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## Sensors for Health Recording and Physical Activity Monitoring

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# SHERPAM

## Sensors for Health Recording and Physical Activity Monitoring



- LTSI - INSERM 1090
- CASA - IRISA UMR 6074
- M2S - CACHAN UR2
- LAUREPS - CRPCC, EA 1285
- CIC 1414

### OBJECTIVES

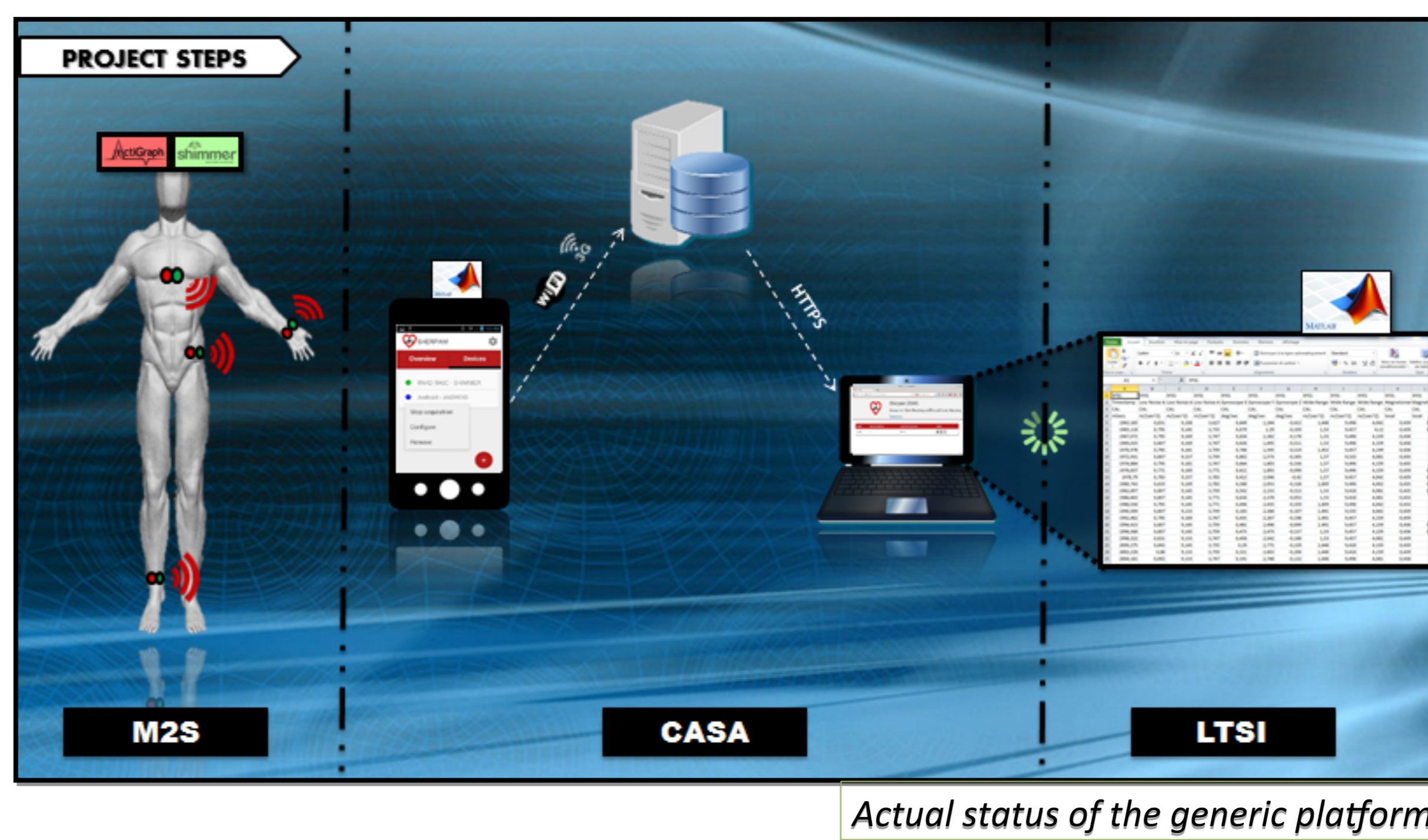
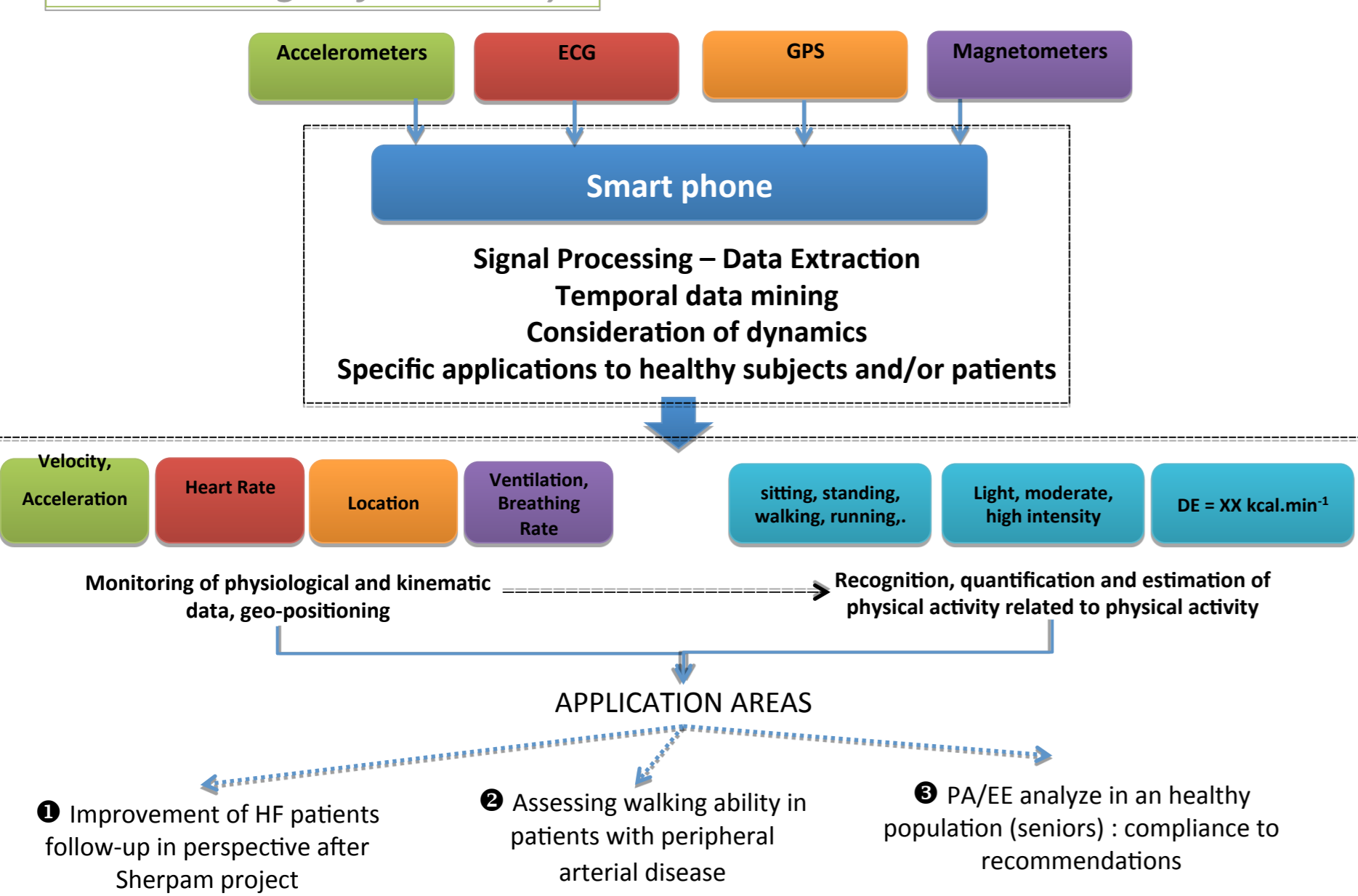
**Conceive, implement, and validate** experimentally devices allowing biophysical data of mobile subjects to be gathered and exploited in a continuous flow.

