MoorControl

MoorControl Business Plan

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Executive Summary

Company Overview
MoorControl is a company that develops and installs an automated mooring system that aims to replace humans' role in boat mooring. The overall system utilizes sophisticated technology and machine learning to automate the entire process, leading to increased stability, efficiency, and safety.

Our Product
Automated Mooring System is an AI based automation system to replace humans in the mooring process with sophisticated automation, increasing safety and efficiency. Using a vision sensor module, the company collects environmental data around the ship to train the AI. This data includes wind speed, temperature, water turbulence, and distance from the port. The windlass on the ship is controlled by the AI and releases optimized length of lines to moor the ship at the port.

The Market
The potential market for our system is ships in general as almost every ship requires adjustment of line tension in the mooring process. However, the system is operable only for ships over 100 meters long and containing windlass, and more specifically the company's target market includes ships greater than 200 meters in length as the mooring process becomes more dangerous and accident prone. Targeting a more general boating market is possible in the future with the company's expansion, reliant upon an AI system that integrates with smaller boats and does not rely on a windlass.

Start-up Costs
The company will require an initial $1 million dollar investment to cover first year costs. This money will be mostly used to cover Research and Development costs, marketing expenses, and rent of a facility/ office space in Annapolis, MA in order to collaborate with the Naval Academy nearby for testing and the launch of the pilot program. The company will apply for secondary funding and further rounds of funding during the first year in order to cover future costs before the company breaks even.

Pay-off
Following the release of the 8 month pilot program working with the U.S. Navy, the company will expand to market and distribute to the Navy and shipping industry, and with this expansion and projected customer growth, the company is projected to break even during the first quarter of the sixth year

The Problem

Mooring accidents

Dangers of mooring operations were deemed a “Death Trap” and became one of the most lethal process on ships. According to the UK P&I institute, accidents during mooring and anchoring accounted for 32.6% of entire maritime on-board injuries in the last five years and 35.5% of mooring accidents were fatal during this time period. It is estimated that the resulting cost of mooring accidents including medical damages, damages to the ship and equipment, and pollution issues was over $35 million dollars. The mooring ropes and wires that are handled on board are not the average ropes and if strict caution is not exercised when handling them, the chances of injury are very high and can cause severe damage to both the ship as well as the personnel. The main reason for this hazard results from the limit of manpower. The processes for smooth mooring operation including clearance of mooring area, equipment maintenance, and operation supervising are only done through manpower. Therefore, human error has high potential to cause major on-board accidents.

Current Solutions

The current widespread solution for minimizing mooring accidents is mitigating the risk factors associated with the process. It is advised that a risk assessment is conducted covering all mooring areas on board to search for hazards that may cause injury, and routine equipment monitoring and maintenance is also required to reduce hazards. Neglecting these tasks can result in mechanical malfunction and serious casualties. However, it is not uncommon for crewmembers to neglect these crucial tasks, increasing the risk of accidents. Currently, experienced and highly trained pilots take charge in the mooring process to supervise and manage crews, control mooring equipment, and operate windlass controllers to adjust length of lines. This solution relies on manual labor, and the introduction of technology to the process is limited, causing other potential solutions outlined in the competition section to be expensive and have a low rate of adoption. Thus, the most common current solution is a risk mitigation plan rather than a technologically advanced solution to eliminate the problem.

Current Solutions Shortcomings

The lack of a concise solution to this problem negatively impacts safety of crews and seafarers and a small human error can cause massive damage. In spite of strict and thorough risk assessments and maintenance, all of these procedures are performed manually leading to the risk of a minor mistake occurring at any time. Additionally, the training of personnel to man this process is expensive, as the salary of harbor pilots who are in charge of the mooring process is over $79,000 dollars and it takes complicated and extensive training to produce one pilot to manage the process. However, even trained and experienced pilots cannot predict every potential variable hazard. Therefore, there is a desperate need for an automation system to replace manpower.

