

# Generic Radio Localisation Solver



Indoor/Outdoor, accurate localisation based on communication of extracted signals

The aim of the localisation solver is to allow localization of any communicating device in a reliable manner whether indoor or outdoor. Based on the information collected directly from the radio, the solver is capable of parsing, filtering and analysing the transmission quality to integrate a reliable position.

Tailored around a particle filtering technique, information collected from the radio environment is transformed into a series of possible points, called particles. For each of these particles, a probability of being the searched position is calculated. The probabilities of all particles are processed through an iterative process until convergence.

## Interfaces

The solver can be used as a stand-alone module accessing the information either from a CSV file or from an SQLite database. The result is then either written in a TEXT file or in a table of an SQLite database.

The solver can also be interfaced to be accessible through a REST API exchanging information using JSON formatting of data.

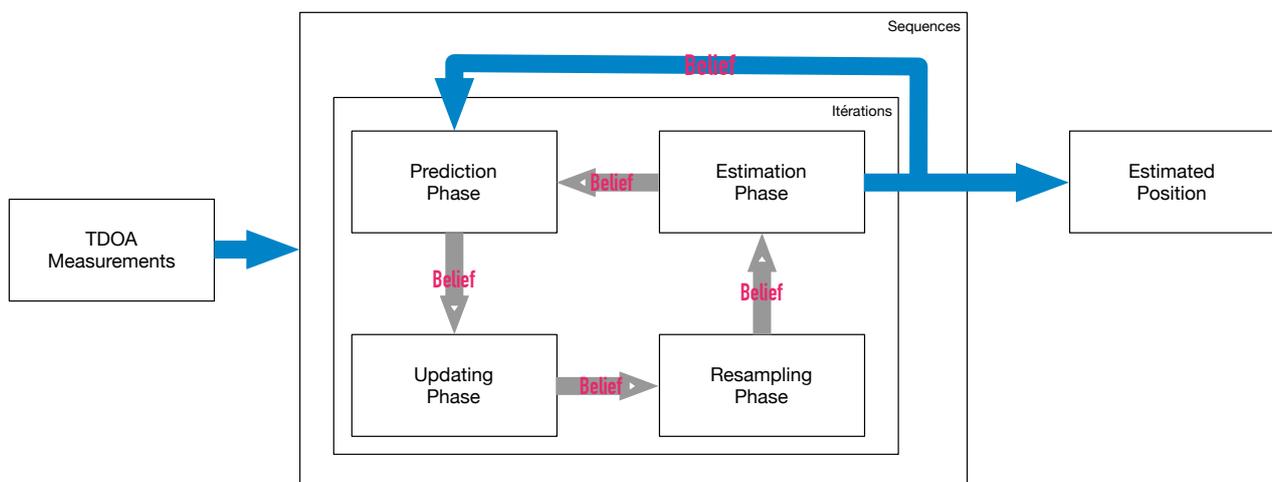
Both interfaces also allow the configuration of the solver by defining for example the number of particles to be distributed or the type of estimator to be used for the final step of the localization.

## Generic Solver tested on

- *Received Signal Strength (RSSI)*  
Precision: 20 to 30% of the gateway granularity (Indoor/Outdoor)
- *Time Difference of Arrival (TDoA)*  
LoRa® Precision: <30m in rural environment  
<100m in urban environment\*
- *Time of Flight (ToF)*  
Ultra Wide Band: 10cm indoor

## Compatible with

LoRa® / LTE-M / NB-IoT / any radio capable of generating RSSI, SNR, ToF, AoA, TDoA, DTDoA



\* Measured on real life deployment with LoRa V2 gateways capable of precise time stamping.