

Welsh Affairs Committee

Oral evidence: Defence industry in Wales, HC 102

Wednesday 7 February 2024

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Members present: Stephen Crabb (Chair); Virginia Crosbie; Ruth Jones; Mr Rob Roberts.

Questions 131-213

Witnesses

I: Emma Morgan, Student, Cardiff and Vale College and Victoria Searle, Industrial Engineer, Airbus.

II: Professor Caroline Gray OBE, Director, OpTIC Technology Centre and Bobby Manesh, Head of Research, AMRC Cymru.

Examination of witnesses

Witnesses: Emma Morgan and Victoria Searle.

Q131 **Chair:** Good morning and welcome to this session of the Welsh Affairs Committee. We are continuing our inquiry into the defence industry in Wales, and today we are interested in looking at skills development in that sector. We are delighted that we are joined by two young people who are studying and being trained in this area in Wales. We are joined by Emma Morgan and Victoria Searle. Victoria and Emma, I wonder whether you could perhaps start the proceedings this morning by just saying a bit about what you are doing and where you are studying and training. Victoria, you can go first.

Victoria Searle: Good morning, everybody. First, just a quick thank you for having us here today. It is a massive honour to come and speak with you all. I am Victoria Searle. I am an industrial engineer now working at Airbus in Broughton. As of last year, I completed an engineering degree apprenticeship. I started in 2019, I completed the three-year course and gained my bachelor's in aeronautical engineering with first-class honours.

Emma Morgan: Hi. I am Emma. I have done nothing as good as Victoria has. I am a second-year student currently studying level 3 computing and cyber-security at Cardiff and Vale College.

Q132 **Chair:** It is National Apprenticeship Week, coincidentally. We did not plan this session to fall within that, but it is quite a happy coincidence that it has. We are promoting the message about the importance of apprenticeships and degree apprenticeships are an important part of that. Victoria, presumably you had friends who went off to university and came out with lots of debt. How has your experience doing a degree apprenticeship differed from some of your friends who have gone down the more traditional academic route?

Victoria Searle: Yes, it has differed quite significantly, both personally and professionally. On the personal side, as you touched on, I have earned while I have learned. Being paid to learn and develop my skills and get a degree without coming out with the debt has allowed me to save while I have completed my apprenticeship, which has been really big for me personally. Obviously, professionally as well: I have come out with three years of industry experience, unlike my colleagues who were in full-time academic study at university. They do not have that, so it has put me in a really good position to take on a role straight away, post-apprenticeship.

Q133 **Chair:** You started off presumably at level 2 for apprenticeship.

Victoria Searle: Yes, level 3, A-levels. I completed A-levels in maths, biology, chemistry and physics. Then I took a year out and I discovered engineering degree apprenticeships. I did some work experience and was absolutely fascinated by the way it worked. I was not completely aware of apprenticeships and the fact you could do a degree in the form of an apprenticeship. As soon as I did some experience in the area, I was sold.



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Q134 **Chair:** Did you know when you were doing your A-levels that engineering was the route that you wanted to go down, ultimately?

Victoria Searle: To be completely transparent, no. I always had a passion for maths and physics and originally was not looking to do engineering. From an early age, I was sold on purely academic study and universities. I did not give myself the opportunity to explore the wider world. You might say that under the pressure of external influences, I looked very much academic and looked down the biology-chemistry route, knowing deep down that my passion was in maths and physics. I do not have any engineering influences in the family or anything, so I did not naturally follow that route to begin with. It took me time to step back, post-study, and realise what I wanted to do, and I have not looked back since.

Q135 **Chair:** At what point did Airbus become the target for where you wanted to do your training? At what point did you know that you wanted to help make the wings for the world's commercial airlines?

Victoria Searle: I am local to Airbus, anyway. I am from Buckley, so I knew of Airbus all along. Aerospace and aviation have fascinated me; growing up and seeing the Beluga going over. It is an extremely exciting field to be a part of. I did experience at Airbus before making the decision, so I got to see the manufacturing side and what actually goes on behind the factory doors, and that inspired me.

Q136 **Chair:** Brilliant. Thank you very much for that introduction. Emma, you are studying computing and cyber-security. At what point did you know that that was the kind of area that you wanted to study?

Emma Morgan: Well, I come from a family of people in the computing industry or the engineering industry. My mum did aeronautical engineering, like Victoria, and my dad worked as a software tester kind of thing—I'm not really too sure! So it's the industry I have followed them into, really.

Q137 **Chair:** What kind of areas is the cyber-security course that you are doing covering? Is it all brand-new to you?

Emma Morgan: Yes. I came to this course from doing GCSE IT instead of GCSE computer science, which meant that, to me, everything was very different and new.

Chair: Very good. Ruth Jones, do you want to pick up the questioning?

Q138 **Ruth Jones:** It is lovely to see you both this morning. Thank you for coming in; it is really helpful to see you in person. Victoria, you said that you had "discovered" aeronautical engineering. I wonder how you discovered it, how you decided to do it and what sort of help got you into thinking about this particular career pathway as opposed to any other career pathway.

Victoria Searle: I touched on this before. In taking the year out, I got the time to listen to what I wanted to do. Obviously, as a young person, you have advice given to you from all angles when you are growing up. If you



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are in education, you have your teachers and your parents or carers. That is definitely what I experienced. So it was a case of taking the time out to listen to what drove me as a person, what I was passionate about, and what I enjoyed academically.

In terms of picking aeronautical engineering, it was about, as I said, seeing things like the Beluga and just learning a bit about what aviation entails and how you can take a manufacturing environment and combine the challenges there with the complexity of aviation. It was the experience of actually going to see that that made me realise that it was something I could and would want to do.

Q139 **Ruth Jones:** You say you did work experience. Did that help?

Victoria Searle: Yes, 100%. It also, obviously, showed me the opportunities that lay ahead, beyond the apprenticeship. So it was a case of looking at not just what my degree would offer me and what the course would entail, but, once you have completed that and got the qualifications, where you can go with them. That was something that, as a student, I never really had the opportunity to consider. I didn't quite realise the wide scope of everything you can do; you are not set in that one job for life.

