January 30, 2017

Dr. Andrew Rawicz  
School of Engineering Science  
Simon Fraser University  
Burnaby, British Columbia  
V5A 1S6

Re: ENSC 405W Project Proposal for MotoVise, an automated solar tracking vehicular sun visor

Dear Dr. Rawicz:

The attached document, titled Proposal for MotoVise, provides an encompassing summary of our project for ENSC 405 W and subsequently ENSC 440 W. Our project goal as a team is to create an embedded system for vehicles which enables the self-movement of a sun visor to dynamically adapt and block incoming sunlight relative to the location of the driver or passenger’s field of view.

Our proposal provides the background and motivation behind MotoVise in addition to detailed analyses regarding the operation, validity, market, and tentative financial considerations of our product. Projected project workflow and prospective deadlines for project deliverables are also included in the attached proposal.

As a company, Trap Bird Technologies has always emphasized the importance of innovation and teamwork. Trap Bird Technologies currently consists of four essential members: Benny Chou, Christopher Chin, Ishita Malhotra, and Roxanne Ling, all of whom are highly capable and motivated individuals. Any questions and/or concerns regarding our proposal can be directed to me at bca50@sfu.ca. Thank you for your time and consideration.

Sincerely,

Benny Chou  
CEO  
Trap Bird Technologies

Enclosure: Proposal for MotoVise
Proposal for MotoVise

an automated solar tracking vehicular sun visor

By

TRAP BIRD
TECHNOLOGIES

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Dr. Andrew Rawicz – ENSC 440 W
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Executive Summary

The Problem
If you have ever driven while the sun is shining, you will know the struggle of the scorching sun shimmering straight into your eyes. At this point, you have the option of putting on sunglasses or flipping down the sun visor in hopes that it will block the sun without obstructing your view. Putting on shades may not always be viable for those wearing glasses or simply do not store sunglasses in their vehicle.

The Solution
Trap Bird Technologies’ MotoVise will revolutionize your daily commute with an autonomous solar tracking vehicular sun visor. We have the specialists to implement this incredible innovation soon to be found on the roads. Our team consists of 4 Engineering students at SFU with strong work ethics, creativity, and experience in embedded systems.

The Market
Vancouver is the “luxury car capital of North America” where 1 in 142 people own a supercar - a car worth more than $150 000 [1]. It is of our interest to tap into this booming market. We are targeting manufacturers of luxurious cars where customers will likely opt to showcase the newest tech feature in their supercars.

The Design
Our design will reflect its luxuriousness from its elegant and thin structure. Using luminosity sensors, MotoVise will reposition itself automatically to shield the sun in relation to the driver’s head. As there are many safety concerns for automated machines, there will be a manual setting where the user may adjust the visor themselves. The main features of MotoVise are the real-time sun-tracking sensors, the motor to position the visor accordingly, and the extendable sunshade to prevent the car cabin from overheating when parked.

The Benefits
Creating a hassle-free sun visor is the main benefit of MotoVise compared to current car visors. MotoVise is transparent and can therefore be lowered to an appropriate level temporarily without breaking the law nor obstructing the driver’s view. This will in turn decrease the number of accidents related to the sun’s glaze.

The Cost
Our design will cost less than $485 to produce and this price will reduce considerably in mass production. For buyers who purchase cars over $150 000, adding a few thousand dollars for the MotoVise should be done without hesitation and thus a great profit is guaranteed. Our current design is not optimized for self installation in existing cars but we do hope to develop such visors in the future.

