



PHOTONICS PUBLIC PRIVATE PARTNERSHIP



# INNODERM

687866 —H2020-ICT-2015

## D6.11: Update, communication kit

Deliverable nature: *Websites, patents filling, etc.*  
 Contractual delivery date: 08.2018  
 Actual delivery date: 09.2018  
 Version: 1.0

Dissemination level (select one)		
PU	Public	x
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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### **1) Purpose of this document**

This document provides information about the INNODERM *Communication Kit*. Adequate and effective communication not only between the consortium partners but also between the consortium and the scientific and public communities is a hallmark of success. It also reflects on the transparent nature of publicly funded research enabling visibility of the project itself, the consortium partners and the use of the research funds. Since communication activities are diverse in nature, INNODERM encompasses a variety of communication activities tailored to specific audiences. One of these measures is a so called *Communication Kit* as outlined below.

### **2) Content of the Communication Kit**

The current INNODERM *Communication Kit* (CK) includes the INNODERM Leaflet (Fig. 1) and the INNODERM Factsheet (Fig. 2) outlining key points of the project. The CK will be updated on a regular basis and each version will be provided to the European Commission.

The CK will be distributed at national and international workshops and conferences as well as during internal topic and public information days to raise awareness. The goal is to inform both the public as well as the scientific sector about the objectives, overall goals and the progress of INNODERM and to promote the project and the resulting product at a later stage.

### **3) Update**

The objectives of the project have not changed and the technological developments are in progress, therefore the content information on the flyer and the brochure has not changed and is up to date.

On both, the flyer and the brochure, the logo of one of the partners, Rayfos, has been updated.

## a. INNODERM Leaflet

The leaflet contains all relevant information about the project including the overall concept, the challenges and objectives, the Impact and the Outcome. Interested people who wants to know more about the projects can find the contact data and also the link to the INNODERM website.

Figure 1: INNODERM leaflet

**Impact and Outcome**

**Impact**

- Strong participation of private sector players: three out of five partners are SMEs
- Project goals set based on medical end-user needs
- Tremendous benefits for the patients due to earlier diagnosis accompanied by a substantial reduction of overall healthcare costs
- Building the foundation for further growing European strengths in the emerging optoacoustic imaging market
- Development of a series of strong industrial ambitions, promote technical excellence and product creation advancing European competitiveness and leadership

**Outcome**

- New User-friendly, light-weight portable scanner for various applications
- Cross-fertilizing Innovation platform that brings optical, ultrasound, software/mathematics and clinical stakeholders to impact photonics with a novel skin imaging modality
- strong value chain to deliver RSOM to clinical markets
- Foundation for additional potential products to be developed and traded by the participating SMEs

**Impressum**

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INNODERM website: [www.innoderm2020.eu](http://www.innoderm2020.eu)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 687866

**Logos:** European Union, PHOTONICS<sup>21</sup>, INNODERM, TUM, SONAXIS, RAY FOS, iTheraMedical, HUMANITAS UNIVERSITY.

**Innovative Dermatology Healthcare based on Label-Free Spectral Optoacoustic Mesoscopy**

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Rayfos LTD – UNITED KINGDOM  
iThera Medical GmbH – GERMANY  
Humanitas University – ITALY

**INNODERM Concept**

**Vision**

INNODERM aims at developing a new portable and light-weight instrument for early diagnosis of skin cancer facilitating earlier detection, more accurate treatment follow-up and improved disease monitoring.

**Concept**

INNODERM will build upon the concept of Raster Scan Optoacoustic Mesoscopy (RSOM) that can visualize features of healthy and morbid skin with markedly superior contrast and specificity. The new device sends short light pulses to the skin and detects ultrasound waves generated in response to light absorption by skin molecules and structures. Tomographic analysis of the ultrasound waves can reveal unprecedented volumetric views of skin constituents and disease manifestations at resolutions and depths never reached before by an optical method. Then, by using light pulses at different colors, accurate spectroscopic information is revealed not only for morphological, but also biochemical features of skin, providing accurate and specific diagnostic information.

**Overall Goal**

The development of the new handheld device during the course of INNODERM promises to lead to substantial benefits for the patients as well as healthcare cost savings by reducing the number of unnecessary biopsies and offering individualized treatment and monitoring towards precision dermatology.

