

## FINAL REPORT

I stayed abroad via: Fonds Studiepunten Buiten Nederland

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Subject of practical training abroad: Application of advanced signal processing methods in control engineering

Period of stay: from 18-08-2005 to 15-12-2005

Name institution / company abroad: Australian Centre for Field Robotics, the University of Sydney

City and country : Sydney, Australia

### 1. Preparation and financial matters:

Finding a place to perform my traineeship has not been too difficult. During a discussion with professor Steinbuch a clear picture was obtained about possible subjects for my practical training, which would be best related to my personal interests. Furthermore we discussed several possible destinations of which Australia in my opinion would be the ideal one.

Two weeks after this discussion I received a message from my professor including the contact details of my coach at the Australian Centre for Field Robotics, a research institution of the University of Sydney, Australia. It was also arranged that another student would accompany me to perform his traineeship as well at ACFR. The first contact was established quickly and just after that preparations were started to obtain an occupational traineeship visa for a stay of four months in Australia.

Before receiving a visa, a nomination approval had to be obtained. Therefore several forms were filled out both by me and my host institution and sent to the Australian Department of Immigration and Multicultural and Indigenous Affairs. After that it took about a month before the nomination approval had been granted. Together with another form and € 95,- this nomination approval was sent to the Australian Embassy in Berlin, Germany to obtain the desired visa.

Concerning financial matters one should be aware that there is only a limited amount of funds available for study/training in Australia. Therefore one should be prepared to pay the largest part oneself. Besides the support of FSNB I received a financial compensation from the department of Mechanical Engineering at TU/e. Furthermore ACFR paid the oneway-ticket Amsterdam-Sydney.

## 2. Accommodation

Finding a place to stay in a city like Sydney can be a bit of a hassle, especially if you try to do this from abroad. Nevertheless I made the choice to arrange my accommodation before arriving in Sydney. After trying several other options I applied for residency at the Sydney University Village. The residential fee of AUD 285,- per week is quite expensive for Sydney standards. However, AUD 40,- of the residential fee is added weekly to a kind of credit card, which can be used to purchase meals at the food outlets in the village or to buy food in the village store. The facilities at SUV are excellent and only three years old. SUV is ideally situated at the main campus of the University of Sydney in the heart of the city, at walking distance of the Central Business District and Circular Quay (with the Opera House and Harbour Bridge).

## 3. Language and culture

In Australia of course the main language is English. Australian English is quite similar to British English but the Ozzies tend to use many abbreviations. However, with a normal level of English you will not encounter any communication problems. Due to the fact that a large part of the Australian citizens consists of immigrants, you will also hear lots of other languages especially in a large multicultural city like Sydney. Australian culture could be described as some kind of mixture between American and European culture with the remark that Ozzies have a far more relaxed way of living than many inhabitants of Western countries. Due to many immigrants you will also encounter many other cultures, especially in Sydney. Most important are the influences from surrounding Asian countries.

## 4. Free time and travelling

In a metropolis like Sydney there is never a dull moment. During the nights after work and during the weekend I had plenty activities to do. Next to major attractions like Sydney Opera House and Sydney Harbour Bridge there are far more things to see and do in Sydney. Due to the nice weather in Sydney all year round, Sydney-siders love the outside life. Sydney is famous because of its beaches, which are really close to the city centre. One thing you should certainly try when you are in Sydney is a surfing lesson. It's possible to ride a wave just after one day of lessons.

Another place where I loved to hang out were the big parks in the city. During the weekends many people go there to have a pleasant afternoon of walking, relaxing, sporting, reading, picnicking etc., which creates a really nice atmosphere. Other places worth visiting are Taronga Zoo, National Maritime Museum, Sydney Aquarium, Powerhouse Museum, AMP tower etc. Moreover each part of the city has its own typical characteristics and atmosphere which are really nice to explore. All over the city centre and surrounding suburbs, there are many possibilities to go out at night.

Ofcourse Australia is much bigger and I would certainly suggest to reserve some spare time to travel through this huge country. In close vicinity of Sydney the Blue Mountains are an excellent place to get out of city life for a weekend. I would certainly recommend an abseiling/canyoning trip, which is really worth the money in these beautiful surroundings.

Furthermore I spent one week of travelling in North-Queensland near Cairns. Rainforest, beautiful beaches, the Great Barrier Reef, farmland, huge waterfalls, volcanic grounds and outback meet together in this part of Australia and guarantee that you can make the best out of your trip. The landscape is really diverse and changes almost every hour when driving through it. Other activities, which are recommendable, are rafting at Tully river, visiting Daintree National Park and snorkelling/diving at the Great Barrier Reef.

Near the end of my training period I spent another week near Alice Springs to explore the outback of Australia. Places worth visiting are Uluru, Kata Tjuta, Kings Canyon and the West MacDonell Ranges. Another nice thing to do is driving the Mereenie loop, which is an off-road track of about 250 km, only accessible by four-wheel driven car.

Finally, I would like to note that Australia as a country is really equipped to meet the demands of tourists. If you like to travel somewhere it is no big deal to hire a car with three other people and drive around the country with no really detailed travel-plan. Places to sleep are available everywhere and in each price category. Every small city has its own tourist information centre for objective advice and detailed maps of the surroundings.

#### 5. Contents of your project abroad

During my training period I worked on time-frequency analysis of servo errors from an iteratively controlled mechanical motion system, i.e. a waferstage, to investigate the so-called position-dependent dynamics in the waferstage. Using signal decomposition of the servo errors from this control system, several physical features of the dynamical system can be extracted and analysed. The analysis method has shown to be particularly useful to obtain more insights in the position-dependent dynamics of the waferstage.

Most of the research conducted, consisted of literature study and computer calculations and simulations. Nevertheless, measured signals from a real test setup were used in all calculations and simulations.

#### 6. What was your best experience

From the first moment I got off the plane in Sydney I felt at home and welcome. This feeling lasted for four months. All people I met were so extremely nice!

#### 7. What was your worst experience

I can't say I have had any bad experiences, from the beginning till the end my traineeship was one positive and challenging adventure.

#### 8. Other(s)