# Vital Signs Mobile Services for First Responder's Life Support

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## Background

Vital Responder (VR) is an ongoing Carnegie Mellon-Portugal research project that intends to explore the synergies between innovative wearable technologies, scattered sensor networks, intelligent building technology and precise localization services to provide secure, reliable and effective first-response systems in critical emergency scenarios. It envisions a multi-dimensional approach to security and critical infrastructures for first responder (FR) professionals.

The wearable platform under development for this project is based on the Vital Jacket® product. It is a wearable vital signs monitoring system that joins textiles with microelectronics. It was designed and developed to be a usable practical approach for different clinical scenarios, in hospitals, home or on the move, that need continuous or frequent high quality vital signs monitoring from its wearer.

In 2007, the result of R&D of IEETA/University of Aveiro in wearable mobile developments have been licensed to a small biomedical engineering spin-off company called Biodevices, S.A. that has further evolved the first prototypes and focused the wearable platform on Cardiology and high performance sports, scaling it down into a simple and comfortable T-shirt with the design and textile development support of Petratex S.A.

## Objectives of the PhD Work

One of the objectives of the VR project is the inception, design and implementation of mobile services to gather vital signs from first responders in real critical scenarios and provide them to different levels of analysis for life threatening event detection and intervention.

These services need to be implemented in mobile devices, such as smartphones or iPads that will be used by different actors in the first responder scenarios.

We envision the use of these devices with mobile services to acquire ECGs, actigraphy and other vital signs, store and forward them to an aggregator unit (for example and iPad) used by the team leader, where he can retrieve the status of each of his men, receive automated alarms and detect when a life threatening event is occurring, triggering the necessary intervention to save the life of the first responder in danger.

The proposed PhD will be embedded in these scenarios of mobile computing and will appeal to the creativity of the candidate to propose and implement the mobile services model and its use cases to provide an innovative intervention in the targeted area of the Vital Responder project.

### Candidate Student Profile

The candidates should have a solid knowledge of programming and SOA architectures, with additional skills and will to further learn advanced mobile programming, i.e., programming of smartphones and iPad (Android and iOS)

## Further information:

VR project website: http://www.vitalresponder.pt
Vital Jacket website: http://www.vitaljacket.com
Supervisor group website: http://www.ieeta.pt/sias