



DASH7 USES CASES

MAARTEN WEYN – GLENN ERGEERTS

Multimodal Low Power Communication

Multimodal Low Power
Localization

Modeling and optimization of low power IoT systems



SIGFOX
One network A billion dreams

Prototyping



Spin-offs



Validation with industry

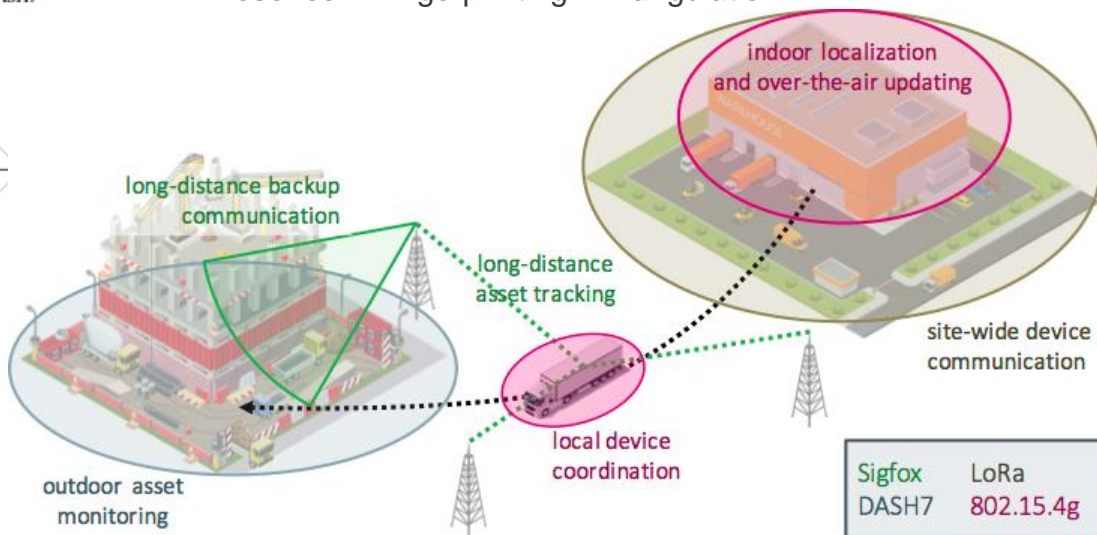
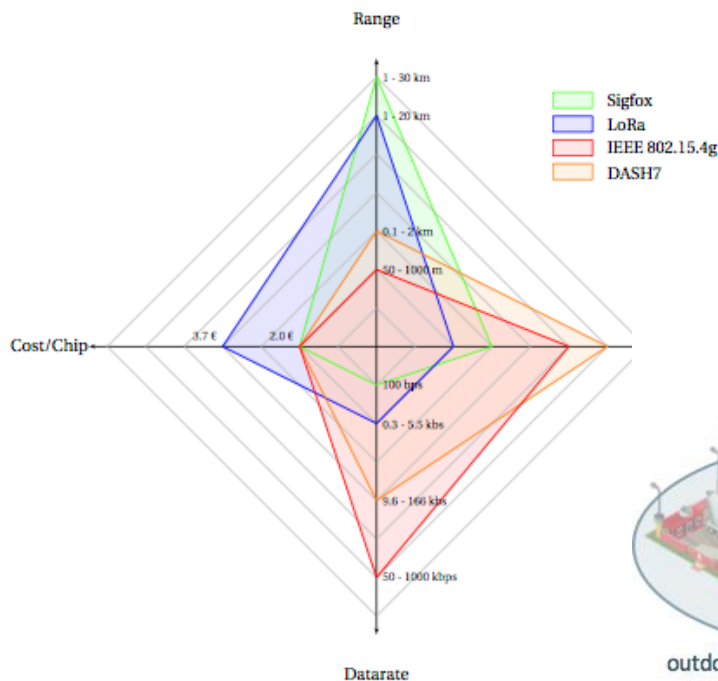
COMPLEMENTARY TECHNOLOGIES USING SUB-1 GHZ

