



*Loading the Future with Success*

Airplane Loading Robots

**CEO:** Kyle Cullen  
**President of Engineering:** Micheal Lindsey  
**VP of Engineering:** Robert Stranghoener  
**VP of Engineering:** Becky Owen

# 1 Executive Summary

AutoLoad will produce an autonomous robot that loads packages into airplanes. This robot is intended to be used by an overnight delivery company. AutoLoad's robot will be easily configured on the fly by a wireless controller.

The robot will replace manual labor used to load the packages. The lack of personnel is not the greatest savings. The most significant savings will be the airplanes' decreased turnaround time. A robot will be able to load all the packages for a single robot faster than a human, thus allowing the airplanes to be fully utilized. Also when humans perform a task then there is an inherent error and the error will be less when a robot performs the task.

At the moment there is not a company that is making robots that are used to load airplanes with packages. So the only competition is a manual process. With the lack of equal competition then AutoLoad will only have to convince companies that its product is far superior to the manual process because of the decreased turnaround time and the low error rate.

AutoLoad is an engineering systems company with intellectual property as its main product. Most of the fabrication of the robots themselves is going to be produced by a third party (Caterpillar). This allows AutoLoad's main responsibilities to be sales and development.

The full-scale prototype has been purchased by FedEx and will take three years to design and construct. The next three years will be used to produce duplicate copies of the robot and to design the second version. Since each robot generation takes three years to design and create then AutoLoad's books are drawn on a three year timetable. AutoLoad will operate at a loss for the first four years and will break even during the fifth year or the second year of selling actual product. Figure 1.0.a shows the growth rate of the company and the projected profits until 2015. This figure shows AutoLoad's large growth potential with in the airplane loading market.

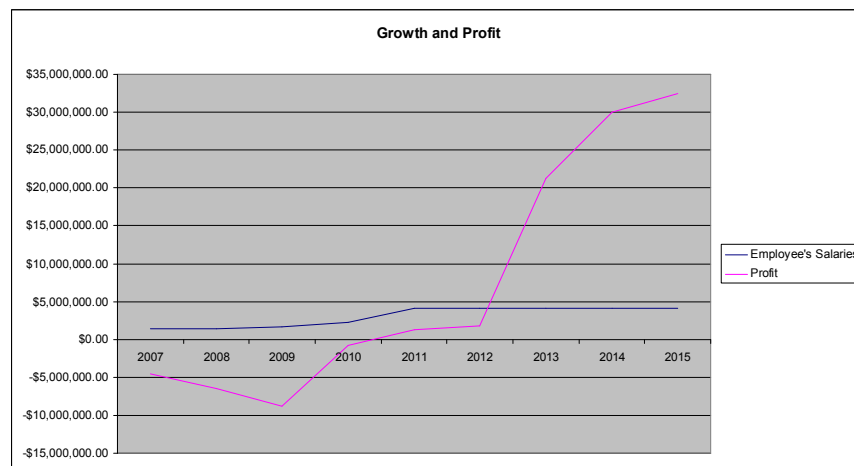


Figure 1.0.a: Growth Rate and Projected Profits

## **2 Company Description**

### **2.1 Summary**

AutoLoad, INC. will be a small company made up of three smaller divisions. The first division, the management team, will be given the task of growing the company into new markets and interfacing with the customers. The second division, the engineering department, will create and test the robot. The third division will interface with the company's business partners. These partners will include manufacturing companies that will create all the parts necessary to build and maintain the robot. The starting partners will be Caterpillar and FedEx. Since most of the manufacturing of the robot will be done by Caterpillar, the company will be small and centralized.

### **2.2 Company Ownership**

AutoLoad is a privately owned by four initial individuals, Kyle Cullen, Micheal Lindsey, Robert Stranghoener, and Rebecca Owen. Each owner owns 25% of the company. The company is an S corporation because an S corporation gives the company the flexibility to easily go public and is not double taxed by the government [1]. Also an S corporation has a higher reputation than an LLC. Each of the board members has a specifically design role in the company. Kyle Cullen is the CEO and sales manager. Micheal Lindsey is the President of Engineering. Robert Stranghoener is the Vice President of Engineering in charge of communications with Caterpillar. Rebecca Owen is the Vice President of Engineering and in charge of the software group which programs the robots' movements.

### **2.3 Company Location**

AutoLoad will be located in Memphis, Tennessee mainly because of its close ties to FedEx. They have a large distribution hub in Memphis that ships packages all over the world. Caterpillar has manufacturing plants in Decatur, Alabama and Jacksonville, Florida. Memphis is a centralized location near these Caterpillar manufacturing sites, has an international airport, and is an industrialized city with several different types of commerce in the area.

### **2.4 Company Facilities**

Since the manufacturing of the robot and the onsite testing will be done at other locations outside of AutoLoad's main facility, AutoLoad's main facility can be a pre-existing 8000 sq foot building. This building will include test laboratories, shop facilities for creation of small test equipment, president's office, three vice presidents' offices, employee offices, demonstration area, conference room, break room, restrooms, and waiting / delivery area.

## 2.5 Company Strategy

AutoLoad will rely on its reputation to compete in the narrow market of airplane freight loading. Customer service will be held paramount to keep its reputation strong and increase repeat business. AutoLoad will also continuously improve the technology of its robots to keep up with the companies' customers' growing needs and wants.

Since the cost of constructing a large scale robot is so great, AutoLoad will get its funding from two places. The first strategy will be to get venture capital from several venture capital firms so that a single venture capital firm will not have to hold the burden of the entire project. Also, a single venture capitalist might not be able to fund the entire project. The second approach is to have FedEx support the project financially. After the first year of having an operational prototype FedEx would be given the option to obtain a monopoly on AutoLoad's robots. This would allow FedEx to be the only company that loads its airplanes in a totally autonomous fashion. During the three-year monopoly, minor changes would be made to the robot's functions, and research would be conducted on its reliability and functionality. Furthermore, during this time period AutoLoad would be working on the next generation of airplane loading robots. The second-generation robot will be released sometime during the third year. After the three-year monopoly expires the company would offer FedEx another three-year monopoly, but they would have to make a considerable purchase and contribution to AutoLoad in order to receive the monopoly. The third generation of the robot will be finished sometime in the last year of the second monopoly or the seventh year. After the first or second monopoly is finished the airplane loading robot would be marketed on the open market. Once AutoLoad's third generation robot has been on the open market and the company has seven years worth of physical evidence of a successful product then at least 43% of the market of the big four package carriers (FedEx, UPS, United States Postal Service, and DHL) should be obtainable.

