



**HORIZON 2020**

**PHC-26-2014**

**Self management of health and disease: citizen engagement and mHealth**

**Grant agreement number: 643694**

**Project Title:**

**A co-operative mHEALTH environment targeting adherence and management of patients suffering from  
Heart Failure**



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## TABLE OF CONTENTS

1. Introduction .....	4
2. HEARTEN Dissemination Tools and activities .....	5
2.1 HEARTEN press releases .....	6
2.2 HEARTEN slide presentation .....	14
2.3 HEARTEN brochure .....	20
2.4 HEARTEN in Social media .....	22
3. HEARTEN publications .....	24
4. Conclusions .....	29
4. References .....	30

## 1. Introduction

The objective of dissemination is to present the progress of the project highlighting the technologies and the results that derived from the extensive and in depth interdisciplinary collaboration of the HEARTEN partners. This kind of activities will ensure and enhance the awareness of the clinic, academic, industrial society and the diffusion of the HEARTEN findings. Dissemination will be carried out by presenting and demonstrating HEARTEN's objectives, concept, tools and vision at related sectors while the communication channels will be maintained through the website, social media, presentations and press releases [1].

In this deliverable we present the promotional material that is both informative and easy to navigate and has been designed, created and circulated during the first six months of the project.

## 2. HEARTEN Dissemination Tools and activities

One of the main goals of HEARTEN dissemination activities is to create and distribute presentation and promotional material that will be available for broadly being distributed at key events.

During the period of the first six months the following material has been prepared as HEARTEN promotional kit:

- press releases
- project slide presentation containing the objectives and summarizing the overall concept
- project brochure
- publications

## 2.1 HEARTEN press releases

The aim of press releases is to attract attention to the project concept, the objectives, the major developments, outcomes and achievements. An initial press release was released after the initiation of the project and published in the “DIGITAL AGENDA FOR EUROPE” [2]. Other press releases have been also published in several websites in order to generate awareness about project in the general public. The press releases were created in different languages; English, Spanish and Italian since the overall scope is to disseminate HEARTEN project on local press contacts as well.



Figure 1: HEARTEN press release in “Digital Agenda for Europe” [3].

ATENE0

# Quasi 4,5 milioni di euro per dodici progetti di ricerca dell'Università di Pisa

Prime valutazioni nell'ambito di Horizon 2020, il nuovo programma quadro per la ricerca e l'innovazione dell'Unione Europea

UNIVERSITÀ

PROGETTI

RICERCA

30 gennaio 2015

0 COMMENTI

4

Condividi

5

Tweet

0

8+1

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LinkedIn

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Pinterest



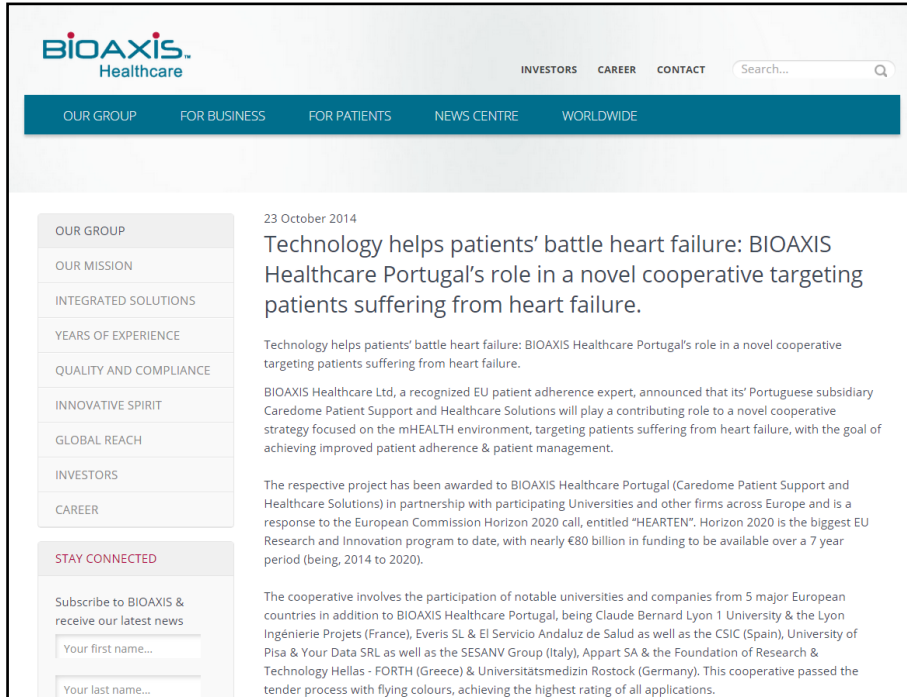
THE FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION

HORIZON 2020

Il logo di Horizon 2020

PISA. Quasi 4,5 milioni di euro per dodici progetti di ricerca a cui partecipa l'Università di Pisa: sono questi i numeri dei primi contratti firmati nell'ambito di Horizon 2020 il nuovo programma quadro per la ricerca e l'innovazione dell'Unione Europea, che ha premiato l'Ateneo pisano selezionando dodici proposte presentate insieme a università di tutta Europa. «Sono progetti che vanno dalla ricerca di frontiera allo sviluppo tecnologico, dalla valorizzazione dei risultati della ricerca allo sviluppo dell'innovazione, dalla salute alla sicurezza alimentare – commenta la professoressa Ann Katherine Isaacs, delegata del rettore per i Programmi europei – Per il nostro Ateneo è un risultato sicuramente positivo, che ci auguriamo venga ampliato nelle prossime settimane, visto che ci sono ancora 75 proposte già presentate in attesa di esito che dovrebbero portare a Pisa altri significativi successi, nonché altre numerose proposte in preparazione».

**Figure 2:** HEARTEN press release in “iltirreno edizione Pisa” and in “Università di Pisa” [4], [5].



The screenshot shows the BIOAXIS Healthcare website. The header includes the BIOAXIS Healthcare logo, navigation links (INVESTORS, CAREER, CONTACT), and a search bar. A secondary navigation bar lists: OUR GROUP, FOR BUSINESS, FOR PATIENTS, NEWS CENTRE, and WORLDWIDE. The main content area features a press release dated 23 October 2014. On the left, there is a sidebar with a menu (OUR GROUP, OUR MISSION, INTEGRATED SOLUTIONS, YEARS OF EXPERIENCE, QUALITY AND COMPLIANCE, INNOVATIVE SPIRIT, GLOBAL REACH, INVESTORS, CAREER) and a 'STAY CONNECTED' section with a newsletter subscription form. The press release text discusses a novel cooperative targeting patients suffering from heart failure, funded by the European Commission Horizon 2020 call.

**BIOAXIS Healthcare**

INVESTORS CAREER CONTACT Search...

OUR GROUP FOR BUSINESS FOR PATIENTS NEWS CENTRE WORLDWIDE

23 October 2014

### Technology helps patients' battle heart failure: BIOAXIS Healthcare Portugal's role in a novel cooperative targeting patients suffering from heart failure.

