ATLS

Automated Traffic Light System

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Brief Description

ATLS is an automated traffic light system that uses deep machine learning to identify objects on the roadways and instantaneously communicate with traffic lights to facilitate traffic flow. Whether you are in a congested intersection or the only car at a light, our system will respond by clearing the way for traffic and adapt in real time.

Mission

ATLS will be the smartest and most adaptable system to power communication between traffic light intersections. We will alleviate traffic congestion and in turn, improve drive time efficiency, reduce drivers gas consumption, provide an environmental impact, and predict future traffic incidents or trends. ATLS will transform the facilitation of traffic flow for the remainder of the twenty first century and serve as a precursor to new modes of transportation.

Objective Goals

Our primary objective is to improve a driver's commute time by implementing our machine learning software and sensor hardware inside the existing transportation infrastructure. We will reach our objective through one intersection and district at a time. Other objectives from designated routes for emergency first responders to the prediction of traffic incidents or trends will be accomplished by focusing on the completion of our primary objective.

1. Improve Drive Time Efficiency
2. Reduce Gas Consumption
3. Predict Traffic Incidents and Trends
4. Designate Routes for Emergency First Responders
5. Enhance City Expansion Planning
6. Discover Positive Environmental and Economic Impacts

Business Strategy

Currently, we have developed a functioning prototype that can identify objects on a roadway at a high rate of efficiency. We are currently testing our service inside a micro-test market and seek outside investment to structure, organize, and provide the resources needed to implement our service inside the existing city infrastructure. Prior

to developing a minimum viable product, we believe a three-step initiative will be vital for our future success. Our first step is in progress by implementing a digital sales funnel strategy through social media lead generations to our website and online petition. This grass roots campaign will raise public awareness of our service and mission. In step two, we will directly target local press and will coincide with step one. The final step involves engagement with our audience generated in previous steps to add pressure toward government agencies and organizations to implement our service inside the existing infrastructure and gradually replace the existing traffic control system. This three-step process will work in unison with our four-step process of developing and implementing our system inside the existing city infrastructure. The four-staged process will allow us to efficiently scale and modify our system with an optimal success rate while implementing a revenue stream. Overtime, we will license our system for consumer and commercial use. Our software is able to be manipulated and serve industries such as medical, hospitality, real estate, and law enforcement.

Technology and Systems

We have filed for a provisional patent to protect our intellectual property and technologies that identify objects on a roadway and recognizes traffic congestion by measuring speed, flow, density, and peak hour factor. A piece of hardware will be produced that include emerging technologies such as: cloud based storage, encrypted based login credentials, camera sensors, renewable power supply, and machine learning software that will properly adapt to current traffic flow. Our unified system communicates with all traffic lighted intersections and signals in real time to adjust traffic flow whether we are sensing traffic incidents, patterns, or making way for emergency first responders. For instance, if you are the only person on the road and you are pulling up to a light that is red, the light will automatically turn green. This concept translates to facilitating communication between heavily dense and congested roadways or multiple block radii.

3. Marketing Strategy

Customer Target Analysis

Our customers range from government to private entities whom work in accordance with one another. A typical partnership with these organizations and agencies request third party or internal assistance for development and maintenance. Our findings suggest that these entities do not have a reason for adapting to modern day technological advancements due to the formation of their corporate infrastructure and partnerships which do not incentivize or prioritize improvement. The relationships our customers possess are believed to act more socially conservative in their dealings. However, we believe the opportunity of adopting our service is highly in our favor when our customer finds a new, sustainable, and competitively priced solution to their current pains. These discoveries impact our marketing plan, growth strategy, and competitors.

Target Audience

- Neighborhood Associations
- General Public (commuters)
- Media Companies and Publishers (local to global)
- City and State Council Officials and Representatives
- The Metropolitan Transit Authority of Transpiration (Metro)
- Houston TranStar
- The Texas Department of Transpiration (TxDOT)

Our target audience conducts their business in partnership with one another and is typically formed through a democratic run bureaucratic board system with representatives of each department or district. They all leverage resources from multiple agencies that provide transportation to emergency management services for their designated region. All promotion content will be linked to our website where those interested can read more information. A petition will be placed in our website for the public to sign and use when addressing council officials and representatives. Once we have collected the optimal number of signatures, we will address city and state council members accordingly.

Targeting the general public is first on our agenda. We will influence the general public through the method of tapping into their emotion that relates to the pain our service plans to alleviate. While targeting the public that commute on a regular basis, we aim to raise awareness and recognition from local media organizations. Media organizations will add a needed pressure to influence our other targeted demographics from neighborhood associations to City and State Officials for seriously considering the implementation of our system inside the existing infrastructure.

Marketing Plan

We will begin marketing our product through an organic grassroots campaign. Promotional content through appropriate social media channels will be used for redirecting our targeted demographics to a website for signing a petition and content that is demonstrating our service prior to launch. Social media usage includes: videos of field tests, field research efforts, and development. All content will lead toward granting us access to discuss the implementation of our service within government agencies through the form of a petition. We believe providing authenticity by displaying the road map we took when developing and marketing our service is crucial for humanizing ourselves toward our audience. This marketing plan will attain its own awareness and press coverage rather than common growth hacking techniques or resorting to expending funds for a public relation agency to form relationships with media organizations.

Our marketing plan is also meant to attract other customers that show interest in implementing our service inside their existing communities. The website will provide a cloud-based login for these early adopters to access our technology.

