

HappyCam

Business Plan

by

Sidney Poulsen, Isaac Schwartz, Damien Wilson, Nicky Mallouk, Andy Romero



Executive Summary

Through market research, we found that 4-5 people die per week due to backover deaths. Our mission here at HappyCam, is to reduce the number of backover accidents that happen in America. Our product, the HappyCam, is an easy solution to dirty backup cameras. The tank fits comfortably behind the license plate, and the remote-controlled, adjustable spray nozzle fits perfectly under it. This design is unique because it is completely independent from the car, able to be installed for free by the user. As a group, we thought there might be a market need for a rearview camera cleaning device, and after surveying over one hundred people, we found this to be true. According to our survey, over 46% of people who have rear view cameras located near their license plate would be willing to pay for a product that remotely cleans their rearview camera. At 49.99 dollars per unit, we will market our product through the use of social media ads and website traffic, and we are projected to break even after selling 5,429 units.

Originally, our team had intended to keep our design open-source and not pursue a patent. It became evident to a couple of us that this class project could truly be turned into a huge opportunity for innovation. We received feedback all around us that proved that this is something people need and want. This gives us great motivation to continue with our business. In order to do so, we have a lot of adjustments to make to not only our product design but also our business plan—which both, in turn, depend on each other. With adjusting our design, we anticipate the financial projections we previously made could change. Ultimately, our current calculations should not be held to high expectations, but they are still crucial and have been important for all the work we have done thus far.

Company Description

Our company, HappyCam, aims to improve the safety of transportation by tackling a serious issue, dirty back-up cameras. What seems to be a minor inconvenience to some, is a deadly outcome for others. HappyCams goal is to help reduce vehicle backup incidents by providing customers with an efficient and reliable way to always keep their rear-view camera clean. With the current design/state of our product, we have identified many things we would need to do to work towards our goals. We are planning to obtain an LLC, begin injection molding a new design, patent our design—and then ultimately, start selling our project. There are, without doubt, several intermediate steps the company will have to take to build a successful business. We will need to expand our resources and network to ensure we are making the right decisions.

Currently our serviceable obtainable market is around 65 thousand, however, our serviceable addressable market is 325 million. Despite this large gap, by improving our product

and adjusting our business model, these numbers may and probably will change for HappyCam. Luckily, there seems to be little implementation of a product like ours within the typical vehicle currently being manufactured. Additionally, the patents that do execute (in similar ways) what the HappyCam does, our product is significantly different from anything that is on the market or been patented. Right now, there is nothing that you can purchase online or in stores that compares to our design. From our patent design research, there were a couple designs that had a camera with self-cleaning using either air or a wiping lens. There was one interesting patent that showed the system integrated into the vehicles windshield wiper reservoir and hardwired to the battery. But like mentioned before, none of them are proving to show any accountable similarities with the HappyCam.

Despite the optimism in moving forward with and continuing our Business, there are still pain points we are expecting to encounter soon. One clear force is the incredibly competitive industry we are entering. The automotive industry is expansive, and this is something to stay optimistic about because people love doing stuff to and with their cars. The feedback we received from the design expo really proved to our team that our product is something people really want and need. But as we move forward, we need to be careful in the decisions we make because of how large our market is. We anticipate this being a huge innovation that will truly make a positive impact; however, we also need to be prepared for setbacks.

Market Analysis

In order to understand who we wanted to sell to, we thought about what type of person would struggle the most with a dirty backup camera. Our ideal customer would be someone who relies heavily on their backup camera, whether that be because they have to parallel park on a regular basis or maneuver in populated areas in reverse. In addition to relying on the camera, they would also need to use their vehicle in a manner that causes the camera to get dirty often enough to get use of our product. There are many ways this happens, from snow slush spraying up on bumpy roads to simple dust flying through the air and drying over the surface of the camera lens. Another obstacle is that our design only allows us to service vehicles whose rearview camera sits somewhere right above the license plate. Because of this, most larger trucks with rear view cameras are excluded from our market, however, the number of cars in the U.S. alone is more than enough to account for this when considering our market size. With these aspects in mind, in addition to the fact that almost every camera gets dirty eventually, we composed our ideal customer as a regular modern driver who uses a regular passenger vehicle often and finds themselves relying heavily on their back up camera during vehicle use.