Technology helps patients' battle heart failure: BIOAXIS Healthcare Portugal's role in a novel cooperative targeting patients suffering from heart failure.

BIOAXIS Healthcare Ltd, a recognized EU patient adherence expert, announced that its' Portuguese subsidiary Caredome Patient Support and Healthcare Solutions will play a contributing role to a novel cooperative strategy focused on the mHEALTH environment, targeting patients suffering from heart failure, with the goal of achieving improved patient adherence & patient management.

The respective project has been awarded to BIOAXIS Healthcare Portugal (Caredome Patient Support and Healthcare Solutions) in partnership with participating Universities and other firms across Europe and is a response to the European Commission Horizon 2020 call, entitled "HEARTEN". Horizon 2020 is the biggest EU Research and Innovation program to date, with nearly €80 billion in funding to be available over a 7 year period (being, 2014 to 2020).

The cooperative involves the participation of notable universities and companies from 5 major European countries in addition to BIOAXIS Healthcare Portugal, being Claude Bernard Lyon 1 University & the Lyon Ingénierie Projets (France), Everis SL & El Servicio Andaluz de Salud as well as the CSIC (Spain), University of Pisa & Your Data SRL as well as the SESANV Group (Italy), Appart SA & the Foundation of Research & Technology Hellas - FORTH (Greece) & Universitätsmedizin Rostock (Germany). This cooperative passed the tender process with flying colours, achieving the highest rating of all applications.

OUR GROUP

OUR MISSION

INTEGRATED SOLUTIONS

YEARS OF EXPERIENCE

QUALITY AND COMPLIANCE

INNOVATIVE SPIRIT

GLOBAL REACH

INVESTORS

CAREER

STAY CONNECTED

Subscribe to BIOAXIS & receive our latest news

Your first name...


Your last name...

Figure 3: HEARTEN press release in "Bioaxis website" [6].





**Figure 4:** HEARTEN press release in “Servicio Andaluz de Salud, Consejería de Igualdad, Salud y Políticas Sociales” and in “Com Sevilla” [7], [8], [9].



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Serie 'Horizontes'

You are here: [Home](#) > [Biology & biomedicine](#) > [Projects](#) > [Hearten, an app to help in the treatment of heart failure](#)

## Hearten, an app to help in the treatment of heart failure

Details Category: Projects 04 Jun 2015

Hearten is a project funded by the European Commission aimed at developing devices and apps for tablets and mobile phones, in order to help heart failure patients and sanitarian professionals to improve adherence to therapy.


Around the 16% of people older than 65 years suffer heart failure treatment, according to some estimations. Life quality of these chronic patients depends mostly on the adherence to therapy and healthy lifestyles. The project HEARTEN is aimed at designing a system which will provide through the mobile apps and phone real-time information to patients and sanitarian professionals.

This research is being developed by a European consortium formed by 12 partners: the CSIC's Microelectronics Institute of Barcelona (IMB-CNM), the Health Service from Andalucía (Servicio Andaluz de Salud, SAS), the consulting firm Everis (Spain); the University of Pisa, SESA NV Srl and YourDATA (Italy); the University Claude Bernard Lyon1 and Lyon Ingeniere Projects (France); AppArt and Foundation For Research and Technology Hellas (Greece); the Medical Center of the University of Rostock (Germany); and Caredome Patient Support and Healthcare Solutions (Portugal).

"The idea is connecting a small device to the mobile phone", says Joan Bausells, scientists at the CNM-CSIC and coordinator of the research. This center of the CSIC is in charge of producing the chips for the biosensors as well as the wireless device which will send the data.

The system will be similar to the glucometres used to measure the levels of glucose in the blood: in this case the patient places a drop on a test strip, which is placed in the glucometre.

Similarly, in the Hearten system two biosensors will transmit data from the patient to the mobile phone, which will send the information to the doctors and careers through the Hearten app. One biosensor will analyze the patient breath. The other sensor, which scientists are considering to place in a mug, will analyze the patient's saliva when he or she drinks from the mug. In both cases, the biosensors will measure molecules whose concentration change when hearth failure happens, acting therefore as biomarkers.



Scientists are considering to place one of the biosensors in a mug, to analyze patient's saliva when he or she drinks from the mug.

Figure 5: HEARTEN press release in "Consejo Superior de Investigaciones Cientificas CSIC" [10].



Figure 6: HEARTEN press release in “Spanish National Research Council (CSIC)” [11].



Figure 7: HEARTEN press release in “Computing” [12].



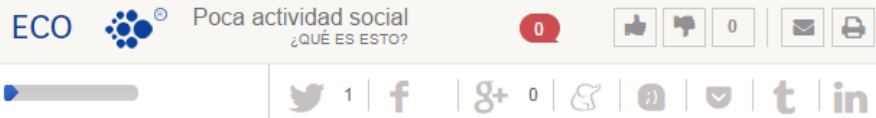
**Figure 8:** HEARTEN press release in “asociacion espanola se empresas de consultoria”, in “elEconomistas”, in “Europa Press”, in “teinteresa” [13], [14], [15]



**Figure 9:** HEARTEN press release in “sevillaactualidad” [16].

## El Virgen del Rocío participa en un proyecto para tratar la insuficiencia cardiaca mediante 'App'

Hearten permite a pacientes controlar su salud y comprobar si siguen su tratamiento con un kit de biosensores conectados a su smartphone



EUROPA PRESS. 05.05.2015

Profesionales del Hospital Universitario Virgen del Rocío participan junto a la consultora multinacional Everis y el Consejo Superior de Investigaciones Científicas (CSIC) en el consorcio de entidades que llevan a cabo el proyecto 'Hearten', financiado por la Comisión Europea. Esta iniciativa consiste en la creación de un ecosistema de aplicaciones de salud móviles (mHealth), centradas en los pacientes que sufren insuficiencia cardíaca (IC).

El objetivo del proyecto, que cuenta con tres años de duración, es, según un comunicado, facilitar tanto a los pacientes como a los profesionales sanitarios del Hospital Universitario Virgen del Rocío el cumplimiento del tratamiento médico que deben seguir para controlar la enfermedad y mejorar la calidad de vida de las personas con insuficiencia cardíaca. Para ello, disponen de un kit de biosensores conectados a una aplicación móvil para que pueda controlar su estado de salud.

Figure 10: HEARTEN press release in "20 minutos" [17].

### Hearten: controlar con una 'app' la insuficiencia cardiaca

La consultora multinacional everis, el Consejo Superior de Investigaciones Científicas (CSIC) y Servicio Andaluz de Salud participan en el Consorcio de entidades que llevarán a cabo el proyecto *Hearten*, financiado por la Comisión Europea, que consiste en la creación de un ecosistema de aplicaciones de salud móviles (mHealth) centradas en los pacientes que sufren insuficiencia cardíaca (IC).

