Janus
Technologies

School of Engineering Science
Burnaby, BC V5A 1S6
ensc440-darm@sfu.ca

January 19, 2009

Dr. Patrick Leung
School of Engineering Science
Simon Fraser University
Burnaby, British Columbia
V5A 1S6

Re: ENSC 440 Project Proposal for a Wireless Gateway Device

Dear Dr. Leung:

The attached document, ***Proposal for a Wireless Gateway Device***, outlines our project for ENSC 440. Our goal is to design and implement a programmable unit that will allow for wireless control and monitoring of solar panels as well as provide data logging and a web-based interface.

The purpose of this proposal is to provide you with an overview of our proposed product, the current need that the product addresses, and an outline of the design considerations that have been taken into account thus far. This proposal will also outline how we plan to implement our product, project scheduling and milestones, our sources of information and funding, a tentative projected budget, as well as information about the people in our group.

Janus Technologies consists of four motivated, innovative, and talented fifth-year engineering students: Adam Ciapponi, Matthew Giassa, Daniel Hilbich, and Robert Szolomicki. If you have any questions or concerns about our proposal, please feel free to contact me by phone at (604) 345-4664 or by e-mail at ensc440-darm@sfu.ca.

Sincerely,

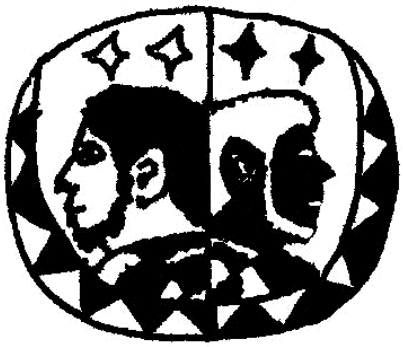
Adam Ciapponi

Adam Ciapponi
President and CEO
Janus Technologies

Enclosure: ***Proposal for a Wireless Gateway Device***

Janus Technologies

Proposal for a Wireless Gateway Device



Project Team: Adam Ciapponi
Matthew Giassa
Daniel Hilbich
Rob Szolomicki

Contact Person: Adam Ciapponi
ensc440-darm@sfu.ca

Submitted To: Dr. Patrick Leung – ENSC440
Steve Whitmore – ENSC305
School of Engineering Science
Simon Fraser University

Date Issued: January 19, 2009

Revision: 1.2

School of Engineering Science
Burnaby, BC V5A 1S6
ensc440-darm@sfu.ca

Executive Summary

Business Description

Janus Technologies is an engineering firm that develops products which enable the effective use and growth of existing green technologies. Our company is based out of Vancouver, British Columbia, with resources at Simon Fraser University where the company's research and development takes place. We are technology entrepreneurs capitalizing on the growing demand for efficient and affordable green technologies. By increasing the usability, scale, and distribution potential of existing products, we, the founders of Janus Technologies, will allow these emerging technologies to become viable energy solutions. Our products bring solutions to our clients that will save them time and money while increasing the overall output of their enterprises.

Key Initiatives and Objectives

The key objective of our company is to begin production of devices for organizations in the Lower Mainland currently providing green solutions through the use of solar energy. The solutions we provide are modeled after the diagram shown in Figure 1 below, where our company plans to expand an existing green technology in a way that is beneficial to both the clients and the environment. Our first objective is to satisfy the desires of our current client, Analytic Systems, Inc. in creating a wireless controller that is accessible remotely for their current solar panel control system, SolarMax. This will allow them to not only control their SolarMax units more efficiently, but to easily control many units at the same time from a remote location rather than individually on site. Our device will also improve upon various shortcomings in their current implementation to ensure that the maximum amount of solar energy is harvested.

Our initiatives can be broken down into three phases: Phase 1 is defined as the financing and product development phase where the capital which we have attained will allow us to develop and refine our product prototype and certify that it is ready to enter production; Phase 2 of the implementation of the product deals with marketing and production, where our product is advertised to local companies and production commences. We are currently in negotiations to sell our product to interested clients as part of this second phase; Phase 3 will see the beginning of growth and sustainability within the company as we expect sales to increase once the product is available for our clients.

School of Engineering Science
Burnaby, BC V5A 1S6
ensc440-darm@sfu.ca

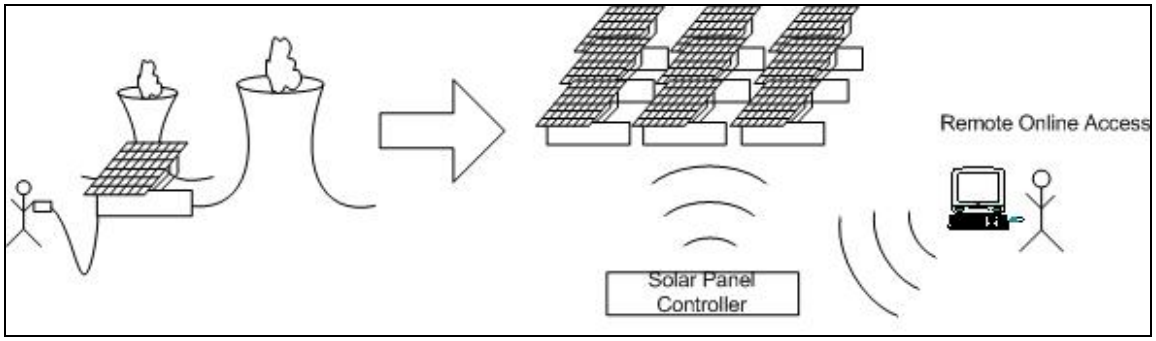


Figure 1 - Control System Overview

Market Opportunities

With a rising concern over the risks of global warming, the world is turning its attention towards green energy solutions. Recently the United States President Elect outlined the details of a stimulus package which would double the US monetary contribution to alternative energy solutions. Similarly, on Canadian soil, Prime Minister Steven Harper has made it clear that he intends to take “extraordinary measures” in enabling green energy solutions [4]. These types of initiatives make it clear that for companies such Janus Technologies, there is great opportunity for growth.

