

# **IPRO 358: Delta Hook Tech**

## **Summer 2009**



## **PROJECT PLAN**

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**Collaborators**      Taylor Augy Park – Sparrowhawk, Delta Hook  
Technologies  
Dr. Ronald Kirschner - Heartland Angels

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## Team Information

### Team Identity:

Team name - Delta Hook Tech Team

Motto – Fish on D. Hook

### Team Members:

*Bogdan Bistriceanu (bbistic@iit.edu)*

Third Year Business Administration / Marketing

Bogdan is currently employed as an intern at a firm that deals with management and marketing consulting for non-for-profit organizations. He is tasked with maintaining a database of contacts, using Microsoft Excel spreadsheets and Constant Contact e-mail marketing solutions, planning and coordinating monthly fundraisers (which attract between 200 and 250 guests) and other general marketing tasks, such as, drafting the monthly newsletter and creating flyers which are part of his monthly mailings. He is proficient in Microsoft Office Suite and Photoshop. His skills also include researching and public presentation. By participating in this IPRO, he looks forward to learning how to conduct market research, and how to develop marketing strategies for a startup business. He went fishing once, and he plans to go again this summer in July.

*Robert Boyer (rboyer1@iit.edu)*

Fourth Year Biomedical Engineering

Bobby plans to use his skills in biomedical engineering and business to create a medical product and eventually sell it. He is able to easily establish a rapport with individuals, and is very easy to approach, when an issue arises. He is skilled with Microsoft Office Suite, Photoshop, MATLAB, has prior marketing experience, has worked on prototyping in a previous IPRO, and is fluent in French. In working on prototyping, Robert has learned how to use various machines such as the modela milling machine, a laser cutter, and a soldering iron to solder wires and circuit boards together. He plans to bring in his knowledge of biomaterial science, chemistry, biology, and dynamics in order to create a mock-up that is able withstand the force of a fish pulling against it. He plans to learn to better work with industry people and work on finalizing a product so that it is ready for the market. He also plans to understand the business aspects of the IPRO and hopes to use the knowledge he learns to better help his fishing techniques as well as understand better the dynamics involved in fishing.

*Austin Champlin (achampli@iit.edu)*

Fourth Year Mechanical Engineering – Business Minor

Austin's minor concentration in business allows him to connect different aspects of engineering and design with business. He is familiar with testing mechanical properties of materials including bending, tension, hardness, torsion, fracture, fatigue, and fracture toughness. He is proficient in Microsoft Office Suite as well as MATLAB. He also has experience with AutoCAD, Pro E and Maple.

Combining these skills with the goals of this project should yield results with scientific proof to back it up, specifically in the choice of materials and testing of prototypes. He plans to learn more about the prototyping process as well as the connections between product development and business/marketing strategies. He is most interested in learning how both sides work together to form a strategy that works for each. As an avid fisher (a few times a week), combing knowledge of the fisher with the mechanical engineer will allow the wants of the target market to be realized through proper design.

*Rachel Choitz (choirac@iit.edu)*

Fourth Year Biology

After completing her summer semester and thus completing her IIT education, Rachel plans to attend medical school or graduate school to study pathology. Currently, she works at a hospital pharmacy as a technician. She hopes her four years of biomedical engineering/biology training will be beneficial to the team. Whether it is by using the information she learned in materials science courses or the marketing experience she gained from her IPRO last semester, she hopes to bring innovative ideas and solutions to the problems presented this semester. Having been involved in a first place IPRO last semester, she knows what it takes to win. She plans to use the experience and team building skills that she acquired last semester to help her current team succeed. She hopes to learn more about marketing techniques, business planning and fishing. Her goal this summer is to help IPRO 358 win their track at IPRO Day.

*Michael DiVito (mdivito@iit.edu)*

Fourth Year Mechanical Engineering

Michael is experienced in working with Microsoft Office Suite and AutoCAD, which will be useful for creating mock-up drawings of the DHT (Delta Hook Technology). He has taken two material science classes, and he is very interested in the mechanical behaviors of materials. He plans to contribute any form of mechanical or materials knowledge that will be useful in developing the mock-ups. Additionally, he plans to gain experience in applying his knowledge in a professional atmosphere and to improve his communication skills. He fishes every summer at local forest preserves.

*Herbert Edwards (hedwards@iit.edu)*

Fourth Year Psychology/Entrepreneurial Minor

As an 5 year tactical officer with the Cook County Sheriff's office Herbert has learned the importance of teamwork through the daily implementation of (HRM) high risk movements of high profile inmates, and cell extractions of combative inmates. Herbert also has experience as an effective team leader and member through this, as a tactical officer. As a psychology major, he has observation skills, which includes a strong sense for detail. He is also skilled in internet research, through the use of online databases. He is currently working on a team ethics research project, with Professor Huyck of IIT's Psychology Department. Therefore, he has studied the team dynamic and understands effective team building. He has taken one marketing class and one entrepreneurial class. He plans to use the skills learned in those classes to help create the marketing plan and better understand the implementation of a business plan of DHT. He is also skilled in creative writing and creating creative ideas. In this IPRO experience, he plans to improve his business professionalism by improving his corresponding skills and utilizing his team building skills in a more business structured environment. He will consider his IPRO experience a success if the group successfully completes its goal and if the collaborators are satisfied with the results of the group. As of the initial date of the IPRO, Herbert has no formal knowledge of the fishing world or market.