After ten years when the airplane loading market has been dominated by AutoLoad's products then the company strategy will undergo a renovation and the target market will be redirected towards warehouse management. AutoLoad will create a new robot that will work with RFID technology to fully manage a warehouse. The new robot will take the product directly off the assembly line and place it in the warehouse and then load it onto the outgoing transportation vessel. The robot will be made to order for each individual customer. That means that AutoLoad could build a robot for Walmart that takes a product off a truck and places it in a warehouse and then places that product on another truck a few days later without human intervention. This type of robot could be used for any company that has a need of managing boxed inventory in a warehouse. Such customers could include L.L. Bean, Walmart, K-mart, Weber, Sony, and Serta.

AutoLoad has decided to have Caterpillar create and assemble the mechanical portion of the robots per detailed specifications. Caterpillar is already established in the market of making large construction machinery and would be a great partner to help create these large scale robots. AutoLoad will purchase the robotic shell from Caterpillar and

Caterpillar will be able to say it has entered into a new market and increase its prestige in the heavy machinery market.

## 2.6 Start-Up Costs

The cost to produce a complex robot that is the size of an earth mover is extraordinary. AutoLoad will have a total of 20 employees to accommodate the creation and management of the project. The entire cost will be financed through an exclusivity agreement with FedEx. FedEx will purchase a single prototype for the total cost of \$8.7 million from AutoLoad and in turn AutoLoad will give FedEx the exclusive rights to purchase robots for three years after the first prototype has been created. Each subsequent robot will be purchased at a price between \$1,000,000 and \$1,500,000.

**Table 2.6.a: Start-up Expenses**

<b>Operation Costs</b>	
<i>Yearly</i>	
Building	\$6,000
Furniture	\$7,000
Office Supplies	\$300
Utilities	\$3,000
<b>Total for 3 years</b>	<b>\$48,900</b>
Salaries (20ppl @ \$65k)	\$1,300,000
Benefits	\$60,000
<b>Total for 3 years</b>	<b>\$4,350,000</b>
<i>Initial</i>	
Testing Equipment	\$15,000
Computers	\$16,000
Software and Licensing	\$4,000
Small Robotic Parts - Testing	\$10,000
Legal	\$120,000
Consultants	\$5,000
Insurance	\$20,000
Sales	\$50,000
Travel Expenses	\$15,000
<b>Total</b>	<b>\$4,653,900</b>
<b>Prototyping Cost</b>	
Caterpillar Fee	\$1,500,000
Materials	\$2,000,000

Electronics	\$500,000
<b>Total</b>	<b>\$4,000,000</b>
<b>Total Costs</b>	<b>\$8,653,900</b>
<b>Assets</b>	
Cash – Line of Credit	\$200,000
Miscellaneous Cash	\$100,000
<b>Liabilities</b>	
Short Term	\$300,000
Long Term	\$0
<b>Total Liabilities</b>	<b>\$300,000</b>
<b>Investments</b>	
Seed Investment 1 – Year One	\$1,721,300
Cash Line of Credit – Year One	\$200,000
Seed Investment 2 – Year Two	\$1,466,300
Cash Line of Credit – Year Two	\$50,000
Seed Investment 3 – Year Three	\$1,466,300
Cash Line of Credit – Year Three	\$50,000
Prototype Payment	\$4,000,000
<b>Total Funding Necessary (3Years)</b>	<b>\$8,953,900</b>
<b>Investors</b>	
FedEx purchase of robot	\$3,000,000
VC Investor 1	\$3,000,000
VC Investor 2	\$2,653,900
<b>Summary</b>	
Total Start-Up Expenses	\$8,953,900
Total Assets	\$300,000
Total Start-Up Requirements	\$8,653,900
Total Investments	\$8,653,900
Total Liabilities	\$300,000
Total Investments and Liabilities	\$8,953,900
Loss at Start up	(\$8,653,900)
Total Capital	\$300,000
Total Capital and Liabilities	\$300,000

