Quuppa RTLS Platform
One System for Many Use Cases

June 15th, 2020

Quuppa Company Overview

- Founded in 2012, spin-off from Nokia Research Center, technology developed since 2005

- HQ in Finland; offices in Washington DC, Shanghai, Shenzhen, Beijing, Sydney and Dubai

- 170+ business partners (solution providers, system integrators, tag vendors,…)

- 2000+ systems delivered to 55 countries

- Key achievements in 2019;

Gartner
Magic Quadrant
Visionary in Indoor Location Services study 2020

FROST & SULLIVAN
Enabling Technology Leadership Award
Indoor Location Systems

NORDIC SEMICONDUCTOR
Nordic Semiconductor Global Partnership

Bluetooth
Bluetooth 5.1 Standard in-line with Quuppa AoA/AoD
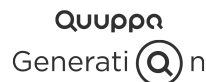
Quuppa
Generati Q n
Generation Q Locators and new subscription model launched

Liiga KHL
Wisehockey wins Finnish Hockey League and KHL league deals

orange
Orange Business Services Global Partnership

Bluetooth Standard for Direction Finding Feature

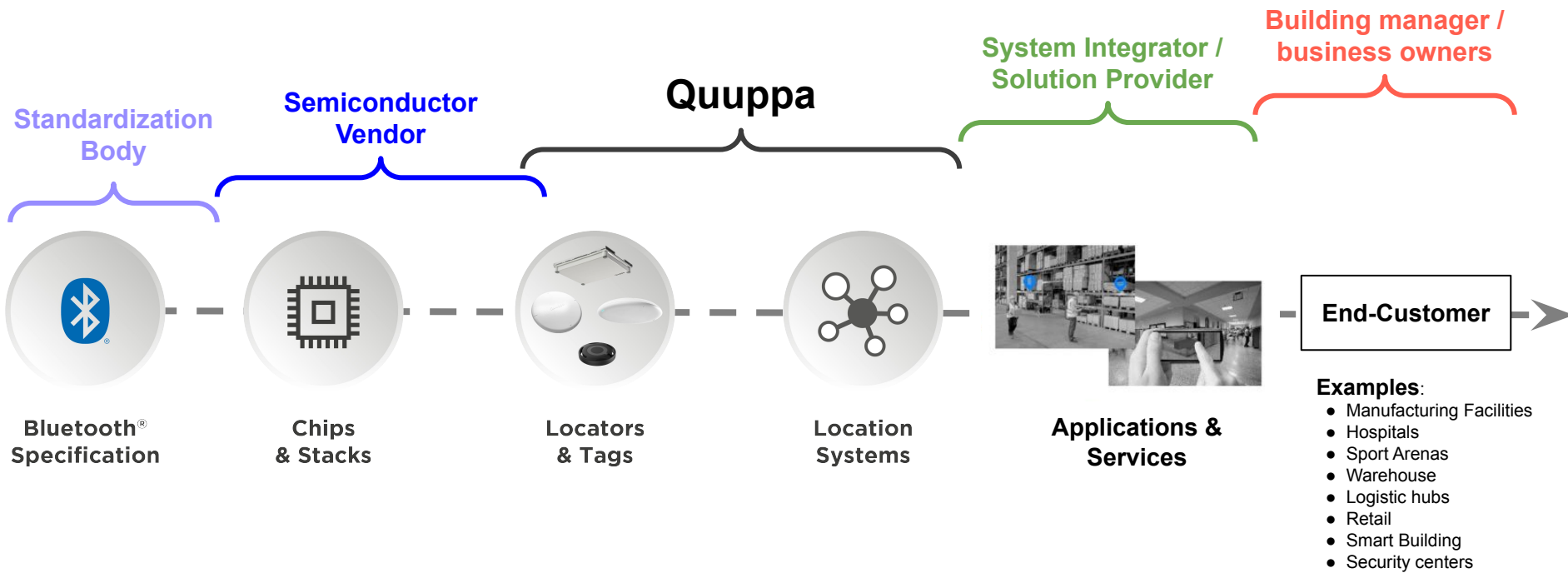Enhancing Bluetooth Location Services with Direction Finding

KIRKLAND, Wash. – January 28, 2019 – The Bluetooth Special Interest Group (SIG) today announced a new direction finding feature that holds the potential to significantly enhance the performance of Bluetooth location services solutions. The new feature allows devices to determine the direction of a Bluetooth signal, thereby enabling the development of Bluetooth proximity solutions that can understand device direction as well as Bluetooth positioning systems that can achieve down to centimeter-level location accuracy.

