IPRO 305

Building a Wireless Broadband Infrastructure to Support Maritime Applications

Project Plan

Instructors: Cindy Hood and Dennis Hood

Sponsor: Air2Access, LLC

Team: James Hendrickson
Joe Dietz
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Brian Kim
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Section 1.0
OBJECTIVES

The 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 to build them from off-the-shelf and custom built software. The infrastructure team will focus on technologies to support the necessary applications and will focus on the site itself, along with the required hardware deployment.

Section 2.0
PROJECT BACKGROUND

Air2Access, LLC (A2A) is a start-up provider of maritime communication systems and solutions. They provide ubiquitous network connectivity and maritime applications along coastal and inland waterways. A2A's offerings include a range of consumer and commercial wireless network services and a suite of software applications aimed at improving industry efficiency and security. The company is headquartered at IIT's University Technology Park in the IIT Tower. A2A has been an active recruiter of IIT students on the Main Campus.

A2A is planning to build a wireless broadband network infrastructure along a local river to help build its maritime solutions offering. This infrastructure effort will be used to understand what it takes to deploy and operate a large scale broadband wireless maritime network. A2A plans to partner with industry leaders to undertake an intensive test of wireless technology, applications and its business case in the maritime environment.

The goal of the project is to improve boat and barge traffic flows, security and emergency response along the river, and will serve as the foundation for A2A's future commercial offerings platform. This IPRO team will focus on both the wireless network infrastructure design and the initial set of maritime applications.

Section 3.0
METHODOLOGY

The problem before our team is to create an efficient wireless broadband network for use of maritime applications along a local river. To solve this problem, our IPRO has divided into two (2) sub-teams, an infrastructure team and an application team. This allows each team to focus on a specific set of requirement that were obtained from the sponsor.

Application Team

The aim of the application team is to research and identify potential vendors and clients for our sponsor, as well as, to define a set of business and technical requirements. To do these tasks, the team will conduct preliminary research, then interviews with relevant stakeholders in conjunction with the sponsor.

Infrastructure Team
The aim of the infrastructure team is to define wireless technologies set, as well as, the technical and network architecture. The team will also need to determine building and permitting requirements related to the construction of a radio tower. To do these tasks, the team will conduct site surveys to determine

Section 4.0
EXPECTED RESULTS
Application Team
The application team will develop recommendations, for Air2Access, on a set of applications to be developed and the vendors with which to partner. From this information, Air2Access will be able to select the most mutually beneficial vendors to incorporate into the pilot test of the system in the summer of 2007.

Infrastructure Team
The infrastructure team will develop recommendations regarding 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. From this information, Air2Access will be able to construct a tower and begin conducting the pilot test in the summer of 2007.

Section 5.0
BUDGET

IPRO Day	$200.00
Miscellaneous	$100.00
Transportation	$100.00
TOTAL	**$400.00**

Section 6.0
SCHEDULE OF TASKS AND MILESTONE EVENTS

	Task	Days	Start Date	End Date	Predecessor
Application Team		**67 days**	**1/26/2007**	**4/26/2007**	
2	Develop initial problem statement	7 days	1/26/2007	2/1/2007	
3	Complete initial project plan	7 days	1/26/2007	2/1/2007	
4	Obtain vendor list from Bill Shipley	5 days	2/2/2007	2/8/2007	2,3
5	Assign out vendors to each team member	5 days	2/2/2007	2/8/2007	2,3
6	Finalize problem statement	5 days	2/2/2007	2/8/2007	2,3
7	Complete 1 vendor summary (each member)	5 days	2/9/2007	2/15/2007	4,5,6
8	Gather feedback from Bill on summaries	5 days	2/9/2007	2/15/2007	4,5,6

9	Complete all vendor summaries (about 3 per member)	5 days	2/16/2007	2/22/2007	7,8
10	Present vendor summaries to team	5 days	2/16/2007	2/22/2007	7,8
11	Start developing initial requirements from vendor summaries for Week 5	5 days	2/16/2007	2/22/2007	7,8
12	Bring requirements driven from vendor summaries	5 days	2/23/2007	3/1/2007	9,10,11
13	Bring together and brainstorm additional requirements as team	5 days	2/23/2007	3/1/2007	9,10,11
14	Finalize requirements	5 days	3/2/2007	3/8/2007	12,13
15	Develop interview questions and get feedback from Bill	5 days	3/2/2007	3/8/2007	12,13
16	Midterm checkpoint	1 day	3/9/2007	3/9/2007	15
17	Finalize interview guide	5 days	3/12/2007	3/16/2007	14,16
18	Begin interviews, if necessary	5 days	3/9/2007	3/15/2007	14,15
19	Conduct Interviews	10 days	3/19/2007	3/30/2007	17,18
20	Begin extracting data from interview notes	5 days	3/30/2007	4/5/2007	17,18
21	Complete gathering data and summarize findings	5 days	4/6/2007	4/12/2007	20
22	Start developing recommendations	5 days	4/6/2007	4/12/2007	20
23	Finalize IPRO day Deliverables	5 days	4/13/2007	4/19/2007	22
24	Finalize Application Team report	5 days	4/13/2007	4/19/2007	22
25	Practice presentations	5 days	4/13/2007	4/19/2007	22
26	Last minute practice and planning for IPRO Day	5 days	4/20/2007	4/26/2007	25
Infrastructure Team		**62 days**	**1/26/2007**	**4/19/2007**	
28	Develop initial problem statement	7 days	1/26/2007	2/1/2007	
Network Design		32 days	1/26/2007	3/8/2007	
30	Survey the site to determine all of the potential forms of interference.	32 days	1/26/2007	3/8/2007	
31	Determine the effects of the topography and surrounding buildings and structures that could interfere with the proposed network.	32 days	1/26/2007	3/8/2007	
32	Determine how the predetermined requirements be implemented into the site.	32 days	1/26/2007	3/8/2007	
Building Logistics		55 days	2/2/2007	4/19/2007	
34	Send a list of scope clarifying questions to Bill	5 days	2/2/2007	2/8/2007	

