OpenRadiation: a collaborative project for radioactivity measurements in the environment by the public

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On behalf of the group

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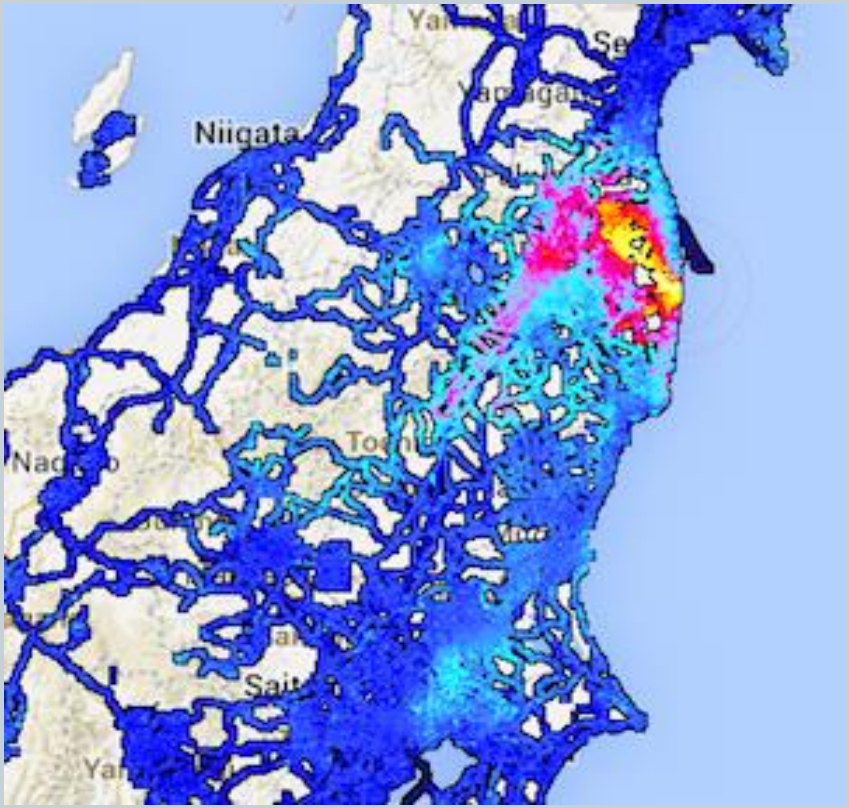
Context

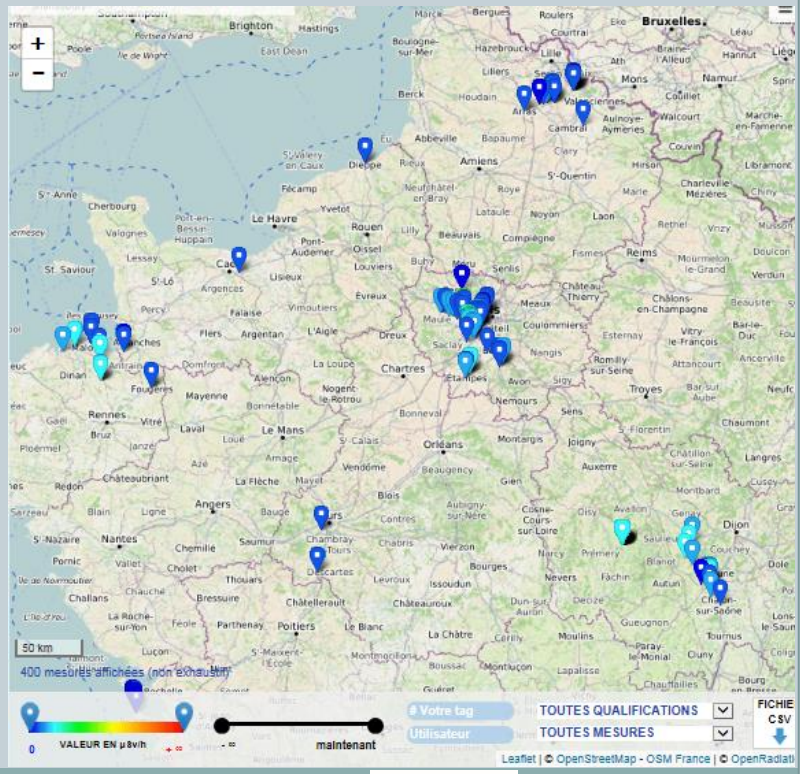


From Safecast

- After the Fukushima accident, **dosimetric applications** dedicated to the **public** appeared to realise **geo-localised measurements of radioactivity** in the environment
- Today, such systems are used at a relatively large scale, in particular by the Japanese population, providing an interesting feedback

What interest in “normal” situation ?

