



# TOBEA

Greece, [www.tobea.gr](http://www.tobea.gr)

A request from a regional authority to a university engineering department leads to the creation of a spin-off company and the commercialization of a smart social innovation

## Executive Summary

TOBEA Ltd (Think Out of the Box Engineering Applications) is a company founded in 2012 with capabilities and activity in designing and manufacturing specific devices for improving the quality of life of the disabled. It is a spin-off company and the product of a research project which was carried out in 2009 by the Applied Mechanics Laboratory, University of Patras, Greece. The project involved designing and manufacturing a device that could grant access to the sea for people with physical disabilities. The project was a collaboration between AML and the former Prefecture of Achaia. After the successful outcome of the project, the work was continued and the device was further developed into a final commercial product called SEATRAC.

**CASE N°: SE36**

**SECTOR: EQUIPMENT FOR DISABLED**

**TECH INTENSITY: LOW-MEDIUM TECH**

**LIFE CYCLE STAGE: START-UP**

**INNOVATION VECTORS: PRODUCT**

**OI PARTNERS: PSR, LEAD CUSTOMERS/  
USERS, REGIONAL AUTHORITY**

**KEYWORDS: Engineering, manufacturing,  
spin-off, devices for disabled**

- BACKGROUND FRAMEWORK
- INNOVATION CHALLENGE & MARKET OPPORTUNITIES
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## BACKGROUND

TOBEA Ltd. is a company founded in 2012 with capabilities and activity in designing and manufacturing specific devices for improving the quality of life of disabled people. It is a spin-off and the product of a research project carried out in 2009 by the Applied Mechanics Laboratory of the University of Patras. The founders of the company are Ignatios Fotiou and George Sotiriadis.

Along with Professor Vassilis Kostopoulos they formed the research group that carried out the collaborative project between AML and the former Prefecture of Achaia. The initiator of the project was Gerassimos Fessian, vice-prefect at that time. All four of them, together with the University of Patras, are holders of the European patent (pending) that covers the SEATRAC invention. Ignatios Fotiou and George Sotiriadis continued working on the commercial development of the SEATRAC through their spin-off company TOBEA Ltd.

In future the young company plans to focus on the

- Design of new products and services which will strengthen the market established by SEATRAC;
- Design of new products and services that will tackle other problems faced by people with reduced mobility;
- Further expansion and economic growth of the company, creating new job opportunities and offerings.

## INNOVATION CHALLENGE & MARKET OPPORTUNITIES

In 2009 Gerasimos Fessian, vice-prefect at the time of the Prefecture of Achaia and a person with limited mobility himself, contacted the Applied Mechanics Laboratory of the University of Patras seeking a solution that would facilitate autonomous access to the sea for people with physical disabilities or limited mobility.

The team soon discovered that although there were wheelchairs designed for the sea and small cranes that required operators no technology solutions or applications were available that would allow people with limited mobility to cross the beach and enter the sea unassisted.

## OPEN INNOVATION TRAJECTORY

### Concept development

The main notion behind the concept was to give people with physical disabilities the opportunity to enjoy a simple leisure activity, such as swimming, completely unassisted. The vice-prefect and the AML team put their minds together and came up with the idea of a device which would take a mobility-impaired person from a point on the beach with wheelchair access to a point in the sea where they could swim safely. Once they were finished swimming, the device would then transport the person back to the waiting wheelchair.

This concept would give the user greater independence and eliminate the need for another mobile person to accompany them. The subsequent R&D project was launched with co-funding from AML and the Prefecture of Achaia.

### The development process, IPR and competition strategy

The team collaborated closely with Gerasimos Fessian, the vice-prefect, in order to define the user requirements for such a device. They also rolled out a crowdsourcing initiative, engaging with and listening to potential end users. Information on user needs, desired functionalities and any challenges associated with its use provided critical input to the team regarding both the design and the engineering development process.