Communication

Seamless integration of technologies using national telecom operator (long range) and local private network provider (short/mid range)

Localization

Seamless integration of algorithms
Presence – Fingerprinting - Triangulation



Sigfox	LoRa
DASH7	802.15.4g

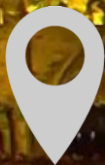


Scalable communication for 80 000 bracelets

Continuous stream of data, latency optimized



Reliable backbone for gateways

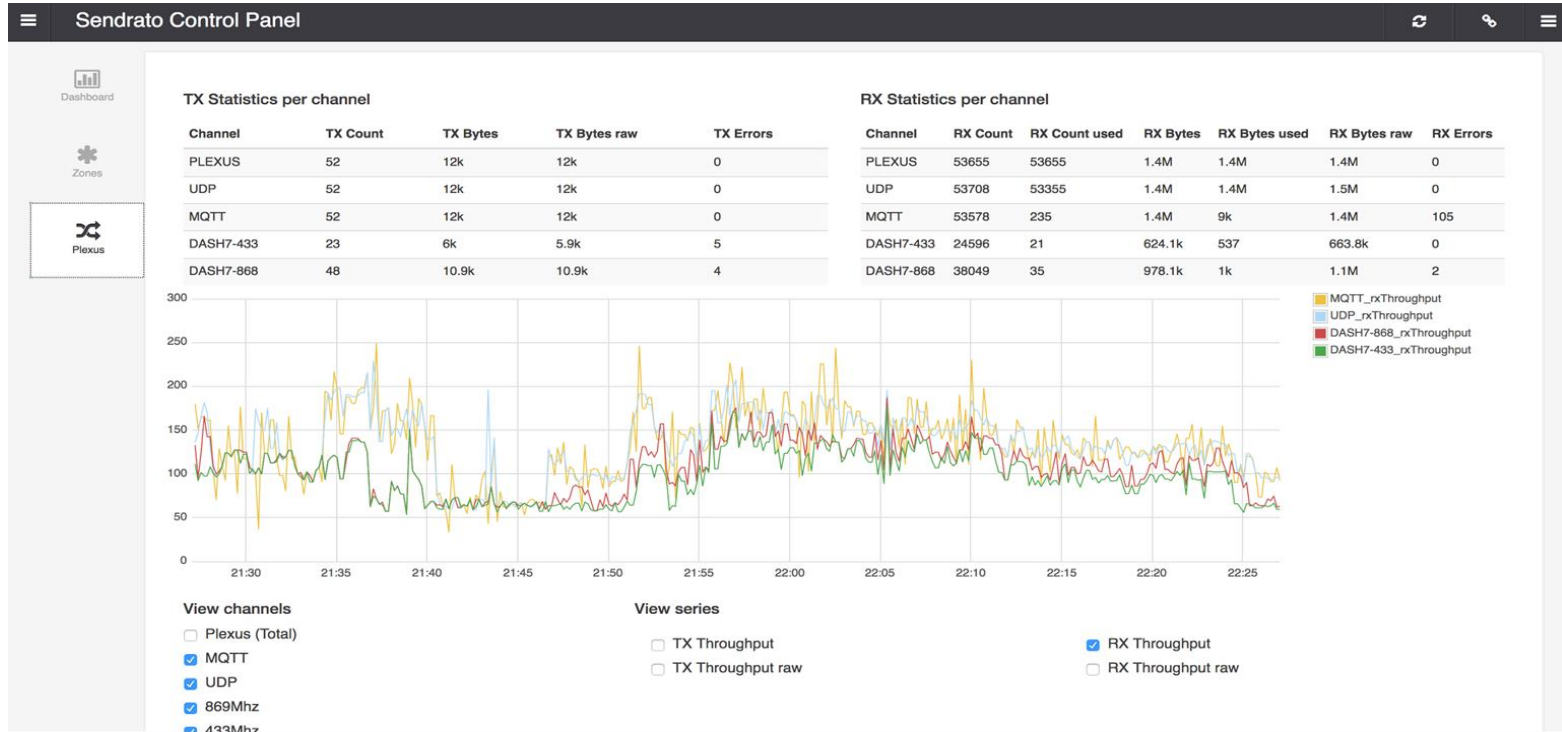


Low – Power Localization

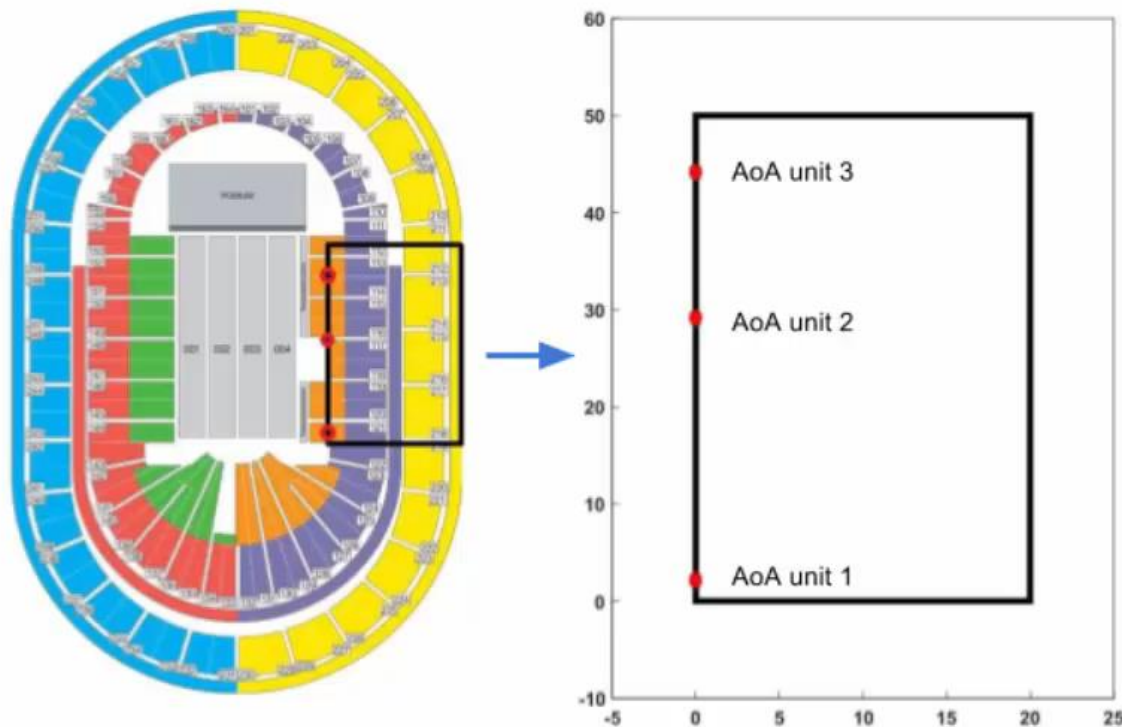
RELIABLE BACKBONE FOR GATEWAYS



RELIABLE BACKBONE FOR GATEWAYS



- 3 Angle of Arrival (AoA) estimation unites
- Each unit constricted of 2 USRP B210 SDR
- Each SDR provides a 2 elements array antenna.



