

Product Documentation



PRODUCT NAME : NURSE ASSIST
VERSION : PILOT

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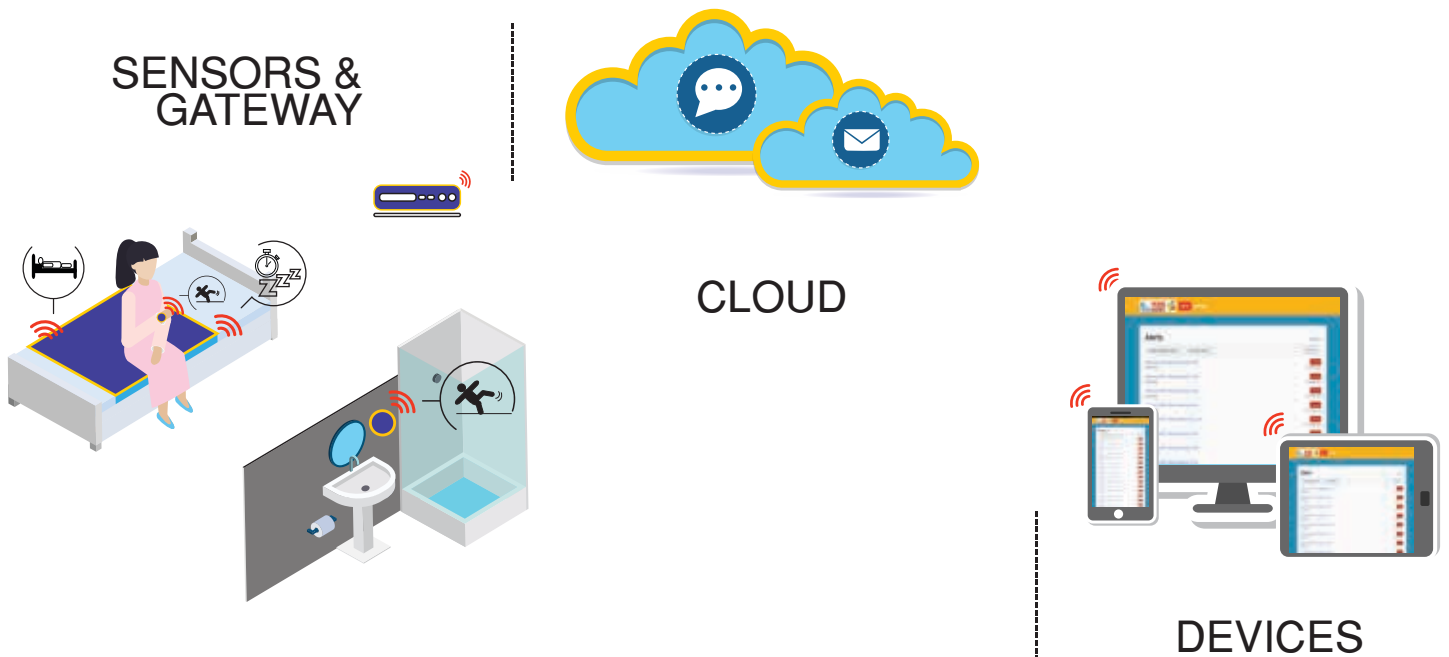
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Introduction

Nurse Assist is a customized alert and response system, leverages state of the art technology, architecture and customized workflows to enable more responsive care. Nurse Assist integrates sensor data with patient's data to provide a 360 view to the care provider. Zeblok closed loop solution also provides management view into patient care enabling business insight for operational improvement and efficiency.

This document outlines the physical and performance specifications for the sensors and components that make up the Nurse Assist system.

Product Architecture



Product Features

Infrastructure – The infrastructure comprises of sensors communicating with a Wifi and Zigbee enabled gateway to transmit sensor data to Microsoft Azure Cloud. Zeblok anomaly detection, rules and alert engine, analyzes the information to detect abnormal patterns and trigger an alerts to the care provider. The Zeblok solution is closed loop; all alerts remains open until action by the care provider; thus providing valuable management reports. The architecture closely resembles a star typology.

