

F-35Bs on LHDs 02 June 2014

Senator CONROY: Regarding the new LHDs, a couple of weeks ago *The Australian* reported that the Prime Minister has, 'Instructed planners working on his Defence white paper to examine the possibility of putting a squadron of 12 of the short take-off and vertical landing version of the JSFs—the F-35B—on to the ships.' Are you familiar with that article, Vice Admiral Griggs?

Vice Adm. Griggs: I am.

Senator CONROY: Has the Navy been asked to provide any input to this possibility?

Vice Adm. Griggs: What is happening is that the whole issue of short or vertical take-off aircraft is being considered as part of the force structure review and the white paper process. We will participate in that, as will Air Force. I welcome that.

Senator CONROY: Thanks for coming to the table. How much modification will be needed to modify the LHDs to launch, land and carry the JSF B variants? Air Marshal Brown might want to comment on—

Vice Adm. Griggs: No, he probably does not.

Air Marshal Brown: Depends on your answer.

Vice Adm. Griggs: There has been some work already done, and it was done during the 2008-09 force structure review white paper process, to understand what the implications would be. It largely revolves around ablative coating on the flight deck because of the heat generated from the F35-B. It relates to fuel storage and fuel lines. It relates to amendments or modifications we would have to make to magazines on the ships to take the weapons that support the F35-B, and there are other aspects like some of the classified compartments that we would need to make sure existed to support the mission system for the F35-B. I think I have covered most of the issues.

Senator CONROY: You mentioned storage, planes equipment, fuel, munitions and support crew. Can you just outline what those changes would need to be? Where are we up to with the LHDs? Where are they being put together?

Vice Adm. Griggs: In Williamstown.

Senator CONROY: I thought so. I saw it on the weekend. I live in Williamstown, as you probably remember. What sort of changes in storage for the actual planes, or the equipment, fuel, munitions, and support crew would you need to make? Because for being put together they seem to be a fairly long way down the track right now.

Vice Adm. Griggs: The ship—

Senator CONROY: Yes.

Vice Adm. Griggs: *Canberra* will deliver some time in the third quarter of this year, probably around September.

Senator CONROY: It looked in pretty good shape.

Vice Adm. Griggs: So, it is not that far away. We have to, obviously, do some more work on this, because I would say this has been a fairly superficial examination up until now because there has not been a serious consideration of this capability going into the ship.

Senator CONROY: Air Marshal Brown, did you ask for this capability? Did the Air Force request this?

Air Marshal Brown: Like all things, when you have a new white paper you should always examine all sorts of options. It was not something that Air Force has particularly pushed. I would just like to add to Vice Admiral Griggs's modifications required to the ship. One of the big issues with having fixed wing aeroplanes come back onto a ship is you have actually got to get them back in poor weather. So, there would be new radars required on the ship as well as instrument landing systems. So, there will be some extensive modifications around that.

Gen. Hurley: I think the start point of this, as Vice Admiral Griggs has pointed out, is there is the need—if we look at the phases we go through, there are needs and then requirements. We are starting at what are the requirements, that is, how do we adapt the ship and what does a ship that launches vertical take-off aircraft look like. There are two parts to the Prime Minister's request. One is to drive it back to see how would this fit into the force structure of the future, how would it meet the needs of the future and so forth, and then we would do the prioritisation, stack it up against other needs and so forth into the future—they come out of the white paper. Once you have gone through all that, if you were to say, 'Okay we need to have this type of capability and we are going to now go through what that would cost and then what the opportunity costs are', then we will go down and say, 'Okay, how would you modify a ship to put this capability in?' That would be part of that costing process. It is a number of steps to actually get to that detailed questioning you are asking at the moment.

Senator CONROY: I appreciate that, General Hurley. I am simply going on a newspaper article that bobbed up and seeking to establish for the committee an understanding of what would be involved in making that sort of change right now. We are a fair way down getting the strike fighters, we are a fair way down of—last time I looked on the weekend, it was getting more impressively large and to suddenly throw a curveball in like this at relatively the last minute—I appreciate we do have things in the pipeline—it just seemed like an odd thing to do.

Mr Richardson: Could I just add—

Senator CONROY: Mr Richardson, join us.

Mr Richardson: It is a reasonable question about that option, and it is being examined in the context of the force structure review.

Senator CONROY: Are you able to take this on notice? Air Marshal Brown indicated radars would be an extensive change. Vice Admiral Griggs described some. Are there any other changes to the structure of the ship? You mentioned the deck; obviously that makes sense.

Air Marshal Brown: I will just defer to the secretary, I think there is a lot.

Senator CONROY: Does the deck need to be reinforced or is it just a paint job?

Air Marshal Brown: There is a lot of—

Senator CONROY: A special paint, but an application.

Air Marshal Brown: There is a lot of work to be done conceptually before we get to that stage, so it would be a little speculative to just give you a list of modifications to the ship at this stage.

Vice Adm. Griggs: I think we have given you a sense of the sort of things that we have—

Senator CONROY: Would there be different personnel, training, aircraft maintenance or pilots needed in the circumstance? I see you are nodding there. Is there anything that you can tell us on that?

Air Marshal Brown: I think it is early days as to how much. There certainly would be differences in training as to how much that would require. There would be issues that we would have to go through. There would be a different logistics system as well for that aeroplane so, again, a fair bit of work to go through.

Senator CONROY: It has been a long time since the Navy had a ship capable of launching aircraft. What sort of organisational changes would you need to make to carry that capability out today? Would they be operated by Navy pilots or Air Force pilots? Who would own them?

Gen. Hurley: I would own them.

Senator CONROY: That goes without saying that the CDF would own them. I am just interested if there was going to be a dogfight there, no pun intended.

Gen. Hurley: No, I am trying to stop one. We need to go back to the processes that we have in place with the white paper force structure review and look at the place of a capability in this. Those types of questions that you are asking are long-term questions. For us to speculate whether we have a new fleet air arm that is bigger which now has fixed wing capabilities to strike off a carrier looking aeroplane, frankly it is just too early. We are not anywhere near that mode. Although they are interesting and intriguing questions and will keep our younger people very busy around the coffee table at the moment, they are pure speculation.

Senator CONROY: Our Prime Minister is tricky like that. You have got to watch him.

Gen. Hurley: It is pure speculation.

Senator CONROY: I am quoting the Prime Minister's leak to *The Australian*. I have not double-checked but I am willing to bet it said exclusively.

Gen. Hurley: I think we are in the situation where new governments come in. There has been a white paper evolving for a while. We have had a platform that is about to come into the service which is essentially based around delivering an amphibious capability built around ship-to-shore, which is helicopter borne and the small boats from the well of the ship. The Prime Minister has a view about a capability that he thinks might be relevant to the ADF. He has asked us to look at that. We have a process in place at the moment that will allow us to have a look at that and, depending where we come out on that process, we would then go into all of those technical decisions about the nature of ship and force structure implications for the ADF. I do not want to touch it yet until I know whether I am going to have one.

Senator CONROY: Minister, you just cannot take your eye off that Prime Minister, can you? He is just full of good ideas.

Senator Johnston: I think you might concede the Prime Minister is interested in exploring options. He wants a versatile, capable ADF and there is no harm in exploring with the experts what the options are. I think that is perfectly normal and natural and he should certainly not be criticised for it.

Senator CONROY: I was just saying that you have got to keep your eye on him every minute. He keeps jumping in there on you. Can I just clarify—and I appreciate the point you are making, General Hurley, that no-one has actually made a decision about it, but just for the purpose of the committee understanding what it would mean if you were to go down that path, without going into too much detail—the discussion relates to the fourth operational squadron of JSFs purchased in addition to the existing 72 which are already on order. When is the last of those 72 expected to be delivered to Australia?

Air Marshal Brown: We expect the last of the JSFs in that tranche in 2022.

Senator CONROY: When is the second LHD expected to enter service?

Vice Adm. Griggs: 2016.

Senator CONROY: So if we were to choose to proceed with the purchase of any B-variant JSFs as a fourth operational squadron they would likely come into service well after both of the current LHDs enter service. Is that correct?

Gen. Hurley: That would be correct.

Senator CONROY: That would seem to be the case?

Senator Johnston: You would think so.

Senator CONROY: I was at Forgacs in Newcastle recently and I had the 1-3-8 rule explained to me. It was said that if something cost \$1 to build on the workshop floor at a facility like Forgacs that it would cost \$3 to build once these blocks have been combined and it would cost \$8 to do it once you are working inside the whole of a commissioned Navy vessel. Does that sound about right?