Q140 **Ruth Jones:** That's helpful; thank you. Emma, you are in the middle of your course now and you have explained how your family helped you to make the decision. How did you find things like information about particular courses and places to study? Was information easy for you to find or did you have to go searching for it?

Emma Morgan: I originally was going to do A-levels at the comprehensive school I was studying at, but for whatever reason—unforeseen circumstances—that wasn't an option anymore. So I did a quick dash round everywhere to see what looked best for me and what could help my future. Then I stumbled on Cardiff and Vale College, and here I am now, two years later.

Q141 **Ruth Jones:** That's great, but how did you stumble on it, because it's important that we know?

Emma Morgan: It was recommended to me, and quite a few of my friends had gone there, for different courses. I was looking, and there were a lot of places that I could have gone to, but that one stuck out to me because there is a lot there. It is new and in the middle of town, so it is big but it is in the heart of the community as well.

Q142 **Ruth Jones:** That's interesting. That helped you to make up your mind?

Emma Morgan: Yes.

Ruth Jones: That's really helpful. I'm sure we will come back to that in a minute, but thank you for now.

Q143 **Mr Roberts:** Good morning. We will start with Emma this time if that's okay. Leaving aside the subject, the computing element, what options did you have? I know you are doing a BTEC level 3. Were you given any



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different options? "You can do a BTEC or you can do this route or that route." Were any different options presented as to routes that you could go down?

Emma Morgan: As I mentioned, I was only told about the A-levels route. I wasn't told anything about BTECs; I stumbled upon that myself, really.

Q144 **Mr Roberts:** We all know about A-levels; they are in the schools and so on. As I understand it, a BTEC is a mix of practical skills rather than book knowledge, if you like. I have always thought there is a really important distinction between the two. I always liken it to swimming: you can't learn how to swim from reading it in a book and then someone chucking you in the deep end. That doesn't work. How do you feel that you have been able to expand your skills using the BTEC, in conjunction with your knowledge? Do they marry together, or has it been more skills or more knowledge?

Emma Morgan: It has been more knowledge, really—learning everything from scratch, basically. Going into it with a GCSE in IT, I had to basically throw all of that away and start from the drawing board again. But I have grown a lot of knowledge and a lot of skills that I don't think I would have if I had gone the typical A-level route.

Q145 **Mr Roberts:** Is BTEC level 3 the same as A-level? Are they equivalent?

Emma Morgan: Yes. My BTEC level 3 is one AS-level at the end of year one and then three A-levels at the end of year two.

Q146 **Mr Roberts:** Gosh. Okay. You are coming to the end of your course this summer—you have a few months to go. What are you planning to do next? What do you hope will be your next steps?

Emma Morgan: I have sent off my UCAS application for university and I have had my offers back, so I am going around to see which one suits me best, but I am also looking at going down the same route as Victoria—the degree apprenticeship route—and I am currently getting a lot of information about that as well.

Q147 **Mr Roberts:** This is something that is going to be topical for us, actually. Out of interest, how many universities have you applied to?

Emma Morgan: Five.

Q148 **Mr Roberts:** And how many of them are in Wales?

Emma Morgan: Five.

Mr Roberts: All of them.

Emma Morgan: Yes.

Q149 **Mr Roberts:** Very interesting. That's good to know. Victoria—my neighbour, in Buckley. I live in Mold.

Victoria Searle: A great town.



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Mr Roberts: A wonderful town—almost as good as Buckley! I can infer from some of the things you have said that you have a big understanding of the difference between skills and knowledge and practical application of these things. What did you feel were the pros and cons of a degree apprenticeship rather than a purely academic bachelor's?

Victoria Searle: Great question. It speaks for itself, really. The degree that we do is the exact same as a full-time student. Mine was through Swansea University. The modules you do are almost identical—you get exactly the same theoretical study—but the difference is that you get to work in an environment growing your soft skills and applying the knowledge that you have learned. Obviously, that is what you would do straight after university; the difference is that you get to do it as you learn and you come out with an abundance of skills on top of the knowledge that you have gained doing the degree. As I said earlier, the earning while you learn is really important—it was very important to me, and it is massively beneficial coming out without any debt. That is probably one of the best advantages.

Q150 **Mr Roberts:** Absolutely. Is there such a thing as a master's apprenticeship?

Victoria Searle: They do exist, I believe. Obviously I haven't done a master's apprenticeship personally.

Q151 **Mr Roberts:** If there was one, would you be looking at moving on to that next as the obvious progression, or would you be looking at progressing through your regular career route as normal?

Victoria Searle: As an engineer, a master's can be beneficial, depending on where you want to work. It is something that I have definitely considered. It is something that I would consider as part of my development plan if the correct master's presented itself. So yes, definitely.

Q152 **Virginia Crosbie:** Thank you for coming here today. It looks like you have proud parents behind you—I bet they are very proud of you. Victoria and Emma, I want to ask you about companies that came into either your primary school or your secondary school, and what sort of relationship they have had with your education. Businesses are looking for young people with the science and technology skills that you are developing. How can we encourage more people to do that? What experience have you had from companies?

Victoria Searle: As I said before, I was quite local to Airbus and, among other companies, they did come to my school while I was growing up, so I got to learn about businesses. It is definitely really helpful. In my opinion, the reason that it helped so much—and what is so critical for young students nowadays—was just the ability to develop an understanding of what is out there. I am really keen that young students are given the opportunity to consider everything. If they don't get the chance to consider everything, they cannot make a fully informed decision.



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Businesses coming in, without any pressure and just telling them what they are about and inspiring them, is critical to that.

Virginia Crosbie: Was that in secondary school?

Victoria Searle: Yes.

Q153 **Virginia Crosbie:** Thank you. Emma?

Emma Morgan: I did not really have any of that; I mainly got most of that through college. In primary school, it was just like, "Have fun and learn," and then in secondary school, it was more like, "Right, you have exams; you need to try and do well at them if you can." Then, companies coming in was more in college.

Q154 **Virginia Crosbie:** Can I ask why, on your UCAS, you have five Welsh universities?

Emma Morgan: I did not want to leave Wales, really. I like it there. I just thought, "Why not stay here and find a uni that would do a course that suits me well?"