- Provide the opportunity to the public **to get to grips with radioactivity measurements** in the frame of a **collaborative project**
- Use such a project for **pedagogical and E&T purposes for students, high school students…**
- Get data **robust** enough in **complement to the radioactive background** reference values
- Contribute to the **watch function** by detecting unusual situations



What interest for emergency situation?

- Get data **contributing to the management of emergency situations** *(decision making, complementary to classical measurements and dispersion models…)*
- Anticipate the **collection of data coming from the public** as well as their **treatment and use**
- Provide an opportunity to the **public to contribute to the crisis management** by providing data

What interest for the public?

Collective use: "I perform measurements and send data for a collective use and to exchange information"

- *In normal situation*, by participating to a **collaborative project / citizen science**
- *In case of emergency*, by providing **spontaneously** data useful for the **stakeholders** involved in the **crisis management** and the **population**

Personal use: *"I perform measurements to assess my own risk, especially in case of emergency situation"*

These different modes have to be taken into account to develop an application for the public

What are the challenges?

Operate the system on a sustainable basis in peaceful time and useful in case of emergency situations

"Normal" situation

- Set up **sustainable system** used by the public
- Get **data robust enough** to be used for scientific purposes
- Manage **alerts** in case of positive measurements
- Operate a **collaborative website**

Emergency situation

- Get **data robust enough** to contribute to the management of emergency situations *(decision making…)*
- Communicate with the **public**
- Operate the **website in "crisis" mode**

An open partnership

Associations, academic partnerships, public representative

IRSN
INSTITUT DE RADIOPROTECTION ET DE SÛRETÉ NUCLÉAIRE

Institute for Radiological Protection and Nuclear Safety

iffo rme

Association involved in E&T for crisis management

Planete Sciences
une aventure pour les jeunes

Association involved citizen science for young people

UPMC
SORBONNE UNIVERSITÉS

University Pierre and Marie Curie

…to be enlarge in the future

The OpenRadiation project

A **collaborative** project **open source & open data** to measure the **radioactivity in the environment** using **connected dosimetric applications** on smartphones

