inHEART Executive Summary

Contact Information
Jean-Marc Peyrat, PhD, MBA
IHU Liryc – Hôpital Xavier Arnozan
Avenue du Haut Lévêque
33600 Pessac, France
+33 (0) 6 75 47 52 48
jean-marc.peyrat@inheart.fr

www.inheart.fr

Industry
MedTech
Cardiac Electrophysiology

Development Stage
Startup

Year Founded
2017

Number of Employees
12

Investment Opportunity
€ 1,500,000

Sales (to date)
€ 250,000

Grants
€ 515,000

Loans
€ 235,000

Partners Current Account
€ 105,000

Capital
€120,000

Founding Team
Jean-Marc Peyrat (25%)
Pierre Jaïs (25%)
Hubert Cochet (25%)
Maxime Sermesant (25%)

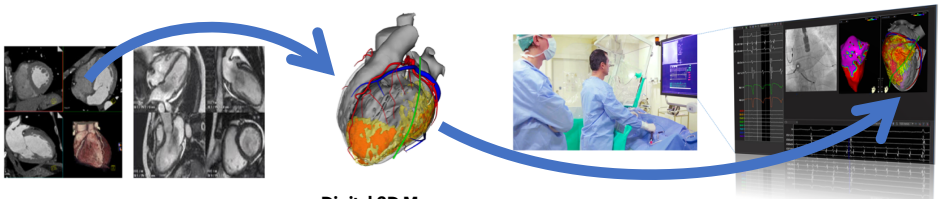
inHEART is a spin-off from IHU Liryc (Bordeaux, France) and Inria (Sophia Antipolis, France) whose vision is to **improve patient care** for **cardiac rhythm disorders**, a major cause of death, by bridging the gap between medical imaging and cardiac electrophysiology. inHEART develops **image-guided diagnosis**, **therapy planning** and **navigation** software solutions, the "Google Maps for cardiac interventions", leveraging artificial intelligence and cloud computing.

PROBLEM

Sudden cardiac arrest, mostly due to cardiac rhythm disorders, is a major cause of death (>8M/year worldwide). These disorders can be treated with a non-invasive intervention, called **catheter ablation**, that does not require to open the patient. The cardiologist inserts instruments inside the heart through the vein to record electrical measurements and to identify tissues with abnormal electrical activity that are then shortcut by burning tissues around. However, the identification of the origin of this abnormal electrical activity makes these interventions **tedious** and **complex**. For more than 40% of interventions, the patient needs a second intervention whose cost can range from $10,000 to $100,000.

SOLUTION

inHEART provides the **cardiologists** with a cloud-based software solution leveraging AI that transforms medical images (CT/MRI) of their patients with cardiac rhythm disorders into a **personalized digital 3D map of the patient heart** that contains the localization of abnormal tissue at the origin of electrical disorders, so that they can **better plan** and **guide** their **interventions**. Our 3D models are compatible with the main vendors of navigation systems (Biosense Webster, Abbott, Boston Scientific). Preliminary results on ventricular tachycardia showed a reduction by half of the failure rate, as well as a reduction to two hours of the procedure time. Eventually, it means a better patient care with less and shorter interventions, a simplified procedure for the cardiologist, and a cost reduction for hospitals and healthcare systems. The next step will be to enhance these structural 3D models with **electrical simulations** to better identify the origin of abnormal electrical activity. The end goal is to replace existing diagnostic catheters by imaging to save time, to gain in efficacy and to save money.

