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**TRANSCRIPT OF PROCEEDINGS  
TRANSCRIPT-IN-CONFIDENCE**

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**INSPECTOR-GENERAL AUSTRALIAN DEFENCE FORCE  
INQUIRY INTO THE CRASH OF A MRH-90 TAIWAN  
HELICOPTER IN WATERS NEAR LINDEMAN ISLAND  
ON 28 JULY 2023**

**PUBLIC INQUIRY**

**THE HONOURABLE M McMURDO AC  
AVM G HARLAND AM CSC DSM**

**COL J STREIT, with MAJ L CHAPMAN and FLTLT A ROSE,  
Counsel Assisting**

**LCDR M GRACIE, representing CAPT D Lyon  
SQNLDR J GILES, representing LT M Nugent  
LCDR M TYSON, representing CPL A Naggs  
SQNLDR C THOMPSON, representing WO2 J P Laycock  
COL N GABBEDY, representing MAJGEN Jobson  
COL S THOMPSON, representing BRIG D Thompson  
LTCOL D HEALEY, representing BRIG J Fenwick  
SQNLDR T SCHMITT, representing COL D Lynch  
SQNLDR M NICOLSON, with FLTLT S SEEFELD, representing D10  
CMDR B JONES SC, representing D19  
MR G O'MAHONEY, representing Airbus  
MS K MUSGROVE, representing the Commonwealth**

**TUESDAY, 29 APRIL 2025**

**DAY 50**

**TRANSCRIPT VERIFICATION**

**I hereby certify that the following transcript was made from the sound recording of the  
above stated case and is true and accurate**

<b>Signed</b>	.....	<b>Date</b>	.....	(Chair)
<b>Signed</b>	.....	<b>Date</b>	.....	(Recorder)
<b>Signed</b>	Epiq Australia Pty Ltd	<b>Date</b>	23/05/25	(Transcription)

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**.MRH-90 Inquiry 29/04/25**

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MS McMURDO: Yes, I think we're up to your cross-examination – no, COL Gabbedy's got something more?

5 COL GABBEDY: Sorry, ma'am. As is often the case, I've just had a couple of further things occur to me overnight. So if I could have five minutes of your time?

MS McMURDO: Yes. Always dangerous, isn't it?

10 COL GABBEDY: It is. I apologise in advance.

**<GPCAPT DAVID RUSSELL SMITH, on former affirmation**

15

**<CROSS-EXAMINATION BY COL GABBEDY, continuing**

20 COL GABBEDY: GPCAPT Smith, I'm COL Gabbedy, appearing for MAJGEN Jobson. I just have a few short questions for you following on from our discussion yesterday. You may recall in our discussion yesterday I asked you whether or not the NTS skills course that DFSB provide is an accredited course, and you indicated that you would basically check and get back to us. I suppose it's a bit hopeful of me, but were you able to determine  
25 that in the break, or is that something we'll still need to find out?

GPCAPT SMITH: My advice regarding accredited, it is not an accredited course.

30 COL GABBEDY: It's not?

GPCAPT SMITH: No, it's not. Not in the context of accredited. The courses are delivered in the training institutions or other organisations as part of an accredited training program.  
35

COL GABBEDY: I suppose given the course falls within your organisation, shouldn't it be an accredited course in terms of maintaining control over its quality and deliverables?

40 GPCAPT SMITH: There are many layers to the delivery of Non-Technical Skills across numerous layers of the training program delivered across Initial Employment Training, or others.

COL GABBEDY: So there are layers to it. But my question was,

shouldn't it be accredited? Because that provides a level of oversight and quality control to a course like your NTS course.

5 GPCAPT SMITH: My advice is that the training that we are providing provides the foundational knowledge for those facilitators. Who then are responsible for implementing NTS training in compliance with the NTS regulations within their respective Commands.

10 COL GABBEDY: Thank you. I understand. But what I think you're telling me is what your course does. And my question goes to whether or not it would be sensible for it to be accredited, given the level of oversight and quality control that that implies. Do you have a view on that?

15 GPCAPT SMITH: My view is that we're providing knowledge-based and theory-based education for those – specifically for the facilitator course. However, other courses which are designed for the implementation of NTS skill-based training are done through the accredited training organisations that are responsible for it.

20 COL GABBEDY: I'll move on from that. So with those course – I thank my friend for that. You mentioned that some of your courses were accredited?

25 GPCAPT SMITH: No, I did not say that.

COL GABBEDY: Sorry. I misunderstood. Towards the end of your evidence you talked about this split in your office with investigators being dedicated to investigations and other people being dedicated to such things as the rollout of policy and the delivery of these courses. You recall that evidence?

30

GPCAPT SMITH: Yes, I do.

35 COL GABBEDY: I understand that as Director of DFSB, you're the Analyse Authority for the DFSB Non-Tech Skills Foundation course. Were you aware that you held that position?

GPCAPT SMITH: Could you repeat the position that you said, sorry?

40 COL GABBEDY: You're the Analyse Authority.

GPCAPT SMITH: I'm not familiar with that term "Analyse Authority".

45 COL GABBEDY: I'm not either, and my next question was going to be what is an Analyse Authority? Do you know that you hold that position?

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- GPCAPT SMITH: I'm sorry, I - - -
- 5 MS McMURDO: Well, he said he's not familiar with the term.
- COL GABBEDY: Well, I suppose the answer is "Yes".
- GPCAPT SMITH: I'm not familiar with your term, I'm sorry.
- 10 COL GABBEDY: In relation to the Aviation Non-Tech Skills Guidebook, are you familiar with that publication?
- GPCAPT SMITH: Yes, I am.
- 15 COL GABBEDY: Do you know who the editors of that publication are?
- GPCAPT SMITH: The authors. And the responsible author within DFSB is Mr Ryan Cooper, Director of the Reporting, Intelligence and Research Section.
- 20 COL GABBEDY: Thank you. Wasn't he also the lead investigator for the investigation into the TALISMAN SABRE accident?
- GPCAPT SMITH: He is not the lead investigator, no.
- 25 COL GABBEDY: Was he involved in the investigation team?
- GPCAPT SMITH: He supported the Aviation Safety Investigation; yes, he did.
- 30 COL GABBEDY: Doesn't that conflict with what you just said in relation to this separation within your office between investigators and policy people?
- 35 GPCAPT SMITH: The Aviation Safety Investigation Team and the members that contributed to the Aviation Safety Investigation, yes, did include members of the Reporting, Intelligence and Research Section. Several members supported that investigation, such as Aviation fatigue biomathematical modelling and other support to the investigation, yes. So
- 40 the Director of Reporting, Intelligence and Research did help support the investigation, yes.
- COL GABBEDY: Look, to be completely upfront with you,

Group Captain, that's where my concern is. Because with the investigation, the investigation looks into the impact of these non-technical skills as potential contributors to the accident that occurred. That's right, isn't it?

5 GPCAPT SMITH: Non-technical skills, correct, as part of a sub-set of overall human factors, yes.

COL GABBEDY: So in looking into that, the investigation then looks into things that, for example, Army Aviation could do better in the training,  
10 education and delivery of those skills. Is that right?

GPCAPT SMITH: The investigation looked at – across the broad Defence Aviation Safety Program, what could be done better for fatigue and non-technical skills, yes.  
15

COL GABBEDY: Did the investigation look into what DFSB could do better?

GPCAPT SMITH: Yes, it did.  
20

COL GABBEDY: Did it?

GPCAPT SMITH: Yes, it did.

25 COL GABBEDY: Well, I suppose I could put it more elegantly. But speaking plainly, how does that work? You're investigating yourselves, aren't you?

GPCAPT SMITH: The DFSB Aviation Safety Investigation Team  
30 investigated across all elements of the Defence Aviation Safety Program.

COL GABBEDY: In doing so, you're calling on some of the people responsible for the delivery of policy, that you're then investigating as part of the NTS section of the investigation. Wouldn't it have been more  
35 sensible to at least engage an independent expert to deal with those aspects of your investigation?

GPCAPT SMITH: We did have independent experts who did peer reviews of the work that we did.  
40

COL GABBEDY: In the NTS area?

GPCAPT SMITH: In the NTS and human factors, yes.

45 COL GABBEDY: Who was it in the NTS and human factors area?

GPCAPT SMITH: Independent experts?

COL GABBEDY: Yes.

5

GPCAPT SMITH: As in, we engaged with an emeritus professor.

COL GABBEDY: Do I see in your investigation an annex from that professor that looks at DFSB's NTS skills?

10

GPCAPT SMITH: No, we didn't.

COL GABBEDY: So again, isn't there at least, if I put it at the lowest level, a concern or a perception that DFSB are in part investigating themselves in the way you've gone about this investigation?

15

GPCAPT SMITH: Perhaps I'd frame it in terms of the guidebooks or other material that DFSB has provided over the years as theory or education for the regulated community. DFSB has been given the mandate to provide such theory-based and guidebooks for the regulated community.

20

COL GABBEDY: That's the foundation, isn't it? That's the source from which the community then develops its policy. So DFSB is the source for the NTS skills and policy and training, developed by the community.

25

GPCAPT SMITH: It is a source. If you go back to the regulatory requirements, it is up to the regulated community as to where they source their information from, be it guidebooks or others. And DFSB does provide a range of those resources for them.

30

COL GABBEDY: It would be courageous for them to source that sort of information outside of DFSB-provided guidebooks, wouldn't it?

GPCAPT SMITH: That'd be a question for the regulated community.

35

COL GABBEDY: Thank you, Group Captain. I think that's as far as I can take it. Thank you, ma'am.

MS McMURDO: Thank you. Yes, LCDR Gracie.

40



**<CROSS-EXAMINATION BY LCDR GRACIE**

5 LCDR GRACIE: Sir, my name is LCDR Malcolm Gracie. I represent  
the interests of CAPT Lyon of Bushman 83. I just want to focus on a couple  
of matters that COL Gabbedy just touched upon. One is this: one of the  
human factor experts, who I think provided input to DFSB, talked about the  
non-technical training skills. And during the course of his evidence to this  
10 Inquiry he said, "I wonder about DFSB's ability to separate itself from the  
organisations it's to investigate". Could I ask for your comment in relation  
to that opinion?

GPCAPT SMITH: Sorry, could you clarify in terms of what you mean by  
15 "separation"?

LCDR GRACIE: Separate itself, as in being objective and independent.

GPCAPT SMITH: By the very nature of the authorities granted within the  
Defence Aviation Safety Program Manual and from the DFAA, DFSB is  
20 independent for the purposes of investigations. With respect to objectivity  
– I guess, is your separate question – again, the processes and the Quality  
Management processes that support the investigation, in accordance with  
the Defence Aviation Safety Manual and the review processes that we have,  
I'm more than confident that the end result of the investigation – so the  
25 evidence that's collected, the analysis, the findings and then the  
development of the recommendations – ultimately are supported by quite  
an extensive, staged and several processes of quality management that, in  
effect, I'm more than confident would cater for any perceived objectivity  
or bias.

30 MS McMURDO: There are two things here though. There's actual lack  
of objectivity – and no one's suggesting that, I don't think; I don't think  
they are – but then there's also the perception that people from outside  
might think, "Well, they're not as objective as they could be and, therefore,  
35 I don't have confidence in their findings". And there's that undermining of  
confidence.

GPCAPT SMITH: Yes, I understand, ma'am.

40 MS McMURDO: Drawing that distinction.

GPCAPT SMITH: Absolutely, I understand. I'm accountable for the  
quality, the objectivity and having a report that's unbiased. And perhaps  
for those readers who have access to the report and seeing the findings and  
45 the recommendations that are made across the whole Defence Aviation

5 Safety Program, including those aspects where – from external influences, so be they regulatory influences, be those influences of – across the thematic – whether we’ve talked about non-technical skills, Aviation Medicine, aeromedical factors – you will absolutely see that the investigation team has actually made findings and recommendations for safety improvement across all layers of the safety program.

10 Yes, I do agree with you that from an external perspective, where we have experts who are working within the Defence Aviation Safety Authority or the Defence Flight Safety Bureau whose task was to provide such knowledge and theory-based learning for the regulated community, and providing the best available information through guidebooks, handbooks, education and training to support the regulated community, yes, I don’t disagree with you that there could be a perception that where we task those  
15 very experts to provide expert opinion for the lead investigators – so we’ll have a lead investigator who’s analysing the sequence of events and human factors – it’s absolutely appropriate to seek assistance from our very experts in biomathematical fatigue modelling to do that work, to then provide that analysis to our investigators. Absolutely.

20 I would highlight to you that the guidebooks and others that are supporting the regulated community, again, is the same very guidebooks, et cetera, that the Senior Aviation Safety Officers within the regulated community who may be doing their own complex investigation. So you would have a  
25 Command-level investigation. A Senior Aviation Safety Officer, again, will do investigation using that same very information. So they will look at human factors through that lens and using the tools that we provided for their own analysis.

30 So, again, it’s not just DFSB’s product. Any of the Senior Aviation Safety Officers doing their own independent investigation on behalf of Command, again, will use that type of background information and theory as part of their investigation as well.

35 The size and scale of DFSB, honestly, does not allow us to have a large team who are sitting waiting for a Class A accident, who do nothing other than just investigate. And I understand where you’re coming from. What it also does for DFSB, it actually provides a very good what I would say closed loop mechanism whereby those folks who were responsible for  
40 generating a guidebook which has had several versions of a guidebook, has actually enabled us to be able to learn deeply from our own experiences and what is being investigated to improve those very guidebooks.

45 The last thing I’d mention is that I have to stress that those theory-based guidebooks and others are not part of the regulatory environment. As the

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Regulator, the Regulator has a choice whether it wishes to choose to use those as the basis upon which Aviation Commands or others will implement. But it is not a directed outcome.

5 LCDR GRACIE: Thank you, ma'am.

I'll come back to this notion of independence and objectivity a bit later. But you did say yesterday that personally you're responsible for the Inquiry to be objective and unbiased, and we've talked just now about perception and  
10 other things.

But what about transparency? So being objective and independent is one thing, but what about being transparent in terms of the processes? I'll put it as bluntly as this. DFSB purports to be bound by the Chicago  
15 Convention, Annex 13. It's not, of course, because it's not a state. It's not "the party", the Commonwealth is the party. But under clause 5.12 of that Annex 13 there is provision for an interested party to make an application to the state-appointed competent authority for access to protected material.

20 Now, we don't have that process for DFSB. So although on the one hand you purport to be bound by best practice in that convention, you're not open to the transparency that the convention permits. What do you say about that?

25 GPCAPT SMITH: I would offer that, in accordance with the Defence Aviation Safety Program Manual, our procedures and the way we conduct investigations and the principles are consistent with the principles of ICAO, Annex 13.

30 LCDR GRACIE: But in terms of transparency, there is no provision under anything in the Defence Regulations, *Defence Act*, or any other admin procedure, to obtain protected information that you claim in accordance with the clause 5.12 principles. So where's the transparency, is my question?  
35

GPCAPT SMITH: Sorry, you'd have to - - -

COL STREIT: Can I just raise the section of the ICAO convention my friend refers to is about an interested party, undefined, making an  
40 application. So the existence – or a mechanism under the convention is present for anyone to make an application. Whether the application is accepted or not by the DFSB is an entirely different matter. So the foundation that my friend is putting his question to, I submit, is not correct. He could ask it another way, but not in the way it's being asked  
45 presently.

MS McMURDO: Can you clarify that?

5 LCDR GRACIE: Well, yes. I don't accept the criticism. What I'm saying is that there is provision for ATSB to have a competent authority that has to be nominated under the convention by the state to have an interested party make an application for provision to protected material. Where is the same provision that applies to DFSB?

10 GPCAPT SMITH: The provision within the Defence Aviation Safety Program Manual points to the Defence Aviation Authority ultimately to be the accountable person, I think, for matters that you are talking about.

15 LCDR GRACIE: So an interested party could make an application to DFSB in the same way that clause 5.12 applies?

20 GPCAPT SMITH: Yes, that would be a true statement. I would just refer you to the Defence Aviation Safety Program Manual which, more from a preservation of safety data and safety information, and information from an Aviation Safety Investigation Report, again, the appropriate authority that has been nominated within the Defence Aviation Safety Program is the Defence Aviation Authority.

25 LCDR GRACIE: All right.

GPCAPT SMITH: Again, I would stress that the policy and the procedures and our conduct of investigations, as much as possible we have aligned with the provisions of ICAO. That is an internationally recognised standard. We've also gone to great lengths to ensure that we have aligned  
30 our procedures with and benchmarked against organisations that we think are highly credible, such as the Australian Transport Safety Bureau. Which is why we've used their very similar framework for the safety analysis model, although we call it a Defence Aviation Safety model, inclusive of verbal probability expressions.

35 So within our construct, I'm more than confident that, again, benchmarking and aligning with the international convention and also benchmarking and aligning with what we have seen is – and again, a very trusted Aviation investigation organisation, the Australian Transport Safety Bureau. I don't  
40 think we can do much better, from a Defence context, to align with those.

LCDR GRACIE: You're still, though, with respect, sir, missing the one critical point, and that is that under the convention there is an independently-appointed competent authority to assess the balancing  
45 factors in the convention – that is, the interest of the affected person – and

the need to maintain the integrity of an investigation. That's a neutral party appointed by the state. We don't have that independent person to assess such an application in respect of DFSB's investigations.

5 COL STREIT: The question is unfair for this reason. My friend knows, if he's read the convention, it doesn't apply to state aircraft. So when the convention was created, the world community agreed that the convention would apply in the context of civil aviation matters, not state aircraft, which by definition is Military aircraft. So that needs to be properly put to this  
10 witness as a matter of fairness.

LCDR GRACIE: I think my learned friend misunderstands the term "state". State is defined in the convention as a country, a sovereign state. If my learned friend is trying to say Defence aircraft, that may be so. I'm  
15 simply asking about the process. Whether it's a Defence aircraft doesn't matter. The point is who is the neutral party to evaluate an application for some transparency in the work that DFSB does?

GPCAPT SMITH: Sorry, I don't have specific advice in terms of "neutral party". All I can offer you is that the way the – if you follow the Joint Directive, the Defence Aviation Safety Framework, which was established by the CDF and Secretary, which defines the Defence Aviation Safety Framework and sets requirements upon the Defence Aviation Authority to establish a Defence Aviation Safety Authority and for the Defence Aviation  
20 Safety Authority to manage the Defence Aviation Safety Program, ultimately the Defence Aviation Authority has been made accountable for such provisions.

LCDR GRACIE: Let me put it as bluntly as this. Under the Chicago Convention the state is obliged to appoint a competent authority, normally a Judicial Officer, to assess an interested party's application for access for, let's say, transparency purposes. In the case of DFSB, notwithstanding its purported adoption of all those principles, there is no equivalent independent body if I was to make an application to DFSB for certain  
30 "Protected" material. Is that right? On behalf of my client, I mean, as an interested party. DFSB makes the decision, no one else does.