Q155 **Virginia Crosbie:** Thank you. Victoria, in terms of the careers advice within schools, how did they talk to you about degree apprenticeships versus university? Did any students from local universities or local industries come in and actually speak to you?

Victoria Searle: Yes, we had local industries—so, apprentices—come in. At my school in particular, my personal experience was that it was quite heavily university focused, which was why my original decision was to go down that route. That is why I am very big on supporting any opportunity to go and advocate for apprenticeships and to just make sure that the information is out there, because I know from personal experience that that is not what I received; it was a push. So, while we had apprentices coming in, the rest of the discussions were very much, "If you can go to university, go."

Q156 **Chair:** Victoria, if I could just build on Virginia's question there, did, at any point, anybody in school, or maybe in the family, say, "Ooh, do you want to go down this route, really? Shouldn't you be focusing on university?" or were you just left to make up your mind, set your goal and go for it yourself?

Victoria Searle: Not while I was in school, because, when I was in school, I was going to go down the university route; it actually took me taking a year out to sort of think for myself. So, at school, I said I was going to university and the school went, "Great! Off you go." Actually, I was pleasantly surprised by the reaction that I got when I said, "I want to take the year out. I want to have some time to consider what's out there. I feel like I've not given enough time to my other options." And, obviously, there is a lot of pressure, as a young person, to know what you want to do, and, when there is so much opportunity, you are almost blinded by it.

Chair: One of the things that I think we have picked up, as Welsh



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Members of Parliament, is that it depends on where you are in Wales. Probably where you are, where you have Airbus and other companies very close by, there is a great heritage of high-quality apprenticeships, but I know that, in other parts of Wales, university is really emphasised: "Go, get yourself away to university and go down that route". As I said at the beginning, with National Apprenticeship Week, we are trying to communicate the message that, actually, there are other options, and that some of those options are actually really attractive, potentially, in terms of not getting into debt and getting real work experience and real life skills.

Q157 Ruth Jones: It is great to have two young women here in front of us who are in STEM, which is renowned to be a male-dominated sort of thing. Do you find that you are in the minority? I just wonder how you deal with that. Would you like to get more women joining you? What are your feelings on the "gender balance", if you like?

Emma Morgan: Well, to put it in perspective, I am one of two girls in my class.

Ruth Jones: Out of how many?

Emma Morgan: Out of 18 of us, I am one of two girls in the class, so you are dealing with a lot of boys in this industry. It is quite crazy to think about how not many girls are interested in going into the industry, but I think that that is because there are not many opportunities for them, and they are not made aware of the fact that they can go into any industry they want. Most girls will decide to go into hair and beauty or a route that is more traditionally suited to women, and they don't think to come and change to a male-dominated industry.

Q158 Ruth Jones: I agree with you 100%. How do you think that could be changed?

Emma Morgan: Women should be told they can go into any industry, not just ones that are traditionally for women. Any industry can be suited to a woman just as well as a man. It is just about finding your feet, digging your way in, not stopping for anyone and just saying, "Look, I'm here. I want to do this. Please can I do this?"

Ruth Jones: I think we need to bottle that. Victoria, what do you think? Are you in a male-dominated area as well?

Victoria Searle: Yes. I cannot say that there are more females than males in my office, but in my personal experience, it has never impacted my decisions or stunted my development, and being a female has never been a consideration, so I have had a really positive experience.

Q159 Ruth Jones: Is there anything that you think could be done to encourage more women or girls to go into this area?

Victoria Searle: It goes back to the point I made earlier about making sure that the information about every opportunity is available to everyone. If we can make sure that young students across the board can link what the subjects they are doing now will do for them in the future, and what



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opportunities are available, that will naturally change the balance. It is about constantly making sure that we push the information out there and that they have everything they need to make a fully informed decision.

Ruth Jones: Absolutely. Thank you very much.

Q160 **Mr Roberts:** Just before I come on to my next question, I want to pick up on something that Emma said about the information not being given to young girls. When the information was given to you and you decided to go down this course, did anyone say, "Don't do that; it's not for you."? Did anyone try to dissuade you in any way?

Emma Morgan: In a way. I had a few people who were like, "Why are you going into this industry?" I was like, "Well, it's because I want to go there, not because anyone has told me to go there." There were a lot of people.

Mr Roberts: I understand. People can ask why because they want to know, and sometimes people can ask why critically, right? They can ask, "Why are doing that?"—a negative "why", rather than just wanting to know. Did you get quite a bit of that?

Emma Morgan: A little bit, yes.

Mr Roberts: Was that from people in school or in your academic circle, or was it more from friends and family?

Emma Morgan: My academic circle.

Q161 **Mr Roberts:** Did you find the same kind of thing, Victoria? Did people ask, "Why are you doing that route?"?

Victoria Searle: Not personally. Maybe I was fortunate and surrounded by a well-balanced environment, but I did not have that experience.

Q162 **Mr Roberts:** We are looking at the work of Welsh defence and cyber-security businesses—that is the purpose of this whole inquiry. Before you got into it, what did you hear—and indeed now, what do you hear—about career opportunities and how things will progress in those sectors generally in Wales? Do you feel that it is a long-term and really good industry to be in generally in Wales, Emma?

Emma Morgan: Definitely. At Airbus, me and colleagues are extremely excited about the potential H175M opportunities. It is something that I would definitely love to be a part of if the opportunity arose.

Mr Roberts: For the purposes of everybody else, what is H175M?

Victoria Searle: The new medium helicopter.

Q163 **Mr Roberts:** Which, of course, would be wonderfully built by Airbus rather than in any other factory anywhere in the UK—quite right. Some young people with skills in areas like engineering, computing and cyber might not necessarily work in the defence sector. They might work in other sectors. Do you think the defence industry in general is seen as a



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good career option among your peer groups?

Emma Morgan: I think it is a good industry, especially for cyber-security and keeping the nation safe, but I don't think it is really advertised out there. I found that my tutors had been telling me to go down the university route or to go into a business associated with computing and cyber-security, and not really into the defence industry.

Q164 **Mr Roberts:** That is interesting. We are in a situation now where AI and all sorts of things are taking over. In the private sector, I am sure that there is a huge amount of money to be made in all these areas, but your priority is serving the country—serving the community and looking at things in that way—rather than private sector. Is that right?