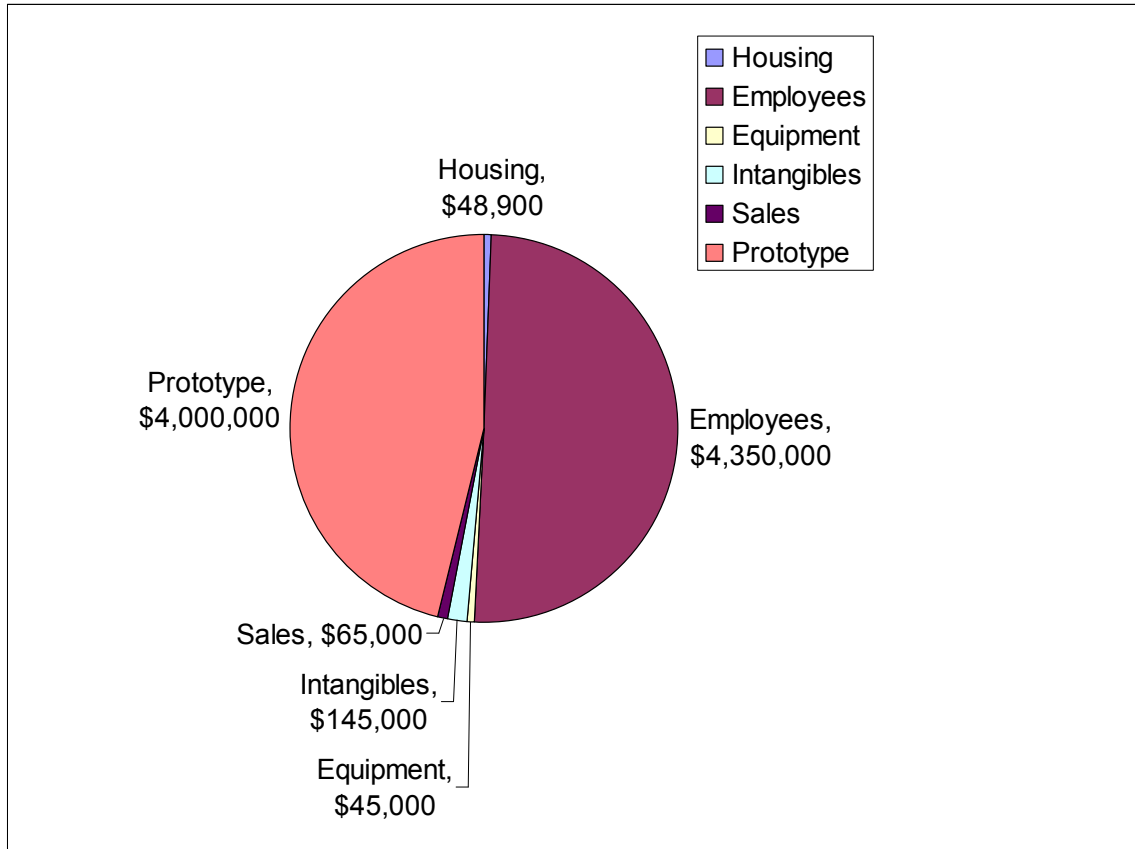


Figure 2.6.a: Pie Chart – Cost Breakdown

### 3 Product Description

AutoLoad will create a number of robots that will autonomously load airplanes with packages. After a package makes it way to FedEx’s hub in Memphis, then it is routed to a storage location. Then the packages are loaded, by one of the robots, into metal containers that are shaped like the inside of an airplane. These containers are called “cans.” Another one of AutoLoad’s robots will collect the cans and place them into the appropriate airplane without human intervention. This system will use an RFID tag on the can to determine the target airplane. The system that loads the cans will write to the RFID tag when it has finished filling it with boxes. When a new airplane is parked on the jet way and is ready to be loaded, a technician will send the position and destination data to the robot via a wireless communication device.

#### 3.1 Product Market and Competitive Comparison

At the moment, the cans are hand loaded by FedEx employees. This is AutoLoad’s competition. Loading packages into a can is a very repetitive task which lends itself to error. On the other hand, a robot can execute the same set of instructions for days or weeks on end without a single failure or mistake. The robot loader will have at least ten times the accuracy of a human and thus a ten times less error rate. If FedEx can lower

their error rate then their cost margin will decrease and in turn their profitability will increase. Also, a robot will be able to load the packages into the cans and then into the airplanes at a much faster rate than humans. If FedEx were to use robots to load its airplanes then the package thrower's job will become unnecessary, and FedEx can decrease its employee base. Once the employee base is decreased, the employees' salaries and benefit plans can be added into the company's bottom line. The biggest advantage of an AutoLoad robot is that the robot will decrease the turn around time of a single airplane. Every second that an airplane is sitting on the runway is a considerable cost to an overnight delivery service company. Decreasing turnaround time will in turn increase AutoLoad's customer's bottom line.

AutoLoad is a company similar to a car manufacturer. AutoLoad produces its product in a very specific market and has a limited number of key players. If another company wishes to compete with AutoLoad to robotically load packages into airplanes then they will have to compete with an established company with a track record of proven reliability. AutoLoad also has the full support of FedEx. Since FedEx has 60% of its market then AutoLoad will have at least 60% of the airplane loading market when competition emerges.

### **3.2 Product Costs**

The majority of the cost of the robot will be accrued by the mechanical cost. The cost of producing the shell and mechanical structure of such a large robot will outweigh the cost of the electrical components and the coding process. The coding and design process will take a large initial cost but will be amortized over a vast number of robots which will drive the cost per unit down. The price set point will be between \$1,000,000 and \$1,500,000 per robot.

### **3.3 Sourcing**

Most of the robot will be built by other companies. The mechanical structure will be produced by Caterpillar INC. The electrical components will be assembled by outside vendors but then placed and wired into the mechanical components by AutoLoad employees to ensure the quality of the product. Since each robot will be made to order then there will be no need for AutoLoad to hold large quantities of parts or assembled robots. Once an order is placed it will be passed on to the individual vendors and the robot will be assembled.

### **3.4 Technology**

AutoLoad's main role in the creation of the product will be the engineering services to create the code and design of each robot. This will allow AutoLoad to concentrate on the technology and implementation of Jacobian-based algorithms to produce the movements necessary to load packages.

### **3.5 Future Products and Services**

After three years the first prototype should be completed, but that is not the end of the company's development. AutoLoad's future plans include the development of a new robot generation every three years. AutoLoad will create three revisions, each with nuances that will allow the robot to perform a variety of tasks. Also, when a company purchases a robot from AutoLoad they will have the option to buy a limited service plan that will allow them to have AutoLoad employees perform on-site repairs and modifications to their robot.

## **4 Market Analysis**

### **4.1 Market Segmentation**

Overnight package delivery is a very specialized field with only a few key players. The four biggest delivery service providers are FedEx, UPS, USPS, and DHL. Each of these companies still load airplanes by hand and would benefit from autonomous loading.

### **4.2 Industry Analysis**

AutoLoad decided to start its expensive venture with FedEx because of their support of technological advances in the industry and their market share. FedEx currently owns 58 Boeing MD-11s while UPS currently owns only 21 MD-11s. The MD-11 is the most technologically advanced airplane in the current market. FedEx is also going to be part of the initial deployment of the new Airbus A308 which is going to be the most sophisticated airplane on the market. Also FedEx holds 62% of the current overnight delivery market. Because of the combination of the two, FedEx is the best option for AutoLoad's Business partner.