Competitive Position

With Canada becoming a global leader in green energy solutions, the competition amongst developers of these solutions is fierce. As a result, recent years have seen the rapid development of solar, wind, and biomass technologies; however, we have seen that while these energy harvesting technologies are being produced, they are not being utilized to their full potential. Any inefficiencies in green energy solutions can spell an end to their production, and our company is devoted to keeping green energy alive and well by ensuring that these solutions live up to their full potential. A lack of competition specializing in this field is what has allowed Janus Technologies to already begin negotiations with potential clients, and to continue to do so with little visible competition.

School of Engineering Science
Burnaby, BC V5A 1S6
ensc440-darm@sfu.ca

Table of Contents

List of Figures

List of Tables

School of Engineering Science
Burnaby, BC V5A 1S6
ensc440-darm@sfu.ca

1. Introduction

Energy has always been an invaluable resource to the world at large. Whether it is used for powering industrial production systems or consumer electronics, the need for a readily available supply of energy has gone hand-in-hand with the tremendous growth of technology over the past several decades. Over the past twenty-five years alone, worldwide consumption of petroleum has increased by over thirty-four percent, and nuclear electric power consumption has nearly tripled, both at an accelerating rate [1]. With these resources being increasingly exploited, it has become clear that alternative forms of energy need to be developed which not only save money, but also have minimal environmental impacts.

With these environmental and monetary considerations in mind, systems designers have necessarily made consistent efforts to optimize designs for power efficiency. Often these optimizations can be made through the implementation of intelligent controllers, which have been researched and developed over the years to become increasingly robust and reliable [2]. Because of these advances, new control systems, such as a wireless control system, may finally be implemented which ensure that existing technologies are acting as efficiently as possible [3]. It is with these key points in mind that we at Janus Technologies propose the Wireless Gateway System (WGS). This system is a low power, wirelessly managed control system designed to interface with industrial solar power charge controllers.

Throughout this document, the reader will be presented with information on the Janus Technologies Wireless Gateway System, along with plans for the design, implementation, and production of the unit. In addition to this, the reader will be provided with all necessary information pertaining to project funding and material requirement, and will be presented with an overview of the hardworking minds behind Janus Technologies.

2. System Overview

During the course of a cooperative education semester with a local power conversion company called Analytic Systems, Inc., Rob Szolomicki of Janus Technologies noted some shortcomings in their existing solar power interface system, and began brainstorming improvements. After consulting with the rest of the team at Janus Technologies, the entire team approached Analytic Systems with a proposal to improve the existing system.

2.1. Introduction to Analytic Systems

Analytic Systems was founded in 1976 by Lloyd Hargrove, P.Eng. The company was one of the first to develop high frequency switching converters for marine applications (in 1976), and offered pure sine-wave inverters in 1994. Through the years, Analytic

Systems has seen steady growth by serving customers with reliable and robust power conversion products. Their ongoing R&D programs create innovative, state-of-the-art electronic designs that provide clean outputs in efficient and compact packages.

2.2. Problem Description

Analytic Systems is currently developing a smart DC to DC controller that maximizes the power drawn from a solar panel using the maximum power point tracking (MPPT) strategy. It uses a three stage charging process and ensures lead acid batteries do not overcharge. The unit directly interfaces with photovoltaic (PV) solar panels that run at a nominal voltage of 200V, and is intended to be left outdoors during operation.

At the present time, the device is controlled with a kiosk module (KM) using RS-232 communications. This module can navigate through a setup screen and assign certain parameters necessary for the SolarMax Charge Controller (SCC) to begin regulation. Once the initial setup is complete, the KM is used to cycle through the current power conditions of the SCC; input and output voltage, input and output current, charge mode, heat sink temperatures etc. This unit is not very portable due to the wire length constraints of RS-232 whereas a wireless command hub can, from a distance, program the unit without the need of cumbersome button controls. Janus Technologies presented a proposal to Analytic Systems for an improved interface system which would overcome these issues. It would do so by providing a wirelessly capable kiosk which could be used to program the SolarMax Charge Controllers in order to conveniently interface with them at a distance. Additionally, if the system can be accessed remotely through a universal interface, such as through a basic web page interface over the internet, it would present an extremely useful method to troubleshoot customers in the field with setting up their SolarMax MPPT charger.

3. Possible Design Solutions

Our team made an on-site visit at Analytic Systems to understand the problem they were having with their current setup and what was issues needed to be addressed in order to resolve it [5]. By taking a black-box view of their kiosk module and assessing its current capabilities, we were able to confer over what kinds of improvements we can make to the KM's setup process. There was much discussion over what we hope to implement but we soon realized that not all of these issues can be addressed within the time-frame allotted. We propounded to create a multi-tiered solution. This means that we would start with the core components required, and then expand that into the next tier of design implementations as time permits, allowing us to improve the marketability of the final product.

