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September 17, 2001

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

Re: ENSC 340 Project Proposal for a Phon-E-Mail System

Dear Dr. Rawicz:

The attached document, *Proposal for a Phon-E-Mail System*, outlines our project for ENSC 340 (Engineering Science Project Course). Our intended project is to create a stand-alone device that allows visually impaired and intellectually inept people to use email through the use of a standard Public Switch Telephone Network (PSTN) telephone system.

Our project proposal contains an overview of our proposed product, our sources of information, probable sources of funding, and general information regarding our group members and group structure. A series of possible solutions is presented, and then our group's proposed solution is described, in addition to a justification for this plan of attack. A detailed progress plan is provided and displayed in Gantt chart form.

Fawg Technologies is comprised of five highly dedicated, ambitious, and intelligent fourth-year engineering students. Each student brings a unique skill set to the project team that will allow us to work in a fast and efficient manner. Group members include **Marvin Tom**, President and CEO; **David Ciampi**, CFO; **Raymond Ngun**, COO; **Calvin Ling**, VP Marketing; and **JP Costales**, VP Operations. Should you have any questions, concerns, or comments about our proposal, please feel free to contact me at (604) 431-6508 or via the Internet at my-aplio@sfu.ca.
Thank you for your time.

Sincerely,

Marvin Tom,
President and CEO
Fawg Technologies

Enclosure : Proposal for a Phon-E-Mail System

FAWG TECH — PHON-E-MAIL

**Proposal for a
Phon-E-Mail System**

PROJECT TEAM

*DAVID CIAMPI
JOHN-PAUL COSTALES
CALVIN LING
RAYMOND NGUN
MARVIN TOM*

CONTACT PERSONNEL

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SUBMITTED TO

*DR. ANDREW RAWICZ
STEVE WHITMORE
SCHOOL OF ENGINEERING
SCIENCE*

FAWG TECH PHON-E-MAIL

EXECUTIVE SUMMARY

Curtis Chong, president of the National Federation of the Blind in Computer Science, says that when blind people first got onto the Net in the early '90s with the help of assistive technologies like WebSpeak or JAWS, "the first big boom was email, because you could now see and send mail without having to pay someone to read it." But with the onset of graphical email and the active desktop, Chong stresses that "the danger signs are on the horizon." As Rosmaita says, "the problem with the Web is that it's point and shoot, but if you're blind, you can't see the target."

Electronic Mail has become a worldwide standard for daily communications between people from different walks of life. Electronic Mail is essentially free and an individual can be left a message or compose a message 24 hours a day, 7 days a week. E-Mail is now second nature to business people, teachers, students, children, and even the elderly. However, due to some physical or psychological restraints, some people still cannot and have not utilized the power of electronic mail. These individuals have been seriously hampered by not being able to actively participate in the electronic mail phenomenon.

The Phon-E-Mail system is a sophisticated piece of equipment that allows an individual to send and receive e-mails without the need of a computer. The Phon-E-Mail system features voice recognition and text-to-voice software. The Phon-E-Mail system is not actually a phone in itself, but rather a phone attachment that can be connected to existing phones to make them E-mail ready and enabled. With the Phon-E-Mail system, even individuals with no computer skills can easily receive and compose E-mail messages freely. The main vision of the Phon-E-Mail system, however, is to allow visually-impaired and/or blind individuals to yield the full advantages of the technological age, and utilize electronic mail without the need of a complex computer system.

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1 INTRODUCTION

Many consumers do not want to purchase a computer for numerous reasons. Some of these reasons may include financial difficulties, intellectual aptitude, and/or a physical disability preventing the use of a computer. Because of these reasons, many consumers do not enjoy some of the privileges of using a computer that most would take for granted. One of the many privileges is communication using the computer and the Internet. More specifically, e-mail is a form of communication via the Internet that is widely used and accepted. The following are some features of e-mail that is not found in other communication methods:

- Mass distribution capability

    o An e-mail can be directed to hundreds of recipients.

