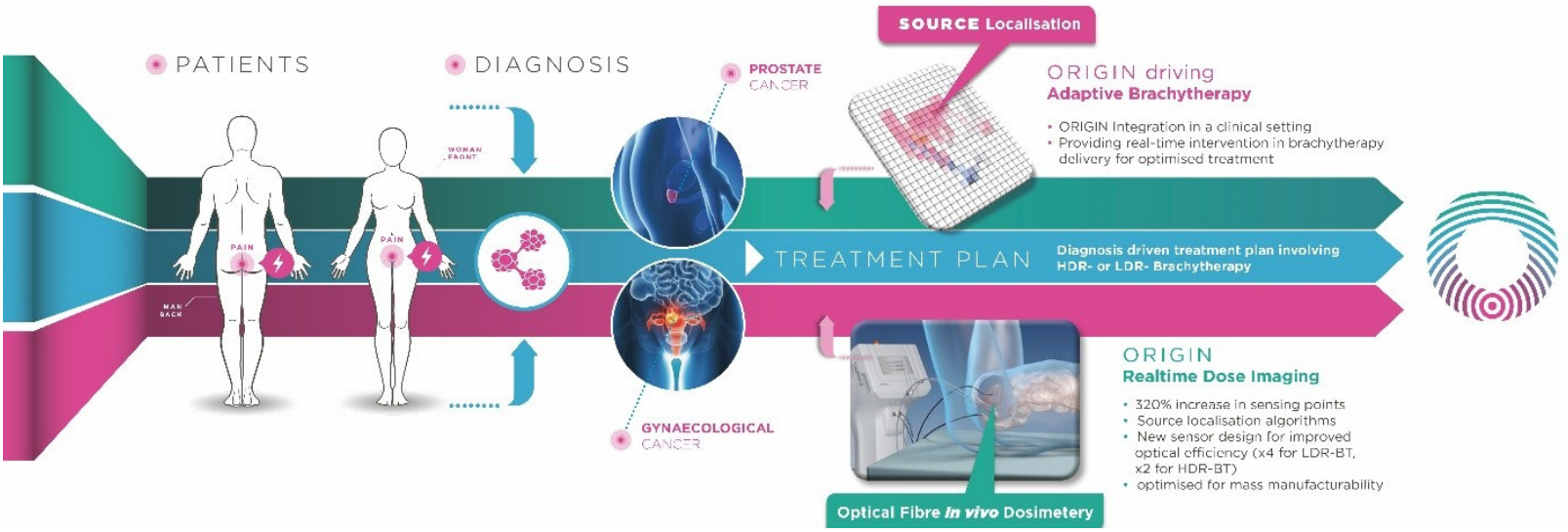
ORIGIN

optical fibre dose imaging for adaptive brachytherapy

ORIGIN FACTSHEET



The ORIGIN Project

PROJECT INFORMATION

Grant Agreement ID: 871324

Call Identifier: H2020-ICT-2019-2

Topic: ICT-05-2019 Application driven Photonics components

Scheme: RIA- Research and Innovation action

Duration: 1st Jan 2020 - 30th Jun 2023 (42 months)

Total Budget: €4,819,920

Coordinator: University of Limerick

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Project website: www.origin2020.eu

MISSION STATEMENT

"ORIGIN will address the urgent need to provide real-time *in-vivo* dose imaging and source localisation methods, by the development of a new optical fibre based sensor system to support diagnostics-driven therapy through enhanced adaptive bracytherapy (The ORIGIN System)"

PHOTONICS PUBLIC PRIVATE PARTNERSHIP

THE CHALLENGE

ORIGIN addresses the challenges of delivering effective and optimal brachytherapy for prostate and gynaecological oncology, through the introduction of novel optical fibre technology.