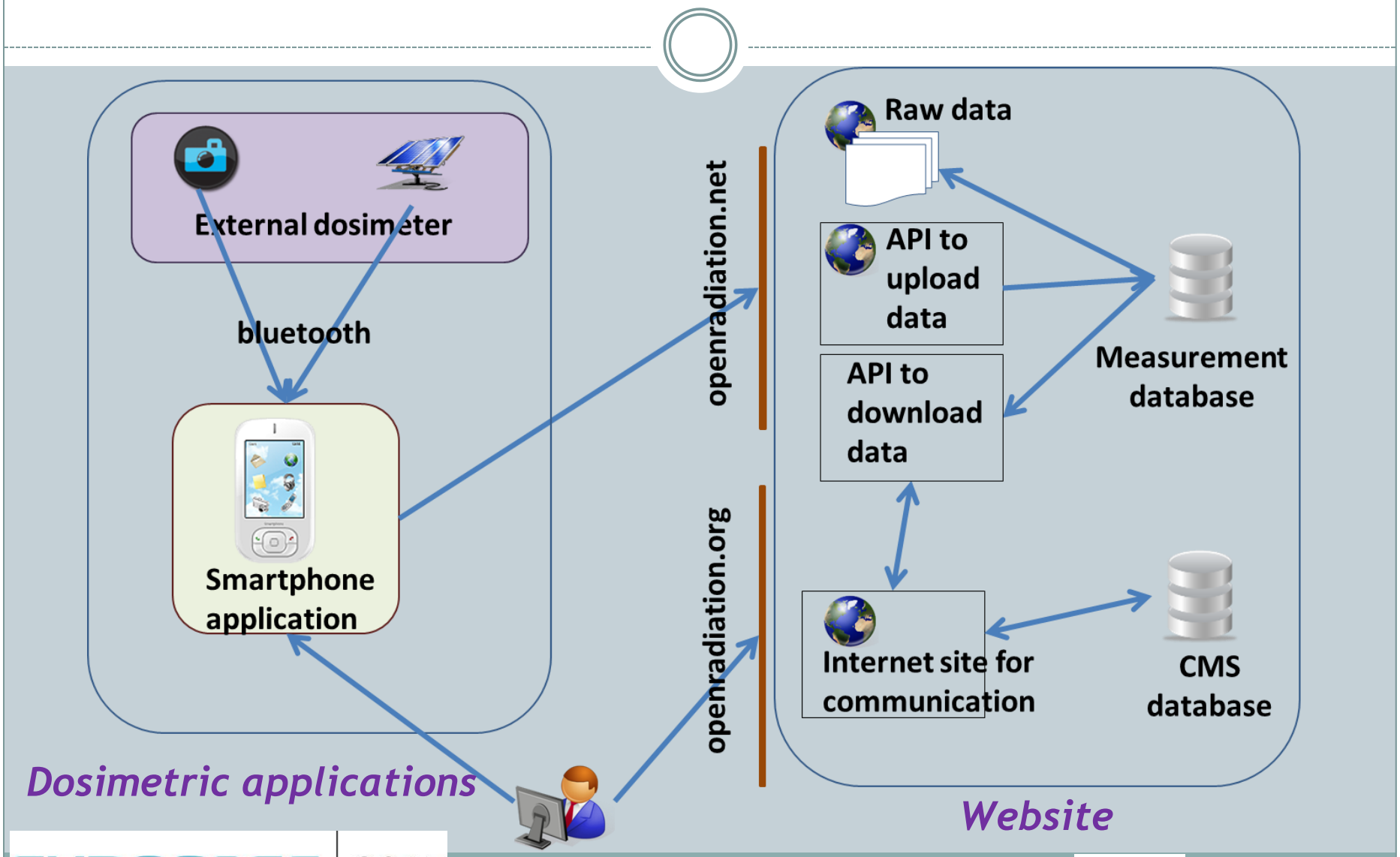
A website

- Collect and centralise **data from various systems/dosimeters**
- Provide **dose rate maps** with raw and “filtered” data
- Create **dedicated areas** for projects and information exchange