Table 4.2.a: Final Quarter 2005 Revenue

<b>Company</b>	<b>FedEx</b>	<b>UPS</b>	<b>USPS</b>	<b>DHL</b>	<b>Other</b>
<b>Revenue(millions)</b>	\$19,500	\$11,900	\$259	\$51	\$10

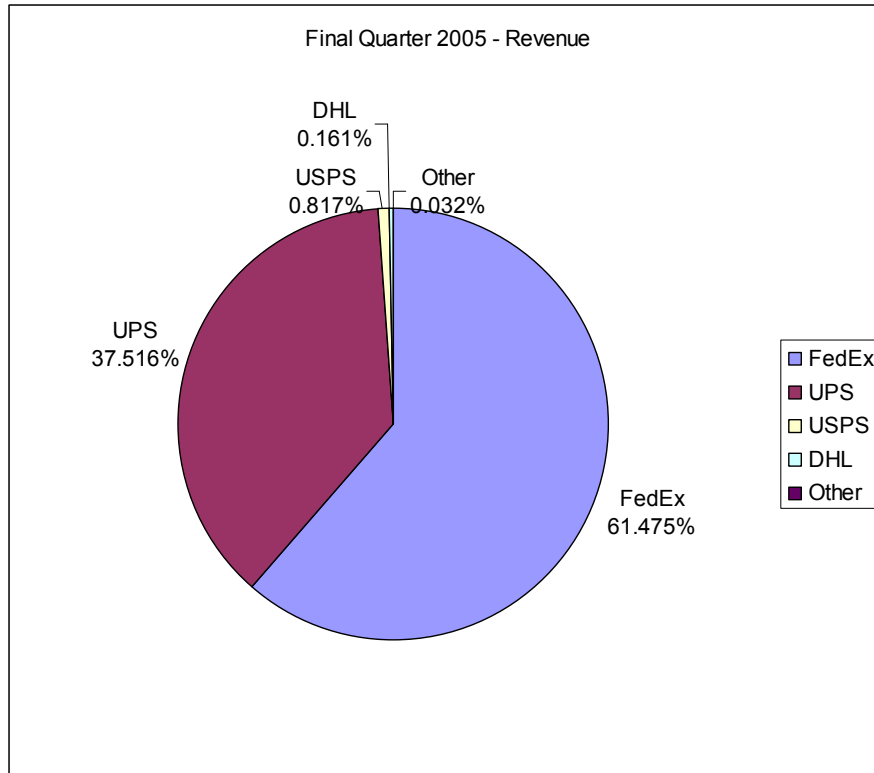


Figure 4.2.a: Final Quarter 2005 – Revenue

Table 4.2.a was compiled from data from the carriers’ websites and annual reports. Figure 4.2.a describes the relation of their revenues to each other and comes up with an approximation of their market shares. High revenue does not always equate to high market share but it is a good tool for comparison.

### 4.3 Competitive Comparison

The current market of loading airplanes does not have any competition because of its technical complexity, but once AutoLoad moves into the automated warehouse market then this will stimulate additional competition. The three largest companies that automate warehouses are Avery and Associates, AGV products, and ProcessPro. Each of these companies has established business models, customers, proven technology, and warehouse management expertise. Where each one of these companies lacks is in their technology. Their automation techniques are out of date and the robots they use to perform the complicated tasks have limited customization. Also these companies only manage warehouses and do not automatically load outgoing transportation mediums. They also do not have experience with large goods such as cars, furniture, or televisions. AutoLoad’s advantage over these established companies is that the company would be able to transport the heaviest of goods with ease after loading airplanes with the cans. Also, AutoLoad will have the ability to gather and load trucks, trains, or airplanes with incoming or outgoing goods. Also AutoLoad will use the most current technological advances to accomplish the task to increase productivity.

## 5 Strategy and Implementation

### 5.1 Market Strategy

AutoLoad's main strategy for being successful is repeat business. The airplane loading market does not have many customers in it and therefore a company that is trying to sell products to them must rely on repeat business. In order to assure repeat business, AutoLoad has adopted the motto that it will have "No Unsatisfied Customers." This strategy can be broken into three distinct regions of our company. Figure 5.1.a shows how AutoLoad's motto will be implemented.

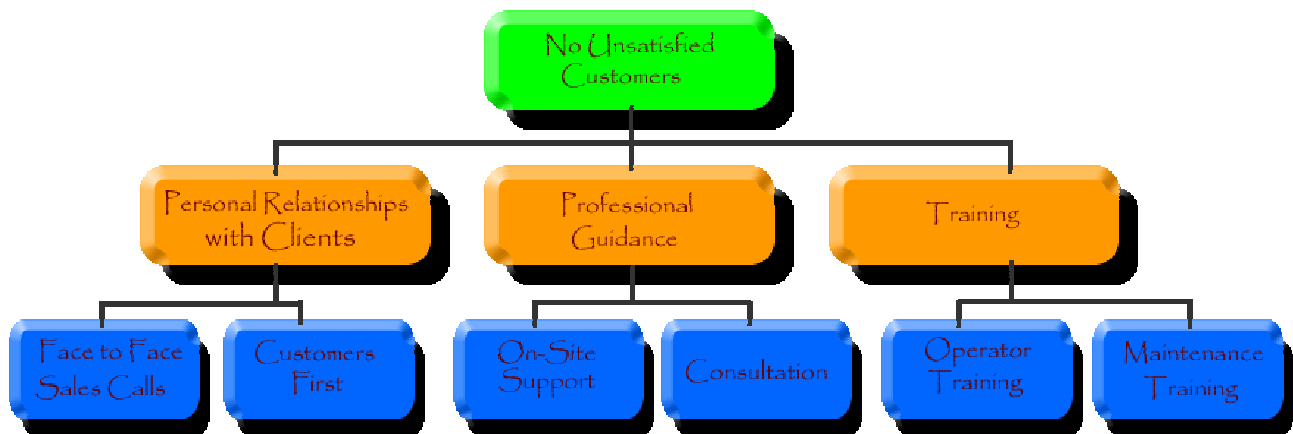


Figure 5.1.a: Strategy Pyramid

The first tactic is to build personal relationships with our clients. Every employee is the face of the company and can make or break AutoLoad's reputation. Most of AutoLoad's reputation will come from the employee's work ethic and some will come from the reliability of our product. Also the sales team must make face-to-face sales and spend quality time with the customers. When a sale is made in person then there is a connection between the two companies and it feels more personal.

