Smart **W**earable and **A**utonomous **N**egative pressure device for wound monitoring and therapy

SEVENTH FRAMEWORK PROGRAMME

SWAN iCare

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General Information

Project full title:
Smart **W**earable and **A**utonomous **N**egative pressure device for wound monitoring and therapy

Call identifier: FP7-ICT-2011-8

Work programme Objective:
Smart Components and Smart Systems integration (b) Micro-Nano Bio-Systems

Grant agreement no: 317894

Total budget: € 8.079.179 **Funding**: € 6.113.999

Start date: 1 September 2012 **Duration**: 48 months

Coordinator: EXUS Greece

Project website: http://www.swan-icare.eu/

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Consortium

EXUS S.A.

Commissariat à l'Energie Atomique et aux Energies Alternatives

Centre Suisse d'Electronique et de Microtechnique SA

Università di Pisa

CHU Grenoble

Euroresearch

Heamopharm Biofluids

European Wound Management Association Secretariat

Institute of Communications and Computer Systems

Smith & Nephew

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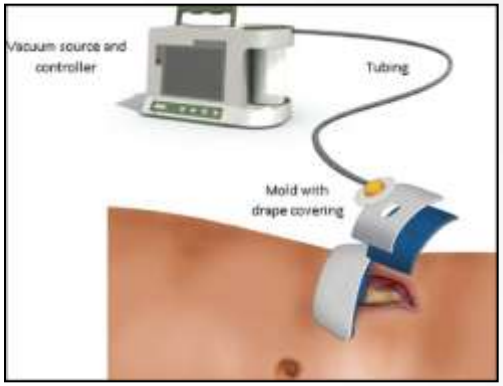
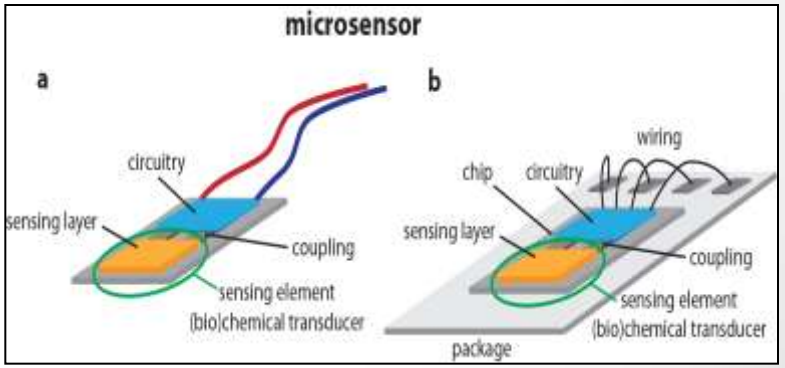
Project goal

SWAN-iCare aims at developing an integrated autonomous device for the monitoring and the personalized management of chronic wounds, mainly venous leg ulcers and diabetic foot ulcers



Such device will allow users to:

- accurately monitor many wound parameters via non-invasive integrated micro-sensors
- early identify infections
- provide remotely an innovative personalised two-line therapy via non-invasive micro-actuators to supplement the negative pressure wound therapy