Competitive Analysis

Previously, The City of Houston installed cameras above the majority of lighted intersections to monitor traffic violations and accidents. The system's intentions served well yet, it was phased out due to computer error and faulty accusations. Half of Houston's cameras were taken down and cost approximately two-hundred million dollars to install and remove. Los Angeles and other cities reconstructed their city roads with sensors or pressure plates for monitoring and determining if that intersection is congested. These strategies are effective yet, to truly smooth traffic flow and implement a system throughout an entire city these traditional methods are counter-productive toward the pains they aim to alleviate. *"And now: the most interesting part of the current traffic control centres. When something is going wrong, the investments should finally pay off and the true value of traffic management is kicking in: making it right again. This is probably the biggest disappointment: can they really? The tools at hand are quite limited: calling the police to intervene on the spot, putting warnings on digital billboards and reaching out to drivers through the radio or social media. In the best case: changing traffic light plans. Should we expect more for a $3.000.000 yearly operational cost [*]? On top, these are all actions that could probably be managed by the processor in an average microwave oven."*[1]

Today, the majority of cities worldwide use manually timed systems that require man-hours for monitoring and timing lights according to a specific time and day. *"The information gathered by this equipment is usually displayed on a lot of screens. Operators watch them 24/7 to check if somewhere something is not as it is supposed to be. Meaning, a lot of the time those operators are bored. Really bored. Apart from this being a waste of beautiful human brainpower, it's also a waste of money. Can't we let those people use their expertise on other things when nothing really is going on?"*[2] This traditional method is effective yet, does not account for everyday circumstances or possess the ability to learn and adapt when left unmanned. *"Unfortunately, older traffic sensing systems do not directly measure speed. In many cases, sensors provide only volume and occupancy, which is a percentage of time which the sensor is "occupied," by a vehicle. This presents some difficulties in determining both density and speed. Occupancy has a direct relationship to density, but that relationship is also affected by the average vehicle length and the sensitivity of the sensor. These two factors, taken together, are referred to as the average field length of the traffic sensor (usually described in feet)."*[3] Our system will not only alleviate the pain of traffic congestion, it

1 https://www.linkedin.com/pulse/traffic-management-service-pieter-morlion

2 https://www.linkedin.com/pulse/traffic-management-service-pieter-morlion

3 http://data.dot.state.mn.us/datatools/Density.html

will correct the way existing systems calculate traffic through the measurements of speed, flow, density, and peak hour factor. We will also be saving human operators time by working alongside our system rather than staying glued to screens for monitoring purposes and busy work. *"Once every three years, city officials take a look at manually timed lights. Unless there are multiple calls of complaints. At times, the system loses a sense of time and need to be reset. Analyze traffic patterns by collecting information on an hour by hour basis through a 15-minute count. They are able to determine the busiest time periods of congestion during this method. Tubes and cameras determine the volume. They analyze intersections for 3 days for averaging. Turning lanes just for one day and at peak traffic hours for inbound and outbound counts."*[4]

Our proposal will only require the implementation of our deep learning software algorithm inside existing camera and traffic control systems. *"In tests, the group's "deep rendering mixture model" largely taught itself how to distinguish handwritten digits using a standard dataset of 10,000 digits written by federal employees and high school students… In tests, the algorithm was more accurate at correctly distinguishing handwritten digits than almost all previous algorithms that were trained with thousands of correct examples of each digit."*[5] The tests we run through the existing camera and traffic control systems mimic the tests used for distinguishing handwritten digits. All intersections with access to our technology will work in unison with another other through our algorithm. *"Drivers are frustrated when they enter roadways that aren't in sync with traffic systems for outbound and inbound flow patterns".*[6] ATLS will transform the way traffic flows for the remainder of the twenty first century and serve as a precursor to new modes of transportation. *"Like human brains, neural networks start out as blank slates and become fully formed as they interact with the world. For example, each processing unit in a convolutional net starts the same and becomes specialized over time as they are exposed to visual stimuli."*[7]

Competitors Researched

We have cited all our competitor's words to argue against each of their approaches when it comes to alleviating the pain of traffic congestion. Furthermore, although they are making strides in the right direction, they are not utilizing accurate methods and emerging technologies to precisely solve the problem.

Direct Competitors

A company overseas by the name of Swarco has developed a similar service, The Omina City Dashboard. Their primary focus is to provide authorities with a tool to apply the usage and grant access of big data for highways. Their platform displays Inter-traffic data and can be customized depending on a user's specific needs. *"The Omina City*

4 https://soundcloud.com/houstonmatters/whats-behind-the-timing-of-houston-traffic-lights#t=0:00

5 https://www.sciencedaily.com/releases/2016/12/161216115448.htm

6 https://soundcloud.com/houstonmatters/whats-behind-the-timing-of-houston-traffic-lights#t=0:00

7 https://www.sciencedaily.com/releases/2016/12/161216115448.htm

Dashboard, is already being used by around 20 cities in Germany and another 10 in the Nordic countries. The software can be controlled to display historic and real-time traffic flow, city-wide or at individually selected junctions or parts of a street network."[8] The main drawback to Swaco service is the fact that they are reliant on existing systems and information. *"The traffic management centre of the future should look definitely different than the ones today, in order to achieve the above. It will have to move away from being an infrastructure-based system in the middle that claims a monopoly on traffic management and traffic information. Look around you. There are plenty of solutions, communities and services available that can do a lot better than we, governments, do. Think about Google Maps, Uber, TomTom, Strava, Moovit, Open Street Maps, Blablacar, Waze .."*[9] However, ATLS will remain completely independent from existing systems while being accessible to previously developed technologies. *"Most of the information needed for traffic management is already out there. Road operators, public transport companies, social media, traffic lights, mobility services and apps all contain loads of information. On top of that, every car is stuffed with sensors. The problem is that a lot of this information is unaccessible for traffic control centres."*[10] The implementation of our systems deliver a superior, state of the art, and self-sufficient piece of technology rather than following existing procedures that request permission to access big data or tear up existing city infrastructures and roadways.