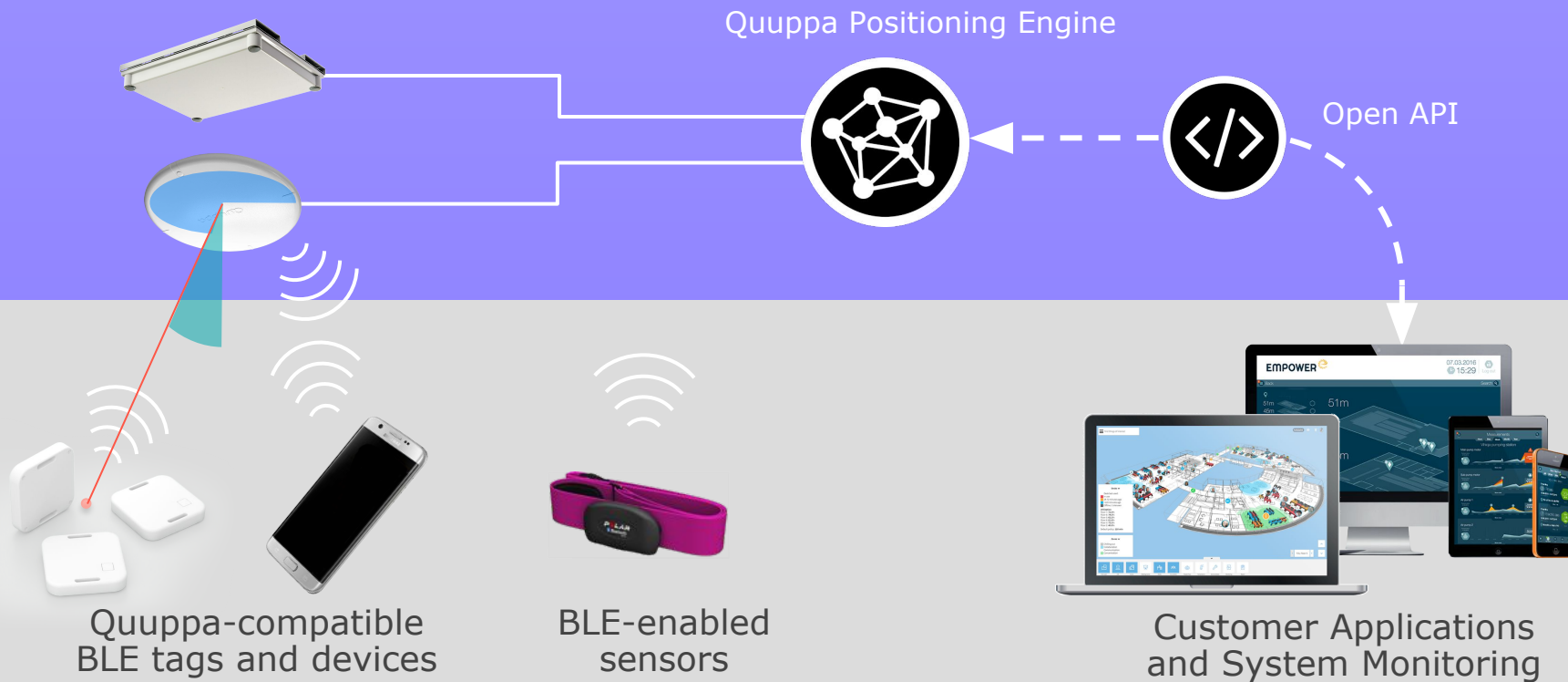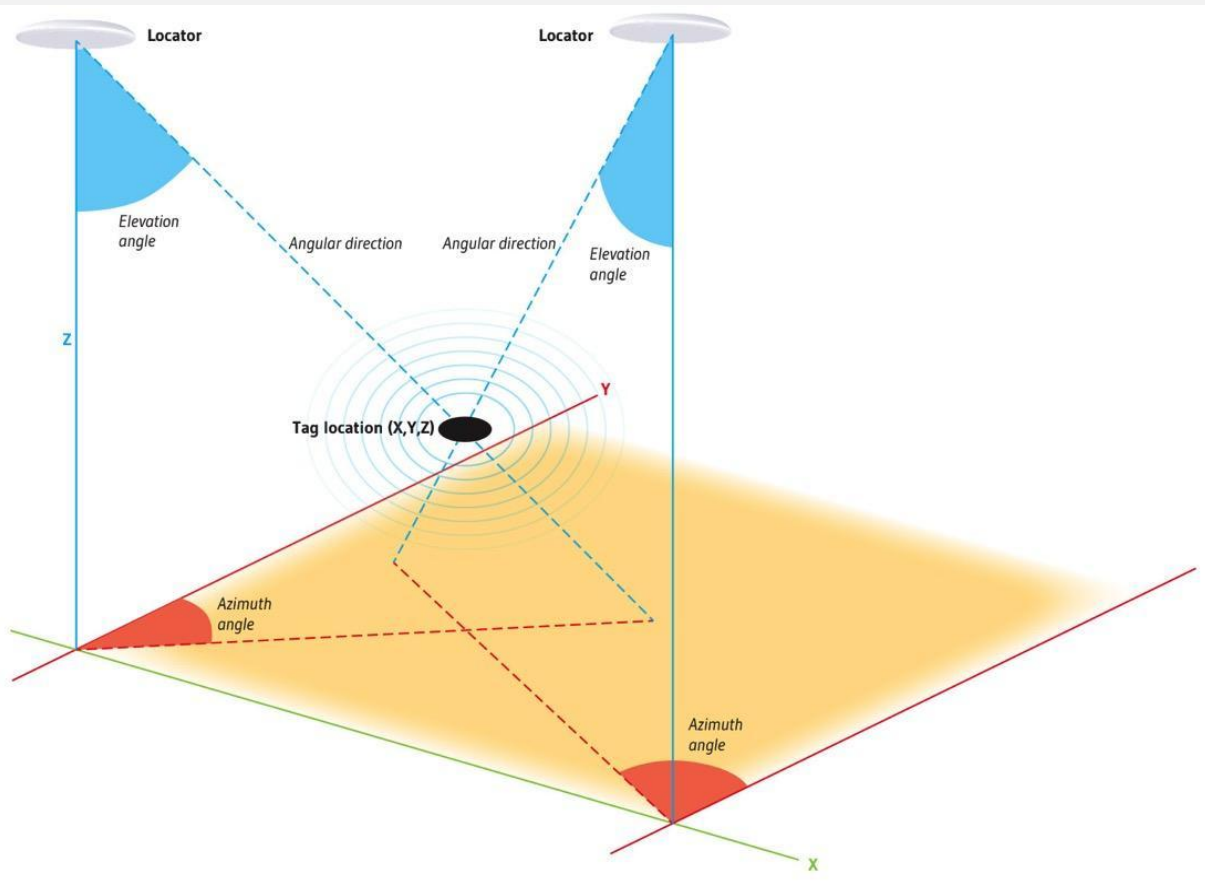Form more info: https://quuppa.com/quuppas-role-regarding-the-new-bluetooth-sig-direction-finding-feature/