The Project
Trap Bird Technologies has the expertise and knowledge to create the next state of the art solution of the future. We aim to complete the first marketable prototype of MotoVise by the end of August 2017. By 2020, we hope to see car manufacturers adapting MotoVise as well as creating a prototype to attach on existent cars. Trap Bird Technologies strives to simplify the life for all drivers to bring us all closer to a truly automated experience inside the vehicle.
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1.0 Introduction and Background
Anyone who has ever driven a vehicle will at one point or another undoubtedly encounter the bane of morning and evening commutes, the sun. The view in Figure 1.0.1 captures this exact feeling. Ranging from a minor inconvenience for the passenger to a legitimate safety concern for the driver, when the sun is at the troughs of its cycle it is a burden to drive against the blinding light. Despite most modern cars coming equipped with a flimsy rectangular cut out dubbed a sun visor, we at Trap Bird Technologies believe that there is untapped potential innovation in the traditional car sun visor. Therefore, our collective purpose as a company is to bring the car sun visor on par with the other technological advancements seen in modern cars today.

Sun visors in their current rendition require manual effort to flip down and angle appropriately so that the visor is in the optimum between sun coverage and road visibility. Additionally, if the glare of sunlight is in one’s peripheral vision, additional exertion is required to unhinge the visor and swing it in front of one’s face to position it to the side. When the sun is no longer in your way, the actions are reversed to place it back into its original position as leaving it unhinged unnecessarily obstructs one’s vision. These processes, for many drivers, is repeated ad finem for every road taken and turn made against the sun. Sometimes, this additional labour is advised to not be taken as unhooking the sun visor will cause the hinge to wear out quicker. Sun visors are rarely left down voluntarily for an extended period and in many cases, drivers opt to wear sun glasses for commutes instead of using the sun visor. Based on anecdotal evidence that we believe extends to the broader general populace, car sun visors are an inadequacy that have been left unaddressed.

To remedy the afterthought that is the sun visor, Trap Bird Technologies proudly presents MotoVise, an autonomous solar tracking vehicular sun visor. MotoVise aims to revolutionize the commuting experience by automating the process of blocking unwanted sun glare while driving.

MotoVise will operate as an embedded system within the vehicle. Figure 1.0.2 depicts the mechanism of MotoVise through conceptual drawings. Sensors such as luminosity sensors will be used in conjunction with a microcontroller to actively determine the placement of the sun relative to the vehicle cabin in real time. If determined that the sun and its glare are within the field of view of the operator or passenger, a signal will be sent to an electrical
linear actuator which extends the visor down from the top of the windshield. Continued tracking of sun position relative to car movement will be used to actuate lateral displacement of the visor along a rail system to enable seamless coverage from the front to the side of the vehicle. Once sun position and glare is determined to be a null factor, the system will return to its original position; hidden and non-obstructive.

Additionally, MotoVise will be able to function as a sunshade; protecting the cabin of the vehicle from prolonged exposure to the parking lot heat. Nothing is worse than returning to the car on a hot summer’s day only to feel the scorching steering wheel that has been exposed to the sun for far too long. There will be a secondary collapsible visor utilizing a gear and rack system powered by an additional motor. MotoVise will be able to extend its range of sun coverage to more than half of the windshield to protect important components of the dashboard. The steering wheel and the seats will be shielded from extended sun exposure while the vehicle is in a parked state. All of this will be done through a single push of a button for extension and retraction as one exits the vehicle. MotoVise will have the functionality of a sunshade without the hassle that current products on the market necessitate in set up and tear down time.

Figure 1.0.2: Conceptual drawings of MotoVise functionality. (Left) MotoVise operation as an autonomous sun visor. Orange line represents vertical displacement of sun visor via actuators to dynamically block incoming sunlight directly in front of vehicle. Blue line represents lateral displacement path of sun visor via secondary motors to provide seamless transition coverage from front to side of vehicle. (Right) MotoVise operation as a sunshade. Sun visor will have an extendable component for when vehicle is parked. Blue lines represent path of visor extension displacement

For MotoVise to succeed as a product, it must perform better than traditional sun visors while also retaining a slender, non-obtrusive profile within the limited space of the cabin overhead. The subsequent chapters of this proposal document will cover important details of the project such as preliminary design solutions, risk assessment, market analysis and logistics such as project planning. All of which are important factors for the realization of MotoVise.
2.0 Scope, Risks, and Benefits
The following section will cover a systematic overview of MotoVise, as well as touch base on the rationale behind our product’s design and features. Subsequently, the potential risks and benefits of our product will also be discussed.