The second tactic is to give guidance to our customers. Our sales team will also be able to consult our customers on how to accurately manage their inventory systems. They will also have to be an expert in AutoLoad's products and systems. The best sales team is one that knows their product as well as the engineers who make it. Also AutoLoad will provide on-site support for any failures that are under warranty. The company will also sell extended warranties because the engineers who created the robots are the ones that will be able to accurately find the problem and create a solution.

The third tactic to keeping customers happy is to offer extensive training. An airplane packaging robot is not a simple device and should only be used by trained professionals. AutoLoad will offer two training classes when a company buys a robot. There will be training for the operators that will use wireless communication to tell the robot when to start and the details necessary to place a package onto an airplane correctly. AutoLoad also does not want to be called for every small maintenance error that occurs on a robot. The company that owns the robot also does not want to call AutoLoad for each small

error because it would be cheaper if they fix the problem themselves. Each air transportation company has an extensive airplane maintenance department that is capable of fixing these robots with a small amount of extra training to learn the specifics of our product. These two training classes will help with customer relations by showing our customers that we care about the lasting relationship between the two companies and are not solely worried about making a single sale.

## 5.2 Milestones

AutoLoad's important milestones are shown in figure 5.2.a. Every task is statically laid out. FedEx will be offered their monopoly after the first prototype is completed. Once the monopoly runs out, AutoLoad will have a second revision of the robot to use as a bargaining chip or to sell to other air freight companies.

Table 5.2.a: Milestones

Milestone		Duration	Start Date	End Date	Department
Corporation					
	Corporate Identity	33 days	2/1/2006	3/17/2006	Administration
	Business Plan Review	1 day	3/23/2006	3/23/2006	Administration
	Obtain Funding	37 days	3/23/2006	5/12/2006	Administration
Prototype					
	Design	110 days	5/29/2006	10/27/2006	Engineering Board
	Mechanical	525 days	10/30/2006	10/31/2008	ME
	Software	525 days	10/30/2006	10/31/2008	SE
	Wiring	95 days	9/29/2008	2/6/2009	ME,SE
	Final Version	86 days	2/9/2009	6/8/2009	ME,SE
Sales					
	Sales Strategy	25 days	9/29/2008	10/31/2008	Sales
	Corporate Brochure	20 days	11/3/2008	11/28/2008	Sales
	Find other Customers	611 days	5/4/2009	9/5/2011	Sales
2nd Prototype					
	Design	110 days	12/1/2008	5/1/2009	Engineering Board
	Mechanical	525 days	5/4/2009	5/6/2011	ME
	Software	525 days	5/4/2009	5/6/2011	SE
	Wiring	95 days	5/2/2011	9/0/2011	ME,SE
	Final Version	86 days	5/9/2011	9/5/2011	ME,SE

## 6 Management

### 6.1 Organizational Structure

The top-level management positions are filled by the four owners of the company. Each of the four owners has the same amount of power even though they may be working for

one another. Each owner has his or her own tasks, responsibilities, and employees to manage. The hierarchy is in place to show which individual is responsible for checking the progress of another department. It also shows the chain of command, but does not represent power levels. Figure 6.1.a shows AutoLoad's hierarchy.

