



This project is funded by the Horizon 2020
Framework Programme of the European Union

PROJECT OUTLINE

May 2018

Project coordinator: Jaime García-Rupérez
(jaigarru@ntc.upv.es)
Universitat Politècnica de València – Spain

The pain

- **Cardiovascular diseases (CVD) remain as the leading cause of death in the European Union**
1.9 million deaths / year in the EU (40% of all deaths)
- **The delay in receiving confirmatory information regarding myocardial infarction results in considerable economic costs**
Estimated associated cost of almost € 196 billion / year
- **Major unmet need for cheaper diagnostics in resource-poor settings**
Inefficiency in triage of patients in primary care centers



The solution



PHOCNOSIS is an advanced nanophotonic point-of-care analysis device for fast and early diagnosis of cardiovascular diseases

The project involves the development of a compact and low-cost point-of-care (POC) analysis device for its application to minimally-invasive diagnosis of cardiovascular diseases (CVD)

- Multiple relevant CVD-related biomarkers to be simultaneously detected from a blood sample in less than 10-15 minutes
- Based on nanophotonic and micro-/nanofluidic technologies



Technology approach



The PHOCNOSIS analysis device bases the diagnosis in the label-free simultaneous detection of a set of relevant cardiac biomarkers present in the blood stream. To this aim, the PHOCNOSIS system relies on novel nanotechnology concepts in order to obtain an ultra-sensitive, compact and low-cost final device for the label-free detection of these biomarkers

Nanophotonic sensing technology

- Very high sensitivity
- Ultra-high integration level (μm^2 size scale)
- Suitable for mass production (CMOS fabrication)

Advanced photonic readout

- Allows having low cost, compact and lightweight readout platform with real time measurement
- Patented technique

Microfluidic concentrator

- Stops the target analytes over the sensors
- Increase of the final sensitivity by a factor $>1000x$

Light-assisted biofunctionalization

- Spatially-selective immobilization (different receptors at each sensor)
- μm resolution (or even below)
- Scalable process for mass production