Vice Adm. Griggs: There is no doubt it costs more to modify them to design and to build, yes.

Senator IAN MACDONALD: I thought it was 1-2-5.

Senator CONROY: Maybe they are already gilding the lily on me. They are buttering me up in advance. With that in mind, does it seem like a sensible financial decision to make significant alterations to the LHDs once they are well into their operational lives within the Navy fleet?

Mr Richardson: We are not at that point.

Senator CONROY: But if you were to make that decision? They are in the water in 2016.

Mr Richardson: We are not at that point. The first step is part of the force structure review. Anything beyond that is speculative at this point.

Senator CONROY: This is just like two plus two equals four. If the ships are already in the water it costs more to adapt them to a new Air Force purchase if we make a new Air Force purchase.

Mr Richardson: Of course it does.

Senator CONROY: Depending on whether it is an Air Force or a Navy purchase in that sense?

Mr Richardson: Yes.

Senator CONROY: That is just maths?

Mr Richardson: That is right.

Senator CONROY: It is not about the high level. That is what you would be thinking about when you would be having a conversation in the Defence white paper?

Mr Richardson: Yes, that is right.

Senator CONROY: Would it make more sense to buy or build a purpose built light aircraft carrier to act as a platform for any future JSF B-variants? This is not just a backdoor way to sneak an aircraft carrier into the game, is it?

Senator IAN MACDONALD: That is certainly hypothetical.

Mr Richardson: It is.

Senator CONROY: I am saying that it is going to cost a lot more to make the changes. You would be the first vice admiral to have an aircraft carrier on your watch for a while.

Mr Richardson: You are getting way ahead of where we are at.

Mr King: The ships are in service for 35 years. In the course of their life, requirements of them change and all the matters that have been raised like costs and amount of change, the national interest is considered in doing that. It is true that there is a different cost after you enter service, but if it is in the national interest and that is a cheaper way to get a capability—and I am referring to the general ship modifications—then that is what a country does, but it is a long way off such a decision.

Senator CONROY: How much do you think it would cost to modify the LHDs to accommodate the variant?

Mr Richardson: We are not prepared to speculate on anything like that in advance of having done the work.

Senator CONROY: The Prime Minister's office has put that into the public domain.

Mr Richardson: We are not prepared to speculate. The Prime Minister has not speculated on that.

Senator CONROY: I said that the Prime Minister's office has put that into the public domain.

Mr Richardson: I do not believe the Prime Minister's office speculated on costs. You are asking us to speculate on costs before we have done any work, and it would be inappropriate for us to do so.

Senator CONROY: I will ask you a technical question rather than a cost question. Would an LHD modified to operate as a launching platform for the JSF also be able to operate as an amphibious vessel as well?

Vice Adm. Griggs: Yes, but there are trade-offs that you would have to make.

Senator CONROY: Would it still be possible to load the same number of helicopters and landing craft that are planned for the existing LHDs?

Gen. Hurley: It is just impossible to answer that question because we do not know whether (a) we will have the platform, (b) what modifications are actually required and (c) what would be the change to capabilities to the ship.

Senator CONROY: We do know a few things, though.

Gen. Hurley: To be very honest, we cannot answer questions of that nature. That is just asking us to do the impossible.

Senator IAN MACDONALD: The better question might be whether there are any other LHD type vessels around the world that have been built by Spain or anyone else that have a fixed wing aircraft take-off capability?

Vice Adm. Griggs: The LHD that we have?

Senator IAN MACDONALD: Yes. Is any other navy using it as an aircraft carrier?

Vice Adm. Griggs: The Spanish do.

Senator IAN MACDONALD: Do they?

Vice Adm. Griggs: They use it as part of the mix of their aircraft that they have.

Senator IAN MACDONALD: What sort of aircraft do they run off?

Vice Adm. Griggs: AV-8B Harriers.

Senator IAN MACDONALD: The English jump jet?

Vice Adm. Griggs: The jump jet.

Senator IAN MACDONALD: Do they jump them off or do they fly them off?

Vice Adm. Griggs: They ramp them off the ramp.

Senator CONROY: Thank you, Senator MacDonald. With all due respect, General Hurley, there are some things that are fixed and, as Vice Admiral Griggs indicated, there are trade-offs so the question is: is it possible to load the same number of helicopters and landing craft if you have joint strike fighters on board? That is short of doubling the size which you cannot do because it is a fixed size—

Gen. Hurley: I do not know. No-one at the table knows and no-one at the table should be asked to speculate on it. I do not know.

Senator IAN MACDONALD: That is purely hypothetical and not under the rules of estimates.

Senator CONROY: You are not actually chairing it, Senator MacDonald.

CHAIR: Can we have some order?

Gen. Hurley: I do not even know. It depends what sort of mix of helicopters. Do you want CH-47s and Tigers and MRH-90s? What does the mix look like? What are you going to substitute? What are you going to carry for a particular mission?

Senator CONROY: Perhaps you did not hear the end of my question. I talked about being planned, so you actually know what you have planned for the existing—

Gen. Hurley: We know what mixes are possible but we do not know what changes to the ship would be required; therefore, how would we know which helicopters we cannot carry and what impact that would have on the operation?

Senator CONROY: We can play a sillier game and say: could you squeeze some joint strike fighters in with all of the existing material that you have planned to be on them at the moment?

Gen. Hurley: I do not know because I do not know what is required to put a STOVL onto the LHD.

Senator CONROY: I am sure that Vice Admiral Griggs could help us. Could you squeeze a joint strike fighter—

Gen. Hurley: Vice Admiral Griggs will not answer the question. I will answer the question, Senator. You are asking us to speculate on something we have no idea about.

CHAIR: Senator Conroy, the witnesses have made it very clear several times that they are not prepared to speculate, and I think you should respect that.

Gen. Hurley: Frankly you are asking me who is going to be in the grand final of the VFL this year.

Senator CONROY: That is easy. It will be Collingwood and it does not matter who else. It is very simple to answer that one.

Gen. Hurley: I do not follow the sport.

Senator IAN MACDONALD: I have a question, Chair.

CHAIR: Senator Conroy, we need to move on so let us stick to substantial questions.

Senator CONROY: I have many substantial questions and those ones were also substantial, based on information that has been leaked by the Prime Minister's office.

CHAIR: Senator Macdonald has questions.

Senator CONROY: I would like to ask some questions about the current use of the LHDs. Within the Amphibious Ready Group can you explain to me the activities such as ship to objective manoeuvres and distributed manoeuvres? Can you explain what is involved in those?

Vice Adm. Griggs: You are using US doctrinal terms.

Senator CONROY: Apologies.

Vice Adm. Griggs: I am sure the Chief of Army will talk about the land warfare aspects of this.

Lt Gen. Morrison: I would characterise our knowledge of amphibious operations at the moment as suitable for what the ADF is currently asked to do primarily in relation to humanitarian assistance or disaster relief and operations up to perhaps service protected evacuation in relatively benign circumstances. We have managed to get to that point with Army and Navy working with the platforms that the Navy has had to date, the LPAs and HMAS *Tobruk*. The formation of an amphibious capability within Army is a process that is now underway, but we are only in the early days of it. I have designated one of our seven battalions as the force that will build our knowledge in that regard.

At the moment, however, there are only two naval platforms that they are capable of working with; that is, HMAS *Tobruk* and HMAS *Choules*. It is not until we see the landing helicopter docks, the LHDs, actually in service that I think we will really start to build more rapidly an amphibious capability within the ADF.

So at the moment, while we understand a number of points around doctrine and indeed current world's best practice because we have allies such as the United States and particularly the US Marine Corp sharing detailed information with us, I think we are not at a point where we could put a hand on our heart and say that we are well down the path now of a true amphibious capability within the ADF beyond that that we have been operating over the last two decades.

Senator CONROY: Admiral Griggs mentioned that I was using American terms. What are our terms for that?

Lt Gen. Morrison: Terminology is all well and good.

Senator CONROY: It is just so that I can use the right language in the future.

Lt Gen. Morrison: If you are interested we could provide a briefing for you.

Senator CONROY: What would be the alternative to ship to objective manoeuvres and distributed manoeuvres which Admiral Griggs indicated were American terms?

