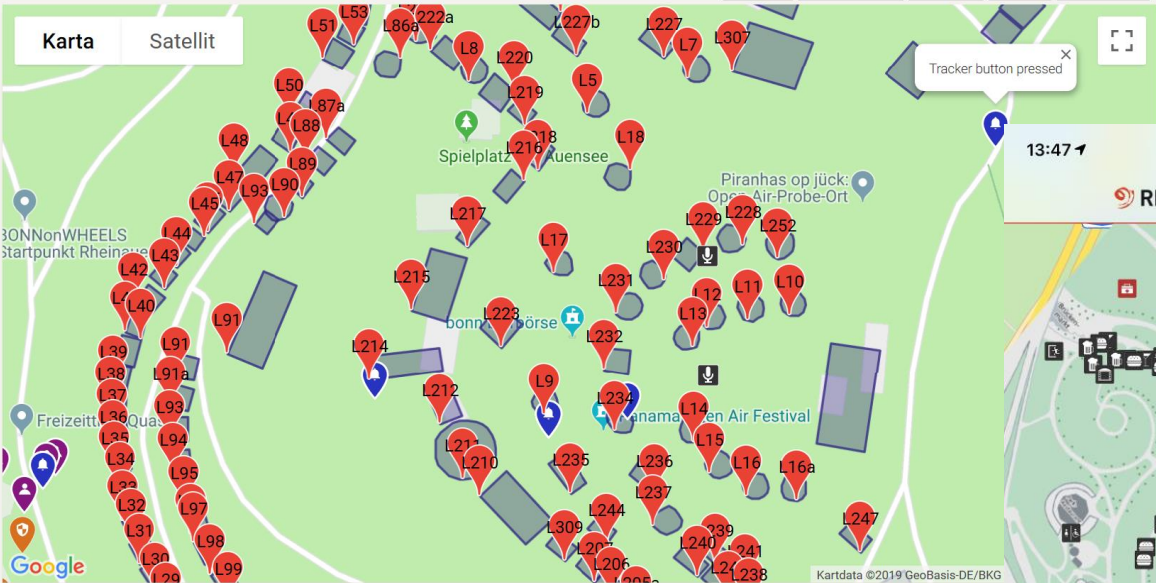
Monica Crew x

Sensors x

Zones x

Zone labels x

Tracker button pressed



Incidents v

Staff v

Sound v

Event v

INCIDENT: ButtonPressed

Tracker button pressed

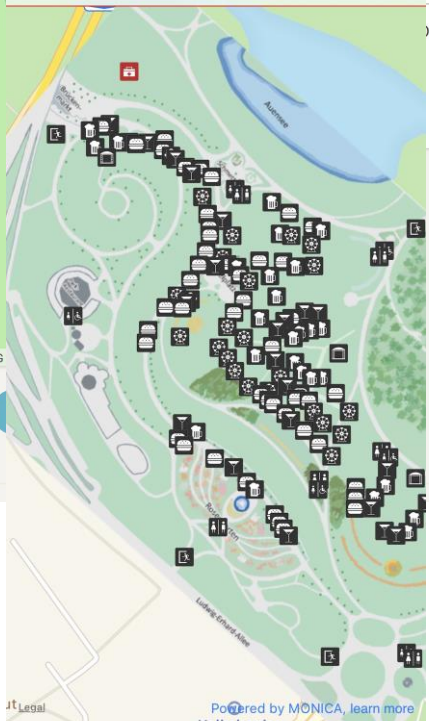
Type	ButtonPressed
Time	2019-05-04T20:20:05

ONGOING

Resolve

13:47

Rhein in Flammen



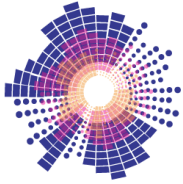
Info

Anzeigen

Informationen

Geländeplan

Feedback



Incident and intervention plan

HAMBURG DOM

Admin

 CROWD

 STAFF

 LOGOUT

Security Incidents

Wind, queues, overcrowd, fight etc.

