COMMONWEALTH OF AUSTRALIA

Official Committee Hansard

HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON SCIENCE AND INNOVATION

Reference: Pathways to technological innovation

MONDAY, 5 SEPTEMBER 2005

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HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON SCIENCE AND INNOVATION

Monday, 5 September 2005

Members: Mr Georgiou *(Chair)*, Mr Quick *(Deputy Chair)*, Mr Hayes, Mr Jenkins, Dr Jensen, Miss Jackie Kelly, Mr Price, Mr Tollner, Mrs Vale and Dr Washer

Members in attendance: Mr Georgiou, Mr Hayes, Mr Jenkins, Dr Jensen, Miss Jackie Kelly, Mr Tollner and Dr Washer

Terms of reference for the inquiry:

To inquire into and report on:

Australian technological innovation and pathways to commercialisation, with particular reference to examples of successful Australian technological innovations that demonstrate strategies to overcome potential impediments and factors determining success.

To assist in its inquiry, the Committee seeks to compile a series of case studies of successful technological innovations, and the pathways to commercialisation. Submissions are sought detailing successful examples of Australian technological innovations.

Submissions are also sought with particular reference to successful innovations, on issues such as:

- pathways to commercialisation;
- intellectual property and patents;
- skills and business knowledge;
- capital and risk investment;
- business and scientific regulatory issues;
- research and market linkages;
- factors determining success; and
- strategies in other countries that may be of instruction to Australia.

WITNESSES

Committee met at 4.34 pm

BLAUENSTEINER, Mr Alex, TechFast Manager, Queensland, Australian Institute for Commercialisation

GILMORE, Dr Rowan, Chief Executive Officer, Australian Institute for Commercialisation

KAPELERIS, Dr John, Director, Regional Commercialisation Services, Australian Institute for Commercialisation

CHAIR (Mr Georgiou)—Welcome to this public hearing of the House of Representatives Standing Committee on Science and Innovation inquiry into pathways to technological innovation. The inquiry arose from a request to the committee by the Minister for Education, Science and Training, Dr Nelson. Written submissions have been called for and 94 have been received to date. The committee is now conducting public hearings and informal discussions. This hearing is the seventh for the inquiry.

Although the committee does not require you to give evidence under oath, I advise that these hearings are formal proceedings of the parliament and warrant the same respect as proceedings of the House itself. It is customary, although usually unnecessary, to remind witnesses that giving false or misleading evidence is a serious matter which may be regarded as a contempt of the parliament. Would you like to make a brief opening statement before we launch into it?

Dr Gilmore—I might say a few words in acknowledging and agreeing with many of the other submissions that have been made. Our reading of those submissions is that the definition of commercialisation is perhaps broader than what might be perceived to be a purely linear process of IP transfer out of a university to a start-up company but also perhaps encompasses other knowledge exchange mechanisms like knowledge relationships, knowledge engagement, knowledge diffusion and so on. I would find that there are two key ingredients for more successful commercialisation that have come out strongly in those submissions as well as ours: firstly, the importance of partnerships between business and universities and, secondly, the importance of people in the process—people with the right skills.

I think those ingredients have been well known for a long time. The difficult part is how you make these happen and how they are paid for in an area that is intrinsically a high-risk endeavour. It was for this reason that the AIC was established three years ago—to look at practical ways of trying to strengthen partnerships between business and universities and to put in place programs for the development of professional skills. We have come up with some answers. Our commercialisation management system is a system for managing IP and taking it downstream. Our commercialisation boot camp is a program that we have now rolled out to over 600 researchers that helps change the culture of research organisations.

But I think it is our TechFast program that is really showing some early signs of success. Since we wrote the submission, just in the four months that have elapsed since our submission was written, we have learnt a number of lessons about TechFast. Just to remind the committee, TechFast is a market pull approach to commercialisation, in which we look for technologically receptive SMEs. We work with the SMEs to identify their business needs and then we look for

innovation, know-how and IP across the research sector—universities, CRCs, medical research institutes and so on—to identify IP that would help that SME to grow and to hopefully become a sizeable enterprise. Then we work with both the SME and the research institute to put together a deal to transfer the technology and to provide services to actually make it happen. We think that this is a program that helps find solutions for a problem rather than one that puts forward solutions that are looking for a problem, which I guess is a classic IP push approach. We feel that it facilitates all forms of knowledge transfer, because it is not just IP that we seek. We have found that, in our engagements, there is a need for transfer of knowledge—perhaps as consultancy, perhaps knowledge relationships—as well as tangible IP that you can wrap around and call a potential product. We have also found that there is a great deal of value in having a third party with no vested interest in the deal, other than ensuring that a deal happens, in order for both the university and the SME to benefit. I am sure that some of those lessons will come out in some of the questions you might ask us.

CHAIR—Thank you, Dr Gilmore. I will start with a couple of simple issues. To me, the definition of 'commercialisation' is very complex. It seems to be further broadened as commercialisation becomes perceivably more significant and as the areas that people want to embrace become more and more extensive. That does not worry me so much. However, on page 9 of your submission you stat that, in order to get a large windfall:

Overseas studies and experience suggest that achieving this requires an annual expenditure of between 1.5 percent and 5.0 percent of annual R&D expenditure on commercialisation.

In my simple mind I grabbed it and said, 'Fantastic'. But, given we are dealing with such an elastic concept, what does that actually mean? I think you described commercialisation as a linear relationship but one which embraces a whole series of intangibles. How can we actually work out what expenditure on commercialisation is?

Dr Gilmore—That figure comes from looking at the dollar expenditure on R&D. Government expenditure is roughly $5 billion a year, so simple mathematics would point to several hundreds of millions of dollars in commercialisation, where commercialisation is funding the process of converting a piece of research into an economic outcome and the technology transfer process.

CHAIR—So that is not your broad definition of 'commercialisation'; it is a much more focused definition. It excludes the networks and all the intangibles, if you like, that you were embracing within your concept.

Dr Kapeleris—This is actually a figure that is focusing on the direct commercialisation of the knowledge, the IP and the know-how. When you look at overseas case studies, the average is around three per cent. Three per cent of R&D expenditure is directed towards direct commercialisation resourcing. For that reason, we have seen successful outcomes, for example, from the US based model and some of the Scandinavian models. The 1.5 per cent to five per cent range that we presented is an indicative range that can be used as a guide. We are also stating that there is significantly less than one per cent of expenditure in the Australian environment focused on direct commercialisation outcomes.

CHAIR—How hard is your figure of one per cent in the Australian context?

Dr Kapeleris—There are some other figures that we have quoted—for example, $60,000 of company turnover per $1 million invested in R&D so that is very low in terms of the direct commercialisation outcomes.

CHAIR—Yes, but I am specifically directing your attention to that one per cent.

Dr Gilmore—Is your question: where does the one per cent come from?

CHAIR—Yes.