Lt Gen. Morrison: The American amphibious capability is well beyond whatever we are aiming at now or into the future. The US Marine Corp, the US Navy and the US Air Force, supported by other US military assets, are capable of conducting amphibious operations at a considerable size and capacity that the ADF will never have. Their terminology refers very specifically to what is intrinsic to the US military.

I am loathe to start getting into descriptions of doctrine or terminology at this point with you because I think it would actually be confusing. It may point to a capability currently resident in the US forces that we are not going to have, so I do not think it is helpful. As I said, we could provide you with a briefing on this and take you through it to show you what we mean by various terms as they apply to amphibious operations with the necessary explanations and diagrams if that would be useful at any time that you may wish, provided the minister is happy.

Senator CONROY: You mentioned doctrine before. I was going to ask who is responsible within Defence for developing our doctrine around this area.

Lt Gen. Morrison: It is a shared capability between the Chief of Navy and myself. We have groups within both services that work together to develop joint doctrine, joint tactics and procedures. They are also supporting a great deal of the work that will actually have to be done as we start to operate at a level of amphibious capability that we have not been at before, and both Admiral Griggs and I have responsibility for that to the CDF.

Senator CONROY: Taking on board your very valid point that we will not be reaching the capability of the US—and no-one suggests that we are going to and we have no intention to try to—when we compare what we are planning to do with our LHDs here in Australia—and this may be too early for you to be able to give us a fulsome answer—are we proposing that the second RAR will be seeking to achieve a specialisation in amphibious operations perhaps comparable to the Royal Marines or the US Marines? I am just looking for a general but if you are not that far down the track, then just say so.

Lt Gen. Morrison: I think that is a fair characterisation of the path that we are on at the moment. Certainly there was a recognition within Army that we needed to commit a major unit to developing a complete understanding of what an ADF or an Australian amphibious capability actually will require in the future and 2 RAR has been designated as that unit.

At the moment, as I said in answer to an earlier question, they have been able to work with HMAS *Tobruk* and HMAS *Choules*, but as yet they have not been able to work with HMAS *Canberra*, the first of the LHDs. They have had personnel attend courses here in Australia and also courses conducted by the US Marine Corp to deepen their level of expertise, but until the LHD is in service and indeed, until both LHDs are in service, I really think that at the moment what level of capability we will be able to reach is probably speculative.

Senator CONROY: Do we have the infrastructure? It may be because it has not hit the water yet. It has hit the water but has not been completed. Do we have the infrastructure that surrounds these LHDs which would allow that level of specialisation? Are you confident where its specs are that you will be able to move in this direction?

Lt Gen. Morrison: Yes, without doubt.

Senator CONROY: When would you hope that the Amphibious Ready Group would be available for operations?

Lt Gen. Morrison: Again, I think that will be dependent on a variety of factors; firstly, bringing the ships into service and then there will be other elements of both the Army and the Navy that will need to be worked up to a level of capability. I would not like to give you a definitive time on that because there are so many variables that come into play, but it is certainly something that both Navy and Army, indeed the ADF, are working towards and I am confident that we will reach it in an acceptable time frame.

Vice Adm. Griggs: I can say that it will take around 12 months from the date the ship is delivered until we reach the initial operating capability. That is not the full operating capability. The initial operating capability will be about 12 months after delivery. We are anticipating delivery in late quarter 3 of this year, so late quarter 3 of next year would be the initial operating capability.

I think it is really important that people understand what is involved in getting to that point. First of all the ship's crew have to learn how to operate the ship. We then need to do the work with the organic landing craft, integrate them into the ship and do the trials that we need to do. Then we need to bring the aviation piece into play and relearn multi-spot deck operations. Then we need to bring 2 RAR into play and put it all together for the initial operating capability, so it is actually quite a complex process.

Senator IAN MACDONALD: It is on the water now, is it not?

Vice Adm. Griggs: Yes, but it has not been delivered to the Commonwealth.

Senator CONROY: They are still putting bits on each. I watch it grow each week.

Vice Adm. Griggs: The point I am trying to make is that as soon as it is commissioned, which will be shortly after it is delivered, there will be expectations that the ship will be able to go and do all of these things. It will not. It will take 12 months post-delivery before it is available to meet its initial operating capability.

Senator CONROY: General Morrison indicated that you really would not be able to get to the stage of that amphibious ready until we had both. Were you saying that you needed both?

Vice Adm. Griggs: You would need both ships for the Amphibious Ready Group, which is different to the Amphibious Ready Element.

Senator CONROY: Am I allowed to split a hair and ask what is the difference between the element and the group?

Vice Adm. Griggs: One is a company size.

Lt Gen. Morrison: I think that is certainly doable. The ARE, the Amphibious Ready Element, is a component part of the ARG, the Amphibious Ready Group. The ready group is made up of the whole battalion of around 600 to 700 personnel—

Senator CONROY: You need both for all of that to be ready?

Lt Gen. Morrison: plus its logistic elements or logistic support, helicopter support and whatever other assets would be made available to it for whatever the mission may be. The Amphibious Ready Element is a smaller part of the ARG. From a 2 RAR perspective it is based on one of the rifle companies that comprise the overall battalion. Of three rifle companies, this would be one of them and it would have smaller logistics elements in it with smaller helicopter assets and smaller enabling support. It is the ARE, of course, that we are aiming at first, as you would expect. As Chief of Navy has said, it is a very complex task getting this capability up and running.

Senator CONROY: How important is this capability to our strategic interests?

Lt Gen. Morrison: It has been a major feature of every white paper that I can recall certainly in the last 15 years. Australia is an island continent. It has a role in our region and our world and it affects military endeavours through a variety of means, but one of them is transit by sea in an amphibious way.

Senator CONROY: It sounds like not just over 15 years that you have indicated we have been seeking this capability. It sounds like there is an awful lot of normal, sensible processes being put in place to bring us up to speed.

Lt Gen. Morrison: Yes.

Senator CONROY: Are you looking forward to having a joint strike fighter plonked in the middle of it?

Lt Gen. Morrison: I think that all of the answers that you have been given from this side of the estimates table about joint strike fighters do not need any additions from me.

Senator CONROY: It sounds like it might get in the way of your group. It is not like you have asked for it. Air Marshal indicated they did not ask for it; Admiral Griggs has indicated that he has not asked for it and from the sound of it you have not asked for it. 'Abbott aims for aircraft carriers' is the headline. I am just trying to get an understanding of what is involved in that. Thank you for that. I am happy to pass over to someone else, Chair, if there is anyone else. I have more questions in this area but if someone else wanted to jump in; Senator MacDonald is always keen.

Senator IAN MACDONALD: I have a couple of questions. I understand Senator Ludwig also raised some issues about the LHD, so please stop me if these have been asked. Admiral, you just mentioned the *Adelaide* is in the harbour in Melbourne?

Vice Adm. Griggs: Both ships are in Melbourne.

Senator IAN MACDONALD: But *Adelaide* has been steaming up for some months.

Vice Adm. Griggs: That was the *Canberra*. *Canberra* is the first one.

Senator IAN MACDONALD: What is the state of the game with *Canberra*?

Vice Adm. Griggs: It has completed its first set of sea trials. It has another set of sea trials to go. As I said, it is anticipated to be delivered around late quarter 3 of this year, so late September, I suspect.

Senator IAN MACDONALD: Are the sea trials being done with Navy personnel on board or someone else?

Vice Adm. Griggs: It is a combination. It is run by the ship builder because it is still the ship builder's ship at the moment. We have some Navy people. Some of the initial crew are embarked on the ship for sea trials.

Senator IAN MACDONALD: If you can remind me, who do we class as the ship builder now? Is it Navanti? ■■■

F-35s for RAAF

02 June 2014

CHAIR: It appears there are no further questions for Army. We thank the Army for appearing. We now go to 1.4, Air Force capabilities.

Senator XENOPHON: I go to a report in the UK *Telegraph* on 19 May. An analysis in the *Air and Space Power Journal* by Colonel Michael Pietrucha says:

Even if funding were unlimited, reasons might still exist for terminating the F-35.

There are a number of criticisms that I think you are familiar with:

... its payload is low, its range is short, and espionage efforts by the People's Republic of China may have compromised the aircraft long in advance of its introduction.

Do you have any comments with respect to that?