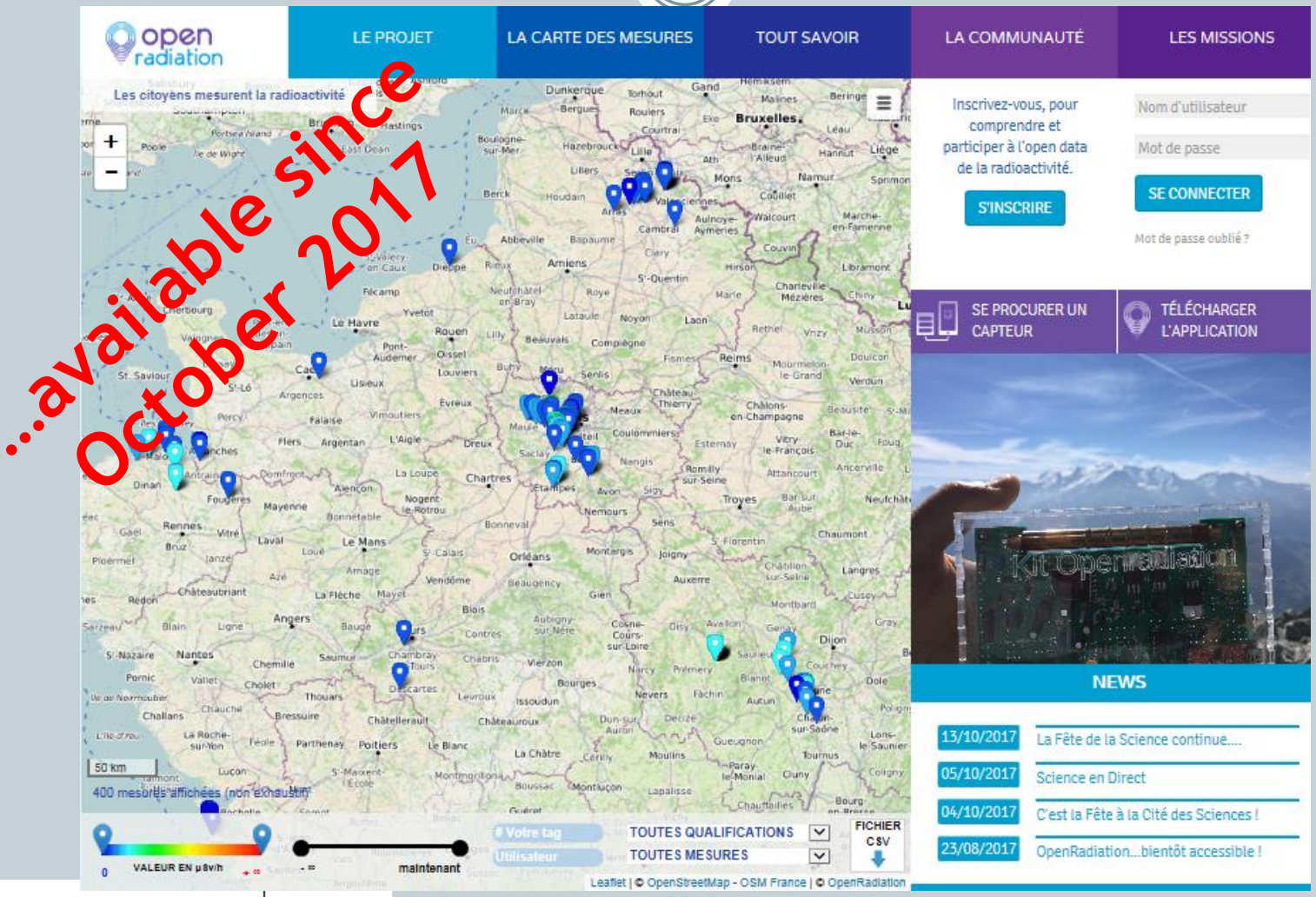
A dosimetric application

- Develop a **connected dosimeter** using bluetooth (GM…)
- Develop a **smartphone application** to collect and transmit data