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Bluetooth Direction Finding (5.1) Value Chain

Standardization Body

Semiconductor Vendor

Quuppa

System Integrator / Solution Provider

Building manager / business owners

Bluetooth® Specification

Chips & Stacks

Locators & Tags

Location Systems

Applications & Services

End-Customer

Examples:
- Manufacturing Facilities
- Hospitals
- Sport Arenas
- Warehouse
- Logistic hubs
- Retail
- Smart Building
- Security centers

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Quuppa Intelligent Locating System™

Quuppa Positioning Engine

Open API

Quuppa-compatible BLE tags and devices

BLE-enabled sensors

Customer Applications and System Monitoring
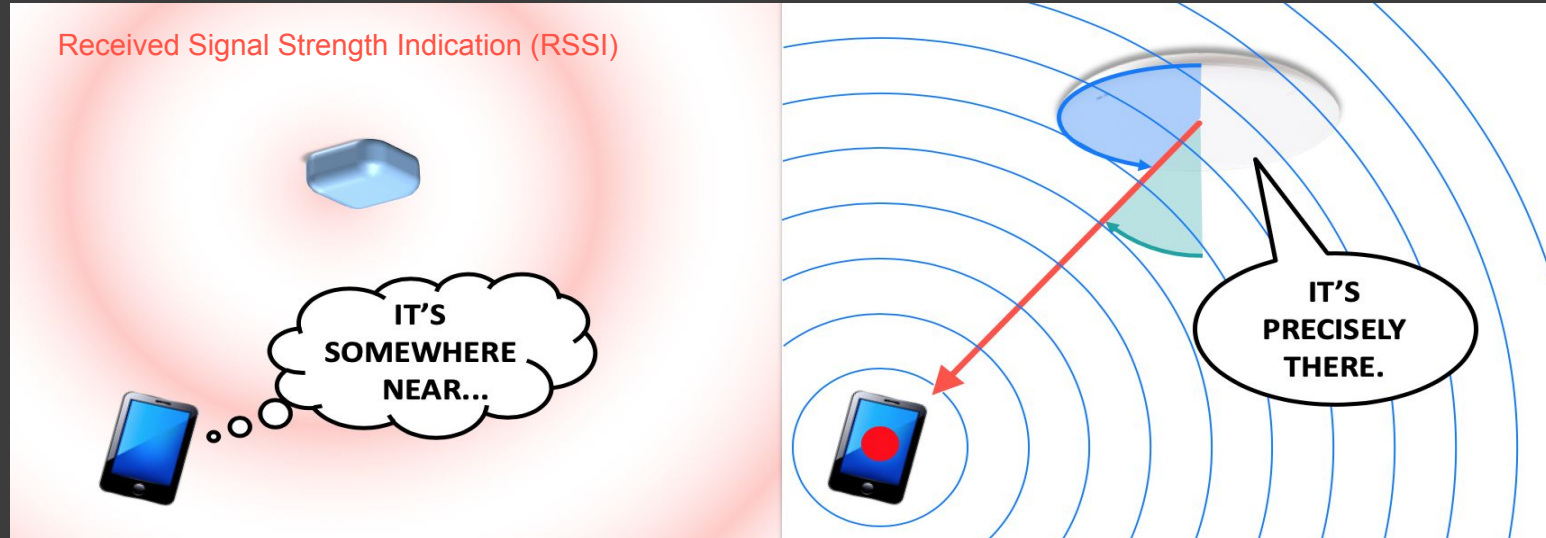
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Quuppa Intelligent Locating System™

Standard Bluetooth Low Energy (BLE) technology

Angle of Arrival (AoA) methodology

Advanced Positioning Engine

Advanced Software Tools

Quuppa

Positioning over Bluetooth: from RSSI to Direction Finding

For more information see the following articles:

- Tags are not Beacons: https://quuppa.com/tags-are-not-beacons/
- Bluetooth AoD as the Technology of Choice for Indoor Positioning Systems (IPS)
  https://quuppa.com/bluetooth-aod-as-the-technology-of-choice-for-indoor-positioning-systems-ips/
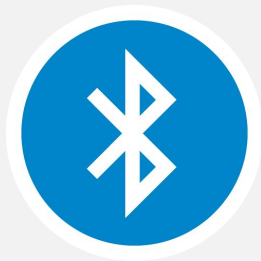
Positioning Technology Comparison

	Quuppa (Bluetooth AoA)	UWB (RTT)	UWB (TDOA)	Wifi / Active RFID (RSSI)	Bluetooth Beaconing (RSSI)
Developed for Positioning	Yes	Yes	Yes	No	Some Profiles
Tag/Beacon Power Consumption	Very Low	Very High	Low	High	High
Accuracy	0.1m - 1m	0.1m - 1m	0.1m - 1m	5m - 20m	5m - 20m
Real-time	Yes	Yes	Yes	No	No
Smartphone Compatibility	Yes	No	No	Yes	Yes
IoT Gateway	Yes	No	No	Yes	No
Cost of Setup	Medium	Medium	Very High	Medium	Low
Cost of Ownership	Low	High	Medium	Medium	Medium

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Key Benefits

Accurate

Versatile
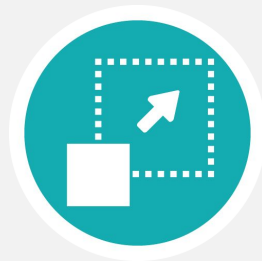
Scalable

Open

One Platform Enabling Multiple Use Cases

High Accuracy Tracking + Asset Control	High Accuracy Tracking	Proximity Beaconing (iBeacon/RSSI)	High Accuracy Positioning via AoD	Remote Sensing IoT Gateway
Tags (Bluetooth v4.0 →)	Bluetooth LE Devices Emulating Tag (Bluetooth v4.2 →)	Bluetooth Beaconing for Mobile Devices (Bluetooth v4.0 →)	Bluetooth LE Devices + QPE (Bluetooth v5.1)	Std. Bluetooth LE Sensors (Bluetooth v4.0 →)
0.1 – 1m	0.1 – 1m	5 – 10m	0.1 – 1m	• Heart-rate • Gyro • Compass • Humidity • Temperature • Barometer