Air Marshal Brown: With a capability as large as that of the JSF, there are always critics out there. Its range, payload and speed are similar to many other fighter aircraft around the world. One of the critical things that most people do not get with the capability is how much of a big change it is from fourth-generation aircraft. A lot of it is to do with the fused nature of the avionics and the increased situational awareness that is available to the pilot. If you ask any of our fourth-generation fighter pilots, and a number of our pilots have flown fifth-generation fighters, they are in no doubt as to the capability of the F35 and its superiority over any aircraft that is on drawing boards or in existence at the moment.

Senator XENOPHON: I go to one of our allies, the Canadians. Back in December 2012 the Harper government suspended its plan to buy 65 F35s after months of criticism. An Auditor-General's report accused National Defence and Public Works in Canada of failing to do their homework and underestimating the lifetime costs of these jets. Have you spoken to your colleagues in the Royal Canadian Air Force about their concerns with respect to the JSF?

Air Marshal Brown: Definitely. I correspond with the Chief of the Canadian Air Force quite a bit. He does not actually have any concerns with the F35. I think that you will find that that was an area where the Canadian government underbudgeted for the requirement. One of the things that I would like to point out is that we put an

amount of money aside in the budget in 2003. That was 11 years ago. We have managed to stay within those same confines for the budget right through to 2014 for the JSF.

Senator XENOPHON: You are saying that the Canadian Auditor General's report was about the budget, not about capability?

Air Marshal Brown: What I can tell you is—

Gen. Hurley: You asked was the chief of air force of the Canadian Air Force—

Senator XENOPHON: I have moved onto another question.

Air Marshal Brown: All I can relate are the conversations that I have had with the chief of the Canadian Air Force. I have not read the Canadian Auditor General's report.

Senator XENOPHON: You are saying that the project is now on track again or is it still proceedings in terms of using the JSF?

Air Marshal Brown: The project at the moment, probably for at least three years since it has been re-baselined, has largely stayed on track. That is not to say that there are not issues with software development and a number of other issues. It is like any complex developmental project: it will have issues, but they will be solved as we go through.

Senator XENOPHON: The concern that has been put to me is that there are a number of commentators—including those with former experience in various air forces—that have expressed criticism of the JSF. For example, a US *Aviation Week* magazine analyst stated that the JSF capability against VHF radar had been downgraded by the Pentagon, lowering the bar for this so-called stealth fighter. When those criticisms appear, to what extent is there an assessment or have you made your assessment and you are getting on with it?

Air Marshal Brown: We continually assess the capability. I would just like to point out that the USAF, the USN, the US Marine Corps, the RAAF, the Japanese Air Force, the Netherlands Air Force, the Korean Air Force and the Israeli Air Force have all ordered the JSF, as well as the Turkish Air Force. I think a lot of other air forces around the world have expressed a lot of confidence in the Joint Strike Fighter.

Senator XENOPHON: You are confident that the maintenance costs and the ongoing costs of the aircraft will not blow out?

Air Marshal Brown: Like any aircraft at this development stage, there are a number of unknowns with the maintainability of the aircraft. But there is a program to continuously improve that, as we have gone through. If you have a look at the program, that has occurred. I expect it to occur. With any new aeroplane, your maintenance costs will always be higher in the initial operating period. There is always what we term a bathtub curve that an aeroplane goes through as it goes through its development. I expect that the maintenance costs will decrease as we start to operate.

Senator XENOPHON: You expect it will decrease.

Air Marshal Brown: Yes.

Senator XENOPHON: Apparently, RAAF officers, as well as US officers, have spoken publicly about secret weapons or systems to be carried on the JSF that it make it unbeatable. Obviously, you cannot tell us what that is, but has there been an assessment of the capabilities that you say make it a superior aircraft?

Air Marshal Brown: We have always continuously assessed the JSF against what possibly threat aircraft are out there. Stealth is a factor, decreased infra-red emissions are a factor and its low probability of electronic emissions is also factor. One of the biggest factors is the operator, where you have had to be a sensor operator, as well as a fuser, in aircraft like the F18 and F15. The great advantage of the JSF is that all of that information is presented to you as one picture.

Senator XENOPHON: I know that Dr Jensen, a coalition member from WA, has expressed concerns as well about this. Can you think of any other major Defence acquisition that has proceeded along the lines of the JSF that is a new platform committed to by a government before its capabilities have been verified in testing?

Air Marshal Brown: I just only have to go back to our F-111.

Senator XENOPHON: They were not without their problems.

Air Marshal Brown: Certainly, but we had them for 37 years and they ended up being a fantastic Defence asset.

Senator XENOPHON: There were some significant teething problems early on.

Gen. Hurley: The people who did not want us to get 35 then did not want us to give up F-111.

Senator Johnston: That is dead right.

Gen. Hurley: It is about balancing.

Senator XENOPHON: Certain representations have been made about JSF by Lockheed Martin. Are you confident that it will live up to the hyperbole or to the representations—to use neutral language—by Lockheed Martin, in terms of the JSF?

Air Marshal Brown: I am not sure I believe any aircraft manufacturer with exactly what they say that they will produce. I am more than happy that that aeroplane will be more than capable and a far better aircraft than our current fourth generation aircraft.

Senator XENOPHON: Can I just go to the issue of dog fights. The US Air Force officer in charge of the JSF project, Lieutenant General Chris Bogdan, says that the fighting edge of the JSF is its ability to avoid dog fighting with other aircraft, destroying them before they can get into aerial engagements. Does that mean that it is the sort of aircraft that is not ideally suited for dog fights in those circumstances? Isn't that the implication of what Lieutenant General Chris Bogdan is saying?

Air Marshal Brown: If I was to give you an example, in 15 years of fighter flying in major exercises, the only time that I have entered into a one-on-one fight with another aircraft, I have actually been shot be an adversary aircraft that was probably 10 nautical miles away. It is not something that you actually want to engage in. Like all aeroplanes, you have advantages and disadvantages at various different parts of the envelope. You tend to fly your tactics so that you take advantage of where you have got the best part in the envelope. The F-35 is not dissimilar to an F-16 in its performance in the dog-fight area.

Senator XENOPHON: Going to comments from the US Air Force chief, Michael Hostage, who said:

If I do not keep that F-22 fleet viable, the F-35 fleet frankly will be irrelevant. The F-35 is not built as an air superiority platform. It needs the F-22.

He goes on to say that he needs the F-22s. That is about the mix of aircraft.

Air Marshal Brown: If I could, I think we are selectively quoting that.

Senator XENOPHON: I am not trying to.

Air Marshal Brown: I know, but I think the context that he was talking about was specifically an upgrade program for the F-22.

Senator XENOPHON: But you need a mix of aircraft for that air superiority, don't you?

Air Marshal Brown: No. You need a system for air superiority. You need AEW&C. You need a lot of the capabilities that we have got, like tankers and Vigilair. It is not just the aeroplane.

Senator XENOPHON: Going back to espionage efforts by the People's Republic of China, has an assessment been carried out to the extent that that may have in any way compromised the aircraft, in terms of its superiority and its combat ability? That is, in terms of any espionage that may have effected or compromised the aircraft in any way?

Air Marshal Brown: Like all espionage, it is difficult to know the exact amount. I do know what some of the limitations are on the Chinese side with their fighter development. The simple one is engine technology. They are still significantly behind on engine technology.

Senator XENOPHON: You are entirely comfortable about the project?

Air Marshal Brown: I am.

Senator XENOPHON: Just finally, because I am conscious of time constraints, how will there be ongoing, robust and independent monitoring of both the efficacy of the JSF and any cost blow outs or its being within budget? Is it done within Air Force? Are there any external controllers or audits that will ensure both in terms of its capacity to do what it is meant to do and any cost blow outs are something that will become readily apparent to the taxpayer and to Australians generally?

Air Marshal Brown: One of the great things about this program is the incredible transparency that is there the entire time. You have not only got our reporting, but you have got US reporting from DOT&E. We have got good insight into the Joint Project Office. All those issues are presented to government on a regular basis.

Senator XENOPHON: I will put a number of questions on notice. I think that is the best way. Thank you for your answers.

Senator LUDLAM: Can you just confirm some of the numbers for us and make sure that that open-source reporting is correct. Australia, under minister Faulkner, committed to the purchase of two of these aircraft. The

government in 2009 committed to 14, although I believe we were still in a position where we could back out of that sale if the aircraft were not ready in time. Was that correct? Or an additional 12, I should say.

Air Marshal Brown: It is an additional 12.

