ABN 85 120 213 381
Level 4, 190 Queen Street, Melbourne 3000 Telephone: 03 8628.5561 Fax: 03 9642.5185
Offices in: Melbourne, Brisbane, Darwin, Canberra, Perth, Sydney, Adelaide

TRANSCRIPT OF PROCEEDINGS
TRANSCRIPT-IN-CONFIDENCE

INSPECTOR-GENERAL AUSTRALIAN DEFENCE FORCE INQUIRY INTO THE CRASH OF A MRH-90 TAIPAN 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 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
SQNLDR M NICOLSON, representing D10
MR C PRATT, with MS M ROLOGAS, representing Senior Sergeant R Callaghan, Detective Inspector E Novosel, Acting Inspector A Dyer, and Senior Sergeant C Troeger
MS K MUSGROVE, representing the Commonwealth

1045, FRIDAY, 21 JUNE 2024

DAY 11

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

Signed	.....	**Date**	.....	(Chair)
Signed	.....	**Date**	.....	(Recorder)
Signed	Epiq Australia Pty Ltd	**Date**	28/06/24	(Transcription)

EXHIBIT LIST

Date: 21/06/2024

Number **Description** **Page No**

WITNESS LIST

Date: 21/06/2024

Name Of Witness **Page No.**

MS McMURDO: Yes, FLTLT Rose.

FLTLT ROSE: The Inquiry calls CAPT Campbell Rogan.

<CAPT CAMPBELL JAMES ROGAN, Sworn

<EXAMINATION-IN-CHIEF BY FLTLT ROSE

FLTLT ROSE: Can you please state your rank, full name and your current unit?

CAPT ROGAN: CAPT Campbell James Rogan, and I'm at the 5th Aviation Regiment in Townsville.

FLTLT ROSE: Can you please confirm that you were sent these documents by the Inquiry: a section 23 Notice requiring your appearance today to give evidence?

CAPT ROGAN: Yes.

FLTLT ROSE: Extract of the Inquiry's Directions?

CAPT ROGAN: Yes.

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

CAPT ROGAN: Yes.

FLTLT ROSE: The Frequently Asked Questions Guide for Witnesses?

CAPT ROGAN: Yes.

FLTLT ROSE: A Privacy Notice?

CAPT ROGAN: Yes.

FLTLT ROSE: I'd like to ask you to please be mindful of your security obligations today, so that if I, or any other questioner, asks you questions the answer to which may lead you into classified territory, then please let us know. Did you prepare a statement for these proceedings?

CAPT ROGAN: I did.

FLTLT ROSE: I'll hand you a document. Can you please look through that document and confirm that that is your statement?

CAPT ROGAN: I'm happy.

FLTLT ROSE: Could you please turn to paragraph 16? You'll note that there is a name that has been whited out and, in handwriting, a pseudonym has been placed on top of that?

CAPT ROGAN: Seen.

FLTLT ROSE: That's an additional redaction. The person whose name has been redacted has – we've been informed does have protected identity status. That name has not been included on the A3 piece of paper in front of you with the list of pseudonyms, but the intention is it is likely to receive a pseudonym in the future. So if you could just be mindful.

CAPT ROGAN: Understood.

FLTLT ROSE: If you turn to the back page of your statement, page 11. Is that your signature?

CAPT ROGAN: It is.

FLTLT ROSE: And it's dated 10 June 2024?

CAPT ROGAN: Correct.

FLTLT ROSE: Are there any additions or amendments you would like to make to your statement?

CAPT ROGAN: Yes. If I can just draw you to paragraph 49 and 59?

FLTLT ROSE: There's a pen in front of you.

CAPT ROGAN: I do have a pen, thank you.

FLTLT ROSE: So paragraph 49, is there an amendment you wish to make to that?

CAPT ROGAN: Forty-nine, I'd like to amend what is quoted as "2022" and have that amended to "2020".

FLTLT ROSE: If you could cross that out and put "2020" and then just initial next to the amendment.

CAPT ROGAN: And then if I can refer you, paragraph 59.

FLTLT ROSE: Yes.

CAPT ROGAN: It is a replacement of the acronym "DASA" for "DFSB".

FLTLT ROSE: So in the fourth line, cross out "DASA" and put "DFSB"?

CAPT ROGAN: That is correct.

FLTLT ROSE: Could you just make that change and then initial next to it. Any further amendments you wish to make?

CAPT ROGAN: No.

FLTLT ROSE: I tender that statement.

MS McMURDO: Exhibit 32.

#EXHIBIT 32 - STATEMENT OF CAPT CAMPBELL ROGAN DATED 10/06/24

FLTLT ROSE: You can keep that statement in front of you. You first made contact with this Inquiry through a submission that you made on the Inquiry's web page on 1 May 2024?

CAPT ROGAN: That's correct.

FLTLT ROSE: In terms of your background and qualifications, at paragraph 3 you stated you enlisted in the Army in 2020, when you were 19 years old?

CAPT ROGAN: 2010.

FLTLT ROSE: 2010. You then went to ADFA and completed a Bachelor of Science in Aviation Studies?

CAPT ROGAN: Yes, I will just apologise. I didn't enlist in the Army in 2010, I enlisted in 2012. I attended the Flight Screening Program for

selection as aircrew in 2010.

