IPRO 305

Building a Wireless Broadband Infrastructure to Support Maritime
Applications

Midterm Progress Report

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Sponsor:

Team: James Hendrickson
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Section 1.0
OBJECTIVES
The objectives of the IPRO 305 team have not changed from what was initially established. The initial objective of IPRO 305 is to build a wireless broadband network infrastructure along a local river to help Air2Access, an IIT University Technology Park Company, expand its maritime solutions offerings. We will do this by becoming familiar with cutting edge wireless broadband network technologies and the different vendors that offer and use this technology. We will also examine the pilot site and work with the appropriate agencies to determine any natural, man-made or legal restrictions that we must abide by. To effectively complete our task in a timely manner, our team has divided into two sub-teams. The application team will focus on business applications and how implement the necessary technologies so that they are appropriate to the potential customers. The infrastructure team will focus on technologies to support the necessary applications and will focus on the site itself, along with the required hardware needed for deployment.

Section 2.0
RESULTS TO DATE
2.1 Project plan
The project plan was prepared submitted to the iKnow website on February 16, 2007. The project plan was created based on the work of the entire team and the consultation of Prof. Cindy Hood.

2.2 Site Visit
To obtain a better understanding of the project, the IPRO team decided to visit the two pilot sites. Bill Shipley, CEO of Air2Access, arranged for the team to visit Crowley's Yacht Yard and a steel mill, the two pilot locations. The visits occurred on February 22, 2007. At the two sites, the team was able to take pictures, which are being used to determine ideal tower locations and potential obstructions to establishing a wireless network in the area.

2.3 Application Team
The application team has completed a large amount of research regarding the market space and any requirements that must be adhered to. As well as creating use case scenarios that will be used to exhibit large scope of services that will be offered to potential customers by Air2Access.

2.4 Infrastructure Team – Building Logistics
The building logistics lead has been contacting the parties necessary for the construction of towers at the pilot sites. These parties include the site owners, the tower erectors, the local alderman, and city officials. In addition to this, the building logistics lead has been working on developing a plat for the two sites. This will assist the entire team in determining the best line of sight and avoid obstructions.

2.5 Infrastructure Team – Bandwidth
The bandwidth lead has contacted several internet service providers in the area of the pilot sites to determine their service offerings, as well as, pros and cons of each. The bandwidth lead as also been researching different camera types and will make a final selection based upon the recommendations of the Application Team.

2.6 Infrastructure Team – Radio Deployment
The radio deployment lead has been researching the different radio options available for the team to select. On the request of our sponsor, the focus has been primarily on two companies, Motorola and Proxim. After the technical requirements are determined by the Application team, a final recommendation will be made.

2.7 Infrastructure Team – Interference
The interference lead has been researching different methods of having the two towers communicate information between one another. On the request of our sponsor, the focus has been primarily on two companies, Motorola and Proxim. After the technical requirements are determined by the Application team, a final recommendation will be made.

Section 3.0
REVISED TASK / EVENT SCHEDULE
3.1 Infrastructure Team
The Infrastructure Team does not have any significant changes to its tasks or schedule.

3.2 Application Team
The Application Team has shifted their focus slightly from the original plan. While the team will still be developing recommendations, for Air2Access, on the type of applications to be offered and the vendors with which to partner, they will now focus more on developing use case scenarios. This will provide key information to the vendors/stakeholders as to the services that will be offered once Air2Access has constructed a full system.