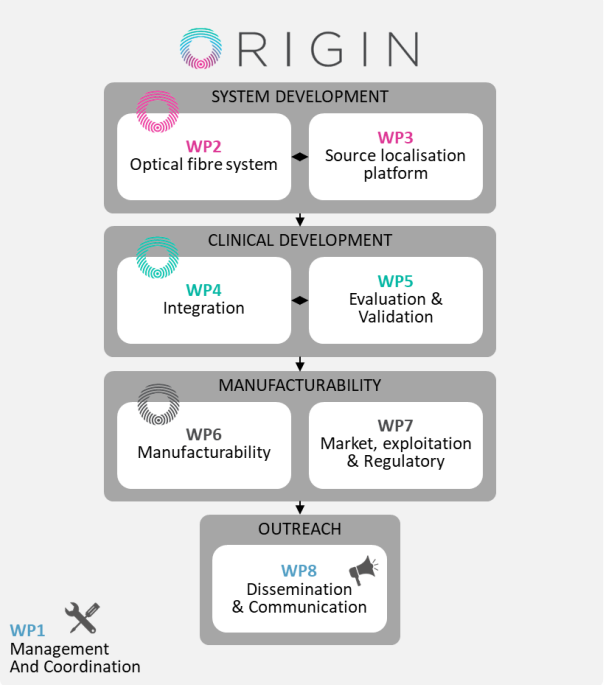
THE PROBLEM

There is an unmet clinical need for accurate monitoring of the radiation dose delivered to the patient during brachytherapy to improve patient outcomes. Monitoring the precise radiation dose delivered to critical organs near the tumour, such as the urethra and rectal wall, is crucial to reduce these adverse side-effects and further improve the quality of life of cancer survivors. ORIGIN addresses the challenges of delivering effective and optimal brachytherapy for prostate and gynaecological oncology, through the introduction of novel optical fibre technology.

THE CONSORTIUM

ORIGIN brings together a highly multidisciplinary consortium of leaders in their respective fields (academia and industry with photonics, engineering, medical physics, radiobiology, and clinical expertise), in order to develop a new 16 point array optical fibre dosimeter for both LDR- and HDR-BT, with novel algorithms to provide 3D dose imaging with source localisation capability. The involvement on both industry and clinical partners from the outset will ensure that patient care is at the forefront across the entire value chain.

THE METHODOLOGY



THE OBJECTIVES

System Design

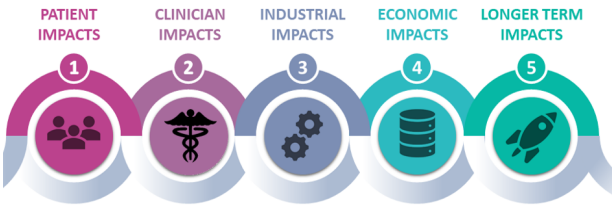
- *Design and fabricate 16 point sensor array for LDR/HDR - BT*
- *Develop a control and data acquisition system*
- *Develop algorithm for 3D dose imaging of the tumour and OARs*
- *Devise localisation strategies to monitor radiation sources*

Clinical Development

- *Demonstrate the clinical validity of the ORIGIN system in clinical prostate and gynaecological phantoms*
- *Develop a protocol for integrating ORIGIN with existing treatment planning software*
- *Integrate the ORIGIN system within a commercial brachytherapy afterloader*

Manufacturability

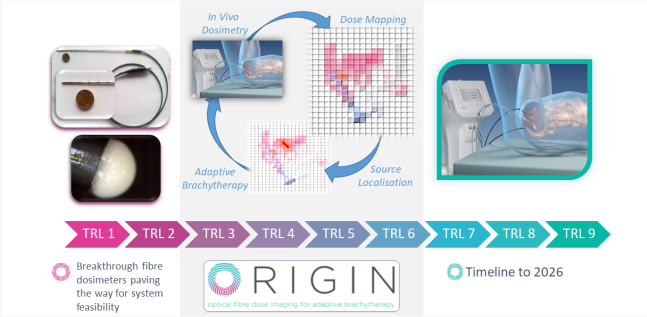
- *Modify the sensing tip design to provide an increase in optical efficiency*
- *Optimise sensor design for high-throughput cost effective mass-manufacturability*
- *To undertake market and regulatory assessments to provide a clear path to market beyond the project*



THE IMPACT

ORIGIN will result in significant impacts on:

- Society: with improved patient outcomes, reduced treatment risks, reduced hospital stays and thereby increasing patient treatment numbers
- Industry: establishing Europe at the fore of brachytherapy system development and photonics manufacturing
- European economy: reducing the economic burden of cancer and costs associated with treatment errors and increasing employment owing to photonics-enabled products



THE EXPLOITATION

ORIGIN will expand on the developed HDR- and LDR- BT dosimeters above, starting at TRL 2, whereby the overall ORIGIN system concept has been formulated, to provide an innovative solution for improving the accuracy of radiation dose delivery, providing safeguarding, real-time dose verification and ultimately improving the outcomes for cancer patients undergoing radiation treatment. The technology will be demonstrated in the relevant clinical environment, using phantoms, to bring the technology to TRL 6.

PHOTONICS 21

PHOTONICS PUBLIC PRIVATE PARTNERSHIP