



U.S.A: Summer 2007

Duncan Roxburgh: Hammermen Scholar 2007

Washington Summer 2007

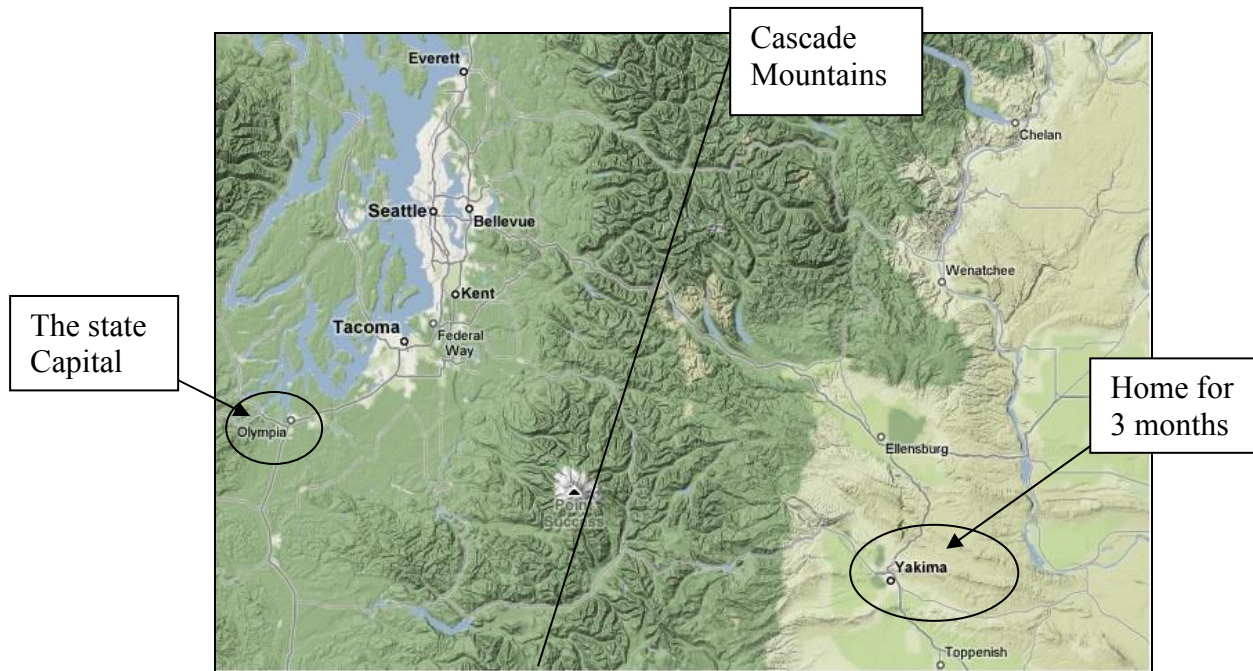
During the summer of 2007 I was offered an Engineering Internship for three months with Smiths Aerospace, now GE Aviation in Yakima, Washington, USA. After taking this Internship I have gained skills and experience that have and will be invaluable throughout the remainder of my degree and career in engineering.

GE Aviation, Yakima, is a relatively small office and manufacturing plant of about 500 employees, delivering mechanical systems and landing gear actuation to customers throughout the world, their largest being Boeing and Airbus. GE Aviation pride themselves on being an inclusive plant, designing, manufacturing and testing their own solutions. This allowed me to encompass a wide range of positions and also exposed me to a number of different aspects of engineering, the majority of these being related to Boeing's newest commercial plane the 787 'Dreamliner'.

Throughout this report I would like to explain where I was, outline several of the key tasks and projects I was involved in, share some of the experiences that I have gained through the internship, and explain how the travel scholarship helped me with the experience.

Yakima

Where is Yakima? I'll be honest and say I had never heard of it until I was looking at the office locations of Smiths Aerospace throughout the world. Yakima lies on a plateau, the other side of the Cascade Mountains from Seattle. It is a relatively small town by American standards and is almost desert like during the summer, temperatures reaching 42 Degrees Celsius in my first week, albeit a very dry heat, made bearable only by the lack of humidity, staying inside during the peak hours of sunshine was definitely wise.



I arrived in Yakima on the 30th of June and found what would be my home for the next three months. The company owned a condo used for relocating staff and provided it for the interns they were employing for the summer. One of the interns actually lived in Yakima and didn't use the condo, while the other, Daniel Beck, essentially became a room mate and a friend for the summer. This worked out very well as it was great to have someone who knew their way around the state, but also to experience the cultural differences between our two countries. I can't imagine what my summer would have been like if I lived alone for the three month period while I was working.

Work

Work started between the hours of 7-8am and we worked nine hour days. It was my first real insight into what working for an internationally renowned company is like and has certainly confirmed my desire to build a career in engineering. From day one I was given responsibility for certain tests and tasks to be carried out and I was always surrounded by an excellent team of very influential engineers, who would always answer any queries I had.

I have already mentioned that most of the work that I was involved in was related to the new Boeing 787 and this was because I was foreign national student in America, unable to work on or with any of the military solutions the company provides. Despite the slight boundaries within the office space I wasn't disheartened in the slightest as it meant that I could only work on the commercial side of the landing gear systems, the new 787 Dreamliner. My workspace consisted of the senior engineer responsible for the steering actuation of the plane and the design engineer for the truck position actuator, used to tilt the wheels upon approach to the runway during the landing of the plane. I learnt a huge amount from the both of them and it made work an exciting and fun place to be.

