# *Title: AUTOMAP TRUCK TRACKER (Development Log)*

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# **Executive Summary**

AutoMap is a company which has a product solution for tracking cars and light trucks. A few companies have asked AutoMap to produce a similar product to track large freight trucks. This development log documents the process that was used to determine whether or not AutoMap would proceed to develop and produce a solution for tracking large freight trucks.

# AutoMap the Company

### History

AutoMap's most recent product is a small electronic device that plugs into the OBD port of cars and consumer trucks. The device works in conjunction with cell phones to inform a cloud server of the location of the vehicle. Customers then use web-browser-based apps to create reports and map the location of the vehicles. This solution is nearly ½ of the cost of other competitors in the market. It is a market disruptor. Current markets for this product include:

- Rental Car Companies
- Car Auction Houses
- Bank Audit Inventory Control
- Auto Dealers

### **Core Competencies**

AutoMap utilizes the following areas to establish itself as a market disruptor:

1. Third party electronic modules:

Off-the-shelf electronics are used to create many of the electronic systems within AutoMaps product offerings. With these components already passing certain regulatory criteria, developmental cost can be reduced.

- 2. Third party consulting and contracting companies to quickly design, develop, and deploy products. Partnerships with third parties allow for company resources to be free from operational costs associated with in house teams.
- **3.** Using many banking business connections, leverage marketing into companies. Executives from several banks are familiar with our product. AutoMap's CEO is on the board of directors of the largest banks that finances vehicles. These connections allow AutoMap access to the right people to partner with.

4. Over ten years of vehicle tracking experience. AutoMap uses its experience to provide expertise to a segment of an established market. While some of the solutions provided may seem obvious, pitfalls and shortcomings have been addressed and allow AutoMap to operate in ways that would deter similar product offerings from less established companies.

# The Market

### Opportunity

AutoMaps has been approached by two companies which have indicated that they were willing to fund a similar product for the large freight truck market. This would put the company in an existing market it currently does not serve while potentially still leveraging off its core competencies. This opportunity would expand our portfolio to "horizon 2" as it is known in common organizational growth maps (Figure 1).



Figure 1: Organizational Growth Map

### Initial Markets Targeted

#### Primary Market = Truck Fleet Management

This market is the largest. Surveys showed that the fleet companies dictate to the dealers and even to some extent to the OEMs.

#### Secondary Markets = Truck Dealers, Banks

Truck dealers carry small quantities of trucks. This market would not even be considered except that a major truck dealer in Canada expressed interest in the product.

Banks finance the trucks for the truck dealers. In order to verify that their collateral is still on the dealer's lot, the banks send out auditors to personally check that the truck is still there.

#### **Initial Stakeholders**

Go Auto Corporation of Canada - as funder of development

This is one of Canada's largest vehicle dealers. (i.e. Cars, RVs, Trucking). With its size and market share in Canada, Go Auto would be a primary user of AutoMap's new product. The company has also expressed interest in financially backing the development of the product.

• Blackburn from South America - as funder of development

Large fleet and fleet management vendor who has expressed interest in financially backing the development of the product.

- AutoMap LLC
- Fleet Truck Owners
- Freight Truck Dealers
- Banks funding Truck Dealers
- Distributors of Tracking Systems and Software

Entities within this market segment have expressed interest and have indicated being eager to distribute.

### Final Market Selected

#### No Market = Truck Fleet Management

After further investigation, it was discovered that the US government is forcing all trucks driven in America starting in December 2017 to have computers in them to keep track of the hours that the driver is driving. This has caused a flurry in the market of devices which will also track vehicles on the road. Additionally all new freight trucks sold now contain a tracking system which is free to use for the first two years. Potentially, AutoMap could enter this market if they had a product already available by January 2017, but given the lead time to design, develop, manufacture, and market a new product, this market is not really viable for AutoMap's late entry.

#### Primary Market = Banks

Although it might seem that since the new trucks all have tracking systems installed, that the banks could use the systems to verify that the truck is on the dealer's lot, the reality is that the tracking systems use up too much of the truck's battery to always be on. This means that there does not currently exists an electronic means for the banks to verify the trucks' locations. This product could provide real-time asset auditing anywhere in the world.