**Challenges and Objectives**

**Challenges**

The current state of the art care in dermatology, visual inspection and all-optical methods come with significant limitations and greatly affect the performance of the current methods:

- Penetration depth -> difficulty to visualize features under the tissue surface
- Specificity and contrast: poor performance of current modalities
- User experience: highly subjective interpretation of results, dependent on the experience of the physician due to the lack of standardized, objective and reliable methods

**Objectives**

- Design of a portable, light-weight and scalable clinical RSOM prototype
- Pre-clinical validation of the RSOM ability
- Quantitative measure of improvements in disease detection and monitoring
- Development and update an exploitation plan for RSOM market introduction.

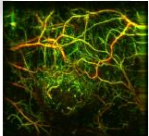


Fig.: Imaging of tumor vasculature in a mouse model acquired with raster scan optoacoustic mesoscopy (RSOM).

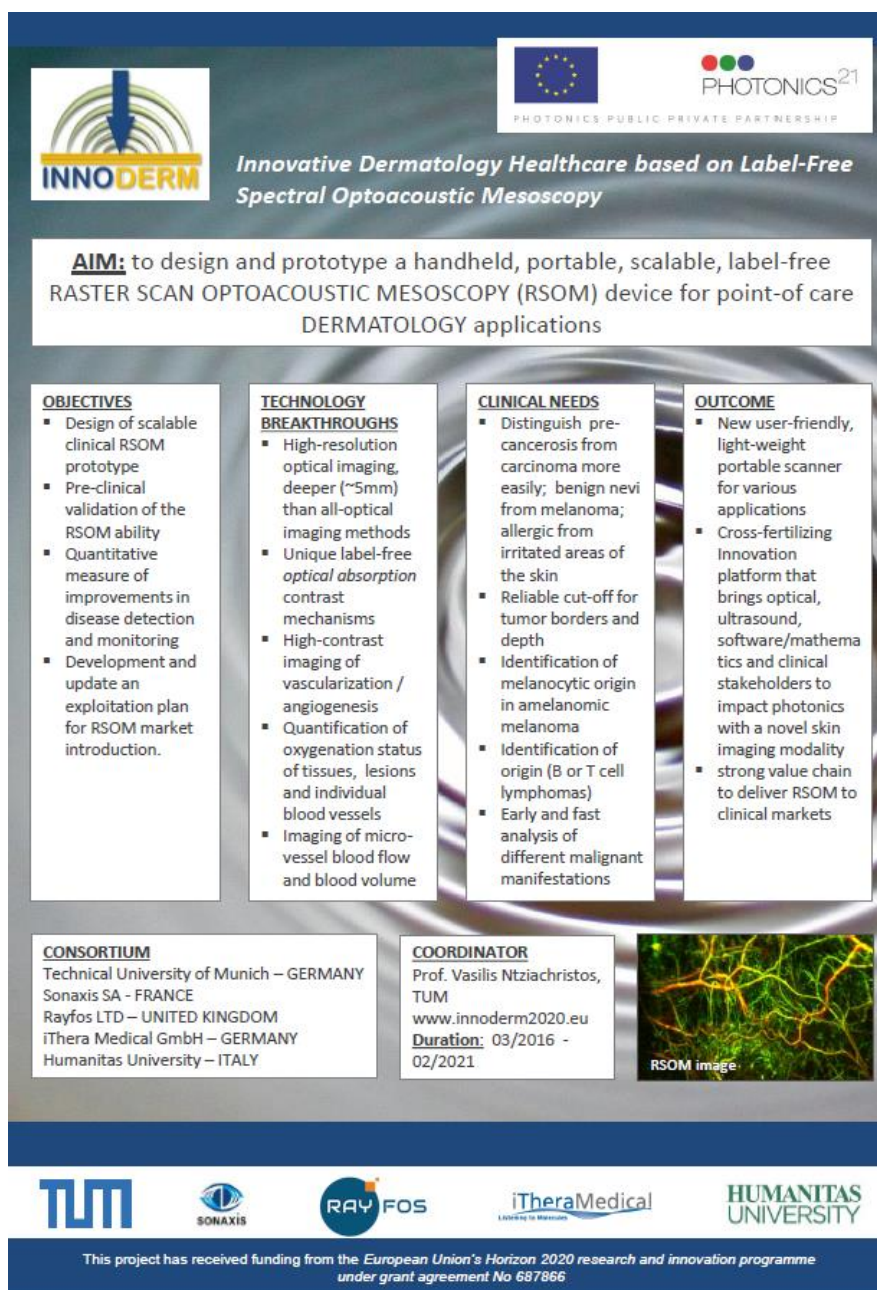
**Clinical Needs**

- Distinguish pre-cancerosis from carcinoma more easily
- Distinguish benign nevi from melanoma ("black cancer")
- Rapid screening of transplantation patients since they are more prone to skin cancer ("white cancer") due to their immuno-suppression
- Reliable cut-off for tumor borders
- Reliable cut-off for tumor depth (especially in the sentinel lymph node) since clinical decisions are based on the penetration depth of the tumor
- Identification of melanocytic origin in amelanomic melanoma, because it is often diagnosed too late and metastasis already occurred
- Identification of origin (B or T cell lymphomas)
- Early and fast analysis of different malignant manifestations (TIME is a big factor for therapy and the current standard of practice, namely histology, takes a couple of days before the results are available)
- Distinguish between allergic and irritated areas of the skin: so far, assessment is only done by eye and there is an urgent need for an objective readout
- Clinical feasibility of the system: it should be fast and cost-effective

## b. INNODERM Factsheet

The INNODERM Factsheet is a hands-on summary of INNODERM contains all key points at a glance. The Factsheet can be printed as handout or in poster form for display at national and international conferences and workshops or local information days.

Figure 2: INNODERM Factsheet



The factsheet poster features a central background image of a skin scan. At the top left is the INNODERM logo, and at the top right are the European Union flag and the PHOTONICS<sup>21</sup> logo with the text 'PHOTONICS PUBLIC PRIVATE PARTNERSHIP'. The main title is 'Innovative Dermatology Healthcare based on Label-Free Spectral Optoacoustic Mesoscopy'. Below this, the AIM is stated: 'to design and prototype a handheld, portable, scalable, label-free RASTER SCAN OPTOACOUSTIC