*Erik Eglund (eegland@iit.edu)*

Fourth Year Mechanical Engineering

Erik has experience with the manufacturing processes of surgical products, including automated machining and quality control. His engineering coursework in behavior of materials will be called upon during the design and building processes of the prototype. He is also skilled in Microsoft Office Suite, CAD, and SolidWorks, which will aid in generating technical drawings regarding the prototype. Through this IPRO experience, he plans to gain a better understanding of starting/running a business.

He would also like to improve his skills of communication with professionals in the workplace. He enjoys visiting his hometown in northern Wisconsin where he spends time fishing with his father.

*Mohit Gaonkar (mgaonkar@iit.edu)*

Masters in Finance, Masters in Information Technology Management

Mohit has a BS in Computer Science and a certificate in Capital Markets from the University of Mumbai. He has also worked as a Software Developer and in Technology Support. During this IPRO, he plans to be able to act as a conduit between the business sub-team and the development sub-team. Also, he plans to gain a comprehensive understanding of transforming an idea into a finished product in the market.

*James Lai (lajame@iit.edu)*

Fourth Year Molecular Biochemistry and Biophysics

James has basic mechanical skills, such as working with powered equipments, and is also capable of working with AutoCad, which will be able to assist in creating a blueprint for the product. He plans to learn additional aspects regarding the business and marketing behind this IPRO, in addition to mechanical methods in solving it. Additionally, he plans to learn how to effectively use the resources of people with different backgrounds. His skills include information gathering, as well as efficiently promoting teamwork, which was reflected in his last IPRO. He plans to improve his skills with AutoCAD or other software necessary to the IPRO and plans to find new, simple, realistic methods to accomplish the team's objectives. Lastly, he wishes to learn more about fishing, as he only had fished once before and would like to know more about the biology behind fishing and how it can help to create a safer and efficient fishhook.

*Hamza Obaid (hobaid@iit.edu)*

Fourth Year Biomedical Engineering

Hamza is eager to explore the differences in entrepreneurial techniques that can be used to market engineered mock-ups, bridging the gap between his college engineering experience and his knowledge of marketing strategies. By working with models of a new and innovative fish hook, he plans to achieve a better understanding materials science and mechanical engineering, as well as, the process of creating a business model and other different aspects in business. He intends to bring his knowledge of the biological sciences, materials science, group psychology, as well as his experience with a number of other engineering fields (such as introductory mechanical engineering, introductory chemical engineering, and introductory electrical engineering) to better serve the group. His skills also include public speaking, organizing team dynamics, and explaining a concept to individuals with little knowledge of the subject area. He would also like better understand the sport of fishing and someday enjoy it. By the end of the semester, he would like to help create and market working mock-ups of a truly innovative fish hook that will be able to integrate safety and utility on the field.

*Sabina Pop (spop@iit.edu)*

Fourth Year Business Administration - Entrepreneurship

Sabina is excited to put into practice some of the learned principles of marketing, entrepreneurship and strategy. In the past, she had been part of a new product development project in which techniques such as building and conducting focus groups, questionnaires and surveys, and concept testing were used in order to launch a new office supply product. She plans to bring these techniques to the IPRO team to help identify and understand the target market, as well as, new methods of marketing the DHT. She has also been part of an opportunity assessment project for an innovative voicemail alternative. Sabina

plans to apply concepts she has learned, industry analysis, competitive analysis and prototyping business transactions, in the real world of innovative fishing. Also, she is familiar with strategic planning such as business-level, corporate-level and international strategies. She would like to learn to better communicate among members of a cross-functional team such as the IPRO team.

*Andy Staats (astaats@iit.edu)*

Fourth Year Information Technology & Management

With only one class left before graduation, Andy has taken all of his IIT coursework at the Rice campus in Wheaton. He is excited about having a class at the main campus and fully experiencing IIT's facilities. Andy works full-time as a web application developer for Tellabs in Naperville. Though he can be quiet at times, when there is work to do, Andy is not shy to speak his mind. In addition to his computer programming, Andy is also a proficient writer. In his previous IPRO, he took care of all of the documentation and deliverables. He also helped with the website that his IPRO worked on. For this IPRO, he would like to branch out from his field and work with more business-oriented goals in mind. Andy has been fishing all of his life, with most of his fishing trips taken at family property in Lake Delavan, Wisconsin.

*Jimmy Ton (jton@iit.edu)*

Fourth Year Biomedical Engineering

Although Jimmy is on the neural engineering track of biomedical engineering, a few of his required core classes have the potential of providing the knowledge necessary to solve certain problems that may arise. For example, he was enrolled in a course called biomaterials that dealt with material properties and the methods of production & testing of the materials for use in biological systems. Biomedical engineering courses also require an extensive amount of reviewing peer-reviewed articles. Therefore, he is accustomed to researching topics through journal databases. Over the years, he has gained proficiency in Microsoft Office Suite and MATLAB that were necessary to complete various academic tasks. At IIT, Microsoft Word and Excel were used to prepare laboratory reports and analyze data, respectively. MATLAB was also used to analyze experimental data and perform calculations. Aside from his contributions, he is optimistic about the benefits of this IPRO, such as becoming acquainted with the sport of fishing and accumulating the skills and experiences from participating as part of a team to work towards achieving the overall goal. The latter benefit will aid Jimmy, who intends on enrolling into medical school where the future entails working with doctors of varying specialties to help patients.

