Career Path / Entry level Requirements

Challenges / Jobs / Likes / dislikes

Skills

Leadership / teamwork

Future of industry / Retrospective / Schedule

University is such a great place to learn some key fundamentals of your Engineering career, a lot of which may not be immediately apparent. I found the first year engineering fundamentals across a variety of disciplines has helped immensely when needing to collaborate with other teams and disciplines within the company. Your work is rarely an isolated project, and immediate stakeholders will likely be those internal to the company. Being able to have a base level of understanding allows you to understand their needs, and communicate effectively how your architecture or design can accomodate any problems they may encounter. Additionally, your ability to work on an engineering problem during group uni assignments and projects is invaluable. You need to learn flexibility in dealing with all different personality types, and solving interpersonal problems. You can put a bunch of smart people in a room together, but if you don't know how to position everyone so they can all play to their strengths, the groups effectiveness will be severely limited. I personally found the transition from student to professional quite easy, and this may be to the credit of Griffith's WIL program. I already had experience in the industry and company I transitioned to work for, and was able to gain this experience in a position where there was very little pressure and expectation of me. There was also a great level of support, because of my role as an intern at the time. This I believe helped me to ease into the professional role, and when I began work full time, I felt that I could focus 100% on my professional work as I no longer had to worry about the completion of my uni degree. In terms of the workload and complexity, Gilmour eased me into the responsibility - so it grew with the amount of experience I had. Within 6-12 months I was given my own projects, and within the first couple of years I became a Subject Matter Expert (SME) on the embedded flight software. I do feel the degree sufficiently prepared myself for a job in the industry. Working with others in the team also helped me to realise that even in industry, people are still constantly learning - so you don't need to be an expert straight out of uni to be valuable in the professional workforce.

The biggest challenge is, due to the fact that it is safety critical real-time software, there is an exceptionally high level of quality required. This was overcome by continuous learning on embedded software best practice and leaning on mentors within the company who have had decades of experience within the aerospace industry, and constantly asking them for advice and feedback. Additionally, as the startup landscape is so dynamic, I have had to be very flexible in both my approach to writing software, and as an engineer - requirements are bound to change, you may have to do a bunch of rework, and some products/projects you have worked on for months may be scrapped. I believe if you can't deal with this, a startup environment is not for you. Software for the aerospace industry requires a higher standard of safety, reliability, and testing than many other industries due to the high stakes involved. Because of this, I believe it is the perfect place to learn fundamental skills and habits - I've since learnt software for other industries, and have found it to be very easy due to my previous learnings. I'm personally quite ambitious when it comes to handling challenging projects, so I will push myself to take on ambitious projects with aggressive schedules as a means to challenge myself and grow.

Technical skills are obviously very important, but the most undervalued skills are interpersonal and communication. You need to learn to sell your work, and work effectively within a team. I see so many super intelligent people with strong technical skills limit themselves because they lack the interpersonal skills. Technical: Work on some coding projects outside of work that interest you. Learn different languages, different projects that are outside of what you would usually work on: you'd be surprised at how much it can help your critical thinking and apply a different way of thinking to your main work. Interpersonal: Read books, watch youtube videos, go out and practice by meeting new people and making friends. Personality types: A range of personality types perform well in the industry. Strong technical and analytical skills are preferred for software, but you can find a role that suits you. There's a place for creative and emotional experience focused developers (ui/ux, front end design), and a place for super lowlevel technical (testing, implementation) and also more high level, abstract thinking (architecture, system design). It is preferred for graduates to demonstrate some talent through their own projects related to what role we are looking to fill, but mainly look for passion, enthusiasm, work ethic, and cultural fit. Technical skills can always be learnt, if you have the passion and work ethic. Additionally, regardless of how brilliant you may be, if you aren't a cultural fit, then you may not enjoy working with the team and may not feel like it is the right place for you. People work best when they enjoy what they do, and feel like they are making a difference.

Collaboration is essential in our workplace. We have regular team meetings and use project management tools to coordinate tasks. As mentioned before, great communication and interpersonal skills. A key skill is being able to communicate a complex idea to people that may have very little understanding of it - which is the case a lot of the time when collaborating with others in the team, and especially with other disciplines. As a mid level engineer, I do have some leadership responsibilities. This involves mentoring junior engineers and coordinating team efforts on some of my projects or work that I am a subject matter expert for. Following standard software development practices, we have regular software reviews for any component of work that anyone in the team completes, and this is a great opportunity for coaching and mentoring. As mentioned before, I often seek guidance from some engineers in the team who have had decades of experience doing what I am currently doing. Even if the experience is not directly relevant, the way of thinking about the problem can be immensely helpful.