Dr Gilmore—If you look at the total spend on commercialisation offices in universities and commercialisation directors in CRCs in medical research institutes, you will see that the figure is substantially less than one per cent of the public R&D spend.

CHAIR—Is that analogous or comparable to your figure of 1.5 per cent to five per cent overseas? Are you talking about the same phenomenon?

Dr Kapeleris—Yes.

CHAIR—Could we impose on you to get some more information so we can harden up that figure? It strikes me that, if it is not overly simplistic, it is quite an important indicator, but I would like to make sure that they are hard figures rather than just figures that are thrown out there.

Dr Gilmore—Yes.

CHAIR—On page 8 of your submission, there is a table. In your estimates of strong direct commercialisation performance, why do use the number of technology based high-growth companies? Why is the number important rather than the aggregate expenditure or the aggregate size? Why are we talking about numbers?

Dr Gilmore—I will give you a bit of background information about this particular study. We can send you the full report if you are interested. This is an extract of the report. This research was done for us by the Allen Consulting Group in 2003. They looked at the landscape of direct commercialisation outcomes in Australia at the time and they looked at the statistics of the number of start-up companies that were produced from publicly funded research. The goal was to see what it takes to try to produce companies of the ilk of Cochlear, Resmed and so on that have billion dollar turnovers and have made substantial contributions to the economy. In order to derive the potential value to the economy they looked at the current production rate of companies out of publicly funded research. They multiplied that by a conversion figure, which is what proportion of those companies become successful and what is their potential turnover. In some sense, the number of companies in figure 2 is an intermediary step in driving their turnover in figure 3.

CHAIR—Why would we be worse off if we had half the number of companies but the companies were twice as large?

Dr Gilmore—In terms of revenue, we would not be worse off.

CHAIR—So why are we focusing on numbers? Why is that the key indicator that you are using in that graph?

Dr Gilmore—It is in the graph, but really the headline indicator, if that is what you want, is that continuing a strong direct commercialisation path would result in $20 billion of annual revenue to the economy by 2020 plus $18 billion in new exports. I believe there is also a figure of 100,000 jobs by 2020, if memory serves me. This study correlates very closely with the Chief Scientist's goal, which in 2003 was very similar in terms of producing high-tech, high-growth companies that would contribute to economic growth in Australia.

CHAIR—I have this vague recollection from one of the very early hearings that the view was being taken that the number of spin-offs was not as important as an indicator of what was going to come out.

Dr Gilmore—We agree with that.

Dr Kapeleris—We are probably focusing more on the word 'number' instead of the key words here being 'technology based high-growth companies'. We do not consider spin-offs as high growth although they may be actually in a technology based industry. However, what we are saying here is that we need to obtain scale in these technology based high-growth companies and we are alluding to supporting the scalability and the scale and the growth of these organisations rather than the number.

Dr Gilmore—Could I also clarify that the purpose of these figures is not to say that spin-out companies would be the preferred route to reaping commercialisation outcomes. It is one route but it is perhaps the most difficult route.

CHAIR—What is the budget of the institute?

Dr Gilmore—This year it is $4.7 million in revenues.

CHAIR—You mentioned boot camp. Can you tell us about that, please?

Dr Gilmore—The commercialisation boot camp was a series of modules that we developed with the University of Queensland with UniQuest. It is a program predominantly to try and change the culture of an organisation and to win the hearts and minds of researchers so that they understand that their research may have market outcomes. It is a two-day program in which we start out by talking a little bit about commercialisation and then talk about the value of IP, the potential need to protect IP, and some of the dilemmas that researchers face in terms of publishing versus disclosing research. We bring in successful entrepreneurs who have founded start-up companies themselves. They give their stories. We talk about what venture capitalists are after and we basically describe the potential paths to market, the importance of considering markets if you do want to take IP downstream, the importance of partnerships, the importance of building a team and so on.

The goal at the end of the two-day program is to expose predominantly early stage researchers to the principles of commercialisation and what is involved. We have probably run around 20 or 25 courses at a number of universities and CRCs—about 600 researchers in all—and also with

government agencies. What we have found from the feedback is firstly a large increase in understanding and on average about a 30 per cent increase in the number of researchers who now say that they will consider the commercial applications of their research.

We have also found it very useful for so-called public good CRCs. We have run a number of courses at CRCs that are predominantly to serve the public good. We have found that the facilitators would go in and face enormous hostility to commercialisation, because commercialisation was seen as being predominantly to pursue a profit motive or monetary outcome, and by the end of the course we found that we had turned that around so that researchers understood that commercialisation is not necessarily about serving a profit motive. It is about a market application of research. So some of the medical CRCs, environmental CRCs and researchers have been exposed to what they need to do so that their research can make it to the market where it can be applied in the fullest sense. We give case studies and examples of public good research where following good commercial principle has brought benefits not only to society—serving the public good—but also to the researcher and the institution.

CHAIR—One final issue from me: if you could sequester five per cent of expenditure on R&D and say, 'This is for commercialisation,' what impact would that have?

Dr Gilmore—In dollar returns?

CHAIR—Yes.

Dr Gilmore—This evidence shows the dollar returns of increasing the commercialisation path. So the impact of greater market application of some proportion of research—and we are not arguing that all research should be market focused but saying—

CHAIR—No, what you are saying is that there is a direct relationship between the amount invested in direct commercialisation, whatever that involves—which is a bit more tightly defined than 'everything that moves' or 'everything that opens and shuts'—and outcomes. We could expect very significant outcomes. Are you recommending that?

Dr Kapeleris—Yes.

Dr Gilmore—Yes.

Dr Kapeleris—I would also put an 'if' there. If the funds were administered appropriately, there would be significant commercial gains. One of the other reasons not only for the boot camp but for other services that the AIC offers is that we try to ensure that there is a lot of up-front homework done in the early stages—assessing the IP, looking at the technical feasibility, the market feasibility—because one of the issues is that if you can put effort up front then you are not spending very costly development dollars when you start to go into the development phase. So if a lot of that money were to go up front to market research, market feasibility and the opportunity to assess the technical feasibility then you would have increased commercial outcomes.

CHAIR—So, if we say that five per cent goes to the third stream, we would have a zero-sum gain and that would be more beneficial than leaving the money where it is.

Dr Gilmore—Yes, absolutely.

Dr Kapeleris—Absolutely.

CHAIR—You do not have any institutional interest in this?

Dr Gilmore—No.

Dr Kapeleris—No, we are an independent third party.

CHAIR—Fantastic.

Dr JENSEN—Back to the issue of commercialisation figures, you said that less than one per cent is invested into commercialisation in Australia. The problem I have is the issue of the defined money that is allocated to commercialisation versus money which you could say is indirectly financing commercialisation. I mean organisations like CSIRO, which as part of their research and their research budget do some of that commercialisation stuff, but it is not actively in a commercialisation budget. So how do you realistically measure or compare those numbers between different nations? An organisation like CSIRO that can afford to do that sort of thing is going to be completely different from a private entity where everything is going to be costed in a more clearly defined box.