*Patrick Zhu (pzhu2@iit.edu)*

Fourth Year Biomedical Engineering

Patrick was enrolled in the architecture major for three years in high school and for a short while in college. He is proficient in Autodesk design programs, as well as 3D studio max. These programs have helped him digitally render various buildings as well as a city plan. Patrick also has experience with architectural modeling, as well as, the skill to utilize the tools required in the process. Such skills include soldering, grinding, operation of various saws and drills, and many other construction related skills. These skills allowed him to recreate scaled versions of New York skyscrapers and city blocks. These skills could prove useful when creating mock-ups of the DHT. After he switched over to biomedical engineering, Patrick took courses relating to materials including material science and biomaterials. Through these courses, he gained knowledge about material properties, as well as, their formation process. Patrick is also able to speak Mandarin and Cantonese. He has been fishing for a

few years and knows the basics of the sport. He plans to gain skills in team dynamics and prototyping methods.

## **Team Purpose and Objectives**

During the summer 2009 semester, IPRO 358 plans to develop mock-ups of the Delta Hook Technology (DHT) and to lay the foundation for a business model for Sparrowhawk, LLC, an early stage company. Sparrowhawk has investigated the concept for an innovative fishing hook that is not currently on the market or ready to be launched. The IPRO team will work together to approach the process of designing mock-ups of the Delta Hook Technology (DHT), testing the mock-ups, and determining measures that can be taken to improve the DHT. Subsequent mock-ups will continue to improve based on results of the product testing. Simultaneously, we will do market research in order to identify the target market, determine price points, and develop marketing strategies for DHT.

The IPRO team will be divided into two sub-teams (development and business) that will work together to achieve their goals. The development sub-team aims to create mock-ups of the DHT, improving the mock-ups with each subsequent redesign. The sub-team also aspires to successfully catch a largemouth bass in a fishing environment with the newly designed DHT. Both of these goals must be achieved through research, design, testing, and redesign. The business sub-team will construct a marketing strategy for the DHT and will develop a report that can be presented to the sponsor for a better understanding of where his product will fit in the marketplace.

### **Development Team Objectives:**

- Explore different design possibilities to create a mock-up of the DHT that will incorporate safety, ease of use, and practicality, while fishing.
- Make a proper material selection for shank and hook of DHT.
- This includes type of material, flexibility, size, quantity and strength.
- Confirm the proper shank and hook geometry necessary for successful landing of fish, while keeping the DHT safe and easy to use.
- Determine the proper size and weight of the DHT to optimize efficiency and performance.
- Confirm cost effective solutions for material selection and manufacturing processes.

### **Business Team Objectives:**

- Identify the problem in the marketplace that we are trying to solve, find out anglers' wants and needs for a better fishing experience.
- Determine if the largemouth bass is the fish for which the DHT should be designed. Both primary and secondary data will aid in accomplishing this objective. This involves research online and in magazines, and also engaging the marketplace by talking to anglers.
- Determine target market. In order to understand the future DHT customer, anglers will be divided into subcategories (e.g. recreational and sport anglers). Analysis will be performed as to which subgroup will be targeted.
- A competitor analysis will be performed. Current competitive products and strategies employed by competitive manufacturing companies will be researched.
- In conjunction with the development team, a concept statement will be designed and tested.
- The price point of the DHT will be determined.

- Optimal marketing mix and strategies of launching DHT will be determined.
- Determine research markets, which would be best to pursue initially.
  - Consumer research (surveys, focus groups)
  - Ethnographic research (observe consumers in their environments)
  - Money research (spending behavior and price points)
  - Distribution channel research (which stores sells the most hook of which type in which region, etc, etc)
- Complete a SWOT analysis of Sparrowhawk and competing companies.

## Background

The IPRO team will work with the CEO and entrepreneur behind Sparrowhawk, LLC, Taylor Augy Park, and with Heartland Angels, Inc. “Heartland” is a private equity network that brings together accredited investors with early stage start-up companies and other opportunities. The Heartland Angels' mission is to be a catalyst in the process of innovation by creating forums in which human, intellectual, and financial capitals are joined together for a common purpose. Furthermore, Heartland Angels will invite students to one of its monthly events to gain additional practical insight concerning the world of entrepreneurial/private equity investing.

The project offers an opportunity for students to gain experience in developing the components of a business strategy and plan, as well as, developing and testing designs and mock-ups that demonstrate the value of the innovation and its place in the market.

