

ARIANNA

.....where GPS is unavailable

Localization, Tracking and Mapping in areas without GPS

ARIANNA is a system for location and tracking of pedestrians based on innovative processing of raw inertial data. It has been developed for environments where the GPS signal is unreliable or absent (inside buildings, underground areas, GPS-denied environments).



SUPPORTED CONFIGURATION

Real-time Configuration (for Localization and Tracking)

The Real-time configuration has been developed to allow real-time acquisition, localization, display and tracking of several operators, each one wearing an ARIANNA system.

Position data are dispatched to a Controlling Center remote from the mission area. In this configuration a Wi-Fi (or GSM or UMTS) connection or a dedicated Radio-Modem (not provided as a part of the system) should be provided.

Off-Line Mode (for Mapping)

The Off-line configuration has been foreseen for mapping in areas when GPS signal is unreliable or absent (building interiors, underground areas, tunnels).

Position data are acquired and recorded on the Computing Unit and downloaded, displayed and integrated at the Controlling Center at the end of the mission.



Easy, light and flexible

Due to the small size and weight ARIANNA is smoothly wearable and it can be used both in real-time mode and in off-line mode according to the Customer needs.

The system includes an **Inertial Sensing Unit** to be attached inside or outside a shoe heel, providing raw data to a **Computing Unit** for processing and a **MMI SW** used to acquire, integrate and display the path walked by the operator wearing ARIANNA.

SOLUTIONS

- Wi-Fi solutions
- Radio-Modem solutions
- Off-Line configuration

APPLICATIONS

- Real-time localization and tracking of operators in dangerous areas
- Mapping of inside buildings and/or underground areas
- Pedestrian Position Monitoring

SERVICES

- Integration Support
- Customized solutions
- Optional devices Selection and realization on Customer request

ARIANNA Components

Sensing Unit: it is the inertial unit measuring angular velocity, acceleration and magnetic field (raw data). It can be placed outside or inside a shoe heel.

When the computing unit is a Smartphone, the sensing unit sends its raw data via a Bluetooth (BT) channel powered with a local battery. When a black box is required, the sensor unit is a cylindrical waterproof unit connected to the black box via a copper cable used to power the sensor and to send raw data to the computing unit. The cable connection is useful where electromagnetic interference is present.



ARIANNA COMPONENTS

Sensing Unit

Computing Unit

Controlling Center SW

OPTIONAL COMPONENTS

Radio-Modem

Serial-to- Bluetooth interface

Serial-to-USB cable

SPECIFICATIONS

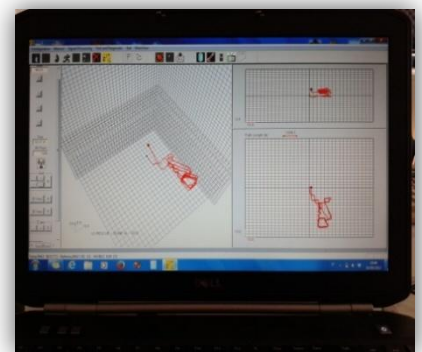
Computing: Smartphone		Dimensions	Weight	Electrical	Remarks
Sensing Unit	Inertial sensor	50 x 30 x 25 mm	20 g	3.7 V	BT connection
	Charger device	16 x 60 x 10 mm	10 g	5 V	USB input
Computing Unit	Main Unit	120 x 60 x 10 mm	100 g	5 V	SAMSUNG Galaxy SX
SW	Pre-installed on the computing unit, raw and tracking data via BT channels				

Computing: Black box		Dimensions	Weight	Electrical	Remarks
Sensing Unit	Water proof	37 x ϕ 13 mm	10 g	3.7 – 4.2 V	Copper connection
Computing Unit	Main Unit	100 x 50 x 25 mm	100 g	3.7 – 4.2 V	Sharc DSP on a proprietary board
SW	Pre-installed on the computing unit, raw and tracking data via copper channels				

Optional Components	Real-Time Configuration with Radio-Modem Unit
Radio-Modem (TX and RX Units)	The Radio Modem device is not provided as a part of the system. It should be selected according to the characteristics of the areas where ARIANNA has to be used.
Radio-Modem (Power Supply Unit)	The selection depends on the selected Radio-Modem device, black box can power radio modem
Serial-to-Bluetooth device	A serial-to-Bluetooth interface is needed if the Radio Modem device has just a serial I/O
Serial-to-USB cable and drivers	Cable interface serial to USB I/O is needed if the Radio Modem device has just a serial I/O. Any commercial cable can be used.

OPERATIONS

By using the raw data from the sensor, ARIANNA is able to compute the operator walked path. This information is transmitted to MMI where a mission responsible is able to control the position of different operators, evaluate the risk of each operator or command a rescue operation in case of emergency or accident. The MMI SW is also in charge of correcting the estimated operator track when more updated information arrives from the system.



Additional characteristics

The operator can send a help request to MMI by pushing a button.

From MMI the operator can be advised by an acoustic warning or a vibration in case of imminent danger.

Optional devices (Radio-Modem configuration)

HW solutions are found to integrate a Power Supply Unit and a serial-to-Bluetooth device according to the Radio-Modem selected by the Customer.