Dr Gilmore—The issue of metrics is indeed complex. I am not sure we could do that question justice in a couple of sentences. I am aware that DEST has done a fair bit of work on metrics. The metrics looking at patents, licensing income and number of start-ups is really too narrow. The ultimate metric that the taxpayer is going to look at would be related to the number of high-wage, high-growth jobs and the sustainability measures.

CHAIR—You are right: you did not do it justice.

Dr JENSEN—You said in your submission that many proposals that are put out to industry really are inadequate in the way that they address it. They are not adequately selling their product in terms of potential return for investors. In what ways are these submissions inadequate and what sort of message can we be telling researchers generally?

Dr Gilmore—Are you talking about submissions that researchers might make to financiers?

Dr JENSEN—Correct.

Dr Gilmore—Angels and venture capitalists.

Mr Blauensteiner—This goes back to what we are trying to do with the AIC boot camps. We are trying to get the academics to put the investor's hat on for a moment. A lot of their submissions are always very focused on the technology and, indeed, maybe the application of the technology, but they might not be speaking in the language that the person sitting on the other side of the table wants to hear. So we have tried with the AIC boot camps not to turn researchers into commercialisation geniuses but to make them think a little bit about what is in it for the other guy, the commercialisation partner, that they want to bring in.

Dr JENSEN—Is a two-day boot camp enough to address this or is more required in this regard? If there is more required, what form do you see that taking?

Mr Blauensteiner—I think a two-day boot camp is a starting point. I would not see it as the be all and end all to solving an issue like that. Realistically, you are talking about a massive cultural change within academia, and that is something that is being thrust upon them in one way or another. I think it is going to take a little bit of time.

Dr JENSEN—What is the best way to get the message through to them and to help them with these submissions? I do not think that talking about generational change is particularly helpful. How do we go about getting these proposals up to scratch for potential investors in the shorter term?

Dr Gilmore—There are a number of initiatives that do that. There are courses like Negotiating Technology Deals, which is a course that we run with one of our partners. It is specifically focused on negotiation strategy, particularly for the biotech industry, and what the deal parameters are. That is quite a detailed course on doing a deal. There are a number of other courses. There is a course called Life's a Pitch, which is on pitching to venture capitalists. On our web site we have materials that describe what a venture capitalist, for example, is looking for and the components that need to be ticked off in order to really turn a piece of research into an investable proposition. It is not just the technology; it is the team and the market and so on.

Dr Kapeleris—Programs like TechFast are also about bringing industry and academia closer together in the longer term and creating those partnerships. For example, through TechFast, because we use a market-pull, demand-driven approach, we bring small to medium enterprises to the university commercial offices and farm the IP, and we then make those linkages and facilitate and expedite the deal flow. What results from that is that one deal may be done but a lifelong partnership is created where the industry participants, the SMEs, go back looking for more opportunities at the research organisations. So we have follow-on learning from both the industry perspective and also the research organisation perspective.

Dr WASHER—Based on my casual observation of universities, I do not envy your task with the boot camp in turning a lot of the researchers into entrepreneurs. They are terrific, but the bulk of the people I meet are not exactly entrepreneurs. Now most universities seem to acknowledge that. Would most universities have people who find out what their science and technology opportunities are and act as intermediaries? Do you find that?

Mr Blauensteiner—The larger ones have a larger pool of resources dedicated to doing that. I would not want to be quoted on this, but I think some of the smaller regional research organisations would have less expertise and commercialisation resources available to them.

Dr WASHER—In those situations, how does the AIC operate? Would you act to identify their science? Obviously you have to do that to train them in the boot camp, but I would have thought that to appoint someone to acknowledge that science and act as that operative would be easier—or is that not your role?

Dr Kapeleris—Through TechFast we have identified opportunities for not only regional universities but also regional based small to medium enterprises. This has been not only within

the state but across the state. Those regional universities have made comments that they would never have found these small to medium enterprises to be able to identify a deal flow.

Dr WASHER—So you network for them?

Dr Kapeleris—Yes. As part of the TechFast program, each project manager acts as an independent third party that facilitates the deal flow.

Dr WASHER—To follow on from that, recommendation (iv) in your submission is to:

- Break down these barriers by trialing a robust system of industry/research exchanges ... Develop appropriate incentive schemes, protect tenure ... and ensure pension rights are unaffected in order to enable such exchanges.

How practical do you think that is? What sort of staff will be moving around—the researchers? There is an indication here that we as a government would need to ensure some protection of rights in the movement and there would be other issues which would be serious enough to address if we knew who we were moving and what benefit it would have.

Dr Gilmore—Frequently you find that the transfer of IP is not something you can bundle up and quarantine and just pass as a package across to industry. Frequently you find that the researcher may need to go with the IP in order to bed it down and so on. Often you will see a researcher going to a start-up company on a part-time basis, perhaps as a CTO or a chief scientist, in order to ensure the smooth flow of knowledge. The point is that anything that can be done to simplify such transfer arrangements will help, firstly, the transfer of knowledge and ideas; secondly, to break down barriers; and, thirdly, to ensure that the vocabulary is shared and the timescale and the cultures begin to be better understood. John might have an example in TechFast where he has seen a great disconnect between the needs of SME and the ability of the university to respond.

Dr Kapeleris—Certainly. Again, it comes back to the researcher versus the commercial office versus the SME. Sometimes, even though we go to the researcher, we still have to work with the commercial office to be able to get the transfer of this IP or know-how to the SME. We are also looking at building little bridges. Before we build the big bridge between the research organisation and the SME we have to build a little bridge between the researcher and the commercial office because there is also a disconnect there. There is knowledge and know-how enhancing capability across that small bridge, and we also see it when we finally have some IP go across to the SME. Sometimes the know-how is in the researcher's tacit understanding, for example. That person has to work for a short period of time within the SME to be able to transfer and apply that know-how through the TechFast program, for example, so that that product or service can be enhanced from a commercial perspective.

Dr WASHER—I refer to the first bullet point following your recommendation (v):

- Encourage, through legislation or rebates, investment of a small component of superannuation funds into private equity and local innovative companies.

I reckon that is a great idea. I would just love you to tell us how you imagine we can do that. I think it is a great idea, but I would appreciate it if you could flesh that out so we can understand it, because there is a hell of a lot of money tied up in superannuation. Very little of that gets into those areas. Every time the committee mentions this, people sort of dive under the table, and I am sure the Treasurer is going to ring us up. What do you imagine we could do to help?