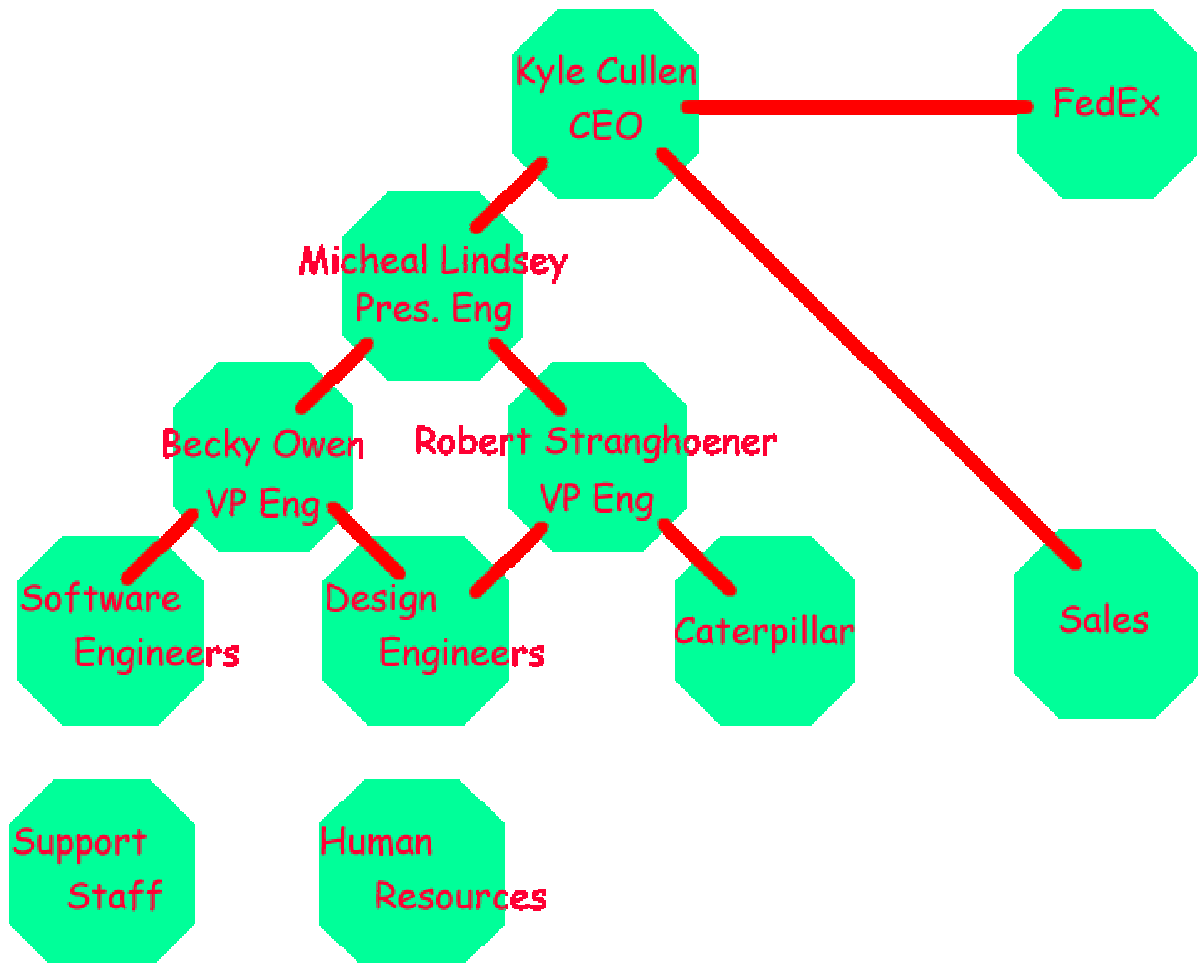


Figure 6.1.a: Organizational Structure

## 6.2 Management Team

Kyle Cullen – CEO

Kyle is in charge of overseeing the company at its highest level. He must make sure that the company is performing its designated tasks and turning a profit. He is also the face of the company and attends meetings with investors, customers, and new vendors. Kyle is also in charge outside sales and finding new customers. The sales team will work with Kyle to get new projects.

Kyle graduated from Mississippi State University in 2006 with a BS in Computer Engineering. He concentrated on Robotics and Embedded Systems development.

Michael Lindsey - President of Engineering

Michael is charged with keeping Autoload's engineers tasked correctly. He oversees project delegation and budgeting.

Michael graduated from Mississippi State University in 2006 with a BS in Computer Engineering and is currently working towards a MS in low level software system design from UAH.

Robert Stranghoener – VP of Engineering – Mechanical

Robert will head mechanical development and communication with Caterpillar. He will develop CAD models of all robot mechanics and oversee the fabrication and assembly of mechanical components by Caterpillar. His responsibilities also include working with the assembly team and Rebecca Owen to ensure efficient integration of all mechanical and electrical components.

Robert graduated with a B.S. in Electrical Engineering from Mississippi State University in 2006 after taking courses in control systems and robotics. He is also experienced with the CAD tools needed for mechanical design.

Rebecca Owen – Vice President of Engineering in charge of Software

Rebecca is in charge of development and implementation of the control software necessary for precise and efficient movement of the robots. Rebecca works with a small group of engineers to develop robots capable of autonomously transporting cargo from a warehouse to a transportation medium. Responsibilities include interfacing with hardware such as scanners for package identification; developing algorithms for accurate locomotion and navigation; constructing code for precise position control of the mechanisms involved in loading and unloading cargo; and overall optimization of code.

Rebecca graduated from Mississippi State University in 2006 with a Bachelor of Science in Electrical Engineering and Minors in Mathematics and Computer Science. Her emphases were Robotics and Control Systems.

#### **6.4 Management Team Gaps**

Most of AutoLoad's management will come from the four initial owners. The rest of the 16 employees are computer engineers, mechanical engineers, team leaders in both areas, sales team, field engineers for assembly and modification, and support staff such as secretaries and custodial technicians. These individuals will be salaried employees of AutoLoad INC.

#### **6.5 Personnel Plan**

Table 6.5.a shows the salaries of each type of employee for the first five years; the first three years are steady due to the lack of positive cash flow. Once the company turns a profit then it will give each employee a review of his or her performance to determine their raise.

Table 6.5.a: Personnel Income

Personnel	Initial # Employed	2007	2008	2009	2010	2011
CEO	1	\$110,000	\$110,000	\$110,000	\$120,000	\$150,000
VPs	3	\$110,000	\$110,000	\$110,000	\$120,000	\$150,000
Team Leaders	2	\$70,000	\$70,000	\$70,000	\$78,000	\$90,000
Comp Eng	5	\$55,000	\$55,000	\$55,000	\$65,000	\$75,000
Mech Eng	5	\$55,000	\$55,000	\$55,000	\$65,000	\$75,000
Sales Rep	2	\$50,000	\$50,000	\$50,000	\$55,000	\$65,000
Secretaries	2	\$35,000	\$35,000	\$35,000	\$40,000	\$42,000
<b>Total # of Employees</b>		20	20	25	30	50

## 7 Financial Plan

### 7.1 Financial Assumptions

The financial plan is based of the following assumptions:

- No new competition entering the market until 2011
- Having FedEx's support for first prototype
- AutoLoad will be able to produce enough robots to meet the demand

### 7.2 Financial Indicators

AutoLoad is different than most other companies because its product is very expensive compared to most products that can be found in convenience stores. This difference means that the cycle of design a product, make it, market it, sell it, and repeat is on a much longer timetable than most. Also AutoLoad's expected sales will be in the range of 3 to 30 and not 1,000 to 1,000,000. These two facts mean that AutoLoad's financial indicators will occur on a tri-yearly basis instead of a yearly basis.

### 7.2 Employee's Salaries

Table 7.2.a shows employee's salaries for the years 2007 through 2015.