MESOSCOPY (RSOM) device for point-of care DERMATOLOGY applications'. The poster is divided into four columns: OBJECTIVES, TECHNOLOGY BREAKTHROUGHS, CLINICAL NEEDS, and OUTCOME. At the bottom, there are sections for CONSORTIUM (listing Technical University of Munich, Sonaxis SA, Rayfos LTD, iThera Medical GmbH, and Humanitas University) and COORDINATOR (Prof. Vasilis Ntziachristos, TUM, with website and duration). A small inset image shows an 'RSOM image' of skin vessels. The footer contains logos for TUM, SONAXIS, RAYFOS, iTheraMedical, and HUMANITAS UNIVERSITY, along with a funding statement from the European Union's Horizon 2020 programme.

**INNODERM**

**PHOTONICS<sup>21</sup>**  
PHOTONICS PUBLIC PRIVATE PARTNERSHIP

*Innovative Dermatology Healthcare based on Label-Free Spectral Optoacoustic Mesoscopy*

**AIM:** to design and prototype a handheld, portable, scalable, label-free RASTER SCAN OPTOACOUSTIC MESOSCOPY (RSOM) device for point-of care DERMATOLOGY applications

**OBJECTIVES**

- Design of scalable clinical RSOM prototype
- Pre-clinical validation of the RSOM ability
- Quantitative measure of improvements in disease detection and monitoring
- Development and update an exploitation plan for RSOM market introduction.

**TECHNOLOGY BREAKTHROUGHS**

- High-resolution optical imaging, deeper (~5mm) than all-optical imaging methods
- Unique label-free *optical absorption* contrast mechanisms
- High-contrast imaging of vascularization / angiogenesis
- Quantification of oxygenation status of tissues, lesions and individual blood vessels
- Imaging of micro-vessel blood flow and blood volume

**CLINICAL NEEDS**

- Distinguish pre-cancerosis from carcinoma more easily; benign nevi from melanoma; allergic from irritated areas of the skin
- Reliable cut-off for tumor borders and depth
- Identification of melanocytic origin in amelanomic melanoma
- Identification of origin (B or T cell lymphomas)
- Early and fast analysis of different malignant manifestations

**OUTCOME**

- New user-friendly, light-weight portable scanner for various applications
- Cross-fertilizing Innovation platform that brings optical, ultrasound, software/mathematics and clinical stakeholders to impact photonics with a novel skin imaging modality
- strong value chain to deliver RSOM to clinical markets

**CONSORTIUM**  
Technical University of Munich – GERMANY  
Sonaxis SA - FRANCE  
Rayfos LTD – UNITED KINGDOM  
iThera Medical GmbH – GERMANY  
Humanitas University – ITALY

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[www.innoderm2020.eu](http://www.innoderm2020.eu)  
**Duration:** 03/2016 - 02/2021

RSOM image

**TUM** **SONAXIS** **RAYFOS** **iTheraMedical** **HUMANITAS UNIVERSITY**

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#### **4) Future Plans and Conclusions**

We will continue to update the Communication Kit according to the status-quo of the project.