

5. Aerialtronics



“We aim to make a positive change, unify with different stakeholders, companies and government authorities in order to include our and their interests and responsibilities”

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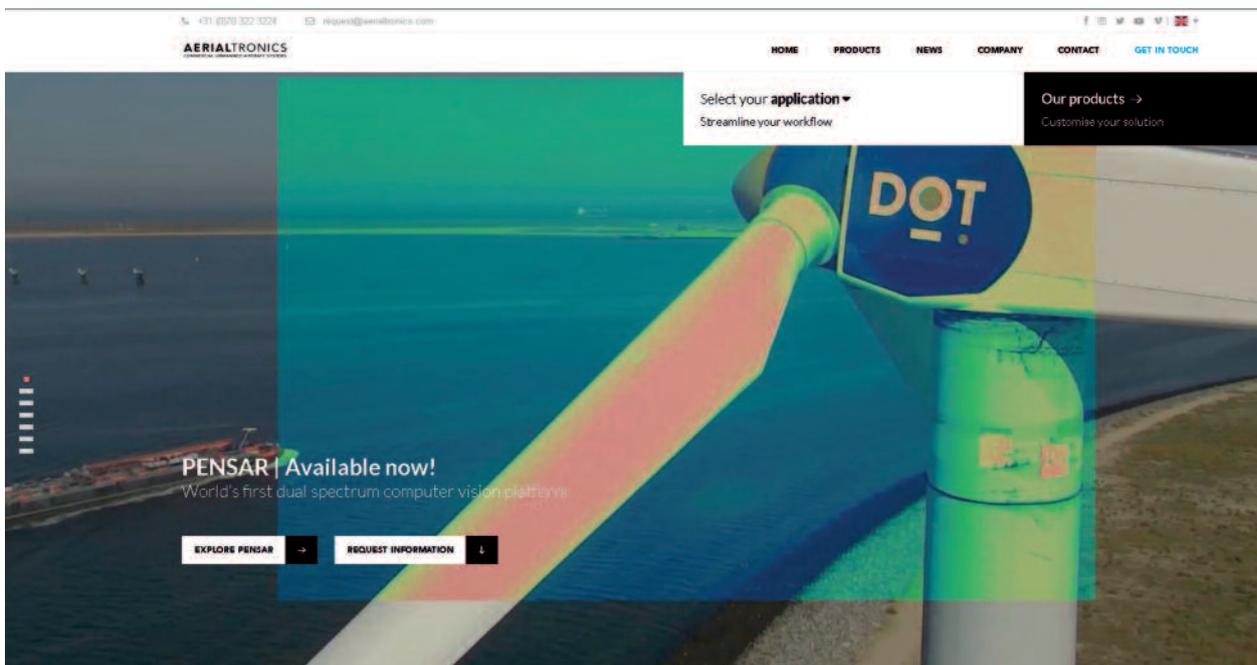


The company and the technology

Technologies to develop autonomous Unmanned Aerial Vehicles (UAVs) are central in the case of Aerialtronics. UAVs also known as drones are large vehicles that can operate either autonomously or in a swarm. Central to the development of these autonomous UAVs is the development of technologies that allow these vehicles to operate safely in an urbanized environment. Currently, existing legislation prevents these activities and as such the commercial value of the technology. In this pilot we work with Aerialtronics, an SME based in Katwijk, the Netherlands. The company focuses on specific technologies that allow the drone to operate more independently from an operator and aims to sell the drones for professional and commercial tasks, such as monitoring and small maintenance tasks carried out for instance by police, fire departments or industrial inspection and maintenance companies. In the Autumn of 2017, the company is acquired by Drone Volt, a French manufacturer of commercial drones. With the acquisition of the knowledge base of Aerialtronics, Drone Volt can further develop the drone technology and include specific technologies, specifically in the field of security. Aerialtronics has developed professional drones that are equipped with technology to monitor and survey by drawing on artificial intelligence and big data analytics. The main technology is the Altura Zenith surveillance system which can be extended by data capture modules (audio, video, physical parameters, etc.) and software for the processing and analysis of the data collected.

The technology

The technology we focus on in this project is the Pensar. The Pensar is a dual spectrum computer vision platform that is mounted to a drone and operates with the Altura Zenith. The Pensar can capture images and data and analyse it real-time by making use of reading text or thermal vision. This helps the operator of the drone, for instance to recognize characteristics, read license plates of cars or serial numbers of equipment immediately in the course of performing monitoring tasks.