#### Secondary Marker = Truck Dealers

For the most part, truck dealers can spot their inventory by stepping out of their dealerships' doors. But if AutoMap is already supplying trackers for the trucks on the dealers' lots for the banks, then perhaps the dealers can also benefit from extra information that the trackers can query directly from the trucks EMU (computers). These would be data such as battery and fuel level, mileage, and engine error codes.

#### **Final Stakeholders**

- Go Auto Corporation of Canada
- Blackburn from South America
- AutoMap LLC
- Banks funding Truck Dealers
- Freight Truck Dealers

### Key Business Goals

The goals for the development of this product are as follows:

#### **Break into New Markets**

While AutoMap is in the process of establishing its place in the car market, it would be beneficial to integrate its core competencies into other markets.

#### Diversification

New product offerings will allow AutoMap to adapt to fluctuations in the markets it serves.

#### Leverage off Core Competencies

AutoMap's current strengths can be utilized in untapped markets.

#### **Increase Revenue**

While breaking into new markets and diversification are both driving factors in the decision to develop, the increase in revenue will allow for the capital to be better equipped for these endeavors.

### Assumptions / Risks

1. AutoMap can leverage off of its core competencies to add value to an established market. While the Truck Tracking industry is large and established, AutoMap's

competencies will provide a viable alternative within the market. Furthermore, the banks that do business within the industry do not have dedicated solutions for their needs.

- 2. Product can be manufactured with current AutoMap manufacturing partners, and meet potential demand. With AutoMap's current product offerings, there is an established supply chain. This foundation can be used to not only produce, but accommodate the demand this new market would require.
- 3. Partnerships will become available to leverage off of long-established software tools. To gain market share and keep product costs down for consumers, partnerships with software tools will come to fruition as the product gains traction in the market. This practice is not unique and can be seen with potential competitors.
- 4. Distribution chains are willing to sell AutoMap's product. Enthusiasm expressed by potential vendors of this product, leads to the assumption that there are more vendors with needs that this product will fulfill.

# **Understanding the Customer's Needs**

### Potential Customers Surveyed

AutoMap personnel held long conversation with companies which currently sell tracking systems to the freight truck fleet companies in Canada, Texas, and South America. Additionally, AutoMap sent a technical employee to a freight truck dealer conference to further define the customer needs. At the conference, several dealers and 3rd party auditors identified their interest in implementing tracking technology now, when previously uninterested due to cost and underdeveloped solutions. Furthermore, lead-users and other potential customers experienced with tracking technology repeatedly identified pain points with key commonality in paying too much for solutions they don't need. Based on these conversations, it became clear that there the dealer and bank / auditor market segment needs have been flooded with solutions that are only applicable to fleet tracking management and the associated costs to provide these solutions.

### Linking Metrics to Needs

We organized these customer statements into need statements, along with latent needs known to us through our extensive experience with auto dealers, in a hierarchy of importance to the customer. We then aligned metrics to these needs in matrix form as shown below (Figure 2). Metrics help to translate customer needs into precise inputs to the design process that are typically quantifiable and can, as a result, verify a product's ability to meet the customer need statements.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Weeds	ocation accuracy	nstallation Time / Truck	öystem Implementation Time	Jnit Price	Monthly Service Price	teport Engine Error Codes	teport Mileage	teport Fuel Level	Report Battery Level	Minimum Operating Temperature	Maximum Operating Temperature	Acceler om eter sensitivity	atelite Capability	Vaximum Operating Humidity
1	Know where the trucks are currently located	×						4		F			1	x	
2	A more affordable solution		x	x	x	x									
3	Know where the trucks have previously been	x													
4	Non-invasive implementation		x	x											
5	Be informed of an accident						x						x		
6	Know the trucks onboard diagnostics						x	x	x	x					
7	Dependable in remote areas													x	
8	Dependable in harsh environmental conditions										x	x			x

Figure 2: Needs-Metrics Matrix

### Benchmarking

The comparison between a new product and its competitive products in key in determining success in the market. Information was gathered on the top truck tracking solutions currently in the market through requesting quotes, customer testimonial, and competitor marketing material. This data was organized in a benchmarking matrix (Figure 3) against our previously identified and ranked metrics to clearly show how each competitor was performing against the customer needs statements we gathered. For the performance metrics, it will be important to procure these competitor products to run through our solutions verification and validation testing because most performance metrics derived from Competitor marketing platforms are grossly over exaggerated. This prevent a "No-Go" decision at testing because of what we "think" is our inability to compete.