2.1 Deliverables
Trap Bird Technologies plans to administer three main deliverables in the scope of our proposed design prototype for MotoVise, those being:

1) Real time **sun tracking** applied through sensors. MotoVise will be able to determine the location of the sun relative to the eye level of the front passengers within the vehicle’s cabin. With this information, MotoVise’s system will autonomously determine if the current light level and sun glare pose a hindrance to its passengers. If so, appropriate actions to relieve the situation will be taken by MotoVise.

2) **Automatic visor positioning** to cover both the automobile’s front windshield and the front side windows. MotoVise will be capable of extending and retracting a visor akin to traditional car sun visors. Its uniqueness lies in the capability to translate laterally from the front of the vehicle to the side and vice versa. All operations of the visor will be hands free and completely automated through the implementation of an embedded system in conjunction with feature 1).

3) Retractable **sunshade** extension capable of covering the majority of a vehicle’s windshield. This extension is intended to be a built-in feature that should only be used when the car is in a parked state. The extension will keep the cabin temperature of the car cool ready for the car to be driven again. Activation of MotoVise’s sunshade will be implemented through a switch the user may use to manually adjust the desired range of coverage.
2.2 System Overview
Introduced below is a low-level flowchart expressing the overall system’s performance:

Figure 2.2.1: Flow Chart of Overall System Performance

2.3 Legal Issues
The details of the Provincial Laws regarding vehicle safety are listed in Appendix A [2]. We have summarized the main points below which we factored into our design of MotoVise.

1) No person shall drive on the highway if the windows impair the vision of the driver.
2) No person shall drive on the highway if the view of highways is obstructed by a sticker, sign, poster or other material placed over the windshield or any window of the vehicle.
3) No person shall replace any glass in a door or windshield or window of a motor vehicle except with safety glass, provided that glass replaced in a windshield of a motor vehicle shall not be heat treated or case hardened glass.
4) No person shall drive on a highway a motor vehicle which has placed on the windshield or a window any material that reduces the light transmitted through the windshield or window unless the material is affixed to or placed on
   a) the windshield but not more than 75 mm below the top of the windshield,
   b) a side window that is behind the driver, or
   c) the rear window of the motor vehicle is equipped with outside rear view mirrors on the left and right side of the motor vehicle.
5) If a motor vehicle contains manufactured glass, tinting contained within the glass must meet the minimum light transmittance requirements under the Canadian Motor Vehicle Safety Standards.
2.4 Proposed Design Solution

2.4.1 Sun Tracking

The proposed method for the sun tracking would be implemented using luminosity sensors placed at the front and side of the headrests of each of the vehicle’s front seats. This will create an adjustable work plane relative to the eye levels for passengers and drivers of different heights sitting in the seats. Three luminosity sensors will be placed around each headrest arranged in the set-up shown in Figure 2.4.1, for a total of six sensors that make up the system. When the intensity of sunlight let into the cabin is sensed passed a certain threshold of lumens, the system will respond accordingly to actuate the visor to the location of highest detected intensity in the work plane. In regards to the calculations necessary for tracking the sun and its positioning, MotoVise will employ the usage of a microcontroller as a central processing unit.

![Figure 2.4.1: Locations of luminosity sensors embedded on headrest labeled from 1 to 3. Sensors 2 and 3 will be facing the front of the vehicle. Sensor 1 will face out towards the side of the vehicle. For example, sensor 1 in the case of the front left car seat will face outwards towards the left of the vehicle.](image)

Knowing the eye level of each individual is critically important as it will dictate the level of actuation of the visor. By placing the sensors on the headrests, we can quickly determine the approximate eye level of each passenger/driver without resorting to additional calibration steps as suggested in other methods. We believe that having a streamlined approach without calibration is ultimately what customers want and what would thrive in the market.