#### Focused application domains:

- Heart failure patient's monitoring (HF).
- Outdoor assessment of functional limitations and community-based walking programs for rehabilitation in patients with peripheral artery disease.
- Physical activity recognition and energy expenditure estimation,

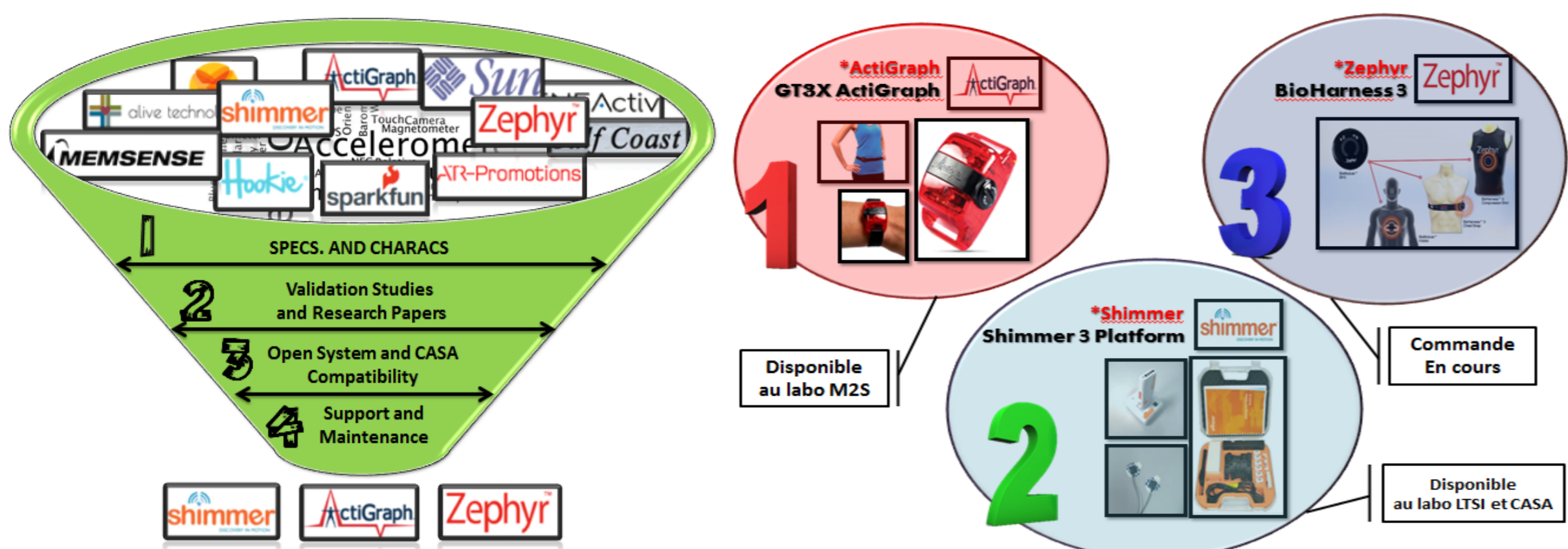
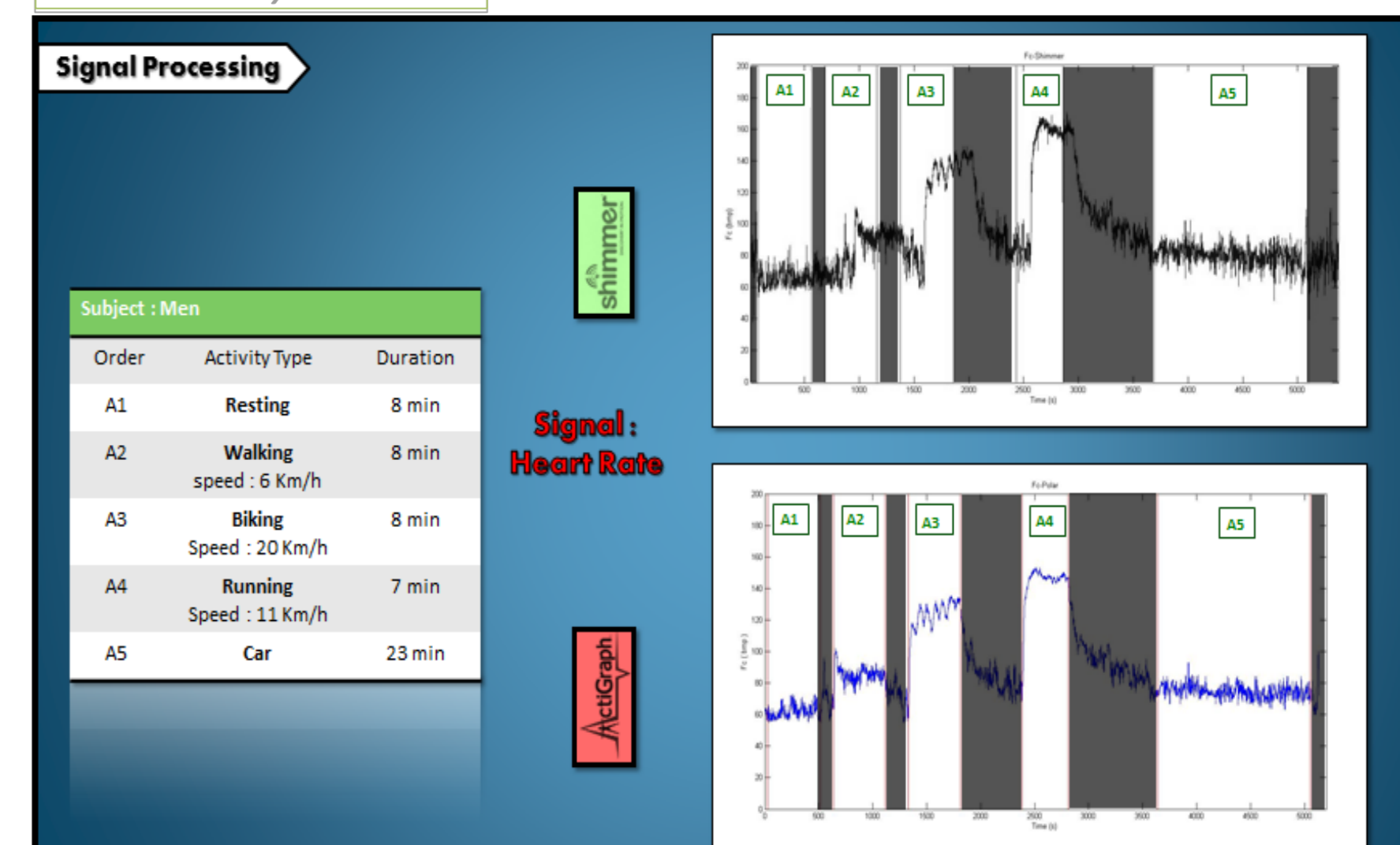
### GENERAL ARCHITECTURE OF THE PROJECT