The Solution

Deep learning based technologies are adopted in the automobile industry extensively for application to improving parking. Automated parking systems utilize a mechanical system to transport cars to and from parking spaces using vision sensor modules. Our product utilizes similar technologies but is intended for use within ships at sea, and mooring can be compared to the parking process. MoorControl provides a solution for the current mooring accidents by replacing manpower in the process with highly trained artificial intelligence. The system calculates and releases optimized tensioned lines so that the ship can be fixed to the port without any risk factors caused by humans operating the windlass. The resulting product is superior to anything on the market right now in terms of its safety, speed, and efficiency.

AVISS(Around View Intelligence System for Ships) is a deep learning based vision sensor module that extracts ocean environment data in real time. Seadronix, who designed and created this module, commercialized this product in the market and continuously improves the performance and the functionality of its algorithm with their development strategy. The module is waterproof, dustproof, explosion-proof, and is intended to survive harsh marine environments and offers easy installation within various ships. Using this technology, our program collects environmental data that have influence on the mooring process including the wave length, tidal difference, windspeed, distance from the ship to the port, and other weather conditions that affect the variability of mooring.

Collected data will be stored in a data server that ships already own onboard. Based on the current conditions represented by the data, highly trained AI will calculate optimized tensioned length of lines to fix the ship. Optimized algorithms are needed for the AI to calculate the result while collecting data that ultimately will be stored in our cloud in order to be analyzed for success and used alongside all the data collected to improve the algorithm through machine learning. Our team's engineers will model the design and develop the system, including software and hardware interfaces, and research and development of the artificial intelligence algorithm and accompanied testing. The numerical output length determined by the system will be sent to the onboard windlass controller linked to the system that was previously controlled by pilots but is now unmanned due to our technology and will release rope as determined by the system and executed by a controlled motor. Additionally, the computing system will send signals to windlass whether to release or tighten the lines based on real time data as the system and windlass execute the command and optimal tension and length of line to fix the ship to the port is created.

The final product we deliver to the ship industry offers human replacement that has been specifically engineered for ship mooring. There are three main attributes that have set our product apart from the competition; uniqueness in the market, unrivaled technology and unmanned ship. First, the market itself is a blue ocean with few competitors. Current solutions for the problem prove that the process is controlled by only manpower without automations. If we can bring successful cases that prevent onboard injuries, we can create barriers to enter this market and secure uniqueness. AI technology has barely been introduced on ships in recent days. Our technology designed by engineers will be unrivaled as we combine vision modules with artificial intelligence analysis and execution. Lastly, as extrapolation, our product has strong potential in business expansion. It could be a first step to approach the unmanned ship industry with AI and sophisticated automation, beginning by automating other processes within shipping.

Business Model

Customer Value Position

Our headquarters are located in Annapolis Maryland near the Naval Academy ports, allowing our company to partner with the U.S. Navy for pilot program and testing. Pilot programs will be tested only on uncommissioned warships whose length is over 200 meters using six lines for the mooring process. Several environments will be designed in the Naval Academy Harbor in Annapolis for performance testing. The tests include minimizing numbers of crews, maximized and minimized tidal differences, and different weather conditions. Lastly, numerized performance will be estimated based on the F1 score on each test case. Following the successful completion of the pilot program in which the system passes every required performance test, our product will be launched to be used in enlarged targets including commissioned ships and ships within the shipping and trading industry.

Marketing strategy for the first launch will include promotion on social media and based upon google analytics, and monthly advertisement within the Marine Technology Reporter Magazine. Advertisements always contain F1 scores for each test and other numerical scores and accuracy we achieved from the performance tests in order to highlight the successful R&D and accuracy of the system. This will increase credibility from AI experts as well as ship manufacturers and increase the promotional effect of our product. Monthly investments in marketing will allow us to gain customers and enter a global market in the long term.

There are two main target customer segments for our products; the United States Navy and Trading/ Shipping companies. These two targets have ideal customer profiles because the Navy owns various sizes of warships and has a large government budget that can be invested into improving the safety for their crewmembers, and trading/ shipping companies own many ships over 200 meters and spend massive amounts of money on human resources and mooring equipment.