The first project I worked on was to create a log of all the seal failures within a number of the actuators used on the 787. This meant analysing technical drawings for the actuators to determine seal placement and the material used for each seal. This log could then be used to summarise the failures to see if there was any correlation between the seal properties. It was a fantastic initial project as it familiarised me with the actuators used on the 787 and the engineering team I would be spending most of the next twelve weeks working with.

As the internship went on I worked with a wide variety of people on a number of different projects from analysis work with stress engineers to part assembly with workshop technicians. This helped me greatly understand the roles that must be played in order for a business to run so effectively but to also visualise the products I was working with when returning to the technical drawings at my desk. I also spent a lot of time with one of the recent graduate engineers and was fortunate enough to be given the chance to redesign a test rig for her. Again this was a very exciting prospect, getting to analyse and then redesign a setup which is going to test components to be used on an aeroplane 37,000 feet in the air, a concept I certainly took a while to get to grips with. It was then quite special to see the redesign that I had implemented in working order and was definitely one of the highlights of my twelve week stay there.

In my last week of work I was approached by one of the senior engineers I had not yet had the chance to work with. I was requested to undertake a project where I would calculate the dynamic bearing pressures on actuators used on a number of commercial aircrafts. I was then suddenly immersed in a project where communicating with engineers from a number of disciplines was key to the success of the task. I had to contact design engineers responsible for each of the actuators to obtain reasons for the bearing choice and the dimensions used for each one. Once I had determined the maximum area of the bearings exposed to a load, I had to communicate with the corresponding stress engineers for each of the actuators. We then worked to determine the maximum buckling load on each of the actuators, which then allowed me to calculate the maximum pressures the bearings could potentially be exposed to.

This project was exciting to be a part of because of the strict deadline set for my findings and it involved a number of great engineers that I had not had the chance to work with up until that point. I played a vital role in communicating with a large number of the team and it was a fantastic final project for me to be a part of as I could see how I had progressed during my time there, with a definite improvement in confidence of my own ability from when I began the internship.

I was always willing to improve my knowledge on current projects and how the company worked in general. Being my first insight into a large engineering company I was always trying to learn from the engineers around me and jumped at the chance to work with them in turn for the potential experience gained. I faced numerous challenges and opportunities throughout my internship due to the scope of the projects and the strict deadlines for which I was involved, but I was credited for always showing willingness and a determination to succeed in each task I was given. On my final day of the internship I spoke with the director of engineering and he was impressed with my enthusiasm and contribution to the team throughout my stay, which was summarised when he asked if I would return the following summer.



The Engineering Team

As the internship came to an end I began to realise that I may never see my work colleagues again, which was a bizarre thought and quite hard to take having spent a large proportion of my time with them over the last twelve weeks. They had become great friends to me throughout my stay and will be greatly missed.

Donut Fridays

On Fridays it was accustomed for donuts to be brought in, a great treat after a busy week at work and certainly one aspect of work I have missed!



Travel

One of the main points of setting off to America was to gain as much experience as possible, not just from the exposure of the engineering internship but also from any adventure I encountered along the way. I have family from the U.K currently living just outside Seattle and this was great as they recommended places to visit but were also there for me during my stay.

I had always planned to make the most of my trip and knew that the West coast of America offered a lot in terms of opportunity and sights to take in. During the three months I was away I rarely had time to stop and reflect upon what I had actually seen and been a part of, every single weekend I was busy getting the most out of what was available to me. Be that flying down to San Francisco and cycling across the Golden Gate Bridge, eating hot dogs at a baseball match or hiring a car to visit Mount Rainier National Park.



For Independence Day and my 21st birthday celebrations I met up with my family from Seattle and we went on a cruise to watch the fireworks above Seattle from Lake Union.

On one of my first weekends in Yakima I rented a car and drove over hundred miles to Mount Rainier National Park. Mount Rainier features a glacier all year round and is home to some of the most beautiful scenery I have ever seen.



I travelled to Seattle a number of times during my stay, frequently flying from Yakima airport. While I was there I had a chance to go up the famous Space Needle and visit The Pike Place Market.

Another of my first weekends I drove North to the Grand Coulee Dam situated on the Columbia River. It produces a massive 6.8 GigaWatts of Power at maximum production and is the largest concrete structure in the USA, a fantastic sight.



Benefiting from a national holiday, I flew down to San Francisco. It was one of the most exciting places I've visited and was definitely worth spending my savings on. During my second day there I cycled across the Golden Gate Bridge and took this photo from the Northern side of the city.

While in San Francisco I also went on a night tour of Alcatraz Island, something I had always wanted to do.



On my second last weekend in the USA, the guys from work decided that I couldn't leave without a visit to the local Junkyard and followed by the fitting of a 4.8 litre V8 engine to a Ford Mustang.

Summary

Throughout this report I hope I have been able to convey just how exciting my time spent working in America was. I thoroughly enjoyed the internship and the variety of challenges I faced on a daily basis. I also appreciated that the company has a flat employee structure. Allowing me to feel welcome and the transition from the university lifestyle to the working environment was effortless.

I have also mentioned that I tried to make the most of the trip on every occasion, be that challenging myself through work or having adventures along the way. The experiences gained throughout the twelve weeks I spent there last summer will not only be valuable to me throughout the remainder of my degree but also for the rest of my career. Looking back on the experiences gained, I am very proud of what I have accomplished and would therefore like to thank the Hammermen guild for allowing me to fulfill the true potential of the trip.

The travel scholarship not only helped me to arrive in Washington State but also kept me financially afloat during the first month of my stay, while I worked at getting a social security number. The remainder of the scholarship then made it possible for me to fuel my desire for travel and certainly made my summer experience one to remember.