- Cost-effective

    o Communication around the world without a long-distance cost. Also reduces telecommunication, printing, and postage costs

- Voice-mail capability

    o E-mail can be retrieved at anytime.

The Phon-E-Mail system allows consumers in the above categories to use e-mail cost-effectively. The email system provides a simple interface that introduces users to a widely used communication method. The email system requires a very short learning curve and thus can be easily adopted by the consumer. The Phon-E-Mail system is a simple system that will allow all types of users to easily connect to the Internet and utilize the power of electronic mail. In short, the email system introduces email to consumers without the complexity and requirements of a classic computer system.

2 SYSTEM OVERVIEW

The Phon-E-Mail system operates regularly when a standard call is received. However, when an email is received, the system will provide a distinct ring to indicate incoming email. An audio confirmation is needed so that visually impaired people will know that an incoming e-mail has been received. The figure below shows a high level system block diagram.

Person   Phone   Phon-e-mail System   Internet
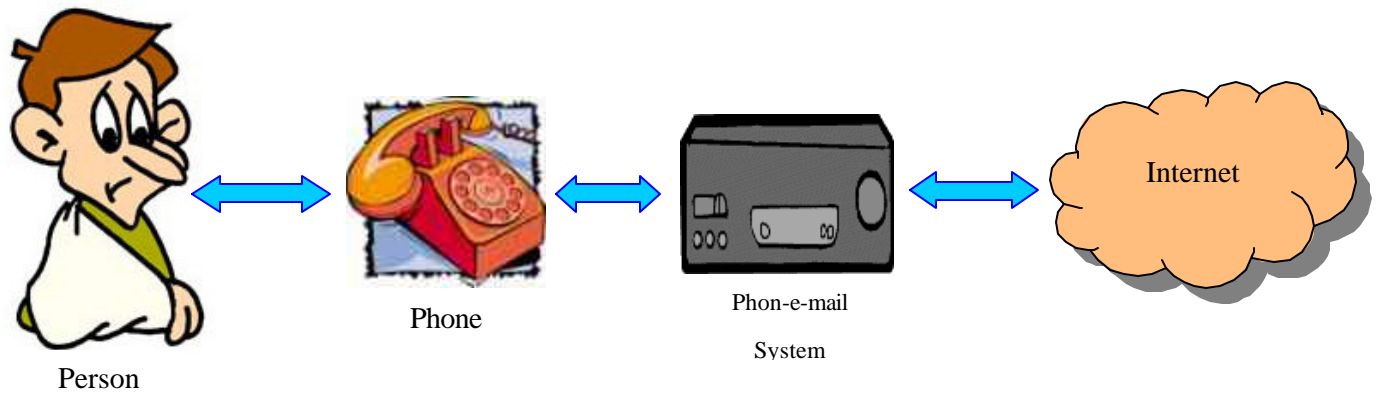
Figure 1: System Overview

Note that the system works in both directions. Once an email has been received by the user, the user then has the option of replying to the message.

3 POSSIBLE SOLUTIONS

3.1 REGULAR VOICE MAIL SYSTEMS

A regular voice mail system such as telephone mail boxes or standard answering machines are often used by visually impaired individuals. Some disadvantages of voice mail systems are that there are no mass distribution capabilities. The caller must verbally say the message into the voice mail. The user cannot easily reply to a voice mail. Long distance charges may also apply for long distance calls.

3.2 ALL IN ONE TELEPHONE

This solution incorporates the whole solution into a super-telephone that contains all the above mentioned functionality. This telephone system can then be purchased as a whole by the user and can be seamlessly plugged into a PSTN or Ethernet jack. This solution will be expensive as the email system needs to be directly interfaced to a telephone.

3.3 COMPUTER AIDED DEVICE

This requires a telephone to be hooked up to the computer. With an existing computer, there already exists email functionality. A computer aided device would be an interface between a normal PSTN telephone and a computer system. This solution may not be viable for visually impaired people as they would normally not own a computer at home.