2.4.2 Automatic Visor

The proposed design for the automatic visor will contain an arm capable of 2 dimensions of rotation and 1 dimension of translation. A belt driven actuator that runs on a steel rail will translate the system from the front windshield to the sides. The rail will be mounted to the side of the vehicle, just above the top of the door opening. The entire system consists of three main motors, one to turn the pivot piece or arm, one to adjust the angle of the visor, and one to translate the mechanism along the rail. Finally, a linear actuator will be used for extension and retraction of the visor itself. Figure 2.4.2 below explains the use of each motor to accomplish these tasks.
The arm will be able to traverse along the rail using a small motor drivetrain, consisting of a stepper motor and rollers attached to an aluminum bracket. Attached to the linear actuator system will be two tinted, polycarbonate visor lenses housed in an aluminum frame (Figure 2.4.3). These will be arranged in a stacked-cascade setup, which will aid in its functionality as a sunshade when the automobile is parked. The aforementioned microcontroller will govern control of the visor system.
2.4.3 Sunshade
As mentioned briefly in the scope for the implementation of the automatic visor positioning, the tinted panels of polycarbonate are proposed to be situated in a cascaded system, using a gear and rack system to extend the second tinted extension further down the windshield, providing shade to a majority of the cabin from the front of the car.

![Sunshade Diagram]

Figure 2.4.4: MotoVise sunshade system. (Left) Cascaded visor components with sunshade unengaged. (Right) Sunshade engaged as visor extension slides out beneath.

This above proposed design for the MotoVise sunshade was chosen for its low overhead in operation. A sliding mechanism for the extension would require the least amount of space to operate compared to alternative solutions. The sliding mechanism with gears and racks also provides the most robust solution that is least prone to failure after extended use and product life.

2.4.4 Materials
Aluminum was concluded to be the main material to make up the pivot and slider mechanism as it is not only sturdy enough to hold the visor lens components, but also light enough to provide little strain on the rail. Steel is proposed for the rail portion, as we seek something robust to undergo repetitive sliding while also holding the continuous strain of the visor compartment.

Polycarbonate, a popular plastic used for manufacturing the lenses of sunglasses, was chosen as it essentially weighs half as much of glass. In terms of safety, it is a lot less likely to shatter and injure a passenger or driver in the event of an accident. We inferred that polycarbonate material would be much easier to work with when assembling a prototype and testing.
2.5 Alternative Design Solutions

2.5.1 Sun Tracking
We considered an alternative setup for the sun tracking system through the placement of luminosity sensors directly on the side windows and windshield. This proposed concept was ruled out during discussion as we concluded that placing the sensors on the headrests would result in a much more accurate depiction of sunlight being directed in the eye area - a priority area of coverage declared in the scope. Realistically, the system will not be able to tell if sun is directly hitting the driver or passenger’s eyes if the sensors are placed before the eyes, resulting in inaccurate movements of the visor.

2.5.2 Automatic Visor
For the design of the automatic visor, two other possible solutions were proposed. The first alternative, dubbed the “black box” design, required a segment of the roof above the driver/front passenger replaced with a box. The proposed box would have two openings: one towards the front of the vehicle and one towards the side. Each opening would then contain an independent visor which slides out using linear actuators of their own. This design was not considered as it was deemed rudimentary and space inefficient in the already confined vehicle cabin available.

The second alternative employed a differently shaped rail. Originally, we planned to use an L-shaped rail system so that the arm attached to the middle of the visor could slide from the front to the side of the vehicle and vice versa. However, having a large rail placed on the roof of the car seemed rather excessive and inelegant. This idea was later redeveloped and refined into the current proposed solution. Instead of having an L-shaped rail, we discovered that it was possible to achieve full frontal coverage with a single straight rail and moving the location where the visor was mounted to the side.