4. Proposed Solution

4.1. Tier 1: Wireless Connectivity & Onboard Displays/Controls

Initially, we would like to create a very small add-on for the SolarMax Charge Controller where the RS-232 coming from the unit is converted to a wireless signal mainly through a low-power RS-232 to wireless chip. Wireless standards discussed included Bluetooth and Zigbee, but it may not provide the range that is needed. Range is high on the priority list, so we will need to investigate a chip to provide us with that functionality. Initially, this RS-232 conversion will be without a Micro-processor which does not ensure the information was successfully transmitted. If data corruption and packet loss becomes an apparent issue when testing, adding a microprocessor to control data loss will have to be a part of Tier 1.

Currently on the Kiosk Module, the command protocol is such that when a carriage return is received by the SCC in 'operational mode,' the SCC responds by constantly outputting data about the current operating conditions discussed in Section 2.2, "Problem Description". Another carriage return is required to cycle to the next operating parameter. Janus Technologies has noted that a more efficient means to arrange the current operation conditions of the system. This involves automatically cycling through each set of operating parameters, sampling that value quickly, and then collating that data into a succinct collection to be reported to the user without the need of constantly pressing a button. We will be investigating whether this is more reliable to cycle through on the SCC add-on control board or the actual command hub located elsewhere.

The main command hub will be located at a distance to the SCC and will be using Microchip microprocessors to communicate to the SCC add-on. This allows the two-way communication for sending commands and retrieving the current operating conditions of the SCC. In Tier 1, the command hub will have on-board push buttons and an LCD display screen to give the user a quick look at what the SolarMax Charge Controller is doing.

4.2. Tier 2: Data Logging & Web-based GUI

Once two-way communication can be made between the SolarMax Charge Controller and the command hub, a natural extension of the command hub's capability would be to log data from the solar panel's performance at the current time and date. This can then be organized to a comma-separated values file (CSV) to be read in a spreadsheet viewer application, such as Microsoft Excel ©. Once this CSV file is exported for the user, a macro can easily convert the data points to a convenient graph so that the user can visually interpret the performance of the solar panels and the energy harvesting capabilities of that location. This visual representation of logged data can even provide incentive to develop a mechanism for tracking the sun. The web based graphical user interface (GUI) is another important step to easily configure the MPPT solar chargers

from off-site locations seeing how many solar panels are off-grid. Despite the SCC's being off the power grid, there are still ways to communicate using the internet if the customer strongly desires it (ie: satellite internet). Being able to communicate with the internet will reduce the onus of data storage from a local source to an external source. This also means that the web interface can possibly produce graphing capabilities within the browser, provided that a convenient browser extension can be used to speed up development.

Janus Technologies has some prior experience with setting up a web server on-a-chip using the open-source "web server on a business card," [6]. This implies that it isn't necessary to use an entire PC to interface with the command hub in order to produce a web server that can be accessed by the customer around the globe. Microchip also has free TCP/IP stack firmware which can be embedded into a variety of their chips without intellectual property issues arising, provided that chips from Microchip are use to run the firmware [7]. There is a wide variety of uses and benefits to embedding web service capabilities to the command hub that can always be improved upon at a later time.

4.3. Tier 3: Multiple Controller Arbitration, SD card capabilities & Command Protocol Modification

If Tier 3 is met in the three months of development, Janus Technologies will be implementing the capability for a command hub to control two or more SolarMax Charge Controllers concurrently, collecting data from each of them while ensuring reliable data transmission. An SD card slot can be added to allow for a very large set of data to be gathered over a long period of time in case the solar panels are to run when it isn't convenient to constantly check up on the device. The command protocol that the current Kiosk Module uses is very simple: the intelligence for the communications remains within the SCC itself.

There is hope for a fundamental change in the way the two devices will operate entirely. Instead of the SolarMax wasting power to broadcast the operating parameters constantly, it will be organized in a packet based format. The command hub will simply send a request for data and the SCC responds with all of the operating status parameters just once, thereby reducing communication complexity and wasted power. This is important because it improves the overall performance of the MPPT controller, where efficiency is a crucial part of its operation. This change implies that the SCC firmware must be modified to accommodate this in the command protocol and may not be part of Janus Technologies' initial prototype. A CANbus interface made the list of possible improvements in the communications systems but will only be implemented depending on available time and resources.

5. Budget and Funding

5.1. Estimated Costs

This command hub is primarily a digital logic circuit using digital communications to convey information between itself and the SCC units. There is some need for analog components when dealing with the power supply of the system but it will likely consist of Microchip's PIC microcontrollers, an external memory unit (flash or SD is possible) and wireless communication chips. The associated costs are outlined in Table 1 below.

Component class	Estimated cost
PIC microprocessors	$150
RS-232 to wireless chips	$200
Memory modules (Flash or SD)	$100
Perforated prototype boards	$50
Additional passive/active components	$100
PCB purchase	$100
Total	**$700**

Table 1 - Summary of Project Expenses & Costs

5.2. Funding

Janus Technologies and Analytic Systems have voiced an agreement in which Janus Technologies will produce a device that can accomplish at least Tier 1 of functionality in exchange for the cost of the device. In addition to the cost of the device, Analytic Systems will obtain the intellectual property rights of solely producing the device for compensation that the team will decide on at the end of the term. This contract will be finalized once the proposal of the device that Janus Technologies would like to produce has passed. The current VP of operations, Paul Bowler, is a former IEEE chair for the Vancouver section and the Engineering Manager, Eugen Trandafir is the current IEEE chair for the Vancouver section. They both have expressed the intent of forming symbiotic relations with students in the past and are ensuring that they present the industrial problem to Janus Technologies with no guidance other than defining the problem clearly.

6. Time Schedule

Shown in Table 2 below is a GANTT chart, outlining the overall production schedule for the proposed wireless gateway device. This schedule summarizes all of the major stages of development for the design, documentation, construction, and testing of the device. The green portions of each bar indicate how much of a certain goal is completed, while the dark blue portion indicates how much work remains to be done for that goal. The end date for each task represents a major milestone in the completion of the overall project. Milestone completion dates can be seen in Figure 2.