GPCAPT SMITH: Sorry, my advice in response to that is DFSB does not make the decision. It's the Defence Aviation Authority who has been granted – or, sorry, who has been promulgated as the appropriate authority  
40 within Defence for matters relating to that.

LCDR GRACIE: We come back then to the human factors expert. I wonder about Defence – let's use the word "Defence" as opposed to

DFSB's ability to separate itself from the organisations it's to investigate – Defence makes the decision.

5 GPCAPT SMITH: Sorry, Defence makes the decision?

LCDR GRACIE: As to whether or not an application for "Protected" material in relation to a DFSB investigation will be released. I'm just asking about the transparency of the process.

10 GPCAPT SMITH: Sorry, I'd have to clarify. You're asking about the appropriate authority, which is the Defence Aviation Authority, with respect to transparency. You might have to clarify.

15 LCDR GRACIE: "Transparency" means being open to an interested party being able to assess the veracity of an investigation or access material. There is no such provision, is there?

20 GPCAPT SMITH: Within the Defence Aviation Safety Program, no, I do not – there is no formal requirement or formal policy related to that.

LCDR GRACIE: Let me drill down this even further in terms of this Inquiry. The accident occurred on 28 July '23. DFSB issues its final report on about 31 March this year. The report remains "Protected" and a public version of it will be made available sometime in May.

25 GPCAPT SMITH: Just to clarify, the report is not "Protected", the report is classified "Official: Sensitive" in accordance with the Australian Government's Protective Security Principles Framework. The Defence Aviation Authority has requested the Defence Flight Safety Bureau to provide an "Official" report.

30 LCDR GRACIE: And DFSB has provided for you to come today to give evidence on terms that findings and recommendations in the report can't be the subject of questioning. That's right, isn't it?

35 GPCAPT SMITH: Sorry, I have not made that determination.

MS MUSGROVE: I object to that. My understanding was that - - -

40 MS McMURDO: Applications can be made.

MS MUSGROVE: I'm sorry?

45 MS McMURDO: Applications can be made.

MS MUSGROVE: Correct. And they haven't been. So the characterisation that's been put to this witness is unfair and inappropriate and should be withdrawn.

5 MS McMURDO: That's true.

LCDR GRACIE: Without an application being made, the position of DFSB, as I understand it, in coming to give your evidence yesterday and today, is that questions in relation to the findings and recommendations of the report cannot be made. Do you understand that?  
10

MS MUSGROVE: I object to that too. The position of the Commonwealth at this point in time is that it's not appropriate in this forum for questions to be asked of the findings and recommendations. I would say that this cross-examination from my friend now, and friend previously, is actually transgressing into areas that, in my submission, are bordering on looking into the substance, certainly looking at the processes of the report. And they are actually, in my submission – and Counsel Assisting to a degree – are bringing into live play allegations going to the credibility of the report, which is in effect the same as questioning about the findings and recommendations.  
15  
20

In my submission, it's not appropriate in this forum for this to continue. And it's not fair to characterise it as it's only DFSB that thinks it's inappropriate. My understanding is that Counsel Assisting was also of the opinion that, in the absence of applications, it was inappropriate for questions of such to be outlined or put to this witness.  
25

So I'd like to put on the record that the Commonwealth have offered to the Inquiry in a letter last week for a briefing to be provided to the Inquiry and that the Inquiry may like to extend that attendance at that to all Counsel representing so that they can have an in-depth and fulsome understanding of the report. This witness was not the sole author of that report. He was the Officer in Charge.  
30  
35

It would be appropriate, before my friends ask any further questions, in my submission, for consideration to be given to that briefing taking place with the various authors who contributed that report to be present to outline the basis of the findings and recommendations so that everyone in the room – and by that, I mean Counsel and the Chairs – have a factual understanding of how the findings and recommendations came about and what they actually mean. Because at this point in time, this questioning is unfair and it is attacking the credibility of the DFSB report in the absence of proper understanding.  
40  
45



MS McMURDO: Are you finished?

MS MUSGROVE: Thank you.

5 MS McMURDO: Well, I do think there is a distinction between process  
and the conclusions of the report, and that's why I think it's appropriate that  
some questions be asked about process. But having said that, the process is  
fairly clear in the set-up, in the statutory set-up, as the witness has referred  
10 to several times. And a lot of this I think is more appropriate to make  
comment in submissions if they want to be made.

LCDR GRACIE: I'll take that on board, ma'am. Thank you.

15 MS McMURDO: Now, in relation to Ms Musgrove's offer about a  
meeting with the various authors of the report to explain this, that is  
problematic in an Inquiry of this kind, where it has to be whatever the  
Inquiry bases its opinions on must be transparent and open and accountable.  
So we'd have to give careful consideration to that, and I understand Counsel  
Assisting is doing that and is liaising with Counsel representing to see if  
20 that is possible in the context of an Inquiry like this, where we have to be  
transparent about the material we rely on in making findings.

LCDR GRACIE: Yes, ma'am. And despite the Commonwealth's - - -

25 MS McMURDO: So I would like you to – you can continue, but could  
you please bear in mind that this witness is doing his best to answer your  
questions. But really, in terms of process, it's probably a question more for  
comment.

30 LCDR GRACIE: Understand, ma'am, and thank you for that. Just in  
relation to the Commonwealth's suggestion that I might derive a better  
understanding of the process, I was present at the family briefing where  
there were four DFSB people walking us through the various findings and  
matters. So I don't know if the proposal put by the Commonwealth, which  
35 I am unaware of, would be any different.

So with respect to my learned friend, I do understand some of the findings  
and the basis of the findings being made, and I don't accept the suggestion  
I don't understand it.

40 MS MUSGROVE: Can I just address on that? Sorry, I just put on the  
record that the family briefing was intended for the families. And then the  
lawyers representing the deceased were present. None of the other Counsel  
representing, including myself, were present, and we do not have the  
45 information that was provided. My friend's raised it. I just raise that.



MS McMURDO: Well, Counsel Assisting weren't present either, and the Inquiry weren't present.

5 MS MUSGROVE: Correct.

MS McMURDO: So that is something quite separate to this Inquiry at this point.

10 MS MUSGROVE: If my friend's characterising it as he has knowledge because he was in the family briefing, that may be so, but the rest of Counsel representing, Counsel Assisting and the Inquiry do not. That's all I was putting on the record.

15 LCDR GRACIE: Well, no, the objection was made to my questions and it was put that I didn't understand, not other Counsel representing, who aren't asking questions.

20 Let me come to this then. In May sometime there will be what I understand as the release of the "Official" report which will be for public release. Is that right, about May?

GPCAPT SMITH: That's a question for the Defence Aviation Authority. My task was to provide the Defence Aviation Authority with an "Official" report. And again, it will be up to the Defence Aviation Authority as to in what forums and by what means that that report will then get released or otherwise.

30 LCDR GRACIE: So if we don't get that report, for this Inquiry's purposes, before 9 May, which will be, so far, the scheduled last hearing date, there will be no opportunity for this Inquiry to ask questions about that official public released version.

35 GPCAPT SMITH: My advice is that the task I was given was to produce an "Official" report, so at a lower classification than the "Official: Sensitive", to the Defence Aviation Authority in May.

40 LCDR GRACIE: And that couldn't be done at the same time as the final report is prepared?

GPCAPT SMITH: Absolutely not.

45 LCDR GRACIE: Can I ask this: if there is a discrepancy – and this is a hypothetical, in part – if there is a discrepancy between something that DSTG has reported on, Defence Science Technology Group, and something

that's in the report, how does DFSB work out those differences? Let's say this: does it ignore DSTG, or does it invariably adopt DSTG's internal reports for the purpose of your investigation?

5 GPCAPT SMITH: Could you please clarify what stage you're referring to? Obviously DSTG supported our investigation by providing independent reports and analysis throughout the course of investigation, or are you referring to other work that DSTG has completed after the investigation?

10

LCDR GRACIE: Let me put this hypothetical. Let's say DSTG identifies certain angle of banks at certain times of the flight. Let's say there's a left angle of bank, various degrees, Y, and right, X. If DSTG does not adopt that – sorry, if DFSB does not adopt that report finding, what is  
15 the process by which that rejection is made?

GPCAPT SMITH: Just to clarify, you've provided a hypothetical. Is this during the course of an investigation, or after the investigation?

20 LCDR GRACIE: No, during the course of the investigation there is certain findings in relation to, let's say, angle of bank by DSTG, and those findings don't make their way into the report. Is that because they're rejected, or it's because of some other information that it has, and is that information disclosed in the report?

25

GPCAPT SMITH: Again, you've proposed a hypothetical question. DSTG did provide independent analysis, and again, DFSB used several sources of information ultimately, and if you are talking about flight data or voice – and again, often there may be minor variations in what analysis is  
30 provided. What I would advise is that we didn't experience any significant differences between what DSTG had provided to us – I can tell you that there were times where it actually required information from DSTG, plus our own analysis, plus some forensic analysis from the Original Equipment Manufacturer from the flight data recorder, to have three independent  
35 sources of information upon which the investigators would then, on balance, make a determination.

I could give you one brief example where the Defence Science and  
40 Technology Group was tasked to provide some independent analysis of voice, and they were not able to determine at times as to who spoke in the cockpit. And again, it's only through a painstaking process whereby the investigators also need to understand who is more than likely to have made that comment in the context of how they were operating the aircraft, and who was in control of the aircraft. So therefore DSTG, as an example, was  
45 only really tasked to provide some specific evidence of which, on balance,

needed to be put together with a trained investigator listening to hours and hours, truly understanding who was in control of the aircraft, and ultimately through that process – again, and the comparison of that type of evidence is where the investigators will make an informed, professional assessment.

5

Again, we have seen from the flight data recorder, for instance, where its samples – its very last sample of flight data, which was actually sampled moments before the aircraft impacted the water, but that sampling of the data actually indicated a certain angle of bank and a certain direction, but that was the last sample. However, our investigators were able to analyse that the impact angle was actually at a different angle of bank, and a different side of the aircraft.

10

MS McMURDO: I think we are really getting into the content of the report.

15

LCDR GRACIE: Yes.

MS McMURDO: So I think what LCDR Gracie is really trying to ask you is if there is information from Defence Science and Technology Group which you don't accept, or you don't accept completely, in the report, is that reasoning process in the report transparent for people to understand why you didn't accept that, and why you've accepted some further evidence, or that in combination with something? That's what he's really asking you. Do you deal with that in your report, or if it's not sufficient, if you don't think it's worth putting in the report, is it just left out? Is that really what you're saying?

20

LCDR GRACIE: Yes. Thank you, ma'am.

30

GPCAPT SMITH: Again, my advice, ma'am, is that I have yet to see a discrepancy between DSTG and our own analysis - - -

35

MS McMURDO: We're just talking about process rather than the contents of this actual report. But if, say hypothetically, DSTG says, "Black", and then you think, "Oh, could that be right?", and you go away and do some more research and, because of some further research from somewhere else, you think, "Grey", do you explain why you've gone to grey and not just accepted black from the DSTG? That's it.

40

GPCAPT SMITH: I guess it's a difficult question to answer because of the very hypothetical nature of the question. But obviously if we had information that was significantly different from DSTG compared to what we understood, it would absolutely be reviewed, and we would do a lot of

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work to truly understand why. But in the nature of this report, it never became - - -

5 MS McMURDO: It didn't arise.

GPCAPT SMITH: It didn't arise. There's also an aspect within the report that you need to understand - - -

10 COL STREIT: Can I just stop you there? I mean, this has turned from a hypothetical into pretty dangerous territory, in my view, and it has been allowed to go on.

MS McMURDO: It's difficult for this witness to separate it, yes.

15 COL STREIT: If I can make this submission? The reality is the report is what it is. All Counsel representing have it, Counsel Assisting now have it. The reasoning process in the report is what's in the report. If there's an absence of reasoning process in relation to an enclosure, that may or may not be significant, as with any report. So really all these matters are matters  
20 of submission if such matters arise at a later stage, and it can be done on the papers from my friend as to what weight or otherwise the Inquiry should place on the report.

MS McMURDO: Well, we have got submissions. We've also got the  
25 possibility of you making an application to cross-examine about the actual report, so I think we could probably move on, couldn't we?

LCDR GRACIE: Ma'am, given the attitude of the Commonwealth, I don't expect it would be an easy application to make. But the  
30 Group Captain has answered the question about what - - -

MS McMURDO: You are content with the answer that's been given?

LCDR GRACIE: Absolutely, ma'am.  
35

MS McMURDO: All right then. Let's move on.

GPCAPT SMITH: Would you mind if I made one final comment which  
40 may help you?

LCDR GRACIE: No, please do.

GPCAPT SMITH: If you understand that there is a significant amount of  
45 information that is provided, upon which there is analysis done, from a documenting within the report, all the information that has been available

for analysis – it is quite a challenge to be able to document in a report all the significant information that's actually been analysed to contribute.

5 The aim of the report is to provide enough detailed information to understand what was reviewed, and how it was reviewed, as a means of demonstrating that if you consider the flight data and cockpit voice data, having three independent means by which DFSB's own analysis – of which we can only go so deep into the technical aspects perhaps provided by the OEM – independent review by DSTG and asking them for independent  
10 voice analysis, compared with our own investigators who are listening to the cockpit voice recorder in the context of what is happening – the report would be absolutely inordinately long if we were to try to document all evidence and the processes by which we did analysis.

15 And ultimately the report is there to provide organisational learning. The report is not there to document every single piece of evidence and analysis and process. The report would just be unwieldy, I'm sorry. There are sufficient annexes and enclosures to document those independent reports or analysis that was provided, to provide confidence that it wasn't solely  
20 DFSB, without using other sources of information or analysis, that ultimately contributed to the professional assessment.

And I would state that more than likely – or in most cases, we had three independent sources that all led to the same conclusion.

25 MS McMURDO: Anyway, so you say the report speaks for itself in terms of its reasoning process.

GPCAPT SMITH: Correct.

30 MS McMURDO: Thank you.

LCDR GRACIE: Thank you, ma'am. Sir, I go to Exhibit 200.

35 GPCAPT SMITH: Which is?

LCDR GRACIE: My accuracy on exhibits is never very good, but I think it's the fact finding.

40 MS McMURDO: It is the fact sheet. Yes.

LCDR GRACIE: The fact sheet. Thank you.

MS McMURDO: Would you like the witness to see that?  
45

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LCDR GRACIE: Do you have that available to you, sir?

GPCAPT SMITH: Yes, I do.

5 LCDR GRACIE: Thank you. Can we just go to, firstly, the second –  
we'll go to the second page under the heading, "Findings". You were taken  
to this yesterday, but I just want to link the first paragraph which talks about  
the level of likelihood with primary cause. The reference to primary cause  
there does not refer to the level of likelihood. Can you tell the Inquiry what  
10 the level of likelihood is as to the conclusion reached?

GPCAPT SMITH: The way I would answer that is in the report the  
findings, which are very specific findings, which ultimately is related to  
evidence analysis, and the findings themselves, where required, will have a  
15 verbal probability expression. So those are discrete statements of findings.

You also will see in the report, in the narrative of the report, where the  
investigator is providing commentary or allowing a reader to understand the  
evidence, and understand as best we can how we reached the conclusion.  
20 You'll find in the narrative that the narrative may be quite direct in saying,  
"The investigation concluded that the primary cause is", but that is within  
the narrative.

We could also tie another verbal probability expression in the narrative, and  
25 I would offer that there are times where you cannot continue to use "likely",  
"more than likely," "almost certain" in every single sentence, but the  
narrative itself is trying to allude – and this document here is really trying  
to summarise for the families that the conclusion – not a finding – but the  
conclusion was that this was the primary cause.

30 It has to be read in the context – unfortunately, you have to read it in the  
context of the report where you will see numerous findings, but the narrative  
will lead you to, "Here is the conclusion".

35 LCDR GRACIE: Those terms in relation to the level of likelihood are in  
cases where there's an absence of direct evidence.

GPCAPT SMITH: Well, I guess where there's absence of definitive  
proof.

40 LCDR GRACIE: Well, they were your words yesterday, that's all.

GPCAPT SMITH: Yes.

45 LCDR GRACIE: Absence of direct evidence.

GPCAPT SMITH: Absence of direct evidence, yes.

5 LCDR GRACIE: Could we go over to the non-contributory findings, please, and the second bullet point? The finding there is to the effect that the night-vision imagery flight display, flight symbology, was functioning correctly, right?

10 GPCAPT SMITH: That's a true statement.

LCDR GRACIE: What I want to know is, did DFSB make any assessment, not whether it's functioning correctly, but whether it functions adequately to provide a safe and controlled flight envelope?

15 GPCAPT SMITH: So I'd have to clarify. You said, "a safe and controlled flight envelope". You'll have to be more specific. The aim of the symbology in the HMSD, so the flight symbology, so an INS GPS-derived horizon line, a flight path vector, altitude, air speed heading, all that information, which is replicated from the Primary Flight Display, so that  
20 information is replicated in the HMSD. And, similarly, through the TopOwl system they have the night imagery presented to the pilots.

LCDR GRACIE: My point of distinction, sir, you say it's functioning correctly; that's one issue. Does it function adequately for the operational  
25 purpose of providing a safe and controlled flight environment?

GPCAPT SMITH: I could not give you advice. The ultimate aim of that symbology, as designed, is to enable to the maximum extent possible that flight information to be provided to the pilots through the helmet. It's not  
30 really a matter of whether it's safe or otherwise. We did not make that assessment.

LCDR GRACIE: And that's really the next part of this question. If you're not assessing whether it's safe, how do you then necessarily provide  
35 recommendations to improve safety?

GPCAPT SMITH: I think you'd have to clarify what you mean by "safe".

40 LCDR GRACIE: Let me come to it more directly. There is evidence before this Inquiry that when the Image Intensifier Tubes, the IITs, are fitted to the TopOwl system, there is a 50 per cent reduction in visual acuity. Do you know about that?

45 GPCAPT SMITH: Visual acuity of?



LCDR GRACIE: Of the system, of the NVD.

GPCAPT SMITH: So now you're talking about the quality of the NVD?

5 LCDR GRACIE: The visual acuity, contrast, resolution, depth perception, is reduced by 50 per cent. So when the Harris L3 is fitted into the TopOwl system through the IITs, that Harris L3 reduces its visual acuity by 50 per cent. Do you know that?

10 GPCAPT SMITH: I couldn't give you the – I don't have a specific reference that I could say that I know that. I think, sir, what you're referring to is night-vision devices, by their inherent design, have limitations, and there are known limitations.

