Ultra-Wideband
by **sevenhugs**

Field Proven
# Ultra-Wideband Software
for Smartphones and Devices

Developing UWB technology since 2014

Sevenhugs' Smart Remote was the world's first consumer electronics product to leverage UWB and offer indoor positioning plus orientation tracking 24/7 without recalibration and realignment by the user. Smart Remote has been in retail since 2018, shipped to more than 70 countries and is FCC and CE certified.

25 International Patents

We've become industry experts in fusing UWB data with additional sensors and have filed over 25 international patents that cover a wide range of categories; including UWB system setup, frame alignment, pairing and node antenna performance.
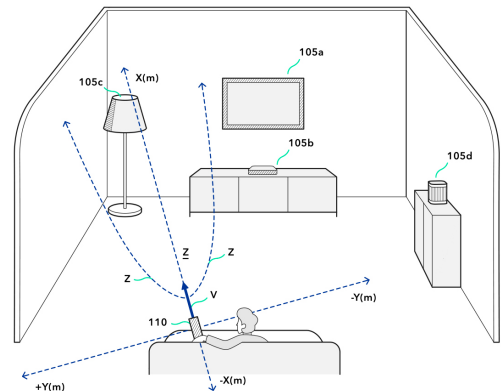
Sevenhugs' UWB Stack

Our efficient and field-proven UWB stack provides interoperability between multiple nodes and tags

LOCALIZATION

Unique know-how enabling real life deployment of UWB to fulfill existing and future applications

SECURITY

Resilient system using joint security communications and ranging with STS resynchronization
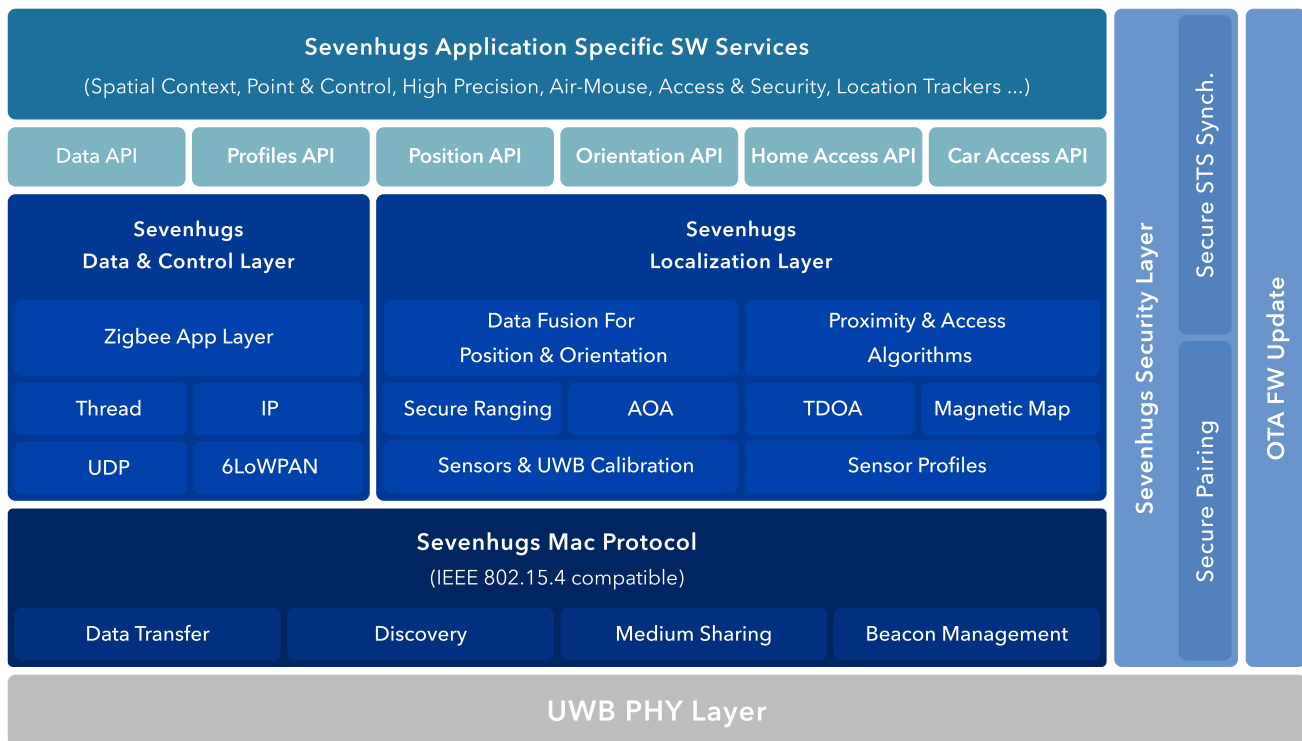
DATA TRANSFER

Standard protocols for fast and reliable data transfers that will remain universal

DEVICE CONTROL

WIFI IP & TCP | UDP for universal device control

SEVENHUGS' UWB STACK

Sevenhugs Application Specific SW Services							
(Spatial Context, Point & Control, High Precision, Air-Mouse, Access & Security, Location Trackers ...)							

Data API	Profiles API	Position API	Orientation API	Home Access API	Car Access API

Sevenhugs Data & Control Layer		Sevenhugs Localization Layer		
Zigbee App Layer		Data Fusion For Position & Orientation	Proximity & Access Algorithms	
Thread	IP	Secure Ranging	AOA	TDOA	Magnetic Map
UDP	6LoWPAN	Sensors & UWB Calibration	Sensor Profiles	

Sevenhugs Mac Protocol
(IEEE 802.15.4 compatible)

Data Transfer	Discovery	Medium Sharing	Beacon Management

Sevenhugs Security Layer

Secure STS Synch.