Traffic Vision, startup in possession of a patented video-analytic software that monitors highway CCTV cameras for real time automatic incident detection and data collection. "*Nearly every time we've done a pet peeves segment on* Houston Matters *we've received an email from a listener complaining about the synchronization of traffic lights around Houston — but particularly through downtown."*[11] They share a similar service to ours yet, their technology is still reliant on human operators to monitor, report, and facilitate traffic flow. We believe that focusing on highways is not the root to solving the pain of traffic congestion. However, that we need to facilitate traffic flow inside city roadways and entry or exit ramps in order to lighten highway and freeway traffic congestion. *"Traffic management as a service is about more than only cars. It connects with authorities and companies providing services for trains, busses, metro's, taxi's and cyclists. This makes it easier to advocate smartly combining and shifting between transport modes."*[12] Their startup shares similar strategies to ours and can be identified as a direct competitor yet, our mission is to solve the problem of traffic congestion and not monitor or document it. In order to solve or alleviate this problem, you must single out the roots of congestion. One root being, managing the light durations near entrance and exit ramps of freeways or highways.

8 http://www.itsinternational.com/event-news/intertraffic/2016/news/swarco-displays-enhanced-and-future-proofed-omnia-platform/

9 https://www.linkedin.com/pulse/traffic-management-service-pieter-morlion

10 https://www.linkedin.com/pulse/traffic-management-service-pieter-morlion

11 http://www.houstonmatters.org/segments/segment-c/2016/01/12/whats-behind-the-timing-of-houston-traffic-lights

12 https://www.linkedin.com/pulse/traffic-management-service-pieter-morlion

Indirect Competitors

Inrix, a global SaaS and DaaS company which provides internet services and mobile applications pertaining to road traffic and driver services. They represent many industries such as: automotive, public sector, retail, and real estate. Their company dealings relating to transportation focus more on connected devices technology and the collection of big data rather than developing solutions to alleviate the pain of traffic congestion. *"And Connected Signals is far from the only one in the traffic data game. Sector giants like Waze and Inrixmake truckloads of money off collecting, organizing, and selling traffic data to governments and private businesses."*[13] We consider Inrix as an indirect competitor who would possible be interested in the purchase of our technology. *"The central platform also takes over a lot of the tasks of human operators. Governments can configure what they consider important and how traffic and mobility should be managed on their territory. Based on this configuration, the traffic management service can automatically take decisions or inform an operator when something goes wrong. This way, the operator can spend her or his time in a more useful way than watching screens all the time."*[14]

AEIO, is a full-service program management firm. They manage a wide array of industries including traffic management. They hold a patent that relates to traffic flow yet, the patent does not mention or include anything directly relating to our technology from deep machine learning to the algorithm we have developed. *"The laws of physics only present this "very special class of problems" — the problems that AI shines at solving, Tegmark told Live Science. "This tiny fraction of the problems that physics makes us care about and the tiny fraction of problems that neural networks can solve are more or less the same," he said."*[15] We place AEIO as an indirect competitor at best.

An indirect competitor, Enlighten App predicts when traffic lights will turn red or green. *"There is no way to work around progressive greens rather than synchronized greens. Everything based on miles per hour and drivers not going at a consistent speed."*[16] Their concept is being adopted in the San Jose, California region and is starting to pick up traction. Enlighten validates our need in the market place and addresses our customer and consumer pains. *"Now for the real challenge: Figuring out how to make that information useful for smartphone-equipped users. And maybe, also, for the planet at large."*[17] Their words previously cited, show that they are not seen as a direct competitor due to the nature of their product and technology used. It is a stepping stone needed prior toward the implementation of our service. *"Traffic light timing keeps congestion in sync. Every driver knows that green means go, but when it comes to*

13 https://www.wired.com/2016/10/enlighten-app-uses-ai-predict-lights-will-turn-green/

14 https://www.linkedin.com/pulse/traffic-management-service-pieter-morlion

15 http://www.seeker.com/the-spooky-secret-behind-ais-power-2036378999.html

16 https://soundcloud.com/houstonmatters/whats-behind-the-timing-of-houston-traffic-lights#t=0:00

17 https://www.wired.com/2016/10/enlighten-app-uses-ai-predict-lights-will-turn-green/

moving vehicles along many Houston roads, it's green-green-green that matters more."[18]

4. Design and Development Plan

Design

Hardware

Our initial design is meant to shape around all existing side polls of traffic lights. ATLS' shape and design allows our hardware and software to blend inside existing infrastructure no matter the size or shape, to reduce any performance issue when faced with severe weather. The thought is to have our hardware serve as a shield for our software and technology where it is not exposed to the elements. Previous techniques to extend a pole on the cross bar of a traffic lighted intersection are both costly and are left open to natures elements. Our methodology will prove to be a way to limit costs of implementing our service, maintenance, and protect our technology from the elements.