Recreational fishing is a very sizeable market, generating \$125 billion of economic output and providing over one million American jobs. Many different fishing hooks are available, retaining the same, basic shape and structure. However, there are many dilemmas that face contemporary fishing hooks. One problem is that fishing hooks are not able to properly fasten onto the fish after embedding. This can be solved by increasing the size of the barb on the fishing hook. However, this would pose a greater difficulty in properly embedding the hook, and it would result in greater damage incurred to the fish. Another problem is that fishing hooks can catch (snag) onto nearby rock formations, algae, weeds, or other vegetation. This problem is approached by utilizing snag-proof guards. However, this increases the manufacturing cost of the product, and is not shown to be conclusively effective. Additionally, barbs can cause damage to the fish, depending on their size. Solutions to this problem would be to remove the barbs from the fishing hooks or using a curved or bulbed hook point. However, this would result in a number of additional problems such as dislodging of the fish from the hook and increasing difficulty in embedding the hook. Perhaps the greatest problem facing conventional fishing hooks is the potential danger facing the anglers, especially the younger, inexperienced ones. The exposed barbed fish hook can pierce through the skin of an angler and cause injuries. The greatest injury is inflicted upon removal of the hook due to the barb. Among major corporations, there appears to be an absence of fishing hooks equipped with safety measures.

Sparrowhawk promises to develop an innovative fish hook (DHT) that offers its users the potential of greater safety by preventing painful fishing hook injuries and a greater likelihood of successfully landing fish while avoiding frustration due to time-wasting snags. The IPRO team will attempt to fully develop the DHT. The design will comprise of an inverted treble hook (i.e., three barbless J-hooks pointing towards the central axis) with three shanks consisting of a flexible, metallic material. In the standard mode, the three shanks isolate the points of the J-hooks, which harmlessly point inwards.



Only an applied force equal to or greater than a fish's bite force is sufficient to drive the shanks toward the center of axis, activating the hook. Therefore, safety increases since the force of the hook colliding with another angler during casting is less than the targeted fish's bite force. In the engaged mode, the J-hooks reorient away from the center of axis resembling a regular treble hook with the points in an impaling trajectory. Once embedded in a fish's mouth, the inward angle of the hook creates a hold. In this scenario, a fish will normally open its mouth to release the hook thereby tightening the hold further. After, the fish is reeled back onto the boat, the hook can be removed without additional injury to the fish and will automatically return to its original shape with the hooks aligned along the central axis. The fish hook incorporating the DHT can also be modified to hold live bait or be incorporated into a lure such as a jig.

There are many technological aspects that must be considered during production of the mock-ups. Prior to this IPRO, the sponsor, Augy Taylor Park, created a few mock-ups. One of the previous attempts consisted of a shank that was entirely composed of a flexible, metallic wire. However, this allowed any one of the hooks to twist into an ineffective position. The torsional movement of the hooks was prevented by replacing the shanks with a flat, curved, flexible metal. Overall, each of these mock-ups was much larger than the desired size. These are a few of the countless technological factors that will be accounted for during the design and production of a mock-up.

During development, the regulations set forth by fishing tournament organizers and the government must be taken into consideration, too. For example, the hook must be biodegradable and harmless to the environment so that the ecological impact is lessened and the aquatic ecosystem is kept intact for future anglers. Legislation can also be an advantage for the DHT. Several states have implemented measures to regulate the use of barbed hooks, even to the degree of banning them completely. Hence, anglers are forced to utilize hooks that have a lower probability of fastening the fish. The DHT would be a welcomed innovation in these areas.

There are many ethical issues that must be addressed involving the entrepreneurial project. For instance, each member of the IPRO team must sign a non-disclosure agreement, agreeing not to divulge confidential information regarding the DHT. This agreement specifies that aspects of the intellectual property of the CEO and founder of Sparrowhawk, LLC are confidential. It also specifies how each team member agrees to treat information he/she is privy to. Any attempt made at reproducing parts of the design for personal gain, legal action will be taken against that person. This is to ensure that the intellectual property of the sponsor is not taken by any other person and so that his idea can be protected.

## Team Values Statement

All group members participating in IPRO 358 acknowledge and agree to adhere to the following principles of professional, ethical conduct:

- To complete their assigned tasks in a timely and earnest manner and trust in their fellow team members to do likewise
- To seek help and/or clarification when needed to understand what is required of them
- To remain informed of all topics and important issues addressed by the group
- To treat each of the group members with courtesy and respect as dictated by professional standards
- To communicate clearly and effectively when sharing information with the group
- To be present, on time, attentive, and open-minded during group meetings so as to achieve maximal participation and comprehension
- To resolve any grievances among group members quickly and peacefully, thereby maintaining focus on their primary objective
- To provide/accept constructive criticism to/from other group members politely.

Absences or tardiness will not be tolerated 15 minutes after the meeting has started. An unexcused absence will be documented unless the cause is a result of a family emergency, personal illness, unavoidable academically/professionally-related obligation, or commuting obstacle. If the cause is due to the aforementioned criteria, the absence or tardy will be documented as an excused absence within reason. Any ambiguity must be inquired through iGroups for a vote. The circumstances for voting will be determined by the team leader. There will be only one explained absence and one unexplained absence (no warning given beforehand) for a total of two absences. In the case of repeated tardiness, it will be voted upon whether or not it is counted as an absence.

