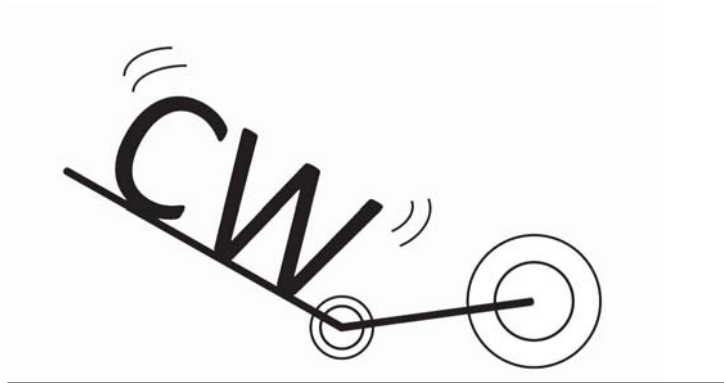


# Battery-Powered Transport for Beach-Launched Boats

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Juan Bueno  
Brian Sklena

Raghuveer Cumar  
Greg Tatkowski

Miry Kim  
William Watts

Mary McCabe  
Jay You

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## I. Team Charter

### 1. Contact Information:

#### A. Team Roster

Name	Email	Phone
Juan Bueno	<a href="mailto:jbueno1@iit.edu">jbueno1@iit.edu</a>	██████████
Raghuveer Cumar	<a href="mailto:rcumar@iit.edu">rcumar@iit.edu</a>	██████████
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Jay You	<a href="mailto:jyou4@iit.edu">jyou4@iit.edu</a>	██████████

#### B. Team Strengths, Needs, Expectations

	Individual Strengths	New knowledge/Skills To Develop	Overall Expectations
Juan	<ul style="list-style-type: none"> <li>- Strong problem solving skills</li> <li>- Research and Investigation skills</li> <li>- Practical knowledge of machinery</li> </ul>	<ul style="list-style-type: none"> <li>- Practical side of engineering concepts</li> <li>- Entrepreneurship</li> <li>- Learning the process from idea to realization</li> </ul>	<p>Expects the IPRO to be a good experience</p>
Raghuveer	<ul style="list-style-type: none"> <li>- Passion for Marketing, Advertising, Sales</li> <li>- Experience in entrepreneurship</li> <li>- Commendable in working on Team Projects</li> <li>- Effective Communication</li> <li>- Creative ideas</li> <li>- Take initiative</li> <li>- Ability to lead a team</li> </ul>	<ul style="list-style-type: none"> <li>- Access to resources for conducting research</li> <li>- Financial support for the project work upon requirement</li> <li>- Constructive criticism – helps in improvement</li> <li>- Improve teamwork skills</li> <li>- Gain business accumen</li> </ul>	<ul style="list-style-type: none"> <li>- Uphold the professional ethics</li> <li>- Meet the deadlines</li> <li>- Provide deliverables and contribute to the team work</li> <li>- Support fellow team members</li> </ul>

Miry	<ul style="list-style-type: none"> <li>- Creative problem solving skills</li> <li>- Model-making</li> <li>- Proficient in computer design programs and Microsoft Office</li> <li>- Ability to organize material</li> <li>- Desire to work as a team</li> </ul>	<ul style="list-style-type: none"> <li>- Understanding business/ engineering approach</li> <li>- Take initiative</li> <li>- Communication and management skills</li> <li>- Illustrator,Photoshop skills</li> </ul>	<ul style="list-style-type: none"> <li>- Gain professional experience as product-design team</li> <li>- Work with other students from different majors</li> <li>- Be fully satisfied with product</li> </ul>
Mary	<ul style="list-style-type: none"> <li>- Problem solving skills</li> <li>- Professionalism</li> <li>- Determination</li> <li>- Leadership</li> <li>- Website Design</li> <li>- Document Writing</li> <li>- Organizational skills</li> </ul>	<ul style="list-style-type: none"> <li>- Gain knowledge and understanding about starting a business</li> <li>- Working with students from different majors</li> <li>- Working as a team</li> </ul>	<ul style="list-style-type: none"> <li>- Produce a working model by IPRO day</li> <li>- Have a more in depth knowledge of the business side of introducing a product into the market</li> </ul>
Brian	<ul style="list-style-type: none"> <li>- Aid in the formation of a business plan including market research, calculating price for product, compute a final forecast for the group</li> <li>- Aid in planning the budget</li> </ul>	<ul style="list-style-type: none"> <li>- Improve organizational skills</li> <li>- Improve communication skills</li> <li>- Working as a team</li> </ul>	<ul style="list-style-type: none"> <li>- Produce a working model by IPRO day</li> <li>- Create a viable business plan for our product by IPRO day</li> </ul>
Greg	<ul style="list-style-type: none"> <li>- Engineering knowledge</li> <li>- Dedication</li> <li>- Leadership</li> </ul>	<ul style="list-style-type: none"> <li>- Starting a business</li> <li>- Acquiring broader knowledge of other fields of study (not just engineering)</li> <li>- How to actually build something after performing detailed calculations on it</li> </ul>	<ul style="list-style-type: none"> <li>- Have a working prototype by IPRO day</li> <li>- Have designs finalized</li> <li>- Have potential customers lined up for sale</li> </ul>
William	<ul style="list-style-type: none"> <li>- Works well with a team</li> <li>- Engineering and design knowledge</li> <li>- Dedicated</li> </ul>	<ul style="list-style-type: none"> <li>- Marketing a product</li> <li>- Starting a business</li> <li>- Working closely with other fields</li> </ul>	<ul style="list-style-type: none"> <li>- Work as a solid group to finish the product</li> <li>- Create a working product</li> <li>- Create a strong business plan</li> </ul>