15 LCDR GRACIE: But do you know about this degradation of the visual acuity when it's fitted to the TopOwl?

AVM HARLAND: I think, if I could clarify? From my understanding of the evidence, it was a comparison between a direct look through a  
20 traditional ANVIS-type system, and by applying the IITs to the TopOwl system and projecting it onto a visor with a half-silvered section on it, you end up with a loss.

GPCAPT SMITH: Okay, I understand. So you're comparing it to, say, an  
25 ANVIS-9 type acuity of other night-vision devices?

LCDR GRACIE: No, the Harris L3, when it's fitted into the TopOwl system, has a reduction of 50 per cent visual acuity, so there's a loss on the projection onto the visor in front of the pilot's eyes.  
30

GPCAPT SMITH: Okay. So in order to answer that question, I would say, no, we did not investigate whether the HMSD was an appropriate system to use. No, we did not. It was not within the scope of the investigation. The TopOwl and the system, again, was the system that was  
35 provided to Army Aviation aircrew.

LCDR GRACIE: And that's why the finding is it was functioning correctly. Whether or not it was safe, different point, not looked at.

40 GPCAPT SMITH: I'm sorry, I'm not prepared to comment on whether it was safe or not. The system, as designed and Service Released, and provided to aircrew, was a known system with obviously known, "This is what you get in terms of image, contrast". That is the system that is provided to Army Aviation aircrew.  
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LCDR GRACIE: Well, I think you went further. It's not that you're not prepared to say it, but you said that DFSB did not look into whether it was safe. That's what you said.

5 GPCAPT SMITH: From an investigation perspective, there was no evidence that was presented to us at any time during the MRH-90 operations with that, that there was any question that it was providing unsafe imagery or unsafe displays to pilots.

10 LCDR GRACIE: You're not aware of an AATES report about that? It's part of Exhibit 41, ma'am.

GPCAPT SMITH: I am aware of AATES reports.

15 LCDR GRACIE: No, that AATES report specifically about IIT loss of visual acuity, which – can I add just one other thing – goes further. There's a further reduction in visual acuity when looking off-axis.

20 GPCAPT SMITH: I don't have the specifics of that report. I have not reviewed the specifics of that report, and I do know that they have had different generations of Image Intensifier Tubes within that system, so I'm not quite sure which one you're referring to.

25 LCDR GRACIE: I'll tell you. It's the 2019 MRH L3 Image Intensifier Tube Assessment Report dated 24 April 2020. Are you aware of that?

GPCAPT SMITH: I may have read that at some point during the investigation, but certainly not in recent history.

30 LCDR GRACIE: I'll just bookmark the relevant parts, ma'am. It's paragraph 13 in relation to the 50 per cent, and paragraph 19 in relation to corresponding reduction in available visual cues in all phases of flight when looking off-axis.

35 The recommendation was to restrict the conduct of SO approaches less than 10 millilux. So if AATES aren't aware of that, what - - -

GPCAPT SMITH: Sorry, AATES or DFSB?

40 LCDR GRACIE: I'm sorry. Thank you. If DFSB aren't aware of those factors, then all it can do, as I think you've said, is determine whether the equipment is functioning correctly, not whether or not it's appropriate for a particular mission profile.

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COL STREIT: Can I just raise one matter – it's not an objection – just with my friend?

MS McMURDO: Yes.

5

LCDR GRACIE: A fair point is made, that you're not the investigator and you're the Officer in Charge, but you are the only witness being called, so this is the only opportunity I have to ask these questions.

10 GPCAPT SMITH: That's okay.

LCDR GRACIE: So what I'm asking is whether or not DFSB looks at the operating environment and the equipment that's provided by Army Aviation to ensure a safe, controlled flight - - -

15

MS MUSGROVE: I object. It's moved from processes into specifics. I've let it go, but it's actually at the point now where I need to object and stop it because firstly, as my friend has obviously raised with Mr Gracie, he's not the investigator, but it's going to the substance of the report, and that is outside what's been allowed for this cross-examination.

20

MS McMURDO: It is going to the substance.

LCDR GRACIE: With respect, ma'am, it's not going to the substance of the report. It's going to what's not in the report, and so to that extent, I've asked a question about whether or not safety was looked at, and the answer is no.

25

MS McMURDO: It is going to the substance of the report.

30

LCDR GRACIE: All right, ma'am.

MS McMURDO: You have to deal with it in some other way.

GPCAPT SMITH: I think it's important just to help close that out. This equipment was Service Released with known limitations. All night-vision devices have certain limitations. If you go back to the requirements for the operator to operate with equipment that has been Service Released, with whatever limitations those are, it requires the operator, in accordance with Defence Aviation Safety Regulations, night-vision illumination systems, in effect to develop its operating procedures based on the limitations of whatever systems that are provided to them for night-vision illumination systems.

35

40

5 So whatever they do from a risk management – if they restrict operations to certain illumination levels, visual environments, again, it is up to the operator to make those informed decisions based on the equipment that they have. I could go further into the investigation, but I would stress that weather and illumination were well within the limits that were authorised, and well within the system that Army has trained for. And there's absolutely no evidence that anyone within that formation – or any other Aviation safety reports had provided evidence to DFSB that there were issues that we needed to investigate specifically related to either design or Service Release of that equipment.

15 So from an investigation perspective, when you investigate and find that illumination levels are quite good, the weather was within authorised limits, and mission planning and execution was conducted within those limits, then that does not provide a basis for the investigation, without any evidence pointing to whether we then should question whether what has been Service Released – or any aircraft system, or anything provided to the pilots was unsafe or otherwise.

20 LCDR GRACIE: Let's just talk about illumination levels. And we won't go into the details of it, but let's say there's an illumination level of 70 or 80 per cent. On this particular occasion, it was a gibbous waning moon. That's, what, 70 or 80 per cent illumination?

25 GPCAPT SMITH: I'm sorry, I don't have any illumination charts, and I don't use them myself.

30 LCDR GRACIE: So there was evidence before this Inquiry that the illumination levels were anywhere from 30 per cent to 60 per cent. So the illumination level could be as low as 30 or it could be as high as, on the evidence we've had, 60, or something else that DFSB has determined.

GPCAPT SMITH: Sorry, you would have to equate that to millilux.

35 LCDR GRACIE: Well, you don't. In the report you talk about illumination levels.

MS MUSGROVE: I object to that. My friend has just put something in the report on the record, and I would ask for it - - -

40 LCDR GRACIE: No, I didn't say what the percentage was. I just said, "You talk about illumination levels".

MS MUSGROVE: If I could ask, Ms McMurdo, if – my friend is

obviously wanting to use this witness to put other pieces of evidence that have been put before this Inquiry to him to effectively challenge the findings and recommendations of the report. In this forum, that is not fair. It's not fair to this witness, firstly, because he hasn't been asked about it in his statement and he hasn't seen the source material. And whilst Counsel Assisting can take him outside of his statement and probe areas of interest, this cross-examination is not fair.

This witness, by rights, should be cross-examined on what's in his statement. That is the appropriate cross-examination for this witness. It's not fair, and I would ask that it not continue in this manner if possible, please.

If the Inquiry wishes to have further hearing blocks in which various witnesses can be brought before it so that pieces of evidence from other witnesses throughout the nine hearing blocks that we've had thus far – to drill down onto some perhaps minute points, then that's a matter for the Inquiry. But at this stage, in my submission, it's not appropriate for this to continue with this witness.

LCDR GRACIE: I was merely responding to the witness who said the illumination levels were good. But I mean, I - - -

MS McMURDO: Yes, all right. Well, let's move on. You're asking him about the non-contributory findings in Exhibit 200.

LCDR GRACIE: Yes. I'll come to the next one.

MS McMURDO: And he's made quite clear that they relate to the technical aspects of it.

LCDR GRACIE: Functionality.

MS McMURDO: And I think you can move on.

LCDR GRACIE: We can, ma'am. We'll go to the next bullet point. So almost certain that the Helmet-Mounted Sight and Display pitch scale attitude was not contributory. You were asked some questions about this yesterday, and the reasoning though is that it is not part of the pilots' instrument scan while flying formation. Now, I take it that that was something provided by way of a subject matter expert.

GPCAPT SMITH: That's a true statement.

LCDR GRACIE: And I imagine that subject matter expert is the person referred to – sorry, it's in the report somewhere here. It's in the fact-finding. Under "Process and Priority", you talk about relevant specialist and experts not directly involved in the accident as being part of the structured process for information, and then over on the second-last page there's a reference to an Army Aviation MRH-90 test pilot to provide detailed advice regarding aircraft systems, avionics, flight control systems, handling characteristics, and Standard Operating Procedures. I take it, it is that person who provided that information as to whether referencing the sight and display pitch scale attitude was not part of the pilots' instrument scale while flying formation. Would that be correct?

GPCAPT SMITH: My advice is we used – sorry, we engaged with numerous MRH pilots, including Standards pilots, including Qualified Flying Instructors, to discuss the night flying, or night formation techniques. So it was not based on LTCOL Norton's evidence to us.

LCDR GRACIE: But LTCOL Norton is the Army Aviation test pilot who you referred to as being seconded.

GPCAPT SMITH: Yes, but he was not the only Army Aviation pilot that we talked to regarding techniques and procedures for night formation techniques.

LCDR GRACIE: I understand that.

MS McMURDO: That paragraph refers to him, does it?

GPCAPT SMITH: Yes, it does, ma'am. What I would stress, that the content of that paragraph was more focussed on his test pilot knowledge of the aircraft systems, not on the formation technique.

LCDR GRACIE: So you're getting assistance from line pilots, QFIs, perhaps in relation to what a pilot might do in relation to an instrument scan while flying formation. Is that right?

GPCAPT SMITH: That's a true statement.

LCDR GRACIE: So you're aware of the OPEVAL report that had a survey done of line pilots, QFIs, two test pilots, in relation to the functionality of this off-axis pitch roll attitude?

MS MUSGROVE: I object. That's not a fair question. If my friend wants to put the report to the witness out of fairness, then that would be appropriate. Whether or not the witness can actually comment on it, again,

it's outside his statement, and probably outside his area of expertise for the purposes of this.

5 MS McMURDO: Well, let's find out.

LCDR GRACIE: Well, it's actually not, because he refers to it in his statement.

10 What I want to ask is this: where you refer to these other pilots providing information in relation to flying formation, do we know the circumstances in which they're talking? Is it with a visual horizon, or is it a two-ship formation, three-ship, four-ship? What is it?

15 GPCAPT SMITH: My understanding is our investigators spoke to a wide range of Army Aviation pilots. That would include at 6 Avn the School of Army Aviation and ex-5 Avn Instructors, Standardisation Officers. And again, my - - -

20 MS McMURDO: This is going outside the permitted line of cross-examination.

LCDR GRACIE: I'll ask one question about this.

25 Are you aware of the AATES report that says that in a low cue environment, at night, in rain, low level, that the most compelling information for a pilot who may experience spatial disorientation is the symbology?

GPCAPT SMITH: Yes, I am aware of the AATES report, but I have not read it.

30 LCDR GRACIE: Are you aware of that point though?

35 GPCAPT SMITH: In specific, when – you need to be very specific in terms of what you're talking about in terms of symbology. The pitch scale attitude is one set of symbology in the Helmet-Mounted Sight and Display. You need to be quite specific that the pitch scale attitude – and again, leveraging off my background and experience, and I also delved into this quite deeply – the pitch scale attitude, as part of your instrument scan and work cycle, is not used.

40 LCDR GRACIE: You say that, or are you saying that the evidence you have - - -

45 GPCAPT SMITH: The evidence that was presented to us across a wide range of Army Aviation pilots - - -

MS McMURDO: This is going into the report. This is going into the report, yes. You are going to hear from a witness later that will be dealing with a lot of these issues, Dr McGrath. You can ask him these questions.

5

LCDR GRACIE: Yes, I'm just dealing with the bullet point as it reads, ma'am, that it's not part of an instrument scan while flying formation.

In relation to the fourth bullet point, all formation crews were current and qualified to conduct low-level formation flight overwater using night-vision devices. Again, the question of currency and qualification is one thing. Did you look at whether or not the training was adequate for the mission that was flown?

15 MS MUSGROVE: I object. It goes into the report.

MS McMURDO: It does.

MS MUSGROVE: I object.

20

MS McMURDO: Yes, it does.

LCDR GRACIE: Well, maybe one day the Commonwealth can let us in on the secret, and why this is all so difficult to bring out in the open because it's up to the Commonwealth to waive the protected nature of this document, or provide something that the Inquiry might be able to utilise, rather than wait until May.

MS MUSGROVE: Well, with respect, the situation may be coming about – the situation could be different if decisions had have been made in relation to the manner in which the Inquiry has been heard. My friend has indicated in his opening – again, we have been on a journey and we're going down various tributaries, various decisions have been made, various evidence has been led. At this point in time, it's not – well, it would obviously be open to the Inquiry if they wished to have further hearing blocks to explore the final report. That is not a matter that is in the hands of the Commonwealth.

At this point in time, no application has been made to cross-examine this witness about the content, the findings, the recommendations of the final report, so it's either in my friend's hands or the Inquiry's hands as to the level of cross-examination and exploration of the final report at this point in time.

LCDR GRACIE: It is, ma'am, a submission that falls ill from the mouth of the Commonwealth. The Commonwealth sought an adjournment back

45



on 28 June last year to have these proceedings stopped, pending the release of the report, and now we've got the report and it's not been released for the purposes of the Inquiry. So what was the purpose of their application back in June last year? To have this adjourned for nothing?

5

MS McMURDO: Well, maybe we're going to have to look at the possibility of further exploring that.

LCDR GRACIE: Yes, ma'am.

10

MS McMURDO: So we can talk about that later, but for the moment you've asked this witness questions well beyond what I said was permissible, and I'm not happy about it. So would you continue. Finish your cross-examination as I've ruled. Thank you.

15

LCDR GRACIE: I have been in a situation where you feel you've got one hand tied behind your back, but not both, and both feet. This, ma'am, is a very, very difficult way to approach evidence. And I appreciate Counsel Assisting's efforts to try and make some of this public, but the transparency issue I raised before, sir, only goes further. Why would you utilise, as the subject matter expert for the MRH-90 expertise, the person who conducted the OPEVAL and wrote the Decision Brief for the Service Release of the TopOwl symbology over the objection of AATES when, as you know, back in March last year 60 Minutes went public about its concerns, its reported concerns, and one of the family member's concerns, about this item of equipment?

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And you have the family sitting here today, all listening to a report that has utilised the person who, as opposed to what AATES said, said that this thing is all fine. Now, why wouldn't you get an independent expert?

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MS MUSGROVE: I object. The factual context for the question hasn't been established. The starting point is that this witness has indicated that they didn't take any of the material that's before this Inquiry, including the 60 Minutes transcript and recording. There's been no establishment as to when Lieutenant – and I apologise if I don't get his rank correct – Mr Norton was engaged, on what basis he was engaged. But the witness has clearly said that he was not engaged to provide findings, and that other experts were also engaged. And so the premise of the question is unfair, and it's probably a matter for submissions my friend could make.

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MS McMURDO: I think it's actually a fair question, and it's something that this witness should be given the opportunity to comment on.

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LCDR GRACIE: I'll make it quick.



MS McMURDO: Do you remember the question, or do you want it asked again?

5 LCDR GRACIE: I'll make it clear, it's not about the 60 Minutes evidence in this, it's about 60 Minutes, media, public concerns about the TopOwl system, one of which involved one of the family members being interviewed and raising questions about this. In your statement you say, contrary to what the Commonwealth just submitted, that:

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*LTCOL Norton's role as an SME was to provide expert advice on the functionality and operation of the HMSD V5.10.*

15 The very thing that AATES identified as unacceptable. The very thing that media has identified as a concern. The very thing one of the family members has raised as a concern, and did so even recently in the Family Brief. And you've got the person, as the SME, who was behind the Service Release of it. Now, don't you think that, as a matter of perception, that was not just a perceived conflict of interest but clumsy and insensitive?

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COL STREIT: Well - - -

LCDR GRACIE: Sit down.

25 COL STREIT: No, I object. First of all, let's be courteous here. No, let's be courteous. The objection is raised. I didn't have a difficulty with the proposition that was put to the witness. The last two or three words about insensitivity and things like that, that's improper. It's unfair. I'm not objecting to these matters being put; he has a job to do. But we need to be mindful of those things, and how we ask questions. Thank you.

30

MS McMURDO: Fair enough.

35 LCDR GRACIE: Did you think it appropriate, given those issues surrounding the independence or objectivity of LTCOL Norton as an SME on the very issue that there is widespread debate – did you think it appropriate to have him as the SME when you could have had any number of MRH test pilots provide SME assistance?

40 GPCAPT SMITH: My professional assessment, after engaging with WGCDR Cooper, who was the Investigator in Charge, and the lead investigator, and my direct engagement with LTCOL Norton, my professional assessment is he had one of the broadest ranges of experience as a test pilot, but also conducted Operational Test and Evaluation activities, had a deep knowledge of introducing the MRH into service. He had a deep

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5 understanding of the transition from HMSD 4.0 to 5.0, and he provided us some very good understanding of how the transition from having a conformal HMSD, so everything is through the front, to a non-conformal HMSD – he was able to clearly articulate what AATES had raised. He was able to clearly articulate what the Operational Evaluation had found. And, yes, at the time we deliberately discussed how we would integrate his knowledge, skills and experience and use him. Absolutely.

10 I made a professional assessment that I found he was totally unbiased, he was totally objective. The majority of the work or information that he provided to us was more aligned to test pilot requirements. The functionality of the automatic flight control systems, engines, all of the aircraft systems, including handling characteristics once you start unloading the aircraft, and the dynamic responses of the aircraft.

15 So, ultimately, I was accountable for making that decision, and I'll back that decision – again, his knowledge, skills and experience. I would probably also offer that if you truly wanted to find across the enterprise someone who was – sorry, you would struggle to find a person who doesn't have that knowledge, skills and experience who wasn't privy to all of those AATES reports at some point. I would struggle to find anyone else who didn't have a view or opinion on that whole process. Any other test pilot would have the same access to all of those, or would have been involved in those as well.

25 MS McMURDO: Okay. Thank you. I think that's the answer. All right?

LCDR GRACIE: All right, ma'am. I think, ma'am, given the other matters I've got to raise, it's going to be met with strenuous objection and I probably can't go there.

MS McMURDO: Well, we'll have to see if these issues can be raised in a different way then.

35 LCDR GRACIE: Thank you, ma'am. Thank you, sir. I appreciate your time on this. Ma'am.

MS McMURDO: Thank you. Re-examination? Ms Musgrove.

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**<RE-EXAMINATION BY MS MUSGROVE**

45 MS MUSGROVE: Thank you. The term “generative safety culture” has been used quite a bit. Can you explain what that is, please?