WHAT

WHERE

Wind: (Test) Ab 15 m/s
muss der Betrieb
eingestellt werden. Plane
an der Rückwand sind
zu entfernen

Probability: 80 %

Nov 15, 2018, 2:16:53 PM

ONGOING



Zone Capacity

All zones with active people count

DOM_101 (35 visitors)

Nov 16, 2018, 7:32:24 PM



DOM_102 (52 visitors)

Nov 16, 2018, 7:32:23 PM



Windspeed meter2

Schwache Brise, Nov 16, 2018, 7:31:22 PM

4.98 m/s



Windspeed meter1

Leiser Zug, Nov 16, 2018, 7:31:10 PM

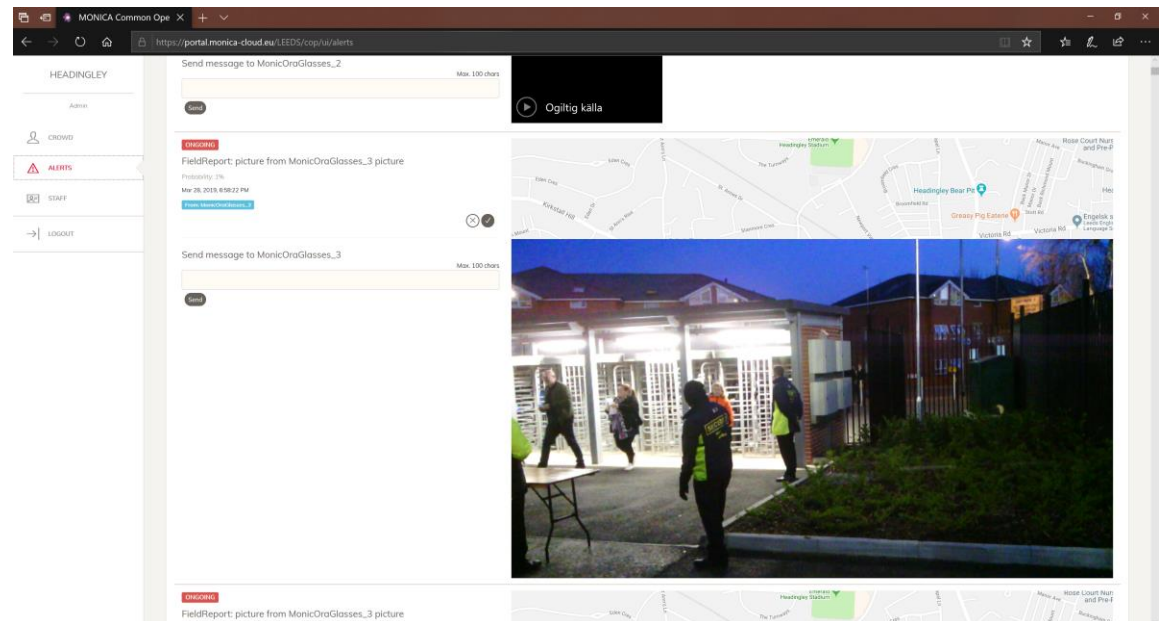
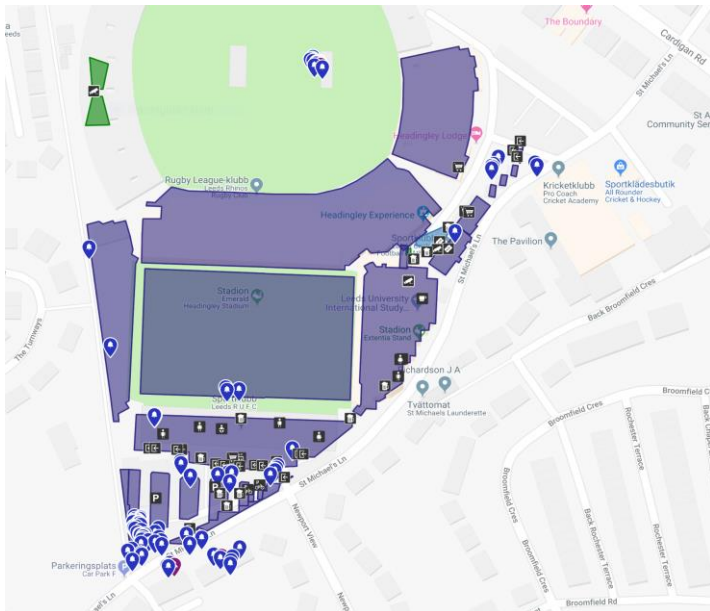
1.47 m/s