3.4 DIAL IN SYSTEM

This solution requires the user to subscribe to a service. The user can then dial in via a regular telephone call to check email messages much like a voice mail system. This system can only process wave files as email messages though and does not perform any text to speech processing. The user must also pay for the service.

4 PROPOSED SOLUTION

Our proposed solution is to not create a stand-alone product but rather to create an attachment system that can interface directly to a standard telephone. The system can then send emails via an Ethernet connection or via a modem. Since the popularity of appliances being Internet ready is increasingly more available, our initial prototype will contain an Ethernet interface. A block dia gram of the system is given below.
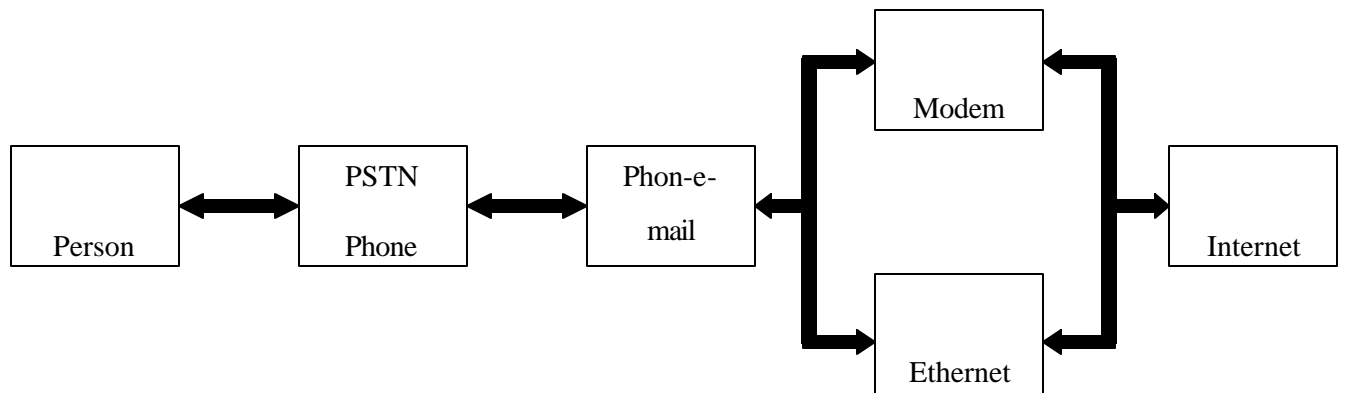
Figure 2: System Block Diagram

The initial plan is to perform both speech-to-text and text-to-speech processing. There are currently a number of text-to-speech open source programs that could be used within a normal micro-processor without the need of DSP. We are still researching speech-to-text options but a contingency plan exists to send mp3 or wave files if a speech-to-text option cannot be found.

5 SOURCES OF INFORMATION

The Internet will be our main portal for market research and analysis. As the market for email devices is continually changing, we need to use a medium that will keep us up to date on the changes in the emerging market. We will continue to monitor websites such as http://www.geek.com/ and http://www.cnet.com/. These websites are constantly updated with news of emerging products. There are also a series of technology magazines that talk about emerging technologies. Some of these magazine publications are Wired, Popular Science, Spectrum, and EE News. Most of these magazines are readily available at SFU.

Our main source for hardware and software development will be Patric k Leung and George Austin. These two SFU lab engineers will be vital in the analysis and debugging of our system. Both of these individuals have extensive knowledge in the areas of embedded systems and hardware design.

Further information regarding product research, ideas, usability, and development will be obtained from Dr. Andrew Rawicz and Steve Whitmore. The teaching assistants Roch Ripley and Maria Trinh will also be used for continual feedback during the development of the project.

6 PROJECT FINANCES

6.1 BUDGET

The following table outlines a tentative budget for the Phon-E-Mail system. The requirements have been broken down into general categories due to the fact we do not have specific solution yet.