GPCAPT SMITH: Yes, I can.

MS MUSGROVE: Could you please do so?

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GPCAPT SMITH: Thanks. In broad terms, the Defence Aviation generative safety culture, there's many facets to it. Importantly, open and honest reporting. Absolutely being able to say, "Hey, this is what I've learnt. This is what I've experienced". Always wanting to be able to learn from others, so we have a proactive system of reporting, and ultimately all the activities that lead to a culture whereby no one is afraid to put their hand up (a) to be in a position where everything we're trying to do is to help others, for others to learn from our own mistakes – I'll probably leave it at that.

15

MS MUSGROVE: That culture of learning and to help others learn from mistakes, is that reflected in DFSB's processes and conclusions, findings, recommendations of not attributing blame?

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GPCAPT SMITH: Absolutely. The foundation of Aviation safety culture and our whole reporting framework is based on not apportioning blame or liability. It's a really important one where again, in the Aviation environment where we're always dealing with human performance limitations, it's critical where others can learn from your own errors. And again, when we're talking errors, as distinct to violations.

25

Even as a Commanding Officer of a Squadron, if I've made an error of judgment or I've inappropriately handled the aircraft. The most important demonstration of that is to stand up at Morning Brief the next morning to be open and honest, even with the most junior pilots, "This is what you can learn. Even though I've got X number of hours, I actually made this poor decision and what I've learnt from this, and what I've learnt from this". And this is how we help indoctrinate our junior aviators to also be able to question if they don't see something right, so that they're in a position to be able to speak up if they do see something that perhaps is making them uncomfortable.

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And again, our Aviation safety culture has very much learnt from that. It breaks down cockpit gradients. It really enables junior pilots to question senior pilots in a cockpit. So there are many facets to it. The generative Aviation safety culture, again, most of the DFSB functions and our product, and our services, are all based upon that very fact.

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MS MUSGROVE: Okay. Have you seen that culture in your experience as an aviator?

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GPCAPT SMITH: Absolutely I've seen that culture, and over the course of – from the start of my career to now, I have seen dramatic improvements all round in that very culture, and really it is, I would say, absolutely  
5 underpinned by our strong culture of reporting. We have in the order of 4500 Aviation safety reports every year, spanning Class As all the way through to multiple class – absolutely the lowest level of reporting, and the reporting has expanded as the regulatory domain has expanded to include  
10 aerodromes, air navigation service providers, air traffic controllers.

That reporting culture has also enabled us to dramatically improve our analysis of safety statistics and be able to do a lot of those higher level reports that feed back at an organisational level as well.

15 MS MUSGROVE: If there's powers of compulsion that are used to obtain those reports that DFSB receives, the Aviation Safety Reports, what in your opinion is the effect on that generative safety culture and the openness of reporting?

20 GPCAPT SMITH: I might just answer the question by first stating that within the Defence Aviation community all Aviation Safety Reports are available across the whole Defence enterprise through the Defence Protected Network, through the Sentinel database, through the Salus, our safety intelligence system. We can access every single report that really  
25 was able to be electronically stored.

In terms of the first part of your question, the fundamental premise upon which, when we sit down and we talk to aircrew, especially if they've been involved in a very serious incident, it's fundamental they truly understand  
30 the purpose of why they are speaking to us and absolutely feel confident that they can openly and honestly talk to us about – and again for witnesses – about what they remembered, their experiences, their recollections. Because ultimately, the best way we can provide the organisational learning is for those aircrew, especially with us – aircrew or air traffic controllers  
35 that provide their views and their learning, and having a culture where they're very open and honest.

I have seen some very, very experienced aviators who, through a certain range of circumstances, have actually made quite a glaring error but often  
40 it has happened so quickly that you can tell as you go through the interviews and their learning, most of the times they are able to really provide you their own learning and help you along the way. Ultimately, that is really designed such that they have to go and fly with other aircrew and they're all about trying to keep other aircrew safe by providing their organisational  
45 learning.

5 If we are to enter a regime where it's unclear as to what is said and where that safety information, for what purposes, will be used – and importantly, I have a mandate to make sure that our safety data, our collection and preservation systems do provide confidence to individuals that have reported, that it's only going to be used for the purposes of an Aviation Safety Investigation.

10 MS MUSGROVE: You spoke to Counsel Assisting in some of your answers, he asked what legislation you would like to see and you spoke about legislative protection for the investigation information and material. Was that to protect that safety culture and that trust?

15 GPCAPT SMITH: That is a true statement. I wouldn't like to offer that I'm seeking legislative. My default answer is having the appropriate protections within the Defence organisation, however that is achieved, through whatever the mechanism to do that. It would definitely assist absolutely in the case of situations such as this where there are complexities with other parallel inquiries. It is really important that those members who  
20 speak to us truly understand that when they have spoken to us, that what they have said, whether it's recorded interviews, or interviewers' notes, or it may be they're a self-administered interviewing form, that they are protected in terms of it's only being used for those purposes, and what they have recorded or what they have written was not going to be used by other  
25 forums as if it was their direct statement or witness account.

Absolutely, I agree that at the appropriate time, or others with other forums, could be asked independently about such matters. I would also highlight that this issue is within our Aviation Safety System. You also need to  
30 understand that if perhaps there are areas that have been raised within an Aviation Safety Investigation, that might come to the attention of a flying supervisor from a performance management, that any subsequent discussion or enquiry related to performance management happens completely separately from anything that was raised for the purpose of an  
35 investigation.

MS MUSGROVE: In terms of legislation and if the investigative arm of DFSB was to be removed from where it sits currently, and to have legislative basis for it to be what might be perceived as truly independent,  
40 but moved outside of where it sits now, what impact do you see that could have on the culture and the learning and the knowledge in any such organisation that's independent – well, legislatively created?

GPCAPT SMITH: Yes. The first thing I'd say, it would be very hard to  
45 equate the establishment of DFSB within the Defence Aviation Safety

Program, to try and equate it directly to an ATSB construct. They are dramatically different. My experience is that the synergies within DFSB for providing a central hub for human factors expertise, aviation fatigue management expertise, we have requirements for a standardised approach to safety analysis and the safety analysis model. We have a common reporting framework through Sentinel. So, therefore, we must actually have some standardisation in many of those functions.

For the size and scale of Defence and how frequently you would actually be investigating a Class A or an incident with fatalities, if DFSB only did investigations of Class A accidents, then you would have to go back a long way in history to find when the previous investigation was. I think it was Chinook in Afghanistan and then Nias back in 2005. So it would actually be a very, very long time between – if it was perhaps under the construct of an ATSB, it would be a very, very long time between events. My honest view is that given the size and scale of Defence and the resources that we have, and more importantly, our ability to truly take on board the lessons from investigations and incorporate that back into the product and services that we have for that generative safety culture, and my remit which is really to do everything I can to prevent the recurrence of a similar event, DFSB, in my view, has a very good closed loop system to be able to investigate.

Again, as I said, the Investigation Section, its primary job is to investigate. It's not required to do other policy. However, through utilising subject matter experts from other areas within DFSB – and we are a learning organisation as well – that also enables us, from an investigation perspective, because we do have experts in fatigue and non-technical skills, and others, to have, I would say, much more of a closed loop learning environment that has probably a greater ability to implement change and implement improvement quite rapidly.

MS MUSGROVE: You were asked some questions about a possible perception of bias in terms of marking your own work, DFSB marking its own work. In your experience, have the investigators generally – I'm not asking for specifics – shied away from being frank and robust and objective in their investigations?

GPCAPT SMITH: No, they have not. I would offer that the DFSB personnel have critiqued themselves perhaps harder than any other organisation.

MS MUSGROVE: You were asked some questions about people outside not having a knowledge of the processes that you investigators go through, and you go through for the reports. If people actually had a knowledge of



the processes that each investigation goes through, do you think that could help to dispel misunderstandings or possible apprehensions of bias?

5 GPCAPT SMITH: Yes, I think it would help. And to perhaps further clarify, if you refer to the Australian Transport Safety Bureau website, you would probably find that they have provided information related to how they do their reports, their analysis frameworks, their verbal probability expression. So there is a range of resources that perhaps inform the civil aviation community. But again, the internal processes of how ATSB would  
10 do their analysis are not made public.

MS MUSGROVE: Not made public. But is it the case that you said DFSB actually models your processes internally on ATSB and ICAO. Is that correct?  
15

GPCAPT SMITH: That is a true statement, and we've also had one of our senior analysts do a secondment with the Australian Transport Safety Bureau as well.

20 MS MUSGROVE: Is it the case that there are separate steps and stages throughout each investigation that is followed for every investigation?

GPCAPT SMITH: That is true. So, generically, we will start with a response phase which is from notification to planning, to obviously, "Where  
25 do we need to position people? Where do we need to preserve and collect evidence?" So really the next phase then is the preservation and collection of evidence. That is really the bounds upon which you will start framing, "What does this investigation look like? Will it be heavily technical? Will it be very heavily operations focused". But upon a true first stage of truly  
30 trying to understand the key sequence of events, that really sets the framework upon which what will be our broad key lines of enquiry.

Those broad lines of enquiry will really set up the scene for what type of evidence will we continue to collect, upon which we will do analysis across  
35 those key lines of enquiry. Those analysis of those key lines of enquiry will ultimately lead to where the investigators will start reaching their conclusions, or as in findings. So really that will be at the analysis phase.

At the end of the analysis phase, we will also progression to the  
40 recommendations development phase. But often the recommendations development is really happening in parallel to the report drafting. So there will be the report drafting phase, and consultation. And eventually, after the report, it will be in the report communication phase. So at the present, we are actually in the report communication and debriefing phase where we  
45 still have some engagement such as the Institute of Aviation Medicine, the

DASA regulatory directorates, and some other organisations likely to benefit.

5 MS MUSGROVE: That's part of that learning process?

GPCAPT SMITH: Absolutely.

10 MS MUSGROVE: Is it the case that within your investigative team there are people or processes in place that actually have a role in ensuring that there's no, for want of a better word, group think going on?

15 GPCAPT SMITH: That is a true statement. Through each phase of the investigation, we have internal peer reviews, as well as my role as accountable for this investigation also requires the Investigator in Charge to provide his briefing. So whether it's, "Here is what we have discovered from our key sequence of events. This is what we have developed from a scoping phase, what our key lines of enquiry are". That enables me to question and challenge.

20 Throughout the analysis, obviously we seek those multiple independent reports, where it's spatial disorientation, DSTG, Institute of Aviation Medicine, Life Support, Logistics Management Unit, independent experts on spatial disorientation, all of those are brought together. But again, it's up to myself and obviously Investigator in Charge to absolutely run a  
25 quality management process and a peer review process.

I would also say that in many of our human factors and fatigue and others, we've also sought independent peer reviews from emeritus professors who have also reviewed – and, again, it's emeritus professors in human factors,  
30 have also done peer reviews of our own analysis. We also, through our Memorandum of Understanding with the Australian Transport Safety Bureau, invited some very experienced investigators from the ATSB.

35 Again, I asked the Chief Commissioner of the ATSB for them to critically review our analysis – as in red teaming – to also be in a position to question and challenge, through our safety analysis model, the linkages between evidence analysis and findings. Again, because our safety analysis model is aligned with the Australian Transport Safety Bureau and we're interoperable, it also provided an independent – and it gave me some  
40 independent assurance to take away the group think because they had some very experienced investigators from DFSB to question and challenge us.

MS MUSGROVE: That occurred; is that correct?

45 GPCAPT SMITH: That's correct.



MS MUSGROVE: You were asked hypothetical questions about someone in your role as Director-General of DFSB perhaps being perceived to have a conflict because your first level assessor is DG DASA. In your experience, have you ever shied away from signing a report that makes findings and recommendations about DASA?

GPCAPT SMITH: Never.

MS MUSGROVE: And findings and recommendations about DFSB?

GPCAPT SMITH: Never.

MS MUSGROVE: In your role as Director-General DFSB, what's your primary consideration when you're undertaking your duties in relation to an air safety investigation?

GPCAPT SMITH: My primary role is to provide the maximum amount of organisational learning through the conduct of the investigation. Ultimately, this particular type of investigation has come as quite of a shock to the enterprise and truly was probably never predicted. However, under our generative Aviation safety culture, and my role to promote organisational learning, my objective is this report will stand the test of time for many, many organisations to truly read this in the context of their own organisation, whether it's the complexities of operating challenging aircraft or across all of the elements of the Defence Aviation Safety Program that enable Commanders to manage Aviation safety.

Ultimately, as many organisations and as many individuals that will read this report, and all layers of the report, will be able to take something away from this report. So my aim is ultimately to provide the most detailed, within the balance of how big a report can be, promote the maximum amount of organisational learning, be quite clear in terms of the findings that arise, but more importantly, is to providing those recommendations for safety improvement.

Ultimately, I will be judged on the amount of organisational learning and the recommendations that we've made and the effects that we are trying to achieve across the Defence Aviation Safety Program including, as I said, the critique of. Importantly, there's more work to be done across the whole Defence Aviation Safety Program. I would also say that the very first recommendation was placed against the Defence Aviation Authority for the independent reviews of Aviation safety.

MS MUSGROVE: Thank you. I have no further questions.

MS McMURDO: Any re-examination?

COL STREIT: No.

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MS McMURDO: Yes?

10 LCDR GRACIE: At the risk of irritating you and the Air Vice-Marshal, something has come out of that re-examination. I just seek leave to ask one question about it.

MS McMURDO: One question, by leave, yes.

15 <FURTHER CROSS-EXAMINATION BY LCDR GRACIE

20 LCDR GRACIE: When, sir, you mentioned peer review, does that also include the distribution of the draft to senior Army Aviation Command?

GPCAPT SMITH: Sorry, are you saying a peer review of?

25 LCDR GRACIE: You talked about peer review. I want to know whether or not the draft final report gets released for review by senior Army Aviation Command?

30 GPCAPT SMITH: Throughout the investigation phases – I will answer that question in a second. So throughout the investigation phases, it's absolutely important that I actually go back to Commander Aviation Command and his senior leadership group to provide updates on the various phases of our investigation. It's important that we provide immediate information as to the technical airworthiness of the MRH and we also have global responsibilities through the Original Equipment Manufacturer.

35 It is important that we provided updates based on the preliminary report, as in our key sequence of events, what we understand about what had happened, which has also enabled us to provide any, what we would say is immediate safety concerns, which is we haven't specifically known what has occurred but we know the specific type of operation requires Army  
40 Aviation Command, "I need you to specifically start looking at this because we know that this is a focus area".

45 As we go through the particular phases of the investigation, we continue to provide Commander Aviation Command and his team with what we have learnt along the way. At some point, we will eventually have a draft.

5 In this particular investigation, we had reached a conclusion of the analysis phase, and that first draft was not a final draft. The first draft was our ability to go to Commander Aviation Command and his senior leadership team, as well as the Institute of Aviation Medicine, the Defence Aviation Safety Authority, Fleet Air Arm and others, to say, "This is where we have reached in terms of the evidence that has been presented so far that we've collected. And to the best of our ability, these are the findings that we have raised so far".

10 This also then sets the scene for, based on that, "We're now in a position to invite commentary on whether the information and evidence that was presented to us, it was accurately represented". So individuals will provide, "Yes, that aligns with what I said, or the evidence". So it does provide an opportunity to ensure that we correct any facts that we have used.

20 But it's important to remember that the Military Air Operator is still operating. So it's important that we're not operating within a silo and not continuing to engage. But I also find it's a very useful mechanism for the Military Air Operator to also question and challenge me, and there's often things that we might not have specifically looked at. But we could answer some of those very questions as to why the report did not include certain information.

25 We can then explain under the safety analysis model why it is that we did not investigate a certain aspect because perhaps it was actually outside the scope of the investigation and there was no direct causal link. So, therefore, under the safety analysis model, I'm not obliged to investigate it.

30 Ultimately, through this process, really that enables – I'm more than happy to have Army Aviation Executives question and challenge. We also do learn from that as well, because there's often times where some additional context was important to truly explain to the reader some additional information; whether it's the complexities of operating MRH. But, again, they're not direct causal links. But that engagement process, again, is similar to ICAO requirements and ATSB requirements, whereby a report is issued for consultation to seek feedback from the operator.

40 LCDR GRACIE: I certainly appreciate the first part that you mentioned in terms of the ICAO obligations and reporting on safety issues that become available. But probably coming back to one of the first things that I asked you about in terms of transparency, is there any disclosure of what that input is from, for example, senior Army Aviation Command?

45 GPCAPT SMITH: You have to clarify disclosure.

**OFFICIAL**

- 5 LCDR GRACIE: Do you disclose what input is provided by these people who are reviewing the report in terms of senior Army Aviation Command, for example?
- GPCAPT SMITH: We seek feedback through that consultation period on the report, yes, we do. We do not have a requirement to then disclose said feedback to other external parties, if that's what your question is.
- 10 LCDR GRACIE: Thank you. Thank you, ma'am and sir.
- MS McMURDO: Any re-examination?
- 15 COL STREIT: No, ma'am.
- MS McMURDO: No. Ms Musgrove, could I ask another thing to add to your list of matters to get instructions on, as to when the public version of the report will be released, please?
- 20 MS MUSGROVE: My instructions are May of this year.
- MS McMURDO: Can you see if you can get some more specific instructions as to when in May, please, approximately?
- 25 MS MUSGROVE: I can ask, yes.
- MS McMURDO: Thank you. Now, the next witness will largely be in Private Session. FLTLT Rose?
- 30 FLTLT ROSE: No. There will be probably about half an hour in the Public Session.
- MS McMURDO: Well, in that case, I think we'd better have the mid-morning break.
- 35 Group Captain, thank you so much for coming along and assisting the Inquiry. It's greatly appreciated. I'm sorry it went over two days, unexpectedly, but we appreciate your assistance and cooperation in that respect. Could I just say you have been asked a lot of questions in
- 40 cross-examination. There have been a lot of interruptions, a bit of aggro in the Hearing Room. It would be perfectly understandable that you would find this difficult and confronting and outside your normal sphere. People usually do find it very difficult. So don't hesitate to take advantage of the assistance that's available to you should you need it.
- 45

**OFFICIAL**

GPCAPT SMITH: Thank you very much, ma'am. Absolutely, DFSB is 100 per cent committed to assisting the Inquiry to truly understand the outcomes of our investigation.

5 MS McMURDO: Thank you very much.

**<WITNESS WITHDREW**

10

MS McMURDO: All right. Well, we'll take the mid-morning break, a 15-minute break.

15 **HEARING ADJOURNED**

**HEARING RESUMED**

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MS McMURDO: Yes, FLTLT Rose.