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Key Features

Superior Accuracy

Open Tag Design

Long Battery Life

Real-time

IoT Gateway

Maintenance-free

Compatible

Open API

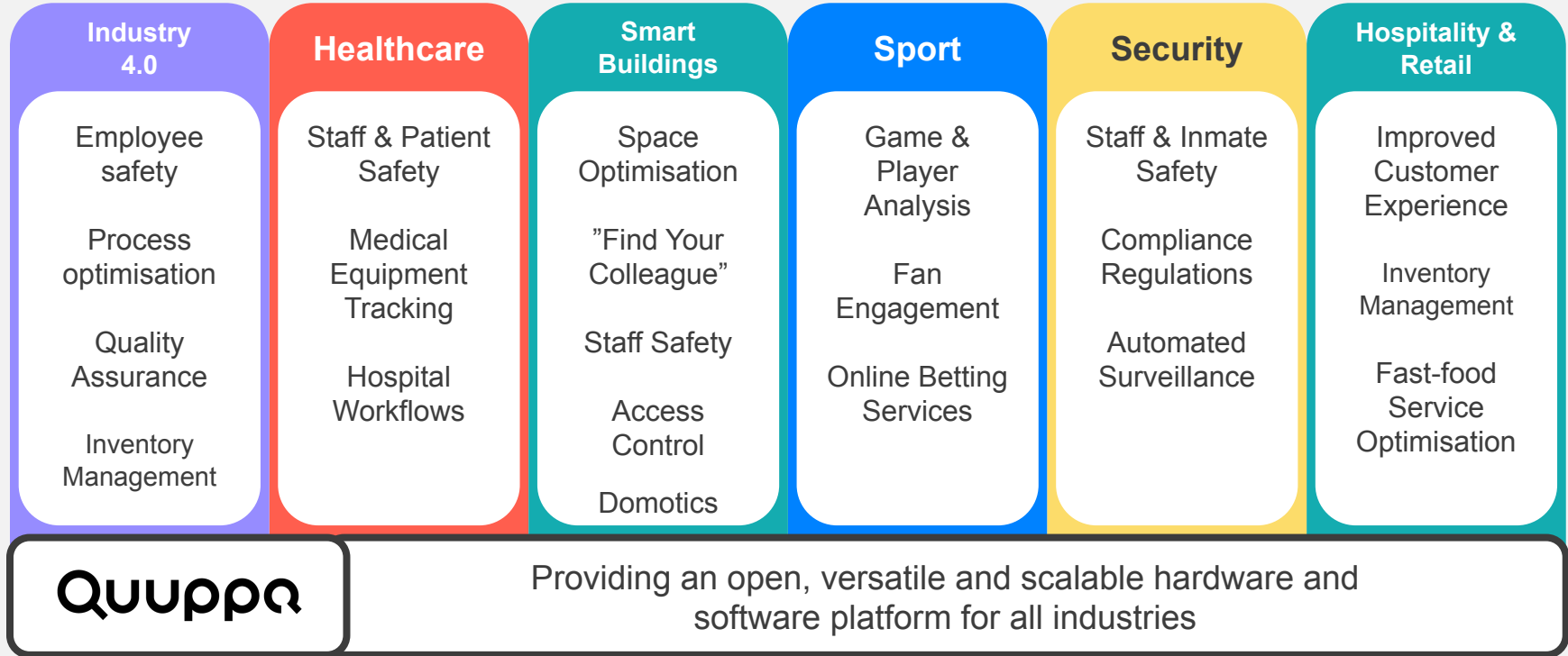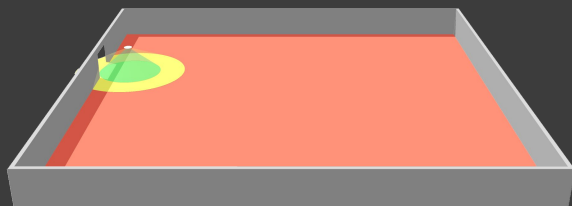Interference-free
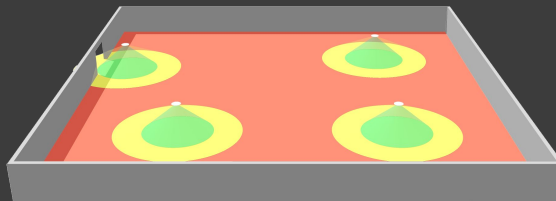
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Versatile Solution Across Industry Verticals