El objetivo del proyecto, que cuenta con tres años de duración, es facilitar tanto a los pacientes como a los profesionales sanitarios el cumplimiento del tratamiento médico que deben seguir para controlar la enfermedad y mejorar la calidad de vida de las personas con IC a través de un kit de biosensores conectados a una aplicación móvil para que pueda controlar su estado de salud.

Gracias al desarrollo y puesta en marcha de este entorno tecnológico cooperativo, los pacientes sabrán, en tiempo real, el estado de sus constantes vitales y tendrán un mayor control para el seguimiento de su enfermedad gracias a la integración de toda la información relacionada con el tratamiento prescrito, a la que podrán acceder desde su propio *smartphone*.

**Emitir avisos**

Aparte de promover la autonomía del paciente, el proyecto facilitará la atención y seguimiento de los pacientes por parte de los profesionales sanitarios ya que hará posible que los profesionales sanitarios y los cuidadores puedan emitir avisos, coordinar las terapias, mejorar la adherencia al tratamiento e intervenir antes de

que ocurran incidencias en la salud del paciente.

Impulsado por un consorcio compuesto por doce socios de seis países europeos, el programa *Hearten* permite involucrar a todos los actores relacionados con la gestión de los pacientes para frenar el avance de la IC, una enfermedad que afecta a 26 millones de personas de todo el mundo, con un coste anual a los servicios de salud de 6.000 euros por paciente. El presupuesto global de desarrollo e implementación del proyecto es de 4,5 millones de euros en 36 meses, financiados por la Comisión Europea.

**HEARTEN**

**everis**  
Company

**@hearten**  
everis an NTT DATA Company

El proyecto contempla el desarrollo de biosensores para la medición del aliento y la saliva que serán capaces de reflejar el estado de salud del paciente y detectar si está siguiendo el tratamiento prescrito. El biosensor de aliento estará integrado en el *smartphone* del paciente y el biosensor de saliva, en una taca.

También se añadirán otros sensores para el control del ritmo cardíaco, la presión arterial y la actividad física del paciente. Estos datos se integrarán conjuntamente con su información nutricional, que será introducida a través del *smartphone*; el seguimiento del peso, medido a través de básculas inalámbricas así como información sobre el perfil y estado del paciente, incorporada por cuidadores y profesionales de la salud.



Figure 11: HEARTEN press release in "elEconomistas" [18].

## 2.2 HEARTEN slide presentation

In line with the objective of keeping an identity to make easier for the target audience to identify HEARTEN project, and with the main idea of providing uniformity in presenting the project's vision, we have created a template for HEARTEN presentation that has been distributed and shared among all partners.













HEARTEN project will be enhanced through providing all the necessary information related to the project activities in conferences and workshops. To this end we have created a presentation, based on HEARTEN presentation consists of the following sections:

- Consortium
- Overall Concept
- Scientific and Technological objectives
- Vision
- HEARTEN main components
- HEARTEN environment
- HEARTEN architecture
- WP description



## Consortium

Coordinating Partner: Université Claude Bernard Lyon 1

Participant No	Participant organisation name	Participant Short name	Country
1	UNIVERSITE LYON 1 CLAUDE BERNARD	UCBL	FR 
2	LYON INGENIERIE PROJETS	LIP	FR 
3	EVERIS SPAIN SL	EVERIS	ES 
4	APPART SA	APPART	EL 
5	FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS	FORTH	EL 
6	AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS	CSIC	ES 
7	UNIVERSITÄTSMEDIZIN ROSTOCK	UMOR	DE 
8	UNIVERSITA DI PISA	UNIFI	IT 
9	SERVICIO ANDALUZ DE SALUD	SAS	ES 
10	YOUR DATA SRL	YourDATA	IT 
11	CAREDOME PATIENT SUPPORT AND HEALTHCARE SOLUTIONS	CARE	PT 
12	SOFTWARE E SISTEMI AVANZATI S.P.A.	SESA	IT 




 Funded by the European Union
 
 This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 643694
 


Figure 12: HEARTEN slide presentation – Consortium.

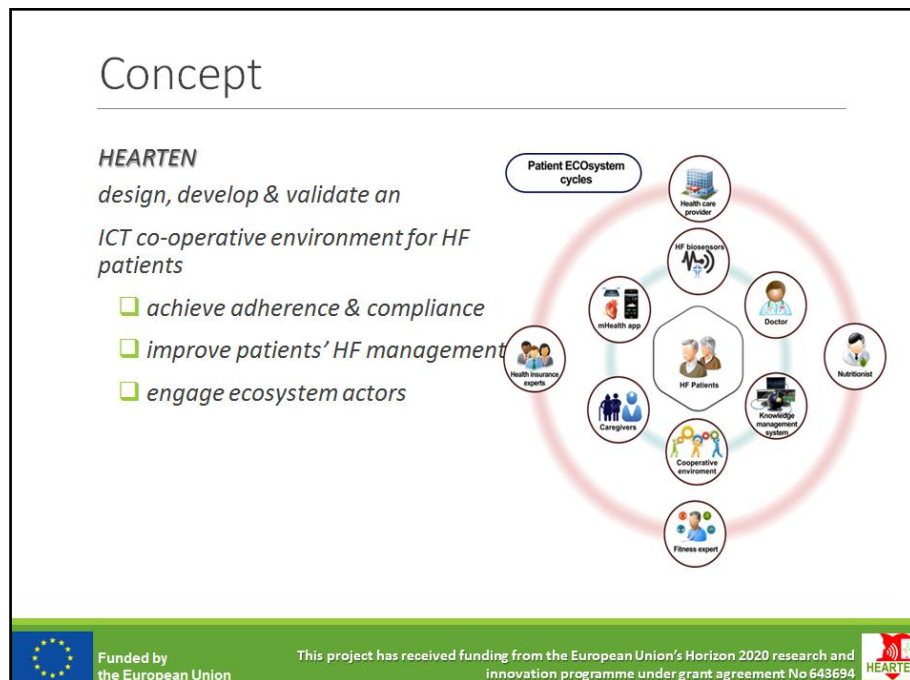


Figure 13: HEARTEN slide presentation - Overall Concept.