Jay	<ul style="list-style-type: none"> <li>- Able to work with design programs</li> <li>- Can do model work</li> <li>- Basic computer skills</li> </ul>	<ul style="list-style-type: none"> <li>- Business/Marketing</li> <li>- Entrepreneurship</li> <li>- Engineering ideas</li> </ul>	<ul style="list-style-type: none"> <li>- To work with people in other majors</li> <li>- To learn how a business develops and markets its product</li> <li>- Successfully complete the project</li> </ul>
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## 2. Team Purpose and Objectives:

### A. Mission Statement

The IPRO 352 team has investigated, experimented, and finally come up with a solution to the beach-launched boat problem. They have worked together and designed an innovative catamaran transporter efficient enough to be operated by a single person, dramatically reducing physical labor and maximizing business potential. The team is made up of students seeking to gain professional experience in all areas of engineering, business, and design.

### B. Team Objectives

- Design catamaran transporter, easy enough for single woman to use, stable enough to avoid corrosion
- Test out different materials
- Study forces applied
- Establish type of power needs involved
- Investigate different drive/battery systems
- Identify business potential of product
- Explore several forms (aesthetic quality)
- Build/Assemble a working, full-scale model to be demonstrated
- Display marketability of the product
- Efficiently organize and thoroughly document all research, results, and analyses
- Attain a particular degree of professionalism
- Put all team members' efforts towards having an educational, enjoyable learning experience and a successful project

### 3. Background

The project we are working on deals with catamarans and other similar types of boats that are hauled to the water when in use, and are returned to the storage location away from the water's edge each time they are not in use. Some examples of these boats are kayaks, canoes, rowboats, small sailboats, and catamarans. The specific ones that we will be dealing with are the "Hobie 16" and the "Getaway," both of which are catamarans built by the Hobie Cat company and used at the Wilmette Park District beach.

Our group doesn't have any sponsors. Our potential customers are the Wilmette Park District and boat owners who rent parking spaces down at the Wilmette Park District beach. In the broader market, we would hope that our finished product could be offered to catamaran owners worldwide.

The user problems the group is facing are in the engineering and marketing fields. Our engineering subgroup needs to find a way to first lift the catamaran onto the already existing catamaran wheels and then to find a motorized method of transporting the catamaran back and forth from the water to its storage location. Problems for the marketing subgroup are figuring out where this product could fit into the market or if there even is a market for this. They will be responsible in finding potential customers and then to try and market our product to them.

The science and technology involved will be mainly on the engineering side. The engineering subgroup will be using different aspects of mechanical and electrical engineering. It will require a few calculations to figure out the powers needed to move the boat.

From what the group has researched so far, we have not seen any commercial historical attempts in addressing the problem. The only thing we've heard of being done before was that of the brother of Professor Braband, our project coordinator. Professor Braband's brother, who also owns a catamaran, had built a homemade device that does exactly what we are trying to get our product to do. We actually may be able to get the opportunity see this device in person or have Mr. Braband come in and give us a few pointers on how we could actually build this product and hopefully we may be able to learn from his experience in the same topic.