Senator LUDLAM: That takes it up to 14. The commitment of April of this year of an additional 58 takes it up to a total of 72. There is speculation about an additional 24, which would take us to a total of 100. For each of those cohorts—two, 12, 58 and 24—could you outline for us what we are contractually obliged to actually do?

Air Marshal Brown: I might be better off handing over to the CEO of DMO to actually talk about contractual arrangements.

Mr King: I will lead off, but Air Vice-Marshall Chris Deeble can provide more detail. We actually place orders on an annual schedule.

CHAIR: We have actually got a scheduled tea break at this point. There may be people here who are anxious to use the time for various things. We might just break and come back at quarter past.

Proceedings suspended from 21:01 to 21:16

Senator LUDLAM: Mr King, regarding the various numbers of aircraft—the two, the 12, the 58 and the speculative 24—that take the Joint Strike Fighter capability of Australia up to 100 aircraft, I want to know how we get out of those contracts if the aircraft continues to be unairworthy? At what point can we cut and run, or can't we?

Mr King: I do not agree with the statement 'unairworthy'. The way we place the contracts is on an annual buy. We foreshadow in advance the number of aircraft we want to buy in a particular year. As we progress towards that year we firm up the price for that year and then we place an order for that year's buy.

Senator LUDLAM: So we do not know how much they are going to cost from year to year?

Mr King: A lot of the commentary you are talking about—

Senator LUDLAM: You do not yet know what I have read. I have not mentioned any commentary.

Mr King: Sorry, that was an earlier question from another senator. It is about the cost of the aircraft, but the costs are now tracking as predicted. In fact, the most recent cost for the aircraft has been slightly under what has been estimated both by the project and by the independent cost agency of the US.

Senator LUDLAM: Let's just work through them. Regarding the two aircraft that were committed to by, I think, Minister Faulkner, we have effectively purchased those—we have paid for those. Is that correct?

Mr King: I am not sure if we have paid for them, but we have certainly ordered them and they will be delivered soon.

Senator LUDLAM: They are committed. What do you define as 'soon' with a project like this? When do we take delivery?

Mr King: July, I think it is for the first aircraft.

Senator LUDLAM: Next month. Will they be in Australia at that point, or will Australian pilots be training in the US?

Mr King: They remain in the US and they are used in a pool in the US. It is our contribution to a pool.

Senator LUDLAM: But from July they are legally Australia's aircraft?

Mr King: They are.

Senator LUDLAM: Tell me about the next 12. How does that work?

Mr King: I will pass to Air Vice Marshal Deeble to go over the detail.

Air Vice Marshal Deeble: I am the program manager for the JSF program. The next purchase is in low-rate initial production 10. We will make the commitment to that in the 2016 time frame, and they will be delivered in 2018. We will commit to LRIP 11 the following year, and they will be delivered in 2019. That will be another eight aircraft. From LRIP 11 we move into full-rate production, and we will be committing to full-rate production 1, 2 and 3 in the subsequent years, and will deliver 15 aircraft at full-rate production. Full-rate production 4 will deliver the last nine aircraft, to give us 72 aircraft, and those aircraft will be delivered in 2023.

Senator LUDLAM: Given the rather troubled production and design history of this procurement, starting with the next 10, beyond the two we will take delivery of in July, what if by 2016 they are not ready?

Mr King: I will start the answer. The description 'they are not ready' is unlikely, because of the milestones that have been established for the program—you might recall it was re-benchmarked about three or four years

ago. The project is hitting all of those milestones. It is still developmental in only a number of small areas—they are important but small. So to be not ready would have to require a major setback. But the government's decision is that provided the cost and capability and Australian industry commitments are met, then we will place the orders. If prior to that something went dramatically wrong we obviously would not place an order. Provided it is making all its benchmarked progress, we will.

Senator LUDLAM: Do we have the legal ability to avoid purchasing those aircraft if they are too expensive, not airworthy, too slow—

Mr King: We are not legally obligated until we actually place the order.

Senator LUDLAM: Thank you. That is helpful. Despite the April announcement of Senator Johnston and the Prime Minister, we are still actually only legally committed to the two aircraft that we were committed to in 2009. Is that correct?

Mr King: In terms of signing a contract. Obviously the government has made a commitment to progress the project, to buy the aircraft. And only in the event that something is seriously amiss, we will progress the project.

Senator LUDLAM: These aircraft were originally scheduled for delivery in 2010. So I guess I am bringing to you the proposition that something is seriously amiss, or they would have been here four years ago.

Mr King: You can always say that. I know it frustrates a lot of people, but most defence projects are highly developmental. You just cannot buy them off the shelf without risk. America and other partner nations have put a lot of money into developing the fifth-generation leading aircraft of the world. It did run into a lot of difficulties. They were very public. They are audited in America. But since the re-baselining of the program cost targets, capability targets and delivery targets have all been met.

Senator LUDLAM: Let's come to those. Can I just confirm that there are three different aircraft types and all of those that are on purchase by Australia are the A-type, which has been designed for the US Air Force.

Mr King: That is correct.

Senator LUDLAM: We are not procuring any of the jump-jets the US Marines were after.

Mr King: That is correct.

Senator LUDLAM: Is it correct, though, that they are all based on the same airframe and there are three different configurations.

Mr King: Fundamentally the same design, with three variations. Correct.

Senator LUDLAM: It is the intention—and maybe you should put this question back to the air force—that Australia will end up with one aircraft, rather than having to maintain, train and keep in the air more than one of these frontline multirole aircraft?

Air Marshal Brown: We will have a mix for quite a while, and there will be decisions taken in the 2020s as to what the final mix will look like.

Senator LUDLAM: Has it not long been the ambition of the air force to stand everything else down and just end up with one?

Air Marshal Brown: The original ambition of the air force was to have one.

Senator LUDLAM: When was that ambition superseded?

Air Marshal Brown: Probably originally in 2003.

Senator LUDLAM: What happened at that time?

Air Marshal Brown: At that stage we had two ageing air frames, the F-111 and the F-18. It was decided to retire the F-111 in 2010 and we bought 24 Super Hornets to replace the F-111.

Senator LUDLAM: So, indefinitely, we would still be operating the Super Hornets, the F-35s and the Growlers, for the foreseeable future, if all goes well?

Air Marshal Brown: I think there are decision points for down the track in the 2020s as to what the ultimate mix will be.

Senator LUDLAM: Let's come to the announcement—and I might have to put this to you, Senator Johnston, because I genuinely do not understand it. You have said that the new jet fighters do not involve any new spending. You have assured us that the money is already there—this is going back to your press conference of last April. It is money that successive governments have carefully put aside to ensure our nation's defences are strong. Senator Johnston, can you point out for us where in the budget papers this \$24 billion has been set aside—in what fund, pool or appropriation?

Senator Johnston: Mr Prior will take you through it.

Senator LUDLAM: As you wish.

Mr Prior: If you were to turn to page—this will not be a satisfactory answer.

Senator LUDLAM: It is really nice to have that foreshadowed, because it so rarely is!

Mr Prior: Not from my doing, but because of the rules of the PBSs. On page 62 of the portfolio budget statement is the Capability Development Group's expenses statement, which includes a depreciation charge, which, in PBS language, is an approximation of capital flows for an agency. The funds set aside for the JSF and other capital items across the future are contained in the budget component for the Capability Development Group. So there are funds set aside in the Capability Development Group for future acquisitions.

Senator LUDLAM: For how many years?

Mr Prior: The PBS—and this is the unsatisfactory part, you might say—is currently a four-year statement. Clearly we have budget plans that go well beyond four years. In fact they go to 10 years. So these statements do not contain budget calculations beyond the four years that are required to be put in this document.

Senator LUDLAM: Referring to the full figure of \$24 billion for the purchase, operation and maintenance of the aircraft, when the Prime Minister said that this money has been carefully put aside, he was not referring to the \$24 billion at all. The sum in the PBS, from memory, is three and a bit.

Mr Prior: No, in our budgets in Defence we do set aside funds for future capability acquisitions.

Senator LUDLAM: But that money does not exist. It could be changed by a future policy decision of government. There is no actual pool of money sitting there.

Mr Prior: As with all budgeting for all Commonwealth agencies, appropriations are only for the year in which the budget occurs.

Senator LUDLAM: I am aware of that.

Mr Prior: So, if you are saying, 'Has the parliament appropriated money for future years—'

Senator LUDLAM: That is, set aside.