#### Global design of the study



Actual status of the generic platform

#### Preliminary Results



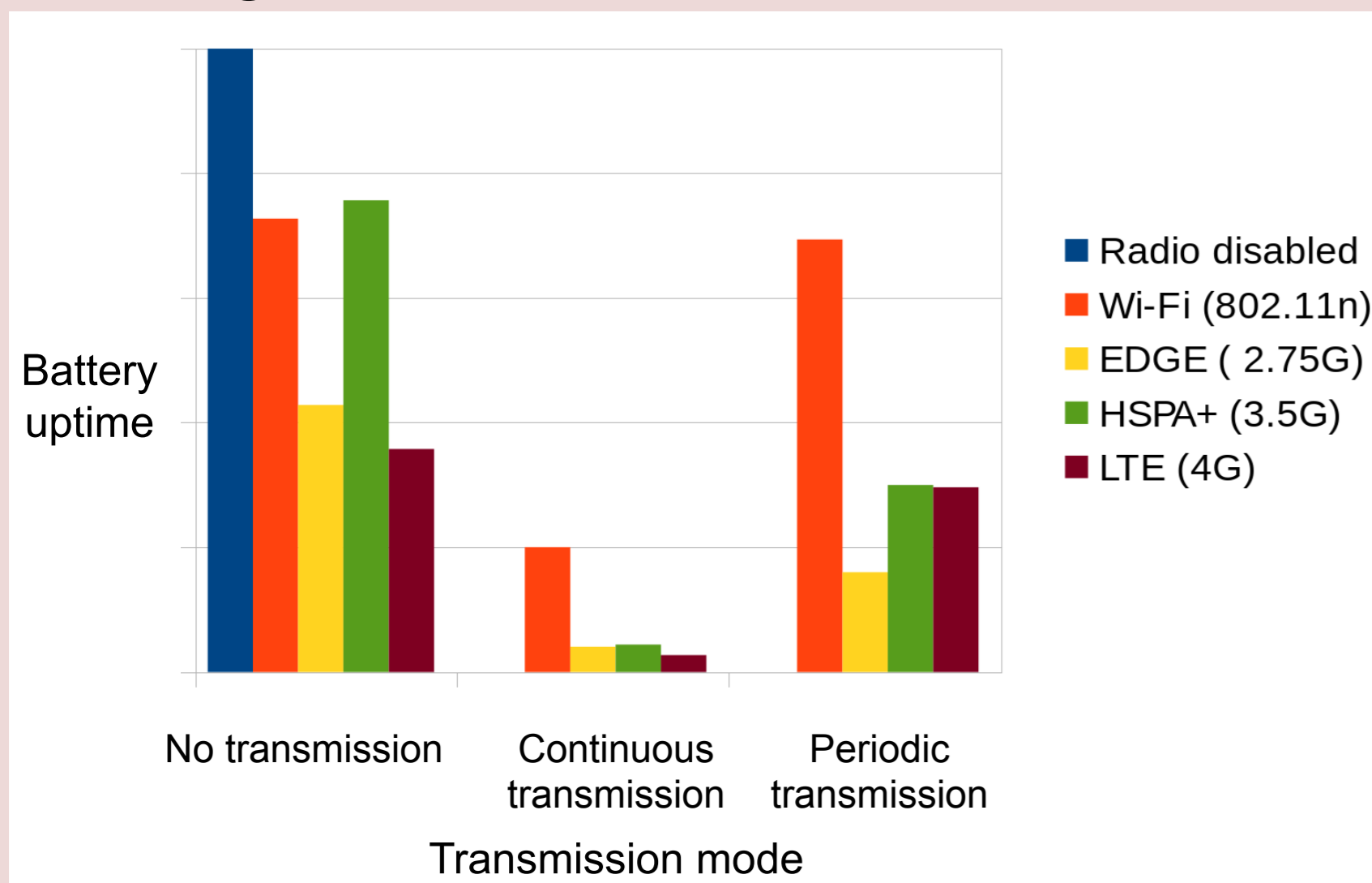
#### Sherpam project design with respect to human factors