Emma Morgan: Yes.

Mr Roberts: Well done, you. As Ruth says, let's bottle some more of that as well. Wonderful—thank you.

Q165 **Virginia Crosbie:** Emma, I want to talk about career opportunities. Do you believe that you have those opportunities in Wales, that you can achieve your potential in Wales, or do you feel that you need to move to other parts of the UK or even abroad?

Emma Morgan: As I said, I applied through UCAS, and all my options are based in Wales. I have been looking at other options and pathways as well—like degree apprenticeships, as Victoria said—in case university falls through for me, and I have kept mainly in Wales, although I have looked at one or two options further afield. I want to ensure that I stay in Wales and keep as many opportunities as I can within Wales, and not have to leave.

Victoria Searle: Definitely. I have had what I like to think of as four successful years at Airbus. It has been a great opportunity for me. Our new head of plant at Broughton started as a craft apprentice, so that is a role model if ever there was one to say that the opportunities that exist are brilliant. As engineers, we are always encouraged to go out to see other cultures and to work further afield, so it is definitely something on my path that I would like to go and do, but obviously you go, get the skills and one day you return to Wales—with the hotspot we have in manufacturing—bringing the skills back.

Q166 **Virginia Crosbie:** Emma, what more could MPs do to support you with this transition?

Emma Morgan: I'm not sure, to be honest.

Q167 **Virginia Crosbie:** How can we get more young people like you into engineering and the cyber sector? What do you think we can do?

Emma Morgan: It is about going into primary and secondary schools, showing that there are opportunities and career paths other than just the academic route that everyone knows about. There are other pathways that people can take—you can take years out, do degree apprenticeships or get

a job. You don't have to do university and just go down the generic academic route that most people will follow.

Virginia Crosbie: Victoria, what can we do as MPs and politicians?

Victoria Searle: I would say something very similar to Emma. Obviously, it is important to keep the momentum with apprenticeships, which have come a long way, but I think they still have a long way to go. It would be brilliant to see them keep the pressure on and keep making sure that people are aware of the opportunities that apprenticeships can offer, especially alongside classic university. I would like to make sure that in the future we have a field where they are considered equal, and where everyone is aware of them as an option.

Mr Roberts: I have a very quick observation. You have been fantastic. You are two very formidable young women. I am very impressed with how you have conducted yourselves today. Virginia asked what we can do as MPs and as Government; my question would be, what can you do? My best observation would be, if you take nothing else away from today—from being in this environment—please keep in touch with each other and please exchange numbers or whatever it is. Be cheerleaders for the things that you are doing. Be vocal and be champions not just for your industry, but—as we covered earlier—for young people and young women in your industry. You have both been wonderful, and I am very impressed with what you have done. Thank you very much.

Q168 **Chair:** Victoria, do you know how many people were in your intake of apprentices at Airbus?

Victoria Searle: About 150 in my intake in particular.

Q169 **Chair:** Did you have friends going into to it?

Victoria Searle: Not friends I knew before.

Chair: So you knew nobody?

Victoria Searle: No.

Q170 **Chair:** Do you know how many people applied for those apprenticeships?

Victoria Searle: I believe the ratio is about six to one for every position that gets offered.

Q171 **Chair:** That is pretty extraordinary competition. You have done extremely well to get that. Do you have an opportunity to meet other apprentices? There are other aeronautical companies in the area and other companies manufacturing in north Wales, aren't there? Do you have opportunities to meet apprentices from other businesses?

Victoria Searle: Definitely. On my scheme, for the first eight months as an engineer you are on the tools and learning the skills of actually building the aircraft parts. We were based down at Coleg Cambria in Deeside. In doing that, we work alongside the apprentices in the other companies, so



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you get to build a rapport with them and build really good working relationships before you have even gone on site, into the factories.

Q172 **Chair:** How did it work in the first year? Were you doing day release or were you doing blocks of time?

Victoria Searle: In the first year, it is four days a week on the tools, in the workshops and learning the skills, and one day a week at university for us as degree apprentices.

Q173 **Chair:** Was the day at university the one that people did not enjoy because you wanted to be back at work—or was it equally useful?

Victoria Searle: I think they both had their good bits. It was a nice balance.

Chair: We have come to the end of this part of this morning's session. Rob has given you effusive praise and I am sure that we would all agree with that. All I would add is that every Wednesday we do sessions like this and we have some of the most senior people in Wales: people who run businesses, chief constables, university vice chancellors, and other people in very senior positions. If only they were all as succinct and as efficient in communicating as you have been, it would make my job as a Chair a lot easier. The higher people seem to rise up in positions of seniority, the more they like to talk and repeat themselves. You have done extremely well, so thank you very much. Thank you and good luck.

Examination of witnesses

Witnesses: Professor Caroline Gray and Bobby Manesh.

Q174 **Chair:** This is the second session this morning. We continue our look at the role of skills development and innovation in the defence sector in Wales. We are delighted to be joined for this second panel by Professor Caroline Gray OBE, who is the director of the OpTIC Technology Centre at St Asaph. We are also joined by Bobby Manesh, who is the head of research at the Advanced Manufacturing Research Centre, AMRC Cymru. Thank you very much for giving us your time. For the benefit of members of the Committee and for the record, please could you take a moment to introduce the work that you do, and how it fits within defence and advanced manufacturing sectors in Wales?

Professor Gray: Good morning. My main role is as director of the OpTIC Technology Centre, which encompasses support and technical facilities for the optics industry in Wales. There is a cluster of defence manufacturers and optoelectronic manufacturers in north Wales. But our remit spreads much wider. We are owned by Wrexham University. We reach across the whole region and across Wales. We have run national programmes to support industrial partners with development. We have our own spinout company, Glyndŵr Innovations, which designs optical systems and works with companies like Airbus and QinetiQ—defence lead companies. They are



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developing optical payloads and optical systems for the next generation of product. OpTIC is all about the link between academia and industrial partners, and making sure that the technology that exists and is developed in universities reaches our industrial partners and serves the pull from university for the technologies. That is what we are there to serve.

Chair: Thank you. That is very helpful. Mr Manesh?