2.5.3 Sunshade
Another design discussed in terms of the implementation of the sunshade was an unhinging mechanism to rotate the visor extension down the windshield as opposed to sliding out from a cascaded configuration. In terms of simplicity and aesthetics, this design was not chosen in our scope. This mechanism would require additional motors at the sides of the visor housings, and the flipping of the extension would be more likely to hit the dashboard and steering wheel when administered. In terms of product life, we also saw many problems that could occur with this system after extensive use and wear, similar to pop up headlights of older generation cars. Extending the visor extension through sliding was thought to be a subtler action that achieves the same end goal.
2.6 Possible Risks
The main risk with MotoVise is its implementation for a portable prototype. In the future, MotoVise can easily be marketed as a built-in car attachment, which would slide inside the roof of the car. Trap Bird Technologies will create a prototype installed as a physical box as it will be extremely expensive to rip off an actual car’s roof.

Sun tracking as a whole is an extremely hard task, which can easily be botched up because of some mistakes in the algorithm. Thus, complexity of sun tracking is a solvable problem with careful calculations.

Space and power are other plausible issues. The length at which the visor should drop down to will be hard to standardize as the safety requirements vary from province to province. The power required to operate the visor may be a problem during the prototype stage, as the connecting wires will be physically installed and will be visible. Further circuit design will be necessary to minimize the visibility of the wires and to optimize MotoVise’s aesthetic. When the vehicle is turned off, the visor will no longer be functional and thus mechanical control may be mandatory.

These potential risks must be solved in future iterations of MotoVise to be successfully marketed.

2.7 Anticipated Benefits
MotoVise will be a complete state of art solution to the problem of manually adjusting the sun visor repeatedly according to the location of the sun. While manually adjusting the visor is an option, it takes away the driver’s attention from driving and can result in a car accident. On an average, 3000 sun glare related car accidents have been reported per year in the UK alone [3].

The potential benefits of installing MotoVise will be for the convenience of the driver. MotoVise will add significantly to user experience as the user will not have to worry about manually adjusting the visor as the angle of sun changes. It will also remove the process of unhinging the visor, moving it to the other side, and then reattaching it as the sun moves back in the frontal vision of the driver.

The automotive sector has already come up with automatically retracting wing mirrors, automatic windows, and automatic seat adjustment systems, but not an effective way to implement automatic sun blocking without impeding the driver’s vision. MotoVise will be the first to tackle this issue.

Not only will MotoVise add to the safety of a vehicle, but will also increase the aesthetic appeal of the vehicle. Once incorporated as part of the vehicle manufacturing process, MotoVise will make the use of aftermarket, add-on sun visors redundant; which usually mar the appearance of the vehicle and are considered to be unsafe.
3.0 Market and Competition

3.1 Target Market

Now is the time when innovations in technology and automation have reached its peak. With automatically maneuvering cars, the automotive industry is headed towards a complete state of art solution to travelling woes. However, the automotive sector has been very stagnant in terms of innovations for the sun visors. Today, consumers are more receptive to the idea of spending a bit more for safety, automatic features, and luxury in cars. MotoVise is bound to find its fit in the current economic trend.

According to a Business Insider’s intelligence report, the number of global cars installed with self-driving features is bound to rise at an exponential rate. It is estimated that there will be 10 million new cars on the road with self-driving features by 2020 [4]. We see potential for MotoVise being introduced as a part of the high end features employed in self-driving cars and other luxury vehicles.

![Figure 3.1.1: Estimated Global Installed Base of Cars with self-driving features [4]](image)

A few years ago, the wing mirrors had to be opened manually and in congested places, where space was less, they had to be manually closed so as to maneuver the car safely. This task changed with the introduction of electrically operated wing mirrors. As so, a new feature can be introduced to change a market trend as there is always room for improvement. This feature was available in high end cars earlier, but now can be seen in middle range cars as well. We want the same results for Motovise. In the short term, we are planning to target the smart car and luxury car market. In the long run, we hope automated sun visors will become an industry norm.