The only ethical concern for our project at the moment seems to be the issue of environmental friendliness. One of the first things our group discussed was designing a product that was environmentally-friendly, meaning that the final product would have to be either run by electricity (battery) or emit very little

carbon dioxide. With the growing concern for the environment, we as future architects, engineers, and businessmen, should begin thinking and coming up with green ideas in whatever we work on.

In the present economic situation, it will be more difficult for the group to find potential buyers or even any interest at all. On the contrary, the people who our product would focus on are people who have the money to own boats and enjoy the expensive hobby of sailing, meaning that the market outlook for the product in terms of the buying power is not so bleak.

#### **4. Team Values Statement**

##### Desired Behavior

Five values that our team believes that we should practice are flexibility, professionalism, creativity, communication, and commitment. We believe that if we instill these characteristics in ourselves, our team will be able to work together more effectively and therefore reach our team's goals. In order to attain our desired behavior, we will ensure that the work throughout the semester is split appropriately between group members, complete all assignments before the set deadline, generate innovative ideas, listen to other team members' ideas, and invest quality time and effort into their assigned work every day.

##### Conflict Resolution

I PRO 352 will use their emphasis on effective communication to help solve any conflicts that they run in to over the course of the next semester. If a conflict arises, we will have a conversation about it with our team, which will be moderated by the team leader. Once every group member has the chance to express their feelings about the topic, we will decide on possible scenarios for the group to choose in order to resolve the conflict. Once all members get to hear all of the possible resolutions we will decide on our desired resolution together.