Secure Pairing

OTA FW Update

UWB PHY Layer

Sevenhugs' UWB Stack Features

Mac Protocol

- FCC and CE certified, compatible with 802.15.4 standard
- Highly tolerant to frame loss
- Multiple independent masters can share the same environment
- Up to four master devices can share the same channel while using the same bandwidth
- Hidden node management (allows two nodes hidden from one another to communicate through other available and visible nodes)

Ultra-Low Power Consumption (with or without BLE)

- Efficient wake/sleep algorithms, system doesn't rely on an external radio (e.g., Bluetooth LE)
- More than one year of autonomy on a typical coin cell battery
- Highly parameterizable system allowing tradeoff between tag and node power consumption and wake up latency
- BLE component becomes optional for system cost savings

Incredibly Small Software Footprint

- Requires Cortex M0 at 16 MHz with 128KB of Flash memory and 10KB of Ram memory and can run on Bare-metal or FreeRTOS.

Sensor Profiles

- Abstracting sensors used in RTLS systems allowing fast driver development

Measurement

- We support different type of measurement methods such as Two Way Ranging (TWR), Angle Of Arrival (AOA) and Time Difference Of Arrival (TDOA)

Data Fusion

- Agnostic fusion of a wide variety of sensors
- Production, user init. & real-time calibrations for reliable and reproducible consumer experience
- Innovative handling of real-life magnetic field disturbances
- Comprehensive SDK

Secure Localization API

- Independent of the underlying sensor configurations

Cost Effective Architecture for Android Based Smartphones

Lightweight UWB stack that unlocks a wide array of innovative experiences

UWB

UWB Transceiver

Host µProcessor

Sevenhugs UWB Application

ANDROID

Sevenhugs UWB Stack
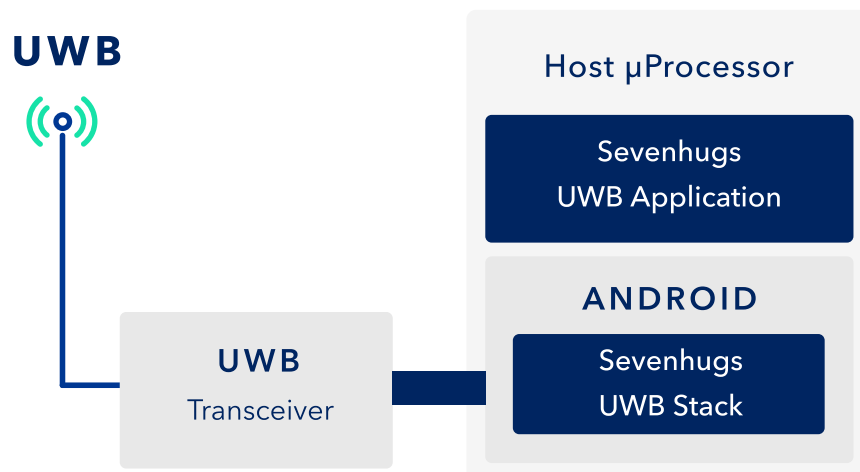
Deploying UWB in the Modern Home

ACCESS & SECURITY

Use of smartphones for unlocking doors for cars or homes. For example, the door unlocks when you approach your home from the outside in.

SPATIAL CONTEXT

Use of smartphones for personalized and contextualized experiences.
For example, your lights switch on when you enter a room, or music that follows you throughout the house.

POINT & CONTROL

When users point their smartphone or remote at a smart product (TV, speaker…), the smartphone display adapts contextually to show info and controls about the device it's being pointed at.

HIGH PRECISION AIR MOUSE

When users point their smartphone or TV remote at a smart TV, a mouse cursor appears on the screen and allows them to make selections within the on-screen interface.

LOCATION TRACKERS

Use of smartphones to search for lost items thanks to small finders/tags that also integrate UWB technology.

Applications

Smartphones

Unlock the potential of UWB using spatial awareness; creating personalized and contextual experiences, precision control systems, actionless security and powerful tracking ecosystems.

Location Trackers

Easily find items and devices with extreme accuracy using a smartphone.

Automotive

Bring security and contextual based experiences to the car. For example, when I approach my car it automatically unlocks and sets the seat position, entertainment and temperature to my desired settings.

Gaming

Enable new control opportunities and end-to-end gaming experiences by adding UWB to game controllers or remotes.

Entertainment

Create exciting new new control experiences and increase user interaction by adding UWB to the TV, Set-top Box or Media Streamer.

Smart home

Create personalized and contextual experiences based on the proximity and orientation of a user's smartphone or remote.

Security

Leverage UWB when distance and orientation are crucial for heightened security, such as unlocking the door of a home or vehicle.

Smart speakers

Use distance and presence between the listener and the speakers to create personalized and adaptive sound experiences in the home.

About Sevenhugs

Sevenhugs is a Paris based start-up that's raised over $25M and has over 50 employees worldwide. In 2018, they launched Smart Remote, the world's first consumer product featuring Ultra-Wideband (UWB) and precise indoor positioning. Their mission is to create new digital experiences that significantly improve the way we interact with all of our connected products and services.