Furthermore, they worked on researching, designing and developing the SEATRAC prototype, as well as implementing a virtual simulation of how it would work (using simulation tools from the preliminary design stage). Later they undertook extensive testing in order to meet the required safety standards, materials properties (mechanical strength and fatigue) and production methods. Last but not least, the prefecture offered support and feedback on legislative issues and related regulatory considerations, contributing actively to the early identification of the final design, the selection of materials and “packaging” specifications to be taken into account.

The device consists of a fixed track system, a specially designed wheelchair, a handrail at the disembarkation point and a control tower (containing the essential mechanical, electric and electronic equipment). However, the team had to tackle several technical challenges, posed not only

by the operational and safety needs of the users, but also by the physical characteristics of the location/environment in which the device would operate. On the other hand, these challenges became the innovation drivers of SEATRAC. The research team had to consider the following:

**Power:** to meet the device's energy needs, it had to be decided whether it was possible to connect the device to the power grid or to use renewable energy via a solar panel.

**Corrosion and climatic effects:** materials with high resistance to corrosion were selected and used.

**Natural environment considerations:** according to the Greek legislative framework, permanent structures are not permitted on beaches. As the device is not a fixed installation no alterations are made to the environment and there is no permanent impact on it. The track can be disassembled into parts small enough to be easily transported and its placement in the selected area does not require the construction of a permanent base or anchorage that would affect the natural environment. The device is temporary in nature and, after use, can be dismantled and moved to a storage area, while the area where it was used is restored to its original condition.

**Production:** extensive research and development was carried out combining RES, electronics, automatic control and innovative production methods aimed at improving quality, reducing production time and achieving affordable costs.

**Last but not least, the operation is simple and safe for the user:** SEATRAC is a non-fixed, rail-type mechanism. The rail operates as a stable track for a carriage to be drawn along. The starting point of the track is at a distance from the shoreline, in a place with wheelchair access. The seat on the carriage is at such a height above the ground to make it easy for the user to move from the wheelchair to the carriage and provides sufficient support to the user so as to be protected from injury. The user operates the control system, starting the movement of the carriage at the end of the route, with remote control. The carriage is moved along the track by an electric motor. The end of the track is in the water at an appropriate point where the water's depth is sufficient for the user to swim safely.

The development of SEATRAC is supported by a memorandum of understanding between TobeA and the University of Patras, with the IP licensed to TOBEA.

SEATRAC's customers are different to its users. The potential end users of the device are people with

disabilities or limited mobility problems, people facing temporary mobility issues and elderly people. SEATRAC's customers consist mainly of regional authorities and municipalities – the institutional actors managing and authorizing such operations on the shoreline which are within their jurisdiction. At the beginning there was no direct competition to TOBEA's product, but during the last few years there are some companies that offer similar solutions and TOBEA sees the growing competition as a motive to improve their product.

## Commercialization and follow-up

The first prototype faced static challenges arising from tides, waves and sand, however the team worked hard and came up with technical solutions that improved the device. It also underwent adjustments to conform to the strict requirements imposed by EU safety standards. After the successful completion of the prototype and its testing in real environment conditions, work continued on the device to turn it into a product (SEATRAC) which would have the necessary readiness level for commercialization. At the same time, several needs for other services and products arose around the general issue of improving the quality of life of disabled people. This in turn created the need to found a company that could achieve such goals which was outside the remit of the laboratory and the university in general.

In 2011, the team decided to take SEATRAC to market and TOBEA Ltd was born. The company founders are Ignatios Fotiou and George Sotiriadis, who together with Professor Vassilis Kostopoulos, Gerassimos Fessian and the University of Patras are holders of the Greek, European and US patents that cover the SEATRAC product. As a spin off company, TOBEA Ltd pays royalties to the University of Patras.

The evolution and scaling up of SEATRAC would not have been feasible without user feedback. TOBEA followed the crowdsourcing approach for product improvement, gathering direct feedback from the end users either through personal contact (usually on site) or surveys to identify areas of improvement and incorporate them in the solution.

The manufacturing of the parts was outsourced and TOBEA is responsible for the assembly of the final product and minor construction tasks. The company is responsible for installation and after sales services, such as maintenance and dismantling. SEATRAC has already been installed and is being used on many beaches in Greece and Cyprus.