iFest

Angle of Arrival Localization

Noori Bni Lam - Glenn Ergeerts - Prof. Maarten Weyn

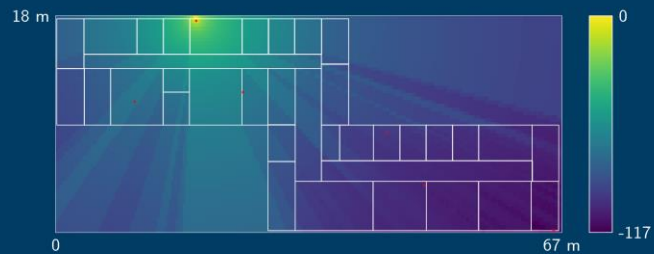
IDLab
INTERNET & DATA LAB

imec

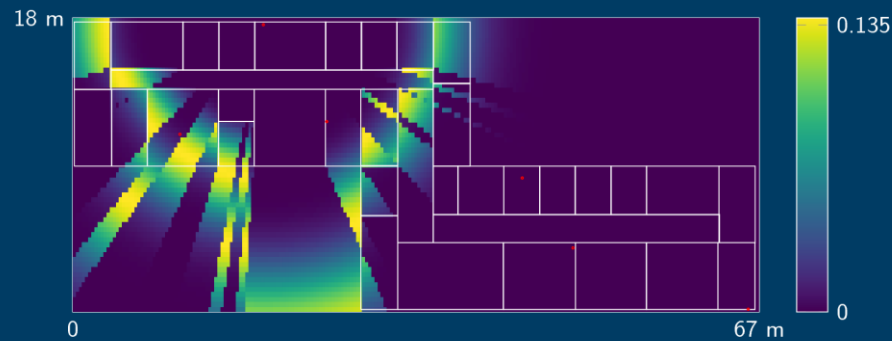
Universiteit
Antwerpen

RSS BASED LOCALIZATION

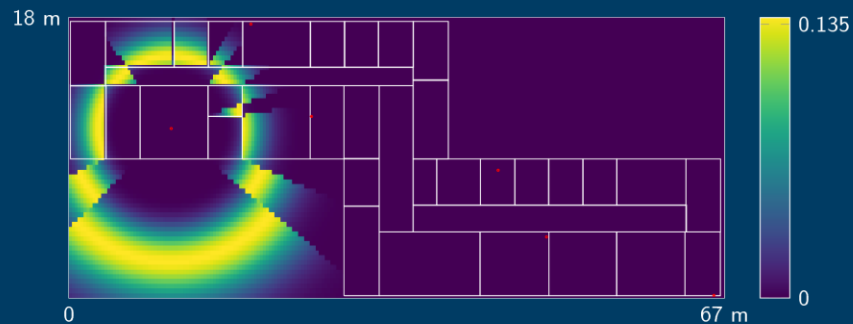
Propagation, link budget [dB]