Bobby Manesh: The Advanced Manufacturing Research Centre is one of the high-value manufacturing catapults. AMRC Cymru is a new satellite site as part of that. AMRC is there to support all manufacturing in Wales. We support the smallest SMEs, from one-man bands all the way to Airbus. Our three technology pillars are automation, manufacturing intelligence, and design for X. Along those, we work with the main sectors in Wales—things like food and drink—and aerospace is one of our biggest areas.

To expand on that, we have worked on projects that can be used in defence. These are projects with companies that have defence applications. Essentially, working in defence is the same as working in any other manufacturing sector. If you are doing advanced manufacturing in automotive, for instance, those same technologies can be applied in defence.

Q175 **Chair:** What proportion of the work of AMRC is geared towards the defence sector? Is it possible to put a figure on it? Give us a sense of the significance of the defence sector in terms of driving the activity of the AMRC.

Bobby Manesh: I do not have the numbers to hand, but it is quite a large proportion of what the AMRC does as a whole. We have recently just taken on Leonardo as a tier 1 member—a cash member—for the sector. We have other organisations like BAE and Airbus, which are obviously all tier members. We do a huge amount of work in that area. In Wales, it has not been a primary focus. We are here to support all manufacturing, and defence is encompassed within that. At the moment, it is quite a small proportion—I would probably say a few per cent.

Q176 **Chair:** AMRC is not just a Welsh initiative, is it? I think it started at the University of Sheffield. Can you help us understand that, the relationship in Wales and how that has come about?

Bobby Manesh: AMRC started just over 20 years ago with a couple of professors developing the Advanced Manufacturing Research Centre. It was primarily to support the aerospace and automotive industries. It grew rapidly and was eventually one of the founding members of the high value manufacturing Catapult. AMRC as a whole is 600 engineers and support staff-strong at the moment. Six or seven years ago, the Welsh Government invested in the advanced manufacturing facility in Cymru, with Airbus alongside. The AMRC then won the contract to basically own and operate that facility. In the last four years, we have grown from 10 engineers to over 50, and now we are just taking on another recruitment round for another 10 engineers. Really, we cannot keep up with demand.



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Q177 **Chair:** What you are saying is that, for AMRC in its broadest sense, defence is quite a significant part of the work, but when it comes to AMRC Cymru—the Welsh arm, if you like—defence is less of a significant sector, but it is still in there alongside other manufacturing. Have I understood that correctly?

Bobby Manesh: That is correct. Our remit is to support Welsh manufacturing and help the Welsh economy grow, so we go where the demand is. There has been huge demand in other sectors, such as food and drink. A large proportion of what we do is aerospace, which is essentially similar to defence.

Q178 **Chair:** Thank you very much. Professor Gray, obviously there is a heritage of optics in north Wales, but how much work at the centre that you lead is driven by the defence sector? It is possible to delineate that?

Professor Gray: The work undertaken by our group is primarily defence-oriented. We offer support services. We recently ran a programme called the Centre for Photonics Expertise, which was for universities across Wales united in delivering support technologies to all sectors, not just defence, but one of the primary things that came out of that programme was the creation of the vacuum thin films research facility in the OpTIC Centre, which is heavily utilised by defence manufacturers to develop their next generation of product. It gives them facilities that are on a production scale to develop the next generation of product, but it means that they do not break into their manufacturing cycles. There are massive efficiencies and a faster route to market because of that.

Chair: That is helpful.

Q179 **Virginia Crosbie:** Good morning; bore da. Professor Gray, what role does your centre play in the whole north Wales manufacturing cluster?

Professor Gray: We offer support services, and these could be technical services. We also have our own spin-out manufacturing companies. As I say, Glyndwr Innovations Ltd is working with QinetiQ, Qioptiq, Airbus and other blue chip companies, all supporting space applications, comms or defence—so, across all those communications sectors—as well as in direct optics fabrication and support. We have a very large optics manufacturing facility, where we develop processes and single-element, one-off elements for that.

In supporting companies, we also have an incubation facility, where small companies can grow. We have a number of innovative companies within that group, some in the defence industry and others across all industries and sectors. But we do have a number of good-quality, innovating companies within our premises as well.

Q180 **Virginia Crosbie:** Mr Manesh, could north Wales make greater use of its advanced manufacturing capabilities to support defence-led and defence-related innovation?

Bobby Manesh: Absolutely. There is a huge number of innovative companies in north Wales that could really feed into the defence network.



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At the moment, the primes are the ones that look for these SMEs and other organisations to feed into. They are not necessarily always best positioned to take that advantage. Better support through conduits such as research centres, to prime them better and make them more available and more aware of the opportunities in defence, would go a long way.

Q181 **Ruth Jones:** I am interested in where the money comes from to fund your research and your development and innovation. Mr Manesh, where does it come from for the work you are doing at the moment?

Bobby Manesh: The catapult centres are designed to make a third-third-third model, which is a third of core funding, a third of competitive grant calls and a third of commercial research income. In AMRC Cymru, we receive approximately £1 million of the High Value Manufacturing Catapult. It is worth noting that the total pot is in the magnitude of £140 million or so, so I do not feel that Wales receives a fair proportion of the High Value Manufacturing Catapult money.

We are slightly higher on the competitive grants. We have had fantastic support from the Welsh Government through various funding mechanisms to support what we are doing to support SMEs in the area, and we have a smaller proportion—probably 10% to 15%—of direct commercial income, but we see that growing. We have only been there for four years, and as we get better traction, we see our commercial income growing.

Q182 **Ruth Jones:** Tell me a little bit more about the third where you feel you are not getting a fair share in Wales. Have you made representations, or is the industry doing something about that?

Bobby Manesh: I am not sure how aware the industry is of the nature of the catapult funding share across the four nations. It is not something we necessarily shout about—we do not want to make them feel unnecessarily underdone—but it is something that we are certainly lobbying on. We are working with the Welsh Government and other officials to try to seek ways in which we can get more of that coming into Wales.

Q183 **Ruth Jones:** I was not aware of that, and I am sure we should be following up on that.

Professor Gray, can you tell me a little bit about where your money comes from?

Professor Gray: From a mixture of sources. There is 100% commercial contract work through Glyndwr Innovations, and that is primarily within the space and defence industries. In the past, we had significant grants from ERDF funding, through European funding, which funded the Centre for Photonics Expertise network across the four universities. In all honesty, we have struggled to replace that under current funding structures, and that has had quite a big impact.