Table 1. Budget	
Category	**Cost Range**
Micro-controller development board	$200
Telephone Handset	$15
DTMF Detector	$5
Extra Small Electronic Components	$50
15 % Contingency	$40
Total	**$310**

Note that the total cost of our solution is quite small and most of the costs can be covered by the grant from the ESSEF fund that we hope to secure. When the product is brought to production the only major cost will be the micro-controller. That will result in a very lost cost solution to our purchasing market.

6.2 FUNDING

We are currently talking to a number of companies to find sources for funding. Talks are ongoing and will progress through the entire duration of the project. We have already secured a number of samples for electronic parts. Shortly, we will be shifting our funding focus to find grants to fund the majority of our expenses. Below is a list of a number of companies we are currently seeking out to find cash funds.

6.2.1 ENGINEERING STUDENT SOCIETY ENDOWMENT FUND

The Engineering Science Student Endowment Fund (ESSEF) was created to ensure Undergraduate Engineering Students at Simon Fraser University (SFU) have the best access to the latest equipment, teaching aids and hardware for their projects. The money for the projects is derived from interest on the principal which is actively managed by SFU's Development Office money managers.

6.2.2 MDS VENTURES PACIFIC INC.

This is the Vancouver-based subsidiary of MDS Capital Corp., providing financial and management support to biotechnology, medical devices, and health-related ventures. It manages the $20 million British Columbia Life Sciences Investment Partnership, investing primarily in B.C. based early stage companies.

6.2.3 PRIMAXIS TECHNOLOGY VENTURES INC. HTTP://WWW.PRIMAXIS.COM/

Primaxis Technology Ventures Inc., is a new (Jan'99) joint venture of Royal Bank Growth Corporation (RBGC) and a global technology transfer company, BTG International Inc., to evaluate and commercialize advanced technologies developed mainly at Universities.

6.2.4 VENTURE CAPITAL CORP HTTP://WWW.BEB.SB.GOV.BC.CA

This is the B.C. Government's Venture Capital program ($18m/yr) which provides a tax -free grant (30%) incentive for venture investors.

6.2.5 NRC'S IRAP PROGRAM HTTP://BC.CTN.NRC.CA/IRAP

This program is unquestionably one of THE BEST sources of funding to small, growing technology companies, not too mention soft support as well!

6.2.6 ISTA/NRC MART PROGRAM HTTP://WWW.SCITECH.GOV.BC.CA, HTTP://BC.CTN.NRC.CA

This program, "Market Assessment for Research and Technology", provides 50% support up to $15,000 to B.C. companies to help them assess the market potential for new technologies.

6.2.7 SCIENCE COUNCIL OF B.C. HTTP://WWW.SCBC.ORG

Science Council offers invaluable support in the form of grants for technology development under its very successful Technology B.C. Program. TechBC funds technology development projects for small and growing companies.