Mr Prior: Clearly they have not. There is no legal appropriation for those funds in the future. Has a budget estimate been made for those future expenditures? Yes, there has been.

Senator LUDLAM: But anything in the out-years is completely imaginary? It could be changed by a policy decision of a future government? There is no big pool of capital sitting there to take us all the way through that acquisition? I know I am labouring the point, but I actually found that press conference entirely deceptive. It is not like we have a fund set aside to buy these planes, which is exactly the intention the Prime Minister was proposing to convey, I suspect.

Mr Prior: I am not trying to labour the point unnecessarily, but a budget, as you know, is a future expectation of expenditure.

Senator LUDLAM: It is different to carefully putting something aside. My understanding of carefully putting it aside is that it exists, not that there is a decision for future governments to continue with.

Senator Johnston: We do not carefully put it aside, because the money would just sit there doing nothing. We actually budget, so that when the money is appropriated it is committed pursuant to what the budget says.

Senator LUDLAM: We are just going to have to agree to disagree.

Senator Johnston: I think we are.

Senator LUDLAM: I am not sure if this one needs to go back to Mr King. Is there a particular heads of agreement or a written document that we have signed either with the US government or with Lockheed Martin. What are the actual clauses, what are the conditions, that we have signed up to?

Mr King: I suppose there are two in effect—I will get the terminology correct. One is that we participate in the program. That was a decision made quite some time ago. That is with the US government and other partner nations. The second one we have signed is with Lockheed Martin, relating to Australian industry opportunities.

Senator LUDLAM: Did the Prime Minister's and Senator Johnston's press conference of April bring with it any new document, any heads of agreement, any MOU or anything at all with either the US government or the defence contractor.

Air Vice Marshal Deebie: It did not need to.

Mr King: I am not sure what you mean by the question.

Senator LUDLAM: Is there anywhere written down the conditions upon which we have signed up for the most expensive defence acquisition in the history of the Commonwealth?

Gen. Hurley: Going back to the point that was made before, the government has made a decision that it will build the air force based on 72 JSFs. We have not entered into contract for that, so the only arrangements we have standing at the moment were when we entered into the JSF program in the early days, and the arrangements, as Mr King has mentioned, with Lockheed Martin. The announcement was not saying, 'And tomorrow we start negotiations for a contract for 58 aircraft.' It was 'It is the government's intention to build an air force based upon 72 JSFs, which we will procure in the manner as described over time and will enter contracts as appropriate when each of those annual purchases are decided upon.'

Mr King: It is not unusual for nearly all of our defence projects. Essentially we go back to second-pass with the government with a business case about the costs, the risks and the capability that is to be acquired. The government then approves that and then the DMO enters into contract negotiations with the supplier. Otherwise you would have a supplier before you have an approval. So there is nothing unusual about that approach.

Senator LUDLAM: I am just trying to get my head around not its unusualness but what is actually going on. What stage of the process are you at now? Second-pass has obviously been through cabinet—

Mr King: That is right—for these additional purchases. We have already had second pass for the original 14. Just using that as an example, we had approval for the first 14 and we have not gone to contract for all of those aircraft yet, because our buy profile is not to be procured until the year after next. So we have those approvals in advance of entering into the contracts.

Senator LUDLAM: I guess you will appreciate why I am labouring this point, in terms of sunk cost and what is actually committed and spent on this project, it is actually only those two aircraft?

Mr King: Plus some other expenditure.

Senator LUDLAM: Some on-costs?

Mr King: Planning and so on. And for being a member of the development phase.

Senator LUDLAM: Where can I find some written criteria on which the government would decide either to delay or abandon the purchase of the aircraft, either in terms of delays in provision of the aircraft, cost or capability?

Senator CONROY: I cannot find the criteria on which we purchased them.

Senator LUDLAM: You were in government. That is a whole separate problem.

Mr King: You cannot, and there is a very simple reason in my opinion, but I cannot speak for the government here. But if I were being asked for advice from the government, when you try to procure these very complex systems you have a range of issues that the government of the day will have to consider for whether to proceed or not. To be totally prescriptive about just one element of that decision would give inadequate consideration to the totality of the matters the government of the day would have to consider, which starts with providing Australia with adequate defence.

Senator LUDLAM: I suppose I, and many others greatly more qualified than me, would contest that this aircraft can actually do that—that is has been compromised in its design. Its design history, which is fascinating, has compromised it. At the outset, it is that we are attempting to build a fighter that it at once stealthy, can fly at supersonic speeds, is a fighter, is a bomber and can take off and land vertically, and that there is in fact no such air frame that can do all of those things. That we have bought a jet—

Gen. Hurley: We are not buying an aeroplane that has all of those characteristics. We certainly do not want it to be a jump-jet. We are buying the A version, which is the conventional take-off and landing version of the aircraft.

Senator LUDLAM: Which has nonetheless been compromised in the design phase by having to satisfy the criteria that the US Marines set down.

Gen. Hurley: That is not necessarily so.

Senator LUDLAM: Is that completely incorrect?

Mr King: The US, amongst all of our Western friends and suppliers, is the most open about their procurement. Here we answer questions from senators about what their operational test and evaluation people have found. All of those matters are published—the issues that are facing the JSF. But none of them are at the level that you are discussing—they are at completing the development into the final capability of that aircraft. They are all available publicly.

Senator LUDLAM: Something that was available publicly was that the aircraft could not fly within 40 kilometres of an electrical storm, and we are proposing to base a substantial number of them in Darwin. Has that been solved.

Gen. Hurley: I think it is just pulling on comments that were made at certain stages of the development of the aircraft. It is at a certain stage of development and it does not have all its kit or systems fitted in it. So whilst you are doing that you put some protections around what you do in the aeroplane. Would we ever buy an aeroplane that could not fly within 40 kilometres of an electrical storm? Believe me, we would not.

Senator LUDLAM: Has that equipment been reinstalled in the two that we are about to get delivery of in July? I believe the equipment that was meant to protect it from lightening was removed because the airframe is too heavy. Have the two that we have purchased and that we take delivery of in July been refitted?

Air Marshal Brown: On the issue around the lightening, until you do some test points on the aeroplane, that is a restriction you often put on. I think at this stage that restriction has been removed.

Mr King: It is in the process of it, I think. In fact, I am attending a conference to be updated next week. The work on that, as two people have said, was more a conservative measure. In fact, our own DSTO did some work on the program to assist in doing that evaluation, and I believe that issue has basically been retired.

Senator LUDLAM: This all sounds a little vague: 'We believe this. We're not sure. We might have that.' The two aircraft that we are taking delivery of in July in the US—they are not to be flown to Australia, I guess—have had the lightening fasteners installed.

Gen. Hurley: I believe you may be confusing two issues. One was a matter of test data about where you can fly the aircraft. The other was the removal of a device to lighten the load. I think it was in fuel control or something. I do not think we removed anything that was lightening protection or something like that. It was a matter of assuring ourselves that the aircraft could fly in that environment safely. I will get some more information on that.

Senator LUDLAM: Yes, if you can.

Senator FAWCETT: I believe it was the gas generator to generate the gas in the fuel cells. Due to a risk of explosion, it was removed due to weight.

Senator LUDLAM: The hour is getting a bit late. If you feel like clarifying that on notice for us but with specific regard to the two aircraft that we have just spent huge amounts of money on, it would be very good. There is a fair bit of material—and Dr Jensen has canvassed some of it in the public debate—to the effect that for a generation 5 aircraft, it is slow, it is heavy and, if you get within a certain distance of it, you can kill it. And that, effectively, its advantage on the battlefield will be that it will be killing things from over the horizon; that its electronic warfare is superior to anything else on the planet.

Air Marshal Brown: Can I just address—

Senator LUDLAM: I can sense your impatience, Air Marshal. Please go ahead.

Air Marshal Brown: We have been very patient over the years, because the majority of commentators who make comment on this aircraft have never flown a fighter in their lives.

Senator LUDLAM: Should we need to pass comment on the most expensive acquisition in Australia's history?

Air Marshal Brown: You can pass comment but I do not think you should be considered in any way expert—

Senator LUDLAM: I am not putting myself up here as an expert.