## Scientific & technological Objectives

- ☐ Continuous monitoring of specific biomarkers in breath/ saliva in HF patients
- ☐ Continuous monitoring of vital signals/ measurements in HF patients
- ☐ Development of mHealth apps for patient & ecosystem actors
- ☐ Identification of trends/ patterns of non-adherence through knowledge management systems
- ☐ Integration of different components & creation of ICT co-operative environment
- ☐ Education & guidance of ecosystem actors
- ☐ Creation of supportive & interactive ecosystem for holistic HF management



Funded by  
the European Union

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 643694



**Figure 14:** HEARTEN slide presentation - Scientific and Technological objectives.



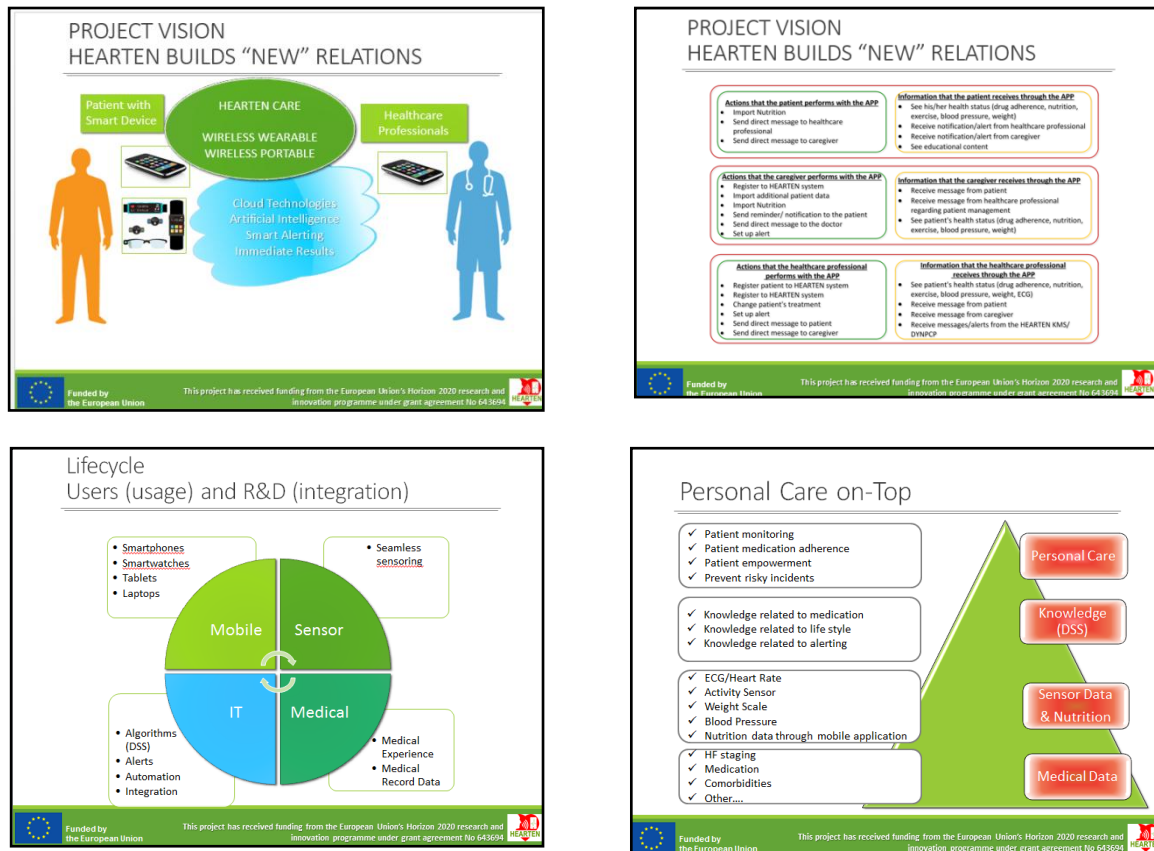


Figure 15: HEARTEN slides presentation -Vision.

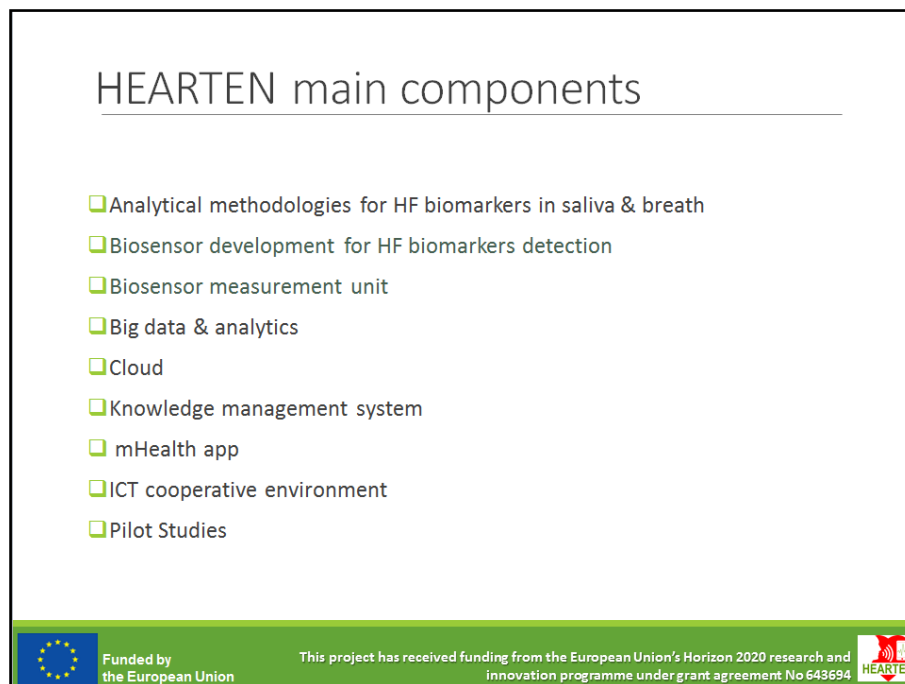
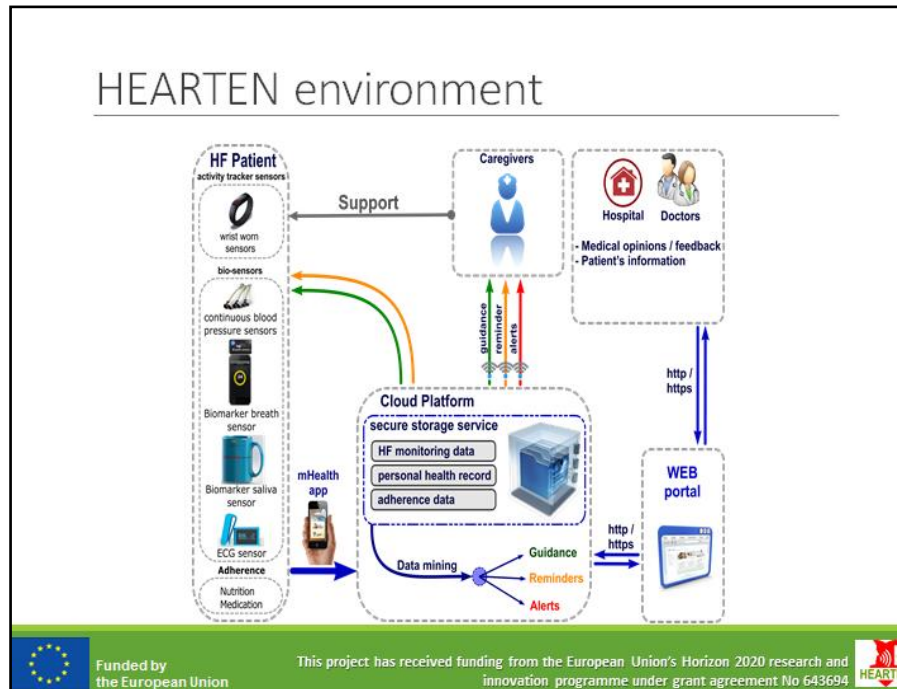
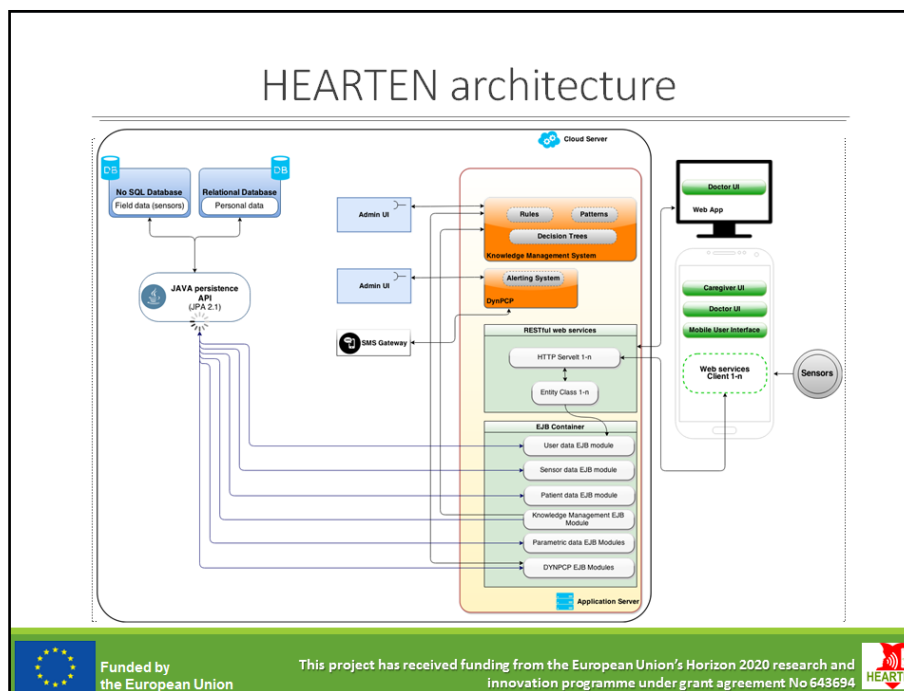