Industry 4.0	Healthcare	Smart Buildings	Sport	Security	Hospitality & Retail
Employee safety	Staff & Patient Safety	Space Optimisation	Game & Player Analysis	Staff & Inmate Safety	Improved Customer Experience
Process optimisation	Medical Equipment Tracking	"Find Your Colleague"	Fan Engagement	Compliance Regulations	Inventory Management
Quality Assurance	Hospital Workflows	Staff Safety	Online Betting Services	Automated Surveillance	Fast-food Service Optimisation
Inventory Management		Access Control			
		Domotics			

Quuppa — Providing an open, versatile and scalable hardware and software platform for all industries

Scalable Solution

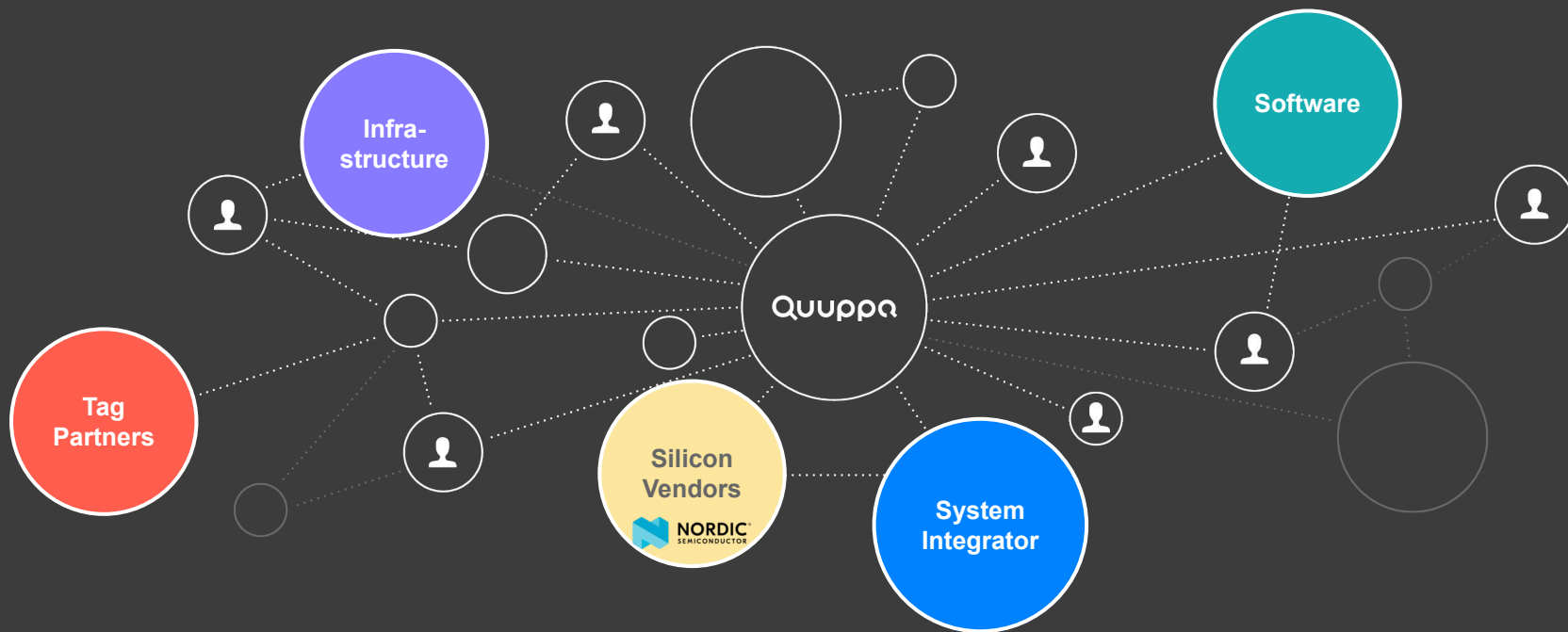| **PRESENCE**	**PROXIMITY**	**POSITIONING**
"Building-level"	"Zone-level"	High-accuracy

Inventory management

Area/zone-level services
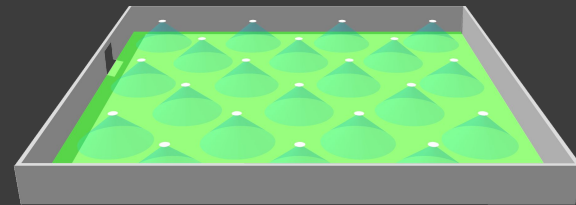
Process optimisation, worker safety

For more information see the article "The 3Ps of Location: Presence. Proximity, Positioning"
https://quuppa.com/the-3ps-of-location-presence-proximity-positioning/

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Quuppa Partner Ecosystem

Quuppa Partner Ecosystem

Quuppa is a leading provider of Real-Time Locating Systems (RTLS) with 2000+ deployments in 55 countries & 170+ partners worldwide.