The dimensions of ATLS are roughly x.x inches in diameter and x inches in height. The purpose of this design is to mold with existing city infrastructure and protect our technology from extreme outer elements such as rain and high winds. We molded two inserts inside the shell of the hardware for a CPU and power source to fit snug inside ATLS without disrupting software performance.

Existing pieces of hardware typically shutdown during storms. Prior to the introduction of hardware, we would like to incorporate solar and wind technology to power our hardware yet, only when the technology is proven to store and effectively run independently. The outer layer will be composed of solar panels and the previous power source will be replaced with a power storage device to collect and store energy collected from the solar panel. An alternative battery source will be considered in this future design.

Software

The prototype is designed to identify all objects from pedestrians to eighteen wheel objects on all local, state, federal, and private roadways. Our systems only identify the types of objects aforementioned without giving specifics such as facial features or license plate numbers. Furthermore, we use any and all objects sensed to measure their speed, flow, density, and peak hour factor. These measurements are vital to calculate and facilitate traffic accurately. A cloud based system coupled with a programming framework will allow for easier integration and access to the data collected. All measurements and calculations previously described are inputted in our patented traffic based formulas and software algorithms utilizing the latest ideas in the

18 http://www.houstonchronicle.com/news/houston-texas/houston/article/Traffic-light-timing-keeps-congestion-in-sync-4551668.php#comments

data science world, including neural networks. *"Like newborn babies, these deep-learning algorithms start out "clueless," yet typically outperform other AI algorithms that are given some of the rules of the game in advance, Tegmark said."*[19]

Development

Hardware

Hardware will be developed through a partnership agreement providing our partner with royalties based off our earnings. We will consult them on our design and allow them to develop according by their experience. We are a software company and believe that focusing on hardware development will impact our growth and earnings.

Software

We measure speed, flow, density, and peak hour factor through existing and newly developed camera sensors to determine if the light should turn red or green based on the aforementioned factors. *"We measure the fundamental curves of transportation engineering, relating speed vs. density and flow vs. speed, which are integral tools for policy makers."* [20] If congestion persists, our system recognizes the traffic flow and adjusts the timing of the nearby intersection traffic lights according to the decrease of density and will increase the speed of traffic. This will ensure that heavier traffic lanes or lone objects on the roadway are given first priority to lighter traffic flows. *"Artificial intelligence and neuroscience experts have taken inspiration from the human brain in creating a new 'deep learning' method that enables computers to learn about the visual world largely on their own, much as human babies do."*[21]

> Example 1: If there is a car waiting at a red light during dead hours, the light for an awaiting car will be sensed and turn green. In this case, a driver will no longer have to wait for the light to turn green when they are the only car at the intersection. Furthermore, cities will no longer have to reconstruct roadways for this action to function properly.
>
> Example 2: If there is a pile up causing major congestion, our system will recognize what intersection is responsible for the congestion and start responding by turning the traffic lighted intersection responsible for the pile up to green for a longer duration of time. Furthermore, cities will no longer need to manually time lighted intersections.

19 http://www.seeker.com/the-spooky-secret-behind-ais-power-2036378999.html

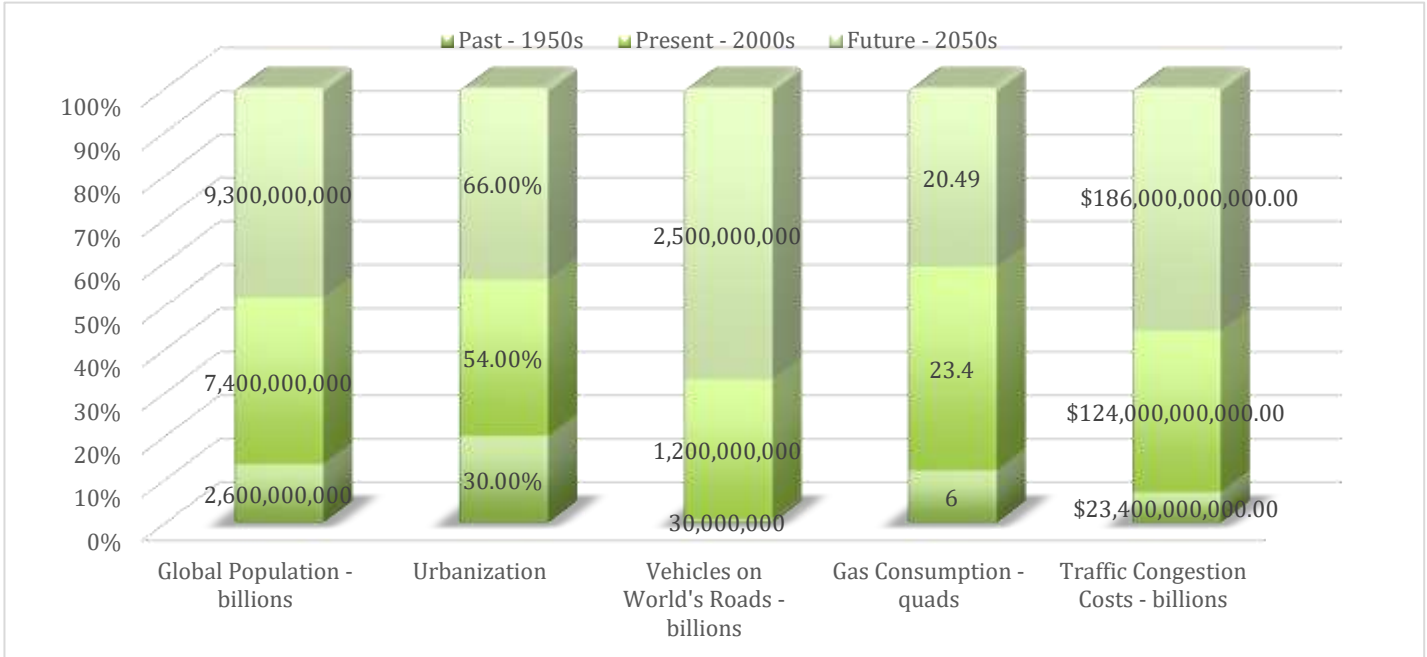
20 https://www.microsoft.com/en-us/research/wp-content/uploads/2016/02/Sen-dev2013-traffic.pdf