Dr Kapeleris—One of the issues there is education of investors within the high-technology sectors. A lot of investors understand bricks and mortar; they understand your specific natural resource investments. When it comes to understanding technology based industries and investing in them, they are not very strong, so one of the issues in this area is the education of these investors in the technology sector. That is the first consideration before we even start to think about legislation and other changes, because the market should actually dictate where the money is going to go. Unfortunately, these private superannuation funds and equity funds seem to go into bricks and mortar and, more recently, into mining and some of the resources. So we also have to educate them that the risks associated with investing in the high-technology sector are not very low. They are going to be high, so a portfolio approach to investment within the high-technology sector, balanced with bricks and mortar and resources, is another approach. They are some of the comments that I want to make from an early stage perspective. From a longer term perspective, it is basically about looking at some sort of innovative or creative way of providing some incentives to these super funds, where some of that money can be released for early stage risk capital.

Dr WASHER—We may have some problems convincing the big companies, but as a government we now encourage people to do their own super. I am one of those people who have done that, and from experience they have pretty strict rules about what you can put that money into. What would your recommendation be? Say I am a high-risk, high-tech company. I am going to get a slap on the wrist and suddenly—

Mr Tollner interjecting—

Dr WASHER—I am sure yours will be just fine! With the exception of you, David! If I invested in David's, they would come and deck me—that is what I am saying. They would say it was a high-risk investment and I would have a little inquiry from the Securities and Investment Commission about it. Would you recommend that we made some ruling that a percentage of these funds, if you do your own super, can be invested in those things? There is a heck of a lot of money that people are now given the right to control themselves. They may be attracted—for philanthropic reasons almost; let's not tell the Taxation Office, the ACCC or ASIC that I said that—

Dr Gilmore—Doesn't the government give incentives to invest in forestry schemes, for example?

Dr WASHER—Yes, we do.

CHAIR—I think you are trying to take the incentives off them after all that! It will cause an enormous amount of trouble.

Dr WASHER—I am not being negative about this; I am looking for an idea. I think it is a great idea. I think we should say to people that a certain percentage of their superannuation, maybe five per cent, should be invested in research. I want you to have a think about that and get back to us. That is something we currently discourage. I think you would get into trouble if you did that.

Dr Gilmore—You would get in trouble if you directed people where to invest?

Dr WASHER—Yes. I think that, if I put my money into one of those things, there would be a big query over it. They direct you in your share portfolios; it almost has to be blue-chip or bullet-proof.

Dr Gilmore—But governments already make certain areas more attractive to invest in than others. So the precedent is there to make it equally attractive to invest in Australian investments.

Dr WASHER—I am saying that, if it all went belly up, at least we would be able to pay your pension because there are good long-term investments overall. I being a bit flippant, but I think it is a good thing that we can do it for DIY, and we need to have a look at it for government. I thought your last dot point was very good, but I did not quite comprehend how we could do it. You say we should, 'Utilise Australian expatriates and alumni to assist Australian firms in market entry and capital raising.' Can you tell us exactly how we as a government should encourage people to go about that, or how you would proceed with that?

Dr Gilmore—Last June we launched ExpatriateConnect, a partnership with the Southern Cross Group, which is a large expatriate network, ostensibly in order to help Australian business to qualify opportunities in offshore markets where Australian expats are already located and may have local knowledge. The difficulty we have with ExpatriateConnect is that we have not found a sustainable revenue model to keep it as active as we would like. But certainly we have been approached by, for example, headhunting firms who are interested in attracting expats back home. I understand that some of the other expat initiatives have also attracted some of the merchant banks, because some expats are high-wealth individuals who are used to investing in a riskier, albeit high reward, environment. So the opportunity is there; the AIC is not in a position to seize that opportunity itself.

Mr HAYES—Are we expecting too much from our researchers?. We really want them to be in a position not only to innovate but also to commercialise their innovation and look for people who are prepared to put in the risk capital—other than Mal's superannuation fund! Is that the role we would ordinarily expect of our researchers at the innovation end of technology?

Dr Kapeleris—From my perspective—and I think it is the AIC's perspective—I believe in a comment which was made overseas: 'Keep the researchers doing the research and the industry doing the commercialising.' I believe in that, in that you require expertise to take an R&D project to a commercial outcome. What we are saying, though, is that if you have some understanding of the commercial aspects of your research then you can communicate with industry to get your know-how across. But when it comes to the commercialisation of those opportunities you must have a business model, a commercial model or a funding model.

Mr HAYES—Is industry going to be the essential driver for undertaking research or developing innovation? Industry has a commercial view about investing, so will it be industry that says, 'We want you to go and do this R&D'?

Dr Kapeleris—Business investment in R&D in Australia is very low, so there is not much R&D in industry.

Mr HAYES—That is why companies are outsourcing it to various universities et cetera.

Dr Kapeleris—Exactly. And the way I would look at that is big 'R' and big 'D'. Big 'R' research is done in universities, but when that opportunity gets to a proof-of-concept or proof-of-application stage then the development should occur more from a commercial perspective and move towards an industry perspective.

Mr HAYES—I am just looking at the initiative, the driver, for this. I am assuming that those who are going to be responsible for making profit out of capitalising on the idea—de-innovating the idea—and commercialising it are very much going to be industry driven at the start of it, commissioning the research or at least giving it authority or funding it in some other way, shape or form.

Dr Kapeleris—Yes. It is essentially industry that is going to make those decisions. For example, if we do bring together those linkages between researchers and industry, we may actually achieve industry influencing what sort of research is being done in research organisations—universities, CRCs et cetera. So industry will be providing market input. The only way we will entice industry to do that is through incentivisation—for example, tax concessions et cetera.

Mr HAYES—Yes, I suppose those things are important—whether they are going to put more money into R&D in this country—but it seems to me that a lot of the prominent industry that we have here commissions or at least sources its innovation and R&D from overseas. That is still the case, isn't it?

Dr Kapeleris—Yes, that is still the case, especially with larger organisations. We are finding that large, established organisations can easily outsource that R&D, and a couple of those examples are in the telecommunications area. You will find that the expectation is that these telecommunications companies should be investing more in internal R&D, but their responses have been that the innovation in a smaller, more flexible research based SME is where they will source that R&D. Therefore, we have a problem with low business investment in R&D in Australia.

Mr HAYES—I suppose it is also predicated upon the idea that it has to be original research and development out here. So, if a company is a lot broader than just listed on the Australian Stock Exchange, I imagine that has some very real effect at the moment in the way we commission our research.

Dr Kapeleris—Yes, and it is all about definition. I recall in the early nineties that the definition of R&D was a bit looser than it is now, and therefore we are restricting the innovation process, for example, when it comes to R&D tax concessions.

Mr HAYES—Following through the concept of the boot camp and everything else, would you visualise researchers becoming more in sync with the developers or those who are going to commercialise the innovation, not necessarily in one organisation but into some form of reasonably structured relationship?