Problems will be discussed and submitted to the group at the beginning of each meeting. All members are encouraged to speak freely. If a team member is reluctant to discuss a problem with the group, the member can vocalize his concerns with either advisor or team leader. The problem will then be anonymously discussed with the entire group. An example of this process is listed as follows:

- After class, the offended individual approaches the overall team leader and informs him of his concerns.
- If the problem cannot be mediated, and if necessary, the team leader will vocalize the concerns regarding the issue during the next meeting.
- If the problem pertains to the overall team leader, the offended individual may approach an advisor regarding the problem. If necessary during the next meeting, the adviser will vocalize the concerns about the issue.
- There will also be a time during the meeting to express any questions/concerns. Note cards will be given at the beginning of the class and during the meeting, and if questions/concerns arise, the questions/concerns are to be written on the card. Towards the end of class, or whenever possible, the cards will be collected and the questions/concerns will be answered. If there is no time left at the end of the meeting, the cards will be collected and the questions/concerns will be addressed at the beginning of the next meeting.

As it relates to the decision-making process, relevant decisions are to be voted upon, with majority rule. There will be a provision for allowing decisions that were struck down to be reconsidered for

discussion after a vote. The motion will be set forth by one individual from the majority party. Up to five minutes will be set aside for discussion before the final vote. This will be the decisive vote. There will be communication established in group meetings, as well as outside of meetings. There are many portals we will utilize for discussion: discussion boards on iGroups, Gmail, Google Documents, etc.

## **Methodology/Brainstorm/Work Breakdown Structure**

The Problem:

Creating the envisioned DHT using technology and prototypes from the sponsor and improving on the concept of the design.

- Is there anything missing in the design that would make it better?
- How effective is this technology in a real fishing environment?
- What materials can be used to lower cost yet stay true to its design?
- How is the product assembled?

Finding an appropriate market for this technology and finding costs for manufacturing and distributing.

- How can the product be made quickly and effectively?
- Where should the product be marketed?
- Where should the product be manufactured to lower overall costs, depending on the amount needed?
- Where do you go on after the fishing conference?

Create a business plan for the company.

- What is needed to start a new business and not get overwhelmed by competition in each area of the market?
- What are the current companies with current & future interests in the markets related to the DHT that may be affected?
- Do these companies distribute their own products or have a contract with a third party for distribution?
- What demographics do these companies attract? Who does Sparrowhawk, LLC want to attract with the DHT?
- Will the DHT be used solely for sport fishing? Can it be abused or modified for other applications?
- What is the current state of the marketplace, is fishing on the rise, if so which sectors? What areas in the fishing world are most attractive as entry points for new products?
- SWOT analysis

Plan of Action:

The team will break up into two sub-teams. One sub-team will focus on developing mock-ups of the hook and determining which materials to use. The other sub-team will work on the business aspect of the project, focusing primarily on marketing.

In order to create the envisioned fish hook, the IPRO team plans to create various mock-ups and look for materials that will be cost-efficient, as well as, create the desired effects. These mock-ups will also be tested various ways, including an onsite test at a fishing location. With the testing done, the intent is to improve the design where needed as well as create viable ways to produce the fish hook.

Specifically, as per recommendations from the sponsor, the team will consider different material aspects for the DHT design. However, further research regarding the following recommendations must be completed before these are considered. Although there are many types of fish caught for sport, the DHT expects to be specifically geared toward catching the largemouth bass fish due to its ubiquity and great popularity in the game fishing market. The DHT must be able to flex and collapse to incorporate the activated motion of the hooks. This suggests that if cables are used for the design of the DHT, the materials used to comprise them must possess a high amount of shape memory (return to their original shape after being plastically deformed, especially when heat is applied). Furthermore, to incorporate the flexing component of the DHT, one must consider incorporating a number of different pieces in the design. To integrate the shank and the head, one must consider two separate components forged together to create the DHT, creating a two-piece design. However, the effectiveness of the two-piece design must be evaluated for durability. In a one-piece design with the shank and the head already integrated, one would expect problems with flexibility. Moreover, the DHT must also be strong and durable enough to withstand forces from the fish attempting to escape. However, this may not be as great of a problem in the DHT as it would be in other fishing hooks due to the flexing design of the DHT, allowing for absorption of the shock while capturing fish. Design of the DHT must also incorporate the weight of the lure. Heavy designs will cause the lure and hook to sink, while very light designs will cause the lure and hook to float. Due to the great amounts of metallic alloys used, one would anticipate a heavy design.

The business aspect of the project will focus on marketing. The business team will first determine the target market. Then the team will conduct marketing research including, competitor research, consumer research and ethnographic research. The information gained by this research will allow the team to determine the best way for the DHT to successfully position itself in the market.

This IPRO involves several different aspects, from marketing to materials science, and it will be difficult to accomplish all of our goals due to the time constraints of a short summer semester. This IPRO will be offered again in the fall; therefore it is important to use this semester to create a strong knowledge base of research and ideas for the future team to benefit from. Any tasks that have not been completed this summer can be used to stimulate next semester's team and get them off to a productive start.

#### Documentation:

Throughout the semester, a notebook will be used to record the results of our research. The mock-ups and business research produced for our programs (for example: surveys, DHT prototypes, step by step instructions, and photos of finished product) will also be provided. The team members will also contribute, in the notebook, to a compendium of ideas for possible implementation and alterations of the design for future semesters of this IPRO to draw upon. Weekly status reports generated by each team will also contribute to our documentation.