People who buy luxury cars are always looking for the exciting features that these cars have to offer. Consumers pay extra for the comfort and ease of driving. MotoVise will add incredibly towards the ease, safety and comfort of driving a car. The driver will no longer need to worry about manually pulling down the sun visor, struggling to get the angle correct or returning to a boiling hot vehicle.
3.2 Current Competition

Current visors equipped in cars pose a huge problem when one is in the middle of driving and must manually adjust the visor. Not only does it take the driver’s concentration off the road, but necessitates an extra task that could be done electronically. When the sun enters our peripheral vision, we must endure the pain of manually unhinging the visor, rotating it to the other side and reattaching it when the sun moves away. All of this motion is usually done while driving in a high tension situation. For taller individuals, the rotation of the visor may hit their head and to dodge the visor is an additional risk taken while driving.

Attachable add-on visors to the equipped car visor are available in the market. However, the main drawback to these visors is the safety and the need to be handled manually. MotoVise will be more high-tech and aesthetically pleasing than these visors.

Google’s current development of the Photochromatic Glass for cars is Trap Bird Technologies’ greatest competitor. Their design dims part of the windshield according to the angle of light hitting the driver’s eyes. Car manufacturers are hesitant to use such technology due to safety concerns regarding the rigidity of the glass and the extreme cost [5]. Instead, MotoVise will get the job done whilst being aesthetically pleasant and not reducing the safety that comes with a traditional wind shield.
4.0 Cost Considerations

4.1 Budget

A tentative cost estimation for the components introduced in the scope of our proposed design is broken down in Table 4.1.1 below. Estimations are based on average costs of parts relative to desired specifications and functions for prototype and testing. These prices may not reflect the true bill of materials for the finalized vendor model.

<table>
<thead>
<tr>
<th>Component</th>
<th>Est. Unit Cost</th>
<th>Quantity</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Luminosity Sensor</td>
<td>$6.00</td>
<td>6</td>
<td>$36.00</td>
</tr>
<tr>
<td>Stepper Motor 200 Steps/rev, 12V, 350mA</td>
<td>$14.00</td>
<td>3</td>
<td>$42.00</td>
</tr>
<tr>
<td>Stepper Motor Mount</td>
<td>$9.00</td>
<td>3</td>
<td>$27.00</td>
</tr>
<tr>
<td>Belt Driven Actuator MSA 628 Actuator</td>
<td>$150.00</td>
<td>1</td>
<td>$150.00</td>
</tr>
<tr>
<td>Aluminum Angle (for housing) 3/4 in. W x 9/16 in. H x 96 in</td>
<td>$11.30</td>
<td>1</td>
<td>$11.30</td>
</tr>
<tr>
<td>Polycarbonate Sheeting 12in x 24 in x 0.093in</td>
<td>$16.00</td>
<td>1</td>
<td>$16.00</td>
</tr>
<tr>
<td>Linear Actuator</td>
<td>$100.00</td>
<td>1</td>
<td>$100.00</td>
</tr>
<tr>
<td>Arduino A000066</td>
<td>$32.00</td>
<td>1</td>
<td>$32.00</td>
</tr>
<tr>
<td>Gear and Rack Actuator Roller and Motor based</td>
<td>$70.00</td>
<td>1</td>
<td>$70.00</td>
</tr>
<tr>
<td><strong>TOTAL COST</strong></td>
<td><strong>$ 484.30</strong></td>
<td></td>
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</tr>
</tbody>
</table>

Table 4.1.1: Estimation of costs per component necessary as described in scope
4.2 Vendor Information

<table>
<thead>
<tr>
<th>Component</th>
<th>Vendor</th>
<th>Website/Location</th>
</tr>
</thead>
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<tr>
<td>Stepper Motor</td>
<td>AdaFruit</td>
<td><a href="https://www.adafruit.com/products/324">https://www.adafruit.com/products/324</a></td>
</tr>
<tr>
<td>Stepper Motor Mount</td>
<td>AdaFruit</td>
<td><a href="https://www.adafruit.com/products/1297">https://www.adafruit.com/products/1297</a></td>
</tr>
<tr>
<td>Belt Driven Actuator</td>
<td>Macrodynamics</td>
<td><a href="http://www.macrodynamics.com/belt-actuator/msa-628">http://www.macrodynamics.com/belt-actuator/msa-628</a></td>
</tr>
</tbody>
</table>