Mr Blauensteiner—In one of the programs that I work on, which is the TechFast program, as we are bringing research organisations together with companies to transfer IP that already exists, we find that, once they start talking, they also often start talking about further collaborative long-

term relationships. I think communication is the key here. I guess the mechanism where we bring them together to communicate needs to be sorted out, but once we bring them and they get to know each other and they get to know the skills of the researchers and the potential expertise of the commercial partners what we are seeing through TechFast is that they are starting to talk about further ongoing relationships together. For instance, there are some commercial-ready projects spinning out of the TechFast program. So we are taking some existing IP and bringing it into the small business, and the small business is coming back and saying, 'We'd also like you to develop some other stuff for us.' It is very much about starting to get the researchers to know what industry needs and industry to know what the researchers could potentially do for them.

Mr HAYES—The picture I am starting to get in my mind is that what is being recommended is something that looks like a CSIRO in terms of their partnership approach—the way they relate with industry at the moment. Is that what you are talking about, but on a smaller scale?

Dr Gilmore—The difference is that CSIRO are like a shopfront in that they have IP and—if you can imagine a shop window—they put it out there and then invite industry to come to them. What we are doing is starting with industry. We are talking to SMEs, and so far we have had face-to-face meetings with about 100 SMEs. We ask them what their needs are and then we look across the national innovation system to find IP that might help them. It turns out that many roads do lead to CSIRO. I think we are doing about five projects—

Mr Blauensteiner—There are a couple of potential deals.

Dr Gilmore—or maybe more with CSIRO.

Mr HAYES—You may have only a couple of deals in a commercial sense, but you are effectively operating on a smaller scale than CSIRO but, to take your point, with a view to probably building a longer term relationship with industry in terms of commercialising other activity.

Mr Blauensteiner—Essentially, what we are doing with TechFast is asking an individual SME whom we believe is high performing and has high-growth potential—the typical type of SME that we are trying to encourage—what it is that they need or what it is that they would like. It is basically a technology wish list. Based on what they tell us, we then see whether we can find some solutions. Whilst it is early days, the evidence is showing us that solutions are available for them in Australian research institutes. They just did not know where to look and they probably did not know how to go about engaging with research organisations either.

Mr HAYES—Other than trying to put a pitch on my superannuation fund, what sort of incentives are necessary to drive R&D investment back up in this country? At one stage I think we did reasonably well in this area. I suppose, over time, commercial and a whole host of other reasons will affect it. What do we need to do? I notice in appendix 2 that you have issues about tax incentives—they have been around for some time—but what other activity do you require or recommend that we should at least be addressing?

Dr Gilmore—There is a school of thought that says publicly funded government research and development results in poor commercial outcomes; it is business funded R&D that results in the commercial outcomes. We are trying to prove that school of thought wrong—that, if in fact there

is industry that cannot afford to do R&D, there is publicly funded R&D there that can be utilised; let us work out a system, a mechanism, to enable Australian industry to benefit from that. Having said that, I guess your question pertains to how to increase the business percentage of R&D. Certainly government funding of R&D, as you are aware, is above the OECD average and the business percentage is below the OECD average. However, there is a correlation. There are some interesting graphs showing the evolution over time of what happens with business R&D when government R&D increases. There is some evidence that business R&D in Australia is starting to pick up. However, certainly in 1996, when the R&D tax concession dropped, business R&D took a big hit. So tax concessions of R&D are part of the story, but perhaps that is less of an issue now that the corporate tax rate has dropped as well.

CHAIR—Gentlemen, I invite you to make any concluding comments. If you are happy to agree, the secretary will pursue you on the issue of expenditure on commercialisation.

Dr Gilmore—I would just note that the AIC would not exist without government support and funding. I would like to acknowledge that the TechFast program is funded by the Commonwealth through the Department of Industry, Tourism and Resources. We believe that we are making headway. That program expires in June 2006, so we will make a proposal to consider how it might expand into a fully-fledged national program. We draw the attention of the committee to that proposal when it comes up in the context of the May budget discussions.

CHAIR—Thank you very much for your evidence. It has been very worth while.

[5.24 pm]

ANDERSON, Dr Ken, Deputy Chief Defence Scientist (Policy), Defence Science and Technology Organisation

GRAY, Mr Andrew Alan, Assistant Secretary, Defence Science and Technology Organisation

CHAIR—I welcome representatives of the Defence Science and Technology Organisation. These are proceedings of the parliament and, while we do not ask anyone to take an oath, they should be treated with the same respect as proceedings of the parliament. Would you like to make an opening statement?

Dr Anderson—Yes. The DSTO is the Defence Science and Technology Organisation. It is part of the Department of Defence and it is the second largest research and development organisation in Australia. It assists industry to assist Defence. It does this by transferring technology to industry, where it can be further developed for Defence use or for broader civilian application. DSTO's efforts to assist and transfer technology to Australian industry have several pay-offs for Australia. Firstly, the ADF benefits through the evolution of sustainable, competitive Australian defence industry capabilities and the savings delivered by improved technology and products that are tailored to Defence requirements.

Secondly, Australian businesses, including small and medium enterprises, benefit from exposure to DSTO's research base, the introduction of new technology and potential new defence markets, the development of spin-off products with civilian application and potential income from sales, including exports. And DSTO itself benefits from experience gained through the widespread application of its technology and through collaboration with other parties. Of course, this benefits Defence generally, through new capabilities and building a strong and more reliant Australian industry, which we believe is an important part of our role.

DSTO is currently involved in 17 industry alliances; 78 collaborative agreements with industry, including 11 research agreements with universities; 26 memoranda of understanding with industry, including six with universities; 78 agreements licensing its technology to industry; 10 cooperative research centres; seven centres of expertise based in universities and numerous technical support service contracts, which in total amount to approximately nine or 10 per cent of the DSTO budget. That is, that amount of money is contracted out to other parties to supply research and development and other contracted services.

Much of this information is in our partnership booklet. I do not know if you have a copy or have had the opportunity to look at one, but it does detail a lot of what I have just described. DSTO actively encourages engagement with industry and with the science and technology community. We regard ourselves as not only a full operational part of Defence but a full operational part of the Australian science and technology community, and we participate in some of the appropriate bodies to represent them.

One of the prime mechanisms for engaging with industry is our capability and technology demonstrator program. The CTD program allows industry to demonstrate how their advanced technologies might enhance Defence capability. New arrangements have been put in place in the last year. These include an annual funding increase and the provision of some seed money to allow small companies to develop initial proposals. This allows them to put innovative solutions to Defence for consideration. Earlier this year, the Minister for Defence announced that $26 million will be invested in 12 new technology projects, including a handheld underwater sonar device to detect mines, blast resistant material for Army vehicles and flexible solar panels to generate power for ADF operations in the field.

That was as a result of round 9, which concluded a few months ago. As I said, the outcomes were 12 new projects, and we have just started our analysis for round 10. We have had something like 120 applications, which are now being filtered down to a more manageable number. DSTO manages the CTD program on behalf of Defence, but it does have a capability theme to it, not just a technology theme. In other words, we are looking for things that will be useful for Defence as defence capabilities, not just technologies that look exciting and show potential. The program has been running since 1998. We currently have 38 active projects. Several of these run for several years. Some, of course, have already concluded. To date, about $116 million has been invested in the CDT program.