Revenue

The company's main source of income comes from selling our product, software, and services of installation. In other words, the type of revenue model of MoorControl is the production model, where revenue comes from customers who value and pay for the product or service. According to the income statement, the company predicts that the number of total customers starts from 0 and grows to 1000 within 5 years. The total revenue per year that comes from the system (software) and the installation will also be increasing in the five years plan: $60,000, $1,130,000, $2,080,500, $2,356,000, $3,819,000 respectively. The revenue increases as the number of new customers per year increases because the customers pay a one time fee for both the product and software package and the installation. A potential modification to the business model that could lead to an additional revenue stream in the future is to charge ships with the system a monthly subscription fee for software updates, but this is currently free to users. The streams of revenue that our product generates are displayed in the financials section, and illustrate a large enough revenue to create a positive net income during the third year and allow the company to break even within the first quarter of the sixth year if the new customers trend continued.

Key Expenses

The major fixed expenses are research and development costs, marketing costs, rent. The account for $360,000, $360,000, $240,000 during the first year. This large investment in these departments is crucial because the company needs a high amount for initial research and development in order to make the product extremely successful and effective. The R&D costs decrease after the first year, as the majority of the development and testing is completed, but the costs are still significant in order to continue improving the technology. The partnership costs are a variable cost that is high at a rate of $3,000 per system because it accounts for the cost of two vision module sensors per ship per system. This cost increases each year as the number of new customers increases. The target market is niche, and therefore a large amount has also been put aside to market the product. Other than that, there are also a couple of other expenses such as maintenance, salaries, management and installation costs. The salaries increase each year as we hire a new member to our team each year, and the first year the five founders work alone to develope the product and are not paid a salary until the second year.

Market

Market Size

When investigating the market size, our company is looking at ships that are greater than 200 meters in length, as these are the optimal candidates for our mooring system and they are where the majority of mooring accidents occur. The world fleet has just over 90,000 ships registered, and this does not account for privately owned vessels as the number is unknown and difficult to estimate. Focusing on the world fleet, if each mooring system was sold for $9500, the total market size would be $855 million. We are looking at the number of ships rather than the number of ports, because the system and technology is located on board the ship, allowing the mooring system to be compatible with every port if the technology is installed on the ship.

Marketing Strategy and Adoption

Because this product targets a niche market and audience, the marketing strategy is to contact big ship manufacturing companies directly, such as Huntington Ingalls Industries, Samsung Heavy Industries, Imabari Shipbuilding, etc. For better reach, the automated mooring system will also be advertised on social media platforms such as Facebook and Google Ads utilizing Google Analytics. As previously stated, the office is to be located in Annapolis, Maryland near the Naval Academy port, ensuring that our product gets the best exposure in the ship industry. In addition, there will also be monthly advertisements in the Marine Technology Reporter Magazine showcasing the advanced technology and positive outcomes of the AI technology and ship mooring integration system.

Risk

In the future, there will be potential problems dealing with the product or the market itself. These problems could largely impact the success of the company; thus, identifying the problems can help mitigate risk.

For instance, there could be a problem with the inaccuracy of the AI program. The software detecting the data from sensors and converting it into the output of tension will be developed by our company. This software needs to be as accurate and precise as possible. Therefore, expanding our team by hiring the best programmers and experts on machine learning is the priority of our company after the initial development stage takes place with our team that consists of experienced Boston University computer engineers. Additionally, continuous testing of the product is crucial to the success in order to detect issues and errors related to the AI. Our company will have a database of data from the systems stored in the cloud, and this data will be used to improve and update the machine learning component of the system.

Another risk is keeping up with an expanding market. One, there could be upcoming competitors or existing competitors that will eventually use similar solutions as MoorControl. Second, technology evolution is rapidly changing and advancing. For example, more advanced sensors may be developed that collect more accurate data or different types of data that we could consider utilizing. Therefore, constantly adapting to the market by staying up to date with artificial intelligence, our suppliers, and other industry solutions will prevent these problems from occurring.

Ecosystem

Supplier

The primary supplier will be Seadronics, the supplier of the camera that gathers data including environmental conditions, wind speed and water roughness conditions, and distance from the port in order to integrate MooreControl's AI program that is developed in-house. The materials to mount the camera will also be supplied by Seadronics, and installation labor will be provided by part time employees located across the country that are paid per job.

Competition

In the market, there are several companies working on solutions to solve the problems related to mooring operation. Therefore, there are competitors with different products that have corresponding pros and cons. These companies also function as substitutions to the manual labor that is most commonly utilized for the mooring process.