Metric No.	Needs Nos.	Metric	Imp. 1-5(high)	Units	Competitor - RCI Wireless	Competitor - TrackYourTruck.com (Coyote RT)	Competitor - TrackYourTruck.com (Skyhawk TT-S)	Competitor - Fleetmatics.com (Verizion)	Competitor - Omnitracs (QualComm)
1	1,3	Location accuracy	5	±Yards	5	2	2	5	5
2	2,4	Installation Time / Truck	4	Min / Truck	5	5	10	Unknown	Unknown
3	2,4	System Implementation Time	4	Week	1	4	4	Unknown	Unknown
4	2	Unit Price	4	USD / Unit	400	16.99	40	Unknown	0
5	2	Monthly Service Price	4	USD / Month	Free	35	35	Unknown	29
6	5,6	Report Engine Error Codes	3	Obj. Yes / No	Yes	Yes	Yes	Yes	Yes
7	6	Report Mileage	2	Obj. Yes / No	Yes	Yes	Yes	Yes	Yes
8	6	Report Fuel Level	2	Obj. Yes / No	Yes	Yes	Yes	Yes	Yes
9	6	Report Battery Level	2	Obj. Yes / No	Yes	Yes	Yes	Yes	Yes
10	8	Minimum Operating Temperature	1	°F	-40	-22	-22	Unknown	Unknown
11	8	Maximum Operating Temperature	1	°F	185	167	167	Unknown	Unknown
12	5	Accelerometer sensitivity	2	± g's	Unknown	Unknown	2	Unknown	Unknown
13	7	Satelite Capability	1	Obj. Yes / No	No	No	Yes	Yes	No
14	8	Maximum Operating Humidity	1	%RH @ °F	Unknown	95% @ 122	95% @ 122	Unknown	Unknown

### **Target Specifications**

Target specifications are derived from competitor benchmarking. The benchmarking matrix above helps to form our target specifications by providing both the marginal value (equal with competition) and ideal value (better than competition). On the contrary, target specifications can also derived from our further understanding of what is required to meet the actual customer need, whereas our competitors may have overshot their landing. These target specifications are organized by their applicable customer need(s) and metric ranking (Figure 4). The resulting information is used to scope and describe a future product that will be successful in the given marketplace; the product solution we are after.

Metric No.	Needs Nos.	Metric	Imp. 1-5(high)	Units	Marginal Value	Ideal Value
1	1,3	Location accuracy	5	±Yards	<50	<20
2	2,4	Installation Time / Truck	4	Min / Truck	<10	<5
3	2,4	System Implementation Time	4	Week	<3	<1
4	2	Unit Price	4	USD / Unit	<100	<80
5	2	Monthly Service Price	4	USD / Month	<30	<10
6	5,6	Report Engine Error Codes	3	Obj. Yes / No	Yes	Yes
7	6	Report Mileage	2	Obj. Yes / No	Yes	Yes
8	6	Report Fuel Level	2	Obj. Yes / No	Yes	Yes
9	6	Report Battery Level	2	Obj. Yes / No	Yes	Yes
10	8	Minimum Operating Temperature	1	°F	-20	-40
11	8	Maximum Operating Temperature	1	°F	130	175
12	5	Accelerometer sensitivity	2	± g's	TBD	TBD
13	7	Satelite Capability	1	Obj. Yes / No	No	Yes
14	8	Maximum Operating Humidity	1	%RH @ °F	95 @ 122	95 <i>@</i> 140

Figure 4 Target Specifications

# **Concepts**

### Generation

During concept generation, four major areas of the product's operation were addressed:

- **Power:** Primary source of power. Will power the device and all its systems.
- Data: Information collected about vehicle.
- **Communication:** The method of transmitting the data to the user.
- Interface: The presentation of vehicle information to user.



Figure 5: Basic Architecture

Figure 5 shows the basic architecture of the system. With this foundation, options were established to meet the needs of these four areas. Each area had questions associated with them that helped dictate the concepts that were generated and are as follows:

#### Power

#### Battery Life:

How long would a source be able to power this device? Some current product offerings on the market are known for draining a vehicle's battery. Whether unit has its own battery or utilizes the vehicle's battery, careful consideration needs to be made with how much power draw will be acceptable for operation.

#### User Participation:

What is an acceptable amount of user required participation for sustained operation? Some concepts may require more maintenance and service than a user is willing to perform.