Smart Glasses

- Integrated in the COP
 - Localization
 - Create incidents in the COP using text/video/pictures
 - Receive commands and images from the COP





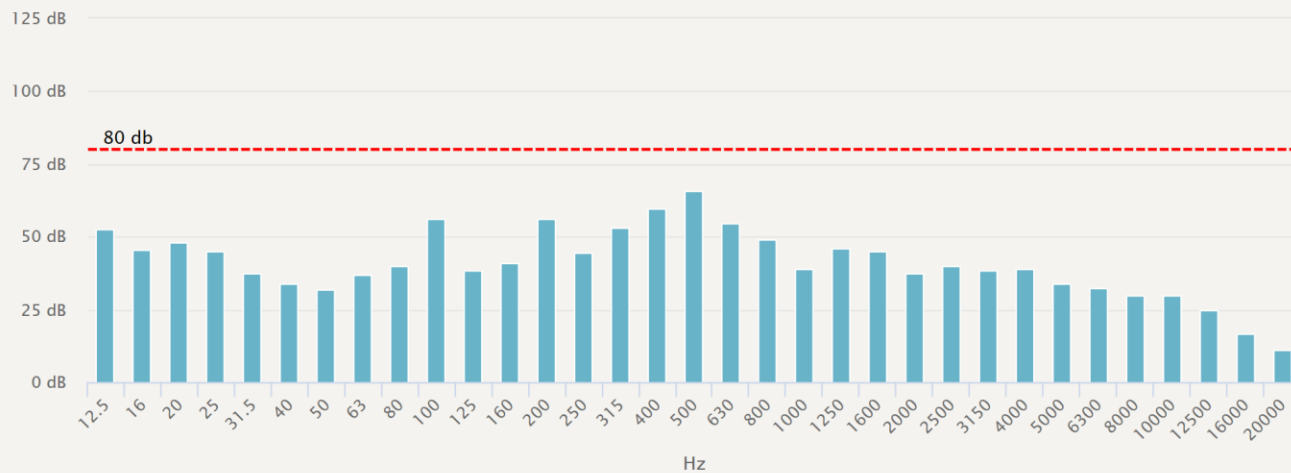


Sound Level data

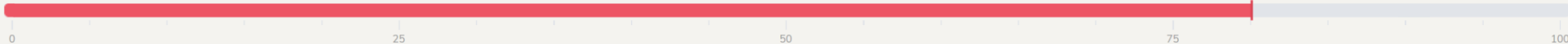
ThingMONICA0004_000608 (376)