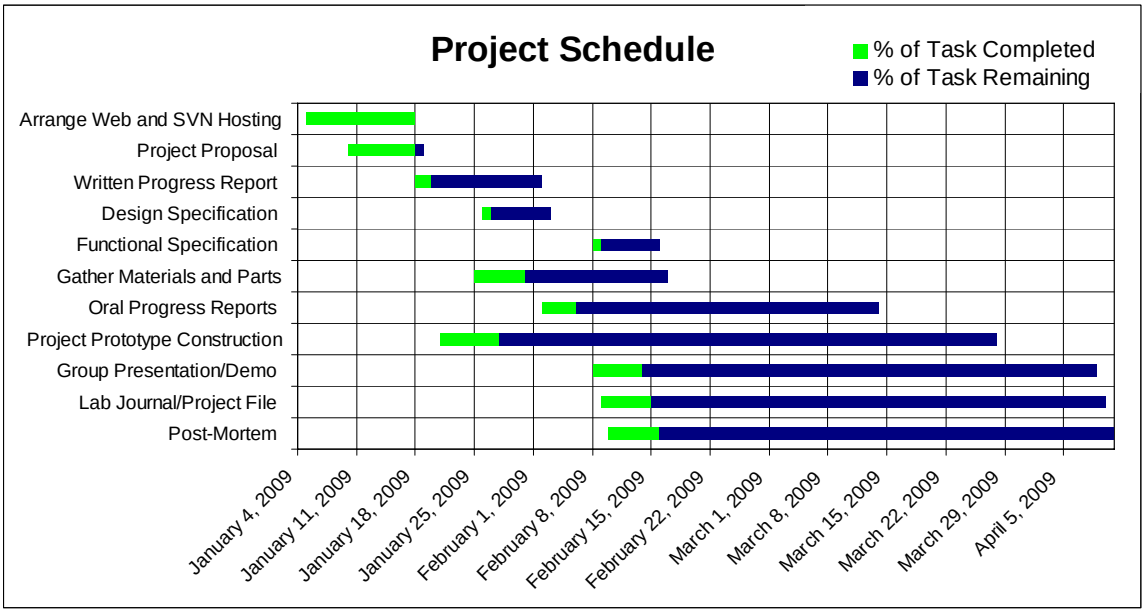


Table 2 - GANTT Chart for Proposed Project

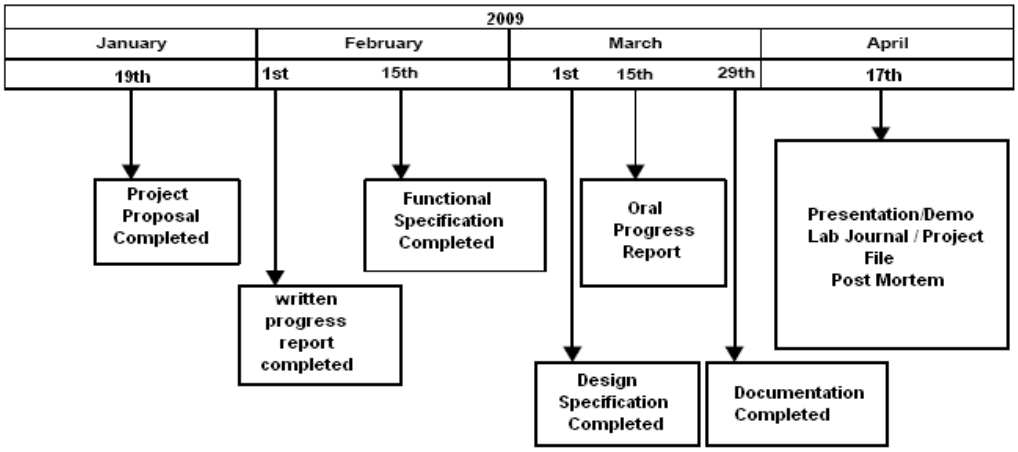


Figure 2 – Project Milestones Timeline

School of Engineering Science
Burnaby, BC V5A 1S6
ensc440-darm@sfu.ca

7. Sources of Information

Throughout the course of this project, from prototyping to full-scale development and eventually the demonstration of a working prototype, information will be used from a variety of sources, including, but not strictly limited to: articles posted on the World Wide Web, journal articles, the proceedings of professional conferences and lectures, books, and technical manuals.

In addition to the above sources, the members of Janus Technologies will draw upon their own respective skill sets expertise in order to deduce means to effectively develop our final product. Also, the team members may consult with established experts in fields pertaining to engineering, electronics, and so on. These experts may include professors and staff at Simon Fraser University.

It is the responsibility of each and every member of Janus Technologies to properly document all sources of information used through the development of any project, and to ensure that project development is conducted in a self-directed manner, utilizing independent research and development, without the direct assistance of any external agency or body.

As stated earlier, Analytic Systems is to provide “no guidance other than defining the problem clearly”, leaving all responsibilities with Janus Technologies, and keeping in-line with the spirit of independent project development.

