Flying cars: transforming a dream into reality

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Photo: Courtesy of AeroMobil

Aeromobil's concept vehicle operates both as a car and as an airplane. The company's aim is to create a viable new personal transport option.

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AeroMobil's aim is to produce a two-seater vehicle with a range of up to 1,000 kilometers in 3 to 3.5 hours and that is capable of driving on-road "at the maximum allowable speed".

Ever been caught in a traffic jam and dreamed of being able to take to the skies? A flying car maybe? Surely that's just a flight of fancy, something that "M" might come up with for the next James Bond extravaganza. Not so! For the past 20 years, Stefan Klein, a Slovakian flying enthusiast with a flair for marrying design with innovation and a strong business sense, has been working to turn that dream into a reality. Someday not too far in the future, flying cars may well conquer the skies.

Like many great innovators, Stefan Klein began this venture in his garage, at home in Nitra, Slovakia. In the early days, with the help of his family he developed two prototypes – AeroMobil 1.0 and AeroMobil 2.0. But in 2010, things really took off when he joined forces with entrepreneur and angel investor Juraj Vaculík to form AeroMobil. Juraj Vaculík is now CEO of the company and "really believes that our vehicle has the potential to transform personal transport," AeroMobil's Chief Operating Officer, Ladislav Batik, told *WIPO Magazine*.

Since its formation, the company has produced two additional prototypes – AeroMobil 2.5 and AeroMobil 3.0. The current prototype, AeroMobil 3.0, took just ten months to develop. The ready availability of high-grade composite materials and other advanced technologies and the expertise of AeroMobil's engineers made such rapid progress possible, Mr. Batik explains.

So what exactly is a flying car? "We are building a vehicle that both operates as a car and as an airplane, with no compromises between these two modes of transport," explains Mr. Batik. "We don't simply want to make a good plane that can drive on the roads; we want to make a vehicle that operates perfectly both as a car and as a plane."

CHALLENGES

This is no mean feat given the competing technical needs of each mode of transport. "Combining these two modes of transport has been our biggest challenge, because by their nature, each one is fighting against the other. For example, the plane needs to be as light and as narrow as possible, it needs to be aerodynamic and to have lift, whereas the car needs to have downforce and to be heavy and wide so that it is stable on the road. But our prototype 3.0 proves that it is possible to combine both modes," Mr. Batik says.

Beyond the technical challenges, the engineers also have to find technical and design solutions to ensure compliance with current automobile and aerospace legislation. "Today, now that we have proven the concept and are starting to develop an experimental vehicle, we need to take the vehicle apart piece by piece to ensure that it meets all statutory requirements in terms of

Photo: Courtesy of AeroMobil

AeroMobil is investing significant resources in overcoming both the technical and regulatory challenges associated with developing its dual-purpose vehicle and is keenly aware of the need to protect its innovations. Building up its portfolio of IP rights is important not only to prevent unauthorized copying of its innovations, but also to attract private investors.

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Photo: Courtesy of AeroMobil

AeroMobil's flying car is the brainchild of Slovakian flying enthusiast, designer and innovator Stefan Klein (above, front right). AeroMobil's engineers (above) took just ten months to produce the AeroMobil 3.0 prototype.

design, safety and so on. For example, to be effective the propeller needs to be as sharp as possible, but when the vehicle is operating in car mode, by law for safety reasons, sharp edges are not allowed. So we have to think about what to do with the propeller when the vehicle is stationery or on the road. Similarly, a car needs wing mirrors so a driver can reverse, but for a plane these create additional drag," explains Mr. Batik.

To overcome these challenges, AeroMobil's engineers have to think out of the box to come up with new solutions. "We want to build a better plane because we are building a car and we want to build a better car because we are building a plane," he notes, citing AeroMobil's Chief Technical Officer, Doug McAndrew. "This process involves introducing elements which were never thought useful for cars but which are available on planes, and vice versa".

WHY IP IS IMPORTANT

Given the huge effort to overcome both technical and regulatory challenges, AeroMobil is keenly aware of the need to protect its innovations. "From the beginning our strategy has been to protect what we have. During this innovation process we are coming up with many ideas which we need to protect because they are a potential future source of income and of course we don't want anybody stealing them," Mr. Batik comments.