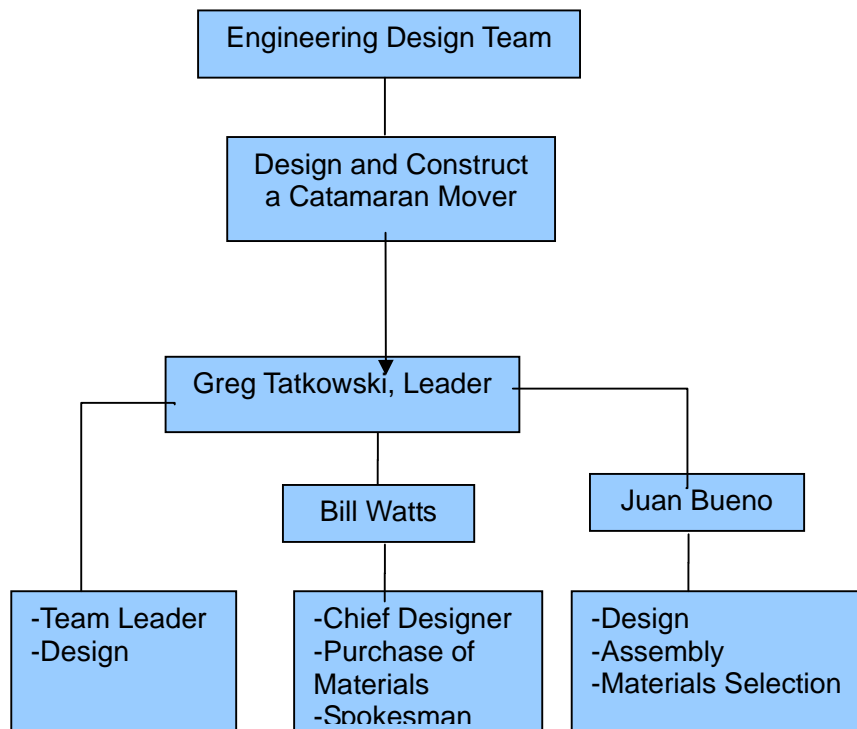
## II. Project Methodology

### 1. Work Breakdown Structure

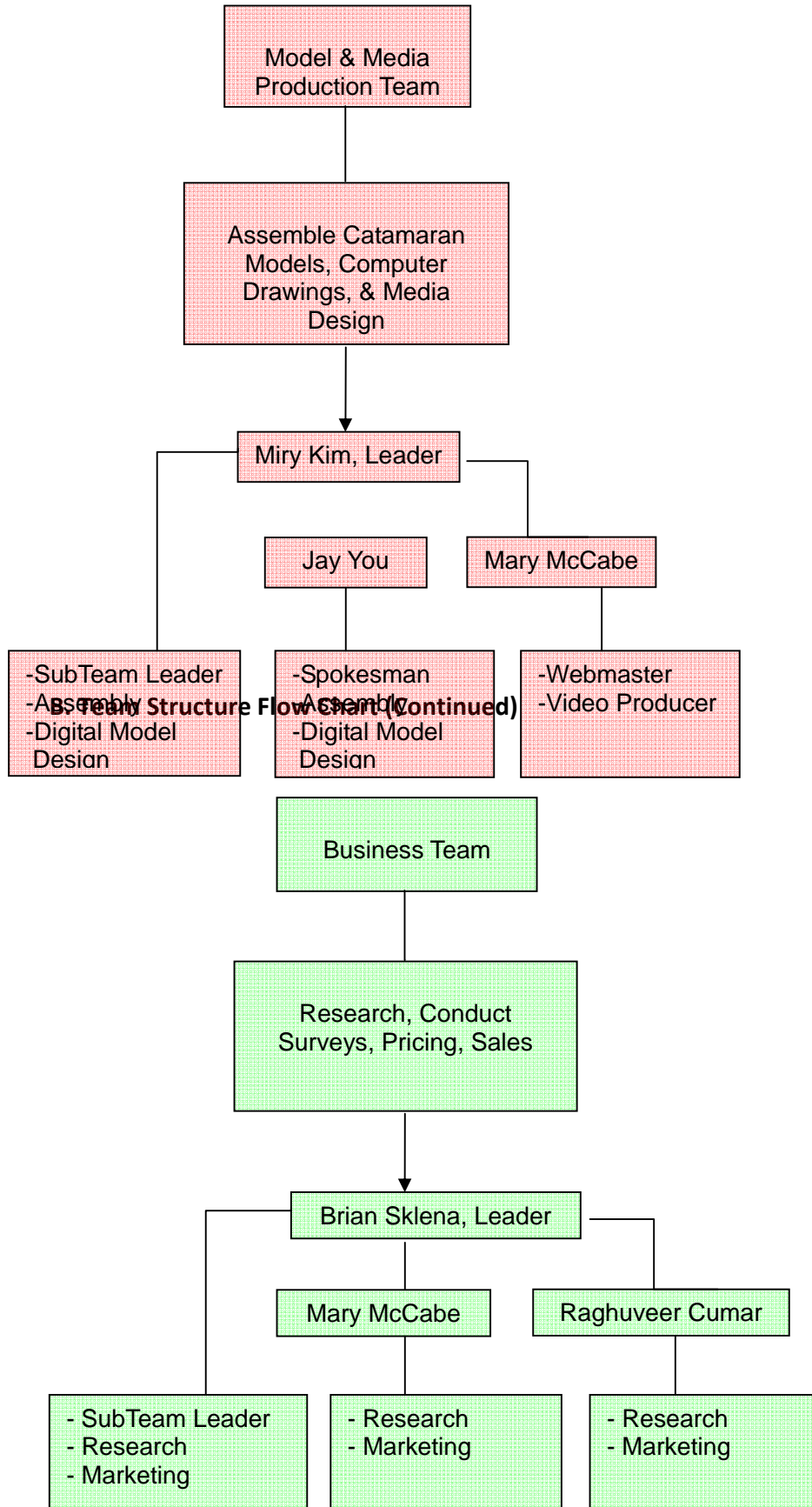
#### A. Work Process

In order for our IPRO 352 Team to successfully achieve our goals and expectations, there is a particular process we must go through. We, as a group, must first research current catamaran movers and see how they succeed and fail. We also investigate buyer and consumer markets. We must also address the problem of building a mechanized device that will most easily lift up catamaran from their storage spaces to the Cat-Trax wheels. That way it will help move the boat to and from the water without discomfort but with ease. Then we will go on to target consumers, conduct interviews and surveys, and produce promotional materials that will ensure a place on the market. We also need to assemble working prototype model to demonstrate how efficient and essential it is for current boat owners in the Wilmette Park District area.