1/3 Octave spectra

Start: 2019-06-02 06:22:50, end: 2019-06-02 06:23:04

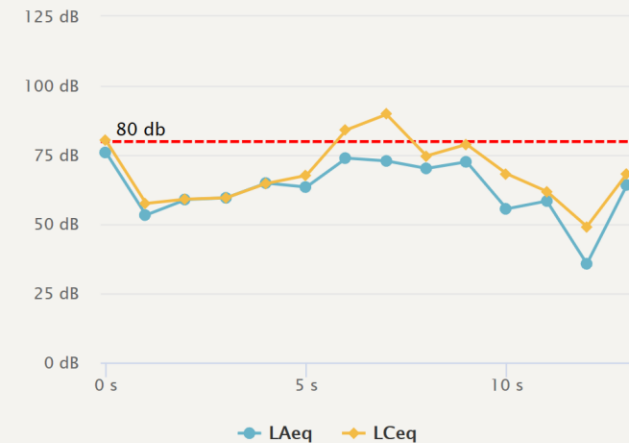


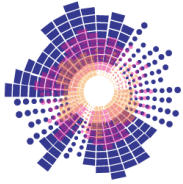
Sound Level Limit: 0 db



L_{Aeq} & L_{Ceq}

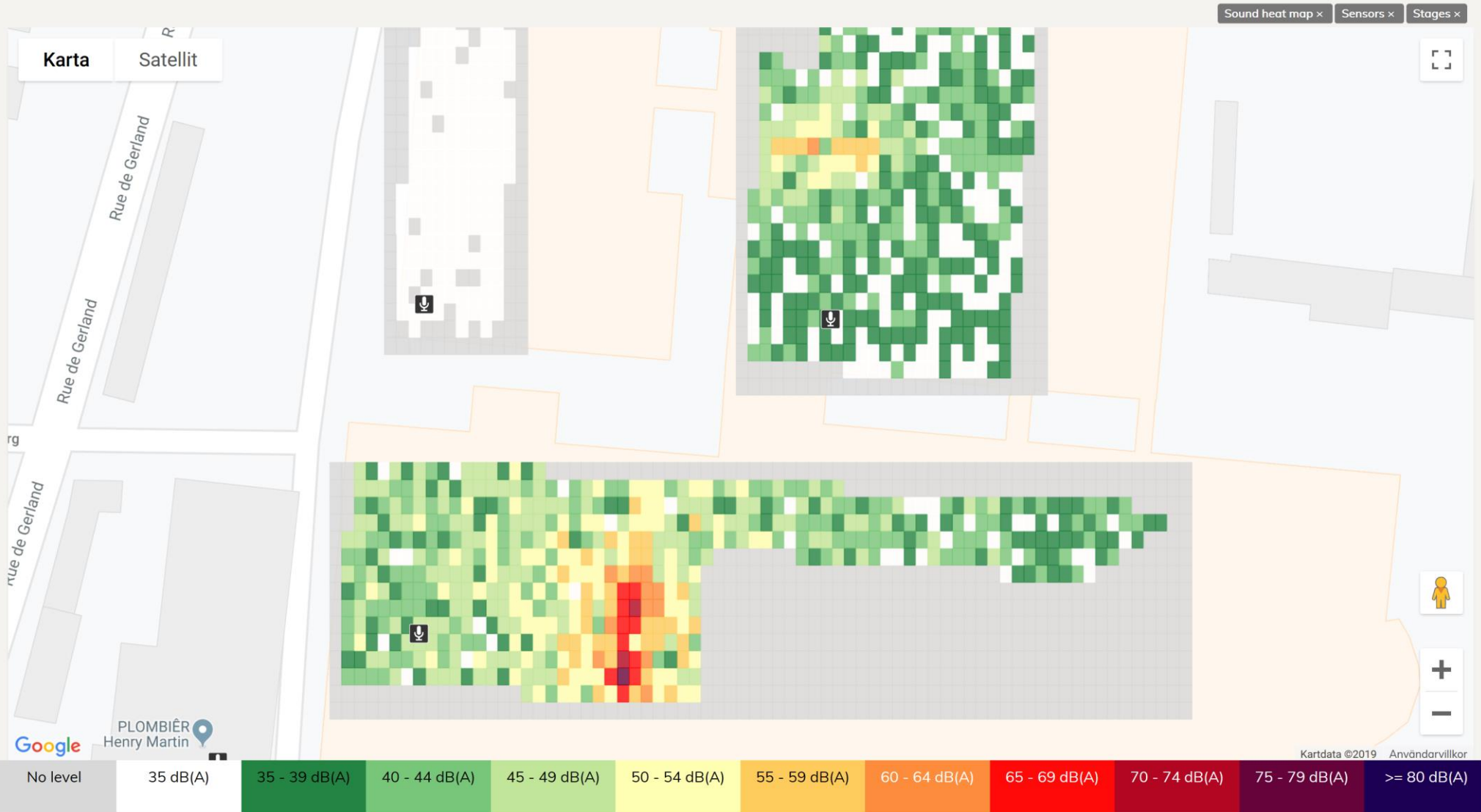
Start: 2019-06-02 06:22:50, end: 2019-06-02 06:23:04, duration: 10 s