FLTLT ROSE: Understood. But is it correct that you then went to ADFA and completed the Bachelor of Science in Aviation Studies?

CAPT ROGAN: Yes.

FLTLT ROSE: And following that, you went to the Royal Military College Duntroon?

CAPT ROGAN: Correct.

FLTLT ROSE: In terms of your pilot training and your posting history, paragraph 5 you state that you completed your basic flying training in Tamworth in 2016?

CAPT ROGAN: Yes.

FLTLT ROSE: Which airframe was that on?

CAPT ROGAN: That was on the C/T4B.

FLTLT ROSE: That's a fixed-wing?

CAPT ROGAN: Correct.

FLTLT ROSE: Then, paragraph 6, you completed your Helicopter Qualification Course at Oakey in 2016 and 2017?

CAPT ROGAN: Correct.

FLTLT ROSE: Which airframe was that on?

CAPT ROGAN: The CA-32 or OH-58, which is colloquially known as the Kiowa.

FLTLT ROSE: Kiowa. And in paragraph 7, it was in 2018 that you completed your CH-47 Chinook Qualification Course in the US.

CAPT ROGAN: Correct.

FLTLT ROSE: Then you went on to complete your operational-type transition back in Townsville.

CAPT ROGAN: Followed by that course, yes.

FLTLT ROSE: Again on the Chinook.

CAPT ROGAN: Correct.

FLTLT ROSE: Paragraph 8, you posted into C Squadron in 5 Aviation Regiment in late 2018 and then remained there until the end of 2023?

CAPT ROGAN: Correct.

FLTLT ROSE: I take it that you flew Chinook that whole time?

CAPT ROGAN: Yes.

FLTLT ROSE: You also have a series of secondary duties in that period, including Troop Commander from mid-2022 to the end of 2023?

CAPT ROGAN: Yes.

FLTLT ROSE: Was that the Troop Commander of C Squadron?

CAPT ROGAN: C Squadron at that time consisted of two fully manned Troops, and I was the 5 Troop Commander alongside the 6 Troop Commander.

FLTLT ROSE: Roughly how many aircrew were in your Troop?

CAPT ROGAN: From memory, it would have been between 20 to 25 personnel.

FLTLT ROSE: At paragraph 9 you state where you're posted now. Is that as the Adjutant to the Commanding Officer of 5 Aviation Regiment?

CAPT ROGAN: That's correct.

FLTLT ROSE: And who is that currently?

CAPT ROGAN: It's LTCOL Andrew Lean.

FLTLT ROSE: What does the Adjutant do?

CAPT ROGAN: The Adjutant's principal role is as a Staff Officer, the Senior Staff Officer for the Executive and the CO specifically. My main remits, alongside the Regimental Sergeant Major, are incident management, discipline and a degree of welfare. But I also act as the

conduit as a senior Captain between the Officer Workforce and the CO, and vice versa.

FLTLT ROSE: Are you still flying?

CAPT ROGAN: I am.

FLTLT ROSE: How often are you flying Chinook?

CAPT ROGAN: Depending on the resources and prioritisation, I will look to have a proactive flying event once a week, whether that's simulator or in the aircraft.

FLTLT ROSE: What category pilot are you?

CAPT ROGAN: I'm an A Category CH-47 pilot.

FLTLT ROSE: You also have an Assault Flight Lead qualification?

CAPT ROGAN: Correct.

FLTLT ROSE: You have approximately 1300 flying hours on the Chinook?

CAPT ROGAN: Correct.

FLTLT ROSE: And 1900 total flying hours across all of the airframes that you've flown in Army Aviation?

CAPT ROGAN: Yes. And that's a number that combines some civilian flying experience.

FLTLT ROSE: When did you do your civilian flying experience?

CAPT ROGAN: Concurrent to my military flying career.

FLTLT ROSE: You say that you have approximately 900 hours as the pilot in command, or the Aircraft Captain?

CAPT ROGAN: Correct.

FLTLT ROSE: I take it then, with those qualifications, you're a very senior pilot?

CAPT ROGAN: I would say I'm a senior general service pilot, I'm not a senior specialist pilot.

FLTLT ROSE: And a specialist pilot, would that be a QFI?

CAPT ROGAN: That would be one of the main sources of QFI. We also have Regimental specialist pilots with key qualifications, like an Air Mission Commander role or an Assault Flight Lead. But in terms of years or seniority, I would be in the middle of the stack.

FLTLT ROSE: What year Captain are you?

CAPT ROGAN: Currently Captain 6 seniority.

FLTLT ROSE: Have you ever flown MRH-90?

CAPT ROGAN: No, I have not.

FLTLT ROSE: Have you ever flown in formation in a mixed sortie with MRH-90s?

CAPT ROGAN: Yes. so during my tenure at 5th Aviation Regiment, we have consisted of a three Squadron Regiment, and that is two Squadrons of MRH and a single Squadron of CH-47. I've had numerous experiences, integrated alongside 808 Squadron from the Royal Australian Navy, and then also 3 Squadron from the Royal New Zealand Air Force, who are both MRH-90 or NH90 operators.