The first main competitor is Trelleborg, an engineering company that focuses on polymer technology. Their product is also an automated mooring system, called Automoor. The purpose of their product is to eliminate excess mooring lines, which consequently enhance the safety level. In other words, the product operates without mooring lines and minimizes vessel motion. Both Automoor and Moor Control have high scalability. However, the differences between the two companies are the cost and the ease of use. The advanced technology mechanism from Automoor makes the cost of the product to be exceedingly expensive (around $18k to $20k), while Moor Control costs around $9500 per ship. The mechanism of Automoor is also complicated with many steps during the mooring process, making it difficult for the user to control. On the other hand, MoorControl will minimize any control by humans, since it will be run by an AI program.

The second competitor is Dynamoor. Their product is also an automated dynamic mooring system, which is similar to Moor Control. The big difference is Dynamoor is attached to port, not ship. This creates

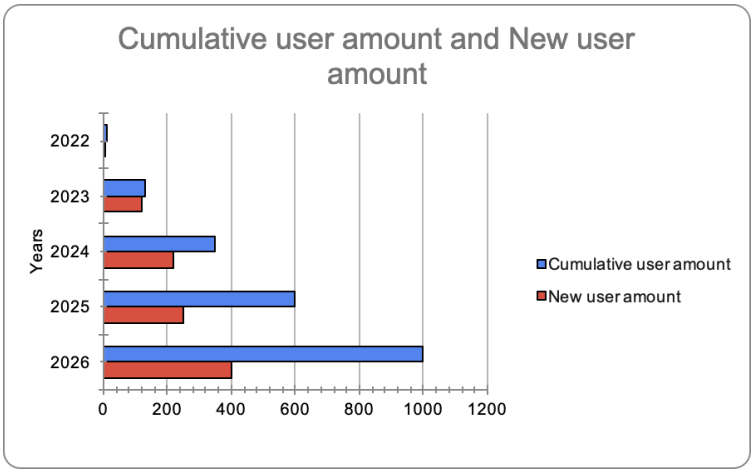
limitations because the improved mooring system will only be able to be used at compatible ports, so the boat would still need trained personnel to moor the ship at ports lacking the advanced system. The cost is very comparable to MoorControl's, at a price point around $8k-$9k. Although the system will be easy to use, the drawback of the product is it will be extremely limited to ships, since not all ports will have Dynamoor setup.

From these competitors, Moor Control emerges advantageous, making us a strong candidate to gain a large customer segment due to the low cost, easy use, and high scalability.

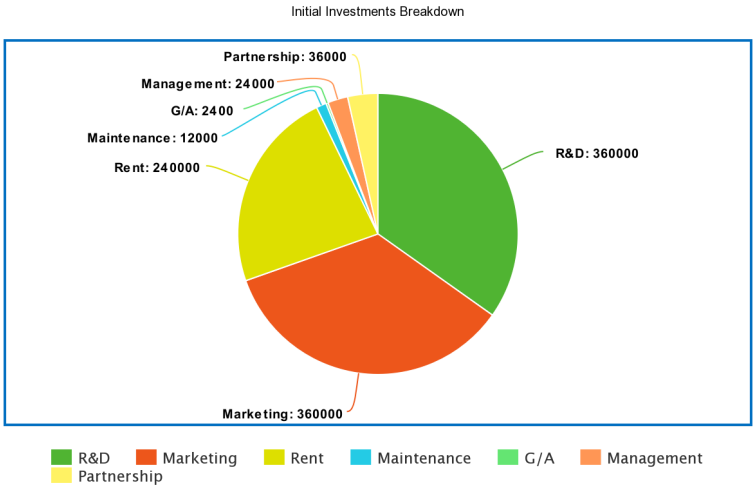
Financials:

Assumptions

The finances are based upon the new customer growth outlined below. At the end of year five, MoorControl will have 1,000 ships using the system, accounting for an adoption rate of only 1.1% so far out of the total market size including 90,000 ships. This is promising, as the company has lots of room for growth. If the current trend relating to the number of new users continues, the company will break even in the first quarter of the sixth year.