21 https://www.sciencedaily.com/releases/2016/12/161216115448.htm

Moreover, we plan to make the software able to distinguish between ambulances, police cars, and firetrucks based off the frequency in sound and visuals such as sirens and lights. *"Information is collected mostly through infrastructure that is bought and maintained by the government itself. Through car detection systems and video cameras, control centres try to get a grasp of what is happening on their roads. This hardware is however expensive and it's nearly unfeasible to supervise the whole road network this way. It takes years of investments, and still then it requires some luck to spot an accident."*[22] If requested or needed, we may provide a software update for emergency responders to tap into the system. This update will allow emergency personnel to designate routes from their department to target location.

5. Economic, Environmental, & Societal Impacts

Traffic congestion impacts more than just traffic alone. *"Research abounds with insight into the detrimental effects of traffic congestion. It stalls business efficiency, elongating transport times for goods and forcing workers to spend more time being idle and unproductive behind the wheel. It also induces anxiety, a feeling that can take years off of commuters' lives when experienced on a daily basis. Tiny cancer-causing particles wafting out of exhaust pipes make their ways into commuters' lungs amidst regular gridlocks of thousands of vehicles. The general air quality also suffers; more traffic means each vehicle spends more time on the road, spewing noxious fumes into the city ambiance."*[23] ATLS' implementation inside the existing infrastructure will provide a healthy economic, environmental, and societal world.



22 https://www.linkedin.com/pulse/traffic-management-service-pieter-morlion

23 http://www.chron.com/news/houston-traffic/article/Traffic-threatens-Texas-prosperity-here-s-how-to-6207080.php

Economic Impacts

We singled out Texas cities in our research to determine the economic benefits of an ATLS system. *"Houston ranked fourth in terms of average hours wasted in traffic annually by each driver. Most area commuters lost 74 hours to congestion, compared to 75 hours in Washington and San Francisco. Los Angeles area commuters lost the most time yearly, with congestion costing them 81 hours."*[24] These figures in mind, we realize that gas consumption and the average costs for commuters is significantly in part by traffic congestion. *"Along with 29 gallons of fuel wasted due to congestion per person, congestion costs totaled $1,490 per auto commuter due to Houston's traffic in 2014."*[25]

Unfortunately, the systems in place today will not alter these numbers for the better. Economically speaking, there is still no solution to the why's and what's for the causes of traffic congestion. *"Population growth, GDP growth, decline in fuel prices, and an increase in car ownership. These are the main factors that will lead, in the next sixteen years, to a 50 percent rise in gridlock costs in the U.S. In short, this means that if, in 2013 traffic congestion cost Americans $124 billion in direct and indirect losses, this number will rise to $186 billion in 2030."*[26]

One of the sole contributors to a successful economy is valued by the productivity of our workforce. *"Delays, which may result in late arrival for employment, meetings, and education, resulting in lost business, disciplinary action or other personal losses."*[27] However, if working professionals and workers in general are incapable to attend or be counted on being prompt, the economy will feel this as population and urbanization rates rise.

Environmental Impacts

One of the biggest and most profound impacts toward environmental concerns derive from societies habit of over consumption and production. *"Wear and tear on vehicles as a result of idling in traffic and frequent acceleration and braking, leading to more frequent repairs and replacements."*[28] If we are able to lower the frequency in repairs and replacement parts for vehicles, we will have drastically lowered our production waste.

A more common environmental impact due to traffic is the consumption and production of energy for powering the billion vehicles estimated on our roadways today. *"Wasted fuel increasing air pollution and carbon dioxide emissions owing to increased*

24 http://www.chron.com/news/transportation/article/Report-unsurprisingly-has-Houston-among-U-S-6890855.php

25 http://www.bizjournals.com/houston/news/2015/08/26/cost-of-houstons-traffic-congestion-keeps.html

26 http://www.forbes.com/sites/federicoguerrini/2014/10/14/traffic-congestion-costs-americans-124-billion-a-year-report-says/#a280796252b0

27 https://en.wikipedia.org/wiki/Traffic_congestion

28 https://en.wikipedia.org/wiki/Traffic_congestion

idling, acceleration and braking."[29] The actions of traffic congestion pay a huge toll on our environmental problems and be solved through the implementation of a smarter traffic system. "*Traffic congestion leads to long and unpredictable commute times, environmental pollution and fuel waste. Intelligent traffic management and better access to traffic information for commuters can help alleviate congestion issues to a certain extent."*[30] The constant acceleration and braking through traffic will never be eliminated while human-beings are behind the wheel. However, preventive measures can counteract these human behaviors to ensure that consumption and production do not go to waste.