FLTLT ROSE: Included in that, have you ever flown in mixed sorties with MRH from 6 Aviation Regiment?

CAPT ROGAN: No.

FLTLT ROSE: I'd like to ask you some questions now about a course you undertook in 2022. From paragraph 13 in your statement you state that you attended the Regimental Officer Intermediate Course in 2022. Where was this course?

CAPT ROGAN: So the ROIC, as it's colloquially known or abbreviated, is run in two parts. The first part of that is held within Gallipoli Barracks at Enoggera here in Brisbane. And then the latter half of that is at the Army Aviation Training Centre at Oakey.

FLTLT ROSE: How long is the course?

CAPT ROGAN: Approximately three weeks.

FLTLT ROSE: Do you remember which month it was in 2022?

CAPT ROGAN: No, but it was cold and I had COVID, so I'm assuming it's the middle of the year.

FLTLT ROSE: Paragraph 17, you state:

> *The course prepares Aviation Officers, particularly Aircraft Captains, for roles as Troop Commanders, Operation Officers, Liaison Officers, Detachment Officers and QFIs.*

Is that correct?

CAPT ROGAN: That's correct. And that's taken straight from the mission statement for that course, or the purpose of that course.

FLTLT ROSE: So this is a course more in terms of your technical advancement or your command responsibilities advancement, as opposed to one of the courses you have to do to be promoted to Major?

CAPT ROGAN: It is part of our corps-specific officer training continuum. So it is one of the stepping stones towards promotion, if you are seeking that. But it is a course designed, not within your flying proficiency, but your tactical proficiency, your awareness of airworthiness, resource constraints, et cetera. And there's some tactical work in there as well in the assessments and the use of TEWTs, or tactical exercises without Troops, that are specific to Aviation operations.

FLTLT ROSE: I take it that you just started your role as Troop Commander then of C Squadron, if this was in 2022?

CAPT ROGAN: That's correct. So just I think in the month or months prior to attending the course I was – I had assumed the Troop Commander role.

FLTLT ROSE: At paragraph 15 and 16 of your statement you list the names of the other officers on this course with you. Now, some of these persons have been assigned pseudonyms and others haven't. So if you can confirm for me that some of the other participants on the course was a D129 ?

CAPT ROGAN: Correct.

FLTLT ROSE: If you turn over the list in front of you, can you find D15 in that list?

CAPT ROGAN: Seen.

FLTLT ROSE: Confirm that that person was on the course?

CAPT ROGAN: That's correct.

FLTLT ROSE: Now, if you look back to your slightly amended statement which you have in front of you, at paragraph 16 there's the new redaction, D55.

CAPT ROGAN: Seen.

FLTLT ROSE: There also was a CAPT Goodridge?

CAPT ROGAN: Correct.

FLTLT ROSE: A CAPT Jackson.

CAPT ROGAN: Correct.

FLTLT ROSE: Was CAPT Danniel Lyon also on the course?

CAPT ROGAN: He was.

FLTLT ROSE: Was there anyone else on the course that you can recall? And if you just answer "Yes" or "No" to that question, because it may be that some of the people have a pseudonym.

CAPT ROGAN: So, yes, D55 that we've just spoken about, and then we had a course manager that was alongside us for the majority of the course, and that was a CAPT Botham.

FLTLT ROSE: You were all mid-seniority Army Aviation Captains for 5 Avn and 6 Avn?

CAPT ROGAN: Yes.

FLTLT ROSE: I mentioned CAPT Danniel Lyon previously. Did you call him Diesel?

CAPT ROGAN: I do.

FLTLT ROSE: And you knew him before the course?

CAPT ROGAN: I did.

FLTLT ROSE: You played in the same AFL club at ADFA in 2012?

CAPT ROGAN: Yes. So whilst Diesel was a third year at that time, I was a first year, he was the club captain for the football team. And although I played reserve grade, the social cohesion and club integration meant that we were known to each other socially.

FLTLT ROSE: Did you ever work together in 5 Aviation Regiment?

CAPT ROGAN: No. So during my time in the United States, I believe Diesel was in the processes of posting on exchange to the Royal New Zealand Air Force.

FLTLT ROSE: Did you ever fly in formation then with Diesel?

CAPT ROGAN: No, I did not.

FLTLT ROSE: At paragraph 15 you say that:

> *Diesel was the Squadron 2IC at 6 Aviation Regiment at the time of the ROIC.*

CAPT ROGAN: Yes, that was my understanding.

FLTLT ROSE: In terms of the other pilots that were on your course, what was the breakdown in terms of which airframes they were flying? Were the majority MRH pilots?

CAPT ROGAN: It was probably a 50-50 split. So half MRH, half CH-47, but we were both from air mobile Regiments. And in this case we had no armoured reconnaissance helicopter pilots from 1 Avn attending on the course.

FLTLT ROSE: You say, at paragraph 17, you were a more senior course than a usual cohort for this type of ROIC because it had been postponed a few times for COVID. Is that correct?

CAPT ROGAN: Yes. So this was 2022, the years of COVID from the end of 2020/2021 saw that course effectively shut down due to interstate travel restrictions. And the operational tempo at the time had meant I personally had to withdraw a number of applications because of HADR or

DACC taskings that prevented me from attending original course dates. And that was similar to the other attendees as well.