If the company is to secure the $1 million investment, the first year expenses will be covered, and we will be able to avoid taking out loans. The initial investment of this money will be distributed as follows.

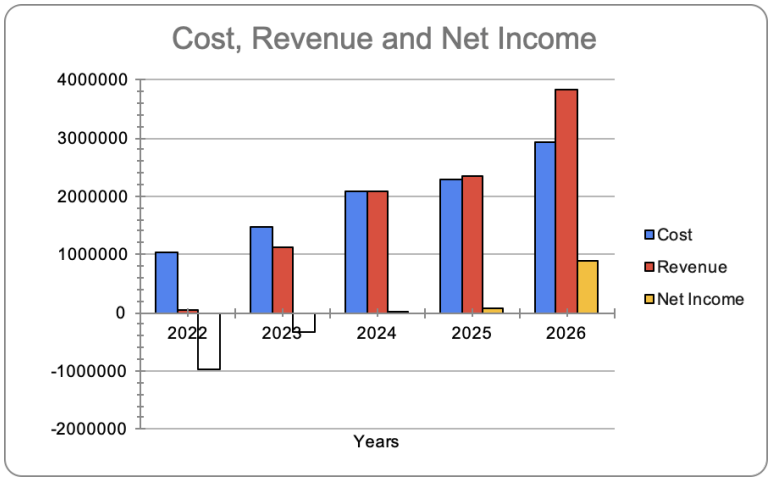


The following financial statements include the income statement across 5 years and the balance sheet following the completion of year 5. The balance sheet assumes the securement of seed funding as requested, and is represented by Investment Capital under Shareholder's equity. The income statement and supplemental bar graph display that the net income by year becomes positive during year 3 and continues growing each year after.

Income Statement

Year		Year 1	Year 2	Year 3	Year 4	Year 5
Revenue	Number of New Users	12	119	219	248	402
	System Revenue per ship	$5,000	$8,000	$8,000	$8,000	$8,000
	Revenue per installation	$0	$1,500	$1,500	$1,500	$1,500
Total Revenue	Total Revenue	$60,000	$1,130,500	$2,080,500	$2,356,000	$3,819,000
COGs	Partnership Costs	$36,000	$357,000	$657,000	$744,000	$1,206,000
	Material + Installation Costs	$6,000	$59,500	$109,500	$124,000	$201,000
Other Expenses	Research & Development	$360,000	$180,000	$180,000	$180,000	$180,000
	Marketing	$360,000	$240,000	$240,000	$240,000	$240,000
	Rent	$240,000	$240,000	$360,000	$360,000	$360,000
	Maintenance	$12,000	$12,000	$18,000	$18,000	$24,000
	Salaries	$0	$360,000	$480,000	$576,000	$672,000
	Management	$24,000	$24,000	$30,000	$30,000	$30,000
	G/A	$2,400	$2,400	$2,400	$2,400	$2,400
Total Costs	Total Cost	$1,040,400	$1,474,900	$2,076,900	$2,274,400	$2,915,400
Net Income (Profit)		(988,400)	(344,400)	3,600	$81,600	$903,600
Taxes	Business Taxes (21%)			$756	$17,136	$189,756

MooreControl's Cost, Revenue, and Net Income by Year



MooreControl's Balance Sheet at the end of Year 5

MoorControl

As of December 31, 2026 (End of Year 5)

Balance Sheet	2026
Assets	
Current assets:	-
Cash	$186,880.00
Accounts Receivable	$3,819,000.00
Inventory	$0.00
Total current assets	$4,005,880.00
Property & Equipment	$102,000.00
Intangible Assets	$0.00
Total Assets	**$4,107,880.00**
Liabilities	
Current liabilities:	
Income Tax Payable	$189,756.00
Short Term Loans	$0.00
Management	$30,000.00
Total current liabilities	$219,756.00
Long-term debt	$0.00
Other long-term liabilities	$0.00
Total Liabilities	**$219,756.00**
Shareholder's Equity	
Investment capital	$1,000,000.00
Retained earnings	$2,888,124.00
Shareholder's Equity	**$3,888,124.00**
Total Liabilities & Shareholder's Equity	**$4,107,880.00**
Balance	*$0.00*

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