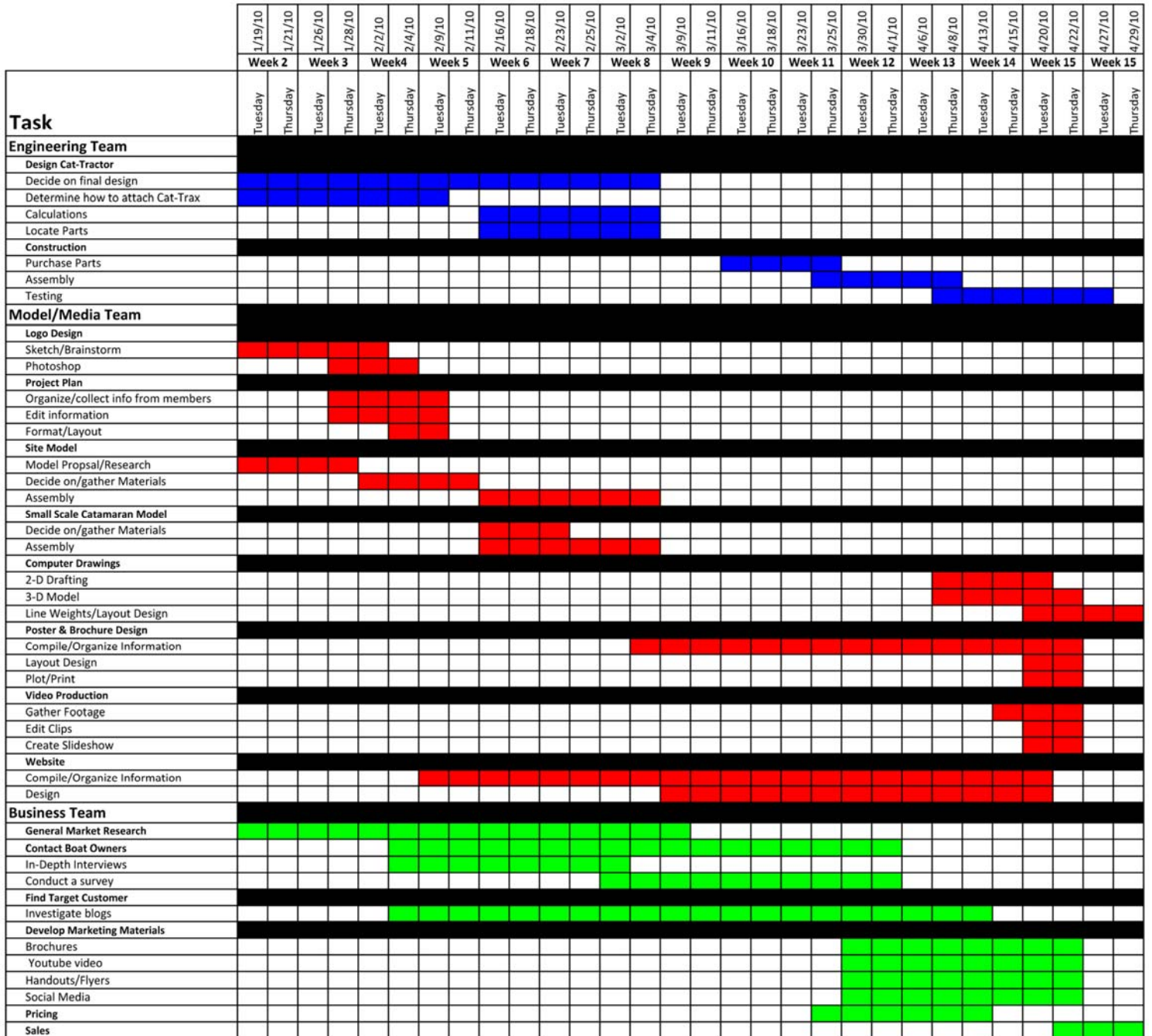
#### B. Team Structure Flow Chart







### C. Gantt Chart



## 2. Expected Results

- A. For our project, we will be requiring activities dealing with engineering, architecture, and business. After deciding on how to approach the problem, we divided the group into subgroups (Engineering Design Team, Model/Media Team, Business Team) to better utilize and focus each individual's strengths.

The Engineering Design Team, made up of engineering students, will come up with the engineering solution to the problem, which is to design a mechanism that will make it easier for people to lift and move the boats at the Wilmette Park District. They will have to design the device, do the calculation to figure out what kind of power will be needed, and then to find the parts that will be able to supply that amount of power and fit into their design scheme. They will also be responsible for the construction of mechanism, and if need be, the other groups will help.

The Model/Media Team, consisting of architecture students, will be in charge of making the small-scale models that will be used on IPRO Day and designing and putting together the deliverables (Project Plan, Brochures, Posters, etc.)

The Business Team, composed of business majors, have the responsibility of gathering data from market, supplier, and customer research. These will require making and distributing surveys, conducting interviews, and researching on the internet and in other databases.