Our business industry is somewhat unique because, unlike our competitors, our product is completely independent from the vehicle, requiring zero wiring or tube integration into the

vehicle itself. Because of this, our product can reach a wider variety of customers because many people get less interested in a product when they find out they have to figure out a tedious and sometimes over complicated installation process.

Using our survey and customer interest results, we calculated our total addressable market to be 63.7 million Americans who owned a personal passenger vehicle with a rear-view camera. From there, we calculated our serviceable addressable market using the cumulative sum of our market and the percent of new customers per year and found it to be 32.5 million Americans. Using this value as well as a predicted initial penetration rate of 0.05%, we found our serviceable obtainable market to come to roughly 65 thousand Americans.

Product Description

The HappyCam is a device which allows customers to clean their backup camera with the click of a button. The device is conveniently mounted directly behind the rear license plate with only two screws. During installation the customer will adjust a nozzle such that it is aimed at their backup camera. When the button is pressed, the device will squirt washer fluid from its reservoir directly at your camera delivering a clean finish every time!



Usage - With usage of three to four times per week, customers can expect to get 1500 hours of battery life, or about two months, before having to replace the batteries. The reservoir can be

¹Install, Filling, & Use - Double click to view video

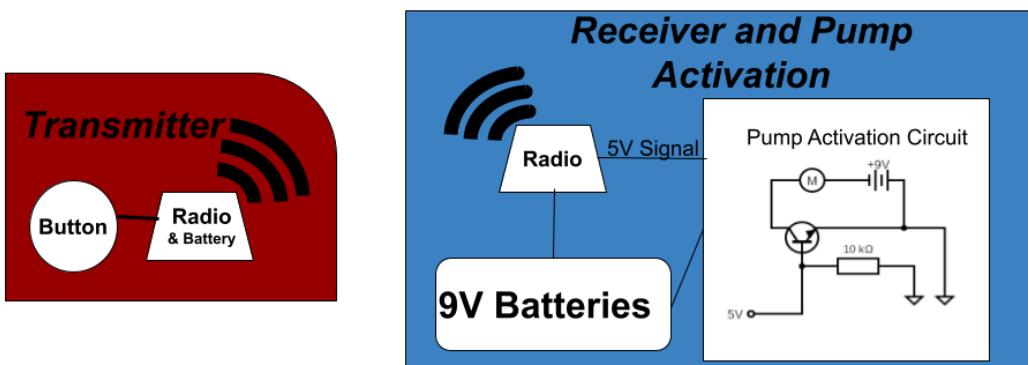
expected to provide up to 45 uses before a refill is needed. Refilling the device is convenient and simple. The customer will receive a hand pump and tubing that fits onto all generic washer fluid refill jugs. The tubing is then connected from the pump to the filling valve on the bottom of the reservoir. From this point the reservoir will fill in less than one minute. It is important to note that the device and license plate do not need to come off the vehicle for filling.

Housing - The device, or unit, is made up of four main parts: main housing, electronics cover, tank cover, and battery door. The main housing contains all electronics, valves, tubing, and acts as a main body for the remaining parts. The battery door slots into the bottom left corner of the housing which hides two lithium 9V batteries. The electronics cover sits on the left side of the main housing and seals the electronics in their own area. The tank cover is much more critical

than the previous parts. This cover, mounted on the right side of the main housing, creates an enclosed space which acts as the washer fluid reservoir. A maximum of 18 fluid ounces can be held at once, or about half a liter. A watertight seal is created through the use of silicone.



the electronic systems but mainly consists of four major components, batteries, a 6-12 Volt electric water pump, radios, and transistors. On earlier iterations Arduino Unos, Nanos, and Nano Everys were used to facilitate radio communication in tandem with nRF24L01+ radios, sending a boolean signal to activate a transistor as seen in the figure below.