35	Make initial contact with the city, FCC, FAA, and any additional governing body's to determine site restrictions	5 days	2/2/2007	2/8/2007	
36	Follow up with original calls to the city and other agencies	5 days	2/9/2007	2/15/2007	35
37	Contact the two tower erectors for additional info in restrictions and viability, and lead time	5 days	2/9/2007	2/15/2007	
38	Continue to follow up with the city, start formulation of city final report	5 days	2/16/2007	2/22/2007	36
39	Document site conditions, present to group for comments	5 days	2/16/2007	2/22/2007	
40	Complete report of city determined restraints	5 days	2/23/2007	3/1/2007	38
41	Amass all required forms from the city	5 days	2/23/2007	3/1/2007	38
42	Continue to add information to the site documentation, meet with bill to discuss constraints, and arrange contact with tower contractor	5 days	2/23/2007	3/1/2007	37,39
43	Start Determining Tower Height	10 days	2/23/2007	3/8/2007	
44	Complete site documentation	10 days	3/2/2007	3/15/2007	42
45	Midterm Checkpoint	1 day	3/22/2007	3/22/2007	
46	Request shop drawings from tower contractor for permitting	10 days	3/23/2007	4/5/2007	43,37
47	Assist with network design	20 days	3/23/2007	4/19/2007	
48	Assemble Final Report	5 days	4/13/2007	4/19/2007	
Radio Deployment		55 days	2/2/2007	4/19/2007	
50	Contact vendors for product specs and cost	15 days	2/2/2007	2/22/2007	
51	Review documents and vendor info and choose a radio set	5 days	2/23/2007	3/1/2007	50
52	Assist with Network Design	35 days	3/2/2007	4/19/2007	51
Band Width Requirements		32 days	1/26/2007	3/8/2007	
54	Determine the fiber requirements and the logistics involved in bringing fiber to site	32 days	1/26/2007	3/8/2007	
55	Determine the number of cameras to use	32 days	1/26/2007	3/8/2007	
56	Determine the bandwidth required to supply all of the cameras along with other functions	32 days	1/26/2007	3/8/2007	
57	Determine howl the predetermined target technologies effect our bandwidth requirements	32 days	1/26/2007	3/8/2007	

Section 7.0
INDIVIDUAL TEAM MEMBER ASSIGNMENTS

A. Team Members

Name	Major
James Hendrickson	Business Administration
Jack Calzaretta	Information and Technology Mgmt
Brian Chung	Electrical Engineering
Daniel Czuchra	Information and Technology Mgmt
Joseph Dietz	Architecture
Ike Emelogu	Electrical Engineering
Eun Kook Kim	Electrical Engineering
Jason Tenenbaum	Aerospace Engineering
Talha Yousuf	Electrical Engineering

B. Team Leader

James Hendrickson

C. Sub-Teams

1. Application Team:

Jason Tenenbaum
Brian Chung
Ike Emelogu
TalhaYousuf

2. Infrastructure Team:

Joe Dietz
Daniel Czuchra
Brian Kim
Jack Calzaretta

D. Sub-Teams' Leaders

1. Application Team
    - Jason Tenenbaum
2. Infrastructure Team
    - Joe Dietz

E. 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.

F. 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

Section 8.0
DESIGNATION OF ROLES

A. Assign Meeting Roles

- **Minute Maker:** Joe Dietz
- **Agenda Maker:** James Hendrickson
- **Time Keeper:** James Hendrickson

B. Assign Status Roles

- **Weekly Timesheet Collector/Summarizer:** James Hendrickson
- **Master Schedule Maker:** James Hendrickson

C. Other Roles

Define Paper Layout: James Hendrickson
Define PowerPoint Layout: Jason Tenenbaum
Presentation Boards: Joe Dietz