25 FLTLT ROSE: Ms McMurdo, I have a number of documents to tender before we call the next witness. During D147's evidence on 26 March 2025, he started to write down the name of a [REDACTED] who was the OC of the Support Squadron in 6 Aviation Regiment in 2023, but he couldn't remember the name at the time. On 31 March 2025, D147 emailed the Inquiry providing the name of that [REDACTED] and that person has been given a pseudonym of D149. So I tender the email from D147 and ask that it be  
30 made part of Exhibit 164.

MS McMURDO: Well, the sheet of paper, the original sheet of paper will be 164A; and the email, 164B.

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**#EXHIBIT 164A - FORMERLY EXHIBIT 164, ORIGINAL SHEET OF PAPER**

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**#EXHIBIT 164B - EMAIL FROM D147**

45 FLTLT ROSE: Thank you. On 28 March 2025 I also tendered two photographs and a short video of LT Nugent flying in the MRH-90 cockpit that his family had provided to the Inquiry. And they were Exhibit 187.

5 There were some security concerns at the time. Those concerns have been resolved, so I will hand up – the photographs have been redacted to cover the cockpit, the insides of the cockpit. So I hand those up to be included as part of Exhibit 187.

MS McMURDO: So the original photos then would be 187A, would they? And the redacted photos, 187B.

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**#EXHIBIT 187A - FORMERLY EXHIBIT 187, ORIGINAL PHOTOS**

15 **#EXHIBIT 187B - REDACTED PHOTOS**

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FLTLT ROSE: The video that we didn't play at the time, because of those security concerns, that has now been classified as "Official", so we can play that video. And I understand it's on the slides.

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MS McMURDO: We're going to play that now?

FLTLT ROSE: We can.

25 MS McMURDO: Thank you.

FLTLT ROSE: It's a short video.

30 **RECORDING PLAYED**

FLTLT ROSE: And based on those discussions about the interior of the cockpit, Exhibit 3 has now been reclassified as "Official: Sensitive". So I hand up a copy of Exhibit 3 with that classification put on it.

35

MS McMURDO: So the original Exhibit 3 will be 3A. This is a redacted one, is it?

40 FLTLT ROSE: It's not redacted. It just has a classification. So it could probably replace the existing Exhibit 3.

MS McMURDO: Well, the existing Exhibit 3 will be replaced by this exhibit which has the updated classification on it.

45

**#EXHIBIT 3 - FORMERLY EXHIBIT 3, PHOTOGRAPHS OF  
MRH-90 COCKPIT (“OFFICIAL: SENSITIVE”)**

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FLTLT ROSE: I also tender the addendum statement of D137, who is the current Commanding Officer of 6 Aviation Regiment, and that statement is dated 31 March 2025, and it includes one annexure.

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MS McMURDO: Sorry, what’s that again, please?

FLTLT ROSE: Addendum statement of D137. It would be its new exhibit number.

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MS McMURDO: So what exhibit number?

FLTLT ROSE: Whatever we’re up to in the list, it’ll be a new exhibit.

MS McMURDO: That’ll be Exhibit 202. So the statement of who?

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FLTLT ROSE: D137, dated 31 March 2025.

**#EXHIBIT 202 - ADDENDUM STATEMENT OF D137  
AND ANNEXURE**

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MS McMURDO: Thank you.

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FLTLT ROSE: I’ll just do a brief summary of that statement for the purpose of those listening. The Inquiry asked D137 to set out any steps that 6 Aviation Regiment has taken to implement the aeromedical guidance that the Institute of Aviation Medicine issued in October 2024 pertaining to the use of tools and strategies to assess and manage fatigue.

35

Of note, D137 states that:

40

*The Regiment has facilities available for the team to nap if they desire, but napping windows are not presently built into the mission planning timeline.*

And D137 attached two photos of the rooms where the team can nap at Holsworthy Barracks, which can be projected on the screen. And the second photo.

45



MS McMURDO: Thank you.

FLTLT ROSE: D137 also states that:

5                   *For future exercises, that 6 Aviation Regiment is involved in, they will incorporate fatigue subject matter experts to support the design, development, implementation and monitoring of crew rest facilities.*

10       MS McMURDO: And those photographs are part of the - - -

FLTLT ROSE: They're Annexure A to D137's statement.

15       MS McMURDO: Could we just have a look at them again, please? Thank you. Does he say whether there are windows in the room?

FLTLT ROSE: Sorry, I've handed my copy to the Inquiry Assistant. For the Inquiry's benefit, Dr Adrian Smith has been asked to review the statement and may make comment on that - - -

20       MS McMURDO: Just describes them as "rooms available internal to the compound", so that perhaps suggests that they don't have windows. One room contains no windows and the other has a small window with a blackout blind. Right, thank you.

25       FLTLT ROSE: I think, Inquiry Assistant, there's an extra document that's been handed to you. I also tender the statement of MAJGEN Paul Kenny, dated 3 March 2025, and annexures.

30       MS McMURDO: Exhibit 203.

**#EXHIBIT 203 - STATEMENT OF MAJGEN KENNY  
AND ANNEXURES**

35                   FLTLT ROSE: And I'll hand up the statement and his annexures. In the first half of 2024, MAJGEN Kenny was the Special Operations Commander Australia. He was the ADF's Senior Officer representative at the Anzac  
40       Day Dawn Service held at Holsworthy Barracks on 25 April 2024. He provided the keynote address for the service, and he has provided the Inquiry with his speaking notes.

45       MAJGEN Kenny states that he read out the names of each of CAPT Lyon, LT Nugent, WO2 Laycock and CPL Naggs, and the name of another soldier

who had recently died at the end of his keynote address as he was aware that their names would not be read out as part of the Honour Roll and he wanted to ensure that their service was recognised at the Anzac Day Service.

5

MAJGEN Kenny explains that the Honour Roll lists the names of ADF personnel killed in active duty – that is, on operations – and that is determined by the War Memorial Council. If I ask to be displayed on the screen, there's a copy of the 2024 Anzac Day Service that MAJGEN Kenny attached to his statement. And if you move through to the final page – stop there, you will see an "In Remembrance" section on the right-hand side at the bottom. Underneath, "6 Aviation Regiment", are the names of the crew of Bushman 83.

10

15 MS McMURDO: Yes, thank you.

FLTLT ROSE: That can be taken down now. I tender the addendum report of Mr Michael Grant from the DSTG, dated 15 April 2025.

20 MS McMURDO: Should this be tendered in association with another earlier exhibit?

FLTLT ROSE: No, it's on a different matter.

25 MS McMURDO: That will be Exhibit 204.

FLTLT ROSE: And I'm also tendering the Letter of Instruction that preceded that expert report, which could be B.

30 MS McMURDO: 204A for the addendum report; and Letter of Instruction, 204B.

35 **#EXHIBIT 204A - ADDENDUM REPORT OF MR GRANT FROM THE DSTG**

**#EXHIBIT 204B - LETTER OF INSTRUCTION**

40

FLTLT ROSE: The Inquiry asked the DSTG to provide evidence about the G-forces present in Bushman 83 during the sortie on 28 July 2023. In particular, the G-forces present from the apex of Bushman 83's climb at the final phase of the flight and as it descended towards the water. Now, Mr Grant's report is classified as "Official: Sensitive", so I cannot

45

summarise its contents in a public hearing, but I note that Dr McGrath and Dr Smith may be asked questions about that report during Private Sessions in their evidence.

5 MS McMURDO: Thank you.

FLTLT ROSE: And the final item I'll tender now is the USB – there's two. There's the USB of the audio of the cockpit voice recording from Bushman 84, and there are four files capturing the audio from the pilot and  
10 the co-pilot's microphones and the aerial and intercom microphones. And parts of the audio have been redacted so that it can be classified at the "Official: Sensitive" level. So I'll start by tendering the USB.

MS McMURDO: That will be Exhibit 205A.  
15

**#EXHIBIT 205A - USB OF REDACTED COCKPIT AUDIO FROM BUSHMAN 84**

FLTLT ROSE: And perhaps while the Inquiry Assistant is up, I'll just hand him the next item, which is the transcript of the audio from the pilot's microphone which was prepared by the Defence Science Technology Group, at which they prepared at the request of the Inquiry following receipt  
20 of a Notice. Redactions have been applied to the transcript by SOCOMD so that it reflects the redactions in the audio.

Now, I reiterate that the evidence is the audio and that the transcript is simply an aide-mémoire, so that if there is a discrepancy between the two,  
30 the Inquiry will defer to the audio. And we will not be playing any aspect of the cockpit voice recording from Bushman 84 at this hearing.

MS McMURDO: So that's 205A and B.

35  
**#EXHIBIT 205B - REDACTED TRANSCRIPT OF COCKPIT AUDIO FROM BUSHMAN 84**

40 FLTLT ROSE: I'm now ready to call the witness, Dr Braden McGrath.

MS McMURDO: Thank you.

**<DR BRADEN JOHN McGRATH, Sworn**

**<EXAMINATION-IN-CHIEF BY FLTLT ROSE**

5

MS McMURDO: Can I just say, if you need a break at any time, just let me know. Thank you, Dr McGrath.

10 DR McGRATH: Thank you.

FLTLT ROSE: Can you please state your full name?

15 DR McGRATH: Braden John McGrath.

FLTLT ROSE: And what is your current occupation?

DR McGRATH: Professor of Practice.

20 FLTLT ROSE: And in terms of documents that you were sent by the Inquiry, can you confirm you received a section 23 Notice requiring your appearance today?

25 DR McGRATH: Yes.

FLTLT ROSE: An extract of the Inquiry's Directions?

DR McGRATH: Yes.

30 FLTLT ROSE: A copy of my Appointment as an Assistant IGADF?

DR McGRATH: Yes.

35 FLTLT ROSE: A Frequently Asked Questions Guide for Witnesses?

DR McGRATH: Yes.

FLTLT ROSE: And a Privacy Notice?

40 DR McGRATH: Yes.

FLTLT ROSE: Did you prepare a statement for the Inquiry in a response to two different sets of section 23 Notices?

45 DR McGRATH: Yes.

FLTLT ROSE: I hand you a series of documents. Now, is the top document your statement dated 23 April 2025?

5 DR McGRATH: Yes.

FLTLT ROSE: And now Annex A is included within that bundle behind your statement. But there's also other annexes that you provided: B, D and E?

10

DR McGRATH: Yes.

FLTLT ROSE: Now, you did also provide the Inquiry with another document, Annex C, but we're not tendering that today on the basis that it's likely to be Commercial-in-Confidence.

15

DR McGRATH: Yes.

FLTLT ROSE: I also note that Annexes D and E, they're "Official: Sensitive". So we won't be asking you any questions about that material in a public forum. But if you can just see the next stapled bundle behind there, there's a series of section 23 Notices. There's a section 23 Notice that you were sent on 16 April 2025. And then behind that, there's an Enclosure 3 and an Enclosure 4.

25

DR McGRATH: Yes.

FLTLT ROSE: And Enclosure 3 and Enclosure 4 are extracts from an earlier section 23 Notice you were sent by the Inquiry?

30

DR McGRATH: Yes.

FLTLT ROSE: Do you wish to make any amendments to your statement?

35 DR McGRATH: No.

FLTLT ROSE: Then I tender the statement to the Inquiry, and the section 23 Notices.

40 MS McMURDO: Exhibit 206.

**#EXHIBIT 206 - STATEMENT OF DR McGRATH AND  
SECTION 23 NOTICES**

45

FLTLT ROSE: You also prepared a report at the request of the Defence Flight Safety Bureau with respect to its investigation into the crash of Bushman 83 on 28 July 2023?

5

DR McGRATH: Yes.

FLTLT ROSE: I hand you a document. Is this your report to the Defence Flight Safety Bureau?

10

DR McGRATH: Yes.

FLTLT ROSE: And it's dated 22 October 2024, on the back page.

15

DR McGRATH: Yes.

FLTLT ROSE: And it's 24 pages in total.

DR McGRATH: Yes.

20

FLTLT ROSE: I tender the DFSB report by Dr Braden McGrath.

MS McMURDO: 207.

25

**#EXHIBIT 207 - REPORT OF DR McGRATH TO DFSB**

FLTLT ROSE: Now, I note that that report is also classified as "Official: Sensitive", so I won't be asking you any questions about the contents of the report in the Public Session, although we are likely to transition to a Private Hearing to discuss those issues. So whilst we're in the public forum, I remind you of your ADF security obligations. So if I, or anyone else, asks you questions you think the answer to which it would be "Official: Sensitive" or above, just let us know and we'll wait until the Private Session to discuss that.

30

35

I'll ask you some questions now about your background and qualifications. So if you just want to have your statement in front of you now. Annex A was, in fact, your CV. You set out that you're an aeronautical engineer?

40

DR McGRATH: Yes.

FLTLT ROSE: And you obtained your doctorate from the University of Sydney in 2000?

45

DR McGRATH: Yes.

5 FLTLT ROSE: In terms of your academic career, you've held positions at a number of universities since 2005, and that includes as the Enterprise Professor at the University of Canberra from 2022 to 2025.

DR McGRATH: Yes.

10 FLTLT ROSE: And you also started as a Professor of Practice at the UNSW site in Canberra this year.

DR McGRATH: That's correct.

15 FLTLT ROSE: You've held a number of executive positions in various different types of businesses.

DR McGRATH: Yes.

20 FLTLT ROSE: And you list a number of your key competencies in your CV that includes Human-Machine Interface Vestibular Sciences and Aircraft Mishap Analysis.

DR McGRATH: Yes.

25 FLTLT ROSE: What do you mean by "Human-Machine Interface"?

DR McGRATH: It's the connection, or in the system perspective of the human and the machine. So in the context of aviation, that's the whoever is on the controls of that vehicle. So whenever we interact with a machine, it's that interaction between the two.

FLTLT ROSE: And in terms of "vestibular sciences", what does that mean?

35 DR McGRATH: That's the study of the vestibular system. So that's the balance organ within our inner ear. And I've studied that for many years in terms of how it works, when it works, what goes wrong with it.

40 FLTLT ROSE: Do you have a medical background?

DR McGRATH: No.

45 FLTLT ROSE: So you're approaching this from balance and how the human balances within a machine. Is that the correct understanding?



5 DR McGRATH: Yes, I look at it from an engineering perspective. So applying those engineering sort of physics and math of how the body works. So even though my degree is in Aeronautical Engineering, most of my work was done with the human, with the human in the loop, so a lot of biomedical work.

10 FLTLT ROSE: And in terms of “aircraft mishap analysis”, is that restricted to spatial disorientation or does it include other issues?

DR McGRATH: Primarily, it was spatial disorientation. So I was always approached as a spatial disorientation analyst to look at those aspects of a mishap.

15 FLTLT ROSE: And you have a particular focus on Military medical research and development; is that correct?

DR McGRATH: That’s correct.

20 FLTLT ROSE: So if you have your statement on page 1, paragraph 4, you state that you were a Flight Test System Engineer at the US Naval Aeromedical Research Laboratory at one point.

25 DR McGRATH: That’s correct.

FLTLT ROSE: When was that?

DR McGRATH: From 1987 to 2006.

30 FLTLT ROSE: And that was a civilian role?

DR McGRATH: A civilian role, yes.

35 FLTLT ROSE: And you flew in a number of different helicopter types, but never in the NH90 or the MRH-90.

DR McGRATH: That’s correct.

40 FLTLT ROSE: Although you haven’t completed a formal Flight Test Engineer course, you’ve still been accepted as a member of the Society of Flight Test Engineers due to your extensive work experience in that field.

DR McGRATH: That’s correct.

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FLTLT ROSE: How many flying hours do you have, total? In a rough ball park, if it's - - -

DR McGRATH: Yes, 200.

5

FLTLT ROSE: When you were a civilian working with the US Navy, you developed a Spatial Disorientation Mishap Analysis Tool to support mishap investigations that you were involved in?

10 DR McGRATH: That's correct, yes.

FLTLT ROSE: Now, if you go to page 2 of your statement? You list 13 different mishap investigations you've been involved in of which resulted in fatalities, including the crash of Bushman 83.

15

DR McGRATH: That's correct.

FLTLT ROSE: In the fifth column, in this table, you have a heading that says, "Visualisation", and you've marked that column for six of your investigations, including the crash of 83. What does "visualisation" mean?

20

DR McGRATH: So that is developing an animation of the mishap primarily focusing on the orientation of the aircrew.

25 FLTLT ROSE: Now, you say on page – this is moving forward in your statement now. You say on page 8, under subparagraph (b), that the term "mishap", it's a term used by the US Department of Defense in all their safety and incident reporting systems?

30 DR McGRATH: Yes.

FLTLT ROSE: And the US Navy uses it to refer to any unplanned event resulting in injury, illness, death, material damage or loss of mission capability?

35

DR McGRATH: Yes.

FLTLT ROSE: And is that why you've used this terminology in your tool instead of saying something like incident or accident?

40

DR McGRATH: That's correct, yes. So all my training and experience and history, yes, I always use the word "mishap".

FLTLT ROSE: I want to turn to the topic of spatial disorientation now. So if you go to page 2 of your statement, paragraph 5? Now, I'm going to read out what you've written here. You state:

5                   *Helicopter pilots can experience spatial disorientation when the sensory inputs from their visual vestibular and proprioceptive systems conflict with actual aircraft motion.*

And you refer to Figure 1 in that sentence.

10                   *This mismatch is particularly dangerous in degraded visual environments, such as low light, fog or brown-out conditions where pilots are unable to rely on external visual cues and must instead trust their instruments. In today's Military Aviation missions there is an added emphasis on high workload, night flying, formation or*  
15                   *weather capability, and low altitude missions, which are all factors that may increase loss of spatial orientation due to reduced ability to repeatedly look at the attitude indicator.*

20       DR McGRATH: Yes.

FLTLT ROSE: Now, I said before that you referred to Figure 1 in that paragraph, but I note there is no Figure 1 in your statement. Did you mean Figure 2 on page 3?

25       DR McGRATH: Yes. There's a - - -

FLTLT ROSE: So in terms of that, that should be Figure 2?

30       DR McGRATH: It should be, yes. It's a typo error.

FLTLT ROSE: On page 3, still under paragraph 6, you then explain what the visual vestibular and proprioceptive systems are.

35       DR McGRATH: Yes.

FLTLT ROSE: Let me know if I've got this right. The visual system then is our eyes.

40       DR McGRATH: Yes.

FLTLT ROSE: And it includes both the central focal vision and our peripheral vision?

45       DR McGRATH: Yes.

FLTLT ROSE: And then the vestibular system is the balance component of the inner ear, as you explained before.

5 DR McGRATH: Yes.

FLTLT ROSE: And the proprioceptive system is also known as the somatosensory system.

10 DR McGRATH: Yes.

FLTLT ROSE: Did I pronounce that correctly?

15 DR McGRATH: Yes.

FLTLT ROSE: And it comprises the skin, joints and the muscle sensors.

