Project Plan

IPRO 353 – **Power-Assist Device for Recreational Kayaks**

Project Objectives

Design and build a new prototype of the power-assist device, make the design universal and aesthetically pleasing. Our group will do some on-the-water testing of the new prototype and fix all the kinks and bugs. Once the prototype is finished and meets our satisfaction, we will obtain a patent and develop a plan for a small business that will successfully launch and produce our universal power-assist devices for recreational kayaks.

To accomplish these goals, the technical and business teams will need to:

- Work together as a team!
- Research other kayak models so that a universal device can be designed
- Research and purchase materials for building new prototype (including replacement propeller(s) since one of our propellers has been broken off)
- Perform on-the-water tests for stability and durability of mounting device, motor, and battery power (if using a new type of battery)
- Research customer interest and the target market
- Research patentability of our product
- Create a business plan that outlines the structure of the business and target market for an adaptable motor for a sit-on-top tandem kayak.
- Have established advertising channels and retailers willing to promote the product.
- Pre-sell our product.

Project Background

IPRO 353 was created to relieve the limitations of people who would normally enjoy participating in recreational kayaking, but too often find themselves restricted. These limitations could range from reduced strength or stamina, physical disabilities, or outside barriers such as wind, waves, or an unexpected change in the weather. Creating a universal power-assist device for recreational kayaks that is both easy to install and easy to remove would allow customers to take advantage of more opportunities to kayak, while

still having the freedom to use the boat in its original form. Both private companies and handy hobbyists have already created kayaks with permanent motors, suggesting that there is a demand for such a product, and a setup that is removable would appeal to an ever wider market.

Knowing this and inspired by this, the IPRO team from the previous semester designed 2 prototypes for a power-assist device for a specific model of kayak. The first design was a trolling motor attached to a tandem sit-on-top kayak by metal brackets and wood. This design, which included keeping the battery in a cooler on the back of the boat, was tested on the water. It was found that the thirty pounds of thrust created by the trolling motor was exactly what the team was looking for as far as power. The design, however, was not appealing and had other flaws needing to be addressed.

The second design mostly relocated many components to a more suitable location on the boat. The battery was moved into a water-tight hatch in the center of the boat to center the weight in the middle. The controls for the motor were altered and moved from the top of the motor to a panel in front of the rear seat. This allowed easy access to controls, whereas before the controls were on the back of the boar and one had to reach behind his or herself to be able to turn the motor on or off. Another change made for this prototype was to engineer and install a breakaway system for the motor. (This allowed the power-assisted kayak to venture into shallower water without damaging the device.)

The materials for the mount of the second prototype were changed to be more appealing, however this current design requires a lot of drilling holes into the body of the kayak and it is complicated to install.

Research Methodology

The initial focus of the technical team's aspect of the project is to achieve these objectives:

- Research other kayak models to help design something universal
- Research and purchase materials needed to build new prototype
- Make new design more appealing, as universal as possible, as little weight added as possible, and easy to install
- Perform on-the-water tests

These goals will be tackled by members of the technical team. Each member of this team has a specific part or thing to study, and must share his or her findings with the rest of the group so that results can be compared and a design can be created, recalling and keeping in mind what it is that we want in the design (appeal, universality, detachability, lightweight, and easy installation). For example, one member has already completed a lot of comparisons between different types of batteries, and one team member has already looked into Jet engines as an alternate source of power. It was soon discovered, however, that these jet engines (similar to those found in Seadoos) have too much power (100hp+) for what we're looking for and they are environmentally damaging. When the second prototype was made, the design was not appealing, was not easy to install, and was not universal to other kayak models.

With this new design, the technical team aims to address and resolve this issue. When the tech team is ready to purchase parts for this design, team members will do so and begin construction. When it is time to perform on-the-water tests, records will be kept of all trials so that they may be examined and analyzed. If the design does not work to our liking, it will be altered to improve functionality (while still being everything we want it to be). Pictures will be taken as visual records of the construction and testing of the new prototype.

The initial focus of the business team's aspect of the project is to achieve these objectives:

- Identify the market for an adaptable motor for sit-on-top tandem kayaks.
- Search for retailers and distributors appropriate to reach target market.
- Formulate a product name, slogan and logo.
- Obtain a patent for our product, if a patent can be obtained.
- Create a business plan and launch business when all aspects of the project are ready
- Explore advertising channels and costs to create awareness of this product.

Each of these six goals will be tackled by groups of two business sub-teams. Both members of each sub-team will share their resources with one another and develop and expand on each of the goals. Each team will research and collect ideas through tradeshows and conventions, websites, personal and telephone interviews, reviews, and surveys. The work done by the two Business Teams will be accomplished by a variety of research methods. Research will be done through interviews, surveys, attending events, analyzing and sorting through online resources, as well as dealing directly with manufacturers and distributors of kayaks. After these objectives have been met, we will know where and when we can find our best choice of a marketplace for our small business.