Air Marshal Brown: unless you have actually done the job. The simple fact of the matter is that the JSF is faster than the Classic Hornet or the Super Hornet. Speed is no longer the great determinant in air combat. In fact, if you have a look over the history of air combat, 95 per cent of the kills have been taken by five per cent of the pilots. The great determinant has been the situational awareness of those individual pilots at the time. The situational awareness of the JSF is contributed by the system around it, as well as the aircraft itself. So to make these sorts of inane comments about weights, speed and turn rate has been the determinant factors in air combat is, frankly, irrelevant.

Senator LUDLAM: Tell us what is relevant and why this is such a great jet.

Air Marshal Brown: What I just said before is that the aeroplane is far superior in the level of fusion that it has got in all the sensors.

Senator LUDLAM: Just break it down for an amateur as to what you mean by that.

Air Marshal Brown: For a start, it is a stealthy aeroplane. If it comes up against a 4th generation aircraft, that 4th generation aircraft has no ability to target a JSF. So you have the immediate advantage that your opponent cannot see where you are.

Senator LUDLAM: What about other 5th generation jets?

Air Marshal Brown: Other 5th generation jets are in a similar case because most of those radars operate either an L- or an X-band.

Senator LUDLAM: That is the case at the moment. What about in 10 years time, when we take delivery of these things?

Air Marshal Brown: When you have a look at it, there is not much technology that would allow the targeting of missiles outside X-band.

Senator LUDLAM: What about in 10 or 15 years time? It is a 40-year acquisition.

Air Marshal Brown: I do not believe there will be much change in that. The VHF radars that you talk about need other radar technology to track missiles with.

Senator LUDLAM: I do not expect you to have this information at the table, but could you take on notice for us—whoever feels most qualified to provide it—the various criteria by which jets are judged to be either fourth or fifth generation? In addition, can you tell us which of those criteria the JSF meets and which it does not?

Air Marshal Brown: Yes, we can do that, but I could talk to you about it now if you wanted me to.

Senator LUDLAM: It depends how much latitude I am going to be given by the chair, because I have a fair bit to cover.

Air Marshal Brown: We can take it on notice.

Senator LUDLAM: It is likely to get fairly technical fairly quickly, so I would appreciate that. I will go back to the issues about which views were expressed along the lines of: 'The jet is back on track', 'We are not too worried about delays and cost overruns anymore', 'They have most of it sorted', and so on. There has been a fair bit of discussion in the literature about the 'buggy' software on the aircraft. Is that all now ticked off?

Mr King: Buggy software?

Senator LUDLAM: I understood you to be saying that speed, turn rate and all that other stuff were no longer a factor in air combat, that it is now all about electronic warfare and dominance of electromagnetic spectrum—

Air Marshal Brown: Let me just pull you up there. It is a matter of degree. You certainly still need to be able to go at a certain speed and you still need to be able to turn at certain rate. It is the relative importance and how all these things work combination. All jets will have advantages and disadvantages, but a fifth generation jet is far superior to any fourth generation jet out there. I have been in the situation of flying against fifth generation jets in a fourth generation jet. I do not think many of your commentators, or anybody that you quote, has been in that situation.

Senator LUDLAM: Yes, but we are not here just to take things for granted. I am sorry if you are finding this insulting or offensive, but we are not here to just take stuff for granted—particularly with a procurement of this magnitude.

Air Marshal Brown: That is true, but I will quote again the number of air forces around the world that have ordered this aircraft. What you are fundamentally saying is that the US Air Force, US Navy, US Marines, the Israeli Air Force, ourselves, the Turkish Air Force, the Dutch and the Italians have got it wrong. Frankly I find that insulting.

Senator LUDLAM: I am just here asking questions. It is my job.

Air Marshal Brown: That is fine.

Senator LUDLAM: Just tell us about the software, then. I am not sure where that all came from. Has it been debugged and is the aircraft ready to fly?

Mr King: The aircraft is flying. There are a lot of aircraft flying, but it is an incremental build of capability. The level of software that we want for initial operations capability is called Block 3i. The 'i' is for initial. It is currently mostly written. It is a very large software program. You do not have a point in time where absolutely everything is resolved—that is the same for any big software system—but you do have a point where it is stable, secure and ready for use. At the moment it is planned for 2015-16—to support the US program. We do not need it until 2020. Even if our assessment is wrong by six months or whatever, it will be ready in sufficient time for our use in Australia.

Senator LUDLAM: So what are we taking delivery of in July?

Mr King: An aircraft with a lesser baseline. But remember that the software can be added.

Senator LUDLAM: A lesser baseline than what? What will it not do? What can it not do that the aircraft will be able to do in 2020?

Mr King: I will pass that to Air Vice Marshal Deeble

Air Vice Marshal Deeble: The aircraft will be delivered in the July time frame with Block 3i software. There are some delays to elements of that at this point in time. We are working through that. But I envisage that there is only about three to six months' worth of delay. That will not delay any of the training that we will undertake. Currently to declare IOC in the 2020 time frame, we can accept 3i or 3F. 3F is running slightly delayed at this point in time—a delay of around six months. Again, we have plenty of scope. It was due to be delivered at the end of 2017 and we will not bring the aircraft back to Australia until the end of 2018. So we have some scope in the schedule to cater for any delays in that software.

Mr King: But, just to be clear, through the life of this aircraft there is already planned a block 4, and it will go on for the life of the aircraft. That is just the nature of modern systems. It exists in all of our platform systems—in our ships and our aircraft. They are software based and are always being upgraded and tuned and their capabilities are being improved.

Senator LUDLAM: I understand that. But at what point does the US government, or Lockheed Martin for that matter, consider the aircraft is actually ready for combat?

Mr King: Lockheed Martin does not play in that space. Lockheed Martin is a supplier. It is the US forces that determine when the aircraft is ready for operational capability.

Senator LUDLAM: And what is their date?

Mr King: It depends on whether it is the marine version, the air force version—

Senator LUDLAM: No, of the A—the one that we are buying.

Mr King: We will actually make our own determination that it is ready for—

Senator LUDLAM: Sorry, you just told me it was the US government. At what point will you make a determination, then? When will this aircraft actually be ready if the July ones that we are taking delivery of still have unfinished software?

Mr King: We need to have it ready for initial operational capability by 2020.

Senator LUDLAM: So we are going to be flying the aircraft for six years before it is actually ready? What am I missing?

Air Marshal Brown: One of the most complex parts of this airframe is actually the training. At the moment I have pilots qualified in F18s, so those initial two aircraft will go into a training pool in the United States and we will start to cycle some of our F18 qualified people through there so that we can actually establish enough pilots to establish the first squadron.

Gen. Hurley: One of the important points about making a decision now in the nature of our future Air Force was to allow us to do the detailed planning to train our pilots, to develop and build our facilities, and to put our training systems and our maintenance systems in place in Australia. So it is not just the airframe. In moving now to get that IOC, the IOC is defining the whole of that fighting capability, not just what an aeroplane can do. We need this time to make a fairly significant transition, and you have heard the Chief of Air Force talk about the difference between generation 4 and generation 5 aircraft. It is a completely different way of thinking about how we are going to fight into the future with this aeroplane, and we have a lot of programs which need a high degree of integration to bring the capability into play. So I do not think you are missing anything other than that it is not just the platform; it is all the systems that we have to put in place, workforce and so forth, to sustain it once we have it in play.

Senator LUDLAM: I have seen a briefing by Boeing, which I acknowledge at the outset was a competitor way back when the US government was trying to work out what to do, that highlights the F35's vulnerabilities to radar detection. What can you tell us about how stealthy this aircraft actually is and how something as solid and lumpy and immovable as an aircraft can keep up with the evolution of the arms race in detection? How can you keep it stealthy as detection technologies mature over a 30- or 40-year period?

Mr King: I can start. It is fundamentally engineered to be stealthy against the radar frequency environment. Clearly, in a public hearing we are not going to go into the specifics of that. Let me put it another way: if you do not start with a stealthy aircraft, how are you going to make a fourth generation one undetectable? Always with

the purchase and acquisition of arms, the question is of it being designed to be as capable as it can be today and with a path to the future. JSF is our best starting point for that. Any other aircraft you start with starts from an even worse position.

Senator LUDLAM: I do not expect you to go into too much detail, I guess, given the sensitivity of what we are discussing, but it is kind of all over the defence literature that the F35 will be able to be detected by Russian and Chinese radar systems that are in the development cycle. So I am still not at all clear how an aircraft like this keeps pace with evolution in those technologies.