The test results will be discussed and analyzed by the development team. The development team will research and devise several solutions to each problem apparent from the results if possible. These solutions will be presented to the business team to evaluate the business implications that may arise such as budget restrictions. The development team will consider the recommendations of the business team and proceed to modification of the mock-up.

The IPRO deliverable reports will be generated as a collaborative process. While the project plan will mostly be written and compiled by a group of three individuals, the entire paper will be reviewed by all group members. The final paper, considerably more involved than the project plan, will be created by as a collaborative effort of the entire group. The separate sub-teams, development and business, will be responsible for providing specialized information regarding the separate sub-teams. Members of each sub-team will be responsible for completing a section of the final paper. The entire paper will then be edited by two from the IPRO group, and later reviewed by the entire IPRO. The deliverables for the midterm presentation, poster, brochure, and final presentation will each have two members that will continue to work on them. This will ensure that each member of the IPRO is able to partake in the documentation of the deliverables and the experimentation process of the DHT process.

## **Expected Results**

### **Development Sub-Team:**

The sub-team expected results include replicating, testing, and improving upon Sparrowhawk's original DHT design. Through research and implementation, the sub-team expects to determine the appropriate materials, construction, and shape for the DHT, this includes but is not limited to optimal elastic deformation for the engagement of the hook, the size of the hook, and various types of metals and alloys.

Through experimentation and research, the properties of various materials and alloys under conditions such as pressure can be evaluated. Similarly through research, the shape and structure of the product will be determined. A balance between flexibility and strength needs to be established in order for the hooks to deploy while maintaining enough integrity to reel the fish in.

Potential products include several mock-ups that can be field tested. These mock-ups will be constructed using different designs and materials, so that the most efficient design path can be identified.

Through experimentation, the optimal material and engagement mechanism can be developed for improving upon the original DHT. Also, by optimizing the materials and mechanisms, a cheaper and more effective product can be produced and marketed effectively to compete with the more established products.

Deliverables include design plans for the renovated DHT, as well as, detailed properties of the materials used to construct the mock-ups. These deliverables will provide a detailed view of how the improved version of the DHT will function and a view of its structural properties.

The development sub-team will have several challenges in design to overcome in order to create a successful mock-up. These challenges include developing a method that will allow the bending of a material while minimizing the changes of failure due to fatigue. Another challenge includes finding a material with flexible properties while still being able to withstand tensile forces.

The results gathered from experimentation and research will be used to develop various mock-ups to be tested. The release mechanism, material composition, and structural properties will all be determined by these results.

### Business Sub-Team:

The business portion of this project can be described as a marketing overview and development of potential marketing strategies for the DHT. The business team will initially conduct market research to determine that largest sector of the market because the largest sector will provide the most opportunity for growth for a new technology, such as the DHT.

The next step will be to conduct competitor research to determine if there are any up-and-coming products that might be direct competitors for the DHT.

Ethnographic and consumer research will be conducted to determine consumers purchasing patterns. Information on what the target consumer looks for in fishing and how he/she purchase fishing hooks will be looked for. Consumer research will be conducted in order to determine what consumers would be willing to pay for the benefits DHT offers.

Lastly, research will be conducted regarding potential distribution channels for the DHT. The level of difficulty in penetrating vendors such as Cabela's or Bass Pro Shops will be determined. It will also be assessed whether to pursue smaller scale distribution channels, such as local shops, etc.

The research will be an ongoing process throughout the semester, and bi-weekly meetings will be held to compare and compile the results.