#### Longevity:

Power should be sustainable with limited user interaction.

#### Data

For unit costs to remain competitive in the market, it is important to include the information that is most pertinent to customer needs while omitting other areas of information.

#### Communication

Customer requires data integrity. To assure accurate asset management to those customers, safeguards are needed to the manipulation of the data as it transmitted to users.

#### Interface

Careful consideration is needed for the level of interactivity that the customer requires to review data and asset managing tools.

Figure 6 shows the concept generation for each area.

Power	Data	Communication	Interface
From Truck Battery Replaceable Rechargeable Solar	Location Speed Accident Battery Status Unit's Truck Gas Engine Codes Vehicle ID	Bluetooth WiFi LTE Wired Smartphone User Supplied Automap Satellite	Web browser Software Display on Unit Central Hub App
Vehicle Battery Drain User Participation Longevity	Necessary for Market	Integrity!	Level of Interactivity

Figure 6 Concept Generation Layout

### Selection

Concept selection was broken down into three options:

#### **AutoMaps Core Competencies**

Concepts that model what AutoMap currently provides with its existing products.

#### Core Competencies with more Robust Data

To service the industry with better accuracy and dependability of the vehicle's location.

#### The "Works"

Concept options that provide direct competition to current offerings on market. This will also serve as a reference to the validity of core competencies within the market.

Figures 7-9 show the concepts selected in each of the four major operational areas.



Figure 7 Core Competencies Concept Architecture



Figure 8 Core Competencies + GPS Concept Architecture



Figure 9 The "Works" Concept Architecture

### **Concept Scoring**

A concept-scoring matrix was developed as a decision tool on our three concept generation options. Each option is scored in a 1-5(best) scale against selection criteria. This selection criteria is only derived from our originally defined customer needs. Additional criteria such as the ability to utilize our original supply chain or distributors was not utilized such to make a customer-focused decision. Each concept score was weighted based on the selection criterion's importance to the customer as a percentage of the total. It was determined, through this concept scoring, that the team would nominate concept "A" - our standard core competencies offering to move forward to the development phase based on this concept scoring process (Figure 10).

Rating 1-5		A	• C.C.	B - C.C. +	Robust Data	C - The Works	
	Weight	/eight Rating Weighted Rating		Weighted	Rating	Weighted	
Selection Criteria (needs)			Score		Score		Score
Know where the trucks are currently located	44%	4	1.76	5	2.2	5	2.2
A more affordable solution	30%	5	1.5	3	0.9	1	0.3
Know where the trucks have previously been	5%	4	0.2	5	0.25	5	0.25
Non-invasive implementation	5%	5	0.25	3	0.15	2	0.1
Be informed of an accident	3%	0	0	0	0	4	0.12
Know the trucks onboard diagnostics	3%	5	0.15	5	0.15	5	0.15
Dependable in remote areas	5%	2	0.1	4	0.2	4	0.2
Dependable in harsh environmental conditions	5%	3	0.15	3	0.15	3	0.15
Net Score		28	4.11	28	4	29	3.47
Rank			1		2		3

Figure 10 Concept Scoring Results

# **Design and Develop**

### Architecture

SAE j1939 is a vehicle bus standard that is used for communication between devices within a vehicle's overall operational system. Used in both trucking and agricultural vehicles in the United States and other parts of the world, this standard will be the main interface between the vehicle and AutoMap's device. The device will connect to the vehicle's j1939 connection. Figure 11 shows the standard configuration of this connector:



Figure 11 J1939 Layout

### **Basic Architecture**

The primary interface between the device and vehicle is the power and j1939 front end. Important design considerations are to isolate the device from potential faults occurring on the vehicle's bus. This is critical as there are many different components, as well as regular wear and tear, that could cause this vehicle system to malfunction and damage AutoMap's device. Furthermore, this will also protect the system from any malfunctions that the device may create. Memory is optional due to the built in memory characteristics in most microcontroller units (MCUs) currently on the market. This design feature will be decided upon during component selection.

Figure 12 shows the overall architecture of an individual unit with design considerations.



Figure 12 Selected Concept Architecture w/ Design Considerations

### Configuration

To conserve cost, and to meet core competency expectations, the device will utilize off the shelf modules from third party vendors. To do so will cut developmental cost associated with some of the rigorous regulatory testing of the circuitry and allows for shorter development times. Modern modules are also made to easily interface with each other and possible configurations for AutoMaps device include a stacking topology. Figure 13 shows the configuration of electronic modules within the unit.