### MAIN RESULTS

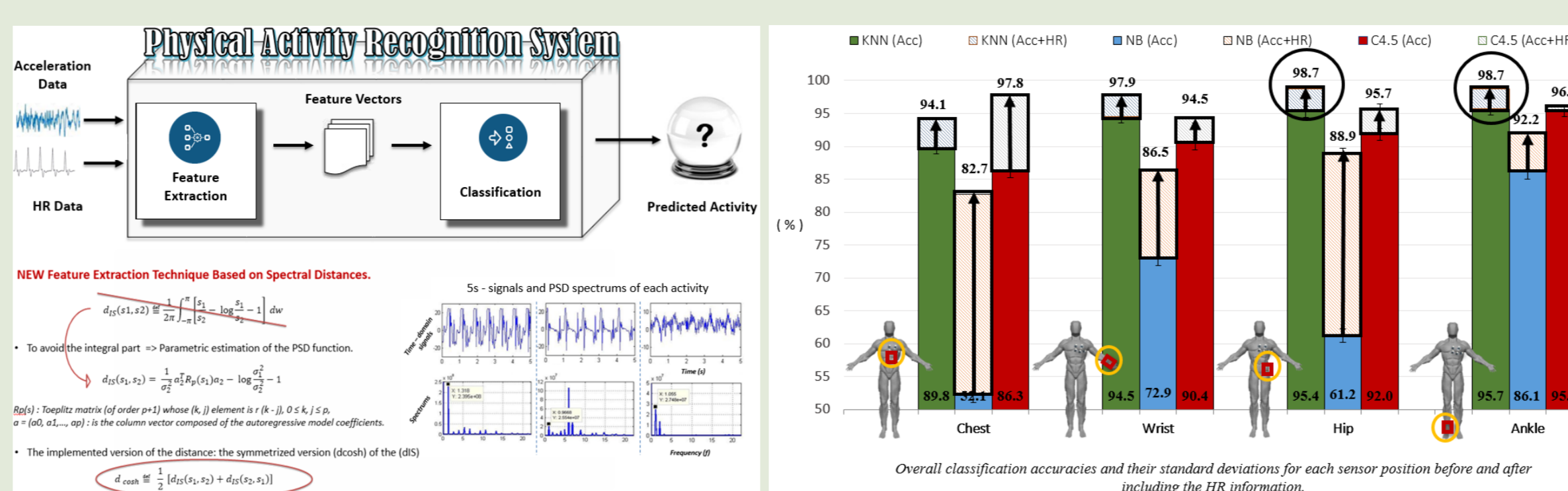
#### IRISA-CASA

- 1) An open platform dedicated to mobile monitoring built around four criteria :
  - Versatility : to accommodate to a large variety of off-the-shelf sensors
  - Extensibility : to add new sensors and embedded processing easily
  - Confidentiality : to ensure the privacy and the non-disclosure of the data
  - Dependability : to work everywhere by limiting the energy consumption (EC) and by providing a resilience to network disruption
- 1) A plugin approach for both sensors and embedded algorithms to personalize the platform for each patient and his/her condition
- 2) Evaluation of EC of various transmission technologies