Table 4.2.1: Vendor name and link to website for specific parts required

4.3 Potential Funding

A core funding towards the development of a working prototype is anticipated to come through the ESSEF of the Engineering Science Student Society (ESSS). The total amount of funding is unknown at the time of the assembly of this report but is not expected to fully fund the total costs of this project. Remaining costs of the project will be expensed evenly and paid for by Trap Bird Technologies’ company members.

As mentioned in the market section, 3.0, of this document, main consumers of MotoVise consist of the many luxury car manufacturers in the industry today. When purchasing a vehicle, an ensured step in the process is the decision of which feature package to buy with the car, usually determined by the manufacturer for simplicity in mass production. Trap Bird Technologies’ proposed marketing strategy is to mass produce and wholesale units to mainly luxury car manufacturers to include in their feature packages. In addition, normal car manufacturers may install MotoVise in their cars as, perhaps, part of their higher end packages. Estimated costs to produce a unit is ~$500 USD, of which if we expect to sell 2500 units at $600 each excluding shipping to manufacturers. In the first year, we can expect to yield a total profit of $250 000. Sales are projected to climb considerably within the next 5 years following release, with the anticipation that designs for newer car models will become more adaptive of the MotoVise system. The results of this potential five-year projection are foreseen to increase our company’s valuation to $1 million as Trap Bird Technologies works to further innovate this line of product.
5.0 Project Planning

The general structure of this project is outlined in the Milestone chart below (Figure 5.0.1). The orange arrows above the timeline indicate the major documentation reports required in the course. Since the schedule for Term 2 has not been provided to us, we have decided to leave it blank and estimate the close date to be the end of the summer semester. The green arrows below the timeline depict due dates specific to features and deliverables of our MotoVise prototype.

![Milestone Chart for MotoVise](image-url)
A more detailed Gantt chart is listed below [Figure 5.0.3] to show all the steps to reach the final Product Gamma in August 2017. Again, the second half of the timeline is less detailed as the outline for the second term was not provided yet.

![Gantt Chart of Project Timeline for MotoVise](image)

**Figure 5.0.3: Gantt Chart of Project Timeline for MotoVise**
6.0 Team Organization

6.1 Company Profile

**Benny Chou – Chief Executive Officer (CEO)**

As a fourth-year systems engineering student approaching the end of his undergraduate studies, Benny brings a considerable amount of experience to Trap Bird Technologies as its chief executive officer. Benny is familiar and experienced with both hardware and software related engineering work having worked on various academic and personal projects throughout his career. His strength lies in his overall versatility and ability to quickly adapt to changes in his working environment. Well versed in the biographies of Julius Caesar, Alexander the Great, and Napoleon Bonaparte, Benny aims to not only be a respectable CEO for Trap Bird Technologies, but also as a great leader amongst his peers.

**Christopher Chin - Chief Financial Officer (CFO)**

Chris is a fourth-year System’s Engineering student whose interests fall within the realm of robotics and mechanical design. From past co-op placements in Alberta’s Oil and Gas industry developing data collection tools for the mechanical integrity of site equipment, a great asset he brings to the company is his round thinking in mechanical design and usability engineering. From his current part time job as a sporting apparatus technician, Chris’ social and hands-on assembly skills have been complemented by his involvement with a great deal of client/consumer based work. Inspired by the scope of this project, Chris intends to apply these attributes towards the development of the MotoVise prototype in the best ways that he can.

