

# CANADA-JAPAN COOP PROGRAM

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## Sanyo Electric Co., Ltd Internship Experiential Work Report June 2007 – April 2008

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## TABLE OF CONTENTS

|    |  |    |
|----|--|----|
| 1  | COMPANY BACKGROUND .....                       | 3  |
| 2  | SPECIALIZATION OF DEPARTMENT .....             | 4  |
| 3  | TASKS AND RESPONSIBILITIES .....               | 5  |
| 4  | ACQUIRED KNOWLEDGE AND SKILLS.....             | 5  |
| 5  | APPLICATION TO ACADEMIC AND CAREER GOALS ..... | 7  |
| 6  | RELATIONSHIP WITH SUPERVISOR & COWORKERS.....  | 8  |
| 7  | LIVING ARRANGEMENTS .....                      | 9  |
| 8  | CULTURAL EXPERIENCE .....                      | 11 |
| 9  | ADVICE FOR FUTURE STUDENTS.....                | 13 |
| 10 | OVERALL IMPRESSION .....                       | 14 |

# 1      **COMPANY BACKGROUND**

SANYO was first found as Sanyo Electric Works in 1947 by Toshio Iue, as a manufacturer of bicycle generator lamps. As business quickly expanded from domestic to overseas, the company went public and SANYO Electric Co., Ltd was officially established in 1950. As a result of setbacks caused by severe shortages of nickel for manufacturing bicycle lamps, SANYO decided to manufacture radios leading to its first step into the electric appliance industry. Differentiated by its affordable cost and plastic instead of wood casing, SANYO's plastic radio successfully established for SANYO a solid starting reputation as an electrical appliance company in Japan. The release of SANYO's new plastic radio was soon followed by a successful launching of Japan's first jet-style washing machine, securing for SANYO a household name throughout the country. After going global, partnering with US companies, SANYO also expanded locally by establishing a production base in Kanto in addition to its headquarter in Kansai, concentrating on producing refrigerators, freezers, radio equipment and semiconductors. This was soon followed by expansion of many manufacturing plants worldwide, producing color TVs and various other commercial appliances. To date, SANYO's product line has expanded to include solar power generating systems, eneloop rechargeable battery, virus washer, multimedia projectors, digital cameras, washing machines, television, electronic components and semiconductors.

## 2 SPECIALIZATION OF DEPARTMENT

The research and development department is an indispensable part of SANYO's continual drive for innovative technologies that keeps SANYO at the fore front of developing cutting edge technology, supporting commercialization of various products of the business department. The research and development department is organized into research centers that focus on human ecology, advanced energy, devices development and digital systems. During my internship at SANYO, I belonged to the Adaptive Wireless System Group of the Wireless Communication Research Department in the Digital Systems Research Center located in Anpachi, Gifu.



The SANYO Solar Ark – Anpachi, Gifu

Our group's research activities involve wireless standardization and development of wireless systems for various applications ranging from multimedia to automotive.

### **3 TASKS AND RESPONSIBILITIES**

The main task of my internship is to help in the development of a wireless network protocol suitable for inter-vehicle communication. In order to complement and support test results from a network simulation, I was to implement the same protocol on a testbed on which the protocol can be tested and demonstrated in real time and realistic conditions. As a starting exercise, I first implemented a WiFi chat program to familiarize myself with setting up WLAN cards and network programming in Linux. After reading many research papers related to flooding protocols, I was given the opportunity to come up with what I thought was an ideal protocol to use for mobile ad-hoc networks before I was introduced to the actual protocol to be developed. In addition to the protocol development project, I provided occasional assistance to other team members by running ray trace simulations and conducting other internet research on topics such as wireless system components, software and devices.

### **4 ACQUIRED KNOWLEDGE AND SKILLS**

As a result of my initial training exercises, I was able to gain a greater understanding of wireless networking, flooding algorithms, and protocol design. I am glad that I was first given the opportunity of designing my own protocol before