The alerting channels available on the Zeblok solution are:

- Email Messages
- Voice Messages
- SMS Messages
- Dash Board Alerts
- Customized Reports

Patients' rooms are wired with bed pad sensors, passive inferred sensors, contact sensors and gateways. All sensors communicates with the gateway via Zigbee.

Nurse Assist patients' triggers:

- not sleeping well
- trying to get off the bed
- have fallen
- have been in the toilet for too long
- have left the room for too long

Wearables



COMPONENT	SPECIFICATIONS
Enclosure	L: 2.67" (68mm); W: 1.69" (42mm); H: 0.70" (18mm) With key ring spacer L: 2.94" (75mm)
Transceiver/MCU (pendant to gateway)	IEEE 802.15.4 Zigbee Protocol Stack/on-board processor (MC13213 SoC) with flash memory (supports up to 64MB) Supports AES-128 security standard On-board processor aggregates sensor data for transmission in frames; supports data sampling rates up to 1000 frames/second
Accelerometer	Acceleration detected in 3 axes from -6g to +6g, in g-ranges of 1.5g, 2g, 4g, and 6g with dynamic real-time range selection
Power Supply	Options include a lithium-polymer rechargeable battery of 400mAh; operating duration: 12 hours (approx. 1-hour recharge time) Other power supply options include coin cell disposable batteries and Nickel Metal Hydride rechargeable batteries
Operating Parameters Heartbeat Manual Alert Transmission Range Location ID	Configurable status reporting, from once per second to once per minute Triggered by user shaking of pendant Up to 50' to gateway indoors; line of sight outdoors. Determined through gateway proximity sensing, localized to approximately 10- foot radius (adjustable)

Gateways

These are stationary units mounted at locations throughout the environment to establish a local Zigbee network. They function as access points for sensors sending data & operational status updates to the host application which communicates with the sensors through the gateway to respond or to issue commands based on data received. Gateways can be configured to communicate using 802.11 (Wi-Fi) and 802.15.4 (Zigbee) protocols. For communication over the internet, options include Wi-Fi and CDMA or GSM cellular communications protocols.



COMPONENT	SPECIFICATIONS
Enclosure	L: 5.51" (140mm); W: 5.51" (140mm); H: 1.83" (47mm)
Transceiver/MCU (pendant to gateway)	IEEE 802.15.4 Zigbee Protocol Stack/on-board processor (MC13213 SoC) with flash memory (supports up to 64MB) Supports AES-128 security standard On-board processor aggregates sensor data for transmission in frames; supports data sampling rates up to 1000 frames/second
WiFi	IEEE 802.11b/g/n
Power Supply	Power over Ethernet (PoE) – twisted pair over Cat5 cable/RJ-45 connector to gateway DC Power – supplied from AC/DC adapter; wall mounted plug USB Power – supplied by USB cable from appropriate source
Operating Parameters Heartbeat Manual Alert Transmission Range Location ID	Configurable status reporting, from once per second to once per minute Backbone Wi-Fi uplink, typical 802.11 range Unique 16-byte device address, associated with user-defined location via web- based application

Smart Pad

SmartPad™ – pressure sensors detect a variety of conditions of interest to caregivers – e.g. waking and rising movements that precede exits from bed; movements associated with restless sleep; and pressure changes indicating the presence or absence of a person in a bed or chair.



COMPONENT	SPECIFICATIONS
Enclosure	L: 33" (840mm); W: 14" (355mm); H: 1.83" (6mm) Medical Grade Vinyl heat sealed at edges
Transceiver/MCU (SmartPad to gateway)	IEEE 802.15.4 Zigbee Protocol Stack/on-board processor (MC13213 SoC) with flash memory (supports up to 64MB) Supports AES-128 security standard On-board processor aggregates sensor data for transmission in frames; supports data sampling rates up to 1000 frames/second
WiFi	IEEE 802.11b/g/n
Power Supply	DC Power – supplied from AC/DC adapter; wall mounted plug
Operating Parameters Heartbeat Transmission Range Location ID	Configurable status reporting, from once per second to once per minute Backbone Wi-Fi uplink, typical 802.11 range Unique 16-byte device address, associated with user-defined location via web- based application
Transceiver/MCU (Pendant to gateway)	IEEE 802.15.4 Zigbee Protocol Stack/on-board processor (MC13213 SoC) with flash memory (supports up to 64MB) Supports AES-128 security standard On-board processor aggregates sensor data for transmission in frames; supports data sampling rates up to 1000 frames/second

