

Enhanced Vision Systems

“Seeing a safer tomorrow, today!”













EnPRO 355

Spring 2009 Project Plan

Section I – Team Information

Team Members

James Burstein	Instructor		burstein@iit.edu
John Stoner	Instructor		stoner@iit.edu
Michael Beemsterboer	Architecture		mbeemste@iit.edu
Bogdan Bistriceanu	Business - Marketing		bbistic@iit.edu
Bank Chavalit	Business - Mat. Sci.		pchavali@iit.edu
Richard Hanley	Computer Engineering		rhanley@iit.edu
David Hoppe	Business - Finance		dhoppe@iit.edu
Julia Rybakova	Business - Finance/Physics		jrybakov@iit.edu
Charles Sticha	Information Tech & Mgmt		csticha@iit.edu
Nicholas Williamson	Business - Finance		nwilli1@iit.edu

Member Strengths and Team Positions

Michael Beemsterboer – Sponsorship Sub-Team Member

- Primary Skills
 - Autocad
 - Photoshop / Illustrator
- Secondary Skills
 - 3ds Max
 - General Office Skills

Bogdan Bistriceanu – Sponsorship Sub-Team Leader

- Primary Skills
 - Finance
 - Sales Techniques

- Marking
- Secondary Skills
 - General Office skills

Bank Chavalit – Sponsorship Sub-Team Member

- Primary Skills
 - Good customer service and people skills
 - General Office skills
- Secondary Skills
 - Skilled in research methodology
 - Photography skills

Richard Hanley – Technology Sub-Team Leader

- Primary Skills
 - Embedded Software Design
 - Systems Software Design
 - Languages Known : C/C++, Java, Haskell, PHP, PERL, VHDL
- Secondary Skills
 - Hardware integration and development
 - Experience with GPS market

David Hoppe – Business Sub-Team Member

- Primary Skills
 - Leadership Experience from U.S. Navy
 - Extreme Attention to Detail
 - Very Good with Accounting/Finances/Forecasting
- Secondary Skills
 - Moderate Computer Programming Experience
 - Excellent with Excel
 - Good Presentation Skills

Julia Rybakova – Business Sub-Team Member

- Primary Skills
 - Synthesizing and organizing information
 - Writing and editing
 - Marketing research
- Secondary Skills
 - Brainstorming and developing ideas
 - Task management

Charles Sticha – Technology Sub-Team Member; EnPro Team Leader

- Primary skills
 - Networking, Wireless (802.11x), Bluetooth (802.15), and network administration
 - Hardware knowledge; A+, Network+, and Security+ trained
 - I've spent many years in retail / customer service management and planning
 - Project Management training

- Secondary skills
 - Java, PHP, Perl, HTML, XHTML, CSS
 - Web application and development

Nicholas Williamson – Business Sub-Team Leader

- Primary
 - Finance
 - Presentation skills
- Secondary
 - General Office skills
 - Quickbooks knowledge and experience

Team Identity

Team Name – Enhanced Vision Systems

Logo – We are currently using “construction lines”, black and yellow slanted lines that denote caution or construction conditions.

Motto – “Seeing a safer tomorrow, today!”

Examples of our team identity can be found at the top of this document.

Section II – Team Purpose and Objectives

Team Purpose

Due to errors on construction sites it is not uncommon for underground utilities to be struck accidentally while digging. Aside from the obvious monetary damages a significant number of people have died as a result of these types of accidents. The purpose of this EnPRO is to aid workers when they are in danger of striking an underground utility by successfully developing a software product that displays subterranean utilities to the workers. The end result being that the number of accidents decreases, saving both lives and money.

Team Objectives

Our underlying objectives are threefold. These three aspects are interdependent, and intrinsic to the team's success. First, the team must strive to create a functioning prototype that can be demonstrated consistently. As the prototyping process moves forward the team must also strive to finalize it's market research and develop an appropriate business model. Finally, the team must strive to obtain a corporate sponsor. These three aspects will also be the basis for determining the team's success.

Beyond what we see as the success of our team as an EnPro and business model; we are also passionate about winning our track at the IPRO Day presentation. We would also each individually like to complete our coursework grade with nothing less than an A for everybody involved. Sub-teams will be created around each of the team objectives.

Section III – Background

Construction accidents are serious matters which must be addressed: 5,000 construction work-site deaths occur annually in the United States, causing annual losses of \$250 million in damages, payments to the injured/bereaved, and lost productivity. We have examined studies on the causes of these accidents and found that a significant number of accidents (around 40-60%) that occurred due to a worker striking a buried underground utility could have been prevented through some sort of advanced method of displaying the locations of the utilities to the worker.