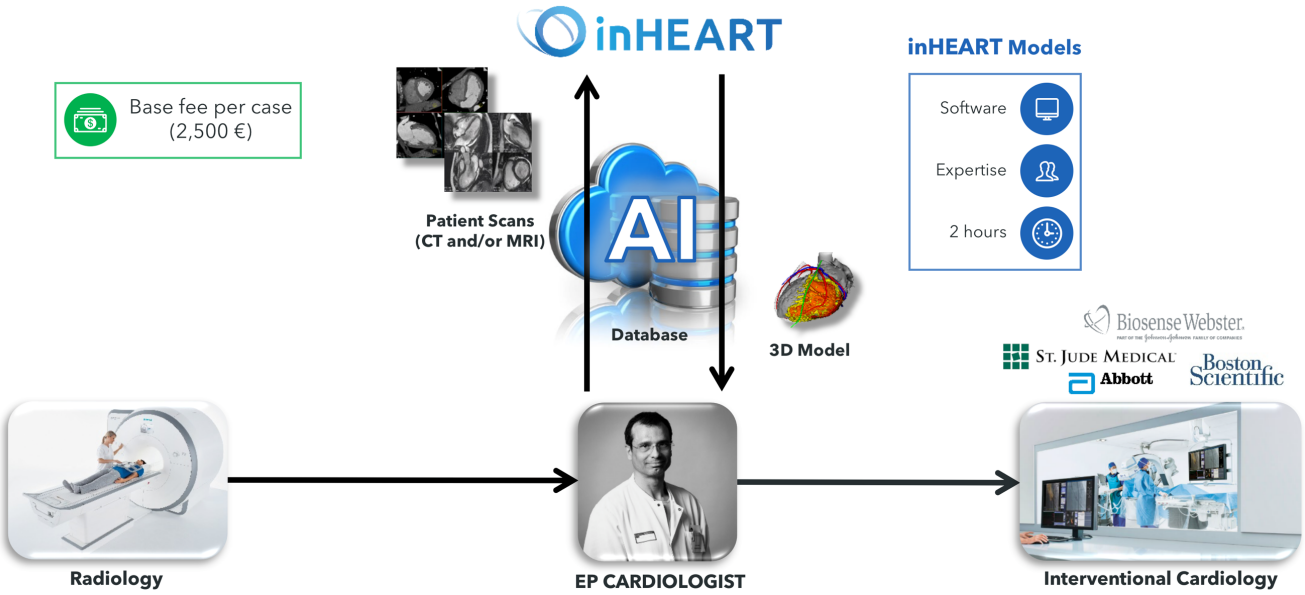


Medical Images (CT/MRI) | **Digital 3D Map of the Patient Heart** | **Image Integration for Cardiac Catheter Ablations**

MARKET & BUSINESS MODEL

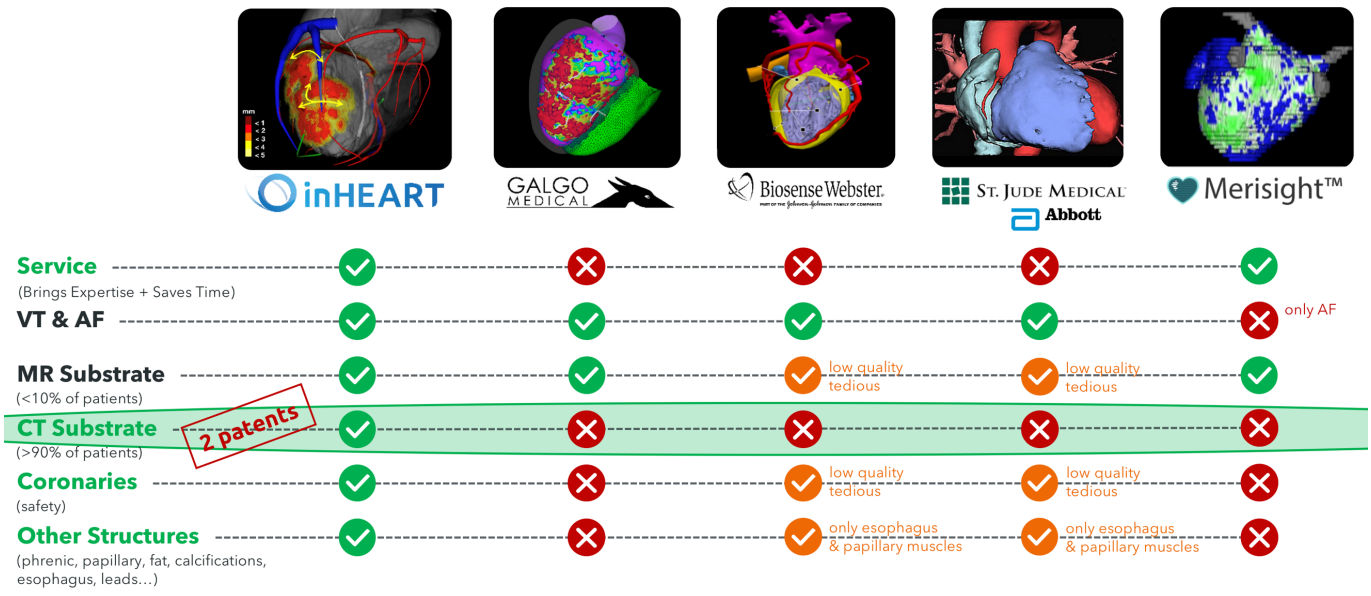
Cardiac catheter ablations are estimated to reach more than **1.5M procedures** around the world by the end of 2019 with more than **15% annual growth**. Among pathologies treated with cardiac catheter ablations, we identified our first target as **ventricular tachycardia (VT)**, the most complex one for which our technology has already demonstrated clear benefits. However, the goal will be to expand our solution in the next two years to **atrial fibrillation (AF)**, the most common one with more than **1M procedures**.