The next thing I want to mention is the Trenberth review. This was conducted by Robert Trenberth in 2003. The subsequent report was called the *Review of DSTO's external engagement and contribution to wealth,* and I guess it is very pertinent to your considerations here today. If you do not have a copy, I would certainly commend it to you. It is all about the transition of publicly funded research in DSTO and how it interacts with universities. This report examined DSTO's interaction with industry and assessed its impact on national wealth creation. It found that DSTO has covered its own annual budget for the last 13 years with just six of its innovative products. It also found that DSTO engages extensively and effectively with large and small companies and other research institutions to create new technically complex capabilities for Defence.

DSTO's quantitative contribution to national wealth was demonstrated by the six case studies I mentioned. This was carried out by economics consultants ACIL Tasman for Mr Trenberth, and that is where it was estimated that the economic benefits of those six projects would be as high as they were. Those figures are available if you want to examine them, but I think some of the figures are commercial in confidence, so we do not release them publicly.

The review found that, while DSTO try hard, they could do better with regard to technology transfer to the wider national innovation community and, to that extent, some initiatives were put in place. In fact, this year we have introduced something we call the TTAG, the Technology Transfer and Advisory Group. This comprises three industry representatives who provide independent technology and market analysis and guidance for the DSTO Business and Commercialisation Office on potential commercialisation opportunities. This body has already met several times this year and has reviewed a number of technologies that have been put before it. I think there may have been some details in the paper that we put to you.

In addition, we have established something called DSAN, the Defence Science Access Network, which is meant to make it easier for small or medium enterprises to gain access to

information about DSTO's research program and where there might be potential for some commercialisation. It certainly helps to connect industry to DSTO and assist DSTO in seeking out industry where R&D might have defence applications. However, I do want to emphasise that DSTO's prime mission is not about commercialisation; the mission for DSTO is to apply science and technology to allow Defence to carry out its mission of the defence of Australia and its interests.

CHAIR—Is that like scientists in universities saying that, after commercialisation, our prime mission is the generation of knowledge for its own sake?

Dr Anderson—I will leave universities to say what they wish, but Defence is funded to a figure of $16 billion or so per annum to provide for the defence of Australia and its interests. Approximately just under two per cent of that is allocated to DSTO, so this is a substantial sum of the order of $300 million per annum. That is being provided so that DSTO can provide advice, partly as a smart buyer, partly policy advice on S&T matters and partly to provide in-service support—particularly how to make the existing technology in the Australian Defence Force last longer, work better or run more efficiently or more cheaply.

I guess that is our prime mission but, in the process of doing this, we have developed some new technologies and, again, there are some details in the booklet for such things like the high-frequency radar for over-the-horizon work; and things like sonar systems for the detection of mines, submarines or, indeed, other bodies in the ocean. Some of this work has led to commercialisation, in some cases for some substantial export earnings.

If I could return to my script here—I will probably repeat myself—DSTO's objective is about saving Defence and ultimately taxpayers' money through investing in future technologies for defence applications, ensuring Australia is a smart buyer and user of defence equipment, developing new defence capabilities in some cases where we have specific needs and enhancing existing capabilities by increasing performance and safety or reducing costs. DSTO is an applied research organisation with a well-defined client. That allows our program to be scrutinised by the client on an annual basis and to be focused and prioritised in accordance with defence priorities.

Where it is consistent with this work, DSTO, of course, does contribute to and assist with national wealth creation in several ways, including technology transfer. This is detailed, to some extent, in the Trenberth report that I mentioned earlier. Often this goal coincides with our objectives to enable industry to support Defence and the defence mission—for example, by keeping vital knowledge and production skills within Australia and within Australian industry.

Specifically, other than through direct utilisation of DSTO output by its clients, DSTO output assists in national wealth creation in several ways, not necessarily resulting in an income stream to DSTO. These are things like building a secure nation through the transfer of technology and through reducing imports by assisting local manufacturers, and enhancing defence industry and, in some cases, by the development of dual use technology.

CHAIR—Thank you very much. Your total budget is in the order of what?

Dr Anderson—It is just a little over $300 million in our basic Defence portfolio budget, but on top of that there are some other funds that come to DSTO which we call tied funds. They are for defined, specific, non-discretionary purposes.

CHAIR—In the order of, for just this year?

Dr Anderson—In the order of another $50 million. But some of that is Defence money, I should say—that is, from other Defence agencies who give us money to do things.

CHAIR—When you distinguish between tied funds and your recurrent funds, what is the difference?

Dr Anderson—Tied funds are funds that come to DSTO for a specific non-discretionary purpose. It might be, for example, to carry out a test on a specific rocket that requires the development of some equipment, the employment of some contractors, the building of some rig, taking people to Woomera and ultimately putting together something that is very specific to a particular project. So it is a service provided.

CHAIR—And the other times?

Dr Anderson—The bulk of our budget is our discretionary budget—perhaps not as discretionary as the name might say—insofar as we keep 10 per cent of that for DSTO initiated purposes—that is, for DSTO choice about where to invest our funds. The other 90 per cent is substantially directed by a series of research and development committees that we have that run through Defence. One looks at aerospace applications, one at maritime, one at land and one at intelligence. Another one looks at joint and information and another one looks at strategy and future capability. These separate little segments of the program have their own committees that work out what their priorities are so that, in effect, the Air Force, through the aerospace R&D review committee, can tell us that this year their current priority is for us to do more work on, let us say, structural integrity for fatigue studies and life extension of air frames as opposed to perhaps more work on electronic counter-measures or whatever it might be.

CHAIR—Who determines the allocation of your 10 per cent?

Dr Anderson—Our 10 per cent is at the discretion of DSTO.

CHAIR—What is DSTO, for the purposes of determining that?

Dr Anderson—Ultimately it is the prerogative of the Chief Defence Scientist, but the Chief Defence Scientist has to go along to the Defence Capability Investment Committee every year. In fact, it is this very Friday that the Chief Defence Scientist and I will go along to describe our program. In addition to describing our program for the major clients—the 90 per cent—we also describe what we do in the 10 per cent. Typically the 10 per cent are things where we have got some ideas through collaboration with other parties or possibly with the universities or through some innovative work of our staff. We think some package of work is worthy of some further investment and then we see how it goes. If it starts to yield something useful then we probably migrate it into the client sponsored program after a period of three or four years.

If I can give you an example, we have the long-range research program within DSTO at the moment; we are doing some work on network-centric warfare; and we are doing some work on automation of the battle space. This is effectively the use of unmanned air vehicles, underwater vehicles, ground vehicles or stationary objects—robots, if you like—to do a range of things that might otherwise be done by humans. We think that is important for a whole range of future reasons. Much of this work in time will migrate into the client sponsored program, but at this stage it is not directly relevant to a specific agreed acquisition program. For that reason our clients do not wish to sponsor it. That is a balance that we have to work every year.