Figure 13 Electronic Configuration of Concept

### Data Communication and User Interface

AutoMap has developed a framework that allows for Bluetooth communication between the device in the vehicle and a mobile device. This is primarily performed with the user's smartphone and is then relayed to cloud storage where it can be accessed by the user with a dedicated browser interface. To conserve development costs, little to no modification will be done to AutoMap's current user interface. Figure 14 shows the interface between Truck and User.



Figure 14 Concept Communication Interface

### Industrial Design

#### Goals

- Professional impression to counter small company judgement
- Maintenance and low cost of production due to large production runs
- Communication to help customers understand this complex product solution

#### Expectations for ID Hardware Results

- Hardware product is clearly visible while installed underneath the dark dashboard
- Has space for AutoMap silkscreen or other Logos
- Easily placed and removed from truck
- Form factor is not obtrusive or easily knocked loose by the driver's knee
- Has unique design dissimilar from other j1939 products
- Cost must be lowered where possible.

#### Expectations for ID Software Results

Quality assurance standards:

- unit tests
- source code control
- error control objects
- common naming rules
- source code documentation

Use industry-standard user-interface libraries such as angular.js or node.js

### Design for Manufacturing

#### **Cross-functional Team**

The manufacturing team is composed of four groups:

- EBI in China : This company has a team of 3 engineers in Hillsboro and 8 engineers in China who are responsible for manufacturing the device
- Cipher Engineering in Hillsboro : This company in Hillsboro has 3 engineers who are responsible for minor firmware changes and for debugging the prototypes
- On the ground field techs: AutoMap has its own techs who test the product in the field
- Software developers in Portland

#### Standardization and Modular Design

- Given the size of the market, it would not pay-off to design a new IC:
- Use off-the-shelf components
- Bluetooth board already vetted by FCC
- ELM-type components

### Prototyping

- The final production cost estimates will not be refined until the first prototypes are built. In part this is due to getting an understanding of the production run size versus cost issue.
- For the prototypes, a test platform will need to be created for EBI in China.
- The first prototypes will be used for testing, but do to the nature of interference between signaling modules, it will take the first production run of approximately 100 prototypes to fully test the platform.

• Prototype testing will be vital for verifying compatibility to various truck brands because no single company of the cross-functional team has the resources to test every truck model. The prototypes can be passed around to do the testing.

### Patents and Intellectual Property

In evaluating the worthiness of submitting patents for this new product, the following are two areas that seem worthy of patenting:

- Data Packet Time Encryption Methods
- Complete solution of product elements arrangement (from integrating car ECU thru Cloud thru Reports available)

It is important to protect this Intellectual Property because the patents in this area can help or hurt AutoMap. Benefits of the patent include:

- Makes partnerships with AutoMap viable
- Hope to stop others from entering field

Note that in the past, other companies have tried to stop AutoMap with their patents, but have been unsuccessful due to the Alice ruling (Section 101 of the Patent Act).

# Financial Analysis

A financial analysis was performed on a 4-year projected cash flow to act as a decision tool when we approached the Go / No-Go milestone. The analysis consisted of three key components, a cumulative cash flow chart, a net present value (NPV) review, and a sensitivity analysis of the NPV review.

### **Cumulative Cash Flow**

The cumulative cash flow analysis allows us to very clearly see when our potential product will reach profitability, one of our key targets of this project. After mapping out these projected cash flows, as seen in the chart below, we understand this project to be very typical of products launched on an organization's existing successful platform (core competencies) where initial investment is small and profitability occurs rather quickly.



Figure 15 Projected 4 Year Cumulative Cash Flow

### **Net Present Value**

It is important to further understand these future projected cash flows in terms of their present value to our company. AutoMaps does not have significant liquidity and therefore needs to continue to invest in known, low-risk returns in the current market they serve rather than investing in projects to diversify their portfolio (i.e. projects in horizons 2 and 3). Therefore, the opportunity cost for AutoMaps is higher than most larger, established organizations and makes the NPV review even more important to our Go / No-Go decision. To represent this opportunity cost, we chose the NPV interest rate, known as the discount or hurdle rate, to be 35%. The NPV review found a positive net cash flow which translates to an opportunity more valuable than that which is already known to the company. Positive net present values is typically a key decision factor in a giving the project development the green light.