Societal Impacts

We all have felt the societal impacts drawn by traffic from running late for an appointment to having a horn pressed at your action or inability to act on a roadway. *"Cities that have experienced the most economic improvement during the past year are at highest risk for consequences related to worsened traffic conditions, including reduced productivity, higher emissions and increased stress levels," INRIX officials said in a release."*[31] No matter the economic or environmental state of a city or state, we all have faced a societal impact from traffic congestion.

Mental and physical health play a significant role when discussing the societal impacts of congestion. We may not even realize the affects traffic plays in our everyday lives yet, the time sitting in traffic is only the start. *"Recent studies have suggested that prolonged exposure to stop-and-go traffic can have a dramatic impact on your health. And in that category, Houston is one of the worst. Texas A&M Traffic Institute ranked Houston sixth among major U.S. cities in number of hours' drivers spend in traffic per year. Four of the ten worst sections of highway for traffic in Texas are within our city limits."*[32] When everyday commuters are constantly having to schedule their day around time lost in traffic is a precursor to how they manage their day-to-day activities. *"Inability to forecast travel time accurately, leading to drivers allocating more time to travel "just in case", and less time on productive activities."*[33] Physical activity from strenuous exercising techniques to walking around the block is known to help treat mental illnesses. The ability to plan an individual's day will help treat or cure many of societies illnesses and is documented to be an impact on everyday commuter's lives. *"Wasting time of motorists and passengers ("opportunity cost"). As a non-productive activity for most people, congestion reduces regional economic health."*[34]

29 https://en.wikipedia.org/wiki/Traffic_congestion

30 https://www.microsoft.com/en-us/research/wp-content/uploads/2016/02/Sen-dev2013-traffic.pdf

31 http://www.chron.com/news/transportation/article/Report-unsurprisingly-has-Houston-among-U-S-6890855.php

32 http://www.houstonpress.com/news/trapped-there-are-no-simple-solutions-to-houstons-traffic-crisis-6601073

33 https://en.wikipedia.org/wiki/Traffic_congestion

34 https://en.wikipedia.org/wiki/Traffic_congestion

A typical life of an everyday motorist could be described as simply as this:

3. Rise from sleeping for 7 hours
4. Sit and eat breakfast for 30 to 45 minutes
5. Drive to work from 30 minutes to 2 hours
6. Sit at a desk for roughly 5 hours
7. Drive home from 30 minutes to 2 hours
8. Sit for dinner
9. Repeat

Excluding the average thirty minutes to hour of working out, a lot of time is devoted to sitting down as depicted above. If we can cut the time of traffic congestion and commuting, we will allow more time for activity. Let us work out a way for society to understand what it means to be human again rather than sitting idle all day.

6. Operations and Management Plan

We look to keep our operations lean and flexible during the preliminary efforts of developing and marketing our service. There are two founders, one primarily focusing on software development and the other directing day to day operations. Both founders work together when it comes to marketing and designing initial concepts or methods.

Our entry to market will start with relationships with micro communities such as neighborhood associations. This relationship will grant us access to test our existing systems and implement new functions for future expansion. During this time period, we will be building relationships with hardware manufactures and other associations or communities. These relationships will prepare ourselves for outside investment to hire the needed personnel for expansion to meet customer demands. Investment provides us with the means to hire a core team comprised of a product engineer and manager, data scientist, software developer, and UI/UX designers.

Once we have developed our minimum viable product and our organic grass roots campaign has kicked into gear, we will have started to speak at city council for pleading our case and request permission to install our system for specific districts. The two founders will play managerial roles plus, put their efforts into growing their existing services through sales and marketing techniques. After we have grown our service into a minimum viable product, we will compartmentalize our corporate infrastructure into

departments. This will allow our team to work more efficiently and prepare ourselves for an acquisition or expansion.

Growth Strategy

Prototype Stage

We have already completed the first step in our growth strategy, which is to develop a prototype of ATLS to identify objects (pedestrians, bicycles, motorcycles, cars, buses, trucks, and trains). The purpose of creating this prototype is to start teaching our deep learning algorithm the differences between objects and collect data from current traffic behaviors to vehicle idle times. After our prototype is running on ninety-nine percent efficiency inside our test markets, we will start developing over the initial concept to construct a pre-minimum viable product that will facilitate the communication between traffic lighted intersections and turn lights green or red based on measuring: speed, flow, density, and peak hour factor of traffic and congestion. The prototype stage will be bootstrapped by the founders and is meant to validate the pain in our market. We will possibly be able to introduce a pricing strategy by selling the data we collect. This method of monetization will continue to exist throughout all stages of growth and will not be given in a form of real time data.

Pre-Minimum Viable Product Stage

Our pre-minimum viable product will be developed with the action of implementing a fully-functional ATLS system into a micro-test markets. At this stage, we will be seeking investment to hire and gather the resources needed to start developing a minimum viable product. The micro-test market will be stationed throughout neighborhood associations and hand-picked communities. We will still be utilizing similar technology in the prototype model however, we will be consulting with data scientists and software developers to hear their suggestions and assumptions for positioning our system for the next stage of growth. Our consulting process will serve as a vetting process when it comes to hiring ideal candidates who have the necessary traits in moving forward with the mass implementation of ATLS. The end result of this stage will be minimum viable product that is implemented into multiple micro test markets.