### Project Budget

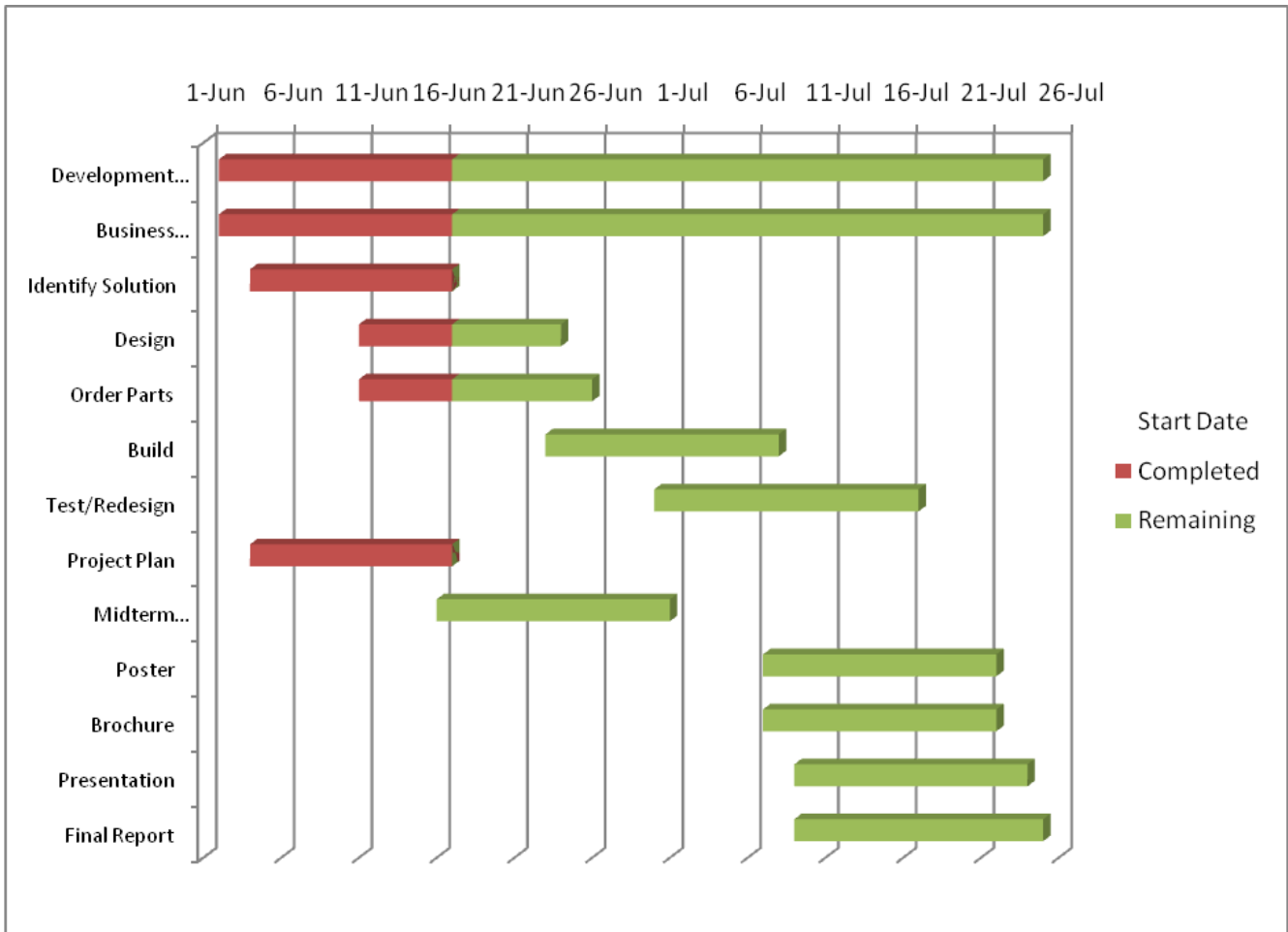
Item	Estimated Cost (\$)
Mock-up Materials/Testing	\$100 (50 J-hooks without barb = \$36, metal wire of varying sizes = \$10 x 4 different sizes = \$40, small firm metal rods = \$5 x 4 different sizes = \$20)
Prototype Evaluation (e.g. fishing trips)	\$250 (license = \$15 x 14 members = \$196 + fishing gear and bait)
Business Research	\$50 (surveys, attracting focus group)
Miscellaneous	\$100 (extra costs from taxes, extra material needed)
Total	\$500

## Schedule of Tasks and Milestone Events

Schedule of Tasks to be Completed

	Start Date	Completed	Remaining	End Date
Development Research	2-Jun	15	38	24-Jul
Business Research	2-Jun	15	38	24-Jul
Identify Solution	4-Jun	13	0	16-Jun
Design	11-Jun	6	7	23-Jun
Order Parts	11-Jun	6	9	25-Jun
Build	23-Jun	0	15	7-Jul
Test/Redesign	30-Jun	0	17	16-Jul
Project Plan	4-Jun	13	0	16-Jun
Midterm Presentation	16-Jun	0	15	30-Jun
Poster	7-Jul	0	15	21-Jul
Brochure	7-Jul	0	15	21-Jul
Presentation	9-Jul	0	15	23-Jul

### IPRO 358 Gantt Chart



The Gantt Chart describes the significant tasks to be completed in IPRO 358.

#### Description of Tasks to be Completed by IPRO 358

	<i>Description</i>	<i>Skills Required</i>	<i>Estimate of Hours Needed to Complete</i>
<i>Development Research</i>	Physical specifications of the DHT must be ascertained.	Extensive background in materials science engineering, particularly regarding metals.	150 All development sub-team members must conduct research to partake in class discussions.
<i>Business Research</i>	Thorough research is required within the market regarding species of fish, sport versus recreational fishing, as well as competitors. Research with consumers and distribution channels will also be done.	Extensive background in marketing and business.	150 All business sub-team members must conduct research to partake in class discussions.



<i>Identify Solution</i>	Different solutions to the problems outlined in previous sections must be explored. Effective solutions must be pursued.	Extensive background in materials science engineering, particularly regarding metals. Extensive background in marketing and business.	40 All team members must collaborate to determine effective solutions.
<i>Design</i>	The DHT must be designed, finding specifications for the different parameters outlined previously. A business plan must be created.	Design background is required. Business experience is required.	50 All team members of the prototyping sub-team must participate.
<i>Order Parts</i>	Different parts for the DHT must be ordered through the IPRO Office.	Knowledge of the IPRO Office.	3 One or two members of the development sub-team.
<i>Build</i>	A number of mock-ups of the DHT must be created, based on time available and effectiveness of previous mock-ups.	Design background.	50 All team members of the development sub-team
<i>Test/Redesign</i>	The different mock-ups of the DHT must be tested and redesigned to determine the most effective one.	Design background.	50 All team members of the development sub-team.
<i>Project Plan</i>	The project plan must be created. The entire group will review it.	Knowledge of the IPRO and communication and literary composition skills required.	20 Three members of the team will compile and edit the plan.
<i>Midterm</i>	The midterm presentation must be created. There must be time included for practice of the presentation.	Knowledge of the IPRO and communication skills required.	30 Two members of the team will create and present.
<i>Poster</i>	The poster must be created. The entire group will review it.	Knowledge of the IPRO and communication and literary composition skills required.	15 Two members of the team will create the poster.
<i>Brochure</i>	The brochure must be created. The entire group will review it.	Knowledge of the IPRO and communication and literary composition skills required.	10 One member of the team will create the brochure.