4-YEAR NPV CASH FLOW STUDY		Year			
	0	1	2	3	4
Development Cost	(25,000.00)				
Testing Cost	(15,000.00)				
Front-End Customization	(36,000.00)				
Marketing & Suppot		(12,000.00)	(10,000.00)	(10,000.00)	(10,000.00)
Production Cost		(22,500.00)	(72,000.00)	(144,000.00)	(144,000.00)
Production Volume		1250	4000	8000	8000
Unit Cost		-18	-18	-18	-18
Sales Revenue		32,000.00	128,000.00	256,000.00	256,000.00
Sales Volume		1000	4000	8000	8000
Unit Price		32	32	32	32
Period Cash Flow		(\$2,500.00)	\$46,000.00	\$102,000.00	\$102,000.00
MARR (hurdle rate)		35.00%	35.00%	35.00%	35.00%
Present Value at Marr		(\$1,851.85)	\$25,240.05	\$41,457.09	\$30,708.96
Projected NPV		\$19,554.26			

Figure 16 Initial NPV Review

### Sensitivity Analysis

Projected cash flows always have some level of uncertainty. For markets that are foreign to AutoMaps such as the Trucking industry, the projected cash flows are even more uncertain. Two key components of our cash flow are the unit cost and the sales volume. Although we have done critical activities to reduce said uncertainty through obtaining supplier quoting and communicating with new distributors, there are still many factors that may occur, as we will discuss in the next section that may influence our cash flow projections. A sensitivity analysis can be a great tool in further understanding the product's future profitability because it can quantify the risk impact(s) to the other cash flow scenarios based on the probability that they are likely to occur. It is also important to provide an optimistic scenario in the sensitivity analysis to identify that the cash flows identified in the 4 year projection was not "best-case". For our sensitivity analysis, we chose to utilize a decision tree tool that branches off to form alternative scenarios. Each branch has its own probability assigned to which the scenario is likely to occur along with its net present value. The product of each scenario's present value and probability of occurrence is summed to find the new NPV that accounts for more than one scenario. The results of the sensitivity analysis show that the projected cash flow scenario does not overcome the probability of scenarios with negative present values. This means that AutoMaps will need to do further work to reduce unit cost and sales volume uncertainties before a "Go" decision can be made to invest in the project.



Figure 17 NPV Sensitivity Analysis

# Other Important Considerations

#### Time to Market

**Connected Car Act**: President Obama had passed a regulation that requires car companies to have their new vehicles communicate with each other by 2018. This will decrease the lifespan of the market because more technology will be pouring into the issue of how to connect and locate cars. It is expected that this technology will spill over into freight trucks as well. On the other hand, some industry experts are now predicting that the connected car regulation may be removed due to Trump's rule that 2 regulations must be removed for everyone added.

**Battery Technology:** The main problem that is stopping trucks from actively using the vehicle locating systems that are installed at the factory is that the trucks may sit for a long while on the dealers' lots and drain the battery if those systems are active. If battery technology were to take a large leap forward then the trucks could have active locating systems for the months while the truck waits. It is believed that is just a matter of time before new battery technology will be capable of this at the right price.

### **Trump Administration**

**Threatens to add 20% tariff**: Trump has threatened to add a 20% tariff to all new products brought into America which are manufactured abroad. A heavy tariff might be

too high and cause AutoMap to have to manufacture its products in the US. This could potentially hurt sales outside of the US.

### **Revenue from Service Charges**

Additional profits would be made by charging a monthly service fee. This service fee would pay for the personnel needed to install and maintain the product. After the first few installations, it is expected that the service fee would more than cover the cost of employees and the servers. This could potentially be worth several times the profit from the sale of the product.

# **Conclusion**

In taking this report into consideration, the possible benefit of this product is not sufficient to overcome the required effort by management to proceed with this product. The reasons are listed below:

- There are several very profitable and encouraging projects that are consuming all of the efforts of the employees of AutoMap. Although this product could potentially pay for the employees who would be required to be added for this product, the managers who are currently in place do not have the time to deal with this and it would take too much time and money to put another management system in place for this one product.
- The cost of money is very high and expected to be that way thru 2018. This means that the expected return of any new project must also be very high. This product does not clearly exhibit that. An expected net return of at least \$200k within 2 years would be needed for any new major project.