6.2.8 CANADA FOUNDATION FOR INNOVATION HTTP://WWW.INNOVATION.CA

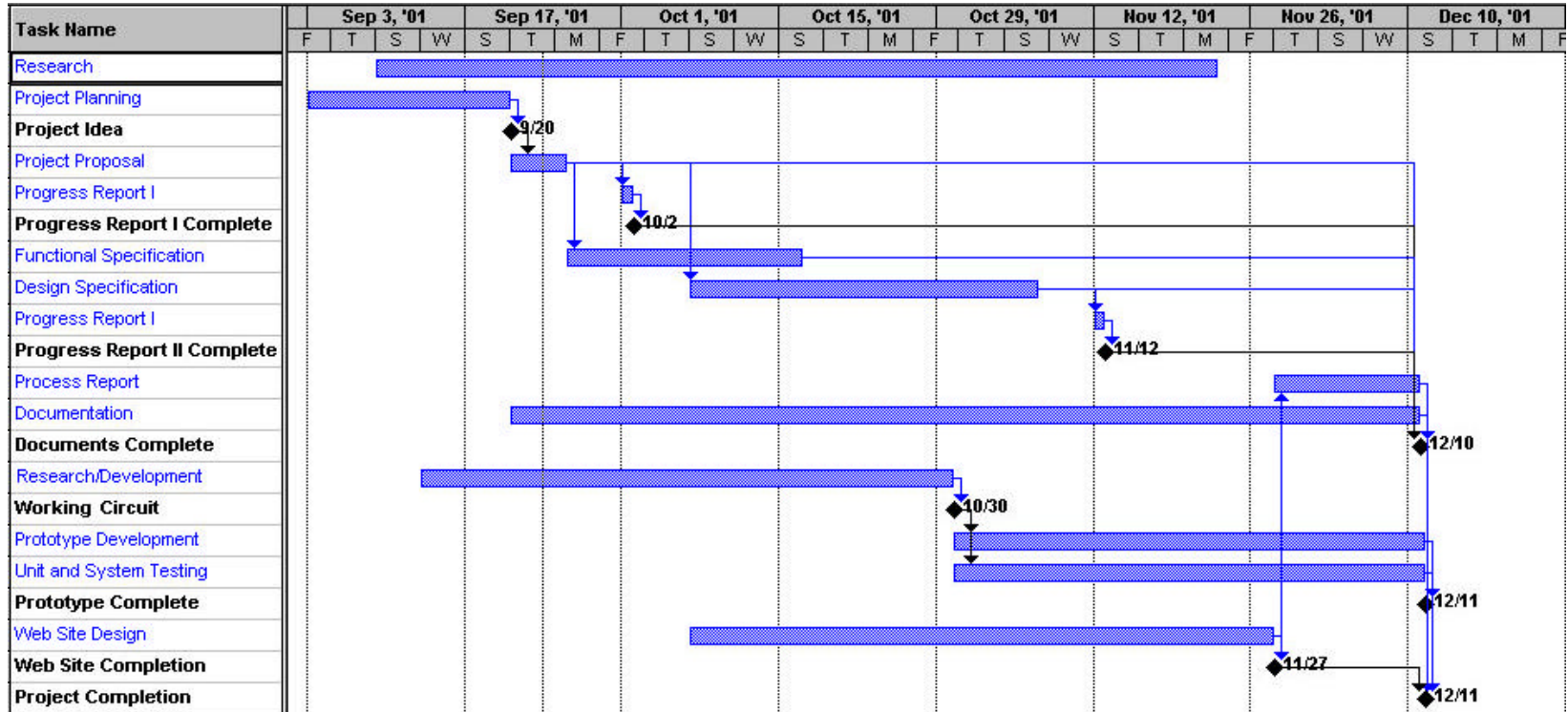This is the Government's recently announced (Feb/97) $800 million Fund for research infrastructure.

6.2.9 NATURAL SCIENCES ENGINEERING RESEARCH COUNCIL HTTP://WWW.NSERC.CA

NSERC provides approximately **$450 million** annually to Canadian Universities for Engineering and Science research. By collaborating with Universities, companie s can get "matching" funding for research programs from NSERC.

![FAWG TECH PHON-E-MAIL logo]

7 SCHEDULE

The project is divided into several distinct activities and then into several sub-items. The activities include project planning, documentation, prototyping, and web site design. Each of these activities and its subsequent items are shown in Table 1 along with the expected time needed to complete each activity and item. Also shown in Table 1 are the milestones achieved after the completion of each activity and item. Note that the project research extends well into the design and prototyping stages of the project.