Figure 16: HEARTEN slides presentation –HEARTEN main components.



**Figure 17:** HEARTEN slides presentation –HEARTEN environment.



**Figure 18:** HEARTEN slides presentation –HEARTEN architecture.

## List of WPs

WP No	WP Title	Lead Part. Short Name	Start Month	End month
1	Coordination and Management	UCBL	1	36
2	Dissemination and Exploitation	YourDATA	1	36
3	Ecosystem needs analysis and design	FORTH	1	9
4	Identification of sensing parameters	UNIFI	1	24
5	Development of biosensors	CSIC	1	24
6	Knowledge management system and data mining techniques	FORTH	5	30
7	mHealth app development	APPART	5	30
8	ICT co-operative environment for compliance and adherence	CARE	15	36
9	Pilot study and health economics analysis	SAS	10	36



Figure 19: HEARTEN slides presentation – WP description.

## HEARTEN website



Figure 20: HEARTEN slides presentation –HEARTEN website.



Figure 21: HEARTEN slides presentation –HEARTEN Social media.

### 2.3 HEARTEN brochure

For the purpose of effectively and efficiently disseminating HEARTEN, a three-fold brochure has been created. The project brochure will be circulated at conferences and events related to the project's objectives and approach. The brochure includes a general project description, presents the main innovations that will be developed during HEARTEN project, highlights the key elements of scientific and technological interest and provides an overall approach of the ecosystem that HEARTEN project will create for empowering the HF patients and enabling their management outside healthcare institutions. In addition, a description of HEARTEN Consortium is provided while all project participants logos are included. The brochure is compact, user-friendly and easy to understand.

**HEARTEN**  
mHealth cooperative environment

The **HEARTEN project** aims at designing, developing & validating an ICT co-operative environment that will enable the HF patients to achieve sustainable behavior change regarding adherence & compliance & the ecosystem actors to be engaged & improve the patients' HF management.



**HEARTEN ecosystem**



**mHealth cooperative environment targeting adherence of Heart Failure patients**

Empowering patient to manage their own health & HF disease will result in more cost-effective healthcare systems by improving utilization of healthcare, enabling the HF management outside institutions & improving health outcomes.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 643694.

Universite Lyon 1 Claude Bernard

Lyon Ingenierie Projets

everis Spain SL

AppArt SA

Foundation For Research And Technology Hellas

Agencia Estatal Consejo Superior De Investigaciones Cientificas

Universitätsmedizin Rostock

Universita Di Pisa

Servicio Andaluz De Salud

Your Data SRL

Caredome Patient Support And Healthcare Solutions

SESA NV Srl

<http://www.hearten.eu/>

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everis

AppArt SA

Foundation For Research And Technology Hellas

Agencia Estatal Consejo Superior De Investigaciones Cientificas

Universitätsmedizin Rostock

Universita Di Pisa

Servicio Andaluz De Salud

Your Data SRL

Caredome Patient Support And Healthcare Solutions


SESA NV Srl

<http://www.hearten.eu/>

Figure 22: HEARTEN brochure- outer page.

**Key elements of the HEARTEN system**

- Biosensors which detect & quantify novel breath/saliva HF biomarkers
  - breath biosensor (Smartphone)
  - saliva biosensor (patient's cup)
- ECG, blood pressure, weight scale & physical activity sensors
- Input data with nutrition information & patient's profile
- HEARTEN cloud reference architecture




**Scientific & technological objectives**

- Continuous monitoring of specific biomarkers in breath/saliva.
- Continuous monitoring of vital signals and measurements.
- Development of mHealth apps for patient & ecosystem actors.
- Identification of trends & patterns of non-adherence.
- Integration of different components & creation of ICT co-operative environment.
- Education & guidance of ecosystem actors.
- Creation of supportive & interactive ecosystem for holistic HF management.

**HEARTEN A co-operative mHealth environment targeting adherence & management of patients suffering from Heart Failure**

News & Announcements at <http://www.hearten.eu/>



**Follow us**










Figure 23: HEARTEN brochure- inner page.

## 2.4 HEARTEN in Social media

With a view to always follow current dissemination trends, the HEARTEN project is focused on establishing strong presence to social media. We have established a presence on Facebook (Figure 16), Twitter (Figure 17) and LinkedIn (Figure 18). The first six months of the project, the Facebook group has 41 “friends”, Twitter has 21 followers and the LinkedIn group has 42 “connections”. All of these accounts are constantly updated regarding the project’s news and the planned activities, as well as provide information related to HF, patient management and empowerment. It is expected that these communication channels will be effective in rapidly communicating project progress, reach the stakeholders and stimulate their interest.