Market opportunity

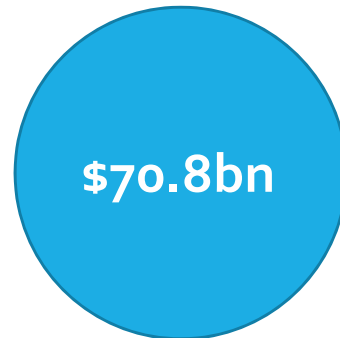


Markets and sub-markets involving PHOCNOSIS remain in constant growth



Med-Tech Market

CAGR of 5.2%
period 2016-2022



IVD Diagnostics Market

Number one device
area in 2022



POCT Market

CAGR of 9.8%
period 2016-2021



CVD Diagnosis Market

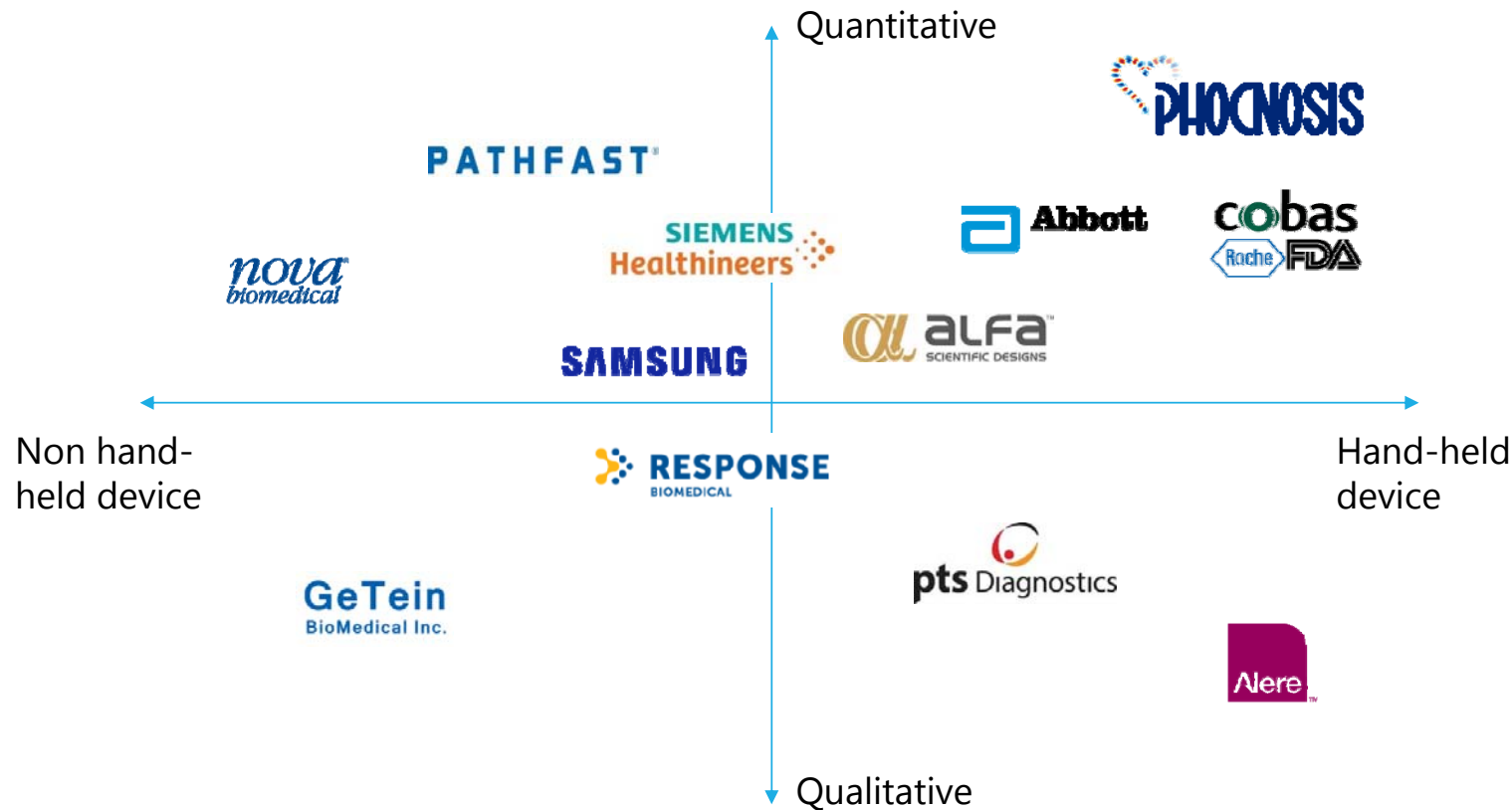
CAGR of 5.7%
period 2016-2021

* Frost & Sullivan



Competitive landscape

The novel technology to be developed in the PHOCNOSIS project will allow a more sensitive, robust and selective analysis for improved clinical decisions through an early and fast diagnosis of CVD at a reduced cost