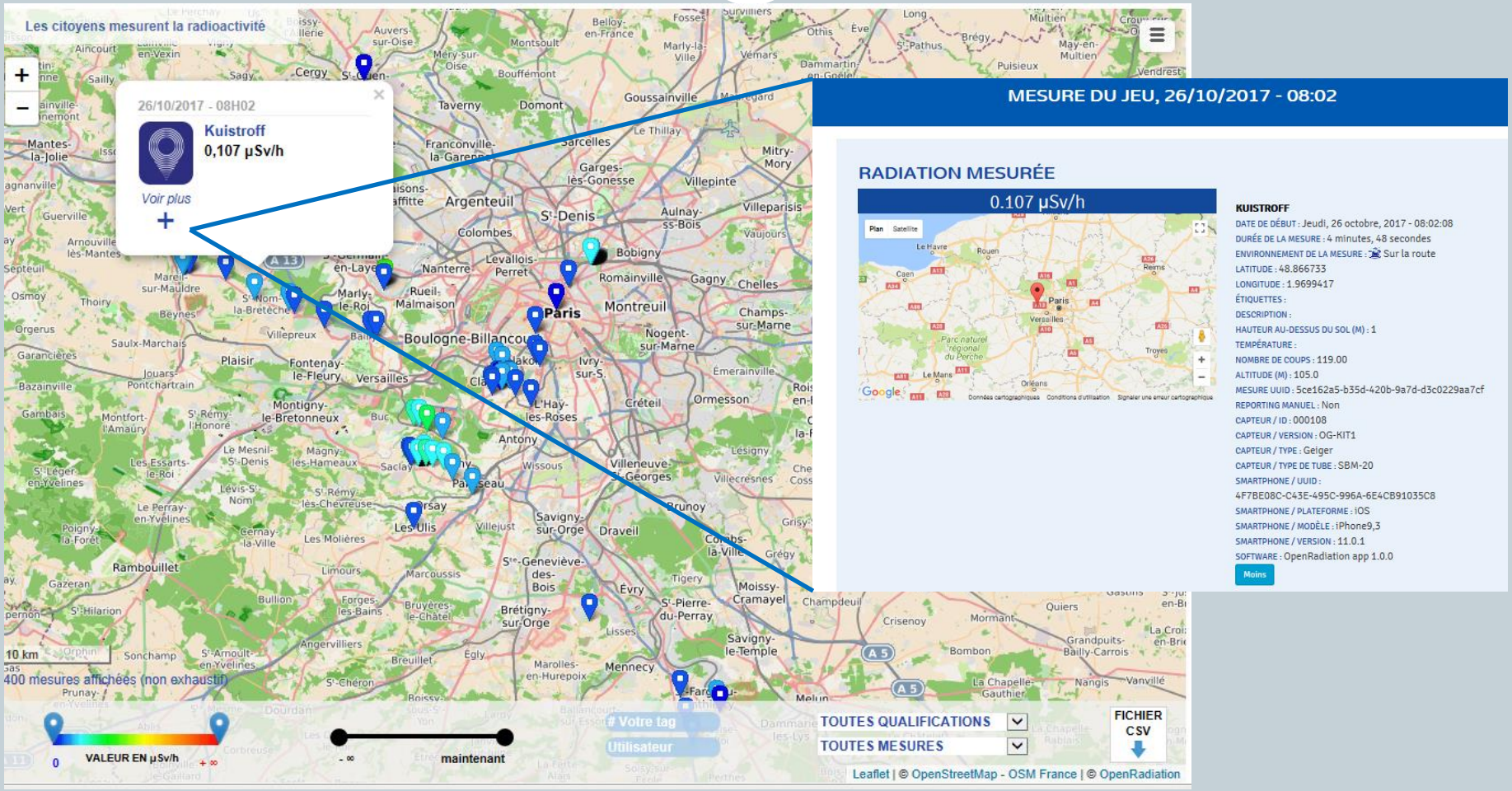
… his architecture



The website: *www.openradiation.org*



… the website


Les citoyens mesurent la radioactivité
26/10/2017 - 08H02
Kuistroff
0,107 µSv/h
Voir plus
MESURE DU JEU, 26/10/2017 - 08:02
RADIATION MESURÉE
0.107 µSv/h
KUISTROFF
DATE DE DÉBUT : Jeudi, 26 octobre, 2017 - 08:02:08
DURÉE DE LA MESURE : 4 minutes, 48 secondes
ENVIRONNEMENT DE LA MESURE : Sur la route
LATITUDE : 48.866733
LONGITUDE : 1.9699417
ÉTIQUETTES :
DESCRIPTION :
HAUTEUR AU-DESSUS DU SOL (M) : 1
TEMPÉRATURE :
NOMBRE DE COUPS : 119.00
ALTITUDE (M) : 105.0
MESURE UUID : 5ce162a5-b35d-420b-9a7d-d3c0229aa7cf
REPORTING MANUEL : Non
CAPTEUR / ID : 000108
CAPTEUR / VERSION : OG-KIT1
CAPTEUR / TYPE : Geiger
CAPTEUR / TYPE DE TUBE : SBM-20
SMARTPHONE / UUID :
4F7BE08C-C43E-495C-996A-6E4CB91035C8
SMARTPHONE / PLATEFORME : IOS
SMARTPHONE / MODÈLE : iPhone9,3
SMARTPHONE / VERSION : 11.0.1
SOFTWARE : OpenRadiation app 1.0.0
Moins
10 km
400 mesures affichées (non exhaustif)
VALEUR EN µSv/h
maintenant
Votre tag
Utilisateur
TOUTES QUALIFICATIONS
TOUTES MESURES
FICHIER CSV
Leaflet | © OpenStreetMap - OSM France | © OpenRadiation

The OpenRadiation dosimeter

- GM counter
- Bluetooth connection
- Available on iPhone, Android and tablet
- Collaboration UPMC/Planète Sciences/IRSN
- 2 versions: “kit” and “packaged”