Minimum Viable Product Stage

During this stage, we will have developed a minimum viable product with the team that was fully vetted in the previous stage of growth. We will start implementing our existing technology developed inside city districts and will update our systems through software updates, similar to how Tesla automobiles are updated. All the technology utilized in ATLS will be custom-made with a cloud-based interface for government organizations and agencies use. Our team will be made up of a product engineer and manager, software developers, designers, and data scientists all under contract and salary. We will continue to position or business for future growth by adding marketing and sales teams to tap into other markets whether they are national or

global. At the end of this stage, we will have a fully functioning service being used inside a major city or possibly replace existing traffic control systems of a small city. The sales and marketing teams organized will be positioned to start negotiating with other cities, businesses, and organizations to implement our system. More information on these monetization methods is shown in our financial plan.

Post-Minimum Viable Product Stage – Full Scale Operation

This stage will be positioned for higher adoption rates inside major cities, organizations, and businesses worldwide. A sales and marketing team will work together toward lead generation and scheduling meetings who seek our services. Our organization will compartmentalize into the following departments: development, marketing, sales, human resource, and research and development. The founders of ATLS will serve upper management positions and interview potential managers inside the departments listed above. Our organization will manage no more than thirty employees. At this time, we will have the proper infrastructure and intellectual property provisions to consider selling our service or expanding our business. When expanding our business, we will start developing new technologies that will support new modes of transportation such as flying and autonomous objects.

7. Financial Proformas

Financial Plan

We have priced our product based on similar services that experience high traffic to their servers with API calls. This does not guarantee full accuracy when related to ATLS and government use. However, after running ATLS' system inside a test market, we will have a better understanding of how our system will scale when implemented inside the existing infrastructures such as, The City of Houston.

Pricing Strategy

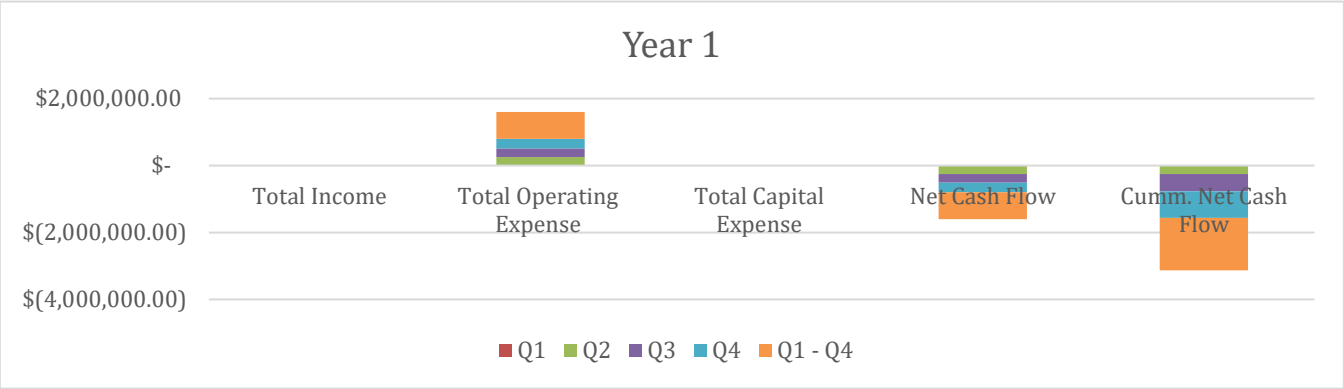
Our pricing strategy mimics our growth strategy as we expand our service into a fully operational business. The majority of our pricing strategies will be offered in annual, subscription-based tiered plans. A government agencies system will be our favorite customer and be granted exclusive permissions from our other customers. We want to ensure that our system will not be compromised and that higher valued customers are granted first, exclusive priority.

Government Agencies (Departments of Transportation)

We will work alongside Government entities for necessary permissions and provisions. Once we have successfully upheld our agreements with government agencies and have implemented our system into a major city, we will start exploring other revenue streams. Government agencies will have access to a privately secured

ATLS API for security purposes and exclusive access. They will have their own product and service line plus, real time access to our technology systems. Data limits or annual contracts will apply.

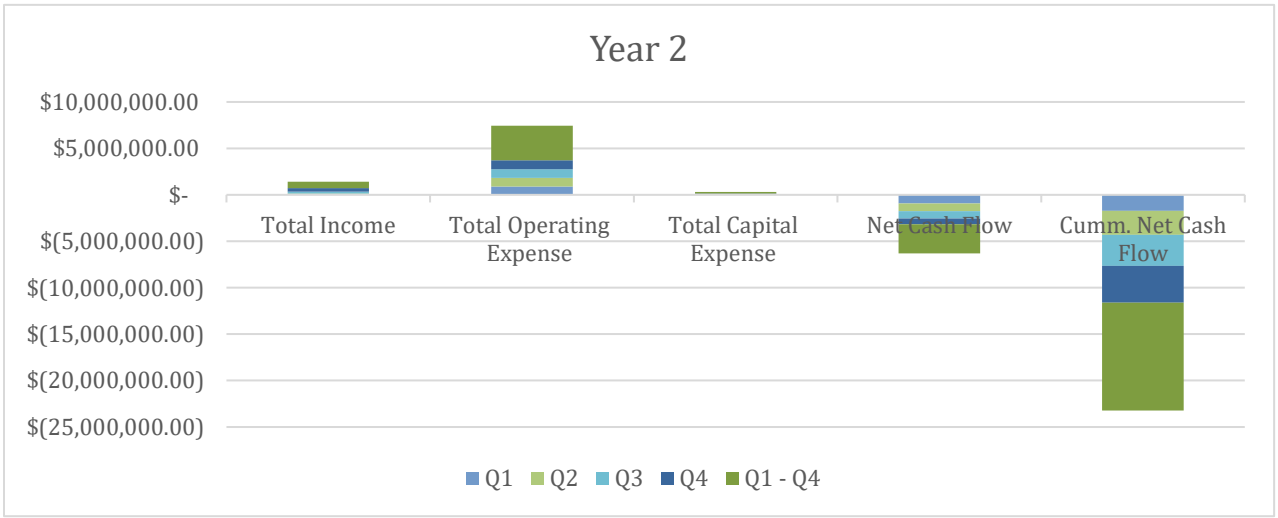
7. Annual Fee – $385,000
    a. Offerings from five to twenty year annual agreements
8. Partnership Agreement
    b. Attain rights to our data
    c. Pay a reduce annual fee for an extended annual terms
        i. For Example, $300,000 annual fee for 10 years