The operator can also get more insights with daylight and thermal vision overlaid on one screen in real-time. This makes the drone a piece of equipment that can perform specific tasks very well with a high level of detail and a potential intrusion in the private lives of people, especially when operating in urban areas. Due to this, the Pensar is equipped with a special privacy masking tool. This tool automatically and instantly blurs the details of sensitive data such as the privacy of bystanders.



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Working with Aerialtronics

The activity with Aerialtronics is to a certain extent infrequent and we changed the focus during the course of the workplan. The infrequent collaboration is partly due to the takeover of Aerialtronics by Drone Volt, at the end of 2017 and because Aerialtronics has focused more on the Pensar technology and less on drone technology as such. Initially we started the project with reviewing the implementation of a technology for sensing the direct environment of a drone and prevent it from colliding into other objects. The sensors, based on onboard ultrasonic technology, give feedback to the drone operator and is a first step to make the drone more autonomous and interact it with regards to its environment. The technology is called the Sense and Avoid system and is a modular functionality for the Altura Zenith Unmanned Aircraft System. This innovative sense and avoid solution improves safety during the inspection of telecommunication towers, utility poles and oil rigs, particularly in windy conditions. The helps the pilot to keep a safe distance from obstacles and increases the safety of their inspection. The system is a precise measurement system that was developed in 2016 and is currently sold to clients. The first generation of the system informs the pilot about the location and distance and can autonomously intervene between the operator and the drone when the drone comes too close to certain objects.

While this semi-autonomous system is relevant, not only for practical purposes, such as windy conditions, it is also an interesting system to investigate how the operator of drones and legislation, including the wider stakeholder environment, responds to it. The idea is that future generations of this technology will have higher levels of intervention and should allow the drone to take its own decisions regarding the tasks it needs to perform. Aerialtronics is discussing with legal officers to see how it may help the implementation of autonomous drones in the future.

However, we decided to focus on the PENSAR technology, because it is being sold and has a potential high intrusion on people's private life.

We started the process of working with Aerialtronics by having talks with various people in the organization to discuss sensitive technology that can be addressed in the PRISMA project. At first we focused on the sense and avoid technology and shifted during the spring of 2018 to the PENSAR technology, which fit well under the goal of PRISMA: 'responsible research and innovation'. In the discussions with Aerialtronics we reviewed the ethical aspects of the new PENSAR technology and



discussed with potential clients, local governments and universities and the wider stakeholder environment about the technology development of the PENSAR and the repercussion for bystanders.

Advice

At this moment, we conducted a number of interviews with company representatives, experts in both university and government and stakeholder organization. The advice we have is to follow two strategies in parallel.

1. Building legitimacy

The first strategy is to build confidence in the technology. Having drones that collect big data and operate more autonomously maybe be perceived as unwanted by users and bystanders. However, the technology can help authorities and inspection companies in the monitoring, surveying and maintenance activities. The question to be answered in this strategy aims at how can we be build trust and test the vision cameras in public spaces, and how do we inform bystanders and authorities about the issues of this equipment?

We advised working closely with civil aviation roads authorities, and considering how other road-users can be given informed expectations about their behaviour. One organisation useful to this task is the national CAA. They have workgroups that discuss the implementation of new legislation concerning the autonomous and Unmanned Aerial Vehicles (UAVs). The focus should not only be on this organisation because we advise the company to build a sense of urgency, that for society there is a lot to gain if the legislation for autonomous drones is passed. The safety of large groups of users, the monitoring of crowd management, people at events or traffic at streets can be increased and the authorities can take immediate measures to safeguard the actions of people. By building a sense of urgency, the authorities can better make a trade-off of the pros and cons of the technology.

2. Identify a lead user.

Building legitimacy should go hand-in-hand with building a life case for implementing the PENSAR

vision platform for a lead user. We advise the lead user to be a government organisation, such as the police or the local municipality when it concerns crowd management. The inclusion of stakeholders can be tested then when the lead user is a known and trusted organisation that uses the technologies to help the people and safeguard them when they attend an event. Our advice is also not to use the technology immediately for traffic control or to use it for sanctioning or controlling people's behaviour. When it is used in the case of the latter, the stakeholders will be fuelled with arguments that the technology is breaking into the personal lives of people and is misused.

In summary, our advice is:

- the influence of the technology on people is pertinent and should be developed and implemented further with care.
- the first applications for the technology in public spaces should be aimed at helping the people that they monitor with the technology. This is to build confidence and trust and to show the benefits of it to the wider public and stakeholder environment.