



*How to give materiality  
to our wireless  
networks data in the  
public space?*

**DATE** 2023

**MEDIUM** High-pressure pump, nozzles, electronics, Raspberry Pi, EXEM electromagnetic wave sensor.

**DIMENSIONS** Variable

**AUTHORS & DEVELOPMENT** Nicolas Guichard & Béatrice Lartigue  
- Lab212

**RESEARCH** <https://lab212.org/research/1:featured/19/Water-and-technology>

**GENESIS** In the age of hyper-connection, the technologies of ubiquity generate, as an echo to a feeling of power (anticipation, optimisation), a certain form of dispossession (fear of emptiness, Fear Of Missing Out). The physical reality of the digital world also raises the question of the energetic and hydric resources needed for the manufacture and operation of these infrastructures, inherent in our daily routines (streaming videos, social networks, etc.). Today, the health crisis has further accentuated these remote practices (teleworking, videoconferencing, etc.).

**SYNOPSIS** *Ombres Blanches* intentionally blurs the boundaries between reality and fiction through an exploration of the invisible physical phenomenon of radio frequency waves. The invisible signals emitted by mobile phones, printers and all sorts of smart devices leave an imprint when they connect and exchange data on wireless networks. The data flows transmitted in a space appear as visual traces from an invisible dimension that gradually form and dissolve. *Ombres Blanches* reveals the invisible spectrum of electromagnetic waves that surround us. The installation embodies in real time the interactions with the surrounding networks, in a climatic phenomenon. *Ombres Blanches* projects a singular view of the landscape, through a collective, ephemeral and multi-sensory ritual.

**TECHNICAL PRINCIPLE** Ombres Blanches materializes radiofrequency waves (2G/3G/4G/5G mobile telephony, FM radio, TV, etc.) in public spaces. An EXEM sensor detects the value of the ambient electromagnetic field (250kHz - 6GHz) and sends it in real time to a Raspberry Pi computer. Driven by Nerves (embedded application platform for the Elixir language), the Raspberry Pi samples the values received (in V/m) in order to control a high-pressure pump in real time. The pump generates a fog whose density changes with the intensity of the surrounding electromagnetic waves detected. The data collected are accessible online, via a graphical interface designed for a wide audience.

**SCIENTIFIC COLLABORATION** EXEM Laboratories Frequency measurement solutions for telecommunications systems (mobile telephony, WiFi) and broadcasting systems (DTT, FM). Lab212 Collective and EXEM Laboratory collaborate together on Ombres Blanches, through an industrial contribution (courtesy loan of an EXEM sensor), and a transfer of knowledge (technical principles of real-time detection of radiofrequency electromagnetic waves).

**COMMUNICATION PROTOCOL & WEB APP** Lucas Sifoni

**SCIENTIFIC CONSULTANT** Arnaud Legout, INRIA Researcher

**TECHNICAL CONSULTANTS** Tobias Muthesius - Lab212, Nicolas Nolibos

**HIGH-PRESSURE HYDRAULIC CONSULTANT** Paul Faÿs-Long

**FILM PRODUCTION** Emmanuelle Rossignol & Isabel Birbes - Film Office

**INSTITUTIONAL & FINANCIAL SUPPORT** CNC DICREAM, DRAC Auvergne-Rhône-Alpes SCAN

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**EXHIBITION** *Ether*

Le Grand Bazar, Toulouse, FRA