DR McGRATH: That's correct.

20 FLTLT ROSE: Now, all these systems help humans to maintain accurate spatial orientation when we're walking around on the earth?

DR McGRATH: Yes.

25 FLTLT ROSE: And that's because it involves gravity, I take it, as well.

DR McGRATH: Yes.

30 FLTLT ROSE: But when humans fly an aircraft, our vestibular and somatosensory systems no longer provide reliable information to us about the magnitude or direction of gravity vector, or the down?

DR McGRATH: That's correct, yes.

35 FLTLT ROSE: Is it called "the down"?

DR McGRATH: Yes, we talk about down.

40 FLTLT ROSE: Down.

DR McGRATH: We, as humans, instinctively know where down is. I mean, we could all close our eyes now, we can get up in the middle of the night and navigate to a light switch. We know where down is. And so in the air, when we're flying, we want to know where down is.

45

FLTLT ROSE: So if we look then at Figure 2 on page 4 – I understand there is an image that can be placed on screen. That's the diagram in your statement that shows a helicopter banking in a turn of 45 degree angle, approximately?

5

DR McGRATH: That's correct.

FLTLT ROSE: And your arrows show that due to the force of centrifugal acceleration and gravity, the pilot of that helicopter actually thinks they're flying straight and level.

10

DR McGRATH: That's correct, yes.

FLTLT ROSE: Is there anything else you wish to explain in that diagram or is that summary accurate?

15

DR McGRATH: No, that's it. I think the key is that there are two forces on the body in that situation and the pilot, or humans, we cannot detect between gravity and acceleration. That's actually from Einstein, showed that. So any sense, especially our own human senses, we perceive those two quite separate forces as a single force. So it's really important to understand that the body cannot distinguish between gravity and acceleration.

20

FLTLT ROSE: So if you go back to page 4 of your statement? You state that:

25

*Aviators are trained to use a strategy of visual dominance. So they rely on visual orientation cues to maintain spatial orientation to the exclusion of their vestibular and their somatosensory cues.*

30

DR McGRATH: Mm-hm.

FLTLT ROSE: Sorry, just in terms of – for the record, you need to say "Yes" or "No".

35

DR McGRATH: Yes.

FLTLT ROSE: If there's a visual horizon, then pilots use their peripheral vision to orientate themselves.

40

DR McGRATH: That's correct.

FLTLT ROSE: And that's using their normal neural pathways to do so.

45

DR McGRATH: Yes.

FLTLT ROSE: But when there is no clear horizon, they obtain their visual cues using focal vision of the attitude indicator.

5

DR McGRATH: Yes.

FLTLT ROSE: So just so I've understood this correctly. Focal vision is looking straight ahead, it's a reduced field of view than, say, your peripheral vision, which is that extended field of view.

10

DR McGRATH: That's correct.

FLTLT ROSE: So when you're saying you're looking at the attitude indicator, it's eyes ahead are eyes down looking at something in particular.

15

DR McGRATH: Yes.

FLTLT ROSE: That could either be the primary flight device that they're looking at but it could also be the instruments in the cockpit or the symbology on their Head-Up Display?

20

DR McGRATH: That is correct.

FLTLT ROSE: So it's wherever their eyes are focused on?

25

DR McGRATH: Yes.

FLTLT ROSE: Is that what it means when you say, "Pilots are trained to trust their instruments in a degraded visual environment"?

30

DR McGRATH: Yes. So the pilot is trained – extensive training to look at that instrument and, using their visual – their eyes to look at an instrument. And again, that instrument could be in the cockpit, it could be a Heads-Up Display, it could be a Helmet-Mounted Display. But they're taught to look at their instruments, absorb that information, and get a perception of what their orientation is.

35

FLTLT ROSE: Are they trained to rely on their focal vision more than their peripheral vision in that environment, or is it whatever the eyes can see?

40

DR McGRATH: No. In that environment you are trained to use your foveal vision to look at that instrument to get the information you need.

45

FLTLT ROSE: Now, you state that this is a complex talent which must be developed through extensive training and then maintained through practice, and that it is the fragility of this concept which makes spatial disorientation such a hazard.

5

DR McGRATH: That is correct.

FLTLT ROSE: So an experienced pilot can still lose the skill if they haven't flown recently?

10

DR McGRATH: Yes.

FLTLT ROSE: Now, on page 2, paragraph 5 of your statement, you list three different types of spatial disorientation.

15

DR McGRATH: Yes.

FLTLT ROSE: So there's Type 1, Unrecognised, where the pilot is unaware of the disorientation.

20

DR McGRATH: Yes.

FLTLT ROSE: There's Type 2, Recognise, where the pilot detects the disorientation but may struggle to correct it.

25

DR McGRATH: Yes.

FLTLT ROSE: And Type 3, Incapacitating, where the pilot is overwhelmed and unable to respond appropriately.

30

DR McGRATH: Yes.

FLTLT ROSE: And within each of these categories aviators can experience a range of illusions as well?

35

DR McGRATH: Yes. Most of the illusions occur in Type 2.

FLTLT ROSE: So it's recognised.

40

DR McGRATH: It's recognised, yes.

FLTLT ROSE: So they understand they're suffering from an illusion?

DR McGRATH: Well, they recognise that it's an illusion and so



something is wrong. And then so we talk about Type 2 when you've got this illusion and something is not right, something is not normal.

5 FLTLT ROSE: You say that the most common situation that contributes to spatial disorientation is when a pilot looks away from the aircraft's orientation instruments and the horizon. And so they lose their focal and their peripheral visual cues?

10 DR McGRATH: Yes.

FLTLT ROSE: Or they look away from the artificial horizon in their flying instruments, when they're flying in instrument weather. So they lose their focal vision in that sense too.

15 DR McGRATH: Yes.

FLTLT ROSE: So, in both these situations, the central nervous system computes spatial orientation with the remaining information that's at their disposal, which is in fact their vestibular and somatosensory systems.

20 DR McGRATH: Yes.

FLTLT ROSE: But you've said that this is frequently inaccurate.

25 DR McGRATH: That's correct.

FLTLT ROSE: On page 4, paragraph 7, from your research, you're aware that over time, since aviators have started receiving training on the correct use of aircraft instruments, that the incidence of spatial disorientation resulting in a loss of situation awareness mishaps has declined over time.

30 DR McGRATH: Yes.

FLTLT ROSE: But it hasn't been eliminated completely.

35 DR McGRATH: That's correct.

FLTLT ROSE: And you understand that pilots in the ADF do receive training from the Institute of Aviation Medicine about spatial disorientation?

40 DR McGRATH: That's correct, yes.

FLTLT ROSE: That's in their basic flying training?

45

DR McGRATH: Yes.

FLTLT ROSE: On page 5 you say there is no structured program of in-flight spatial disorientation training after basic training.

5

DR McGRATH: That is my understanding, yes.

FLTLT ROSE: And that's your understanding as at October 2024 or as of today?

10

DR McGRATH: As of today.

FLTLT ROSE: And you suggest that the ADF could introduce advanced flight simulator-based spatial disorientation training and in-flight spatial disorientation demonstration sorties, like the British Army does.

15

DR McGRATH: That is correct, yes.

FLTLT ROSE: That's because the spatial disorientation mishap rate in Australian Aviation is equivalent and may be slightly higher than the US Army's spatial disorientation mishap rate.

20

DR McGRATH: Yes, that is correct.

FLTLT ROSE: When you said "Australian Aviation" – do you see that in your statement – did you mean Army Aviation, or did you mean all of ADF's Aviation?

25

DR McGRATH: Australian Army Aviation.

30

FLTLT ROSE: So you've done a comparison then, have you, between the Australian Army's mishap rate versus the US versus British?

DR McGRATH: I haven't looked at the British and I've only – in terms of these aren't – with the data that I had publicly available then, yes, in terms of both the Australian mishap rate and the US mishap rate. Yes.

35

FLTLT ROSE: And your research about spatial disorientation, does that focus on helicopters or does it also include mishaps in fixed-wing aircraft?

40

DR McGRATH: No, my research is both fixed-wing and rotary-wing.

FLTLT ROSE: On page 5, under paragraph 8, you list some other ways you think spatial disorientation mishaps can be reduced.

45

DR McGRATH: Yes.

FLTLT ROSE: One is to build spatial disorientation thinking into mission planning and Risk Management processes.

5

DR McGRATH: Yes.

FLTLT ROSE: Using in-flight artificial intelligence prediction models of pilot orientation?

10

DR McGRATH: Yes.

FLTLT ROSE: Sorry, what does that mean?

15

DR McGRATH: So similar to the mishap report, we've developed models of pilot orientation, so that's what we've used in the report that I provided on this mishap. And what we could do there is that in pre-flight training you could run that model as well knowing where the aircraft is going, what it's doing, all of those parameters that are built into your flight planning. That would identify regions of the flight where the likelihood of spatial disorientation would be increased.

20

In that pre-flight planning, it would allow in that planning phase – it would identify those phases of the flight that would be conducive to spatial disorientation.

25

FLTLT ROSE: And I'm taking it, they're using your tool or someone else's tool?

30

DR McGRATH: Well, no one's doing it at the moment, to the best of my knowledge. But a tool like mine could be used for those purposes, yes.

FLTLT ROSE: So the other option would be using a multi-sensory human-machine display?

35

DR McGRATH: Yes. So, again, going back to that original discussion where we talked about on earth we have three systems, three concordant systems, that provide redundant information to the brain on our orientation. Orientation is such a basic need. We couldn't function without orientation.

40

So nature has provided us with three distinct independent systems. When we go flying, we remove two of those. We teach our pilots from day one, "Trust your instruments. Don't fly by the seat of your pants". So by adding back those systems that we've told the pilots not to use, that is a way of naturally providing that orientation information to the pilot.

45

FLTLT ROSE: And in terms of “flying by the seat of your pants”, that’s because that’s an aviation – it’s come from an aviation background in terms of people would feel the indents in their seat.

5

DR McGRATH: They’re feeling seating in their seat. So what we do is, we train our pilots not to respond to how they’re feeling because as I showed in that diagram there, the aircrew in that aircraft, in that situation, would feel pressure just like they’re sitting upright. But the reality is they’re actually tilted over in pitch.

10

So if we could be providing cues to the pilot, other than foveal vision, that they’re banked in this situation, and with multi-sensory we can use the haptic, our sense of touch is one way of providing additional information. We can also use 3D sound. So there are other sensors in the body as opposed to just the foveal vision.

15

FLTLT ROSE: But at the moment, as your understanding is, these don’t exist within aircraft used by the ADF, or potentially any other operators?

20

DR McGRATH: No. That is correct, yes.

FLTLT ROSE: And it needs to be developed.

25

DR McGRATH: Yes.

FLTLT ROSE: That diagram can actually be taken down now. You are aware that the pilots of Bushman 83 were wearing TopOwl helmets during the incident sortie, and they were on night-vision devices.

30

DR McGRATH: Yes.

FLTLT ROSE: And that included a Helmet-Mounted Sight and Display with symbology projected on the visor?

35

DR McGRATH: Yes.

FLTLT ROSE: If you go to page 5, paragraph 9? This is where you state that research indicates that Helmet-Mounted Sight and Display and night-vision devices have been shown to increase the probability of a helicopter pilot being spatially disoriented.

40

DR McGRATH: Yes.

45

FLTLT ROSE: And on page 6 you state that this is because these

sophisticated displays provide no orientation information when the pilot's attention is not on the visor. So if they're looking out or inwards and down, they're not looking at what's on the symbology. Is that the point?

5 DR McGRATH: Yes, the point is that the foveal vision you actually have to be looking at it. So even though the symbology is in front of your face, you still have to focus on it. So when we look at these very sophisticated displays, they're very good at displaying a lot of information but you still have to look at them. And, again, we are not wired to acquire all of our  
10 orientation information by focussing on a piece of visual information.

So, as I stated in my report, foveal vision, it's very good but you've got to look at it. And it doesn't matter where it is, whether it's inside, in the helmet or in a Heads-Up Display, you still have to look at it and it's like a  
15 cognitive skill. You've got to look at that information, absorb it and then work out where you are in space.

FLTLT ROSE: And you say that that actually increases the workload because they need to either make a decision to look through their foveal vision in the close-up, what's on the visor, or use their foveal vision to look  
20 down at their instruments?

DR McGRATH: Yes.

25 FLTLT ROSE: Or use their peripheral vision to take in the scene?

DR McGRATH: Take in the scene. And I would add that they also need their foveal vision to look where they're going or what's out there in the world.  
30

AVM HARLAND: So can I just clear that. If you're flying visually, whether it be through an ANVIS system or just visual, when you're looking through and you're focussing on – so you're forming off another aircraft. You're effectively looking at that, at the expense of being able to look at  
35 the symbology. Does the symbology, to the person essentially disappear or is it there but not interpreted or not focused on by the brain?

DR McGRATH: It's still there. And which is why a lot of the – you'll catch it moving and you'll – but you've got to come back in and look at it. So to get the information – like, if we use pitch as the example. To get your pitch, you've got to come in, so to speak, or focus on the pitch ladder, interpret it, and then act accordingly.  
40

AVM HARLAND: So this is not just a matter of vision, this is really about bringing your vision in to see the symbology, to interpret it, to understand what's happening.

5 DR McGRATH: Yes. And that goes back to my earlier comment about training. That's a cognitive skill that you have to train to learn. So it's not a natural skill. It's a skill that needs to be trained.

10 AVM HARLAND: So I'm understanding that there are two things that are happening. There's the focus, and then there's the interpretation.

DR McGRATH: That's correct.

15 AVM HARLAND: Okay, thank you.

FLTLT ROSE: And then if we add the complication of night vision, flying at night on night-vision devices. Now, obviously there's a benefit of them helping pilots be able to fly in darkness, but you state they significantly reduce the pilot's field of view, thus reducing their visual orientation cues and predisposing them to spatial disorientation.

20 DR McGRATH: Yes, so that comment is around the peripheral. Again, night-vision goggles tend to make the – you've got a very restricted field of view. So you've now actually removed any peripheral cues. So, again, that's the natural way that we orientate, and we've taken those away from our pilots on night-vision goggles.

25 FLTLT ROSE: And the Inquiry has heard some evidence previously that, in fact, it's about a 45 degree view, once you've got the night-vision devices on. It's as if looking through two toilet rolls.

DR McGRATH: Yes, that's correct.

35 AVM HARLAND: Could I just ask – sorry, to interrupt again. But in terms of humans getting a horizon in visual conditions, is it the foveal vision or peripheral vision which is dominant, or is it a mix of both?

DR McGRATH: I would say it's a mix of both.

40 AVM HARLAND: My point is understanding that peripheral vision in a visual environment is important in terms of establishing a horizon.

45 DR McGRATH: Yes. Especially from what I – I would use the word "naturally". So that we naturally use peripheral vision for orientation. I always use the example of, if you've ever sat in a car or a train and the car

or train beside you moves, you feel as if you've moved. That's your peripheral vision. It's natural. It's very much part of that orientation system.

5 So when we fly, if we've got good peripheral horizons and we see that – there was actually work done around building a peripheral display to give you that orientation information using your peripheral, because it's part of the natural system.

10 AVM HARLAND: And we go to a night-vision system which has a reduced field of view, we lose that peripheral aid, is my understanding.

DR McGRATH: That's correct. That's correct, yes.

15 AVM HARLAND: Okay, thank you.

FLTLT ROSE: So just to summarise, when you're in the air then on night-vision devices, you've lost your peripheral vision, you can't trust your vestibular system, you can't trust your somatosensory system, all you've  
20 got is your foveal vision.

DR McGRATH: That is correct.

FLTLT ROSE: Now, in the final paragraph in that section where we were  
25 before, page 6, you state:

*The influence of night-vision devices appears to be an important factor in Aviation mishaps, with 64 per cent of all spatial disorientation mishaps occurring at night. More importantly, there has been little change in the statistics over the past 20 plus years.*  
30

DR McGRATH: Yes.

FLTLT ROSE: And then two paragraphs where I've just read that out from, you give an example from aircraft mishap investigations of when a pilot has become spatially disorientated after momentarily looking away from their primary flight instrument as they looked out at the helicopter in front when formation station-keeping. And you refer to this as attention  
40 filtering.

DR McGRATH: Yes.

FLTLT ROSE: What do you mean by "attention filtering"?  
45



DR McGRATH: So this is, again, going back to the foveal vision. The foveal vision is very, very good at what I call receiving high frequency information. So this is where we're looking out, we're looking for – whether it's another aircraft in formation flight, if we're trying to land. It's very good at getting that very high detailed information.

But what we tend to do, the foveal vision, is you're getting no other information. So if I'm looking at something like a lead aircraft, I'm focussing in on that at the expense of other information that you need.

FLTLT ROSE: And you would only gather other information you need by looking to it.

DR McGRATH: Exactly.

FLTLT ROSE: Because you've got that restrictive field of view.

DR McGRATH: Yes.

FLTLT ROSE: So if you go to page 6, paragraph 10, you also state that fatigue makes pilots more susceptible to spatial disorientation as it impairs their sensory processing and cognitive awareness.

DR McGRATH: Yes.

FLTLT ROSE: Can I take it from your years of experience, you've also studied the impact of fatigue on spatial disorientation?

DR McGRATH: Yes.

FLTLT ROSE: We'll come to this in a moment, but it's a factor in your tool.

DR McGRATH: Yes.

FLTLT ROSE: So if you go to page 7, paragraph 11(c), this is where you start discussing your Spatial Disorientation Mishap Analysis Tool.

DR McGRATH: Yes.

FLTLT ROSE: So the mishap tool uses, and you say it uses –

*data processing, mathematical models, fuzzy logic and animation techniques to produce 3D animations of mishaps to support Mishap Boards in their investigations, provide insight into the*

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*problem of spatial disorientation in Aviation and to train aviators to avoid spatial disorientation mishaps.*

- 5 DR McGRATH: Yes.
- FLTLT ROSE: What's "fuzzy logic"?
- DR McGRATH: Fuzzy logic is – it's fuzzy logic.
- 10 FLTLT ROSE: Is it a computer-based program?
- DR McGRATH: No.
- FLTLT ROSE: Or is it a human analysis?
- 15 DR McGRATH: No, it's about going through a set of rules where the rules aren't black and white. So if you think about it's a yes or a no answer, it's sort of somewhere in between. It's that grey zone that the human brain works in quite well. So instead of it being logical, like one and zero, we're
- 20 sort of looking at it from a – it could be one, it could be zero, or it could be somewhere in between. And you'll see that a bit further on, when we talk about all the different rules.
- So what we're looking at as we step through all of these rules, it sort of
- 25 says, "Well, okay, there's a little bit of uncertainty in the answers that comes out".
- FLTLT ROSE: And is fuzzy logic something that arises in mathematical models plus computer software?
- 30 DR McGRATH: Yes.
- FLTLT ROSE: Now, I'll go into some further questions about this aspect of the tool in the Private Session, but for now, if you go to pages 7 to 8,
- 35 that's where you set out where the tool follows a four-step process.
- DR McGRATH: Yes.
- FLTLT ROSE: So if we just go to step 1, we go through this. Step 1 is
- 40 gather data about the mishap from the flight data recorder, eyewitness accounts, videotapes and other sources to help you estimate the 3D angular position of velocity and the 3D linear acceleration of the mishap aircraft. Is that correct?
- 45 DR McGRATH: Yes.

