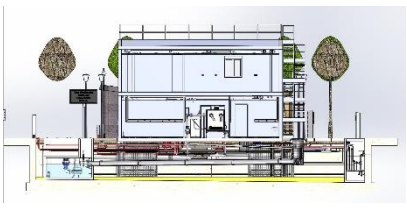
Université Gustave Eiffel

Sense-City Newsletter

Nov 2023



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Industrial/start-up collaborations @Sense-city

Kumulus

Water production from atmosphere with different controlled levels of temperature and hygrometry will start shortly in Sense-city with a product developed by Kumulus engineering team. A CIFRE thesis project is also currently being discussed.

Urban Canopée

Performance of urban cooling solutions will be evaluated using microclimatic experimental data in Sense-city. Urban Canopée and Sense-City team have both joined the national project PN ISSU which aims at providing guidelines and innovative solutions to deal with urban overheating and development of systemic assessment for city cooling.

Benchmarking of microclimate simulation solutions - CIFRE Thesis (CEREMA/CSTB/INGEROP)

A highly dense network of climate sensors has been deployed on the Canyon Street of Sense-city over a long period this summer. The data from many hot climatic events has been recorded and is currently being analyzed. The data will be used to evaluate different software simulation solutions on a simple and representative case.

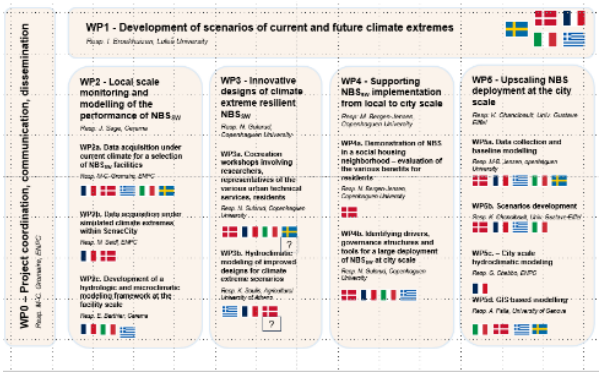
Stormwater trees for sustainable urban runoff management - CIFRE Thesis (LEESU/hydrasol)

The stormwater trees zone in the mini-city 2 of Sense-Citi was designed to study the sustainable management of stormwater. 3 maples (Acer platanoide Globosum) have been planted on each side of the “Canyon” Street of Sense-City, one side receives road runoff which has been equipped with different sensors to measure incoming and outgoing flows. The tree sap flow of each tree is measured by a heat dissipation sensor. In addition, meteorological parameters are monitored at 8 meters height (Vaisala), while an additional tipping bucket rain gauge.

Collaborative project @Sense-city

GreenStorm : a new European project on stormwater NBS for resilient cities (start in 2024)

This new European project coordinated by LEESU, ENPC was granted on the Driving Urban Transitions to a sustainable future initiative (https://dutpartnership.eu/). It will start early 2024 and in the WP1 (Development of scenarios of future climate extremes). Sense-City will contribute to evaluate the performance of Nature Based Solutions in terms of hydrologic, thermic but also physiologic response which will be tested for a range of extreme climate conditions using the Sense-City climatic chamber.



Euro-Indian project LOTUS

last European conference and demo @Sense-city (3rd and 4th July)

During the last European event of LOTUS, Dr Bérengère Lebental and PhD student Balakumara Vignesh displayed in real-time the results of the measurements conducted by the LOTUS sensor in different conditions in Sense-City platform (regular and when chlorine was injected in the pipeline loop) and compared the outputs with these of traditional measurement tools.

More information:
https://www.youtube.com/watch?v=jdyLfY5KjDchttps://www.lotus-india.eu/index.php/2023/08/25/final-steps-towards-the-implementation-and-potential-commercialisation-of-the-lotus-sensor-in-india/

CAYD (Charge As You Drive)

This project funded by BPI and coordinated by Vinci is aiming to demonstrate in real circulated roads two innovative dynamic charging systems for future electric trucks, thus enabling potentially a drastic reduction of battery size and carbon footprint of this type of transportation. The KO Meeting took place in CEREMA Rouen on Sept 12 with about 30 participants.