inHEART will provide its software solution as a service where the cardiologists send cardiac images over the cloud to be processed and checked by inHEART experts, and soon driven by AI-based technology currently under development. This **cloud-based service** will be charged at a base fee of about **€ 2,500 per case** processed. The cost of an ablation catheter it can replace.



COMPETITION

inHEART has two main competitors: **Galgo Medical** (Spain) and **Merisight** (USA). Both of them only process MRI, which is the less common type of images available in the clinical routine (less than 10% of patients). And Merisight has only a solution for AF and not VT. inHEART competitive advantage is to be able to provide a model from both MRI and/or CT and thus to cover most patients in clinical routine. Other players in cardiac imaging could be future competitors, such as **HeartFlow** (USA), that provides a cloud-based service to model coronary arteries and to simulate blood flow in them, and **Siemens** / **GE** / **Philips**, that have expertise in cardiac image analysis. However, these big players usually provide software solutions to radiologists (and not cardiologists) to support the sales of scanners, which is their main business.



EXECUTION PLAN

In the last three years, the IHU Liryc, a worldwide reference center in cardiac electrophysiology, has developed a research network of users that reached more than **30 active centers** around the world (US, Europe, Australia) including key opinion leaders (KOL). So far, more than **1,500 patients** have been treated using inHEART technology.

A **randomized control trial (RCT)** is currently being setup for a thorough validation of inHEART technology benefits (procedure time, efficacy, cost saving). It is planned to start in 2020. This RCT will be key to support inHEART sales and to prepare for reimbursement.

inHEART obtained the **CE marking** in Q1 2019 and is preparing for **FDA 510(k)** submissions aiming at an approval to market its service in the **USA** by **Q2 2020**. In the meantime, inHEART started to sell its service for research use only in January 2018 to customers in Europe and US.

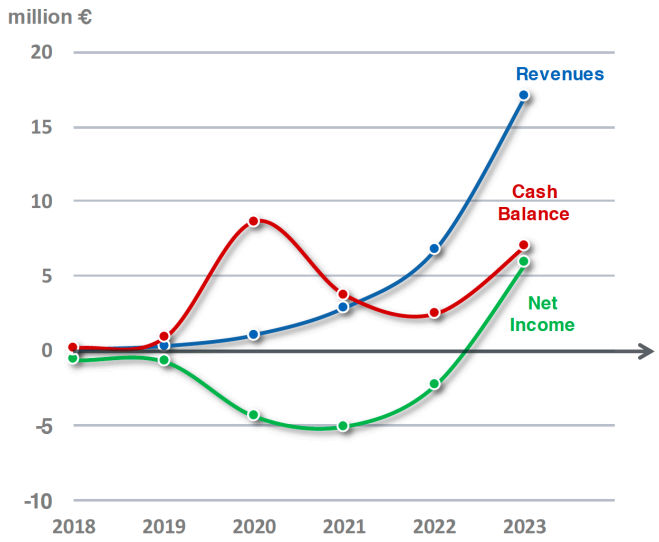
inHEART will start with **direct sales** using the extended network of IHU Liryc that counts more than 100 centers worldwide. After gaining initial traction, inHEART will scale up its sales with a **distribution partnership** most probably with the main vendors in cardiac electrophysiology (Biosense Webster, Abbott, Boston Scientific, Medtronic) that have already shown interest in our technology.