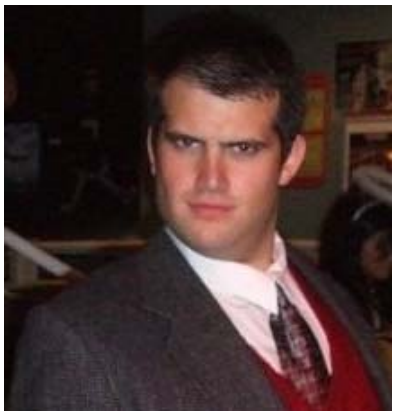
8. Team Organization & Company Profile

The founders of Janus Technologies represent a pool of diverse experience and knowledge which will be critical in implementing such an inclusive project as ours. With skills ranging from hardware engineering to software engineering and even information technology, this team has the technical skills necessary to tackle any engineering problem we may encounter, and a keen business sense to ensure that our solutions are not only functional but also marketable. A short profile of each member of the team, along with their respective roles and strengths, is given below, along with resumes attached for reference in the appendix attached to the end of this document.

Every team member has equal influence in the direction of our company. Weekly meetings are held to discuss the progress of our current projects and review the collective goals of all members. Formal roles are assigned to employees based on individual strengths and preferences, allowing for the specialization of human resources, as well as promoting an egalitarian company structure to foster cooperation amongst employees.

School of Engineering Science
Burnaby, BC V5A 1S6
ensc440-darm@sfu.ca

Adam Ciapponi - President and CEO



Adam Ciapponi is a fifth-year Electronics Engineering student at Simon Fraser University. His engineering interests include analog and digital system design, wireless communications, and high frequency electronics. He has extensive programming experience with both web-based technologies and C++. On his first work term at MacDonald Dettwiler and Associates, he created a framework for testing the 3D geometry for air traffic control landing procedures and created numerous tools that saved the test team a significant amount of time and labor. Furthermore, Adam has worked on many projects with a wide range of applications during his engineering science career, such as FPGA development, assembly level programming, advanced analog design, CAD, high frequency circuit design, and digital communications. These projects have provided Adam with a wide range of design and technical skills as well as interpersonal and leadership skills that will aid him with his duties on this project. Finally, Adam's extensive knowledge of testing methodologies and practices will be essential to the implementation of this project.

Matthew Giassa - VP Communications

Matthew Giassa is a fifth-year Computer Engineering student at Simon Fraser University. Over the past year, he has involved himself in several extracurricular engineering projects. These projects include the design and implementation of a dielectric and bio-materials analysis system, wireless communication devices, and an experimental electrical impedance tomography system to generate 2D and 3D representations of a human breast, indicating the presence of a potential tumor. Each of these projects also required the designing of graphical user interfaces to allow for easy use of these systems by non-technical professionals. In addition to his studies at Simon Fraser University, Matthew continues to volunteer his time as a cancer researcher and bio-impedance system designer for BC Cancer Agency. Currently working as an IT director, he has considerable prior experience in team-based projects and time management. Matthew's IT experience will undoubtedly play a pivotal roll in developing the communication protocols necessary for our controller.

Daniel Hilbich - VP R&D

Daniel Hilbich is a fifth year Electronics Engineering student at Simon Fraser University specializing in hardware development and entrepreneurial design. Along with participating in and winning business plan competitions at SFU, his previous work experience in the ASIC design industry and software development has given Daniel the knowledge of what it takes to create an original product that is technologically superior to the competition and market it. Daniel has participated in various projects with a wide range of applications from hardware development, to advanced circuit design, digital communications, and CAD; these projects have given him a diverse skill set while refining his ability to succeed in any environment. Daniel's experience will become vital in developing the circuitry and hardware modules necessary to provide accurate and immediate signal processing solutions.

Rob Szolomicki - VP Operations

Robert Szolomicki is a fifth year Electronics Engineering student at Simon Fraser University. His engineering interests include wireless communication theory/implementation and ASIC development with VHDL. His has experience working for Environmental Technologies Inc. developing a PIC-based control system circuit for a calibration chamber meant for gas detection instruments. He also coded a GUI to interface with that control system easily by other technicians. Recently, he completed his third (but not final) co-op at Analytic Systems testing, debugging and modifying a 3kW AC-DC power supply with a DC-DC battery backup meant for use in the U.S. Military while creating MTBF documents conforming to the MIL-HNBK-217F Notice 2 parts count method specifications. He plans to pursue an entrepreneurial endeavor after graduating at the end of 2009. Robert's rapport with Analytic Systems and his expertise in power conversion are essential to the implementation of this project.

9. Conclusion

The wireless gateway device which we propose to implement is revolutionary such that it modernizes the control and monitoring of an existing technology by introducing wireless access it, while still conforming to strict power consumption requirements. This effectively improves on the core functionality of the device, without sacrificing any of its original features.

The prototype device we plan to construct will prove itself to be a robust and flexible solution. With the most important features implemented and realized, it will still lend itself to future improvements with relative ease, and provide its users with a more intuitive and effective means to interface with SolarMax units.

As outlined in the tiers of our proposed system overview and our time schedule, the design and production of our prototype device is well within the means of our dedicated and focused team. We eagerly anticipate the development of this project, and look forward to extending it beyond its core functionality to demonstrate its full potential.