- Solution Providers
- System Integrators
- Tag Manufacturers
- Application Developers
- Hardware Manufacturers
- End Users

View More About Quuppa Partner Ecosystem

Quuppa Tag Ecosystem: Wide range of Tags, Sensors & Devices

Tag Partnership

- Access to the Ecosystem — Quuppa facilitates business partners acquisition

- New revenue streams — RTLS use cases scales up to 6-figures

- Quick time-to-market — with Quuppa Native nRF52xxx FR libraries

- Joint Marketing — www, webinars, exhibitions, newsletter, joint-PR, etc...

Q2/2020 HOT TOPICS:
- wearable with AI-fall detection, heart rate, and **vibration alert** capabilities
- highly visible LED for asset tracking identification
- barometer for asset elevation tracking
- ATEX-tags for intrinsically safe working areas
- 6-axis accelerometer & gyroscope

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Tag Partnership – Eligibility?

- **Established company seeking to expand their business!**
- **Know-how** on embedded development, electronics engineering, and antenna design.
- **Experience** in bluetooth-sensor devices (even beacons)
- Capacity to **support** their customers and control production **quality.**
- **Own specialization** or value add in the ecosystem be it sensor, certification, form factor, IP/ATEX class. I.e. not yet another "low-cost asset tracking tag.

For more information please contact us at info@quuppa.com or directly santtu.pulli@quuppa.com

Quuppa Native Compatibility (nRF52-family)

- Quuppa Tag Partners can get access to the Quuppa FW Library for the nRF52832
  - accelerate development by leveraging the extensive Quuppa SW application API
  - operate on proprietary channels (2403 & 2481 MHz)
  - get all Quuppa Software Suite features natively supported
- Quuppa is extending the FW library support for the nRF52833/840
  - release schedule: Q3 (closed beta Q2)
- FW support for the nRF52811, and -810 also on the near term roadmap
  - planned schedule: Q3-4 (closed beta Q3)
- For future Nordic Semiconductor Bluetooth radios, we are working for making the Quuppa (DF) profile to be easily integrated with the Nordic nRF Connect SDK

For more information please contact us at info@quuppa.com or directly santtu.pulli@quuppa.com

Quuppa Natively Compatible Firmware for nRF52832

- **Full support of all Quuppa native system application** features, including:
  - Accurate real-time positioning (down to 10 cm)
  - Exposing onboard sensor data
  - Operation on Bluetooth ADV channels AND Quuppa proprietary channels (2403 & 2481)
  - Up to 50 Hz (20ms) TX rate
  - OTA configuration using Locators
  - Retrieve the Tag Data info via the native *QPE API*
  - Native back channel (uplink) support
  - Location based commanding (LED, buzzer, vibration, you-name-the-tag-side-action...)

- **Configure**, **Provision** and **Test Tag profiles** with *Quuppa Site Planner (QSP)*:
  - Transmit Power and Rate
  - Response time
  - Final State Machine logic (interrupts and timeouts)
  - Accelerometer settings (sample rate & sensitivity)
  - Data Payloads info (i.e exposed sensor data)
  - Also Zone-based Tag Profiles (automatically applied with OTA Location-Based Commanding)

- **Can be tested and approved by Quuppa to ensure quality and full compatibility with the Quuppa!**

Use Cases - Industry Examples

Asset tracking drives process efficiency, quality assurance

Manufacturing & Logistics

Inventory mgmt, process optimisation in factories and warehouses

Construction

Tool tracking at construction sites for theft prevention and process optimisation

Healthcare

Inventory management of mobile medical equipment (wheelchairs, beds, crash carts, defibrillators,...)