We had generated just under 90 projects in three years, including the covid years, supporting businesses—from single-owner businesses to large defence manufacturing businesses—with both the facilities and access to facilities at existing universities. That programme was about making the



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university assets at the four universities and technologies within the universities sweat for industry. That is what that was about: allowing direct contact with businesses of every size.

Of the 85 companies we engaged with, I think 60 of those had never engaged with academia previously, so we found it a formula that really worked very well. We would very much like to continue that and are exploring funding streams that would allow that collaborative activity across Wales to exist.

Q184 Ruth Jones: In terms of the CPE funding from Europe, which has gone, have you been able to make that up yet or is that still a gap?

Professor Gray: It is still a gap. What that funding primarily did was create a resource for companies to develop their next generation of products. It was very much for industry solutions. We have managed to secure some funding through a voucher network through Wrexham University, which is allowing those knowledge transfer vouchers to support companies, but it is not on the same scale and the direct access and length. You could have a programme that was 50% matched through CPE, so it was a real engagement. It was a collaborative working solution, which built relationships in the long term; we are still dealing with a number of the companies that we developed those relationships with.

I believe that that is a formula that could win for Wales, if I am honest, not only in the photonics network but throughout. It is very much aligned with what colleagues in AMRC are doing.

Ruth Jones: Thank you. That is really helpful.

Q185 Chair: Mr Manesh, just so that I am clear, did you say that you are not receiving a fair share of the funding from the High Value Manufacturing Catapult?

Bobby Manesh: I am not exactly sure of the formula, but at the moment the model works on the number of engineers based at centres and getting a share of that pot. In Wales we only have 50, growing to 60, of those engineers. Across the entire HVMC there is something in the order of magnitude of 4,000, so we are quite a small part of that.

Q186 Chair: You say the funding is not fair. What would a fair funding level at the moment be?

Bobby Manesh: At the moment we are playing catch-up, so we have to grow naturally to start receiving a better share across Wales. If we were to get it in advance, we could start building up our capabilities and grow the engineering team. There is certainly enough demand.

Q187 Chair: I am not clear. The funding is driven by the number of engineers and you have a low number of engineers, but you are looking to grow that. What is unfair about that? Where is the unfairness coming in?

Bobby Manesh: Because of the time it takes. This is the first time a centre has been in Wales. We have not been there from the beginning.



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England and Scotland have had centres for many years and Wales only for the last four years, so we are far behind the others.

Q188 **Chair:** I understand that. I understand going from a low base, growing, but you are still receiving the same amount of money per engineer as other places, no?

Bobby Manesh: I do not have the exact figures to hand, but mental arithmetic suggests that that might be the case.

Q189 **Chair:** I still do not understand what is unfair about the current situation. Are you saying it is unfair funding, so someone is to blame for not giving you fair funding? Where is that unfairness?

Bobby Manesh: If you look at it from the devolved nations' perspective, up in Scotland we see £20 million or so in terms of HVMC funding. We have the same opportunities in terms of advanced manufacturing that we can support, but we have to grow a little bit each year—we cannot suddenly just take on a vast array of engineers to support those. So it is going to be a long road to get to the same sort of level of support as other nations have.

Q190 **Chair:** The other nations are getting, per engineer, the same amount.

Bobby Manesh: I believe so, but I do not know exactly.

Chair: That is really helpful. I am not trying to be difficult; it is just that I still do not know where the unfairness comes in. We will leave it.

Q191 **Ruth Jones:** Going back to the links between Welsh-based defence companies and academia and research centres, Professor Gray, how strong are those links?

Professor Gray: I think they are strong. There is a range of universities in Wales. Certainly, we work closely with Qioptiq, which is on our doorstep, so it is quite right that we do so. I know that Bangor University and Aberystwyth University also have projects with them. We did a number of projects, and those relationships grew during the CPE project and have continued beyond that to access the resources that were created. That is on support they are now working with us to develop further. We work with Airbus across the country, particularly on space, communications and those areas of Airbus in optical systems development.

Q192 **Ruth Jones:** Mr Manesh, you also work with Airbus, don't you? From your partnership, what lessons do you think other parts of the sector can learn about how to promote effective R&D between the two?

Bobby Manesh: We are in a really fortunate position where we share the facility with Airbus as they are undertaking their Wing of Tomorrow project. We have a number of large programmes funded through the Aerospace Technology Institute and other mechanisms to support what they are doing. I think that relationship really is a gold standard for how to go about supporting large organisations develop big research



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programmes. If that could be replicated in other areas, that would create a strong—

Q193 Ruth Jones: Victoria Searle was very enthusiastic about the new helicopters. Bear with me, I do not know anything about helicopters. What role do you think AMRC Cymru will play in the new helicopter partnership with the High Value Manufacturing Catapult? How is that going to work and how is it going to help Airbus, getting the new helicopters?

Bobby Manesh: Airbus Helicopters has signed a memorandum of understanding with the HVMC. AMRC Cymru is a key part of that support and promise to support. We are looking at developing and supporting—if they are successful with the Airbus Helicopters factory, we would be looking at the smart factories and looking at the virtualisation of that factory. Really, where we are proposing to support is by decreasing the trading time and taking best practice from the French facility and other facilities in Europe, and also improving those when they are brought here so we can essentially work more efficiently than other sites and adopt that very quickly as well.

Q194 Ruth Jones: Did you say virtualisation?

Bobby Manesh: Yes, one of our research programmes is creating virtual plants and we are able to rapidly move the operations of the plant around and look at the effect on that plant's efficiency. That is something that we propose to support Airbus with.

Ruth Jones: I am in awe. I will just hand you back to the Chair at this point, I think.

Q195 Virginia Crosbie: Professor Gray, you talked about your relationship with some of the universities, science parks and technology centres. How do those relationships actually happen? Do you proactively reach out to them? How does it work?

Professor Gray: Through direct engagement and direct contact. What we have found is that we have to have a synergy. We have something to offer. Being a university, we can offer a skills pathway. We offer degree apprenticeships, which we do into the defence industry as well. With those sorts of relationships, those degree apprentices studying at Wrexham know about what we do and they go back to their workplaces, so you have your ambassadors from age 18 through to everybody who is involved in the group.