Arduinos had been chosen to allow for the later addition of additional features and additional communication between the radios, however the lack of reliability of the smaller Arduinos in conjunction with the nRF24's led to a shift to commercial radio switches. Just like in our arduino set up the radio switch has sends with the press of a button a boolean from the radio in the transmitter remote to a receiver which activates an onboard transistor allowing current to flow to the electric pump, pumping water to the nozzle, spraying the water on the camera. In both the old and current design two lithium 9V batteries are used for operation of the pump and receiver radio board, the remote has a smaller dedicated battery (which should almost never need replacing).



All the electronics in the housing run off of the two 9V batteries, and in at least the current model are completely separate from the electrical systems of the vehicle, meaning they have a limited supply and usage time before the batteries need to be replaced. Lithium batteries were selected because they are able to function more reliably in cold weather conditions and have very good capacity as well. On the Energizer I522's we were using for all our tests the product should be able to function for at least two and a half months under typical operation conditions (3-4 uses per week on average) depending on usage this period could decrease or increase, though even without usage the batteries will constantly be draining because of the radio though its current usage is not very big.

Numerous tests on and off real vehicles have been performed showing the effectiveness of HappyCam in cleaning off dirty backup cameras like the one shown in the overview video and the figure to the right.



Market and Sales

With a product like our HappyCam, our target customer is someone who lives a fast lifestyle, is often busy, and values safety and efficiency in their life. With this being said, through looking at survey results, doing interviews, and talking to people at the expo, we found that all sorts of people are interested in possibly buying our product. So, knowing this, we want to market our product in a way that can reach a large number of people who fall under no particular niche, therefore we plan on marketing by running ads on social media platforms such as Instagram, Facebook, and others. If we were to market to our target customers, we would advertise through a more niche section of social media, such as a defined Reddit page or niche page already existing on Facebook or Instagram.

When it comes to how we plan on selling our product there are two distinct stages. The first is us selling directly to users through a self-made and self-sustained website, and the second is selling our product in mass to retail stores or other clients. In the first phase of selling through our website, we will be further testing and developing our product in a way that aligns with our customer feedback. On top of being the beta phase of our sales, this first phase will also serve as a way for us to reach the second phase of selling in mass to clients or retail stores. To land major deals with clients and/or retail stores we would need to have proven our credibility as a company and show that people are willing to buy our product. When looking at other companies that initially sold their products independently before selling through retail, we found that these companies often already had made millions to tens of millions of dollars in revenue before striking their first retail deal. Knowing this we believe it will likely be a few years into production before we could strike a deal with a retail company.

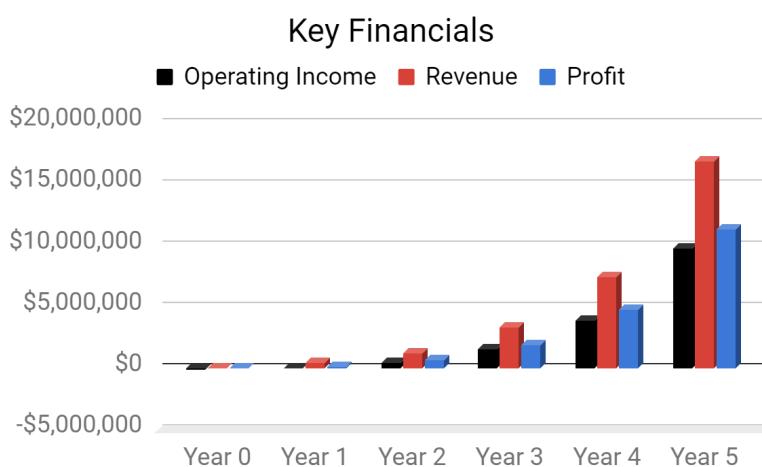
The second stage of our sales strategy consists mainly of selling in mass to large clients or retail companies, however, there is no reason to discontinue selling directly to users through our website, so we would continue to do that as well. There are many retail companies in the automotive industry, such as Autozone, Advanced Auto Parts, O'Reilly Auto Parts, and many others. We also consider striking a deal with clients to buy our product in mass. These clients may be, for example, a public transportation company that values safety in their vehicles, or any other organization that can find large-scale use in our product. This second phase is where we would be scaling up as a company.