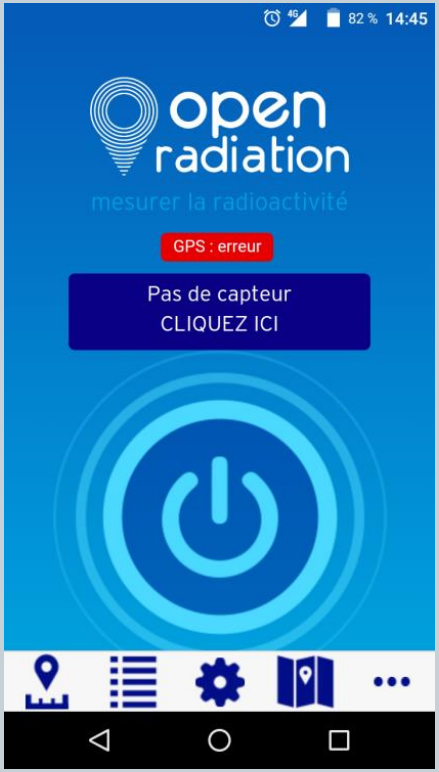
« kit » version

UPMC Fablab

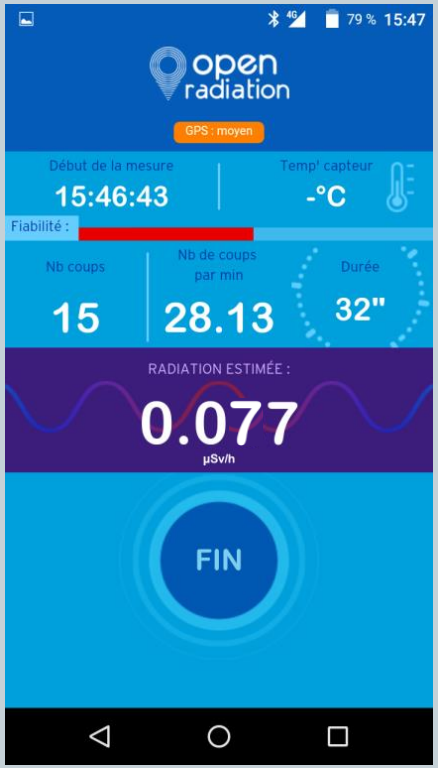
« packaged » prototype

The smartphone application

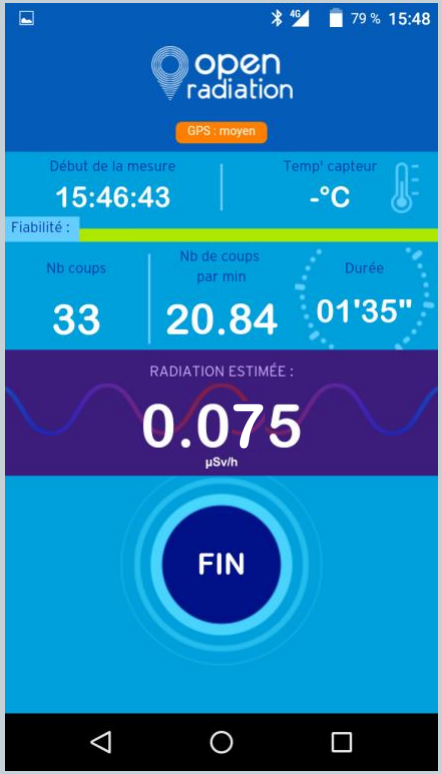
Measurement



Home page



"Poor" statistic



"Acceptable" statistic

Metadata

Use of other dosimeters

Other dosimeters can be used using a **specific interface** or enter measurements **manually**

Today: *Safecast*

Other systems in the future

Around the project today

- **Contact with other collaborative projects:**
  Tela Botanica, Safecast…
- **Pedagogical projects with high school students:**
  Vichy, Villeneuve-sur-Lot, Perpignan, Dieppe…
  Contact with Fukushima high school…
- **Presentation of the project to potential users in France:**
  ANCCLI (local information committees), Paris district…

Future actions and challenges

Technical

- Develop **interfaces with other dosimetric systems**
- Develop an application using the **CMOS camera** *(Reaching Out project)*
- Define and implement **protocols for data analysis**

Organisational

- **Create a community**: *public, associations, students… dosimeters*
- **Manage the website:** *forums, alerts…*
- **Improve the economical model:** *produce/distribute dosimeters, use of other dosimetric systems…*

Thank you for your attention