FLTLT ROSE: At paragraph 17 – so you've already given evidence that this wasn't a flying skills course – you said that:

> *It aimed to develop attendees' operational perspective and comprehension of human and material resources within the technical and airworthiness regulatory environment.*

So it was an introduction to what you needed to know before you were fulfilling command roles in the Squadron?

CAPT ROGAN: And an appreciation for those that wouldn't fulfil those positions and a chance to, I guess, receive instruction and lectures from personnel in those key roles.

FLTLT ROSE: What generally are the responsibilities of a Troop Commander in an Aviation Squadron?

CAPT ROGAN: So you're responsible directly to your Officer Commanding for the operational capability of that Troop. In terms of what your remit is, it's all dependent on the mission set for that Squadron, that Troop, and what your notice of readiness is. But you are the responsible party for developing, maintaining, or progressing that Troop on a skillset and then individual aircrew proficiency, be that pilot, aircrewman or aircrewman technician, alongside your Troop Sergeant.

FLTLT ROSE: Is another responsibility crewing the sorties?

CAPT ROGAN: It is, in conjunction with the Troop Sergeants and your fellow Troop Commander.

FLTLT ROSE: Paragraph 22, you state that there were various presentations from various personnel on this course and you refer to a particular session at Enoggera where you received a brief from BRIG Dean Thompson.

CAPT ROGAN: Correct.

FLTLT ROSE: What was BRIG Thompson's role at that time?

CAPT ROGAN: So he was then Commander of the 16 Aviation Brigade in 2022.

FLTLT ROSE: Also attending was COL James Pidgeon?

CAPT ROGAN: Correct.

FLTLT ROSE: What was his role at that time?

CAPT ROGAN: He was Brigade Operations Officer.

FLTLT ROSE: Did he have a nickname?

CAPT ROGAN: From around the corps, it was Pidgeon. But I wouldn't call him that.

FLTLT ROSE: Understood. If you could also look at your pseudonym list again and find D9.

CAPT ROGAN: Yes.

FLTLT ROSE: Was that person also in that session?

CAPT ROGAN: He was in the brief, yes.

FLTLT ROSE: And what role was that person fulfilling, D9 fulfilling, at that point in time?

CAPT ROGAN: He was then Brigade Manager, or BM.

FLTLT ROSE: You've mentioned before that there was a CAPT Botham, who was the Session Manager.

CAPT ROGAN: Correct.

FLTLT ROSE: Was he in attendance during this particular session?

CAPT ROGAN: He was.

FLTLT ROSE: Do you recall what the session, or the brief, was about?

CAPT ROGAN: It was the chance for the Senior Leadership Team – and I think this was before the formation of our High Command – so our Senior Leadership Team that was then headquartered at Enoggera there in Gallipoli Barracks, to interact with what were their next generation of Troop Commanders, Operations Officers, and really a session, I guess, to feel the pulse on both the Leadership Team as trainees and candidates on

course. And then, likewise, for those leaders with us as a pool of personnel from the 5th and the 6th Aviation Regiment.

FLTLT ROSE: Was it more of an informal session where you – an exchange of ideas and information?

CAPT ROGAN: Correct.

FLTLT ROSE: Were you given the opportunity, as course participants, to raise and discuss organisational concerns with these senior officers?

CAPT ROGAN: Yes, with these officers in particular, and other visiting lecturers from key disciplines or roles within the Brigade at the time.

FLTLT ROSE: Did BRIG Thompson also have a different role in addition to being the Commander of 16 Aviation Brigade at that time?

CAPT ROGAN: Not that I'm aware.

FLTLT ROSE: Was it a general pattern in this course where you would receive a brief from senior officers, and then there'd be some sort of Q&A opportunity at the end of each brief?

CAPT ROGAN: Yes, in both the formal classroom setting or an informal setting where we would retire to the Officers' Mess and, over a few drinks as well, have discussions with other officers.

FLTLT ROSE: Paragraph 23, you state that Diesel shared his concerns during this particular session with the participants we noted earlier: BRIG Thompson, COL Pidgeon, D9 and CAPT Botham.

> *Diesel shared concerns about the ability of Army Aviation pilots to appropriately develop and maintain safe and adequate levels of airborne confidence, proficiency and competency in their core primary and safety-critical role as Aircraft Captains, and then aircrew in general, against what we collectively agreed as a course were the significant imposition of highly demanding secondary positions and appointments, appointments that were increasingly being fulfilled by Squadron Troop pilots.*

CAPT ROGAN: That's correct, and that was a theme that was shared by all participants on the course, or concern that we all shared.

FLTLT ROSE: But in this instance, Diesel specifically raised this as a concern that he had in that session.

CAPT ROGAN: Yes, he did.

FLTLT ROSE: Had he raised the same concerns in other sessions?

CAPT ROGAN: He had to similar effects, yes, where appropriate for the visiting lecturers.

FLTLT ROSE: Did you all discuss your positions prior to this particular session?

CAPT ROGAN: I think we were, from our respective, Regiments – our interactions throughout the course with visiting lecturers, we understood that this was a shared grievance and concern that we all held, and we were appreciative of that.