being introduced to the algorithm of the protocol our team designed. Subsequently, I was able to obtain a broader perspective on protocol design as oppose to beginning with a limited view based only around our design. At the project briefing, my supervisor and I agreed on carrying out my project at the more difficult kernel level in hope of minimizing runtime delay. As most team members and I are relatively new to Linux kernel development, taking on this task has definitely been one of the most stretching learning experiences I have had. Although the first few months were marked by many cycles of successful and failed approaches, much of that helped me edge closer and closer to the final product, learning an amazing amount by my own mistakes. In hindsight, although it was a daring decision to venture into the complicated world of Linux kernel development, the results and the process have proven the decision to be a wise and productive one. Though I was often discouraged at the little process I was able to make at the start, I am now glad to be able to see the payoff as my internship comes to a close. By choosing to develop the protocol in kernel space, not only did I come to learn a whole lot about Linux Kernel Module programming, I also got to see how the networking programming worked in finer details that otherwise would have been encapsulated if I was to program at the application level. Along the whole development process, I had the opportunity to learn and apply many other useful tools such as the packet generators and analyzers, kernel logging mechanisms, system time synchronizing protocol, secure network protocols like SSH and SCP, bash scripting and MJPEG video decoding. Furthermore, while assisting other co-workers, I had to chance to explore

many other interesting topics and software such as CDMA devices, GPS, radio propagation, Google SketchUp, Google Earth and GIS tools.

## **5 APPLICATION TO ACADEMIC AND CAREER GOALS**

With a major in Engineering Physics in the Electrical Engineering option, I have always taken an interesting in the area of wireless communication. I spent my first coop term working in the mobile company, Research in Motion, developing CDMA drivers for Blackberry products that were soon released into market. Working here at the Wireless Communication Research Department of SANYO in Gifu allowed me to complement my previous experience and see how it is working in the wireless communication industry from a R&D perspective. As I also have an interest in Business Administration, it was great to be able to see and learn from a different working culture and company structure.

## 6

## RELATIONSHIP WITH SUPERVISOR & COWORKERS



Nakaoka-San and I

During my internship, I was under the supervision of Nakaoka-San. Nakaoka-San is a very caring and responsible manager. Though often busy, he will always follow up with how I am doing or ensure that I am looked after by other co-worker when he is unavailable to do so. Although the development process of my project can be slow, tedious, and discouraging at times, Nakaoka-San has never added to my pressure and remained supportive and understanding of the many challenges I faced. Other superiors as well as co-workers are all very resourceful and helpful whenever I go to them for help. A healthy relationship can be seen between all members of the group and the working atmosphere is friendly (and especially friendly during the occasionally group enkaï when all the co-workers enjoy the company of each other).

A few of my co-workers, a couple of which I held weekly language exchange sessions with, also often help me out with my everyday needs, driving me to places, and inviting me to social luncheons, dinner and sports activities.

## 7 LIVING ARRANGEMENTS



My Apartment in front of the Solar Ark

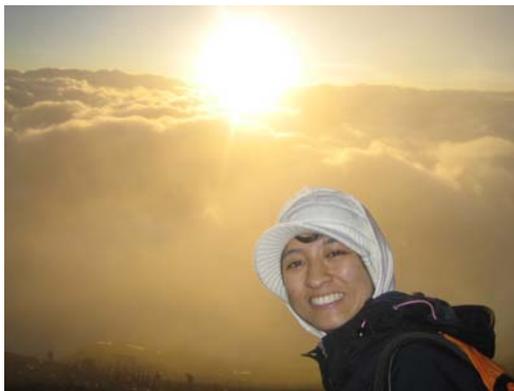
I was very pleased with the apartment that I was provided with. As I've heard that the female dormitory has been removed a while ago, the company had arranged for me a private apartment in front of the solar ark. It is a spacious, air-conditioned apartment containing almost all the furniture, home appliances and housing items that I need. Using the bicycle I was provided with, it only takes me 5 minutes to commute to work. The only downside to this apartment is that getting decent

internet access is difficult as the internet service providers refused to route a new line to the apartment and placed me on a waiting list until a sufficient number of tenants will apply for their services. I never heard back from the service provider since. Though inconvenient at times, I soon adapted to life without internet at home, which may turn out to be a good thing as I can spend more time doing other things like play table tennis or basketball at the Sanyo Sports Center, or read a book instead of surf the net. Other than internet, the setting up of everything else such as my bank account, cellular phone and alien registration went well with the help of a co-worker who also showed me the closest grocery stores and train stations. The nearest grocery store is conveniently located about 5 minutes away by bicycle whereas a couple bigger and cheaper grocery stores can be found about 20-25 minutes by bike. Equipped with a full kitchen at my apartment, I was able to do groceries about once a week and enjoy cooking dinner for myself. Several restaurants are also within 5 minutes bike ride when I feel like eating out. For lunch, the company cafeteria provides a variety of decently priced meals over which I can enjoy a nice break with a few friendly and amusing lunch buddies.