Expected Results

The technical team expects to have a working prototype that has a universal motor-mount attachment for tandem sit-on-top kayaks before the end of the semester. This prototype is expected to be aesthetically pleasing, easily installable and detachable, and will require little to no drilling of holes into the kayak itself. With hard work and excellent design, our hopes are that this prototype will be our final working model ready for sale and distribution. Once our final prototype is ready, we hope to get a patent to protect it. The business team expects to identify and define the target market, establish a client base, help obtain a patent, develop a detailed business plan, and create an analysis of the financial risk or gain of the product. When all of these objectives and expectations of each team match the actual results, the overall team's goal and expected result is to have a solid business and potential customers who wish to purchase our product.

Project Budget

At this time, we are anticipating these expenses listed below. We do not yet know pricing for many of these things, but when we know for sure, those expenses will be edited in our budget (question marks taken out and numbers put in). We would like to have a team credit card to cover these expenses, though it will be enforced that use of the credit card is strictly for our project's purposes and must be approved, with all receipts being kept as well.

Anticipated Expenses

- Parts
  - Batteries: $100-$150
  - Replacement propeller(s): ?
  - Materials for Mounting Device (including screws): ~$150
  - Trolling Motor (if we need another one): $150
- Machine Shop use for construction: ?
- Travel Expenses, Transportation to and from events
  - Travel (for visiting, surveying, or interviewing potential distributors, retailers, etc.): ?
  - Tradeshows and conventions (Ex: Canoecopia in WI): ?
  - *This could be train fare or gas if carpooling is possible
  - *When team members attend events in Chicago, it is possible to use U-Passes
- Admission to events: ?
- Phone calls related to the project: ?
  - *For research, making arrangements with distributors, etc.
- Infomercial: ?
  - Renting out A/V equipment, purchasing needed materials/props for filming?
- Advertising
  - Advertisements: ?
  - Flyers: ?
  - Brochures: ?
  - Anything we might need to purchase or fund for advertising our product
- Team Materials
  - Posterboard: ?

- Printing: ?
- Phonecard for making business calls: ?
- *Materials that would need to be purchased for our display and presentation

Milestones

Business

- Complete Market Analysis
  - All members of team research by internet, phone, and other methods to investigate the target market and then analyze it. Work together by sharing and collaborating results to weed out unnecessary and undesired information. Useful and necessary information will be used to assist in the project and business plans. Team members will do weekly reports on what they have accomplished to achieve the defined objectives. These reports will be effective for sharing information as well as receiving feedback for further direction.
- Have name for product, slogan, and logo
  - Members of team will brainstorm and discuss possible ideas for all of these things; decision will be reached by majority vote, if not unanimous.
- Obtain patent for our product to protect it
  - Research patentability, look into what goes into obtaining a patent, contact U.S. Patent Office to find out more.
- Choose advertising channels and define cost
  - Members of team will research (by internet, phone calls, visits to companies, etc.) possible advertising channels and the costs of advertising through these channels. After research is complete and satisfactory results are found, advertising channels will be chosen for promoting our product.
- Choose distributor(s) and retailer(s)
  - Research will be done in a similar manner as listed above, but this time for businesses willing to manufacture and distribute the parts, as well as retailers willing to sell our product.
- Complete infomercial
  - An infomercial will be created by ideas from members of the team. Producing this infomercial will take a decent amount of time, so a few weeks might need to be spent to accomplish this task. Students (from the team, around campus, or friends in the Chicago area) will participate in the infomercial from the scripts that are created. School and/or personal A/V equipment will be used to film the infomercial. The infomercial will be shown during IPRO day and can be used to help promote our product.

- Set Business Plan
    - Members of the Business Team will work together to create a business plan. They will decide what needs to be part of the plan, how our business should be organized and carried out, and establish the aims of our business. (Example: This business is not geared to make multi-millions, but to provide kayak enthusiasts of all ages and physical abilities a power-assist device to enhance their enjoyment of the sport.)

Technical

- Design and Build Prototype #3 (1 and 2 were created in the Fall '05 semester)
    - Technical team will work together to design mount for device (expected to take approximately 2 weeks). The team will decide where the motor(s) should go, what kind of battery to use if we try a different battery than Proto. 1 and 2, and how to make this design as universal and aesthetically pleasing as possible. The team will try to ensure a relatively easy installation process, while drilling as few holes in the kayak as possible. The team will work together to purchase materials (1-2 weeks) and then build the prototype (4 weeks).
- Test prototype by the end of March
    - After prototype is designed, on-the-water testing will commence, weather permitting (hopefully, this will take 1 week, but more time can be spent testing if needed). The testing of the prototype will involve trial-and-error methods, and keeping records of the results of each trial.
- Work out flaws in design if they come up, modify design accordingly to make Final Prototype
    - If there are flaws in the design, the technical team will work together to find where the flaws are in the design, and fix these flaws (3 weeks). If major changes need to be made to the design, the design will be modified and re-tested for satisfactory performance and durability. (Final testing 4-5 days.)
- Prototype Ready for Market
    - Both teams will work together to ensure the prototype is ready for market. The technical team will ensure functionality, and safety. The business team will see to it that the product is pleasing to the customers.