FLTLT ROSE: And you use something called MATLAB, which is a mathematical analysis software package.

5 DR McGRATH: Yes.

FLTLT ROSE: And you can get aircraft performance data, pilot state data, and environmental conditions. You can also obtain that to help you with your estimations.

10 DR McGRATH: That's correct, yes.

FLTLT ROSE: So you gather the data. Then you go to step 2. You input the angular and the linear acceleration of the aircraft into two spatial orientation models to produce an initial estimate of the pilot perceived orientation.

DR McGRATH: Yes.

20 FLTLT ROSE: And then with step 3, you refine the initial orientation estimation by inputting additional data, such as the pilot's control inputs, advice from subject matter experts into a rule-based fuzzy logic expert system.

25 DR McGRATH: That's correct.

FLTLT ROSE: So is this a different model than the ones used in step 2 then, or is it just putting more information into the same model?

30 DR McGRATH: It's putting more information into the same model.

AVM HARLAND: Does that include pilot's head position and head movement? Is that a factor in step 3's analysis?

35 DR McGRATH: In the current state of the model, no. We don't have that information of what the head position is. From a scientific perspective, yes, that head position would be a factor, but it's not included in the current model.

40 AVM HARLAND: So how does that account for the vestibular system alignment to the fore/aft axis of the aircraft?

DR McGRATH: Well, in terms of the vestibular, yes, that's why it could be a factor. But also the somatosensory, which is typically you are bolted in, you're strapped into the aircraft. But, yes, the head position is definitely

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a factor that needs to be – further variations of the model would require where the head is. But that information is normally not available.

5 AVM HARLAND: Yes. Thank you.

FLTLT ROSE: You can also put in data relating to the pilot's experience such as their recency and proficiency?

10 DR McGRATH: Yes.

FLTLT ROSE: And any distractions that they may have experienced.

DR McGRATH: Yes.

15 FLTLT ROSE: And do you obtain that information from listening to the cockpit voice recorder or from elsewhere?

DR McGRATH: I receive that information from listening to the cockpit voice recorder and discussions at the Bureau.

20 FLTLT ROSE: We're just talking in general at the moment.

DR McGRATH: Yes.

25 FLTLT ROSE: We'll get to the specifics when we go to Private Session. But in terms of your model, step 4 is to develop a 3D animation of pilot perceived orientation versus actual aircraft orientation and pilot position.

DR McGRATH: Yes.

30 FLTLT ROSE: I take it that you used your tool to analyse the Bushman 83 mishap?

DR McGRATH: Yes.

35 FLTLT ROSE: So if you go page 9, paragraph 12, of your statement? You state that the DFSB, or the Defence Flight Safety Bureau, first contacted you to assist with its investigation in March 2024.

40 DR McGRATH: Yes.

FLTLT ROSE: And you were formally engaged as a subject matter expert on spatial disorientation in May 2024.

45 DR McGRATH: Yes.

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FLTLT ROSE: And as we know, you've produced your report to the Defence Flight Safety Bureau in October 2024.

5 DR McGRATH: Yes.

FLTLT ROSE: Now, this is when you were working at the University of Canberra?

10 DR McGRATH: That's correct.

FLTLT ROSE: And together with your report, you actually produced two animations to the DFSB?

15 DR McGRATH: Yes.

FLTLT ROSE: That concludes the questions I have in the Public Hearing. To proceed further, we need to move to a Private Hearing.

20 MS McMURDO: So we'll need a short adjournment, will we?

FLTLT ROSE: I understand they may need a five-minute adjournment to disconnect the cameras.

25 MS McMURDO: Yes, all right. And I'll need to make a Direction.

LCDR GRACIE: I do have some cross-examination on the Public - - -

MS McMURDO: Sorry?

30

LCDR GRACIE: I do have some cross-examination on the Public Hearing.

MS McMURDO: Well, we would do that now. Are you happy to do that?

35

FLTLT ROSE: Yes.

MS McMURDO: Yes, all right.

40

**<CROSS-EXAMINATION BY LCDR GRACIE**

5 LCDR GRACIE: Doctor, my name is LCDR Malcolm Gracie.  
I represent the interests of CAPT Danniel Lyon, who was the Captain of  
Bushman 83. Can I ask you to just return back to page 5 of your report in  
relation to the reference to research showing that HMDs, night-vision  
10 devices, provide critical information, including orientation information, but  
have been shown to increase the probability of a helicopter pilot becoming  
spatially disorientated. I just want to focus on that for a minute.

15 Would you agree with this statement, that in a degraded visual environment,  
or low cue environment, without a visual horizon to reference, the HMSD  
provides overwhelming visual attitude cues based on that research?

DR McGRATH: Can you repeat the question, please?

20 LCDR GRACIE: Yes. In a low cue environment without a visual horizon  
to reference, does the Helmet-Mounted Sight Display, the symbology,  
provide overwhelming visual attitude cues?

DR McGRATH: I wouldn't use the word "overwhelming".

25 LCDR GRACIE: Compelling?

DR McGRATH: No, I wouldn't have an adjective in there. I would just  
say it provides orientation cues.

30 LCDR GRACIE: And during a high workload or a stressful situation,  
would you agree that the pilot may have difficulty ignoring HMSD attitude  
information?

DR McGRATH: Can you say that again, please?

35 LCDR GRACIE: Would you agree that in a high workload or a stressful  
situation, a pilot might have difficulty in ignoring that HMSD attitude  
information that's displayed by the symbology?

40 DR McGRATH: I'm a bit confused because you're using two negatives.  
You're using - - -

LCDR GRACIE: I want to be faithful to what I'm reading.

45 DR McGRATH: Yes.

5 LCDR GRACIE: Let me put it this way. Would you agree with this proposition: that in a high workload environment, low cue environment, stressful situation, that attitude information that is displayed by the symbology in the optimum field of view of a pilot could be a primary source of information of that pilot?

10 DR McGRATH: Again, I think the word “primary”, because again, I’m not too sure what the current ADF rules are on what the word “primary” – it is a primary flight instrument. But in terms of, if that data can be seen and interpreted and looked at, yes, it can be used to orientate the pilot – or he can use that for orientation purposes.

15 LCDR GRACIE: And would you agree that in terms of – I think you referred to it – sorry, I’ll put this more accurately. You referred to it as the HMD, or as we have referred to it sometimes as HMSD.

DR McGRATH: Yes.

20 LCDR GRACIE: Same thing. It places the symbology or information collimated at optical infinity in the pilot’s field of view. Can you explain that in lay terms for me?

25 DR McGRATH: Yes. So what that’s saying is that visual symbology is superimposed on the real world at optical infinity, which is when our eyes have stopped moving. So it doesn’t appear to be sitting right – obviously, the Helmet-Mounted Display glass is right here. To look at that, you’ve got a lot of foveal movement of the eye. And what it’s doing is it’s collimating it so that it appears at optical infinity, which would be where the outside world is.

30 So now, in this situation, you are at optical infinity for me. That can is not; I’ve got to focus in on that. So that data is superimposed on that optical infinity. To add to that though, what has been shown is that even though that information is superimposed at optical infinity, as I said earlier, you still have to focus in on that information to absorb it.

35 LCDR GRACIE: And would you agree with this scenario, that when we’re talking about information, including attitude information, we’re talking about pitch and roll?

40 DR McGRATH: Mm-hm.

45 LCDR GRACIE: And what would you say about this scenario, just as a hypothetical, that if attitude information displayed in the HMSD is ambiguous or incorrect, would that give you some concern if a pilot, flying

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in a degraded visual environment, was to utilise that information from the symbology?

5 DR McGRATH: Again, I can't comment on what is the current ADF rules in terms of what is their primary flight information. Again, from my history, the primary flight instrument is in the cockpit, not in the HMD.

10 LCDR GRACIE: But in terms of the research that you've referred to, there would be a possibility, even a likelihood that the pilot might reference that symbology.

DR McGRATH: Yes.

15 LCDR GRACIE: And in that circumstance, if it was incorrect, would that give you some concerns in terms of maintaining pilot orientation?

DR McGRATH: Yes, if that information was incorrect and he wasn't maintaining what would be the primary scan.

20 LCDR GRACIE: And notwithstanding, perhaps training or practice, that referencing the symbology on the Helmet-Mounted Sight Display in relation to an aircraft attitude, pitch or roll, whether or not that's part of a pilot's instrument scan in flying formation, you would have a concern if that information was provided incorrectly in that symbology.

25 DR McGRATH: Yes.

30 LCDR GRACIE: Can I ask you something else in relation to your knowledge of what is the HMSD 5.10 software utilised in the TopOwl system? Are you aware what I'm talking about?

DR McGRATH: No, I'm not familiar with the TopOwl system.

35 FLTLT ROSE: At this point in time, I'm not sure where my friend is going. I'm wondering whether that might be better explored in the Private Session. It's getting quite specific into the facts of his actual analysis.

LCDR GRACIE: No, it's not.

40 FLTLT ROSE: Unless it's a general - - -

LCDR GRACIE: It's a general question, and you probably should wait for it.

45 FLTLT ROSE: No, I - - -



5 LCDR GRACIE: Well, really, I mean last time you interrupted me in the middle of an apology. So maybe we could just wait for the question before it's objected to.

MS McMURDO: Well, what is the question?

LCDR GRACIE: Thank you, ma'am.

10 I want you to assume for present purposes that the HMSD utilised in Bushman 83 and the other aircraft in the formation that night was a conformal display. Do you understand what I mean by that?

15 DR McGRATH: Yes.

LCDR GRACIE: Could you explain what a conformal display is, please?

20 DR McGRATH: Again, similar to what I've just discussed. It's about placing that information in an optical infinity so that it matches the outside views.

LCDR GRACIE: Are you aware of any research to the effect that pilots made pitch judgment errors three times more often with conformal display than body-axis displays?

25 DR McGRATH: I'm aware of the research, but not to a level of expert.

LCDR GRACIE: What is the research, as far as you can say, in terms of what I've just put there as a proposition?

30 DR McGRATH: Yes. No, I'm not in a position as an expert to comment on that point.

35 LCDR GRACIE: Thank you. Why would it be, if that is the fact, or if that is the research – and I can identify it to you, it's a NASA Technical Memorandum done by Denise Jones and Terence Abbott - - -

MS McMURDO: He has said it's outside his expertise.

40 LCDR GRACIE: Well, I was just going to ask this though, if that is the fact, what is it about a conformal display versus body-axis display that is more difficult in determining pitch?

45 DR McGRATH: No, that's not my level. Thank you.

MS McMURDO: Yes. Any other?

LCDR GRACIE: I have more, ma'am. Just touching on something that AVM Harland mentioned.

5

Talking about head position, are you aware whether or not line-of-sight information is available from the HMSD data or flight data?

DR McGRATH: Not aware of that, no.

10

LCDR GRACIE: Thank you. Thank you, ma'am, sir.

MS McMURDO: Any other applications to cross-examine in Public Session? Yes, LCDR Tyson.

15

**<CROSS-EXAMINATION BY LCDR TYSON**

20 LCDR TYSON: Thank you, ma'am.

Professor, my name's LCDR Matthew Tyson. I represent the interests of CPL Alex Naggs. You referred to a term "attitude indicator" in the course of your evidence. The attitude indicator is part of the primary flight instrument panel on the MRH-90, isn't it?

25

DR McGRATH: Well, I'd say on all aircraft, yes.

LCDR TYSON: Can you explain what it does? Does it, for example, give you a visual depiction of both the angle of bank of the aircraft and the pitch of the aircraft relative to the horizon?

30

DR McGRATH: Yes, the attitude indicator provides both pitch and roll.

LCDR TYSON: It gives you a visual display as well as giving you some numbers of angle of degrees compared to alignment to the horizon; is that correct?

35

DR McGRATH: That's correct.

40

LCDR TYSON: As part of your analysis, did you do any work into understanding the training or practice of MRH-90 pilots in terms of looking at the attitude indicator as part of their workload and scanning duties while flying an MRH-90?

45

DR McGRATH: No, that was outside of the scope of my analysis.

LCDR TYSON: So you don't know the frequency or extent to which the attitude indicator is looked at during the course of flying?

5

DR McGRATH: That is correct.

LCDR TYSON: You'd agree that in addition to the attitude indicator, HMSD version 5.10 presents to the pilot and the non-flying pilot a horizon bar. Correct?

10

DR McGRATH: That's correct, yes.

LCDR TYSON: A pitch indicator?

15

DR McGRATH: Yes.

LCDR TYSON: The altitude of the aircraft?

20

DR McGRATH: Yes.

LCDR TYSON: Also, it gives the pilot and the non-flying pilot the flight vector of the aircraft. Correct?

25

DR McGRATH: That's correct.

LCDR TYSON: Is your evidence about pilot perception of spatial disorientation, is that evidence really premised – or does it assume that both the flying pilot and the non-flying pilot are not aware of the aircraft's attitude through the attitude indicator?

30

DR McGRATH: That is correct.

LCDR TYSON: Your evidence about pilot perception of spatial disorientation is also premised on the flying pilot and the non-flying pilot not being aware of the altitude of the aircraft?

35

DR McGRATH: No, my analysis is all on the attitude of the aircraft.

LCDR TYSON: But your evidence assumes that both the flying pilot and the non-flying pilot are not scanning the aircraft primary instruments, including the attitude indicator. Correct?

40

DR McGRATH: That is correct.

45

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LCDR TYSON: Your evidence also assumes that the pilot and the non-flying pilot are not picking up the horizon, pitch and flight vector of the aircraft through HMSD version 5.10?

5 DR McGRATH: That is correct.

LCDR TYSON: Thank you, ma'am, sir. They're my questions.

10 MS McMURDO: Any other applications to cross-examine?

COL GABBEDY: Just briefly, ma'am.

MS McMURDO: Yes.

15

**<CROSS-EXAMINATION BY COL GABBEDY**

20 COL GABBEDY: Good afternoon, Doctor. I'm COL Nigel Gabbedy. I appear for MAJGEN Jobson. I've just got a couple of questions about a statement that you made that appears at the bottom of page 4 and the top of page 5 of your statement, and you're talking about the training of pilots to recognise, effectively, spatial disorientation. Do you recall that?

25 DR McGRATH: Yes.

COL GABBEDY: Is it your understanding that that training is provided once, and once only, as part of initial training?

30 DR McGRATH: My understanding is that it's provided as part of basic training or initial training, and then it is provided as refreshers throughout the career.

35 COL GABBEDY: Are you aware that it's provided annually as part of refreshers for instrument flight examination?

DR McGRATH: No.

40 COL GABBEDY: Were you aware that that training was expanded after this particular accident to be done, I believe, three times per year?

DR McGRATH: No.

45 COL GABBEDY: You've been asked a number of questions in relation to the Heads-Up Display and the instruments. My understanding of your

evidence – and please tell me if I’m wrong – is that what pilots are trained is to trust their instruments. Is that right?

DR McGRATH: Yes.

5

COL GABBEDY: We heard an expression from a Dr Brock, who’s been a pilot for many years, he said you’re told, “Look at the clocks”. Is that the same thing?

10 DR McGRATH: Repeat that statement?

COL GABBEDY: “Look at the clocks”.

15 DR McGRATH: I’ve never heard that statement.

COL GABBEDY: So if I remove that statement, is it the case that what you should be doing is looking at your flight instruments in the helicopter when you’re concerned about your attitude?

20 DR McGRATH: That is correct.

COL GABBEDY: Thank you very much, Doctor. I have nothing further.

25 MS McMURDO: Any other applications to cross-examine?

CMDR JONES: Very briefly.

MS McMURDO: Yes.

30

**<CROSS-EXAMINATION BY CMDR JONES**

35 CMDR JONES: Doctor, my name is CMDR Bradley Jones. I appear for D19, the CO of 6 Aviation Regiment. In your studies of aircraft mishaps, has there been any consideration as to the risk incidence increasing or decreasing when you have two pilots as opposed to one pilot?

40 DR McGRATH: Look, the answer is, I do not have data on single-ship versus two-ship or two aircrew. What I can add though is that the forces that are experienced by the flying pilot are experienced by the non-flying pilot as well. So in the mishaps that I have done as an expert, that’s a question that’s often asked, “What is the other aircrew doing?” And again, from my perspective, from a mathematical modelling perspective, they are  
45 experiencing the same perception as the flying pilot.

CMDR JONES: Well, that's just fundamental physics.

DR McGRATH: It's fundamental physics, yes.

5

CMDR JONES: But in terms of, is it rational to conclude that the probability of spatial disorientation occurring is less if you have the non-flying pilot examining the instruments?

10 DR McGRATH: Absolutely. I can add to that. In the work I've done, it has shown – actually, I can answer that question in the next session. I can provide you more context to that in terms of what works or what doesn't work, yes.

15 CMDR JONES: Thank you, Doctor. That was my last question, the answer to which can be given in the Closed Session. Thank you.

MS McMURDO: Any other applications to cross-examine? Do we know if lunch is ready yet? It is ready. It might be quicker then to have lunch  
20 now – we had an early start – rather than coming back and then having to adjourn for lunch, so that we can go into Private Session and organise the orders to be made and so forth.

FLTLT ROSE: Could I ask those who wish to attend the Private Session, just to hold back before they leave for lunch to let me know so we include  
25 them in the order?

MS McMURDO: Yes, that's a very good idea. So 1.15, we'll resume.

30 FLTLT ROSE: Yes, thank you.

**<WITNESS WITHDREW**

35

**HEARING ADJOURNED**

**(Continued in Private Hearing Session)**

40

**HEARING RESUMED**

5 MS McMURDO: Are we ready to proceed yet? Not yet.

COL STREIT: Ms McMurdo, I am informed that the live stream has been reactivated.

10 MS McMURDO: Excellent.

COL STREIT: And audio and visual are on me and the Inquiry, and audio only for the witness, who has a pseudonym, and their identity is protected. I call – I'll just check. Am I correct in that?

15 MS McMURDO: So we're just checking that it's audio only of the witness box.

COL STREIT: No video on the witness box.

20 INQUIRY ASSISTANT: Correct.

MS McMURDO: Correct.

25 COL STREIT: Thank you.

MS McMURDO: Thank you.