We currently do not have sponsor or customer involved with our project. However we have acquired industry contacts including a safety engineer at WALSH Construction, a safety engineer representing Local 150, two construction attorneys, and a patent attorney at Seyfarth Shaw LLP. One of the goals of this semester is to obtain an official sponsor or outside collaborator.

Current methods of indicating the location of buried utilities are flawed. These include the use spray paint, which can be washed away, and flags, which can be picked up and moved. We are proposing a software application that makes use of Global Positioning System (GPS) technology to accurately display a real-time overview of underground utilities to aid operators in avoiding accidents involving underground utilities.

There have been numerous successes and failures at addressing this problem. One success we have had is in identifying what exactly our project should encompass. This has been attained through the acquisition of numerous interviews with industry professionals. We have interviewed mechanics and operators in the construction field as well as construction attorneys in relation to our product. One failure we have suffered is the revelation of patents similar to our proposal. To combat this failure we have conducted research to identify what can be done about the patents, including pro bono work done on our behalf by a patent attorney from Seyfarth Shaw LLP. This ultimately turned into a success in the fact that it allowed us to clearly identify how we can safely proceed with our project.

During the process of solving our problem, numerous ethical issues have arisen. The most important of these was the revelation of other existing patents similar to our product concept. We were faced with an ethical dilemma on how to react to these existing patents; do we go ahead with what we were doing, do we change what we are doing, what exactly it is they are doing, how does our product concept relate to what they are doing, etc. Copyright infringement and the idea of intellectual property have headlined our major ethical issues. We have also faced an ethical issue internally; who exactly will benefit from our work? We have identified that previous semesters of this EnPro have contributed to the success of this problem, and the ethical issue of how to credit them in the long run has arisen. The patent crediting issue will be addressed again when we are ready to pursue a patent application. These have been the major ethical issues we have faced, but not forgetting the minor issues such as privacy of interviews.

Societal impact from utility breach related accidents is widespread. When lives are lost, there is always an immeasurable impact on family members, loved ones, and friends of the victims. Construction equipment operators aren't the only lives that have been lost due to this type of incident. There is risk associated with any job, but minimizing and mitigating that risk is an important step that businesses must address if they are to remain competitive in the marketplace. If a perceived risk is high, a business may also have to pay more in compensation (both in salaries and litigation) to maintain its operations. When utility breach accidents do occur, businesses incur losses due to monies paid in settlements, medical bills, damages, and higher insurance rates.

As our team goals stand, we will have a testable prototype of our software model by the end of this semester. This testing state would be an Alpha release of our product, leading into subsequent testing, implementation, and refinement of our product in Beta forms for subsequent semesters of this project. An Alpha software build is not a build that is released to the public. Often times, it is kept internally until such testing has been completed to allow it to continue on to a Beta phase. A Beta software build is one that is released to the public with the intent of usability testing and consumer feedback. A Beta phase will more than likely incorporate the use and feedback of actual construction operators in a test and control environment. The goal of having a working software Alpha version of our product by this summer may also lead to the application for a patent by the end of this year.

Section IV – Team Values Statement

Team Values

Good project management skills, dedication, and diligence will all be executed in the pursuit of our product application. Sound ethical practices, analytical skills, and a good sense of business and scope will also factor heavily throughout our Business and Technical teams, as well as our IPRO and Sponsorship teams. Commitment to transparency and disclosure between sub-teams will be maintained. Camaraderie and honesty will be key in our project relationships and success.

In order for this team to function properly there are two things that must be maintained throughout the course in all aspects of the project. The first of these values can be described as communication within sub-teams and between sub-teams. Secondly, the team has a hierarchy and each person is responsible for their tasks. In order to ensure that the project succeeds the team must be able to determine who is responsible for certain tasks, and how to enforce these tasks. Unless members value responsibility and the structure of the team, it will be very difficult to succeed.

In order to value communication within the team, it is important to enumerate what is meant by valuing communication, and how it will be implemented. As this document will show, there are three sub-teams. These teams have interdependent roles, but specializing in different areas. To facilitate communication the team has designated a single minute taker whose job is to record the highlights of each meeting, and to publish those records for the group's edification.

Furthermore, the minute taker is tasked to work alongside the team leader and post the agenda for the next team meeting to iGroups. This ensures that all members of the team know what has transpired, and what is scheduled to occur in each of the team meetings.