Everyone

- Website updated
    - One member from each team, Blue and Scott, will work together to update and improve the team's pre-existing website. These two team members can bring new ideas for the website, as well as provide accurate, updated information on our progress for people to access. This is expected to take about a week.
- Mid-term Review Presentation

    - All team members will help put together a presentation on our progress at the mid-term review. It is very likely that this could require meeting outside of class for preparation, and in that instance arrangements will be made to complete the task. At this point in time, the technical team will have purchased materials for construction and nearly completed construction of the new prototype. The business team's analysis of the target market should be complete by now. The business team will have a name, slogan, and logo for our product, as well as be working towards finding advertising channels and costs for promoting our product.
- IPRO Day Presentation and Exhibit
    - Team members will work together to make visual aids (such as infomercial, pictures, and poster board) for display, as well as ensure great knowledge of the project for answering all questions on the day of the exhibit. Team members will be well prepared for giving their presentation and look and act professional while doing so. The team is selling the product, not just the Business sub-team. The team knows what went into the design of the product, not just the Technical sub-team. All team members must work together as one large team on IPRO day and help each other out. We're in this boat together!

Individual Assignments

Christina Arvis: Business Team, Infomercial
Eliseo "Blue" Cornejo: Business Team, Website, Infomercial
Manjeet Inamdar: Technical Team, Batteries
Scott Larson: Technical Team Leader, Website, Motors
Michael Merkley: Business Team, Infomercial
Daniel Netherton: Technical Team, Jets
Katy Pyles: IPRO Team Leader, Technical Team, Paperwork
Robert Zaprzal: Business Team Leader, Infomercial

Task Schedule

Spring Semester, 2006			Professor Braband		
Tuesday, Thursday Classes			IPRO 350, 353	Tech Team	Business Team
Date	Day	Session #	Deliverable Deadline	Tasks/Milestones	Tasks/Milestones
17-Jan	Tues	1	IPRO Office Team Briefing		
19-Jan	Thurs	2		Research	Market Research
24-Jan	Tues	3		Research	Research
26-Jan	Thurs	4		Research	Research
31-Jan	Tues	5		Research	Research
2-Feb	Thurs	6		Research	Research
7-Feb	Tues	7	Project Plan Due	Research/ Initiate Design	Research/Analysis
9-Feb	Thurs	8	Reflection 1 Due	Research/Design	Research Analysis
14-Feb	Tues	9		Design Mounting/Components	Research Analysis
16-Feb	Thurs	10		Design Mounting/Components	Research Analysis
21-Feb	Tues	11		Design/Get Materials	Market Analysis Complete
23-Feb	Thurs	12		Get Materials	Brainstorm ideas for product name
28-Feb	Tues	13		Get Materials	Have a name for the product, slogan, logo
2-Mar	Thurs	14		Get Materials/Begin Construction	Research advertising channels and costs
7-Mar	Tues	15		Construction	Research
9-Mar	Thurs	16	Reflection 2 & Initial Peer Review Due	Construction	Research
14-Mar	Tues	No Class		Break	
16-Mar	Thurs	No Class		Break	
21-Mar	Tues	17		Construction/Initial Testing (if possible)	Research
23-Mar	Thurs	18	Mid-Term Review (Presentation)	Presentation	Presentation/Research
28-Mar	Tues	19		Initial Testing (if possible)	Finalize advertising channels, determine cost
30-Mar	Thurs	20		Debug/Design Changes	Research distributors and retailers
4-Apr	Tues	21		Debug/Design Changes	Research
6-Apr	Thurs	22		Debug/Design Changes	Research,
11-Apr	Tues	23		Debug/Design Changes	Determine our best distributor(s) & retailer(s)
13-Apr	Thurs	24		Debug/Design Changes	Work on Infomercial
18-Apr	Tues	25		Debug/Design Changes	Infomercial Due
20-Apr	Thurs	26		Final Testing	Work on Business Plan
25-Apr	Tues	27	Written Business Plan Due	Final Testing/Website	Written business plan due!
27-Apr	Thurs	28		Website/Prepare for IPRO day	Website/Prepare for IPRO day
2-May	Tues	29		Prepare for IPRO day	Potential customer wants to buy our product!
4-May	Thurs	30		Prepare for IPRO day	
5-May	Friday	IPRO Day	IPRO Exhibit, Presentation, Abstract, CD Rom		
8-May		Exam Week	Reflection 3 & Final Peer Review Due		