10. References

[1] Energy Information Administration. 2008. World Consumption of Primary Energy by Energy Type and Selected Country Groups (U.S. Physical Units), 1980-2006. *International Energy Annual 2006*. 10 Jan 2009. <http://www.eia.doe.gov/pub/international/iealf/table11.xls>

[2] Frost & Sullivan's Technical Insights Research Group. 2008. Advances in Wireless Systems Increase their Reliability in Industrial Applications. *Frost & Sullivan Press Release*. 10 Jan 2009. <http://www.frost.com/prod/servlet/press-release-print.pag?docid=135700400>

[3] Morales, M. and K. Belnap. 2009. Eeny, Meeny, Miney Moe: Choosing a Low Power Wireless Network Protocol - Part 1. 11 Jan 2009 <http://www.embedded.com/design/networking/208402988>

[4] Lauren Krugel. 2009. Green Energy Firms Upbeat about Prospects Despite Economic Woes. *The Canadian Press.* 17 Jan 2009. <http://www.canadianbusiness.com/markets/headline_news/article.jsp?content=b011008A>

[5] Eugen Trandafir, General meeting to discuss project work with Analytic Systems, 16 Jan 2009

[6] Ian Lesnet. 2008. Web Server on a Business Card. *Hack-A-Day.* 4 Jan 2009. <http://www.hackaday.com/2008/09/18/web-server-on-a-business-card-part-1>

[7] Ethernet Solutions Design Center. 2009. *Microchip Design Resources*. 6 Jan 2009. <www.microchip.com/stellent/idcplg?IdcService=SS_GET_PAGE&nodeId=1489>

School of Engineering Science
Burnaby, BC V5A 1S6
ensc440-darm@sfu.ca

Appendix

Attached are the resumes or curriculum vitae for each of the team members with Janus Technologies.

Adam Ciapponi

8888 University DR RM TH17B, Burnaby, BC V5A 1S6
Phone: (604) 345-4664, E-mail: aciappon@sfu.ca

Work Experience

Apr. 2007 – Dec. 2007 **Software Tester - Macdonald Dettwiler** Richmond, BC

- Developed test procedures for the IPDS software program, an air traffic control landing procedure designer.
- Created numerous tools to enhance productivity and fulfill various needs for the test team
- Created an innovative and flexible framework for testing 3D geometry
- Created a code generator that significantly speeded up creation of test procedures
- Wrote documentation for test procedures

Education

Sept. 2004 – Present **Simon Fraser University** Burnaby, BC

- 5th Year Electronics Engineering Student, Graduating Soon
- Dean's Honour Roll, Cumulative GPA of 3.69 on a 4.33 scale

Sept. 1999 – June 2004 **Dover Bay Secondary** Nanaimo, BC

- Graduated with honours and awards with a final average of 94%

Personal Skills

- Ability to work independently or in a team
- Good grammar and writing skills

Technical Skills

Multipurpose Skills:

- Keyboarding speed: 75 words per minute
- Strong math, computing, testing, and design skills

Hardware Knowledge:

- Analog System Design
- Digital System Design using VHDL
- High Frequency System Design

Software Knowledge:

General:	Microsoft Windows, some Linux, Microsoft Office
Scientific/Engineering:	MATLAB, SolidWorks, Eagle, PSPICE, OPNET

Programming Knowledge:

Web/Scripting:	HTML, CSS, XML, PHP, MySQL/SQL
Programming:	C++, Visual BASIC, MIPS Assembly

Volunteer Activities

May 2005 **Volunteer Football Coach - NDSS Football** Nanaimo, BC

- Helped coach the lineman during the spring camp and jamboree for Nanaimo and District Secondary School

Sept. 2003 – Nov. 2003 **Volunteer Football Coach - Football Nanaimo** Nanaimo, BC

- Helped coach a youth football team, the Nanaimo Junior Bantam Raiders
- Aided the development of youths age 12-14
- Helped to coordinated both practices and games
- Coordinated the execution of various drills and activities

Various Volunteer:

- Volunteer Computer Repairman
- Volunteer Math Tutor
- Volunteer Web Designer

Major Awards and Achievements

- 2004 – Gordon M. Shrum Major Entrance Scholarship
- 2004 – Kiwanis Mathematics Local District Scholarship
- 2004 – BC Provincial Scholarship
- 2004 – Dover Bay Physics Award
- 2003 – Dover Bay Information Technology Award
- 2002 – Nanaimo Bantam Redmen Defensive Lineman of the Year
- 2000 – BC Community Football Championship

Hobbies and Interests

My hobbies and interests include:

- Computer Programming and Web Design
- Creative Writing
- Coaching Football
- Weightlifting
- Swing and Salsa Dancing

21102 91A Avenue, Langley, BC, V1M 2C3

Daniel Hilbich

Phone: (604) 616-5854, Email: dhilbich@sfu.ca

Education

Sep 04- Present **Simon Fraser University, Burnaby, BC**

- BASc: Fifth Year Electronics Engineering
- Currently holding a 3.770 CGPA after eight academic semesters, expected graduation after Fall 09.

Co-op Work Experience

Jan 07- Aug 07 **MacDonald Dettwiler, Inc, Richmond, BC – Junior Software Engineer**

- Developed trainer software for pilots using the new advanced multi-mode airborne radar system, contracted by the Department of National Defense
- Specific subsystem developed was a terrain and entity data management system. Involved dynamically managing terrain maps and entities currently in the 'game' according to various radar and game states, and interacting with various other subsystem components.
- Developed in Visual Studio C++. Highlights include a quad tree terrain map design for fast dynamic access and redesigning/redefining in some way nearly all components developed.

Jan 06- Apr 06 **PMC Sierra, Inc, Burnaby, BC – Reliability Engineer**

- Coop Reliability Engineer with participation in Quality Assurance, Reliability and Product Engineering
- Tasks included developing alternative testing for products with Pb-Free packages, revising internal assembly design rules documents, and planning and conducting thermal validation experiments on products
- Administrative tasks including distributing a weekly updated schedule displaying information on current product qualifications, as well as participating in, and in some cases leading, several meetings.

Other Work Experience

Jun 06- Aug 06 Beedie Group Construction, Richmond, BC – General Labourer

- General Labourer for commercial construction company
- Varied duties including carpentry, drainage network connection, ground compaction, etc.