FLTLT ROSE: In essence, was Diesel speaking on all of your behalf when he made these comments?

CAPT ROGAN: Yes.

FLTLT ROSE: And you, yourself, agreed with the comments that Diesel made?

CAPT ROGAN: I did.

FLTLT ROSE: What do you think he meant when he said he – or all of you, as Aircraft Captains, were not able to "maintain safe and adequate levels of airborne confidence, proficiency and competency"?

CAPT ROGAN: The way that he presented that statement was to highlight the fact that the impost of our secondary appointments were distracting us from our safety-critical roles of being Aircraft Captains, and it was blurring the line between a sterile cockpit and being fit to fly, with the distractions that come with secondary appointments.

FLTLT ROSE: From what you just said in your evidence, is it the case that you were able to still fly and have sufficient number of flying hours, it's just that you were not entirely focussed on flying when you were in the cockpit?

CAPT ROGAN: For our individual experiences, and what I can speak to with my experience, you're routinely the first one in at work and the last one out. You deal with a lot of – I shouldn't say "a lot of", but you are normally dealing with complex welfare issues, progression of aircrew,

scarce resources, manpower issues. A lot of that takes a lot of time, effort, cognitive ability, and it's very hard to separate the brain space that you allocate to that whilst stepping into an aircraft or operating it, and then dealing with mission complexities, depending on the sorties that you're flying.

FLTLT ROSE: Is it the case that as a helicopter pilot you need to be focussed on flying because it's a highly complex task?

CAPT ROGAN: I think for any role in a safety-critical industry, that's correct.

FLTLT ROSE: Were you, yourself, distracted? You were a Troop Commander at the time of this course. Had you found yourself becoming distracted whilst in the cockpit as you were thinking about the welfare concerns or the unit progression that you were focussed on in your ground role?

CAPT ROGAN: Distracted, frustrations, general grievances. Yes, it would. I wouldn't want to say all the time, but it is something that would be nagging on your mind.

FLTLT ROSE: Was there also a concern that you were spending so many hours working in these secondary roles that you actually didn't get enough flying time?

CAPT ROGAN: In the Troop Commander role, I'd say no, because you're part of the active Troop. In other auxiliary roles, I can see that that would be truthful. I, myself, was fortunate enough to maintain quite consistent flying consistency within my Squadron and my Troop while I was a Troop Commander. But that, as we've seen, varies across Squadrons and Regiments.

FLTLT ROSE: I take it now that you're in an Adjutant role, you said you're only flying about once a week. This is one of the auxiliary roles where you fly less.

CAPT ROGAN: Yes, that's correct.

FLTLT ROSE: Was Diesel concerned about his own proficiency then, by making these comments?

CAPT ROGAN: I believe so, yes.

FLTLT ROSE: Were you concerned about your own?

CAPT ROGAN: I think we all were, about what was the appropriate prioritisation for development, and you can always say that you don't feel 100 per cent confident, because everyone has, you know, nagging doubts, but in terms of the allocation of resources to address that, we thought we were being short-changed.

FLTLT ROSE: You said before that you were mid-level Captains, and even now two years on you still say you're in the middle of the pack in terms of proficiency, if there's a ladder in terms of test pilots, QFIs, down to the junior pilots. Is it the case that when you're mid-level Captains, even though you're Troop Commanders, you are still needing to hone your skills and develop new skills as a pilot?

CAPT ROGAN: Very much so. And I think there have been examples of either side of the fence where personnel have posted into those positions with the appropriate qualifications and experience and seniority. But I've seen a number of occasions where personnel as early as Captain seniority 2 are posting in there without the appropriate category submission qualifications, and the stress and the angst that gives those individuals, while also dealing with a fully operational Troop, I believe, is unfair.

FLTLT ROSE: So it may be that a Captain 2 is a Troop Commander before they've even become an Aircraft Captain?

CAPT ROGAN: No, not necessarily. They'll still be of an appropriate seniority where they – and this is in the 5th Aviation Regiment's context – but they have the pre-requisites to be an Aircraft Captain, and they're executing those roles. But in terms of authorisation, it comes at a minimum of a B CAT standard in order to authorise other flying sorties.

Mission qualifications come at more senior categorisation as well, so it just sets them on the back foot, and with the large amount of workload and parallel to their administrative requirements when they're fulfilling that appointment.

FLTLT ROSE: Is there a way to quantify how many times a week you think, as an Aircraft Captain at that mid-level range, you need to fly per week to remain proficient?

CAPT ROGAN: Quite subjective on the individual. I personally, in my current state and experience, feel comfortable with what I fly proactively at the moment, but you would get a different answer from any different aviator that would be sitting in the seat.

FLTLT ROSE: When Diesel mentioned "highly demanding secondary positions that were being fulfilled by Squadron Troop pilots", what are some of those highly demanding Squadron positions? We've already discussed Troop Commander, but are there others?

CAPT ROGAN: Squadron Operations Officers are a finite resource, and quite overworked in my experience, and depending on how well they thrive; and then Squadron 2ICs, depending on the personnel within the Squadron.

FLTLT ROSE: You've mentioned Troop pilots in your statement. What's a Troop pilot?