Career progression at our company for an engineering can be within either the technical or people management stream, depending on your preference. There is a guideline for how long each progression should take between positions, however I'm glad that our company fosters the idea that advancement is largely based on merit - show to the company with tangible results that you are worthy of promotion and advancement. Our team is currently quite focused on quarterly KPIs which are guided by our head of department, but ultimately set for ourselves. Set ambitious KPIs and achieve them consistently, and you will progress very quickly. Performance reviews are done on a half yearly basis for position and remuneration negotiation.

The space industry in Australia is set to grow significantly over the next decade, with increased investment in sovereign launch capability, space exploration and satellite technology. Gaining skills early will be huge for future career prospects within the country. This will likely boost the Australian economy by creating jobs and inspiring innovation. Our company plans to continue developing cutting-edge technology and possibly exploring manned space missions. If I could go back, I would take more advantage of networking opportunities. Building a strong professional network can be immensely beneficial. My advice would be to maintain a balance between focusing on your studies and gaining practical experience through internships or projects. It may require some sacrifice to close off the final courses needed for the degree, but this one little push will all be worth it when you come to graduating and starting work full time. My daily duties involve code development, reviewing code, attending team meetings, testing software, and documenting software design/architecture. I plan these based on the company, department and team priorities and deadlines. Know when you need to surge and invest the extra hours, and when you need to focus on your personal life. You can't give it your all if you end up burning out. However, there will be times when you may need to sacrifice some days to ensuring you can deliver on ambitious goals you have set for your own progression and growth,.

What I enjoy most is the thrill of solving complex problems and contributing to cutting-edge technology that pushes the boundaries of human knowledge and capabilities. I'm able to do some super meaningful work, with an amazing team that have grown to become some of my best friends. I do believe that because I've focused heavily on growing close personal relationships with my team, heading into the office every day feels little like work and very much like just seeing friends/family.

The most challenging part of my job is dealing with the high-stakes nature of the industry - a minor error could lead to significant problems. We invest years into a single moment of a rocket launch. A safety issue could endanger countless human lives, and any other issue could cost the mission, which is morally crushing and impacts the success of the company. I think this is just a part of the industry, but we limit the risks by putting in the work when it comes to thorough testing and validation. What I enjoy the least is possibly the level of documentation and testing required, but it's a necessary part of ensuring safety and quality.