Jun 05- Aug 05 Drake Painting, Langley, BC – Painter

- Painter for contract painting company
- Duties involved both interior and exterior painting, as well as other tasks such as caulking, mudding, sanding, and finishing

Skills

Software	• MS Windows XP, QNX Neutrino • C/C++, Assembly in Motorolla HC 11/12 microcontrollers, MATLAB, SolidWorks
Hardware	• Knowledgeable in computer architecture, as well as the design/analysis of combinational and sequential logic circuits • Electronic breadboarding and PCB design using Eagle. • VHDL using both Xilinx and Altera FPGA development kits • Knowledgeble in FPGA design.
Other	• Skilled in woodworking design and manufacturing. Also adaptable to other machining and construction processes • Capable in Laboratory environment, able to use sensitive equipment (i.e. semiconductor parameter analyzer for characterizing transistors)

Award and Accomplishments

04-present	• **Faculty of Applied Science Dean's Honour Roll** o Awarded for academic standing in the top 10% of my peers
Dec 07	• **SFU Ken Spencer Business Plan Competition** o First place, prize valued at $3,000
Jan 05	• **Western Engineering Championships, Saskatoon, Saskatchewan** o Placed fourth in Junior Team Design, out of eighteen teams of four, in Shell Canada Limited WEC 2005
May 04	• **Gordon M Shrum Major Entrance Scholarship** (**Simon Fraser University**) o Awarded for community leadership and academic excellence o Valued at $24,000

Interests

Academic	• Designed an approximately 1cm scale Microfly, and implemented the design in SolidWorks. • Designed a real-time audio processor using Xilinx FPGA development kit. Inlcuded various hardware blocks and C code instructions. • Designed video codec (luminance component only) with several optimizations to out perform 'baseline' codec. • Other projects include a 12 bit, 7 stage multiplier in VHDL, a poker game implemented in assembly using the Motorolla HC11 controller, a robot arm controller written in C using the QNX Neutrino RTOS, and various bread boarding circuits including multistage amplifiers and high order filters.
Other	• Executive member of Engineers Without Borders SFU Chapter. • Volunteer as Team Leader for SFU Residence Orientation • Athletics: triathlon, squash, hockey, snowboarding, tennis, soccer, and others • Outdoor activities: hiking, backpacking, swimming, camping, etc

Matthew R.J. Giassa

Curriculum Vitae (C.V.)

Contacts

[home] #204 – 6001 Yew St, Vancouver, BC, V6M-3Y7, Canada
[cell #] +1-604-813-2097
[school] Simon Fraser University
[dept] Faculty of Applied Sciences, School of Engineering Science
[e-mail] teo@giassa.net

A Short Biography

I am a fifth year electrical engineering student at Simon Fraser University who is currently specializing in computer engineering and biomedical imaging systems. As an ambitious individual, I have taken it upon myself to take part in several extracurricular projects outside of my regular studies, with my most recent projects involving medical research with BC Cancer Agency. Outside of my professional and scholastic endeavors, I have been an avid volunteer for more than ten years now, and I am very keen to further my professional goals.

Education	**Bachelors of Applied Science (B.A.Sc)** *Simon Fraser University, Burnaby, British Columbia, Canada* Major in Electrical & Computer Engineering (Graduating December 2009, expected) Coursework included: • Team based software and hardware engineering • Biomedical imaging systems design • Designing embedded systems and system-on-a-chip devices
Employment	**Medical Systems Engineer & Cancer Researcher, BC Cancer Agency in cooperation with Simon Fraser University** **April 2008 – Present** • Designed an embedded electrical impedance tomography system to screen for breast cancer in its early stages • Developed image construction software in conjunction with the system to generate a three dimensional representation of a human breast, indicating where a potential tumor was present **IT Director, H Street Media** **August 2007 – Present** • Administrated Microsoft Active Directory, Microsoft Exchange, Citrix Presentation Server, Cisco Call Manager, and proprietary backup systems for the Vancouver, Montreal, and Costa Rica offices of H Street Media • Coordinated computer workstation support for all H Street Media users • Oversaw major equipment purchases **Programmer & Senior Technician, Axis Business Solutions** **April 2004 – August 2007** • Developed custom database applications with Java and SQL • Organized and deployed backup and security solutions for small to medium-sized medical clinics and law firms • Trained new employees **Private Tutor** **January 2004 – November 2008** • Worked as an independent personal tutor • Tutored university level topics, including *Digital Logic*, *Introduction to Computer Architecture*, and *Numerical Analysis* • Experienced in tutoring mathematics at K-5 levels

Volunteer Experience	**Micro-instrumentation Lab Assistant, Simon Fraser University** **March 2008 – Present** • Designed and implemented professional interfaces for lab equipment, including semiconductor parameter analyzers, impedance analyzers, and digital multi-meters • Developed device drivers and firmware for proprietary control circuits **President, Simon Fraser University Martial Arts Training Club** **April 2004 – February 2006** • Increased club membership significantly • Organized club events and equipment purchases • Managed club insurance policies **Database Assistant, BC Child Care Resource & Referral Office** **June 2001 – September 2001** • Managed company inventory databases • Prepared tutorial sessions and manuals on the use of company equipment and software
Conference Papers	• Kholi, Kripal S., Ramani Ramaseshan, Ajit Khosla, Matthew Giassa, Bonnie L. Gray, and M. Parameswaran. "Initial investigation of breast cancer screening method." University of Washington, Pacific Northwest Microsystems and Nanotechnology Meeting, 4 Sept. 2008, Seattle.
Research	**Bioimpedance Analysis and Electrical Impedance Tomography** **Self Powered Embedded System Design**
Software	**ANSI-C** **C++** **Java** **LabVIEW** **MATLAB** **Simulink** **HSPICE** **MIPS Assembly**
Operating Systems	**Linux** • 16 years experience with desktop and embedded Linux distributions **Microsoft Windows** • 14 years experience, 4 of which were in a senior IT role
Languages	• Fluent in English • Proficient in Italian (written and verbal) • Intermediate knowledge of French
Professional Affiliations	• Student Member, Association of Professional Engineers and Geoscientists of British Columbia (APEGBC) Student Society • Member, Institute of Electrical and Electronics Engineers - Dielectrics and Electrical Insulation Society (IEEE-DEIS) • Contributing Member, Experts Exchange - IT Solutions Division (EE)
Activities	• Volunteer Personal Trainer • Hiking • Swimming