3.3 Event Schedule
The full schedule for IPRO 305 can be found on the next page.

ID	Task Name	Duration
1	Application Team	62 days
2	Team Ramp Up	10 days
3	Conduct Wireless Security Marketplace Research	10 days
4	Develop Application Use Cases Scenarios	10 days
5	Define Business Functional Requirements	5 days
6	Define Technical Requirements	5 days
7	Define Working Hypothesis	5 days
8	Develop Problem Statement	5 days
9	Develop Interview Guides	5 days
10	Identify Interview Candidates	3 days
11	Set Up Interviews	2 days
12	Interview Key Stake Holders	20 days
13	Analyze Findings	3 days
14	Develop Recommendations	2 days
15	Develop IPRD Documents	5 days
16	IPRD DAY	1 day
17	Infrastructure Team	67 days
18	Develop initial problem statement	7 days
19	Network Design	45 days
20	Research communication and electromagnetic interference based on the lo	5 days
21	Survey the site to determine all of the potential forms of interference	1 day
22	Continue to research possible interference	5 days
23	Determine the effects of the topography and surrounding buildings and stru	5 days
24	Determine how the predetermined requirements will be implemented into th	5 days
25	Complete Network Design and assemble final IPRD report	5 days
26	Building Logistics	35 days
27	Send a list of scope clarifying questions to Bill	5 days
28	Make initial contact with the city, fcc, fire, and any additional governing bod	5 days
29	Follow up with original calls to the city and other agencies	5 days
30	Contact the two tower vendors for additional info in restrictions and viabilit	5 days
31	Continue to follow up with the city, start formulation of city final report	5 days
32	Document site conditions, present to group for comments	5 days
33	Complete report of city determined restraints	5 days
34	Amass all required forms from the city	5 days
35	Continue to add information to the site documentation, meet with bill to dis	5 days
36	Start Determining Tower Height	10 days
37	Complete site documentation	1 day
38	Midterm Checkpoint	1 day
39	Request shop drawings from tower contractor for permitting	10 days
40	Assist with network design	20 days
41	Assemble Final Report	5 days
42	Radio Deployment	60 days
43	Contact vendors for product specs and cost	5 days
44	Present radio findings	1 day
45	Narrow down vendor list	20 days
46	Review documents and vendor info	5 days
47	Assist with Building Logistics	10 days
48	Choose a radio set	5 days
49	Band Width Requirements	35 days
50	Contact Bill for clarification of scope as well as technology/vendor	5 days
51	Research on alternate power methods and vendors	5 days
52	Follow up calls to Comcast / AT&T as well as Crowleys regarding fiber ins	5 days
53	Research into AWS camera technology	5 days
54	Follow up on the application team's environmental vendor needs	5 days
55	Work on basic technology set. for infrastructure	5 days
56	Determine capacity per tower	10 days
57	Assist in developing report for midterm review session	1 day
58	Midterm Review Session	1 day
59	Create a capacity per tower figure for the system	5 days
60	Determine final tower equipment	10 days
61	Finalize bandwidth requirements	5 days
62	Assemble final report	5 days

Section 4.0
UPDATED TASK ASSIGNMENTS AND DESIGNATION OF ROLES
The individual task assignments and roles have remained largely the same the same, any changes

A. **Team Leader**
   James Hendrickson

B. **Sub-Teams**
   1. Application Team:
   　　Jason Tenenbaum (Leader)
   　　Brian Chung
   　　Ike Emelogu
   　　TalhaYousuf

   2. Infrastructure Team:
   　　Joe Dietz
   　　Daniel Czuchra
   　　Brian Kim
   　　Jack Calzaretta

C. **Sub-Teams' Responsibilities**
   Application Team:
   - The application team will focus on how maritime customers use broadband wireless access and applications. Using A2A's RiverWatch application suite as the initial platform, we will help in defining A2A's waterside perimeter protection offering for riverside and port facilities and vessels. We will create a list of perceived business and technical requirements for potential maritime customers. We will meet and work with public and private stakeholders to better define the needs and requirements. We will survey the landscape of existing applications and meet with vendors to review and assess capabilities. We will develop recommendations on a set of applications to be developed and vendors with which to partner.

   Infrastructure Team:
   - The infrastructure team will focus on the building and operation of a wireless network in maritime conditions. We will be working with the latest wireless technologies, including Mobile Wi-Max, 802.11 a/b/g, and 4.9Ghz Public Safety, as well as looking at creative and alternative power sources to operate our hardware. We will review GPS & satellite data and imagery and make design recommendations. We will assist in the design and network engineering of individual site locations, tower placement, and design configurations including high capacity links, mesh networks and stand alone access points. We will also assist in site surveys, field testing and pre-implementation and test planning.

D. Sub-Teams Individual Responsibilities

    Application Team:
- Jason Tenenbaum: Not Defined
- Brian Chung: Not Defined
- Ike Emelogu: Not Defined
- TalhaYousuf: Not Defined

    Infrastructure Team:
- Joe Dietz: Building Logistics
- Daniel Czuchra: Bandwidth Requirements
- Brian Kim: Network Design
- Jack Calzaretta: Radio Deployment

E. Assign Meeting Roles
- **Minute Maker:** James Hendrickson
- **Agenda Maker:** James Hendrickson
- **Time Keeper:** James Hendrickson

F. Other Roles
- **Define Paper Layout:** James Hendrickson
- **Define PowerPoint Layout:** Jason Tenenbaum
- **Presentation Boards:** Joe Dietz

Section 5.0
BARRIERS AND OBSTACLES

As we began the project, IPRO 305 encountered barriers and obstacles that slowed us down and raised certain questions of dealing with identified barriers. It initially took longer than expected for all the team members to gain a full understanding of the project. This kept the project from progressing according to the original plan. This was addressed by the team members through a great deal of effort in research and work to get the project back on schedule.

Another obstacle that IPRO 305 has encountered is the punctuality of members for meetings. This has been addressed and hopefully will not be a significant problem in the future.

One obstacle that has been brought to the attention of the team is the inability to construct a tower on one of the sites due to environmental reasons. The building logistics lead is currently working with the local alderman and the sponsor to establish an alternative. While this has not expressed itself as a true obstacle up to now, it could be a large obstacle in the near future.