Figure 1 - Photos of participants (left) – View of the portions of A 10 close to Longvilliers for demonstrations, conductive (middle) inductive (right)Portion of A10 for

The experimentations will take place close to Long Villiers on A10 2 km portions. Roadwork will start from June 2024. Sense-City team will coordinate the task 4.7 performance evaluation of inductive and ground conductive solutions. The staffing is currently ongoing .

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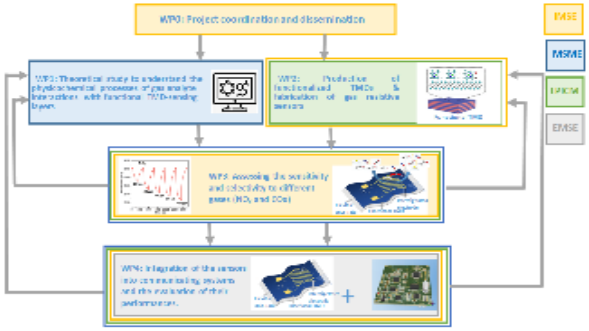
ResbioBat ANR project coordinated by UGE started in 2021 is focusing its activities in characterization and evaluation of comfort and thermal performance in Sense-City 's raw earth demonstrator (currently being instrumented).

DuReTerre ANR national project started in 2023 is coordinated by UGE and currently focusses on durability, reparability and new ins-situ characterization of constructive structures in raw earth localized in Sense City.



SenseCo

The new ANR Project Sens Co coordinated by UGE will start in 2024. It aims at developing Wearable Gas SENSors based on functionalized transition metal dichalcogenide nanosheets for the detection of NOx and CO. It will use the Sense-City platform for the validation phases in a representative urban environment.

Internships results @Sense-city

Safety critical climate simulation for automated mobility systems in Sense-City

An internship has shown new possibilities of safety critical climatic events simulation in Sense-City, i.e., ice on road and fog generation. In addition to actual feature (controlled temperature, hygrometry, sun, rain), these new capabilities cover now a wide set of road safety critical climate simulations possibilities. These capabilities can contribute to develop protocols to assess robustness of ADAS in adverse driving conditions

Figure 1 - Illustration of fog and ice generation possibilities in Sense-City (A. Rubak, ENSTA, June 2023)

Microgrid development in Sense-City

A new microgrid functional architecture based on state-of the art components has been proposed for use sense-city facility during an internship.

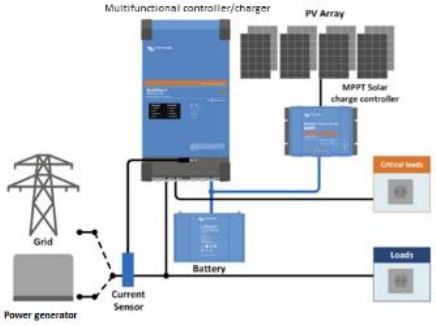


Figure 2 New functional architecture for Sense-City microgrid (Paul Intartaglia, ESIEE, June 2023)

The open and extendable architecture will enable additional consumer or producers' components (existing ReN producers' system like wind turbine, solar panels or local geothermal system or prosumers like bidirectional chargers for EVs) to be added end interconnected, simulating a local urban multienergy microgrid. With this part of the Sense-City platform, energy performance characterization of new electric grid systems and components can be experimentally studied, in both very realistic:

- urban environment (i.e., on-story building)
- climatic physical simulation climatic conditions.

Therefore, Tuning-up and optimization of new components as well as climate impact studies can be easily experienced and instrumented.

Equipement status

Maintenance of climate functions of Sense-City has been finalized on October 20th (topping up of the coolant liquid). The performances have been assessed and are identical to initial capacities.

A new server has been purchased and is now fully operational.

Need for more information?

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