

HIGH-RESOLUTION IMAGE-BASED COMPUTATIONAL INNER EAR MODELLING FOR SURGICAL PLANNING OF COCHLEAR IMPLANTATION



CONCEPT

Cochlear implantation is a surgical procedure that aims to overcome hearing loss by direct electrical stimulation of the spiral ganglion cells in the cochlea.

The surgical scenario of implantation is very complex due to:

- 🌀 Cochlear **inaccessibility**.
- 🌀 A vast **anatomical variability** amongst patients.

It requires:

- 🌀 Efficiently **access** the surgical site, the cochlea.
- 🌀 Localize nearby **critical structures** (e.g. facial nerve).
- 🌀 **Optimize** the implantable device.

Furthermore, there is a vast **anatomical variability** amongst patients. Therefore, the **optimal individual** fitting for each patient requires high clinical expertise and state-of-the-art technical support for a successful hearing restoration.

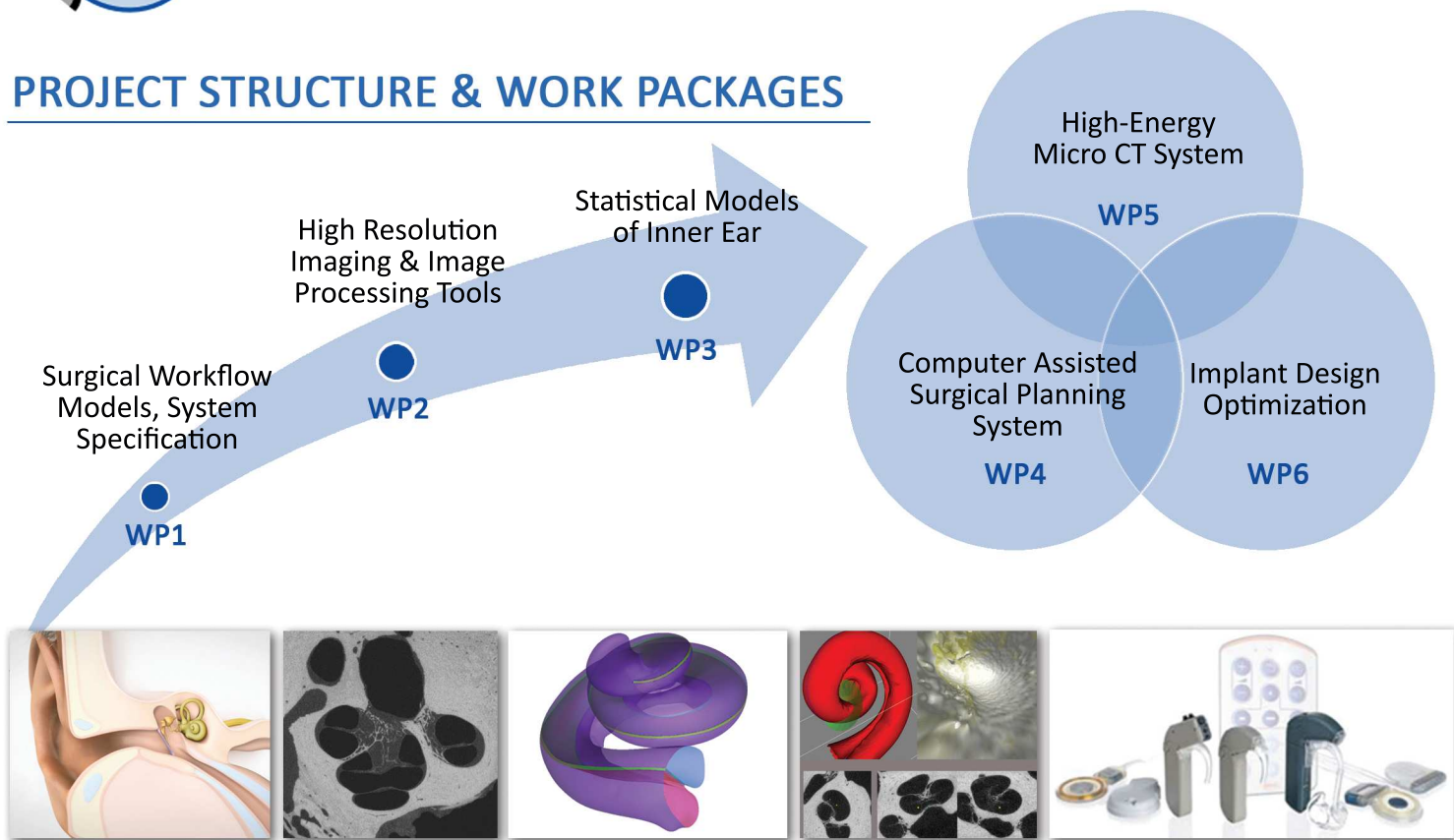


OBJECTIVES

- 🌀 Development of a **novel high-resolution high-energy microCT** system to obtain detailed images of the middle and inner ear, even in the presence of metallic implants.
- 🌀 To build a **model of the shape variability** of the middle and inner ear incorporating functional information.
- 🌀 Development of a computer-assisted **patient-specific pre-operative planning system** for surgery.
- 🌀 Improvement of the **design of cochlear implant** electrode arrays and associated insertion tools using a population-based optimization framework.

High-resolution image-based computational inner ear modelling for surgical planning of cochlear implantation
 Project number: HEALTH-F2-2012-304857

PROJECT STRUCTURE & WORK PACKAGES



EXPECTED RESULTS



- Minimize invasiveness & insertion-induced trauma.
- Enhance functional outcome through patient-specific frequency mapping.

PROJECT PARTNERS

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WEB SITE
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September 2012

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36 months

TOTAL BUDGET
4.7 M€

PARTICIPATING ORGANIZATIONS
6

NUMBER OF COUNTRIES
4

CONTRACT NO
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FUNDING SCHEME
Collaborative Project