Air Marshal Brown: I do not believe that there will be an aircraft fitted with radar that will have the ability to detect it. And stealth is more than just the radar; in fact, it is the infrared signature and it is also the electronic emissions that come out of the aircraft, which can be just as important as the overall radar signature. So low probability detection of electronic emissions is an important factor as well. There are actually three areas, when you talk about stealth; it is not just against radar.

Senator LUDLAM: Can you just spell out those three for us? There are the emissions from the aircraft itself—

Air Marshal Brown: Low electronic emissions from the aircraft, a low infrared signature and a low radar signature.

Senator LUDLAM: And the radar signature is the shape?

Air Marshal Brown: Shape, materials—there are a lot of factors that go into it.

Senator LUDLAM: Given what you have said, some of its other performance characteristics are lower than they might be—you have made the point that stealth is all important and the fact that it can kill you from a very long way away—or the fusion I think is how you put it—how confident are you in the stealth characteristics of the aircraft?

Air Marshal Brown: I am extremely confident in the stealth characteristics of the aircraft. It is comparable to an F-22, which has proven to be a good fifth-generation fighter. And they are very difficult for anybody else to replicate.

Senator LUDLAM: Can you just spell out for me—Senator Xenophon put a quote to you before where General Mike Hoston—chief of US Air Combat Command, so not a Greens senator; somebody with a bit of skin in the game—on 3 February this year said:

If I do not keep that F-22 fleet viable, the F-35 ... will be irrelevant. [It] is not built as an air superiority platform.

Now that is all very well for the US air force, because they have both of those aircraft. We do not, and we probably never will. What is your response to that comment—that is, the F-35 is somewhat defenceless by itself?

Air Marshal Brown: Senator, I would like to get the rest of the comment. If we could take that one on notice, what I would like to do is get the full comment back to you and we could read the entire—

Senator LUDLAM: By nature it is somewhat out of context.

Air Marshal Brown: Yes; it is well and truly out of context.

Senator LUDLAM: Okay, I will put that reference to you through the secretary. We will come back to this later.

Senator CONROY: The breadth of the questions has covered quite a lot of the questions I was going to ask. But I do want to follow up on some things. You have been very emphatic that generation five against generation four is not a contest. Other than the countries you have named, are there any other countries that you are aware of who have developed the fifth-generation fighter capacity at this stage?

Air Marshal Brown: The Chinese have two aircraft in development and the Russians have an aircraft as well. But the way I would characterise their development is that the JSF flew two prototypes probably 10 to 12 years ago, and that is about where both of those countries are at the moment. There is a fair bit of work to be done on all three aircraft. I do not believe that any of those three aircraft have the same stealth characteristics of an F-35.

Senator CONROY: I have read that the Russians and the Chinese claim their planes are as good. You are making the point that that could not possibly be because they are in such an early developmental stage. Have any countries in our region—China, by definition, is in our region—bought into either of those platforms?

Air Marshal Brown: Nobody has bought into the Chinese platforms, but the Indians have got a co-development project with the Russians on the PAK T-50.

Senator CONROY: And Indonesia?

Air Marshal Brown: Not that I am aware of.

Senator CONROY: Let us assume they develop theirs, albeit in a 10- to 12-year timeline or possibly faster. How does a fifth-generation plane fare against a fifth-generation plane? You have certainly been very, very emphatic: five versus four, not worth talking about; criticism unfounded. Five versus five: where do we stack up there?

Air Marshal Brown: Again, I do not believe that those platforms reach the same level of fifth-generation capability that we are talking about with an F-35. I will give you a comparison. The commentariat out there, which people love to quote, often talk about aircrafts like the Su-30MKI. They say they actually have an advantage over our current fourth-generation fighters. I can emphatically state that that is not the case. In fact, unlike the majority of the people who comment on these things, I have actually flown Su-30MKIs. I have been in these aeroplanes and I have been able to make my own assessment of their capability against the capability of the fourth-generation aircraft that we fly.

Senator CONROY: Apologies for my ignorance, that is a fourth-generation or a fifth-generation?

Air Marshal Brown: That is probably the best of the Russian fourth-generation aircraft. There are deficiencies in those aircraft compared to our aircraft and the systems that we operate.

Senator CONROY: So you think that sort of differential will be replicated when you move into the fifth generation?

Air Marshal Brown: Yes.

Senator CONROY: Is that on a software basis, is that on a hardware basis, is that on a stealth technology basis?

Air Marshal Brown: I think it is on two bases: probably stealth technology, the inability to have low probability of detection on electronic emissions, and engine technology. This is where both the Russians and the Chinese are significantly behind Western engines.

Senator CONROY: Do the Russians claim theirs is—apologies for this; hopefully you can help with the terminology—a more traditional fighter style plane, more of a Raptor F-22 style? Or is it designed to have the same capabilities as the Joint Strike Fighter?

Air Marshal Brown: No, I think that they would like to see it as a pure fighter aircraft. At the moment I am not aware of any air-to-ground emissions that it is able to drop.

Senator CONROY: As you say, the commentariat, others, have made the comment that they believe that the ultimate Russian fifth-generation fighter will be superior as a fighter aircraft to our fifth generation planes.

Air Marshal Brown: Can I just give you an example? We actually did an exercise, probably about three months ago—again, this was with the Super Hornets. They have 4.5 gen with an AESA radar. It was against the specialist aggressor squadron from the United States. I think the kill ratio was in excess of 20 to one in favour of the Super Hornets. I am very confident given the training that we do and the knowledge that we have of these systems and that is what I tend to dismiss the commentariat out of hand.

Senator CONROY: Just a couple of slightly more boring topics to do with the plane: what sorts of changes will be required to your organisational structures, especially around aircraft maintenance, when this aircraft becomes operational?

Air Marshal Brown: We have a program going on at the moment to streamline our maintenance. Some of the other big changes that we have going on are security around the aircraft—again, because there is technology involved, it requires a lot more security. We are looking at the training that we do for the aircraft. And it has a fairly large intelligence requirement so that you can characterise what it actually picks up, so we have to work for a more seamless integration of a lot of that data into the aircraft.

Gen. Hurley: Senator Conroy, if I could just answer Senator Ludlam's question about this approach to the IOC. It is not just about the platform. Back in Russell the intelligence community is looking at the whole structure of supporting the aeroplane and the capability we need to evolve in our intelligence capabilities. It starts in a back room of public servants in Russell to enable the fighter to launch with the appropriate electronic warfare capability. So all of those evolutions have to be built into the organisation to maximise the capability of this.

Senator CONROY: What sorts of challenges do you expect around training the pilots and the support crew for this aircraft at the same time as we have the Hornets, the Super Hornets and the Growlers? That must be a bit of a challenge.

Air Marshal Brown: Certainly, and that is one of the great things about having the decision laid out the way that it is. It has allowed us to go into some fairly detailed planning on how we rank down our squadrons and stand up the others. So there are certainly some differences. This aircraft does not have a two-seater, so we have to transition from having two-seaters to single-seaters; we certainly have a greater use of simulators in the training evolutions, so some quite big changes.

Senator CONROY: I was asking you just before about the Russian plane, which you said they consider more of a pure fighter. You mentioned that there were two platforms for the Chinese developments. Could you give us a brief description of the two platforms. Is one a more pure fighter or one that matches the J35?

Air Marshal Brown: One is probably a pure fighter. I would classify it more as an interceptor. The other one is a little bit more like an F35.

Senator CONROY: I have questions on unmanned aerial vehicles. What is the time frame for the acquisition of the new Triton capability?

Air Marshal Brown: At the moment, the Triton is still going through its development phase. We are looking at acquiring the Triton for an IOC around the 2019-20 period.

Vice Adm. Jones: We have had an initial pass to date. The time line that we are working towards is that we would intend to go to government for a first pass in 2016, with an IOC of about 2019. We are looking to be in lockstep with the USA and to wait until they gain their IOC for their end of the Triton that we are interested in. That will be in 2018. It will be about 12 months after that.

Senator CONROY: You mentioned that you thought that the developmental stage of those other fighters would be in the early 2020s. Someone is suggesting to me that the T50 PAK FA and the Chengdu J20 are both scheduled for initial operating capacity in 2019. Are you able to shed any light on those claims?

Air Marshal Brown: I suspect that it is a bit like saying the initial operation of the JSF would be in 2012 or 2013. You tend to be very optimistic at the start of these programs.

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Estimates

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