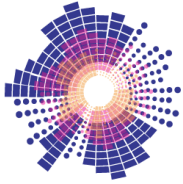




Sound Heatmaps

Jun 2, 2019, 7:36:13 PM





Sound Level Data over time

NUITS SONORES

Admin

 SOUND

 MAP

 AUDIENCE AREA

 NEIGHBOUR AREA

 RESTING AREA

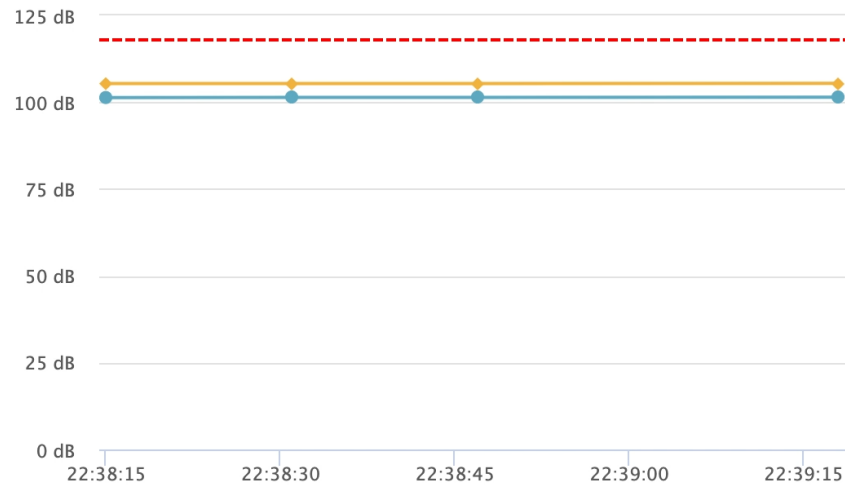
 DOWNLOAD DATA

 LOGOUT

0 dB 22:38:15 22:38:30 22:38:45 22:39:00 22:39:15 22:39:30

● At Sound engineer's console
● At most critical point in audience (location)

dB



15 MINUTES AVERAGE

101.4 dB

105.4 dB

Jun 1, 2019, 10:39:18 PM

MAXIMUM ALLOWABLE

118 dB



Sound Contribution

NUITES SONORES

Admin



SOUND



MAP



AUDIENCE AREA



NEIGHBOUR AREA



RESTING AREA

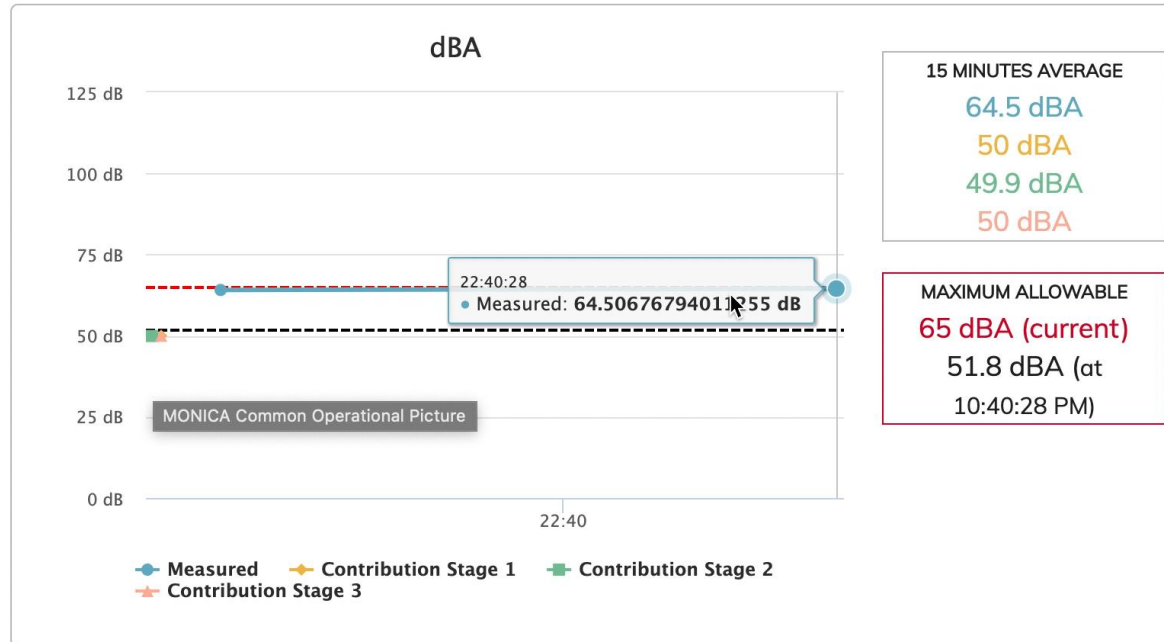


DOWNLOAD DATA



LOGOUT

Overall Sound level



Exceedings: 0

Octave bands



Thanks for your attention

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