- Facebook account

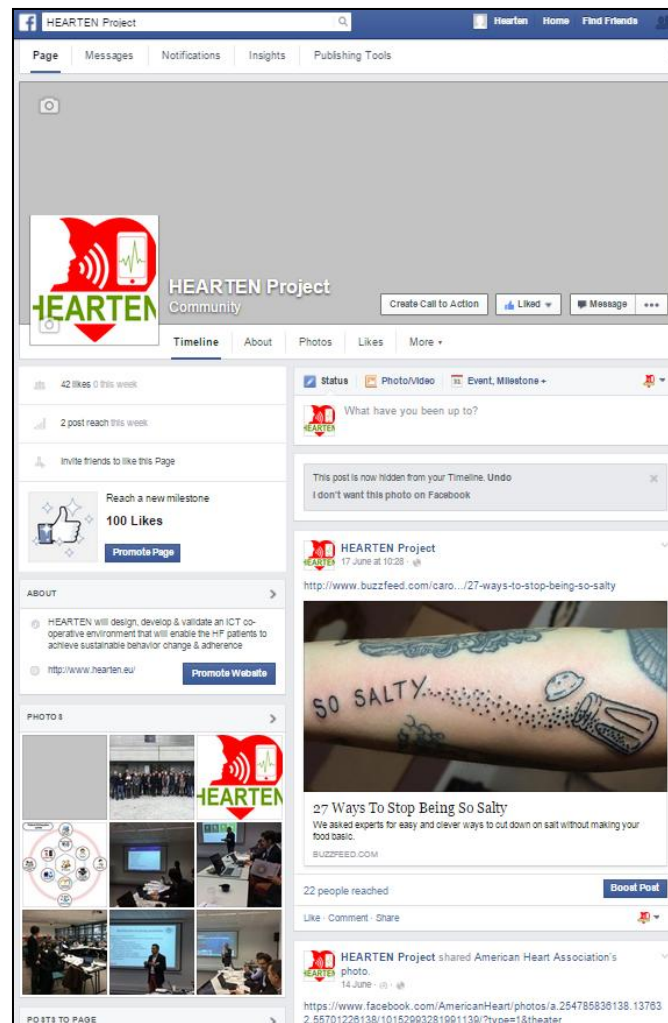


Figure 24: HEARTEN Facebook account [19].



### ○ Twitter account

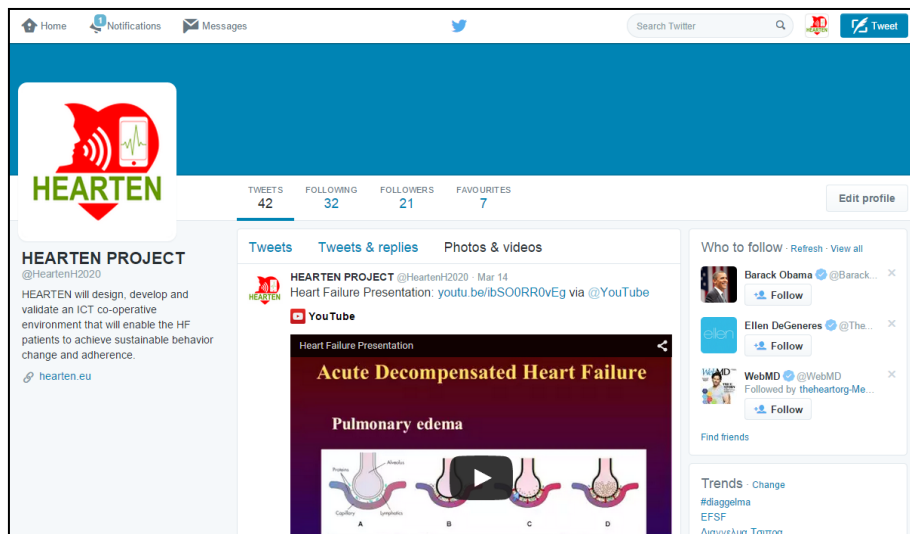


Figure 25: HEARTEN Twitter account [20].

### ○ LinkedIn account

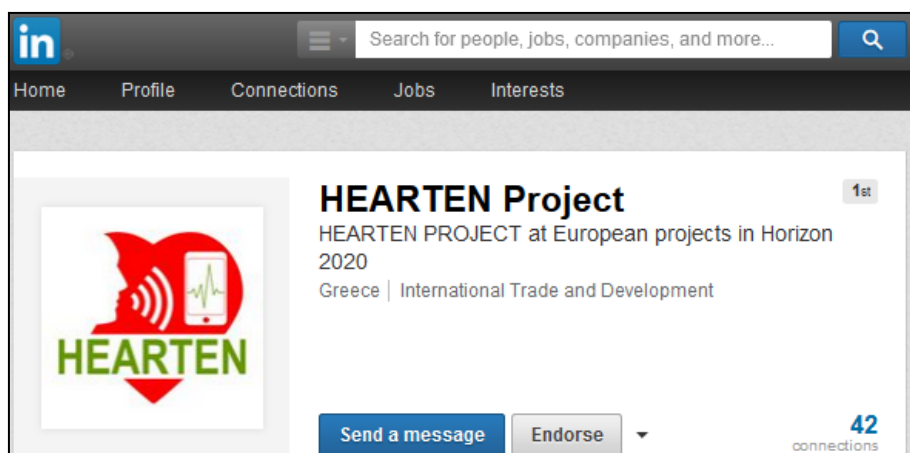


Figure 26: HEARTEN LinkedIn account [21].

## 3. HEARTEN publications

In addition to the aforementioned presentation and promotional material, HEARTEN Consortium has already made several publications in International Conferences and Workshops presenting some of the HEARTEN main components in researchers operating in the field of breath analysis as well as in biosensing and medical researchers.

More specifically these publications have been presented in:

- International Association of Breath Research, 10th anniversary - Jubilee Conference, Vienna, Austria
- BITE 2015, 4th International Conference on Bio-Sensing Technology, Lisbon, Portugal



- Surfocap'15, International Workshop on functionalized surfaces for sensor applications, Agadir, Morocco.
- 1st Progress Workshop & 1st Case Study of the Sea-on-a-Chip project, Sivota, Greece