Table 7.2.a: Employee's Salaries for 2007 – 2015

Year	Position	Salary	# of Employees	Total Salary for that Position	Total Salary for Year
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<b>2007</b>	Pres	\$110,000	1	\$110,000	
	VP	\$110,000	3	\$330,000	
	Team Leader	\$70,000	2	\$140,000	
	ME	\$55,000	5	\$275,000	
	SE	\$55,000	5	\$275,000	
	Sec	\$50,000	2	\$100,000	
	Custodian	\$35,000	2	\$70,000	
			20		\$1,300,000
<b>2008</b>					
	Pres	\$110,000	1	\$110,000	
	VP	\$110,000	3	\$330,000	
	Team Leader	\$70,000	2	\$140,000	
	ME	\$55,000	5	\$275,000	
	SE	\$55,000	5	\$275,000	
	Sec	\$50,000	2	\$100,000	
	Custodian	\$35,000	2	\$70,000	
			20		\$1,300,000
<b>2009</b>					
	Pres	\$110,000	1	\$110,000	
	VP	\$110,000	3	\$330,000	
	Team Leader	\$70,000	3	\$210,000	
	ME	\$55,000	7	\$385,000	
	SE	\$55,000	7	\$385,000	
	Sec	\$50,000	2	\$100,000	
	Custodian	\$35,000	2	\$70,000	
			25		\$1,590,000
<b>2010</b>					
	Pres	\$120,000	1	\$120,000	
	VP	\$120,000	3	\$360,000	
	Team Leader	\$78,000	4	\$312,000	
	ME	\$65,000	8	\$520,000	
	SE	\$65,000	8	\$520,000	
	Sec	\$55,000	3	\$165,000	
	Custodian	\$40,000	3	\$120,000	
			30		\$2,117,000
<b>2011-2015</b>					
	Pres	\$150,000	1	\$150,000	
	VP	\$150,000	3	\$450,000	
	Team Leader	\$90,000	6	\$540,000	
	ME	\$75,000	15	\$1,125,000	
	SE	\$75,000	15	\$1,125,000	
	Sec	\$65,000	5	\$325,000	
	Custodian	\$42,000	5	\$210,000	
			50		\$3,925,000

### 7.3 Unit Cost

Table 7.3.a computes the unit cost of a single robot for the first three generations of robots.

Table 7.3.a: Unit Cost of Robot

Revision	Years	Fee Type	Cost	Total Cost
<b>Prototype</b>	<b>2007</b>	<b>Caterpillar Fee</b>	\$1,500,000	Per unit
	<b>2008</b>	<b>Materials</b>	\$50,000	Per unit
	<b>2009</b>	<b>Wires</b>	\$7,000	Per unit
		<b>Electrical</b>	\$50,000	Per unit
		<b>Units Sold</b>	1	
				\$1,607,000.00
<b>Rev 1 &amp; 2</b>	<b>2010</b>	<b>Caterpillar Fee</b>	\$1,000,000	Per unit
	<b>2011</b>	<b>Materials</b>	\$50,000	Per unit
	<b>2012</b>	<b>Wires</b>	\$7,000	Per unit
	<b>2013</b>	<b>Electrical</b>	\$50,000	Per unit
	<b>2014</b>	<b>Units Sold</b>	?	
	<b>2015</b>			

### 7.4 Fixed Cost

Table 7.4.a shows the fixed costs for the years 2007 through 2015.

Table 7.4.a: Fixed Cost

Year	Type of Expense	Cost	Total Cost for Group	Total Cost for Year
<b>2007</b>	Building	\$6,000.00		
	Furniture	\$7,000.00		
	Office Supplies	\$300.00		
	Utilities	\$3,000.00		
				\$16,300.00
	Salaries	\$1,300,000.00		
	Benefits	\$3,000.00		
	Number of People	20		
				\$1,360,000.00
	Sales	\$10,000.00		
Travel Expenses	\$15,000.00			
			\$25,000.00	
				\$1,401,300.00
<b>2008</b>	Building	\$6,000.00		
	Furniture	\$7,000.00		
	Office Supplies	\$300.00		
	Utilities	\$3,000.00		

			\$16,300.00	
	Salaries	\$1,300,000.00		
	Benefits	\$3,000.00		
	Number of People	20		
			\$1,360,000.00	
	Sales	\$10,000.00		
	Travel Expenses	\$15,000.00		
			\$25,000.00	
				\$1,401,300.00
<b>2009</b>	Building	\$6,000.00		
	Furniture	\$7,000.00		
	Office Supplies	\$300.00		
	Utilities	\$3,000.00		
			\$16,300.00	
	Salaries	\$1,590,000.00		
	Benefits	\$3,000.00		
	Number of People	25		
			\$1,665,000.00	
	Sales	\$10,000.00		
	Travel Expenses	\$15,000.00		
			\$25,000.00	
				\$1,706,300.00
<b>2010</b>	Building	\$6,000.00		
	Furniture	\$7,000.00		
	Office Supplies	\$300.00		
	Utilities	\$3,000.00		
			\$16,300.00	
	Salaries	\$2,117,000.00		
	Benefits	\$3,000.00		
	Number of People	30		
			\$2,207,000.00	
	Sales	\$10,000.00		
	Travel Expenses	\$15,000.00		
			\$25,000.00	
				\$2,248,300.00
<b>2011</b>	Building	\$6,000.00		
	Furniture	\$7,000.00		
	Office Supplies	\$300.00		
	Utilities	\$3,000.00		
			\$16,300.00	
	Salaries	\$3,925,000.00		
	Benefits	\$3,000.00		
	Number of People	50		
			\$4,075,000.00	
	Sales	\$10,000.00		
	Travel Expenses	\$15,000.00		


\$25,000.00

\$4,116,300.00

### 7.5 Break-Even Analysis

Table 7.5.a shows the break even analysis and shows that AutoLoad’s revenue will turn positive after it has finished its first robot.

Table 7.5.a: Break Even Analysis

<b>Prototype</b>			
<b>2007</b>	Unit Cost	\$1,607,000.00	
<b>2008</b>	Special First Time cost	\$2,415,000	
<b>2009</b>	Fixed Cost	\$4,508,900.00	Total Cost
	Other Fixed Cost	\$145,000	\$8,675,900.00
	Expected Unit Sales	1	Total Revenue
	Price Per Unit	\$3,000,000.00	\$3,000,000.00
			Profit
			-\$5,675,900.00
<b>Rev 1</b>			
<b>2010</b>	Unit Cost	\$207,000.00	
<b>2011</b>	Fixed Cost	\$10,480,900.00	Total Cost
<b>2012</b>	Expected Unit Sales	17	Total Revenue
	Price Per Unit	\$1,500,000.00	\$25,500,000.00
	R & D	\$900,000	Profit
			\$10,600,100.00
<b>Rev 2</b>			
<b>2013</b>	Unit Cost	\$207,000.00	
<b>2014</b>	Fixed Cost	\$12,348,900.00	Total Cost
<b>2015</b>	Expected Unit Sales	63	Total Revenue
	Price Per Unit	\$1,000,000.00	\$63,000,000.00
			Profit
			\$30,610,100.00