These were not the only challenges for TOBEA: bureaucratic issues arising from the public character of its customers, as well as challenges posed by the Greek economic crisis required extra effort, resources and skills for the successful commercialization of SEATRAC. The team has gained considerable experience and skills over the years of operation to tackle them.

SEATRAC received the 1st Innovation Award at the 2nd National Contest for Applied Research and Innovation "Greece Innovates", organized by the Hellenic Federation of Enterprises and Eurobank. It was also declared a "National Champion" at the European Business Awards for 2015/2016.

Organizational changes were gradual as TOBEA grew. The main team consists of departments for R&D, design and horizontal activities, but there is flexibility among the teams and lean manufacturing principles have been useful for making the company function efficiently. As the number of SEATRAC installations grows, it is evident that more resources will be needed for procurement in terms of people, skills and equipment.

According to TOBEA, there is a strong focus and ongoing effort to enhance team awareness and provide the opportunities and tools to access and share new knowledge, as well as develop new skills (capacity building, training, team building) so as to create an organizational culture that embraces continuous improvement in processes and products.

Continuous feedback, connections and collaboration with end users are based on the crowdsourced feedback model, enabled by a live community with 3 000 members (Facebook group: "Rights of the People With Disabilities to the Sea"), thereby providing TOBEA with the necessary information to develop the product according to users' needs, and at the same time as a vehicle for dissemination, user information and awareness-raising.

SEATRAC not only provides swimming access to people with special needs but also paves the way for business synergies with tourism companies that wish to be active in social responsibility and awareness. So far the interested parties and potential applicants are regional authorities and municipalities as well as hotels and businesses that offer services beside the sea (beach bars, restaurants, water sports, etc.).

SEATRAC has undergone a number of new developments since its launch thanks to TOBEA's entrepreneurial culture and interaction with users. Those include the development of a camera apparatus which will act as an active optoelectronic device by means of pattern recognition. The system

to be integrated will trigger the immobilization of the chair in the event that it 'detects' that there is a person standing in its way. At the time of the interview, the incorporation of new features in SEATRAC was being examined to take advantage of the Internet of Things (e.g. the provision of real-time information regarding the state of the sea, temperature data, reports and analytics, etc.).

## BUSINESS IMPACT

This open innovation project resulted in the commercialization of SEATRAC, a unique-at-the-time innovative device which radically facilitated access to the sea for people with lower-limb disabilities. The outcome of the project led to the granting of Greek, European and US patents and a new company venture - TOBEA - was created to exploit and commercialize the new product.

After being involved in the very first steps of the project ideation, the core team at TOBEA succeeded in the transition from research and engineering to commercialization. The team also gained experience in managing difficult situations and overcoming managerial, legislative and bureaucratic issues, while developing their entrepreneurial/soft skills.

## LESSONS LEARNED

The TOBEA / SEATRAC case is an interesting strategic collaboration project between a public organization and academia resulting in the creation of a successful SME which undertook the commercial development of the product and keeps it evolving by incorporating technical innovations. The project is also a great example of engineering serving social innovation.

Furthermore, the way in which the patent rights were shared among all the parties of the OI partnership, as well as the successful development of the spin-off provide interesting facts and challenges for our analysis.

### Main lessons learned:

1. Here we have an example of the initiation of an OI project by a public organization in response to a social need, i.e. a Prefecture that engaged external ideas to solve issues that went beyond its capabilities.

2. The innovative nature of the project led to the granting of Greek, European and US patents that cover the SEATRAC product. The roll-out and commercialization of the device were the core operations of a spin-off company, which successfully led the concept from the idea to the market with mutual benefits for all parties involved.
3. The company is engaged in open innovation on a continuous basis by getting feedback, ideas and needs directly from the users through personal contact (usually on site) and surveys (media, social media) and utilizing this information to improve SEATRAC and develop new solutions to improve the quality of life of a disadvantaged group of the population.
4. Open innovation can have a very positive impact on society (social OI).