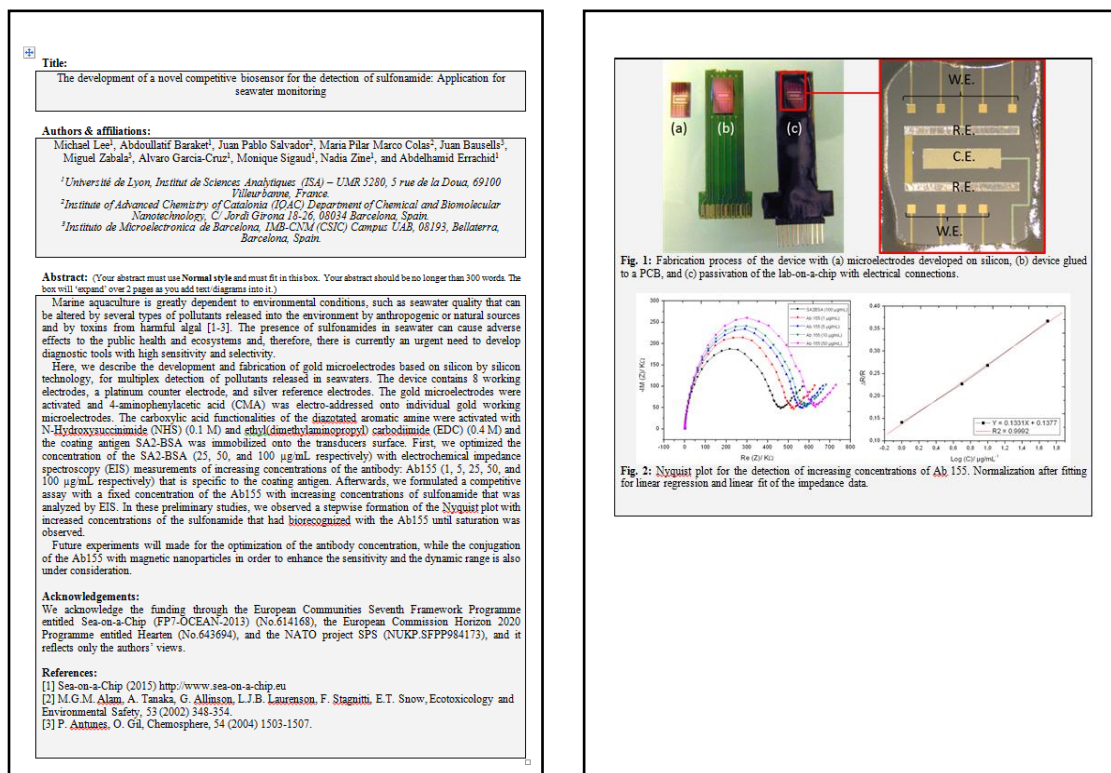
**A CO-OPERATIVE mHEALTH ENVIRONMENT TARGETING ADHERENCE AND MANAGEMENT OF PATIENTS SUFFERING FROM HEART FAILURE**

Abdelhamid Errachid el sahl<sup>1</sup>, Javier Olaiz<sup>2</sup>, Francisco Jose Fernandez Galeano<sup>3</sup>, Lida Sygkouana<sup>4</sup>, Dimitrios Fotiadis<sup>5</sup>, Joan Bausells<sup>6</sup>, Wolfram Miekisch<sup>7</sup>, Jochen K Schubert<sup>8</sup>, Tommaso Lomonaco<sup>9</sup>, Fabio Di Francesco<sup>8</sup>, Roger Fuoco<sup>8</sup>, Carlos Parra<sup>9</sup>, Marco Sideri<sup>10</sup>, Vasilis Triantopoulos<sup>11</sup>, Riccardo Pelliccioli<sup>12</sup>

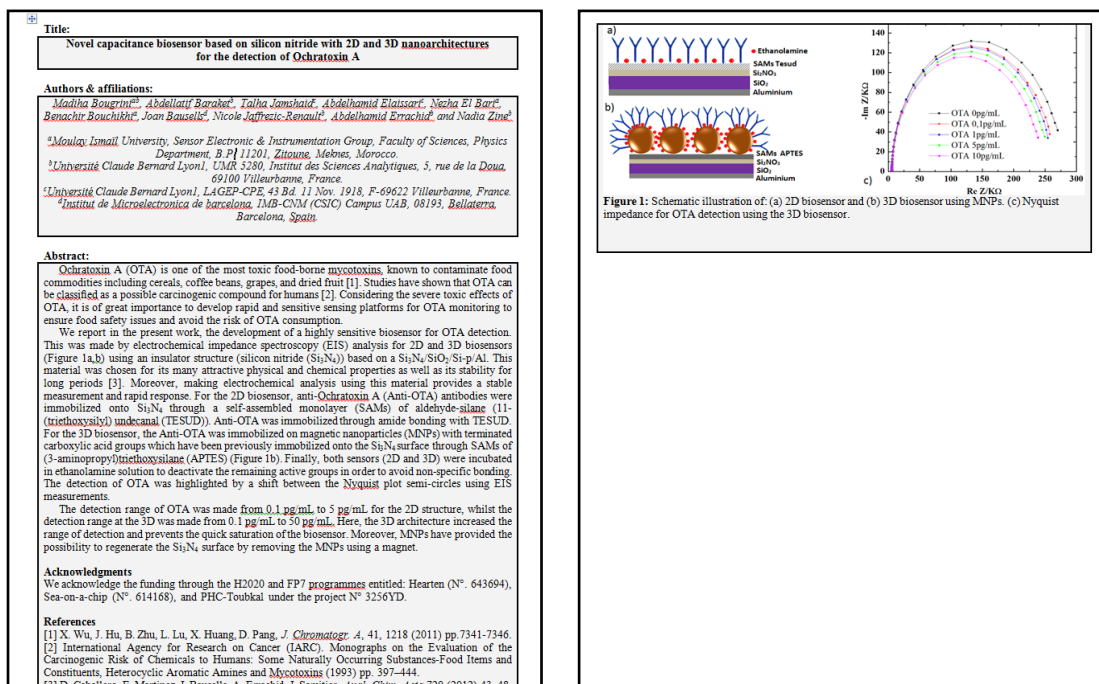
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<sup>10</sup> Your Data srl, Cagliari, Italy  
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Heart Failure (HF), a rapidly increasing cardiovascular chronic disease, is the main cause of mortality and poor quality of life in western societies. According to the European Heart Failure Association, 26 million people experience HF globally and 3.6 million people are diagnosed with HF, every year. The annual cost of HF to insurers has been recently estimated to be approximately 6.000€ per person per year. According to this scenario, HEARTEN project was recently funded by the European Commission under the H2020 program. The target of HEARTEN is to design, develop and validate an ICT co-operative environment that will enable the HF patients to achieve sustainable behavior change regarding their adherence and compliance in order to improve the patients' HF management. The target population of HEARTEN will be patients with chronic and acute HF, either post- ischemic or with dilated cardiomyopathy, requiring occasionally re-admittance into hospitals. The idea of HEARTEN project is to develop biosensors that detect and quantify novel breath and saliva HF biomarkers, being identified through analytical techniques. These biomarkers reflect the health status of the patient and identify whether the patient adheres to the administered drugs. The breath biosensor will be integrated into the smartphone whereas the saliva biosensor will be integrated into the patient's cup. Additional sensors for monitoring the ECG, the blood pressure and the physical activity constitute the sensor kit of the patient. The input data are complemented with nutrition information from the patient's smartphone, weight monitoring through wireless weight scales as well as the patient's profile and information directly added by the caregivers and the healthcare professionals. These multiparametric data are transmitted to the HEARTEN cloud reference architecture, where a knowledge management system analyses them and delivers critical information at hand, provides alerts, guidelines, trends and predictive models to the patient and the ecosystem actors.