<i>Presentation</i>	The final presentation must be created. There must be time included for practice of the presentation.	Knowledge of the IPRO and communication skills required.	15 Two members of the team will create and present.
<i>Final Report</i>	The final report must be compiled, a collaborative effort.	Knowledge of the IPRO and communication and literary composition skills required.	40 All members of the team will contribute. One or two members will edit and revise.
<i>Miscellaneous</i>	“Slack Time”		10
<i>Total Hours</i>			633

## Individual Team Member Assignments

The initial steps taken in dividing the team involved identifying the major themes requiring the most attention. In that, the classification of task subsets could be established. Because of this understanding the IPRO group was then divided into two sub-teams. These teams are listed below.

### Development Sub-Team:

The development sub-team will focus on assessing different materials for the development of DHT mock-ups, using models created by the sponsor. This group will aim to test these mock-ups in various locations, and determine how the design and functions of the specific hook can be improved. This group will also assess which material is best to use and how lower costing materials can work. The goal is to create a mock-up that meets the desired effects and can be manufactured at a relatively low cost in order to increase profits.

The development sub-team will meet from 1-3pm on Tuesday afternoons.

#### *Team leader:*

Patrick Zhu

#### *Team members:*

Robert Boyer

Austin Champlin

Michael DiVito

Erik Eglund

James Lai

Hamza Obaid

Jimmy Ton

### Business Sub-Team:

The business sub-team will assess a business plan and marketing aspects for the DHT. This group will aim to research similar products, establish a preliminary selling price, and determine distribution and communication strategies for DHT. This group will also involve a business planning aspect, which will include research and find the best way in which the sponsor can gain the most revenue and influence the greatest number of people with his technology.

The business sub-team will meet from 6-8pm on Tuesday evenings.

*Team leader:*

Bogdan Bistriceanu

*Team members:*

Rachel Choitz

Herbert Edwards

Mohit Gaonkar

Sabina Pop

Andy Staats

## **Designation of Roles**

### Project Monitoring Roles

*Overall Team Leader: Robert Boyer*

(In charge of keeping the entire team going and making decisions, liaison with the professors. The leader ensures that all tasks are accomplished in a timely manner. Resolves conflicts if needed)

*Development Sub-Team Leader: Patrick Zhu*

(In charge of keeping the development sub-team working and stays focused. This leader ensures that all tasks are accomplished in a timely manner within the team.)

*Business Sub-Team Leader: Bogdan Bistriceanu*

(In charge of keeping the business sub-team working and stays focused. This leader ensures that all tasks are accomplished in a timely manner within the team.)

*Development Sub-Team Minute Taker: Michael DiVito*

(Writes down all important information discussed in class and posts them on iGroups)

*Business Sub-Team Minute Taker: Sabina Pop*

(Writes down all important information discussed in class and posts them on iGroups)

*Agenda Makers: All team members in rotation.*

(Writes an agenda of all class meetings and posts them on iGroups before the meeting takes place)

*Deliverable Coordinator: Rachel Choitz*

(Makes sure that all deliverables are completed online and posts the completed deliverable as a nugget on iGroups)

*Spy(s): All team members in rotation.*

(Reports on what the other team is working on so no confusion ensues with the product development)

*Skeptic: All team members in rotation.*

(Acts as a skeptic to comments and ideas in order to encourage opposing ideas.)

*Optomist: All team members in rotation.*

(Keeps the atmosphere happy and calm in order to maintain team morale)

*Reflector:* All team members in rotation.

(Reflects and comments on ideas given by team members, makes sure nothing is lost in translation from other team members)

*Weekly Meeting Report Recorder:* All team members in rotation.

(Writes a report on what occurred during the class and what the goals are for the next class)

## **Works Referenced**

"American Sportfishing Association." American Sportfishing Association 8 June 2009

<[http://asafishing.org/asa/statistics/saleco\\_trends/](http://asafishing.org/asa/statistics/saleco_trends/)>.

- statistics for anglers and sports fishing

"Chicago Fishing Information | Chicago Fishing Reports | WindyCityFishing.com." 16 June 2009

<<http://www.windycityfishing.com>>.

- place where the sponsor and other fishermen share their fishing experience. It is also where we can find our focus group, which was picked by our sponsor.

"ESPN - BASS Membership and Tournament News, Information, Standings, Photos, Videos, Blogs."

ESPN 16 June 2009 <<http://www.bassmaster.com>>.

- to learn tournament rules and regulations for largemouth bass fishing.

"USFWS - Management Offices - State, Territorial, and Tribal." United States Fish & Wildlife Service.

14 June 2009. <<http://www.fws.gov/offices/statelinks.html>>.

- resource for federal and state regulations on fishing