Task Name	Sep 3, '01	Sep 17, '01	Oct 1, '01	Oct 15, '01	Oct 29, '01	Nov 12, '01	Nov 26, '01	Dec 10, '01
	F T S W	S T M F	T S W	S T M F	T S W	S T M	F T S W	S T M F
Research								
Project Planning								
Project Idea		9/20						
Project Proposal								
Progress Report I								
Progress Report I Complete			10/2					
Functional Specification								
Design Specification								
Progress Report I								
Progress Report II Complete						11/12		
Process Report								
Documentation								
Documents Complete								12/10
Research/Development								
Working Circuit					10/30			
Prototype Development								
Unit and System Testing								
Prototype Complete								12/11
Web Site Design								
Web Site Completion							11/27	
Project Completion								12/11

8 TEAM ORGANIZATION

FAWG Technologies have employed a highly competent team of five prolific and proficient workers. All five of the individuals are 4th year students at Simon Fraser University's prestigious School of Engineering Science. Through a plethora of different work experiences at a variety of different companies, each team member brings a unique set of specialized skills and knowledge base to the group, covering all areas of the project scope. The team is ready to work hard to achieve a common goal for the project. We believe the broad range of skill set and the work ethic we are willing to contribute to the project will undoubtedly be the deciding factor on successfully completing the project. Refer to the next section for an outline of each member's skill set.

8.1 ROLES AND RESPONSIBILITIES

At FAWG Technologies, the corporate structure is not heavily enforced. Each member of the team has equal status and will be heard by other teammates. Each member of the group will be given their opportunity to take on the task they want and each member is given their fair share of the workload. However, for structural purposes each member is designated a position within the company. Marvin Tom is the Chief Executive Officer (CEO) and thus in charge of group dynamics and work ethic. David Ciampi is the Chief Financial Officer (CFO) and thus in charge of the budget and financial issues of FAWG Technologies. Raymond Ngun is the Chief Operating Officer (COO) and thus in charge of the ongoing development of the product. John-Paul Costales is the Vice President of Operations and thus is also in charge of the ongoing development work. Calvin Ling is the Vice President of Marketing and thus responsible for the documentation and presentation of the company and the product. In terms of development work, each member of the group will have development responsibilities on top of the aforementioned duties.

The development work given to each member is determined by the member's expertise. Initial stages of the project require close teamwork for research purposes. As the project moves into the prototyping and development phase, each member is given tasks best fitted to their abilities. The assignment of work will

be done during the team meetings where we will discuss the best person for each task. This provides depth and organization to the project.

8.2 COMMUNICATION

Communication among the members of this team is not a problematic issue since all team members attend the same school and have very similar class schedules. The main form of formal project communication between the team members will be bi-weekly meetings with all or most team members present. Team meetings are conducted without a head speaker and each person is given their opportunity to contribute. Time constraints are imposed on the meetings so that proper work is done during the meeting. Several team meetings will be scheduled weekly to discuss individual and group progress. Additional meetings will be announced depending on the need at the time. But one meeting at the end of week is conducted to ensure the project is progressing. At this meeting, we will discuss accomplishments in the past week and our goals and objectives for the next week. We will also assign work and schedule team meetings for the upcoming week. A group e-mail list is set up so that we can communicate easily through email. In case of emergencies, each member of our team will have the phone numbers of the rest of the group.

8.3 TECHNICAL RESPONSIBILITIES

The following table indicates the major technical parts of the project that each member will be responsible for.

Team Member	Responsiblities
Raymond Ngun	Software Development
David Ciampi	Hardware Development
Marvin Tom	Protocol and Communications
Calvin Ling	Protocol and Communications
JP Costales	Text to Speech, Speech to Text Development

9 COMPANY PROFILE

9.1 MARVIN TOM – CHIEF EXECUTIVE OFFICER (CEO)

Team member Marvin Tom comes with experience in digital data communications. Marvin has developed ASICs, worked extensively with hardware description languages, and also worked extensively on testing and developing ATM backbone switches. Marvin has worked for big name companies including Cogent Chipware Inc, PMC-Sierra, Newbridge Networks, and Glenayre. Marvin brings a broad range of expertise to the group. Technical writing and digital development are some of the important assets Marvin brings to the group. Outside of work, Marvin enjoys playing basketball and skiing.