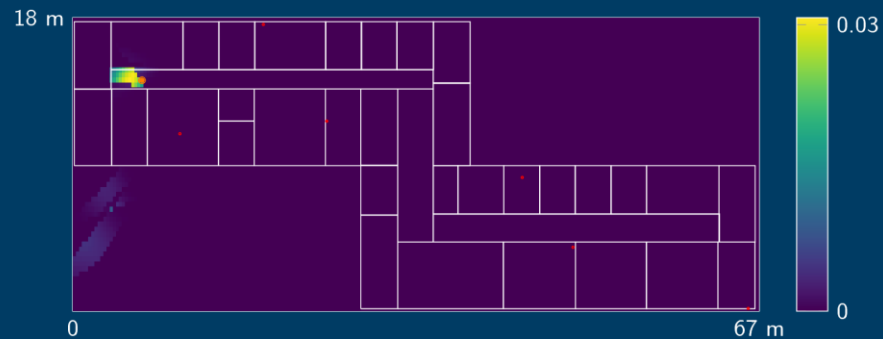
Likelihood gateway 1: RSS -83 dBm



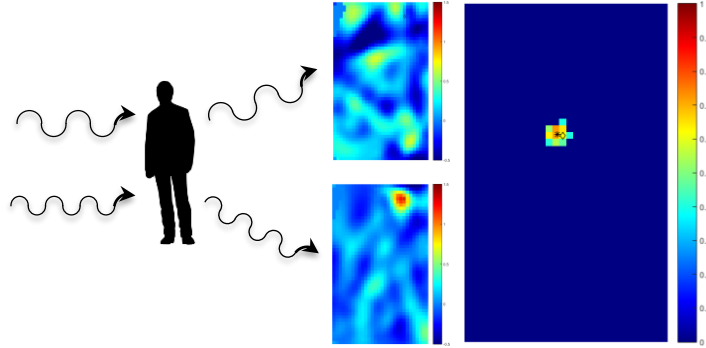
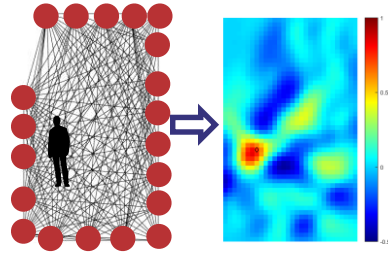
Likelihood gateway 2: RSS -62 dBm



Posterior



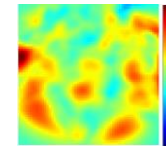
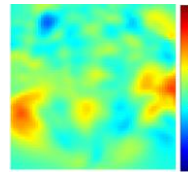
MULTI-FREQUENCY DEVICE FREE DASH7 LOCALIZATION



Radio Tomographic Imaging

Combining 433 MHz and 868 MHz in a basic shadowing-based RTI-system using a newly developed probabilistic method. Sub-meter positioning accuracy was easily obtained in an empty classroom environment of 60 m².