CAPT ROGAN: A Troop pilot is a pilot qualified personnel that's posted into the Troop, and their primary and secondary role is just to fly. That's to allow them to develop again those pieces we've touched on – the proficiency, and competence, and exposure to the flying operations – that your specific unit does prior to the assumption of more demanding secondary roles.

FLTLT ROSE: So these are the junior pilots, essentially?

CAPT ROGAN: Normally, yes.

FLTLT ROSE: Do they have any secondary duties, even if they're not the highly demanding type?

CAPT ROGAN: Mine are secondary duties in line with their responsibilities as an Army Officer, bits and bobs around the Squadron. It could be Electronic Flight Bag Officer. It could be Publications Officer to the brew club, things like that.

FLTLT ROSE: We've heard reference to a Tea and Coffee Officer?

CAPT ROGAN: Yes, or they're running the bottles down to the recycling depot for money. So yes.

FLTLT ROSE: In your opinion, or not even in your opinion, is there a Standing Instruction or other form of document which states what year Captain you should be before you fulfil these Troop Commander, or Squadron 2IC, or Squadron Operations Officer roles?

CAPT ROGAN: The employment specification, whether it's called a manual or not, highlights what is the ideal career pathway and stream and

that normally has the Troop Commander around about that four to six-year mark at the seniority for Captain.

FLTLT ROSE: Paragraph 23, you state that Diesel then said some further words to BRIG Thompson, COL Pidgeon and D9, and they are, and I quote from your statement:

> *I no longer have time to remain proficient or confident within the cockpit because of the imposts of my secondary appointment and don't feel empowered to prioritise my primary role, a role that ultimately can kill me.*

CAPT ROGAN: That's correct.

FLTLT ROSE: Did you agree with what Diesel said in terms of the demands of the secondary appointments potentially leading to pilots becoming so distracted or not proficient enough that it could lead to their death?

CAPT ROGAN: Yes, I agreed, and I understood the consequence.

FLTLT ROSE: So you didn't think that was Diesel being overly dramatic?

CAPT ROGAN: Not in a safety critical industry, no.

FLTLT ROSE: I take it then that it's a common issue that you discuss as aviators, the risks involved in flying helicopters?

CAPT ROGAN: And the reality day to day. In my specific example at, the 5th Aviation Regiment I walk past tablets that have 18 names on them from '96.

FLTLT ROSE: So it's a stark reminder to you every day of the dangers that you put yourselves in.

CAPT ROGAN: It is.

FLTLT ROSE: At paragraph 30 you said that Diesel was a natural leader and that he felt confident to share these thoughts with the leadership panel. Is that correct?

CAPT ROGAN: That's correct.

FLTLT ROSE: So I take it that Diesel wasn't backwards about coming forwards and raising issues?

CAPT ROGAN: No, he wasn't, and he did it in his own informal way to diffuse the situation, and whether it was the Brigade Commander at the time, it would normally start with the boss, that would leave us, as a course, smiling. He was so informal, but a genuine way to get across a point and kind of level that gradient in the room at the time.

FLTLT ROSE: So did you find his manner effective in communicating concerns with a sort of informal, jovial tone?

CAPT ROGAN: I wouldn't say informal or jovial, but a way that diffused the rank differential in the room and be genuine in getting that point across instead of a "Yes/No, sir" kind of dynamic.

FLTLT ROSE: So even though Diesel was a natural leader, he did raise these issues. I take it that all of you on the course were comfortable sharing your own concerns?

CAPT ROGAN: We were more than comfortable and equally frustrated that both Regiments had the same feelings.

FLTLT ROSE: You also state that:

> *Diesel was more comfortable in directly communicating the realities of our concerns, despite the command gradients at times present during the course.*

What does "command gradients" mean?

CAPT ROGAN: So kind of what I referred to before, whether in your own context, senior management and the way you interact. It's not day-to-day interactions. It's not colloquial in nature with friends or other work colleagues. It's a senior officer that you're addressing which, for some individuals, can be intimidating or be a bit of a block if you want to raise a certain concern or make a remark or ask a question. But again, we felt a bit more – I shouldn't say empowered, but we were a bit more senior and diffused to that kind of anxiety as a course.

FLTLT ROSE: So you feel as if it was quite an honest and open session and course.

CAPT ROGAN: And it was, and that's the purpose of the course and the visit during that week at Gallipoli Barracks.

FLTLT ROSE: At paragraph 25 you state that the secondary appointments take up a lot of brain space, which can distract a pilot when they're in the cockpit. And you've already given evidence about that. Is this something that still happens to you now in your current role?

CAPT ROGAN: It does in terms of, again, having a chance to step outside of an operational Squadron has also allowed a bit of rest and respite, but these roles are demanding. There's frustrations at times with how things progress if you're involved in welfare incident management that drains you of a lot of empathy over a long period of time, and they all take a toll. So there's no one straw. It's a number of cuts, slashes, over a period of time that slowly eat away at you.

FLTLT ROSE: Can you turn your mind back to when you were a line pilot yourself, or Troop pilot, and you didn't have a highly demanding secondary role. Did you feel as if you had the brain space then to concentrate solely on the flying task?

CAPT ROGAN: In my specific example, I did. I was afforded that opportunity.