ROBERT SZOLOMICKI

4691 Dallyn Rd.
Richmond, BC V6X 2Y3
rms6@sfu.ca
604.767.7990

EDUCATION

Sept 2005 – Present	Simon Fraser University, Burnaby, BC Fifth Year Electronics Engineering
Sept 2003 – Jul 2005	Kwantlen University College, Richmond, BC University Transfer Program
Jul 2003	Cambie Secondary School, Richmond, BC

TECHNICAL SKILLS

Software

- C, C++, VHDL ,VB6, VBScript, Matlab, Excel VBA and Assembly
- Using C++ with the QNX RTOS (multi-threading, multi-processes)
- Experienced with Eagle 4.16r, PSPICE and MatLab for constructing schematics, PCB layouts, circuit responses and simulations, AutoCAD
- Can fully utilize Windows XP, 2000, ME, Mobile and Office '07

Hardware

- Designed circuits using filters, Op-Amps, MOSFET, BJT transistors and linear / non-linear circuit components into circuits
- Lab work with DMM's, power supplies, function generators
- Soldering on prototype boards, analog and digital oscilloscopes

WORK EXPERIENCE

Sept 2008 – Dec 2008
Electronics Lab Engineering Co-op
Analytic Systems Wares. Surrey, BC

- Managed the assembly, testing and quality assurance of the OSCAR UPS prototype AC/DC power supply with DC/DC backup built for the U.S. Military
- Contributed to the circuit design modifications to reduce the radiated thermal energy of the PCB's inside the OSCAR by reducing copper loss and core loss
- Produced six MIL-STD-217F Notice #2 MTBF (mean time between failures) reports for three environmental conditions: ground mobile, ground fixed and ground benign

Jan 2008 – May 2008
Laboratory Technician: SFU's Biorhythms Unit
Simon Fraser University Burnaby, BC

- Used Excel VBA to automate data extraction to streamline research efforts

Apr 2007 – Sep 2007
Software/Hardware Engineer
Critical Environmental Technologies Delta, BC

- Designed a control system that interfaced with a Windows PC via USB to control a calibration chamber for Critical's gas detection instruments
- Programmed firmware for a PIC microprocessor that sampled internal conditions inside the chamber and controlled devices used for the chamber
- Programmed a GUI in VB 6 to provide technicians with a simple way to control the devices that adjust the conditions inside of the chamber

WORK EXPERIENCE (CONT)

Sep 2006 – May 2007 **IT Support: Co-op Student**

Quadra Logic Technologies Inc. Vancouver, BC

- Used VBScript to convert the workstation deployment infrastructure from its existing Novell paradigm. Also scripted with Active Directory
- Made use of Active Directory, Lotus Notes, Systems Management Console, Novell administrative client (ConsoleONE), Livelink
- Performs basic equipment set for new and existing employees

ENGINEERING PROJECTS

Jan 2008 – Apr 2008 **Computer Architecture: 12-bit Multiplier, Simple Processors**

- Used Altera's DE-70 FPGA to construct a 12-bit multiplier and processors (with and without memory) using VHDL. Used the FPGA in conjunction with Quartus II 7.2 and Xilinx's ISE tool

Apr 2008 **Simulated a transceiver in Matlab's Simulink**

- Used MatLab's Simulink to simulate a transceiver that sent a BPSK modulated signal through a channel that experienced Additive White Gaussian Noise. Cyclic, Hamming and BCH encoding/decoding were employed to reduce the Bit Error Rate

Aug 2007 **Constructed a Circuit that Sensed the Movement of Metallic Objects**

- An inductor pair was used to as a means to detect moving objects while a circuit that contained: an amplifier, filter, power detector, differentiator, 1-bit ADC, Latch and LED displayed the movement

Jun 2006 **Designed a Butterworth and Chebyshev Filter**

- Used Matlab to simulate second order filters with both passive and active components

Jan 2006 – Apr 2006 **Digital and Computer Design Laboratory: Texas Hold 'Em**

- Programmed a Motorola M68HC12 Microcontroller circuit board to play 'Texas Hold 'Em.' Used CVS while programming

VOLUNTEER EXPERIENCE

July 2007 – Oct 2007 **Financial Literacy Week**

Advancing Canadian Entrepreneurship SFU (ACE) Burnaby, BC

- Helped with organizing financial literacy week for students at SFU
- Produced marketing material, contacted speakers and sponsors

INTERESTS AND ACTIVITIES

Sports	Playing rugby, volleyball, basketball, tennis and soccer
Music	Playing the Didgeridoo, Bongo drums, Air guitar
Technical	Installing and upgrading PC's, laptops, networks. Engineering design
Art	Taking photos, writing, reading dystopic fiction, freehand poetry
Business	Thinking up new ideas for startups, reading/viewing business related media