Certainly some of the work, in our 10 per cent, if you like—the long-range research program—is longer term, blue sky, boundary-pushing work. Some of it, however, is more about capability for things that we think we will need to do in five or 10 years time because we can see the impact of technology as it is developing in an area where perhaps we do not currently have many skills. There are a number of ways that we use that budget. We do have to expose it to scrutiny—we do so periodically—and it usually stands up pretty well.

Dr JENSEN—You talk about the issue of budgetary oversight. I see a bit of a problem in that the desk officer is in effect, in combination with DSTO, defining the direction of research, but he is also the overseeing authority. The problem that I foresee is that maybe the research direction goes down a path that Defence, not DSTO, thinks is the right way to go, and DSTO will do its best to help in that regard, but the person doing the research may be aware that the question being asked is not actually the right question. How do you see this process of the desk officer and potential separation of the oversight from the actual funding authority?

Dr Anderson—We do work with our client, our desk officers, who go through the detail of a specific task plan. A task plan is a bit like a contract, with a DSTO task manager working out something and a desk officer working out what the sponsor would like. Those task plans have to be endorsed at more senior level committees. The purpose of that is to ensure that there is an appropriate degree of balance and priority in terms of the allocation of resources and the allocation of tasks.

We recognise that there is a bit of a two-edged sword here. If that connection is too loose there is the potential for the work to be more motivated by the interests of the scientists, the curiosity—whatever the skill strength is of that group of people. On the other hand, if the grip is too tight you wind up with a program that is very tightly focused on near-term objectives; it tends to be risk averse and tends not to be discovering anything terribly new; it is essentially a contracting or consulting role. We try to strike a balance. In some cases one model is more appropriate and at other times the other model might be more appropriate. As I say, we try to strike a balance.

Periodically we have an external review. In fact, just a couple of weeks ago we had in three experts—one from the UK, one from the US and one from Canada—who are leaders in their own country's chemical, biological and radiological defence networks. They were reviewing our program in those areas—not only its content but also its application and balance. The purpose of this was to give us some confidence about the way we are doing it and to give us guidance about how we might structure it better. We recognise that there is a need for periodic reviews to look at quality. Our customers tend to give us pretty good feedback on the issue of relevance.

You raised the point about their real insight, and we certainly recognise that, for longer term technology issues, there are occasions when DSTO has to take a lead with its clients and say that, looking at the next generation aircraft—when the JSF or whatever comes in—we are going to have a whole lot of issues that we do not have now with the current generation aircraft, and we have to talk through those. In some cases this leads to the generation of new work, either for us or externally to do that.

Dr JENSEN—How do you deal with political pressure in terms of—

CHAIR—I do not think DSTO knows what political pressure is. I would like to keep it a little bit tight, and Jackie also has some questions. Is that okay?

Dr JENSEN—Okay.

Miss JACKIE KELLY—You mentioned that Defence has developed a new IP policy. Could you tell the committee about that policy and what mechanisms you are using to protect your IP overseas?

Dr Anderson—I sit on the Defence Materiel Export Committee, which is looking at IP issues and the protection of it with regard to exports of Australian technology. Very often, the examples we are talking about are technologies that have been developed by the Commonwealth—by DSTO or some other government agency. The IP issue is a mixed one in many cases, because we feel that we want to encourage private industry to have the opportunity to exploit a technology.

Much of the thinking behind our Technology Transfer Advisory Group is to do what we can to get small and medium enterprises engaged with the IP to think about how it might be commercialised by not putting up too many barriers and putting the IP hurdle too high. But equally, we do not ever want to be caught in the situation where the Commonwealth has to pay for IP that it developed itself. Certainly if there are royalties to be had, if there is potential for earning commercial income, we are quite keen about identifying that early and protecting it as appropriate. If you are thinking more about not allowing IP out of the country because it might get into—

Miss JACKIE KELLY—What did you change between your old policy and your new one?

Dr Anderson—I am not closely familiar with the previous policy; it would have been in the time of my predecessor. Certainly the key point that we are emphasising now is that, in addition to protecting IP for our own use, we do not want to put it behind barriers so high that it can never be accessed by Australian industry. But that is really an Australian industry engagement policy, not a national protection policy. With regard to national protection, I do not believe there has been any change in that respect. The Defence committee that looks at that has to make judgments about the IP case by case—what it might be used for and who might be able to use it.

Mr Gray—Our DSTO industry interaction manual is scheduled to be updated in the third quarter of 2005. In updating it, we will be picking up on new initiatives such as TTAG and some of the new licence arrangements that flow out of the Trenberth report. We would be happy to table some of the changes that are being made to that manual, which goes to your question, I think.

Dr WASHER—You mentioned the new plane, and that will be a cooperative international construction effort. How is that managed? Would Australia build a component of the plane and have that intellectual property? How do we do that? How do we internationally collaborate successfully and innovate and retain our own share? How does it operate?

Dr Anderson—I think I would have to ask the head of the JSF program office to brief you on that specific point. It is a large international engagement. Australia does have a role as a tier 3 contributor to the JSF, but the major design and development are all US led and operated. There have been a number of commercial opportunities; and I believe a number of Australian companies, some with some DSTO help, have got access to contribute to some of the design and development phase. While I cannot speak with great certainty, I imagine that where Australian IP has been generated it would be retained. Certainly, I understand that the idea is, in the longer term, that some of the manufacture of the JSF will be shared in Australia.

Mr HAYES—Regarding your collaborative aspects, does your organisation go and make the contact or establish the networks out there or are you being targeted by developers?

Dr Anderson—Do you mean within Australia?

Mr HAYES—Yes.

Dr Anderson—Yes. A point I should have made earlier is that we do have within DSTO—indeed within Alan's branch—a business and commercialisation office. Its job is to build a lot of those linkages, to write a lot of the contracts, to facilitate various alliance meetings and so on, to organise the TTAG system and to provide them with appropriate material to identify appropriate technologies that might work there. So we do have a number of business development managers employed inside the DSTO business and commercialisation office. Indeed, in line with the Trenberth recommendations, our expenditure in that area has risen from about $1.6 million a year to about $2.3 million a year.

Mr HAYES—So you are in a relatively unique position—at one stage you would be considered the researcher and at other points you are the lead agency outsourcing, or collaborating on, levels of research.

Dr Anderson—That is probably right.

Mr Gray—To add to the answer to the earlier question, we take a proactive role so that people from my team go out at least once a year and visit all the states and territories together with the Defence Materiel Organisation. We do a bit of a roadshow to companies of some of our capabilities and some of our wares. Over and above that we have TTAG which has been in place now for about 18 months. TTAG is the Technology Transfer Advisory Group and it includes three venture capital companies: UniQuest, QPSX and Starfish. They meet three or four times a year to look at the research and some of the products that are coming through and provide expert advice on the sorts of companies who could take it on to the next phase.