For my Japanese lesson, my co-worker found for me a volunteer-based Japanese class located at the JR Gifu Station. To get to the JR Gifu Station, I would take a 30 minutes train from the local meitetsu station located about 10 minutes by bike from my apartment. The GifuHashima shinkansen station is also conveniently located by the meitetsu station, if I wanted to get to somewhere farther quickly (and lavishly).

## 8 CULTURAL EXPERIENCE

With no doubt, this has been so much more than another coop term. Here in Japan, there is so much to see, eat and experience outside of work. I made use of my first month in Japan in rainy June to slowly settle and adjust to daily life in Japan. But shortly following that was a weekly schedule packed with traveling and cultural activities. I attended my very first matsuri in a yukata at the famous Gion Matsuri. Even though I was not able to attend the actual parade which took place on a working day for most of us, I enjoyed the company of a turn out 18 other coops in addition to what felt like a crowd of 18 thousand people. It was quite an experience and I was surprised at the high spirited atmosphere though it was not even the actual day of the parade. Following that I've had the pleasure of attending various other matsuri's while traveling to places throughout Japan including Chubu, Kanto, Kansai, Hokkaido, and Okinawa, the most memorable of which have been trying to beat the sun up Mount Fuji, chasing an unending school of fish while snorkeling in the crystal clear waters of Okinawa, eating the sweetest sea urchin in Hokkaido,



Sunrise at the Top of Mt. Fuji



Sea Urchin Rice Bowl from Hokkaido



Shirakawago Village in Gifu



Sand Onsen at Ibaraki, Kagoshima

visiting the traditional Japanese towns and villages in northern Gifu and slowly rolling all over Kyushu on the famous “18 Kippu”, an all-you-can-ride slow train ticket. On top of being able to see random beautiful scenery just by traveling on the train, getting to see the seasonally spectacular scenes like the fireworks, the red leaves and cherry blossoms is absolutely amazing. In addition to learning a lot about the Japanese culture, I was glad I was able to share a little bit of our culture during times like Christmas and through volunteering to teach young kids English a couple times a month.



The Moms and Kids in my English Class

## 9

## ADVICE FOR FUTURE STUDENTS

I think my biggest regret while leaving Japan is not having been braver in practicing the Japanese I learned from the books. Though I learn to read and write a lot more Japanese than before, my listening and speaking skills soon fell behind because I was always more comfortable to fall back to English when that seemed to be more easily and quickly understood. Even though communication was essentially not a big issue for me as many co-workers speak very good English and I was to get around alright on my basic Japanese, I would really have loved to get to know everyone more personally as well as be able to carry on a decent conversation which non-English speaking people that I meet. I would encourage all future students to focus on practicing their listening and speaking as much as they do in reading and writing.

In terms of traveling, I always feel so fortunate to be able to travel and experience Japan over a long period of time. Most people have to pay expensive flights just to spend a few days or weeks in Japan. Because it seemed relatively cheaper for me to travel domestically in Japan, I sometimes I find myself feeling like I have a bigger budget than I really do as the number of days I spend traveling really accumulate over the year. Transportation and eating costs can actually deplete your funds quicker than you realize. So it is always helpful to spend more time doing research for cheaper transportation and accommodation. It is always useful to form a close network with your fellow coop students to exchange ideas, experiences and share accommodations. Though it is always more comfortable hanging out and traveling

your fellow coop students, do go out and get to know some local friends as well.

Those are the people that can show you the most authentic Japanese experience as oppose to always ending up in the common tourist traps.

## **10 OVERALL IMPRESSION**

As the term progresses, I began to realize that what makes this more than just another working and traveling experience is the simple fact that I have been given the opportunity to experience the daily life in Japan amongst Japanese people. Although picking up a new language has been a big challenge, I am very lucky to have met many kind Japanese co-workers, who have been very helpful in the process. At the middle of my term, I started attending these language exchange sessions, in which I got to meet friends with whom I can engage in interesting and real life conversations with. Not only did I learn a lot from these people during the language exchanges, they have also included me in all sorts of social activities such as luncheons, dinners, and sports events of various kinds. I've taken on badminton every week and through that I have met many non-English speakers. The language barrier however, doesn't seem to keep them from including me in their conversations and social events. Though as shy in their English as I am in my Japanese, I really enjoy being a part of their playful Japanese conversations. As the term progresses, I find that all people I work with and met have made me feel more like a resident than a traveler. So all in all, being given this opportunity to get to work with and live amongst these genuine people has helped me experience how it really is to live in Japan.