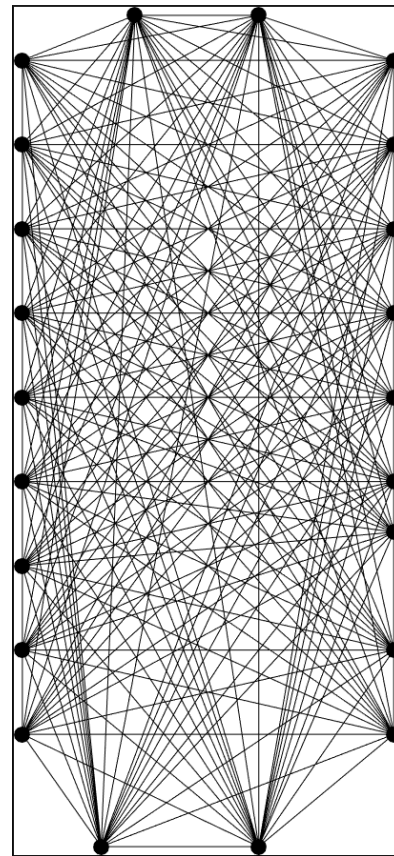
Population Density Estimation



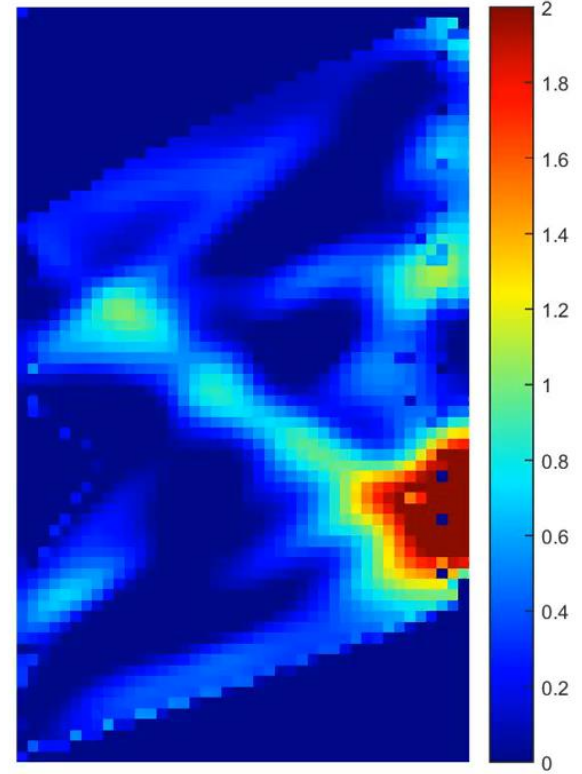
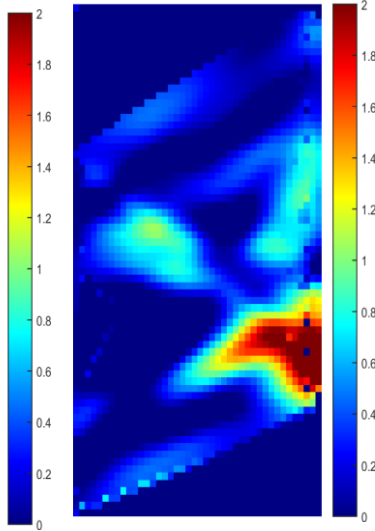
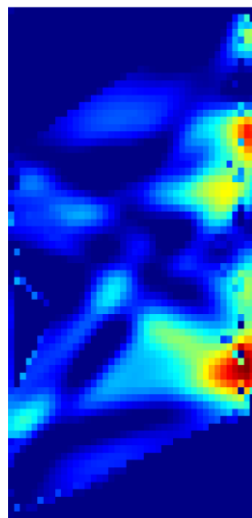
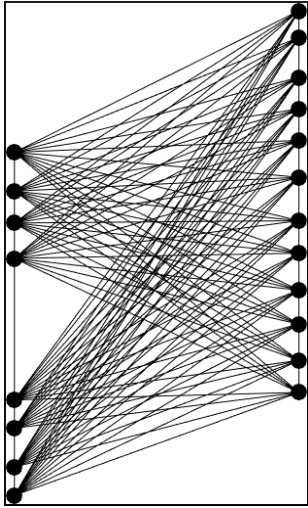