**Ishita Malhotra - Chief Operation Officer (COO)**

Ishita’s ability to track due dates, deadlines and maintain order makes her apt to be the COO of the company. As a part of her previous co-op experiences, she has experience with team management, tracking milestones and working in sync with all the team members. She will be responsible for the team’s progress and management, along with taking the role of managing the product.

**Roxanne Ling - Chief Marketing Officer (CMO)**

Roxanne Ling is a fourth-year Systems Engineering student at SFU. Having done her previous co-op at PHSA with a high focus on customer interaction, she brings her expertise of succinct documentation to Trap Bird Technologies. She is experienced in market research and delivering easy-to-understand content to audiences of all types. As the Chief Marketing Officer, Roxanne will design captivating documents written suitably for the audience and create marketing videos and promotions for MotoVise. Roxanne aspires to bring laughter to the team and be the voice that unites the company during disagreements.
7.0 Conclusion

Trap Bird Technologies is adamant on the vision of MotoVise: to simplify the life for all drivers leading us closer to a truly automated experience inside the vehicle. Our team will work hard to achieve a vendor-ready prototype by August 2017. We believe that MotoVise is a spark of innovation in automobile technology that targets a genuine pain of motor transportation.

As of writing this proposal, nothing is available on the market that comes close to what MotoVise can and will provide. Even cars such as the Tesla Model S and X, vehicles which represent the pinnacle of modern vehicular technology, do not come with an automated system for blocking incoming sun glare. Our vision for MotoVise is to subtly revolutionize the automobile and become an industry standard, analogous to the coming of power window.

For any project to succeed, logistics and planning must be at the forefront of thought. This philosophy is thoroughly demonstrated in the proposal above for MotoVise. As a company, we have shown a clear understanding of all elements required for this project to be accomplished including analyses of the design, the finance, and its marketability. Accompanied with an aggressive schedule and well defined due dates for project deliverables, we at Trap Bird Technologies are confident in our abilities to deliver MotoVise: the luxury you never knew you wanted until now.
Appendix A: BC Regulations on Vehicle Parts

Windshields and windows

7.05 (1) No person shall drive or operate on a highway a motor vehicle the windshield or any window of which is in such condition that the vision of the driver is impaired.

Windshield stickers

(2) No person shall drive or operate a vehicle on a highway while his view of the highway or of any intersecting highway is unduly obstructed by any windshield sticker, sign, poster or other thing or material placed over or affixed to the windshield or any window of the vehicle.

Windshield wiper

(3) A motor vehicle other than a motorcycle equipped with a windshield shall also be equipped with a device which is effective for clearing rain, snow or other moisture from the windshield.

(3.1) A bus manufactured prior to January 1, 1971, shall be equipped with 2 windshield wipers.

Windshield and windows, replacing glass

(4) No person shall replace, or cause to be replaced, any glass in a door or windshield or window of a motor vehicle or a camper except with safety glass, provided that glass replaced in a windshield of a motor vehicle shall not be heat treated or case hardened glass.

Windshield and windows, new vehicles

(5) No person shall sell any new motor vehicle unless the glass in the windshield and all the doors and all the windows with which the vehicle is equipped is safety glass, provided that the glass in the windshield shall not be heat treated or case hardened glass.

(6) On and after January 1, 1968, no person shall sell a new camper unless the glass in all the doors and all the windows with which the camper is equipped is safety glass.

(7) A bus manufactured prior to January 1, 1971, shall be equipped with a device for preventing or removing ice or condensation from the inside of the windshield.

(8) No person shall drive or operate on a highway a motor vehicle which has affixed to or placed on the windshield or a window any material that reduces the light transmitted through the windshield or window unless the material is affixed to or placed on

(a) the windshield but not more than 75 mm below the top of the windshield,
(b) a side window that is behind the driver, or
(c) the rear window if the motor vehicle is equipped with outside rear view mirrors on the left and right side of the motor vehicle.

(9) If a motor vehicle contains manufactured glass, tinting contained within the glass must meet the minimum light transmittancy requirements under the Canadian Motor Vehicle Safety Standards.
Sources and References