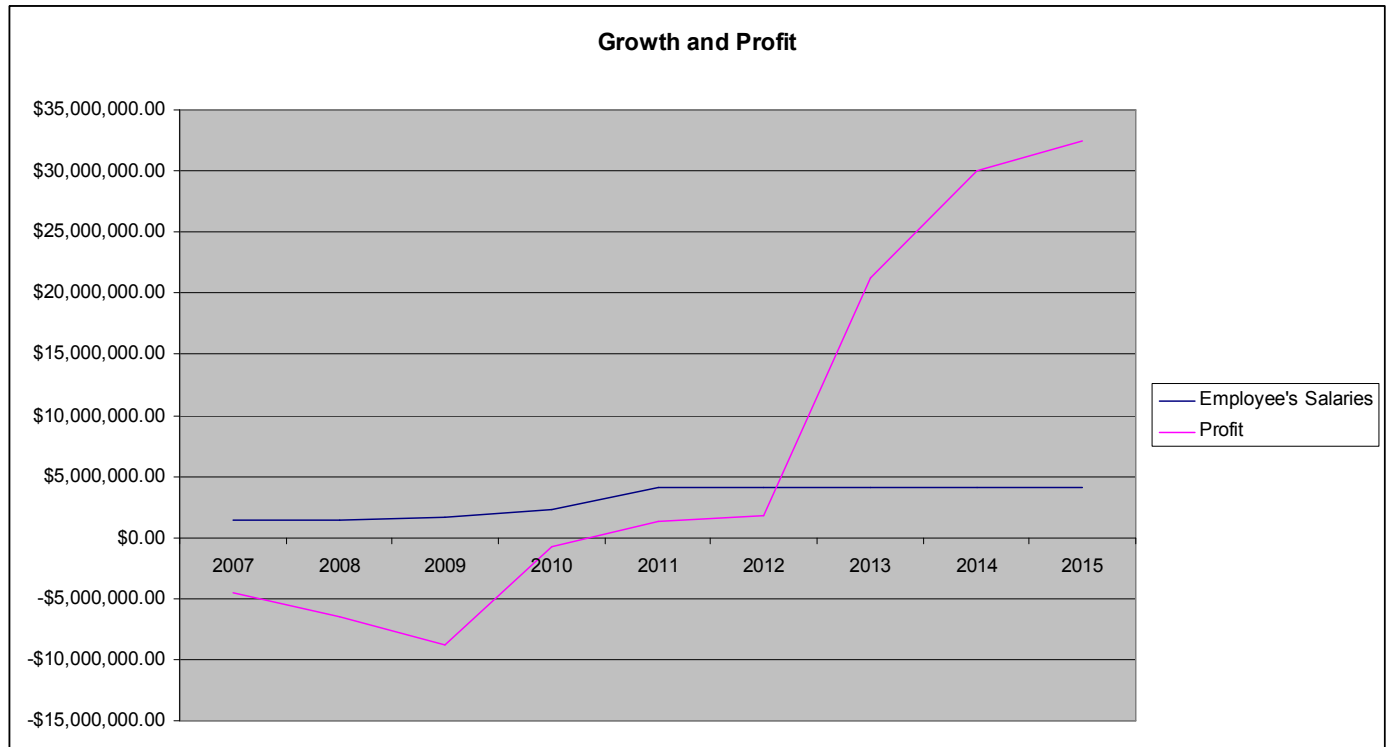
### 7.6 Cash Flow Projections

Table 7.6.a shows the yearly cash flow and figure 7.6.a shows a comparison between employee’s salaries and company profit.

Table 7.6.a: Cash Flow Projections

	End of Pervious Year	Units Sold	Price	Cash Sales	Material Costs	Fixed Cost	R & D of Warehouse Market	Net Profit	Net Profit Margin
<b>Investment</b>	-\$5,653,900	0	\$0	\$0	\$0	\$0	\$0	-\$5,653,900	0.00%
<b>Prototype</b>									
<b>2007</b>	-\$5,653,900	1	\$3,000,000	\$3,000,000	-\$535,667	\$1,401,300	\$0	-\$4,590,867	153.03%
<b>2008</b>	-\$4,590,867	0	\$3,000,000	\$0	-\$535,667	\$1,401,300	\$0	-\$6,527,833	0.00%
<b>2009</b>	-\$6,527,833	0	\$3,000,000	\$0	-\$535,667	\$1,706,300	\$0	-\$8,769,800	0.00%
<b>Rev 1</b>									
<b>2010</b>	-\$8,769,800	8	\$1,500,000	\$12,000,000	\$1,656,000	\$2,248,300	-\$100,000	-\$774,100	-6.45%
<b>2011</b>	-\$774,100	5	\$1,500,000	\$7,500,000	-	-	-\$300,000	\$1,274,600	16.99%

					\$1,035,000	\$4,116,300			
<b>2012</b>	\$1,274,600	4	\$1,500,000	\$6,000,000	-\$828,000	\$4,116,300	-\$500,000	\$1,830,300	30.51%
<b>Rev 2</b>									
<b>2013</b>	\$1,830,300	31	\$1,000,000	\$31,000,000	\$6,417,000	\$4,116,300	-\$1,000,000	\$21,297,000	68.70%
<b>2014</b>	\$21,297,000	20	\$1,000,000	\$20,000,000	\$4,140,000	\$4,116,300	-\$3,000,000	\$30,040,700	150.20%
<b>2015</b>	\$30,040,700	12	\$1,000,000	\$12,000,000	\$2,484,000	\$4,116,300	-\$3,000,000	\$32,440,400	270.34%



### References

[1] "INC. vs. LLC: Which legal structure suits your Business?," Feb 7, 2006. [Online]. Available: [http://www.bankrate.com/brm/news/biz/Biz\\_ops/20000831.asp](http://www.bankrate.com/brm/news/biz/Biz_ops/20000831.asp)