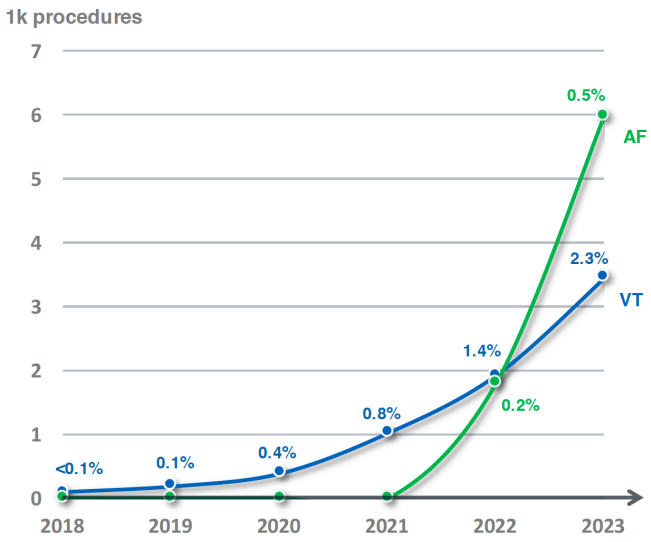
FINANCIALS

So far, inHEART has been funded mostly with initial capital investment from co-founders and non-dilutive grants from Bpifrance (Concours i-Lab 2017), Région Nouvelle-Aquitaine, Airbus, and EIT Health. We currently raise **€ 1,500,000** to fund in the next year the consolidation of the management team (VP Sales & Marketing, CTO…), the commercial development in Europe and US, the design of a randomized clinical trial, as well as R&D for an advanced AI-based solution with increased productivity and with advanced features. We will raise an additional **€ 10,000,000** by the end of 2020 to scale-up the business, especially in the US.

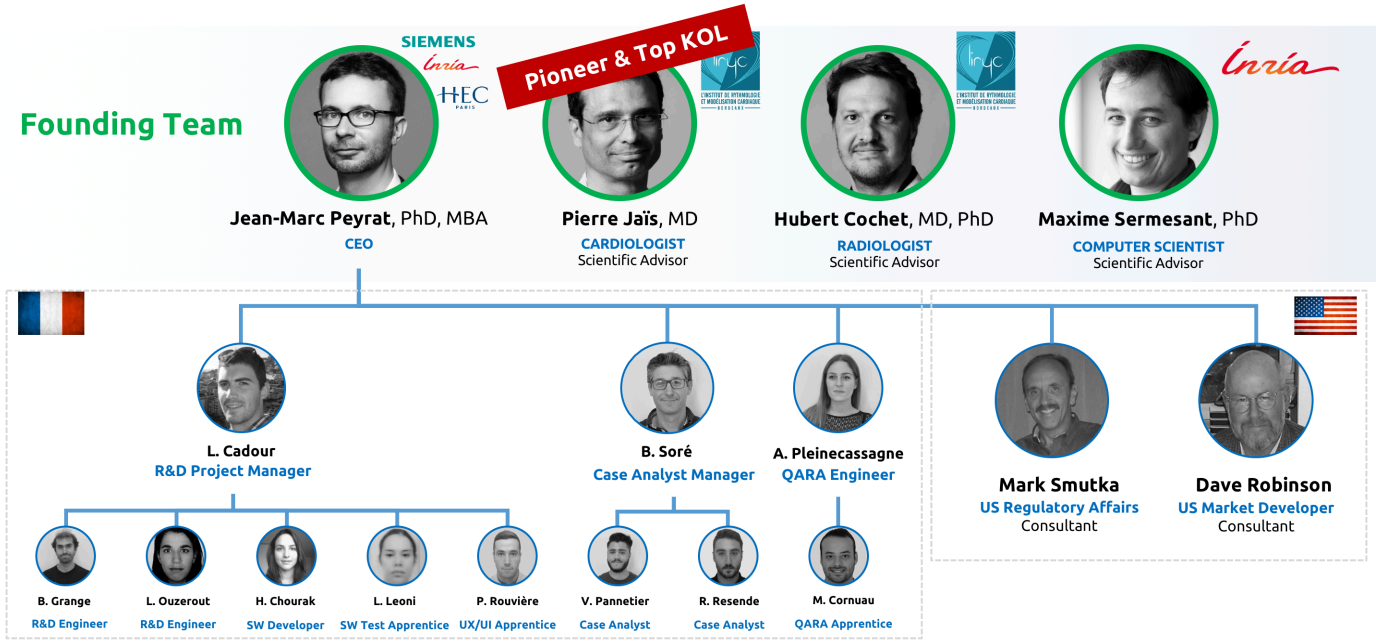
Considering the traction inHEART has with the main actors in cardiac electrophysiology (Biosense Webster, Abbott, Boston Scientific, Medtronic), the most probable exit is an acquisition from one of them in the near future.