"We filed our first patent (PCT SK/2012/000010) in 2012 in Slovakia and then in 101 countries through WIPO's Patent Cooperation Treaty (PCT). In some of these countries we have already been granted a patent, and in others the national phases are running now," he notes, explaining that when an international patent application filed under the PCT is examined for patentability by national patent authorities, the outcomes can vary from country to country because of differences in national patent laws. "In some countries we need to defend our idea more than in others, and the costs related to that can be quite significant. That is why we have hired a well-respected patent law firm to help us to defend our applications in those countries and do all the necessary paperwork. We would not be able to do it on our own," he says.

AeroMobil has also registered its trademarks internationally through WIPO's Madrid System. Its IP portfolio currently comprises three patents (including PCT SK/2015/00003, and PCT SK/2015/00004) and eight trademarks plus a handful of utility models and design rights.

Building up the company's IP portfolio is also strategically important when it comes to attracting private investors. "Our current IP portfolio is basically the outcome of creating the AeroMobil 3.0 prototype. Now, as we improve on that and move towards AeroMobil 4.0, we are developing new ideas and have already started the process of filing IP applications for these. This is important because it shows investors that we are able to overcome regulatory hurdles and that we are coming up with patentable solutions, and that means they are going to get a return on their investment."

But AeroMobil is not the only one pursuing the dream of a flying car: there are around 20 other projects around the globe working on similar ventures, although not all comparable to AeroMobil. "We welcome this because if we were on our own it would be much more difficult to create this industry and to show that this is something which should be here," Mr. Batik explains. "But the fact that we are not alone in pursuing this technology is another reason why we need to protect our intellectual property."

ABOUT THE VEHICLE

The final specifications of the vehicle are as yet unknown. "What we have today is a concept vehicle, and its technical parameters are not necessarily those that will feature in the final product," explains Mr. Batik. He does confirm, however, that the aim is to produce a two-seater vehicle with a range of up to 1,000 kilometers in 3 to 3.5 hours, and that it will be capable of driving at "the maximum allowable speed." The vehicle will also come with all the safety features you would expect for a car and a plane. The latest prototype is already equipped with dual-axis autopilot and a safety parachute system "which safely lands the whole vehicle together with the pilot in case of any emergency," says Mr. Batik.

Anyone toying with the idea of acquiring an AeroMobil will have to have a pilot's license as well as a full driver's license, but as it is a short take-off and landing (STOL) vehicle, access to a runway shouldn't pose a problem. "We are testing a lot of engines to shorten the take-off distance to a few hundred meters. We are strong supporters of using the wings as a source of lift as opposed to any other technology, but are still open to any new technologies." notes Mr. Batik.

"If you have an idea that you think is innovative and commercially viable, you definitely need to protect it and get advice on how to do so."

Ladislav Batik

POTENTIAL USES

The company foresees three main uses for its vehicle.

First, for short and middle distance travel from 50 to 600 kilometers.

Second, for travel to areas with limited infrastructure. "With AeroMobil, you can remove a variety of obstacles," Mr. Batik explains, noting that behind the wheel of an AeroMobil, it would no longer be necessary to drive around a Norwegian fjord or the St. Francisco Bay area; one could fly directly over it. He also foresees uses in remote areas with no or limited road infrastructure, such as in Africa, Australia and some parts of the USA, where the vehicle flies over vast expanses but does the last mile as a car.

The third main use would be for commuters who spend up to two-and-a-half hours traveling intercity due to heavy congestion. "Of course the last mile you probably need to do as a car, but in between those cities, you can fly and significantly shorten your travel time," Mr. Batik explains.

"What is really good about our vehicle is its versatility. You can land when the weather is no longer suitable for flight, transfer to car mode and continue by road, whereas with a small aircraft you need to land and wait until the weather clears before you can carry on."

GETTING THE VEHICLE TO MARKET

Compliance with current automobile and aerospace legislation is a priority for AeroMobil as this will speed up the time it takes to get the product to market. "We have decided that the first vehicle we put on the market will fulfill existing regulations. Waiting for new legislation would take years."

The company plans to begin taking orders in 2017 with delivery of the first vehicles a year later. It is targeting collectors of small airplanes, sports cars and yachts. "We are creating a new industry, a new environment, so at first we will only produce a limited number of vehicles. Our first goal is to get the vehicle onto the market, create ambassadors for the product and demonstrate that it can coexist with the current means of transport and is a viable personal transport option. Once it has been introduced to the general public and demand increases, then we can think about large-scale production and offer it as a mobility-as-a-service solution."

So the next time you are caught in a traffic jam, take heart, because new personal transport options like AeroMobil promise to soon make congestion a thing of the past.

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