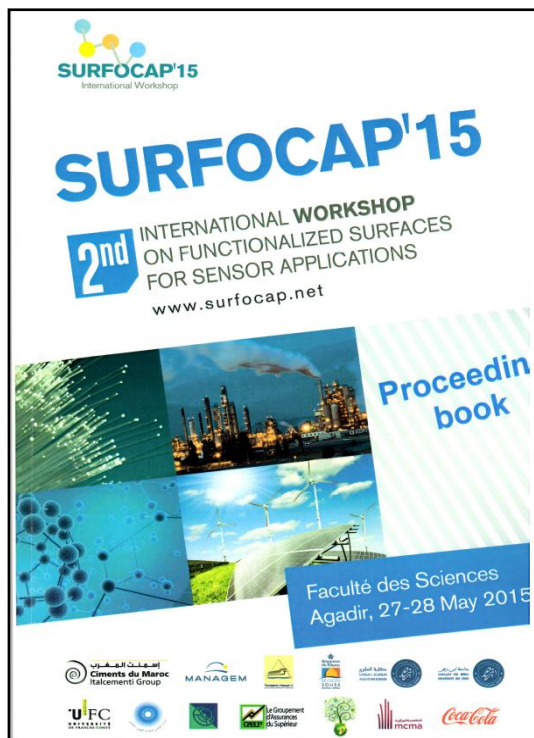
**Figure 27:** HEARTEN poster presentation entitled “A co-operative mhealth environment targeting adherence and management of patients suffering from heart failure” in “International Association of Breath Research” [22].



**Figure 28:** HEARTEN poster presentation entitled “The development of a novel competitive biosensor for the detection of sulfonamide: Application for seawater monitoring” in “BITE 2015, 4th International Conference on Bio-Sensing Technology” [23].



**Figure 29:** HEARTEN poster presentation entitled “Novel capacitance biosensor based on silicon nitride with 2D and 3D nanoarchitectures for the detection of Ochratoxin A” in “BITE 2015, 4th International Conference on Bio-Sensing Technology” [23].



**Flexible BioLab-on-a-chip for biomedical and environmental analysis based on functionalized surfaces using micro&nano-contact printing combined with wet etching**  
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#### ABSTRACT

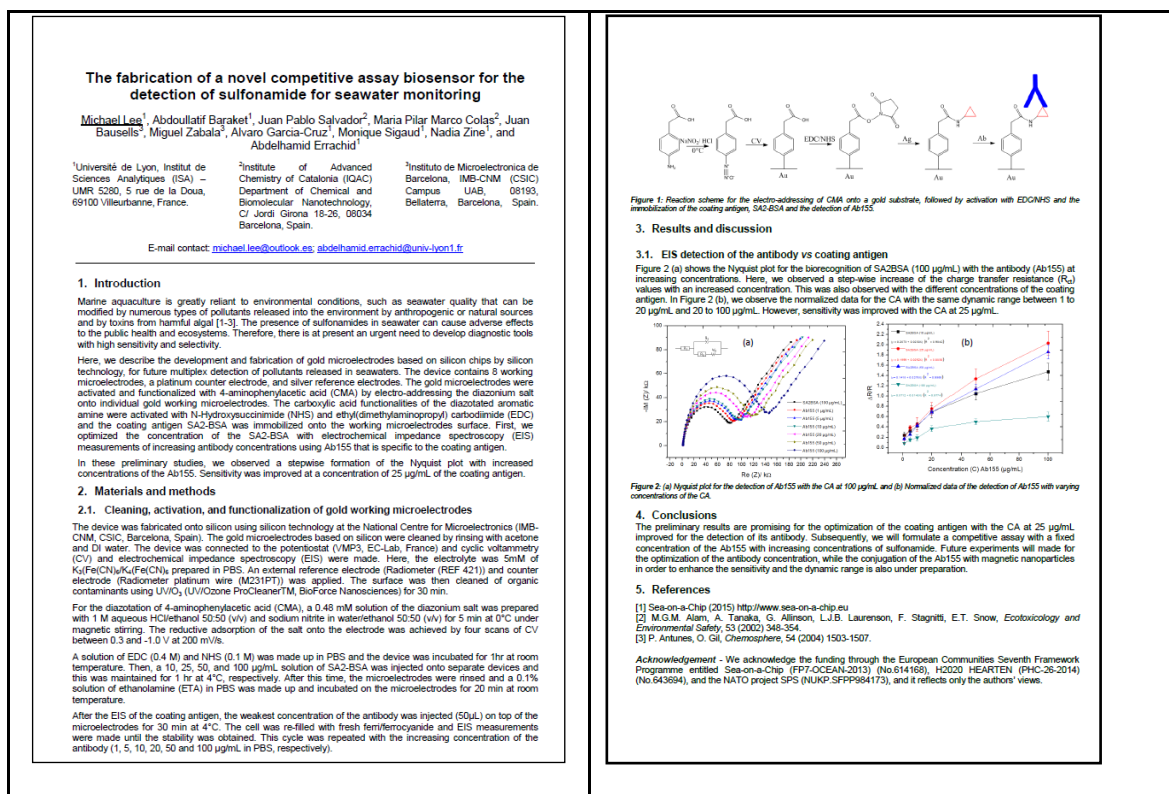
Micro&nano-contact printing ( $\mu$ &nCP) is a versatile tool for the surface modification of substrates and production of microstructures [1]. It is a simple and cheap alternative to the rather complicated and expensive Photolithography. It makes use of an elastomeric stamp of polydimethylsiloxane (PDMS) with a relief pattern. The stamp is inked with the chemical to deposit, so that a pattern of chemical is transferred onto the surface of the substrate by direct contact of the stamp with the substrate. For instance, thiol can be printed on a suitable substrate, for e.g. gold. The Self-Assembled Monolayer (SAM) protects the surface from being etched when in a next step the surface is etched to produce a lateral structure. The chemical function of a thiol depends on its functional groups, which can be modified. In that way, the surface can be modified to bind particular classes of molecules. Through  $\mu$ &nCP of SAMs it will form the basis for many fabrication tasks involved in miniaturization of biosensors, biomicroelectromechanical systems (BioMEMS), microfluidics, and microanalytical systems. Potential applications of  $\mu$ &nCP will be discussed in the field of biosensors and BioLab-on-a-chips with emphasis on different examples that have been recently developed in our laboratory [2-9].

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**Figure 30:** HEARTEN abstract presentation entitled “Flexible BioLab-on-a-chip for biomedical and environmental analysis based on functionalized surfaces using micro&nano-contact printing combined with wet etching” in “Surfocap’15, International Workshop on functionalized surfaces for sensor applications” [24].



**Figure 31:** HEARTEN presentation entitled “The fabrication of a novel competitive assay biosensor for the detection of sulfonamide for seawater monitoring” in “1st Progress Workshop & 1st Case Study of the Sea-on-a-Chip project” [25].

## 4. Conclusions

In this deliverable we have presented HEARTEN presentation and promotional material that has been created, shared and distributed during the first six months of the project. These activities have been strategically chosen and selected in terms of the benefits that are expected, such as to arise awareness of the project, inform on the undertaken activities and promote HEARTEN environment components.



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