Tracking Individuals

DEMO



Corridor Monitoring



PROTOTYPING I.C.W. INDUSTRY

Story telling tablets in Talbot House

Using 433 Mhz Presence localization



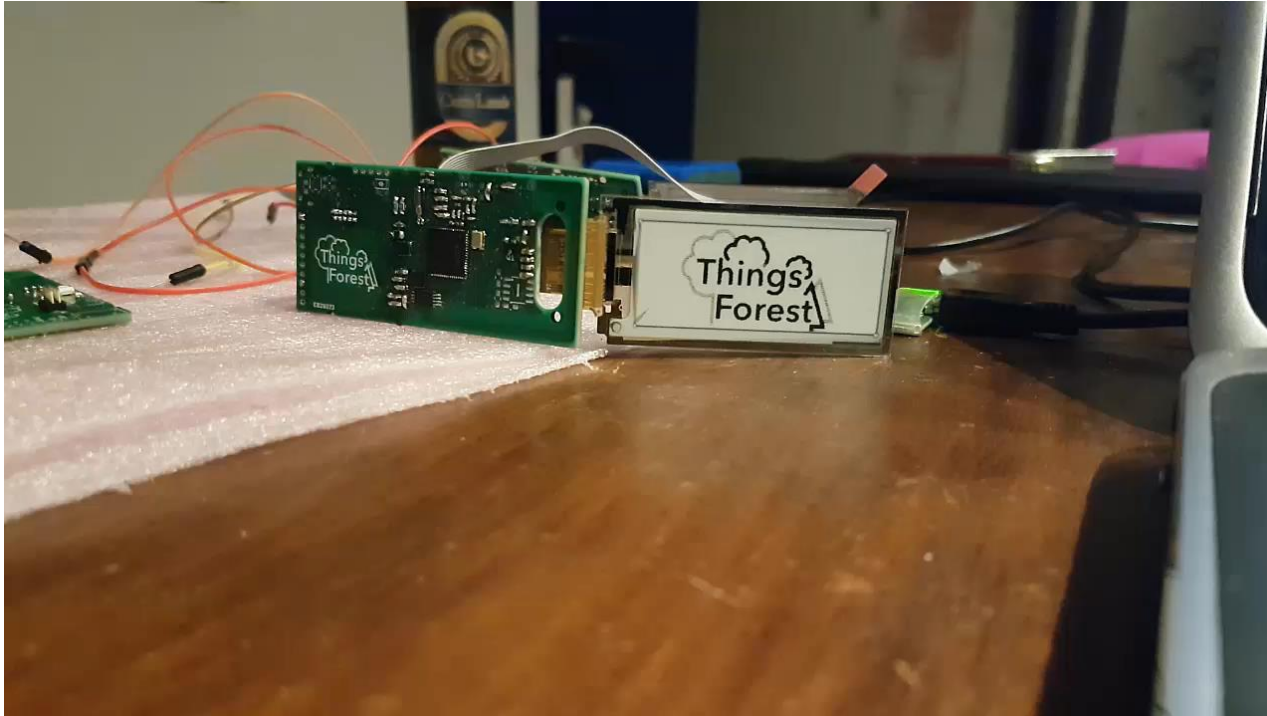
868 Mhz / NFC smart badge



20 gram bird tracking

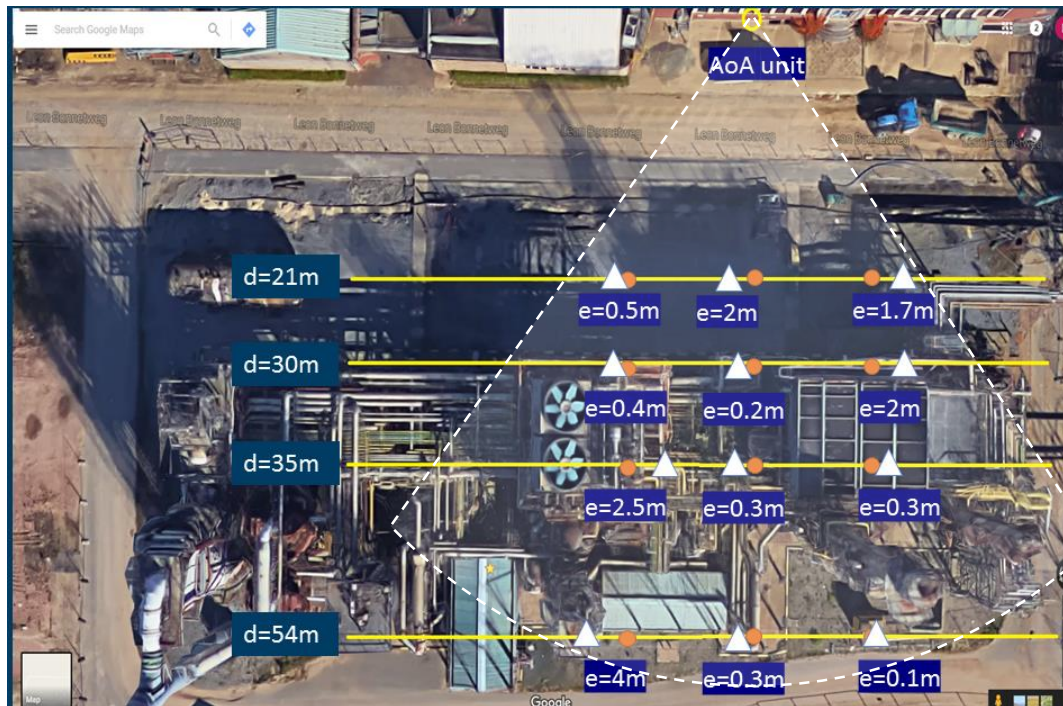


AN EARLY TECH PROTOTYPE IS ALREADY DEVELOPED



FIRST FIELD TESTS OF THE LOCATION TRACKING SHOW PROMISING RESULTS

DISTANCE VERSUS ERROR ON LOCATION ACCURACY





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