FLTLT ROSE: Are there examples where you've felt, now that you've taken on some welfare roles, that that's not always the case for Troop pilots?

CAPT ROGAN: It's, again, a mixed bag across the Squadrons and they're all so diverse in themselves. You can have personnel that come in and they go straight to operations. There's examples – and this is fantastic and this is what – you join to be an aviator as well as a junior line pilot, is to go on back-to-back operations, be it regionally, domestic, or internationally. So you're kind of enthusiastic and passionate to do that early in your career, and you're naive to the admin, the flux that goes on behind the scenes with the Command teams in those key positions in order to actually enable those, you know, operations, activities to go ahead.

FLTLT ROSE: How did BRIG Thompson, COL Pidgeon and D9 react to the statements that Diesel made during that course?

CAPT ROGAN: They all respectfully took note. I'll just look at the pseudonym. D9 made the effort to stay behind and had some more informal talks back and forth with us about our concerns, but they definitely weren't washed away and they were taken on, and that was the purpose of that brief and that Q&A. I make reference to it in my statement.

We weren't naive either, as a course, due to our maturity and our level of seniority, that just telling that to Brigade Commanders can have a change the next day. We were cognisant of the reality within the corps, but just relieved to have the opportunity as a small collective group. Which is quite rare in our organisation, to have the ear in such a small forum to get that point across.

FLTLT ROSE: You kept in touch with Diesel after this course, I take it?

CAPT ROGAN: I did and that's really where our relationship started, was on the course.

FLTLT ROSE: Did he ever mention to you that BRIG Thompson, or COL Pidgeon or D9 ever spoke to him about this particular concern he raised after the course?

CAPT ROGAN: No.

FLTLT ROSE: Did you ever speak to BRIG Thompson, COL Pidgeon or D9 about the concerns that were raised on this course after it had completed?

CAPT ROGAN: Not them specifically but, again, at most opportunities I am more proactive in raising concerns than others and I would – I still, to this day, chase those endeavours.

FLTLT ROSE: If you could turn to paragraph 28 of your statement. You state that during a similar session on the ROIC at Gallipoli Barracks with other senior officers, but you can't recall those particular officers' names. Is that still the case?

CAPT ROGAN: It would be unfair for me to throw names in there from the fog of my memory, but it was part of the Senior Leadership Team at the time.

FLTLT ROSE: You said Diesel also said words to the effect of:

> *There is a shared feeling amongst our respective Squadron aircrew that the Army are currently and continuing to cheat current and future generations of pilots by not prioritising their flying development during their formative and core junior Aircraft Captain years.*

By continuing to facilitate premature fulfilment of secondary Squadron and Regimental appointments by relatively junior Aviation Officers, this only serves to continue to compound overall job dissatisfaction, did not address perceived low levels of experience and contribute to separation rates.

Do you recall Diesel saying that?

CAPT ROGAN: I do. Words to that effect.

FLTLT ROSE: Did you agree with what Diesel said?

CAPT ROGAN: I did.

FLTLT ROSE: What do you think he meant when he said, "The Army cheating pilots by not prioritising their flying development during their formative junior Aircraft Captain years"?

CAPT ROGAN: As a course, we had discussed a number of times about how the efficiency of our new pilot training scheme was developing. The seniority of pilots that were graduating due to delays that were coming into the operational Squadron and how that accelerated their timeline to fulfilling secondary appointments because of those delays.

FLTLT ROSE: You said there was a new advancement program. Are you talking about the UTAP or something different?

CAPT ROGAN: No, I'm talking about the pilot training continuum at the time and the transition from what is now the legacy system that I graduated from to the new system that's both in combination with the Royal Australian Air Force and the Royal Navy.

FLTLT ROSE: Is there a name for the two different systems and a way to distinguish them?

CAPT ROGAN: The institutions themselves. So where it was quoted earlier, I was a graduate of the ADF Basic Flight Training School for both Basic and Intermediate Fixed-Wing Flying Courses and then the Helicopter Qualification Course of the Army Helicopter School. Those units and those training pipelines don't exist, nor do those airframes.

The new generation of aviators across the three Services are part of the first flight training school out of the RAAF station at Sale, and then the HATS system out of the Naval air station at *Albatross*.

FLTLT ROSE: And then for Army aviators, they may go to the School of Army Aviation at Oakey?

CAPT ROGAN: For their operational-type transitions. But there is no longer an Army specific ab initio helicopter training establishment like there was with the Army Helicopter School.

FLTLT ROSE: So HATS in Nowra is essentially joint?

CAPT ROGAN: It is a joint venture with the Royal Australian - - -

FLTLT ROSE: You said specifically this relates to the junior aircraft Captain years as opposed to the co-pilot years. Was there something specific about – I assume for Aircraft Captains there's a mixture. Those of you who went through the legacy system, those of you who have gone through the new system but you're all Aircraft Captains now.

Is there something particular about the development of Aircraft Captains that Diesel, you think, was referring to?

CAPT ROGAN: More Battalions to their window of development. You really have a timeline that started as soon as you post into an operational Squadron. It's a finite period of time. It depends on who you are individually and your own career progression, but it's normally stock standard to be there for four, five, six years, dependent on the individual.