To account for the large increase in scale within the second phase, there are a few steps that we would need to take to keep up with the new changes. The first thing we would need to do is hire more employees. Simply put, with our current group size we would not be capable of keeping up with our production demand after only a year or two. So, having more people helping us is our most necessary need. The next step we would need to take is to reduce our production costs and hassle. If we are going to be selling in mass, we will also be buying and producing in

mass as well. Ideally, we would want better margins for our product, so getting our production cost down is important. The majority of our production cost comes from outsourcing our injection molding. So, if we were to invest in buying our injection molding machines, not only would it reduce our production costs, but it would also reduce the overall hassle that comes with outsourcing injection molding.

Financial Projections

Our company will focus on perfecting our product to guarantee continued sales. The entirety of the company's revenue is generated through product sales, so that is where the most time and effort will be spent. As seen in the figure below, our projected revenue for year five is 16.8 million dollars, and this is created entirely through predicted sales. Our company's cost structure is broken down into three separate chunks, being fixed, direct, and variable costs. The fixed costs consist of salaries, work space, utilities, website development, office equipment, and software costs. During the first few years of production for our company, we all decided that a large salary is not necessary. As we start making more in profit as a company we will likely adjust our incomes accordingly. However, we wanted to reduce the overhead cost for the first few years, and after consulting the TA's we found that this is what most founders decide to do when starting a company. The fixed annual total of this is 101,825 dollars. The next section of our cost structure is the direct costs relating to product production, which includes payments for the production and acquisition of the nozzle, pump, transistor, security screws, control circuit, radio components, wire connectors and resistors, housing, and tubing. The direct cost of production of our product is 21.24 dollars. The final section of our cost structure is the variable costs. Variable costs for our company include both sales commissions as well as warranty coverage. As of now, we have an estimated sales commission of 7% and a warranty coverage of 5%, however, when production starts these will vary depending on sales being made by sales representatives and the number of warranties we have to cover.



The current cost to the consumer for our product is \$49.99. And with a cost of production of \$21.24 we get a gross profit margin of 47% and \$18.76 as a profit per unit. To break even we would need to sell 5,429 units, or, in other words, sell about \$217k worth of product. This means, based on our revenue projections we

would be breaking even within one year of production.

Considering our overhead cost at year 0 is \$101,825 we believe it would be best to find an investor. We are seeking \$150k for an 8% stake in our company. This money would be used to further develop our product, and increase production capabilities by buying our own company injection molding machines, customer acquisition and retention, and our overhead costs for the first year. The investor can expect to have their money made back in full between years 2 and 3 and can expect a share value of about \$1.3 million.

Ethical Framework

We plan to approach our future employees, customers, suppliers, and competitors with the utmost respect in a variety of ways. We do recognize the need to address the specific ethics in each area. For each of those, the breakdown is provided.

(1) Employees

Fair Treatment, Safety and Well-being, Diversity and Inclusion, Honesty

(2) Customers

Quality, Safety, Transparency, Fair Price

(3) Suppliers

Transparency, Collaboration, Responsibility, Fairness

(4) Competitors

Fair Competition, Integrity, Respect

Even though HappyCam strives for safety, we are aware that our product may cause more problems than it is trying to solve, and in turn, put safety into question. Because our product is mounted behind the vehicle's license plate, this means we have to provide screws sufficient enough to make sure nothing comes loose or falls off. We have yet to test our product for longevity so we will have to address the reliability in those terms.

The reason and necessity for us to obtain an LLC is to protect us from the risk our product does pose. There is a potential threat our company faces with the law and we want to reduce any possibility that we are held accountable for something that is not intentional. Putting an LLC in place ensures our customers are working with a company with adequate responsibility.

Appendix



Below is link overviewing the HappyCam Experience:

https://drive.google.com/file/d/1ehA9-PAuOF3mVQzMbAoU7Ae_AD5i3dGF/view?usp=drivve_link (Installation, Filling, & Use)

