

# Wearable sensors for clinical research

## FIRST LINE EXTENSION

Introducing Verisense **Pulse+**. Now providing photoplethysmogram (PPG), galvanic skin response (GSR), and accelerometer data. The PPG sensor monitors heart rate by using light absorption and the GSR sensor measures changes in sweat gland activity. Verisense now measures trial participants heart rate, oxygen saturation and emotional responses in addition to their activity and sleep levels.

## OUR SOLUTION

Verisense is a flexible platform designed from the ground up specifically to meet the challenges of clinical research.

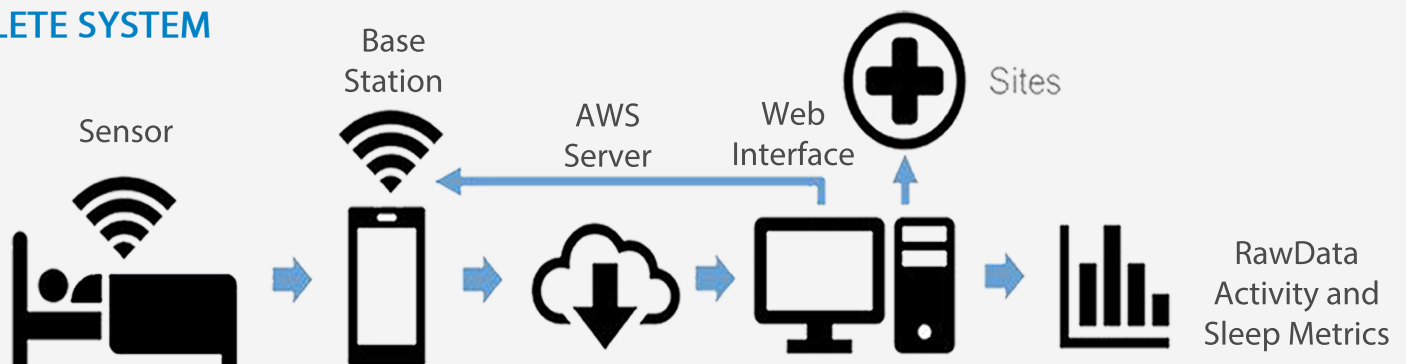
Building on from the Verisense IMU providing continuous collection of raw triaxial accelerometer data Pulse+ adds versatility and flexibility to your clinical trials and research all within a complete system that places absolute minimum burden on participants and clinical sites.

Raw data is transmitted from Verisense sensors via a base station to a secure AWS server where it can be downloaded at any point. Integrated open-source algorithms provide validated endpoints for use in clinical trials.

## KEY BENEFITS

-  Photoplethysmogram (PPG)
-  Galvanic Skin Response (GSR)
-  Continuous raw data
-  Water resistant IP67
-  24x7 data coverage
-  Lightweight
-  Remote management features
-  Guaranteed data integrity
-  Flexible styling options

## A COMPLETE SYSTEM



## PULSE+ SENSOR

- 24x7 no touch operation
- Raw PPG, GSR and triaxial accel Data
- USB Charger
- Replaceable or Rechargeable battery options
- Water resistant
- Automatic data encryption and upload
- Interchangeable bands for flexible styling

## BASE STATION

- Collects data whenever sensor is in range
- Automatic data upload, via cellular or Wi-Fi
- Alerts participant and web server to issues
- 5-minute setup
- No touch for participants
- Can link up to seven sensors to single base station

## WEB SERVER

- Monitors all sites at a glance
- Able to drill down to individual participants
- Generates automatic status emails
- Generates activity and sleep metrics from peer-reviewed algorithms

## PULSE+ TECHNICAL SPECIFICATIONS

|                 |   |
|-----------------|---|
| Accelerometer   | Sample Rate: 12.5Hz, 25Hz, 50Hz, 100Hz<br>Range: $\pm 2g$ , $\pm 4g$ , $\pm 8g$ , $\pm 16g$   |
| GSR Measurement | Sample Rate: 5.12Hz, 10.24Hz, 20.48Hz, 51.2Hz<br>Range: $8k\Omega - 4.7M\Omega$ (.2uS - 12uS) +/- 10%, $22k\Omega - 680k\Omega$ (1.5uS-45uS) +/- 3% |
| GSR Frequency   | DC-15.9Hz   |
| PPG Module      | Integrated LED's: Red, Green, Blue & IR. Reflective heart rate monitor, pulse oximeter  |
| PPG Size        | Sample Rate: 50Hz, 100Hz, 200Hz, 400Hz<br>35mm x 43mm x 12mm  |
| Water resistant | IP67  |
| Weight          | 29.6 grams (1 ounce)  |
| Connectivity    | Bluetooth 5, Configurable upload interval   |
| Compliance      | ISO13485:2016, FCC, CE  |
| Storage         | Up to 40 days at 25Hz triaxial accelerometer  |

## VERISENSE IMU TEST REPORTS

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|--|
| IEC 60601-1: 2005 + CORR.1:2006 + CORR.2:2007 + AM1:2012                     |
| IEC 60601-2-10:2015 + A1:2016  |
| EN 60601-1-11:2015   |
| EN 60601-1:2006+A11:2011+A1:2013   |
| EN 60601-1-2: 2014 (4th Edition)   |
| EN 55011: 2009 + A1: 2010  |
| AAMI ES 60601-1:2005/(R)2012 and A1:2012, C1:2009(R)2012 and A2:2010/(R)2012 |
| ETSI EN 300 328 V2.1.1 (2016-11)   |



## ABOUT SHIMMER

Shimmer Research is a leading provider of wearable sensing systems for the clinical assessment, remote patient monitoring, and clinical trials market. Serving over 75 countries worldwide, Shimmer Research is headquartered in Dublin, Ireland, with offices in Boston, USA and Malaysia.