Mr HAYES—Do you have a weighting system of some sort that actually looks at Australian based research companies for your collaboration?

Mr Gray—The rating system is more for the rating of the technology. We have a scale of one to nine for how commercialisable some of the technology is. We would normally operate in the range of one to four, and then you are starting to move it out into industry from there on up.

CHAIR—I may have misheard your opening statement. Is 90 per cent of your expenditure consumed internally and 10 per cent expended on collaborative operations?

Dr Anderson—Approximately 10 per cent of the DSTO budget is spent outside DSTO—that is, with university research agreements or with some private companies to do some of our work.

CHAIR—What do the Brits and the Americans do with the balance between internal and external?

Dr Anderson—I do not know the precise answer to that, but I do not think it would be very relevant either because the amount of industry and the magnitude of universities they have to deal with is very different from what we have here.

CHAIR—Is that data available? Is there an international comparison?

Dr Anderson—We could look for it—I am sure we could. Organisations like DAPA run a huge multibillion dollar annual contract for research and development and it is all contracted out. Indeed, some of it comes to us in Australia—some to DSTO as well as some to Australian universities.

CHAIR—I am trying to get some standpoint from which to compare that amount of internal as against that amount of external science—what does the world look like?

Mr Gray—On page 32 of the Trenberth report, there is a table which shows DSTO benchmarked against recent US commercialisation survey data. That table suggests that we were not performing too badly.

CHAIR—I had no prima facie views. I just wanted to see.

Mr JENKINS—At the end of the submission you talk about the 71 licences that DSTO manages. Do you directly manage all those or do you enter into agreements with other companies to manage them on your behalf?

Dr Anderson—We do employ some contract project managers but many of these would be managed by our own staff. Certainly, the S&T advice that goes with it would normally come from our own staff, but, in some cases, we may use contractors to help with the process.

Mr JENKINS—How does it change if you have worked with a similar overseas agency to work up an outcome which has led to a licensing?

Dr Anderson—Yes, we certainly have to be careful. We cannot go licensing somebody else's IP. There is no doubt that we do gain a lot from our international collaboration. We have a very active international collaboration program, particularly with the US, UK, Canada and more recently with Singapore. The purpose of a lot of that collaboration is of course to get back more

than we put in and to share their ideas. We clearly have to be careful if there is something that goes that next stage to becoming a commercial product not just a scientific concept, where it is beyond a matter of giving advice to government, where it potentially becomes a commercial product, that we duly recognise any foreign IP. It is not just the recognition for royalties reasons; it is also for the authority to make further use of it.

Mr JENKINS—Your submission talks about not necessarily everything going to create revenue but to enhancing defence capability and therefore it is in the national interest. In your ranking of commercialisation, is it considered the same when it goes to enhance the defence capability without bringing a revenue stream that we would attach to a common course of commercialisation?

Dr Anderson—In the hierarchy of things our greatest preference would be something that helped defence and led to a revenue stream, but at the next level we would rather have a project that was commercialised and led to some enhanced defence capability and enhanced business activity, even if there were no revenue stream, than have nothing at all. We could look back at previous examples. Doubtless, you have read of the black box or the T-VASIS landing aid system where things have been developed in DSTO and led to no revenue and not nearly as much commercial exploitation as we may have wished.

Mr JENKINS—I take it from raising that example that your organisation has developed a capacity that not only enhances a capability, whether it be the black box or any other defence capability, but has an eye to the revenue stream commercialisation.

Dr Anderson—Yes.

Mr Gray—I would add a caveat to that. It has an eye to national wealth. Now we are defining national wealth more broadly than simply a dollar value, so we are looking at the contribution that it is making to welfare and to the overall safety of the country. So there is a range of criteria there which we apply.

Mr JENKINS—I wonder what your brothers and sisters at CSIRO would say.

CHAIR—Could I ask for some clarification there. What does national wealth actually mean for you?

Mr Gray—National wealth, which was defined in Trenberth, includes natural man-made capital, environmental assets, knowledge, skills, networks, distribution systems and attitude to innovation and risk taking.

Dr JENSEN—DSTO, in terms of research organisations, is fairly unique in that you have various levels of secrecy within the ADF and collaborative arrangements with the US, Europe, Canada or whoever. What is the best way in which you can operate within those constraints and still commercialise ideas, technologies and so on? In other words, that is a significant constraint—you have all this compartmentalisation and so on. What is the best way in which you can identify how some of those constraints could be loosened up?

Mr Gray—I have only been with the organisation for a fairly short time, but I have spent a fair bit of time in science and technology in Australia over a number of years. I think DSTO does it pretty well and there is a pretty good balance with respect to reaching out to industry. It is improving all the time. The TTAG is one example. Australian industry are starting to participate in some quite complex and highly secure activities. It is not an easy task; nonetheless they are increasingly getting involved in that. Indeed, some of the SMEs are getting involved as well. So there is a track record there and it is improving all the time.

Dr Anderson—DSTO manages the patent portfolio for Defence. Many of them are DSTO patents, anyway. Some of those patents are secret. We can have secret patents. We do, of course, as you point out, share some information that is classified with people from other countries. Sometimes that translates into capability—something we might develop, something that might be transferred to industry or an industry might help to commercialise it. But there may be some component of the design, of the algorithms, that are classified and we keep a tight hold on it. That is particularly pertinent when it comes before the defence exports committee for consideration. We certainly see part of our role as keeping a careful eye on monitoring that.

I refer back to a previous comment about CSIRO. There are obviously some significant differences between ourselves and CSIRO, such as the way we manage IP, the way we interact with industry. Allow me to suggest that the fundamental reason behind that is that DSTO is part of Defence. It is connected to its main customer. Its main customer allocates its budget. That gives us a lot of insight into Defence requirements. It means that we have a program that is tightly aligned with defence application and outcomes. To that extent that is our main business and that is the way it is funded. The commercialisation activities, valid as they are, are effectively secondary.

CHAIR—I think Dr Jensen was making the point that I was thinking about—that somehow it looks quite similar to CSIRO in terms of measuring outputs. Would you like to make any final statements?

Dr Anderson—No, I think we have covered all the issues that I had in mind.

CHAIR—Tell me that we are managing our IP better than we did with JORN.

Dr Anderson—I think we could find lots of other examples where the IP in previous years has not been well managed. We are certainly trying to keep a tighter grip on things where there is potential, as I was saying earlier, for a defence application, where we want to keep it for ourselves or we certainly do not want to have to pay for it to get it back, or we might have some particular reasons why we do not wish others to have access to it at all.

Mr Gray—Since JORN, there is now in DSTO a full-time business office and its full-time job is to manage the commercial relationship. So it is a much tighter affair.

CHAIR—Thank you very much. That has been very useful.

Resolved (on motion by **Dr Jensen**):

That this committee authorises the publication of evidence given before it at public hearing this day.

Committee adjourned at 6.04 pm