Further ensuring proper communication, a sub-team topic summary will be created by the sub-team leaders once a week. This will be a short summary that identifies what the team has achieved thus far, and what the team's plans are for the following week. This document will be sent to the minute-taker by midnight of every Friday, so that they can be included in the previous Thursday's minutes. This way the entire team will be able to get a general idea of what the other teams are doing.

These two plans are used to ensure that the team has proper communication; which is a value that we (the team) hold dear. However, this network will not be useful unless there is some way to delegate tasks, resolve conflict, and define umbrella tasks. These actions form a broad category that can best be summed up by one word: responsibility. For more information on the hierarchy of the team's organization, please refer to Section IX: Individual Team Member Assignments.

Each team member is responsible for punctuality and attendance. It is understandable that each and every team member may not be at every single meeting. However, if a member is unable to attend class, it is expected the person will notify the instructors, and team leader at least one hour in advance via email or phone call. Excessive tardiness or absence will be dealt with the faculty advisors acting as the final arbiters.

Conflicts within a team project are inevitable. The goal of a properly managed team is to ensure that these conflicts are reduced to a minimum and resolved efficiently. As a result the team will have a few ways of handling team conflicts. If there is a conflict within a sub-team the sub-team leader has a greater weight than other members. However, it is important for team members to be able to go beyond their sub-team leaders. As such it is well within anyone's right to bring a conflict before the team leader, or even the entire team (during a scheduled meeting). The team leader has precedence over any of the sub-team leaders. However, his voice is not stronger than the whole team together. If there are any problems that deal with a team leader and a member, or any sub-team leader has a problem with the team leader; then the faculty advisors will be the arbiters. In the unlikely event that there is a conflict deep enough that the faculty advisors cannot handle it, the IPRO office will be the final arbiter.

Other expectations of team members will be the reading and reviewing of previous meeting minutes prior to coming to class. Each team member is expected to come to class on time and prepared. Communication and conflict resolution as described above shall be adhered to at all times. Punctuality and attendance are also mandatory as outlined in our values, with the appropriate actions being taken in the unlikely event that an infraction occurs. If the above values are held dear and the umbrella activities are implemented as described, this team will have a strong framework. A strong framework will be very important to helping this project succeed.

Section V – Methodology / Brainstorm / WBS

The problem we are trying to solve can be derived directly from our Team Purpose. As it states:

Due to errors on a construction site it is not uncommon for underground utilities to be struck accidentally while digging. Aside from the obvious monetary damages a significant number of people have died as a result of these types of accidents. The purpose of this EnPRO is to aid workers when they are in danger of striking an underground utility. The end result being that the number of accidents decreases, saving both lives and money.

We will be creating a device that can potentially save lives and money by assisting construction equipment operators in locating buried subterranean utility lines.

In order to properly create this device, software has to be developed that can incorporate various points of data into a usable graphical map. This 2-D map would then be displayed on an LCD screen mounted inside of the construction vehicle (or equipment). Our goal for this semester is to have a working Alpha version of the software, so that further Beta testing can be performed prior to selecting a hardware device or platform to be used. Specific tasks relating to the creation and testing of the software product can be found in the Section VIII Gantt chart attachment.

While the software version of our product is being developed and initially tested, our Sponsorship team will be working on securing a sponsor or collaborator for our project. The business team will also be working to conduct market research, and producing an appropriate business model for our project and product to follow. Specific tasks relating to each of these sub-team's tasks can also be found in the Section VIII Gantt chart attachment.

IPro related deliverables and deadlines will fall under the dual responsibility of the team leader, and the IPro Day Team. Specific tasks and deliverable deadlines are being individually incorporated into each team's specific Gantt chart and WBS. Please refer to the attachments referred to in Section VIII for further details.

Section VI – Expected Results

As a team, we expect to be able to achieve our objectives. The individual goal for each of the sub-teams lends to the overall goal of our project. We intend to have market research and an appropriate business model completed from our business sub-team; a sponsorship or collaborator secured from our sponsorship-sub team; and a functioning prototype that can be demonstrated consistently from our tech sub-team. Our IPro Day Team will focus on the IPro Day presentation and deliverables associated with it. The formulation of the IPro Day sub-team will take place in late Feb. as to precede the midterm reviews. The expected result of the IPro sub-team will be the successful completion and submission of the IPro related deliverables, and top placement within our track in regards to overall judgment on IPro Day.

The assumption being made as a whole is that the product that we intend to create is feasible as being limited to a semester long project. Another assumption being made is that the

subterranean utility data can either be mapped or collected by a means that's usable for our purposes. We are also assuming that everybody on our team is going to give it their all, and strive for the "gold" when it comes to IPRO Day, and the deliverables due.