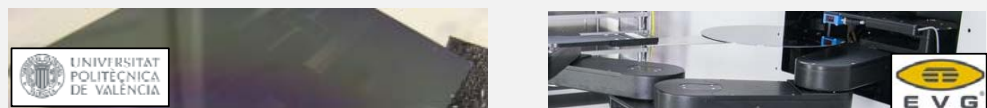
Project development

RESEARCH & INNOVATION

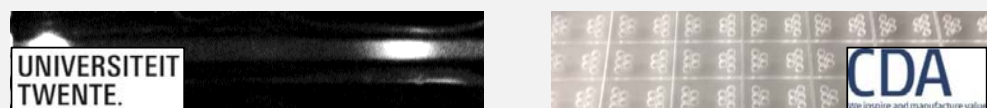
Biomarkers and probes selection



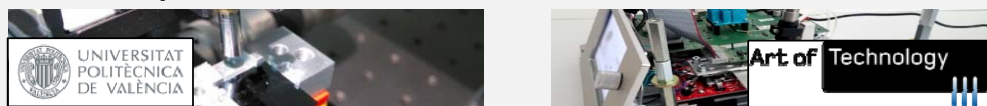
Nanophotonic sensors



Microfluidic concentrator



Readout platform



Biofunctionalization



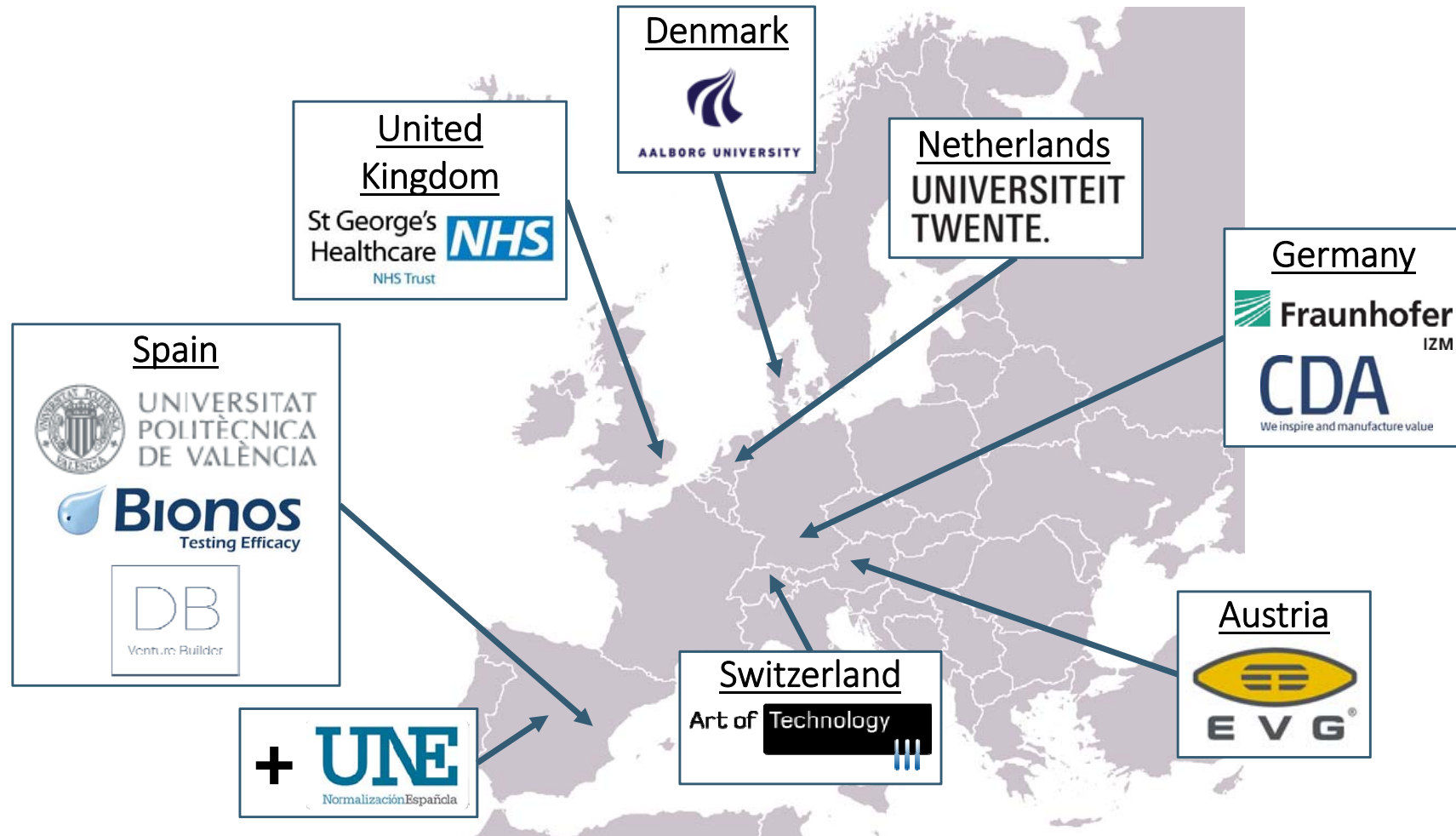
Integration & packaging



Validation & commercial assessment



Consortium





This project is funded by the Horizon 2020
Framework Programme of the European Union

Project coordinator: Jaime García-Rupérez
(jaigarru@ntc.upv.es)
Universitat Politècnica de València – Spain