30 COL STREIT: I call D10, whose name appears in the pseudonym list before the Inquiry. I can indicate that his Counsel, FLTLT Seefeld, will take his evidence-in-chief.

35 LCDR GRACIE: Just while that's happening, now that we're on the public record, I should apologise to Counsel Assisting for my intemperate comments earlier, ma'am. I've taken on board what you said, and I would like to – she's not here. I'll also convey it to her privately. But frustration got the better of me, and I apologise.

40 MS McMURDO: Yes, I understand that there's a lot of pressure on you at this stage of the proceedings. Thank you. Thank you for that apology. Yes.

**<D10, Sworn**

**<EXAMINATION-IN-CHIEF BY FLTLT SEEFELD**

5

MS McMURDO: Now, please let me know if you need a break at any time. We'll only be having a fairly short session this afternoon, but in any case, if you need a break before we adjourn at around about 5.15, let me  
10 know, otherwise we'll keep going.

D10: Thanks, ma'am.

MS McMURDO: Yes.  
15

FLTLT SEEFELD: Sir, is it correct that you have been allocated a pseudonym in this Inquiry?

D10: Yes.  
20

FLTLT SEEFELD: Now, on the desk in front of you are two lists. Could I just trouble you to look at – there's a list that has an alphabetical list of names, and could you have a look down that and just identify your name? And is it correct that a pseudonym has been allocated to you on that  
25 list?

D10: Yes.

FLTLT SEEFELD: What is that pseudonym?  
30

D10: D10.

FLTLT SEEFELD: D10. Thank you. You have been issued a Notice, have you not, under section 23 by this Inquiry, requiring you to produce a statement and to answer certain questions?  
35

D10: I have, yes.

FLTLT SEEFELD: And you have done that?  
40

D10: I have, yes.

FLTLT SEEFELD: I'm going to hand to you a document. Thank you. So if you could open up that folder that has just been provided to you. Just go in a couple of pages to the start of your statement. Do you have that?  
45



D10: I do, yes.

5 FLTLT SEEFELD: Just go to the first page of your statement. Do you have that?

D10: Yes.

10 FLTLT SEEFELD: Do you recognise that as the statement you produced for this Inquiry?

D10: I do, yes.

15 FLTLT SEEFELD: Now, could you go to, please, page 25. So at the top it's got numbers, page 25 of 40.

D10: I've got it.

20 FLTLT SEEFELD: Thank you. Perhaps undo that little clip there, it might make it easier. There you go. If you go to paragraph 73 and look to the last sentence at 73(a)? So just take a moment to read that sentence to yourself. Two things: first, where it says "preceded", that should of course be "proceeded". Do you agree?

25 D10: Correct, I agree.

FLTLT SEEFELD: Then it says, "As described above in 30". Now, where it says "30", should in fact that be "69"?

30 D10: It should be 69, yes.

FLTLT SEEFELD: So that's a correction that you'd request to your statement?

35 D10: Yes.

FLTLT SEEFELD: Other than that correction to your statement, do you have any other corrections to make to your statement?

40 D10: No corrections.

FLTLT SEEFELD: To the best of your knowledge and belief, are the matters set out in your statement true and correct?

45 D10: Yes.

FLTLT SEEFELD: Ma'am, I tender that statement.

MS McMURDO: That will be Exhibit 209.

5

**#EXHIBIT 209 - STATEMENT OF D10**

10 FLTLT SEEFELD: Ma'am, that is the evidence-in-chief from this witness.

MS McMURDO: Thank you, FLTLT Seefeld.

15 FLTLT SEEFELD: Thank you.

MS McMURDO: Yes, COL Streit.

COL STREIT: Thank you.

20

**<CROSS-EXAMINATION BY COL STREIT**

25 COL STREIT: D10, thank you for your patience today. I know you've been waiting outside. I'm just going to deal with some very brief preliminary matters if I can. First, can I just confirm, in line with receiving the section 23 Notice, you also received some other documents, including a Frequently Asked Questions Guide for Witnesses?

30

D10: I did, yes.

COL STREIT: A copy of a Privacy Notice?

35 D10: Yes.

COL STREIT: An Instrument of an Appointment for an Assistant IGADF, which was me?

40 D10: Yes.

COL STREIT: A copy of the Inquiry's Directions?

D10: Yes.

45

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COL STREIT: Thank you. Now, in completing your statement, you have attached, have you, the statement you provided in response to a requirement from the Coroner?

5 D10: I did, yes.

COL STREIT: You've referred to that statement in the list of documents as "Coroner's Statement"; is that right?

10 D10: Yes.

COL STREIT: I think you've listed it at Annex DD; is that right?

15 D10: It is, yes.

COL STREIT: Now, to help you and orientate you, what I propose to do is to lead evidence from you in a narrative form, or a story form, following chronologically in time. So what that will mean is that we will move at different points in time from your statement provided to the Inquiry to your  
20 Coroner's statement, and then back to your statement provided to the inquiry. We'll only do it a couple of times. That is simply to ensure that your evidence is given in a chronological form, or format rather, which will make it easier for everyone to understand and for you to respond to questions.

25 If I ask something that is outside your lane of experience or your knowledge, could you please let me know. Also, can you just – I know you will, but just be mindful of your security obligations. If I inadvertently ask you a question that might mean in order to respond you have to give an  
30 answer that's at a classification above "Official", can you just let me know, not answer the question but just let me know, and the same if that's asked of you by the Inquiry or a member of Counsel representing. Everything I've indicated so far you understand?

35 D10: I do, yes.

COL STREIT: Thank you. Now, just dealing with your Inquiry statement, you'll always have your statement and annexures in front of you. So if you can just come to the front cover, or the first page of your  
40 Inquiry statement. So at paragraph 1 you identify that you've read and understood the Inquiry's consolidated Directions and your statement contains all the evidence you're able to give which is relevant to the Directions and the work of the Inquiry. That's correct?

45 D10: Correct.

COL STREIT: You also indicate, helpfully, at paragraph 3 that the statement is written – that is, your statement is given with the benefit of listening to and reading all the statements from witnesses that participated in hearing blocks 2 to 8. Is that right?

D10: Correct.

COL STREIT: Now, in terms of pre-incident matters – and we’re talking there about your background, qualifications and posting history – you refer to Enclosure 1. So Enclosure 1 is a statement you have made but at the “Official: Sensitive” level. Is that right?

D10: Correct.

COL STREIT: I won’t ask you any questions in a Public Hearing in relation to the contents of Enclosure 1. But can I just ask you to turn to your Coroner’s statement which is Annexure DD at the back of that folder of material, and I’d just like to ask you some questions. So, first, just in relation to this statement, this was a statement that was signed by you – if you go to the back page of your statement, which is page 21 – signed by you on 30 November 2023. Is that right?

D10: Correct.

COL STREIT: Your signature’s been redacted but you recall signing the statement?

D10: I do.

COL STREIT: Now, coming back to the front page of that statement, was this statement made as a result of a Direction issued by the Coroner for a statement to be obtained from you in relation to the events on 28 July 2023?

D10: It was.

COL STREIT: You made this statement on the basis of it containing the evidence that you would be prepared to give if you were called in a Court as a witness; is that right?

D10: It was, yes.

COL STREIT: Now, you refer to, at paragraph 2, that you make the statement in response to a Form 25 requirement by the Coroner for information issued on 5 September 2023. Is that right, what I’ve read?

D10: Yes.

5 COL STREIT: Now, can you remember – again, not a memory test, but can you remember whether or not you were ever provided a copy of the actual Form 25 that the Coroner had issued?

D10: I can't remember, no.

10 COL STREIT: In relation to the creation of your statement – and we'll return to this in a little bit more detail later in your evidence – but in relation to the creation of your statement, is it the case you had some assistance from the person you identify at paragraph 3, the position Deputy General Counsel of the Department of Defence?

15 D10: Correct.

20 COL STREIT: Just in relation to your Coroner's statement, I'm just going to take you through those parts of that statement that deal with your background information, and then we'll return to your Inquiry statement.

D10: Okay.

25 COL STREIT: First, just in an overview of your ADF service, you joined the ADF on 19 January 2010. That's correct?

D10: Correct.

30 COL STREIT: You're current at the rank of [REDACTED]. You were posted, as at the date of the statement, 30 November 2023. You were posted to the 6th Aviation Regiment, 173 Special Operations Aviation Squadron. That's right?

35 D10: Correct.

40 COL STREIT: Your role as the Officer Commanding of 173 Special Operations Aviation Squadron, you were responsible for the command, leadership, and management of all personnel within the Squadron. That's right?

D10: Correct.

COL STREIT: Indeed, at the time you made your statement, signed your statement to the Coroner, you were at that time on leave and had already

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handed over duties to your successor who was taking over your position as the next OC of the Squadron?

5 D10: Yes.

COL STREIT: You had been the OC of 173 Special Operations Aviation Squadron since January 2022; is that correct?

10 D10: Correct.

COL STREIT: So was it a normal two-year posting cycle?

D10: A normal, yes.

15 COL STREIT: As the OC of the Squadron, your immediate supervisor was the then Commanding Officer of 6 Aviation Regiment?

D10: Yes.

20 COL STREIT: Just at the time in relation to the structure of 6 Aviation Regiment, how many Squadrons did it have?

D10: Three Squadrons.

25 COL STREIT: Was one of those Squadrons a Support Squadron?

D10: Yes.

30 COL STREIT: Did that Support Squadron provide – well, perhaps if you could explain, what did the Support Squadron do? What was its main effort?

D10: It's primary role was to provide ancillary support to either of the Squadrons for their primary role.

35 COL STREIT: Did Support Squadron have qualified MRH-90 pilots in it or was the support in the sense of maintenance and logistics?

40 D10: Primarily maintenance and logistics.

COL STREIT: So the 6 Aviation Regiment, in effect, had two flying Squadrons, the one you commanded, and another Squadron?

45 D10: Correct.

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COL STREIT: Just in terms of your tertiary qualifications, at paragraph 8 of your Coroner's statement, you have a Master of Business through the University of New South Wales.

5 D10: Yes.

COL STREIT: Is that correct?

10 D10: Correct.

COL STREIT: Now, after you completed your Officer Training at the Royal Military College Duntroon, you were promoted to Lieutenant and allocated to the Army Aviation Corps. And, subsequently, did you then commence pilot training?

15 D10: I did, yes.

COL STREIT: If we look at paragraph 11, you say that during your career in the ADF, you've qualified to fly the following operational rotary-wing helicopter platforms: the MRH-90 helicopter, the S-70A-9 Black Hawk helicopter, and the Kiowa helicopter. Is that right?

20 D10: Correct.

COL STREIT: Out of those three aircraft, which one have you had the most hours as a pilot in?

D10: The S-70A-9 Black Hawk.

30 COL STREIT: You set out at paragraph 12, in summary form, the total number of flying hours in the MRH-90 helicopter as at 28 July 2023. That's right?

35 D10: Correct.

COL STREIT: You also describe the concepts of recency and currency concerning Aviation hours. So could you just explain what is the difference between "recency" and "currency"?

40 D10: Sir, I'm just reading that quickly.

COL STREIT: Sure.

D10: So recency describes how often a member has conducted that particular activity or profile, whereas currency relates to the qualification in question.

5 COL STREIT: So would it be safe for the Inquiry to understand that currency is the minimum qualification required to fly a particular aircraft in that you have to be current?

10 D10: It might – a better way to describe it is potentially the currency relates to a qualification, and a qualification inside of the Standing Instructions generally has a level of currency associated, i.e. how many times within a certain period of time would define you as current.

15 COL STREIT: Another way of describing recency would be that that level of experience that a pilot might have in flying a particular aircraft on which they're current?

D10: Potentially, yes.

20 COL STREIT: So you can be current and qualified to fly an aircraft, but you may not have a lot of experience in flying that aircraft in relation to a particular mission profile?

25 D10: Potentially, better described as you may be qualified and current on that profile, but you may have a level of recency that is worth – sorry, your recency in that profile is separate to the currency associated.

30 COL STREIT: The more you fly a profile, the more recency you have, the more experience you have?

D10: The time period between flying that profile, I would define as the recency.

35 COL STREIT: I see. Now, at paragraph 13 – sorry, I'll just return to paragraph 12 very briefly. You identify in that second-last sentence, you say:

*By airframe hours, I am referring to hours I have spent in MRH-90 aircraft as distinct from a simulator.*

40 You then identify the number of hours you've spent in the airframe and the number of simulator hours as being the night flying hours. Is that correct?

45 D10: Correct.



COL STREIT: You set out at paragraph 13 your flying experience in Black Hawk helicopter, having 1278 flying hours; comprising 1183.7 airframe hours, including 350 night-flying hours and 94.3 hours in the simulator, including 30.2 night-flying hours. Is that correct?

5

D10: One amendment, it's 360 night-flying hours, but yes.

COL STREIT: Thanks. Now, the other aircraft you qualified on as part of your pilot training was the single-engine fixed-wing platform, the CT-4, during your pilot training. Is that right?

10

D10: Yes.

COL STREIT: You have listed at paragraph 16 the various courses that you have participated in, and principally from 2011 onwards to 2023. That's right?

15

D10: Correct.

COL STREIT: In paragraph 16(c)(x), which is on page 3, you identify Introduction to Defence Aviation Safety as a course you did.

20

D10: Yes.

COL STREIT: I went through all of your other courses from 2011 onwards and I didn't see in that list that you had completed this Introduction to Defence Aviation Safety course earlier than 2021. There may be an explanation for that in that it might be called something else earlier in time, but are you able just to have a quick look at the course history you've provided and just indicate if I've missed something, that in fact you did a Defence Aviation Safety course earlier in time?

25

30

D10: I don't see it listed. It's not to say it's in there with a different name. The course is usually associated with a course code, which I probably need to confirm that.

35

COL STREIT: Sure. And I'm certainly not suggesting you haven't, until that course, done any Defence Aviation Safety because the courses you've listed are drawn from your PMKeyS records. That's right?

40

D10: Correct, yes.

COL STREIT: And not everything you do by way of training in the Military, including a course, results in a PMKeyS record; is that correct?

45

D10: Correct.

COL STREIT: Do you remember – and I know it’s a little while ago now – but do you remember anything about that Introduction to Defence  
5 Aviation Safety in terms of how long it went for or the nature of the syllabus?

D10: I don’t remember that specific course, no, sorry.

10 COL STREIT: Now, the courses that you have drawn from your PMKeyS record that you’ve listed from 2011 to 2023, were all of those courses that you can remember, were they mandated as part of your training?

15 D10: There’s a mixture of courses in there. There are a number of courses which are mandated. There are also a number of courses that are specific to qualifications and progression of qualifications.

COL STREIT: Now, can I ask you to return to your Inquiry statement. We won’t come back to the Coroner’s statement until we come to the  
20 mission on 28 July. So if we just come back to your statement to the Inquiry, please, and if we just go to page 2, paragraph 6(e), which lists your responsibilities as the OC before you give some evidence about that. So, first, you indicate that your responsibilities as the Officer Commanding was for – and I’m looking at 6(e)(i) – was for providing effective sub-unit  
25 command leadership and management during the execution of its directed mission. That’s right?

D10: Correct.

30 COL STREIT: Now, you make a reference at the time for more information to Annexure A. Now, Annexure A is a document that’s beyond the security classification of this proceeding, isn’t it?

D10: Correct.

35 COL STREIT: Just to be clear, that we’re careful about this, a number of the annexures that you have properly referred to and attached to your statement are at a classification above “Official”. That’s right?

40 D10: Correct.

COL STREIT: So what I will do is, as we go through your “Official”  
classified statement, is just identify where there’s a direct linkage to your  
45 evidence that you put in your “Official” statement to a document that’s “Official: Sensitive”, and so the Inquiry can properly understand that your

evidence is not just comprised of what's in the "Official" document but also the "Official: Sensitive".

5 D10: Happy. I would just add one thing, sir, for either of the Chairs, I'm happy to go through any of those documents in detail in a different forum, should you seek that.

MS McMURDO: Thank you.

10 COL STREIT: Now, just returning to your responsibilities as the OC as you've listed. You say in (ii):

15 *The OC is responsible for ensuring the Squadron is prepared to conduct recovery, interdiction, and assault missions as Combined Special Operations effect in a domestic or international environment, integrate the Squadron within a Combined Joint Special Operations Aviation Component Command with Coalition partners. You are expected, as the OC, to maintain the Senior Special Operations Aviation Flying qualifications which are*  
20 *required for the planning, authorisation, and execution of Special Operations Aviation missions.*

Is that, what I read out, correct?

25 D10: Correct.

COL STREIT: So the function and role you had as the OC of the Special Operations Aviation Squadron is not limited to just performing the functions as an OC and an Aircraft Captain in Special Operations, but in  
30 fact you held higher authorisations and qualifications to enable to conduct of Special Operations missions. Is that right?

D10: Correct.

35 COL STREIT: In the Squadron itself, provided it's not outside this classification, was there only one other person in the Regiment that had that same level of qualifications that you had?

40 D10: Yes.

COL STREIT: Was that the Regimental Standards Officer?

D10: No, the Regimental Operations Officer.

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COL STREIT: I apologise. Can I ask you just to look – do you recall the name of that person? If you could just identify their pseudonym, please?

D10: D23.

5

COL STREIT: D23. So D23 had the same qualifications and authorisations that you had as the OC of the Squadron?

D10: Correct.

10

COL STREIT: So there were only two of you, at that time anyway, within the Regiment; is that right?

D10: Correct.

15

COL STREIT: Ms McMurdo, I note the time.

MS McMURDO: Yes.

20

COL STREIT: We've just crossed the Rubicon at just a little bit after 5.15, if that's convenient.

MS McMURDO: Yes, sure. So a 9.30 start tomorrow morning is adequate, is it?

25

COL STREIT: Yes, thank you. We have made arrangements for MAJ Lewis to give evidence via audio-visual link at 9.30.

MS McMURDO: 9.30, yes.

30

COL STREIT: What's proposed shortly after his evidence is for FLTLT Rose to briefly tender some documents that have been prepared without the need to call a witness, and that shouldn't take very long, and then return to the evidence of D10.

35

MS McMURDO: It's always nice to get started, so at least you're off the mark. But we'll hear from you again, I'm not sure what time tomorrow, but it will be in the morning, and hopefully finish your evidence tomorrow.

40

**<WITNESS WITHDREW**

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COL STREIT: Can I just ask Counsel representing to indicate to me, when they're able, how long they think they might be with MAJ Lewis, so I can consider the planning.

5 MS McMURDO: This witness, yes. I'm sure they'll do that. All right. We'll adjourn until 9.30 tomorrow morning. Thank you.

10 **PUBLIC INQUIRY ADJOURNED UNTIL  
WEDNESDAY, 30 APRIL 2025 AT 0930**