Emergency Services

A system exclusively for emergency services such as Police, Fire, and Medical Departments. They are granted exclusive access to our platform made available only by their designated department with a privately secured ATLS API for security purposes and exclusive access. Our system will allow local departments to swiftly and safely respond and react to emergencies. Overtime, our software will be able to predict incidents prior to it taking place.

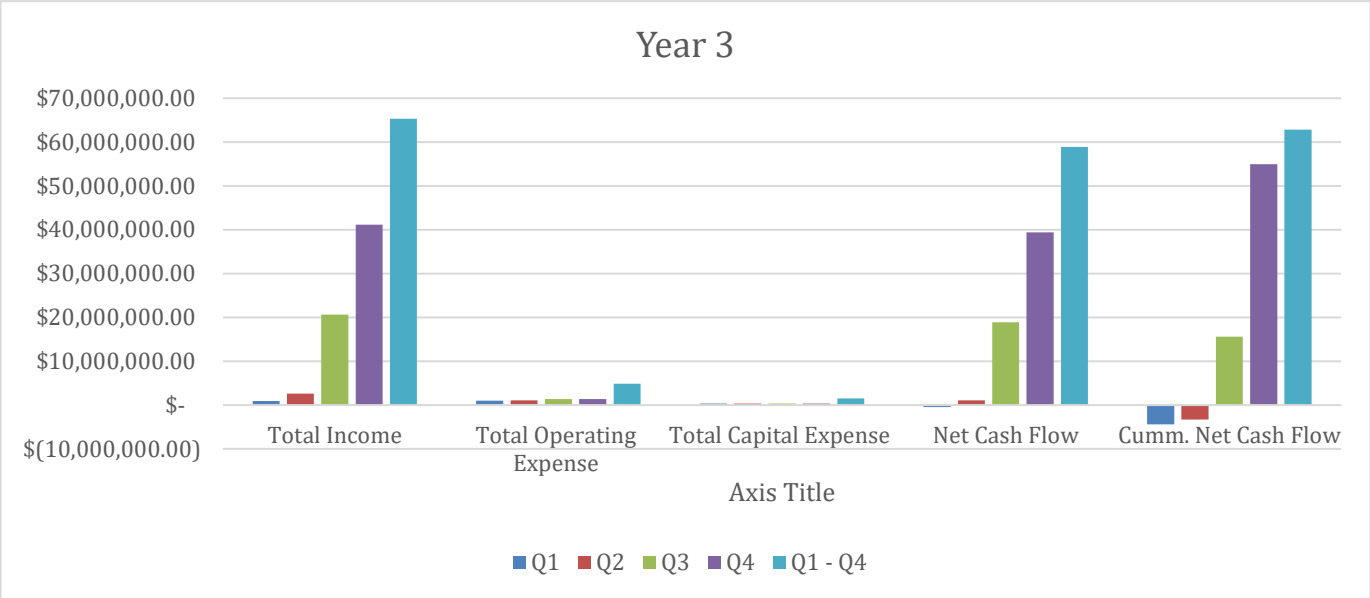
9. Annual Fee - $150,000
    d. Offering reduced annual fees for extended annual terms
        i. For Example, $100,000 annual fee for 10 years
10. Licensing Agreement
    e. Access to our data with admin controls for recording and responding to emergency situations



Media Organizations

Media organizations will be granted permission to license our system and given access to a web interface coupled with a cloud based ATLS API through proper login credentials through the purchase of our annual service agreements. Our system provides media organizations to report accurate and up to date information regarding to traffic conditions.

11. Annual Fee - $100,000
    f. Offering reduced annual fees for extended annual terms
        i. For Example, $50,000 annual fee for 5 years
12. Licensing Agreement
    g. Access to our data for reporting accurate traffic simulations



Commercial Service

A commercial service for corporate and enterprise use from companies such as Uber, Google, automakers, land developers, and media conglomerates will be granted permission and access to our web interface coupled with a cloud based ATLS API. Our interface will feed data and enhance their existing products or services however, will not have access to all its feature or all real-time information.

- Annual Fee - $50,000
    - Offering reduced annual fees for extended annual terms
        - For Example, $25,000 annual fee for 5 years
    - Access to our data and dashboard for organizational use

Consumer Product Based Service

Our consumer products and service will range from software sold in proper market places to a device integrated with our software that is sold separately.

- Device - $500
- Compatible Software Annual Fee - $50
    - Offering reduced annual fees for extended annual terms
        - For Example, $25 annual fee for 5 years