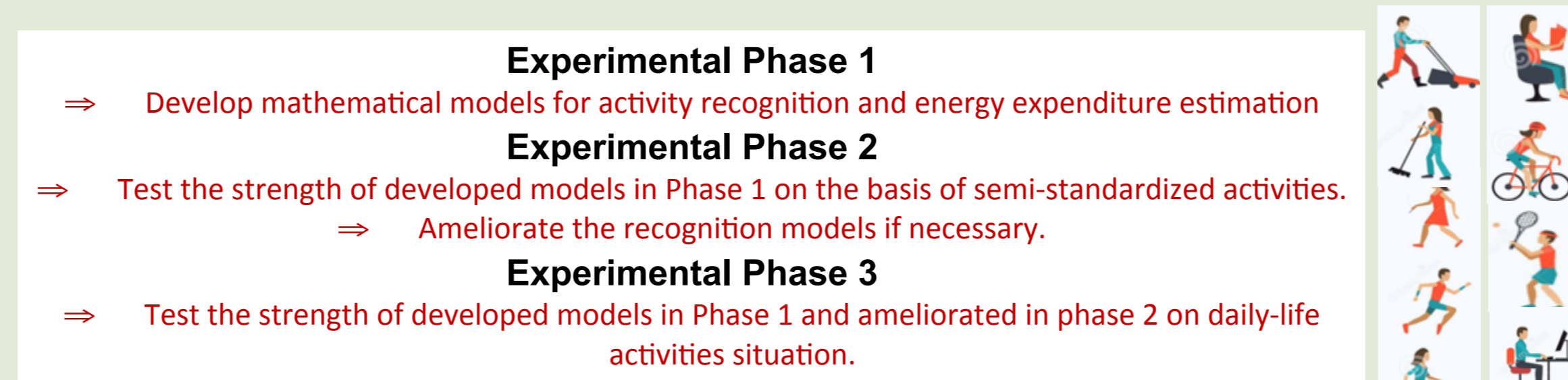


#### LTSI/M2S

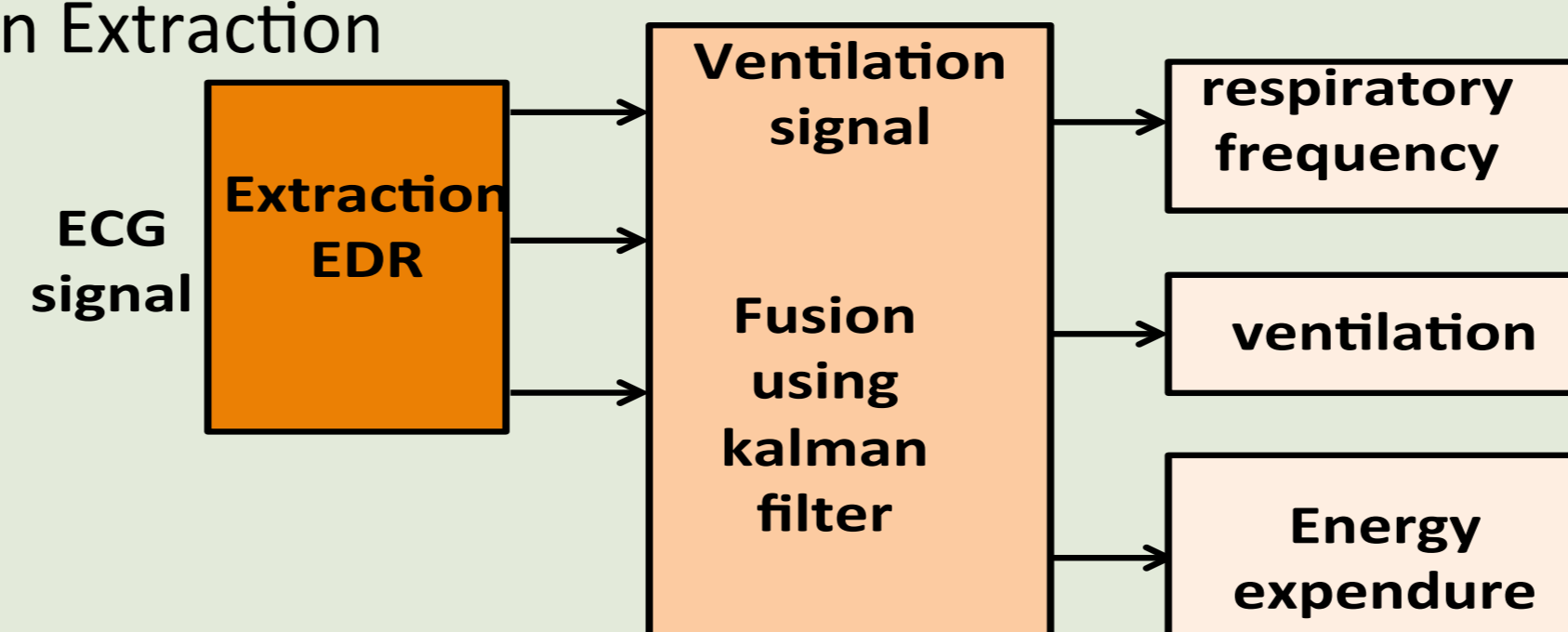
- 1) Develop signal processing tools to : Recognize and classify five ambulatory and sedentary activities (cycling, walking, running, sitting, car-riding) using heart rate and acceleration data fusion.



- 2) Develop a new experimental protocol for daily-life activities recognition and energy expenditure estimation:

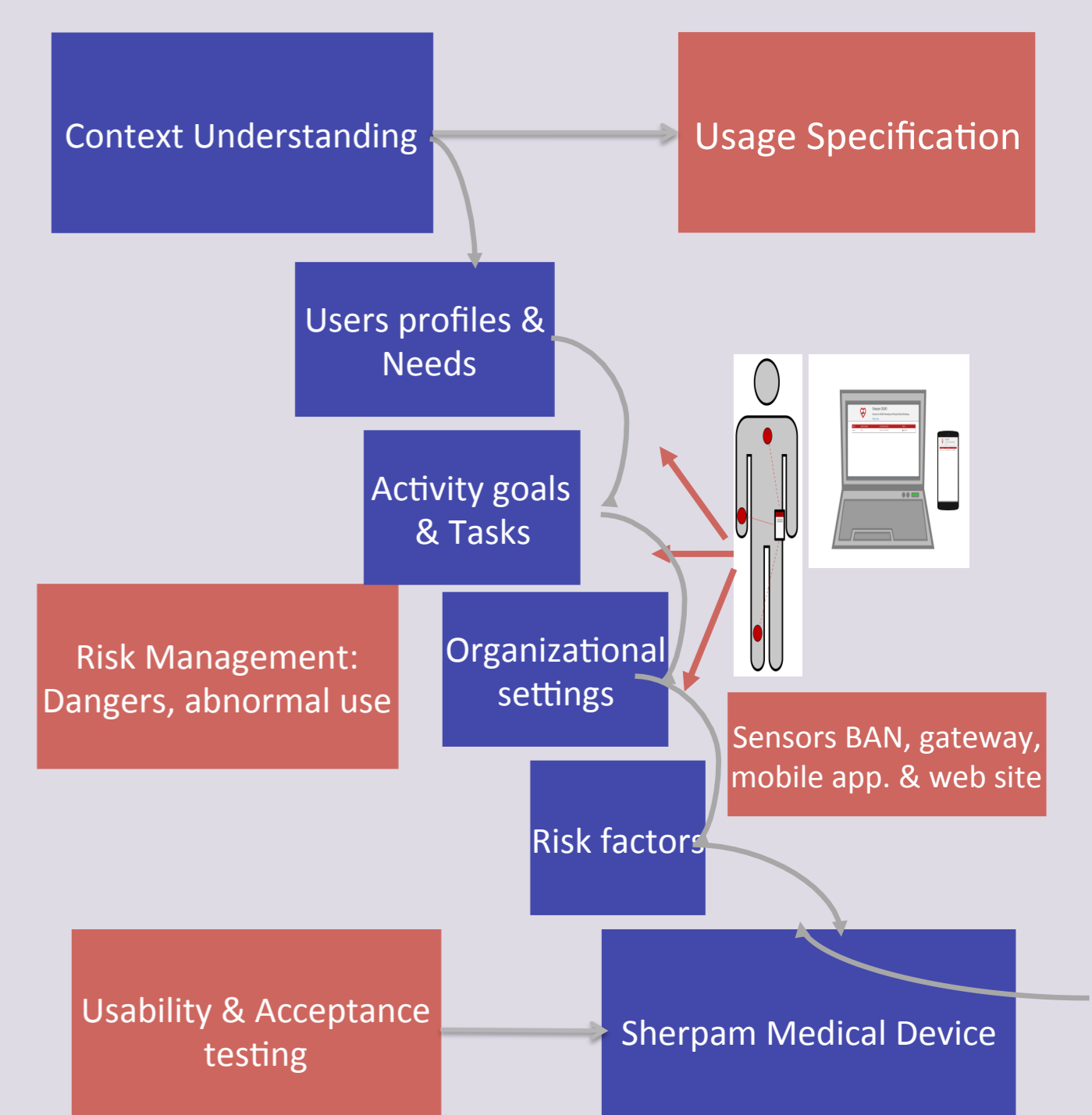


- 3) ECG-Ventilation Extraction



#### LAUREPS-CIC-IT

- 1) Context of Sherpam use understanding
- 2) User's profiles and requirements
- 3) Authentication of primary functions and risks of sensors/gateway/mobile app. /web site use
- 4) Review wearable sensor acceptance and usability



#### Publications

Biomedical Signal Processing and Control (Journal, 2016) - Mobihealth'16 - 6th EAI International Conference on Wireless Mobile Communication and Healthcare (November 2016) - Healthcom'16 - 18th International Conference on e-Health Networking, Applications and Services (September 2016) - ECSS'16 Conference - Advances in Biomedical Engineering (ICABME'15) International Conference and then published in IEEE Conference proceedings.