# Interview

Thomas Ireland, Software Engineer @ Gilmour Space Technologies 15:09 hi thomas thanks for joining us it's all right thanks for having me on board appreciate it no worries thomas i'm curious what is 15:17 this eris orbital rocket can you tell us a bit about that and gilmore space technologies 15:23 yeah so first of all gilmore space we're a startup rocket company on the gold coast in queensland 15:28 we have a rapidly growing team of about 60 people now and some of us have come from all around the world previously worked for 15:36 big companies like rocket lab boeing the european space agency so i get to 15:42 work with some incredibly switched on people it's brilliant and the goal is our current goal is to launch small 15:48 satellites into orbit starting from 2022 and to do that we're currently designing and manufacturing 15:54 our first rocket named eris fantastic and what will these satellites do when they're 16:00 orbiting our worst there's a variety of different things endless really 16:05 communications tracking yeah it's literally endless what we can do with satellites in space 16:11 great so how did you get this amazing job yeah so i think you mentioned after high 16:17 school i started studying a bachelor of engineering majoring in electrical and electronic engineering at griffith 16:24 but during then i started a few small businesses and they were doing pretty well so i decided to prefer to focus on them full-time i was 16:31 making pretty good money as a kid but i was lacking motivation and meaning and purpose to really have a reason to 16:37 wake up every morning because the money it was just money at the end of the day i decided to go back to you to finish 16:44 studying what i was really passionate about which was technology and using that to design and build things to make the world a better place 16:51 so i was in my final year of uni i needed to complete a certain amount of placement days at an engineering company to finish my 16:57 degree so i'd heard of gilmore space a company in the gold coast building of rocket and i emailed him hoping to land 17:04 an internship luckily gilmore had a great relationship with griffith 17:09 and their work integrated learning program and i was offered a placement and turns out they liked me enough to 17:14 keep me on board afterwards so we are today well congratulations sounds amazing 17:20 so can you tell us or can you describe to us what a typical day in your job looks like sure so as a 17:26 software engineer i work with the avionics team and also the guidance navigation control team 17:32 so we're responsible for programming the brains of the rocket essentially uh we make sure that all the parts of 17:38 the rocket can talk to each other we find out where the rocket is during its flight where it needs to go to get 17:44 our payload into the correct orbit and determine how to stay on the current trajectory so we tell the motors when to fire when 17:51 to separate each stage and when to deploy our payload as well we work with other teams such as the 17:56 mechanical team who are responsible for building the body and structure of the rocket and propulsion team who developed rocket 18:02 engines so a typical day involves me getting into work and of course first seeing charging my brain with the coffee 18:09 i'm useless without my coffee in the morning and we like to plan our work into week-long chunks so i'll review what the weekly goal is and determine 18:16 what i want to achieve for the day and as a software engineer i do spend a lot of time in front of the computer who would have 18:22 guessed but we have to validate a lot of the stuff we write with hardware as well to test it all so i do spend a lot 18:28 of time tinkering with hardware because we're developing a lot of new 18:33 different things we spend a lot of time brainstorming with other teams other people how best to solve things 18:39 and something very interesting which i didn't find from uni when you're at an engineering company 18:46 you have to develop with a certain outcome in mind so you have to achieve an outcome with a 18:51 certain budget in a certain time frame with a certain regard performance and regard for safety so it's not just 18:57 the technically the technical best outcome an engineering company and by doing that we have a lot of 19:04 chances to flex our problem solving skills if i want to break from the computer there's always someone that could use a hand 19:11 so the day is really never boring it certainly doesn't sound boring 19:16 when you're at school did you always want to work in space or working your career has it been a 19:22 surprise to you honestly a huge surprise i never ever thought i'd be working in the space 19:28 industry in australia i thought i'd always thought it was awesome obviously but i always thought i'd have 19:35 to move overseas to be able to be involved so i feel incredibly blessed and for everyone 19:41 aspiring to be in the space industry in australia now is a better time than ever so we're lucky enough to meet the new head of the 19:47 australian space agency enrico palermo this week and he confirmed there's going to be a massive massive 19:53 push for the space industry in australia and i think annie will most likely touch more on this on which is on a bit later 19:59 yeah i can't wait to hear more about it it's definitely an exciting time for space tell me tommy when you were at school 20:06 what was your favorite subject and what were you good at so my favorite subjects were the 20:11 maths and sciences i went to school on the gold coast here at somerset college so i found as a kid you learn that 20:18 the world around you exists and behaves in certain ways but you don't really understand why and the more i learned about the 20:25 sciences at school i understood there were laws and systems that governed everything around us and i learned that we can use these 20:32 laws to create some amazing things to help people and make people's lives better which was super exciting for me 20:37 so that's why i chose to study engineering at uni definitely sounds like it has the purpose like you mentioned 20:44 if you were to talk to somebody who's at school right now and thinking about a career in space 20:50 would you have any advice for them yes so look as you mentioned there are plenty of different fields 20:57 in which you can go to a future career in space you have to be an astronaut or an engineer or anything 21:02 and i can't wait to hear from annie helen and gail to share their stories with us as well because their fields are all quite different 21:08 i honestly suggest you need to try as many different things as you can and find out exactly what it is you're 21:13 interested in so think about your favorite subjects at school what you like to do outside of school and how that might relate to your future 21:20 career because whatever you're passionate in will drive you to develop skills in that area and ultimately that's what you want so i 21:27 completed a degree in electrical and electronic engineering but turns out i like writing software a lot more 21:33 so yeah find out what it is you're passionate and you can start to develop those skills in our company we have 21:39 many non-engineering roles we need a manufacturing team to actually build the rocket finance team to handle our money human 21:46 resources legal team sales marketing communications and we also have many people who started off in 21:52 different fields so we have a physicist and a former medical science researcher now 21:58 in an engineering role also former tradesmen that went back to uni to get their degree and are now engineers 22:04 and i think if you don't know exactly what you want to do right now it's completely okay it's okay to not have it all figured out 22:11 straight away after school good advice thanks for that tommy if anyone's got any questions i'd like to 22:17 ask thomas feel free to put them in the q a and i've got one that's already here thomas that i might 22:23 throw at you it's quite specific it says what tech stack what's the tech stack required for your 22:30 job that comes from steph tech stack it really differs so my 22:36 role i was hired to do more embedded software some more low level like c c plus plus but really even in the 22:44 software realm there are so many different aspects there's the actual embedded rocket software which is 22:51 real time safety critical there's also a lot of things like the ground control stations devops so helping the other teams 22:58 with the i.t and programming all that type of thing so it really really differs there's no one kind of 23:03 specific skill set for my role that makes sense all right well thanks for the question steph and yeah if 23:10 anyone else has any questions feel free to put them in the chat and we're going to get thomas to come back toward the 23:15 end with the panelists so we can go through more questions there thanks thomas we'll speak a little 23:20 while thank you no worries all right 23:26 so let me just quickly just share my screen again so we've got thomas mentioned that annie 23:33 is going to be speaking with us i'm so pleased that we've got annie with us today annie is the executive director