Maintenance

Tool & part tracking, work order digitalisation, quality assurance

Retail

Inventory management, click & collect process optimisation, anti-theft solution

CLICK & COLLECT

People tracking is becoming acceptable and even a "must have" in many industries

Industry 4.0

Worker safety in hazardous environments (man-down detection, vital sign monitoring)

Security

Access control preventing unauthorised entries in offices and highly secure places

Healthcare

Hand-hygiene compliance, assistance needed, fall detection, vital sign monitoring

Elderly care

Wander management compliance (elopement prevention of dementia patients)

Law enforcement

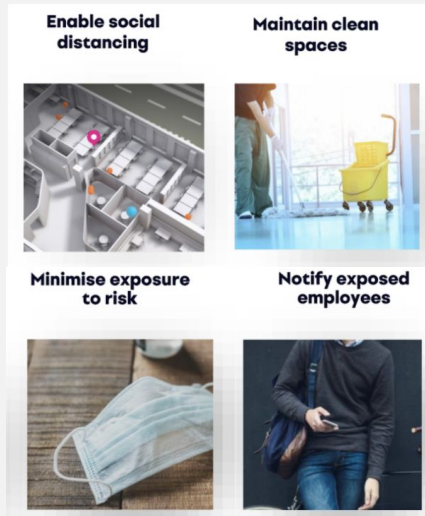Inmate and guard safety (anti-assault, assistance needed)

Hospitality

Hotel staff safety (cleaning, room-service)

Combating COVID-19 with RTLS
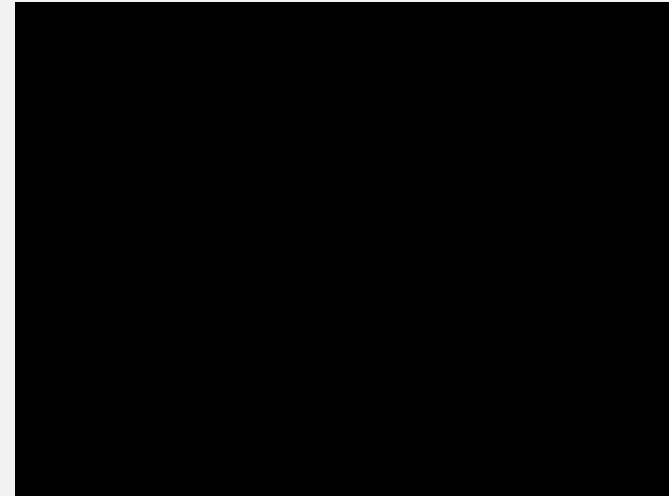
Social Distancing
Symbiosy platform

https://hbreavis.com/uk/symbiosy/

Quarantine Control
Restrata platform

https://www.restrata.com/restrata-platform-cv19/

Contact Tracing
NESA Halo Contact Tracing

https://nesasolutions.com/home

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Combating COVID-19 with RTLS - Hand-Hygiene Compliance

- High accuracy real-time positioning
- Sanitation station - sensor triggered by usage
- Geofence areas around sanitation station and beds
- Real-time alerting (buzzer, light)
- Personnel tag, patient tag

Case study: University of Fukui:

"*According to the University of Fukui Hospital, the number of times medical staff performed hand hygiene while attending to a patient increased by more than 300% as a result of visualizing the presence and timing of hand hygiene practices.*"

https://quuppa.com/case-study-university-of-fukui-hospital/

Summary

Quuppa unlocks the full potential of indoor location-based services without compromising accuracy, compatibility and cost.

Quuppa enables a Partner Ecosystem of infrastructure, devices and service providers to offer accurate indoor location services.

Quuppa is the pioneer of the Bluetooth DIrection Finding for global indoor location services, with the current products being already standard-ready.
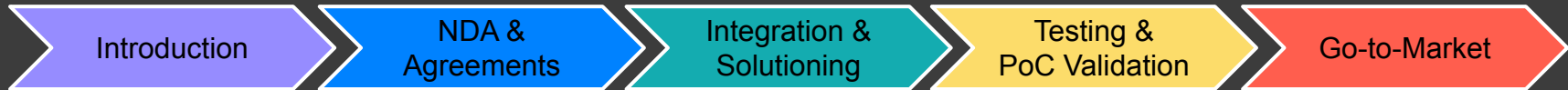
How to get started with Quuppa?

1. **Tag Partnership:**

● Ready to join?? https://quuppa.com/partners/partner-tags/#TagContact

2. **VAR (Value Added Reseller) Partner** - System Integrator and Solution Provider:

● Contact Quuppa or submit a request at https://quuppa.com/contact/

Introduction	NDA & Agreements	Integration & Solutioning	Testing & PoC Validation	Go-to-Market

3. **End-customers** - e.g. Facility Operators, Building Managers, Business Owners

● Contact Quuppa for consultation at info@quuppa.com

● We are happy to put you in contact with our Partners' Ecosystem

Thank You

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