9.2 RAYMOND NGUN – CHIEF OPERATION OFFICER (COO)

Team member Raymond Ngun has experience in several areas of communications. Raymond has developed software on a DSP processor for signal processing, worked with the exploding IP technology, developed on multi-services access switches, and designed a complete test platform solution. Raymond has worked for such companies as Cogent Chipware Inc, HotHaus Technologies, Nortel Networks, Newbridge Networks, and Broadcom Canada. Raymond brings an unyielding dedication for excellence in project quality as well as a driving work ethic, which in turn, is reflected upon the other members of the project group. Outside of work, Raymond creates professional style web pages, a trait beneficial to this project.

9.3 DAVID CIAMPI – CHIEF FINANCIAL OFFICER (CFO)

Team member David Ciampi has a background in "hands-on" engineering development. His skills and employment experience include work with wireless data communications, lab equipment, circuit board soldering, software testing and extensive experience with project documentation. David's credentials include work terms at companies such as Conexant Systems, Philips Semiconductors, Circon Technology Corporation, Newbridge Networks, and Sierra Wireless. David is a dynamic individual who brings new

ideas and a vast experience to the group. Outside of professional work, David is an ambitious entrepreneur, having already started several home businesses.

9.4   CALVIN LING – VICE PRESIDENT OF MARKETING

Calvin Ling is a versatile and dedicated member of the project team. Calvin has an extensive background covering data analysis, data collecting, development of data analysis software, and script development. Calvin's work terms at Spectrum Signal Processing, Creo Products and Newbridge Networks have given him the many skills listed above, and have given him invaluable and practical project group experience that will aid this particular project group. Outside of work, Calvin is an accomplished athlete, competing and participating in several organized sports including volleyball, skiing and snowboarding.

9.5   JOHN-PAUL COSTALES – VICE PRESIDENT OF OPERATIONS

Team member John-Paul Costales has a background in wireless data communications, software development and testing, computer programming, customer service, and software/hardware computer security. John-Paul worked for prestigious organizations including the Ministry of Human Resources, Simon Fraser University, Orca Bay Sports & Entertainment, Conexant Systems, Philips Semiconductors, and Sierra Wireless. John-Paul brings many new and innovative ideas to the group as well as a focused perspective on human factors and usability engineering. Outside of professional work, John-Paul likes to spend his time playing jazz on his alto-saxophone and " playing" the stock market as well.

10 CONCLUSION

There are many visually impaired individuals in society that may not own a computer due to their disability. These people still may want to be a part of the greatly expanding Internet, but have no gateway to it. There may be people only interested in using email and do not want to purchase an entire computer system. These people would like to purchase the minimum amount of equipment to hook up to already common and existing household items, in this case the phone. In small offices or labs, using the phone for email allows for more space for workers and experiments without the cluttering of large computers. Also, it reduces the value of equipment that is exposed to thieves. Computer theft is growing and it reduces the amount of expensive computer equipment needed to email.

Our Phon-E-Mail system can provide an affordable means of accessing email via a regular telephone. It will provide a small compact design and provide a seamless link between a phone connected to the telephone company and the Internet. The Phon-E-Mail system is a product that is easy to use, yet with extremely powerful capabilities.

11 REFERENCES

11.1 COMPANIES

Rabbit Semiconductor Inc. Davis, California. http://www.rabbitsemiconductor.com/

National Semiconductor Inc. Santa Clara, California. http://www.nsc.com/

Motorola Semiconductor Products Inc. Calgary, Alberta. http://e-www.motorola.com/

11.2 SFU PROFESSORS

Dr. Andrew Rawicz. *Reliability physics and engineering, VLSI reliability, physical transducers, integrated sensors, film technology, nonlinear optics, materials processing in microelectronics.*

Patrick Leung. *Engineering Lab Instructor.*

George Austin. *Engineering Lab Instructor.*