For those direct relationships, it is about business development and about going to the companies. The formula we use is to engage directly with the companies and to talk to them about what challenges they face, what the direction is for the next generation of their product and how we could possibly support that. Rather than going into companies and saying, "We are great at this; would you like this?", which universities have done in the past, our formula is about listening, drawing in the challenges for the next generation of product, seeing where we can support that and engaging with our other university partners to make sure that the companies get

the best level of support for solving the problems most effectively and efficiently.

Q196 **Virginia Crosbie:** Mr Manesh, how do your relationships with industry, universities and R&D happen? Do you proactively reach out to them?

Bobby Manesh: We do proactively reach out. We have communications with all the universities in Wales through different sorts of research forum. We look for possible synergies whereby we can co-operate and work on larger challenges together. We also participate in forums to reach other organisations with which we can collaborate and look for opportunities.

We also host our own events. We invite companies and other academic institutions to come along to those to discuss challenges in different matters and forums.

Q197 **Mr Roberts:** Good morning, both. I would like to speak about the future. We have had a load of witnesses to the inquiry who have highlighted space as an emerging and very innovative defence sector. Peter White from Qioptiq, who I am sure you know, said that “most satellites...in the western world” include their products, which is wonderful for manufacturing in north Wales. He said that the space section of his business was growing at a rate of about 25%, year on year. Another company, Tritech, said that they were seeing, “increased demand for space-application products”. Is that a major area of focus for your centres? If it is, do you think that Wales has the skills and the infrastructure to be a leader in the field of space?

Professor Gray: Yes and yes. I can elaborate on that.

Yes, we have seen the development of the space industry and growth of investment in the space industry from the UK Government, which has generated demand for the types of products that defence manufacturers produce, such as imaging systems—imaging payloads based on anything from visible systems to LiDAR and hyperspectral systems, which are the next generation of imaging. Those imaging platforms can actually supply applications for many other spheres and sectors.

To focus on space development, however, I think that it is an area of growth and of high skill in north Wales in the areas of instrument and systems development. It also utilises the investment in semiconductor devices, and North Wales has the power to develop the systems that utilise that; every one of those systems has a semiconductor device. Wales can make a direct link between the semiconductor component level development in south Wales to the systems development, applications and building and manufacturing strengths that are in north Wales.

Q198 **Mr Roberts:** You mentioned particular areas and the different elements in those different areas. Do you think we have the required skills base? Do you think we have the knowledge and sufficient numbers of qualified people to populate that, now and into the future?

Professor Gray: The growth is quite rapid, so the skills are struggling to keep up with that, if I'm honest. Bobby already mentioned recruiting high-



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quality staff. Creating the pathways for the next generation of engineers takes time, too. The degree apprenticeship scheme is very successful, but bringing mid-career engineers into Wales and offering the right support and the right career paths for them is a challenge because of the growth in these areas at the moment.

- Q199 **Mr Roberts:** John Whalley from the Aerospace Wales Forum told us that although lots of SMEs in Wales are currently focused on very civil uses of space technology, they are also talking to the MOD about potential military applications. Is that also an area where we may need more drive and focus, or are the defence and military secondary in terms of space?

Professor Gray: It is quite hard to differentiate the pathways that developed systems take. They can take a civil or a defence pathway, because it is the same technology being used for the same applications. What we can do is promote the defence industry as a positive industry in supplying technology, jobs and career pathways for people in Wales.

There are some very successful and world-leading companies in Wales, and they offer opportunity to people. People do not directly join the defence industry as a career in the defence industry. They become engineers—optical engineers or fabrication engineers—and their employer is in the defence industry. As your career develops, you are then in the defence industry. It is technology driven.

- Q200 **Mr Roberts:** Mr Manesh, what about up in north Wales with AMRC Cymru? We heard earlier that you are not massively into space—it not a huge amount of your business—but is it a growing element of your business?

Bobby Manesh: Space is something that is very much on our radar at the moment and is something we want to grow into. We are part of the Welsh Academic Space Partnership. We sit on that group, and there is some fantastic work being done by Welsh universities, such as Aberystwyth's Mars rover programme.

We are looking to see where we can offer support. We are understanding the challenges at the moment and developing our capabilities to be able to build support in the future. We see the huge amount of work that we do with aerospace as pivoting and transitioning quite well into supporting space programmes in the future. In terms of attracting talent, having a space programme within Wales is certainly going to help to attract the overall advanced manufacturing talent that we are trying to build and attract into Wales.

- Q201 **Mr Roberts:** Are there any other defence-related sectors in relation to space—and, indeed, the rest of the work you do—that you could highlight where Wales could probably become a leader in industry-led innovation? We are wonderful at optics—we are market leaders—but are there any other areas where you think we are on the cusp of becoming something great if we could just take a couple more steps in the right direction?



Bobby Manesh: Yes. Although the AMRC in Wales is not hugely involved, other AMRC centres are. The cybersecurity side of what we are doing in Wales is really significant. Obviously, there are large clusters in south Wales, and there are some growing in north Wales. Menai Science Park potentially has a part to play in supporting that as well.

In advanced manufacturing, there is the assembly and manufacture of other vehicles within Wales. I think we can really strive to increase that, notwithstanding the current potential for an AMRC to support them to become world leaders in what they do.

Q202 **Mr Roberts:** We heard the Chair ask you a few questions earlier about funding, unfairness and the things that you mentioned. What do you think the Government could do to help you scale up your activity? Could it be R&D funding? Could it be an extra focus on skills provision, degree apprenticeships and things that we heard about earlier?

What can the Government do to say, "This is the sector. We know it's going to be huge, and we are going to help you."? If you were speaking to the Government's R&D Minister, Business Minister or Space Minister, what would you be asking for now?

Bobby Manesh: Specifically in defence, we don't know what we don't know, essentially. When we speak to defence organisations, they are less forthcoming with funding for us to go in and understand the challenges, because that alone does not have an outcome. Having funding to enable us to understand the full networks and the challenges within Wales would better position us to create our capabilities to support those networks. That is something that maybe the Government could bear the burden of. Going forwards, we can find other mechanisms to support the companies.