- B. Data from research and testing will come from the engineering and business aspects of our project. On the engineering side, there will have to research done on other similar mechanisms that lift and transport heavy objects. After designing a few test models, they would have to test to see which ones work and how they can be modified.

Research on the business will first deal with precedents; to see if there are any similar products out on the market. Then there will be research conducted on both the supplier and business markets. The group would first have to see if there is any interest in what we're working on, and then find out what companies or businesses can supply the parts we would need to build and hopefully market out product. Testing on the business side seems to go hand in hand with research, and so to conduct this combined element, the group will organize interviews with both individuals and

groups of people (suppliers, potential customers, the Wilmette Park District, etc.).

- C. The potential product resulting from our project will be a mechanized device that will make transporting boats, mainly catamarans, easier. The goal of the device is to make it easier to first lift the catamaran onto the Cat-Trax, a set of wheels already on the market, and second to move the catamaran from where it is parked to closer to the water. The device would have to be small enough to store indoors, most likely a garage-like space, be able to run all day if needed, be durable enough for the park district to lend out to boat renters, and be reasonably priced and efficient to be sold on the market.
  
- D. Potential products from our project will be:
  - prototypes for final model
  - small scale models
    - site
    - catamaran
    - finished product
  - brochures
    - to be handed out on IPRO Day
  - poster
    - for IPRO Day
  - website
  - video
    - for website and/or IPRO Day
  
- E. Potential Deliverables
  - working prototype
    - the final product of the group's research and testing
  - brochure
    - background and instructions for the final product to hand out on IPRO Day
  - poster
    - to display the result of our final project (i.e. background, process, research, etc.), and to act as a sales pitch to potential buyers
  - surveys
    - for market research; to give out to those who have catamarans down at the Wilmette Park District's beach
  - focus group feedback

from focus group of people who own catamarans and have rented parking spaces for them down at the Wilmette Park District's beach

- F. As a group of students from all different majors, coming together for the first time to work on a project, which may never have ever crossed our minds or even have the passion for, all sorts of problems may arise. Some of the challenges our group may face are communicating, sharing the workload, and successfully finishing the project.

A risk in our project is that during our research on the business side, we find that there is no place for our product in the consumer market. Little or no potential customers would mean that while our project may be innovative, there is no demand for it, or even that it is unnecessary. This could be devastating to the morale of the group, jeopardizing the quality and completion of our project.

Communication, or the lack of, has to be the source of almost any kind of problem. If members of the group do not communicate efficiently, honestly, and completely, people's feelings may get hurt. Feelings of neglect, dislike, and animosity towards each other may brew inside and could possibly destroy the entire project. Individuals MUST voice their opinions and ideas in order for the project to progress smoothly and be completed on time.

As in most group projects, there are always people who do more or less work than others. Though it starts out with everyone in the group with the same amount of work assigned, some will go beyond, others will do the minimum, and others will not even do that. We, as individuals working towards the same goal, must try to maintain the amount and quality of work that every individual performs. Though it may not be the same on a weekly basis, hopefully the workload will be, on average, equal throughout the entire project.

Not completing this project successfully or on time would be a failure for everyone involved. This would show everyone that this group of people could not come together, communicate, or push each other to reach a common goal. Though we all have our own different majors, classes, and projects to worry about, we all signed up for this project; to work with people from different backgrounds to come up with an innovative solution to a given problem. We all need to complete this project, if not for our own

benefit, then for the other members of the group who are counting on each other.

- G. Our expected results at the end should all come together to become a marketable product. The working prototype, informational brochure and poster, scale models, and presentation will become a marketing tool on IPRO Day. Other than the Wilmette Park District, for whom the product is being designed for, the group will also try to find companies or manufacturers that might like to take on the product.

### 3. Team Budget

Engineering:

Steel	\$100
Bearings	\$50
Wheel	\$50
Tire	\$50
Motor	\$150
Battery	\$200
Models	\$50
Misc	\$50
<b>Subtotal</b>	<b>\$700.00</b>

Model/Media:

Wood	\$20
Cork Sheets	\$15
Acrylic	\$5
Rubber Mold	\$30
Wood Dowels	\$5
Misc.	\$15
<b>Subtotal</b>	<b>\$90</b>

**TOTAL BUDGET = \$790**

### 4. Designation of Roles:

Minute Taker: Brian Sklena  
Agenda Maker: Mary & Raghuveer  
Time Keeper: Will rotate among all team members  
iGroups Moderator: Mary McCabe