However, inHEART has additional growth drivers down the line with the risk stratification of sudden cardiac death that can help to better select patients for implantable cardioverter-defibrillator (ICD) using the large database of images collected with our cloud-based service. This represents a multi-billion addressable market for inHEART.





THE TEAM



Jean-Marc Peyrat, PhD, MBA is the CEO of inHEART. He has more than 10 years of experience in managing research projects in medical imaging and robotic surgery for both academic and industrial research labs (Inria, Siemens). He complemented his scientific education with a MBA at HEC Paris. He is a co-founder of the company.

Prof. Pierre Jaïs, MD is a cardiologist and the co-director of IHU Liryc (Bordeaux, France) with more than 25 years of experience in cardiac electrophysiology. He is a pioneer in cardiac catheter ablation and a key opinion leader in the scientific community. He is also very well connected with the big players in this field (Biosense Webster, Abbott, Boston Scientific, Medtronic). He is a co-founder and scientific advisor for inHEART.

Prof. Hubert Cochet, MD, PhD is a radiologist and the co-leader of the imaging research team at IHU Liryc (Bordeaux, France) with more than 15 years of experience in cardiac imaging. He has expertise in developing novel imaging technologies to better understand cardiac electrical disorders and in integrating imaging with electrophysiological data to improve diagnosis, risk stratification and personalization of therapy. He is a co-founder and scientific advisor.

Maxime Sermesant, PhD is a computer scientist at Inria (Sophia Antipolis, France) with more than 15 years of experience in the personalization of cardiac modelling from patient clinical data, and more particularly from imaging, to improve diagnosis and therapy planning for cardiac diseases. He is a co-founder and scientific advisor for inHEART.

Another key member of inHEART team is **David Robinson**, who is a consultant with more than 30 years of experience in the cardiac electrophysiology business. He is currently working on inHEART market development in the US.

SCIENTIFIC ADVISORY BOARD



Leo Grady, PhD has recently been appointed the CEO of Paige.ai (USA) and was the Senior VP Engineering of HeartFlow (USA).

Antoine Bordes, PhD is the AI Research Co-Director for Facebook.

Nicholas Ayache, PhD is the team leader of Epione team at Inria specialized in medical image analysis and organ modeling. He is member of the French Academy of Sciences.

William Stevenson, MD is a cardiac electrophysiologist who has been recently appointed at Vanderbilt University (USA) after running the electrophysiology department at Harvard University (USA).

Pasquale Santangeli, MD is a cardiac electrophysiologist at the University of Pennsylvania (USA).

Timm Dickfeld, MD is a cardiac electrophysiologist at the University of Maryland (USA).

Thomas Deneke, MD is a cardiac electrophysiologist at the Cardiovascular Centre Bad Neustadt (Germany).