Mr Roberts: How about you, Professor Gray? Do you think the Government have the right policies in place to support innovation in this defence-related manufacturing space?

Professor Gray: I think it could be better. The reach of the Government—the support, willingness and accessibility—is there, but we need a focus on resource funding. In recent years, there has been more of a bias towards capital support, to buy capital items.

Q203 **Mr Roberts:** This is expensive kit. It is expensive stuff to build.

Professor Gray: We need people to run those, sweat those assets and deliver what the companies need. If resource is scant to support those pieces of kit, and companies want to access them, then the resource is not there for them to do that because universities themselves cannot support the resource. It must either be through funded research programmes or supported collaborative R&D programmes.

I believe that structure is not quite there yet, as a collaborative nature. As I say, I do not think we have quite recovered from the ERDF structure that was previously there. With the shared prosperity funds, which I think have been controlled by local government, there has been a challenge for cross-local-government collaborative workings, because they struggle to get



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equal support in equal areas from local governments, with everybody having their own priorities.

- Q204 **Mr Roberts:** You mentioned the difference between capital and revenue funding. When you are confronted with a pot of capital and you think, "Jeez, I wish I could make that into revenue," do you ever feel that you are able to return to the awarding body and say, "Can we swap these around?"

Are you able to have those conversations, whether that is with Government, civil servants, Ministers or whoever, to make those changes and say, "Look, this is what we need. I appreciate what you are providing, but we don't need that—we need this." How open are they to those discussions?

Professor Gray: I have had those discussions in the past, and people have been open to the discussion, but the pathway for that money has not allowed that to happen in the past. Some capital funding support has come—take at the end of the ERDF funding—to allow us to continue our operations. Around £1 million a year would allow us to have nine academics servicing the Welsh economy and support throughout that. There was a call for capital funding of around that value, and I would much rather have retained that skill within Wales. In the end, it did not happen. That is a very real example.

- Q205 **Mr Roberts:** In terms of getting the most bang for your buck, I guess you would have felt that more revenue funding for the equivalent amount would have been more beneficial in the long run.

Professor Gray: Definitely on economic return, because in developing these products and processes, those active projects are going out and developing their own economic value within Wales.

- Q206 **Mr Roberts:** You mentioned the shared prosperity fund. Can you give us a brief dime store version of your feeling on how the shared prosperity fund has run so far in its first iteration? How might you change it in future allocations to better benefit your sector?

Professor Gray: I do not have huge experience with it. I researched it originally to gain some funding, but it did not fit the criteria, so I have not explored it hugely. We need to make it more accessible to emerging skills and businesses, and make sure it is accessible across industry and academia or bringing the two together. There needs to be a recognition that funding is required to explore things sometimes. That may not succeed, as there seems to have to be a guaranteed pathway of outcome.

- Q207 **Chair:** We are drawing to the close of this session. Professor Gray, who owns the intellectual property of the products and solutions being developed at the centre? Is it the companies themselves that are commissioning the work, or is it held within the centre?

Professor Gray: It depends on the format of the contract. Every project comes under an initial scope of work and contractual agreement. For the CPE, the IP was owned by the primary owner of the IP coming in. For



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instance, the work we do with Qioptiq where they are developing products—there has been mention of the Mars rover project.

Our facilities are being used to develop the optical coatings required for that programme. That IP sits with the developer—absolutely. If we are developing a system under a commercial contract, it sits with the commercial owner. If we develop it for ourselves under a research project, it sits with us.

Q208 Chair: Does that create constraints for your researchers and academics who are working on the projects, in terms of what they can do afterwards or other pieces of work they could do alongside that?

Professor Gray: No, because we retain the ability to build on that IP in different areas. For instance, if we support the development of a system for hyperspectral imaging in space, we can then perhaps go and use the same technology to develop it for medical imaging.

Q209 Chair: Is it primes coming to you, or is it smaller companies, lower down the network of the supply chain?

Professor Gray: It very much varies. We deal with primes directly. We deal as second-tier suppliers and sometimes third-tier advisers on technology areas. We try to provide what our potential partners need.

Q210 Chair: In terms of pure defence-related output, have you been able to see specific products and solutions come through the centre and make it into UK sovereign capability? Is there a direct linkage that you can see between the work you are doing and what ultimately goes into strengthening our defence capabilities?

Professor Gray: Yes, and it is a very rewarding outcome to any engineer's or scientist's work that they would see the end result of their initial research and development. We are currently on the cusp of potentially having launched into space some of the systems that we have developed for multiple spectral communications. There are also things like the optical coatings going on a Mars rover. These are phenomenal outcomes for technology development in Wales.

Q211 Chair: Do you get the sense, from a UK Government perspective, that the relevant Departments of State—the MoD, Department for Business and Trade and Department for Science, Innovation and Technology—are cognisant of the value of the work being done at the centre? Do they really understand?

We get the feeling in the Welsh Affairs Committee that the great things that happen in Wales, because they are in Wales, sometimes feel further away from the centre here and we have to work a bit harder to get attention drawn to them.

Professor Gray: I think you're right and we do have to work a bit harder. Getting our expertise and our impact into an international economy and not just across the UK is quite difficult at times. However, the one thing I would say—I am sure Bobby would say the same—is that every time a



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Minister visits our centre, they go away incredibly impressed and buoyed by the expertise and activity going on in our area.

Q212 **Chair:** Does anyone from the centre go to the DSEI—the defence exhibition?

Professor Gray: Yes, we do. We have been in the past. I am a career-long defence industry person, so I know the exhibition well. We have attended together with Aerospace Wales and also as guests of some of our customers.

Q213 **Chair:** I will come to you, Mr Manesh, to wrap up the discussion. Professor Gray has been reflecting on intellectual property and the link between the activity of the centre and specific defence-related output. Are similar things happening at the Advanced Manufacturing Research Centre?

Bobby Manesh: We have a very similar model in terms of IP. It depends on the contract with the companies. Our engineers are able to be IP-inquisitive for internal projects, but when it's external, we obviously base that on the contract or the grant funding arrangement.

Chair: Thank you both for coming this morning. That has made it a really interesting two-part session. It has been very useful for the Committee. Thank you.