Dwell PIR

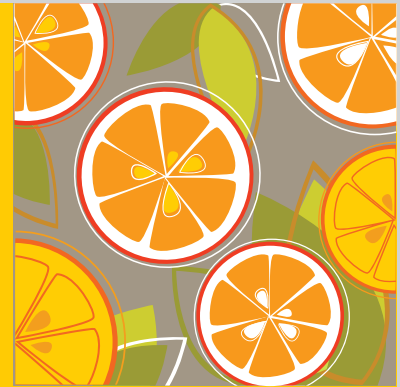
PIR Motion Sensor – these are third party passive infrared (PIR) motion sensors fitted with the SmartSense™ data processing and communications module. The motion sensors detect levels of activity within the detection area.



COMPONENT	SPECIFICATIONS
Enclosure	L: 1.88" (48mm); W: 2.63" (67mm); H: 4.25" (108mm)
Transceiver/MCU (pendant to gateway)	IEEE 802.15.4 Zigbee Protocol Stack/on-board processor (MC13213 SoC) with flash memory (supports up to 64MB) Supports AES-128 security standard On-board processor aggregates sensor data for transmission in frames; supports data sampling rates up to 1000 frames/second
Power Supply	9V disposable battery LED indicator for low battery
Operating Parameters Heartbeat Detection Dwell Alert Transmission Range Location ID	Configurable status reporting, from once per second to once per minute 40 angle coverage up to 30', mounted 4' high Triggered when entry/exit pair of PIR activations is not received within a user- configurable time interval (configured through admin web portal) Up to 50' to gateway indoors Unique 16-byte device address, associated with user-defined location via web- based application

Host Application

Host Application– this application controls the sensor network, generates alerts, manages notifications and responses, and stores and analyzes the sensor data. The application provides access to end users through a web interface. Users with administrative privileges are also able to configure the sensing environment and set up alert rules and notification sequences.



COMPONENT / FUNCTION	SPECIFICATIONS
Web Application	Microsoft .NET 3.5 Framework
Database	Microsoft SQL 2008
Alerts Manual/Emergency Missing heartbeat Missing Location	User-activated by tugging on the pendant lanyard; acceleration detected over a set threshold and pattern generates the alert Application-generated when heartbeat message is not received after a (configurable) time period Application-generated when the pendant is not located within designated areas or bounds
Notifications SMS Email Voice Escalation	Text message to one or more designated cell phones or smart devices Preformatted email to one or more designated email accounts Voice Dynamic text-to-speech voice message to one or more designated phone numbers Application supports multiple levels of escalation by alert type, each with user- definable criteria or parameters for escalation

Contact Sensor

Contact Sensor - this sensor detects the opening and closing of the door. The sensor uses a reed switch to trigger the event of door opening. The sensor has two parts namely the magnet unit and detection unit.



COMPONENT	SPECIFICATIONS
Enclosure	Magnet unit - L: 1.5" (38.1mm); W: 0.75" (19.05mm); H: 0.5" (12.7mm) Detection unit - L: 2.875" (73.025mm); W: 1.6875" (42.86mm); H: 1" (25.4mm)
Transceiver/MCU (pendant to gateway)	IEEE 802.15.4 Zigbee Protocol Stack/on-board processor (MC13213 SoC) with flash memory (supports up to 64MB) Supports AES-128 security standard On-board processor aggregates sensor data for transmission in frames; supports data sampling rates up to 1000 frames/second
Power Supply	DC Power – supplied from AC/DC adapter; wall mounted plug
Operating Parameters Heartbeat Detection Dwell Alert Transmission Range Location ID	Configurable status reporting, from once per second to once per minute Backbone Wi-Fi uplink, typical 802.11 range Unique 16-byte device address, associated with user-defined location via web- based application



Nurse Assist is brought to you by Zeblok - a cloud based sensor management company focussed on solutions for healthcare built around connecting, alerting, and reporting. We bridge the gap between physical and virtual worlds to create meaningful experiences and simplify lives.

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