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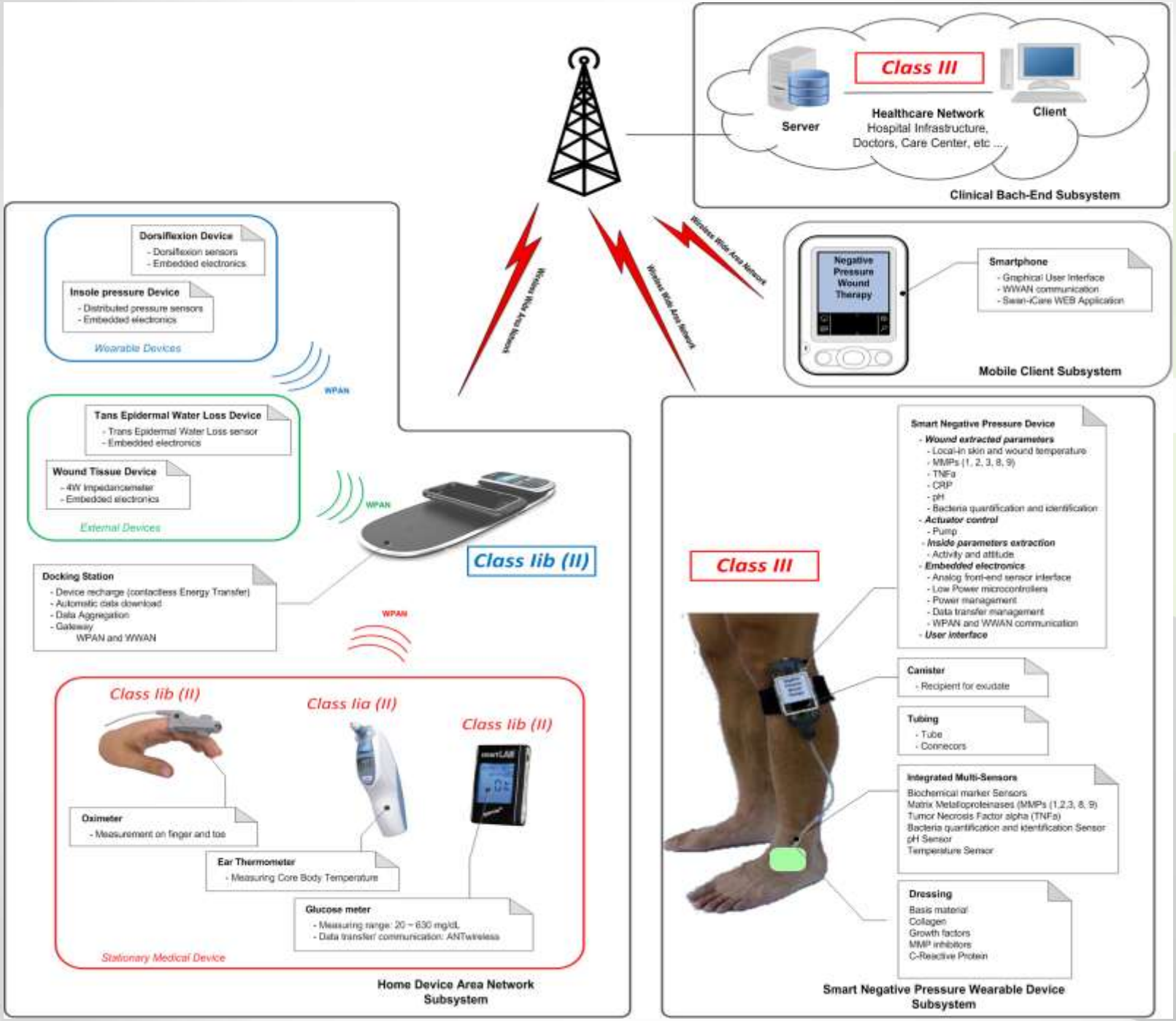
Class III
Server
Healthcare Network
Hospital Infrastructure,
Doctors, Care Center, etc ...
Client
Clinical Bach-End Subsystem
Wireless Wide Area Network
Wireless Wide Area Network
Negative Pressure Wound Therapy
Smartphone
- Graphical User Interface
- WWAN communication
- Swan-iCare WEB Application
Mobile Client Subsystem
Dorsiflexion Device
- Dorsiflexion sensors
- Embedded electronics
Insole pressure Device
- Distributed pressure sensors
- Embedded electronics
Wearable Devices
WPAN
Tans Epidermal Water Loss Device
- Trans Epidermal Water Loss sensor
- Embedded electronics
Wound Tissue Device
- 4W Impedancemeter
- Embedded electronics
External Devices
WPAN
Class IIb (II)
Docking Station
- Device recharge (contactless Energy Transfer)
- Automatic data download
- Data Aggregation
- Gateway
WPAN and WWAN
WPAN
Class IIb (II)
Class IIa (II)
Class IIb (II)
Oximeter
- Measurement on finger and toe
Ear Thermometer
- Measuring Core Body Temperature
Glucose meter
- Measuring range: 20 ~ 630 mg/dL
- Data transfer/ communication: ANTwireless
Stationary Medical Device
Home Device Area Network Subsystem
Class III
Smart Negative Pressure Device
- Wound extracted parameters
- Local-in skin and wound temperature
- MMPs (1, 2, 3, 8, 9)
- TNFa
- CRP
- pH
- Bacteria quantification and identification
- Actuator control
- Pump
- Inside parameters extraction
- Activity and attitude
- Embedded electronics
- Analog front-end sensor interface
- Low Power microcontrollers
- Power management
- Data transfer management
- WPAN and WWAN communication
- User interface
Canister
- Recipient for exudate
Tubing
- Tube
- Connecors
Integrated Multi-Sensors
Biochemical marker Sensors
Matrix Metalloproteinases (MMPs (1,2,3, 8, 9)
Tumor Necrosis Factor alpha (TNFa)
Bacteria quantification and identification Sensor
pH Sensor
Temperature Sensor
Dressing
Basis material
Collagen
Growth factors
MMP inhibitors
C-Reactive Protein
Smart Negative Pressure Wearable Device Subsystem

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Expected Impact: the patient

Benefits for the patient

- Continuous home monitoring of a number of wound parameters
- Personalised therapy initiated by the physician remotely and adapted to the daily measurements
- Faster wound healing due to the early identification and therapy of potential problems

- Wound deterioration can be identified early and acted upon, therefore leading to reduced morbidity and amputation rates
- Reduced disturbance to patients life and possible need for hospitalisation
- Better quality of life with better mobility, more comfort ,less stress

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Expected Impact: Society and Healthcare

Benefits for society and healthcare

- Reduced healthcare costs as a result of reduced need for hospitalisation
- Reduced burden for the patients relatives due to faster wound healing and remote monitoring
- Reduced social costs and improved productivity as the patient returns to work earlier

- Increased access to best practice wound care for patients living in remote geographical locations
- Reduced daily nursing visits allows for more new patients' to be added to the case load

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Expected Impact: Medical science

Benefits for the medical science

- Advancement of wound care best practice, supply of the most effective wound care protocols available
- Continuous objective measurement contributing to evaluation of wound progress, and treatment effectiveness
- A better understanding of wound healing due to creation of a DATA base of continuous wound parameter measurements
- Potential for new wound healing research

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