Section VII – Project Budget

Estimated Business Team Expenses:

\$100 Marketing and Presentation materials

Estimated Sponsorship Team Expenses:

\$15 Business cards for the team

\$50 Travel related expenses

\$85 Business lunch with prospective sponsor

Estimated Tech Team Expenses:

\$75 Parts, adapters, hardware essentials

\$175 Software and licensing

Estimated IPRO Day Team Expenses:

\$150 Supplies and Materials (estimate based on last years figures)

Estimated Other Expenses:

\$50 Planned team building exercise

\$50 Team IPRO Day preparation luncheon

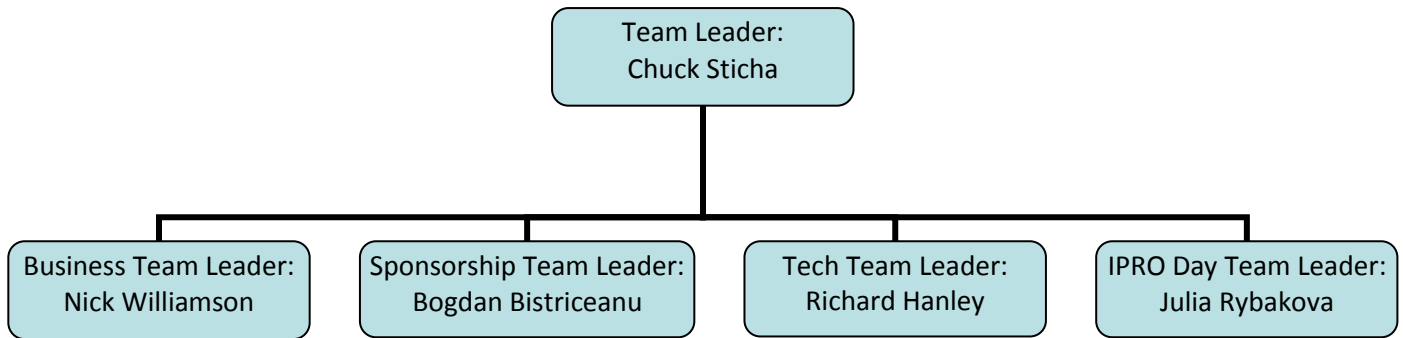
Total:
\$750

Section VIII – Schedule of Tasks and Milestone Events

Please see attached Gantt chart.

Section IX – Individual Team Member Assignments

Team Hierarchy



Team Structure

Team Leader – Chuck Sticha

Business Sub-Team Leader – Nick Williamson

Team Member – Mike Beemsterboer

Team Member – Julia Rybakova

Sponsorship Sub-Team Leader – Bogdan Bistriceanu

Team Member – Bank Chavalit

Team Member – David Hoppe

Tech Sub-Team Leader – Richard Hanley

Team Member – Chuck Sticha

IPRO Day Sub-Team Leader – Julia Rybakova

Team Member – Bank Chavalit

Team Member – Bogdan Bistriceanu

Team Member – Richard Hanley

Team Member – Mike Beemsterboer

Section X – Designation of Roles

Agenda Maker – Chuck Sticha

Duties: Meeting agendas will be used for our Tuesday and Thursday main class sessions. The agenda will outline what topics will be addressed in the upcoming meeting, and include time allotment estimates, and person(s) responsible for executing the agenda item. Agendas will be received by the Minute Taker no later than 11am Wednesday's and Saturday's for the upcoming Thursday and Tuesday meetings respectively.

iGroups Coordinator – Chuck Sticha

Duties: Ensuring that the team is collectively using iGroups properly, and taking self-responsibility

Master Schedule Maker – Bogdan Bistriceanu

Duties: Collecting and maintaining individual team members' schedules and availability via Google Calendar; collecting and maintaining team member contact information.

Minute Taker – Bank Chavalit

Duties: Recording and uploading meeting minutes and highlights to iGroups. Minutes will include next meeting's agenda, and Thursday minutes will include next week's sub-team discussion topic summaries. Tuesday minutes are due to iGroups by 3pm Wednesday, and Thursday minutes are due to iGroups by midnight Saturday. for appropriate use and upkeep.

Time Keeper – Chuck Sticha

Duties: Ensuring that meeting progress in a timely fashion, and that the agenda timeline is followed.

Weekly Timesheet Coordinator – Mike Beemsterboer

Duties: Ensuring that all team members are actively logging and recording their iGroups timesheets; addressing members who fail to comply with timesheet recording; summarizing timesheet statistics to the team leader on a weekly basis; advising the team leader of members who consistently fail or refuse to comply with timesheet updating.