And it all depends on where you sit seniority-wise when you go in there. So you can graduate from the pilot training continuum as a junior Lieutenant or, due to delays, you can be graduating in an operational Squadron as a first-year Captain. The secondaries, and the responsibilities expected of you, differ greatly if you're a Lieutenant to a Captain, and what you're susceptible to be tasked to do.

So in terms of – I'll use the latter case of a first-year Captain coming into a Squadron. They really have one or two years where they are quarantined and left alone before they are now eligible to be posted into an operations role and assume another secondary or supporting position because of their seniority as an Army Officer.

FLTLT ROSE: And when Diesel referred to the premature fulfilment of secondary appointments, is that – when he said "premature", did you understand him to mean that people weren't ready for those more demanding secondary duties, or that they just weren't ready to move away from the primary focus, being their flying?

CAPT ROGAN: The latter.

FLTLT ROSE: It's not that the administrative tasks were too much necessarily, it was just that it was taking them away from flying - - -

CAPT ROGAN: They had not – yes, they had not been afforded the time to be quarantined and focused solely on flying to develop to a state that they were comfortable to do that concurrent with a secondary appointment.

FLTLT ROSE: Do you think that included yourself in terms of your training continuum?

CAPT ROGAN: No. I was fortunate, and there's a few cases where I pretty parallel with the employment specification for my timeline.

FLTLT ROSE: Do you know whether Diesel was promoted prematurely to the high demanding secondary appointments?

CAPT ROGAN: I don't know.

FLTLT ROSE: And why do you think he said, "This leads to job dissatisfaction and contributed to separation rates"?

CAPT ROGAN: Everyone joins to be an aviator – to be an aviator. And the sooner that's taken away from you, yes, it's dissatisfaction in that alone, let alone if it's a highly competing or a highly compounding secondary appointment and then you see your own flying skill and progression regress as a result of that. So that's both a hit in pride, job satisfaction and morale that you're taking a step back at that point.

It really empowers the individual when they are quarantined from these roles to seize every opportunity they can before it ultimately takes a back seat.

FLTLT ROSE: And are there high separation rates, particularly in 5 Avn?

CAPT ROGAN: There are when it gets to a piece but unique to aircrew, we are under a return of service obligation of – depending on whether you have a tertiary degree funded by the Australian taxpayer or not, you have an obligation of 13 years to serve. Whether you are dissatisfied with your workplace, whether you're unhappy, whether you love your job or not, you have 13 years of service before you make a decision, bar a financial penalty.

FLTLT ROSE: Now, you heard Diesel speak these words in 2022. Do you still think that the same concerns exist today in Army Aviation?

CAPT ROGAN: I think they've existed in the history of Army Aviation.

FLTLT ROSE: Is that a yes, that they still exist today as well?

CAPT ROGAN: Yes, in various degrees.

FLTLT ROSE: At paragraph 35 you refer to the DFSB's annual snapshot survey. What is this?

CAPT ROGAN: Defence Flight Safety Bureau, it's the tri-service safety bureau for Aviation flying operations within the ADF itself. Yearly – I think it is yearly and they've just released one over, I think, May or March this year. They'll release anonymous surveys for flying Squadrons across all three Services in which the workforce will answer its set bank of questions that are pretty routine over the years, through the survey.

And then some space there for some larger submissions, be it on your experience. What the DFSB does with these survey results is they correlate all that date. It's set data, year to year with certain parameters, and then they're able to provide, down the track, a briefing pack for individual Commanders at the formation level, the COs, the OCs, the Maintenance Troop Commanders, et cetera, that break down their individual workforces and their parameters of performance.

And that's able, and routinely is, debrief by Commanders to those workforces on how they're performing. But the benefit of having years of this survey data for your specific unit is you can compare previous years. You can compare yourself to other Squadrons within Army Aviation. You can compare yourself to a Squadron within the Royal Australian Air Force on performance parameters, what the median result is.

And it gives you a pretty stark picture of the pulse of your unit and how healthy you are, as compared to those parameters that the DFSB survey on.

FLTLT ROSE: I take it that you listen to some of these back briefs every year that are delivered to C Squadron in 5 Aviation? Or was it more generally 5 Avn?

CAPT ROGAN: From memory, and during my time at the Squadron, it's normally presented by your OC to your specific disciplines. If you're an MRH pilot it would be from you're A or B OC. In my case, it was always

the OC C specific to CH-47.

FLTLT ROSE: And you said before that you can gauge a stark understanding of where you sit in the organisation compared to other Squadrons, or even within your own. What are the common concerns that you have noticed across the last couple of years of snapshot survey results?

CAPT ROGAN: In my specific examples and my Squadron, it's organisational burnout, it's tempo, it's fatigue, it's overtasking, it's the inappropriate prioritisation of administrative roles or tasks. They're the common themes that are across them and I can recall. And I'd expect to get a debrief in the next couple of months as part of the Regimental debrief.

FLTLT ROSE: So those concerns have existed, in your understanding, over a number of years?

CAPT ROGAN: Yes, and that's on display for the Squadron to see as well, with the parameters from previous years and where your results stack up generally against the rest of the organisation.

FLTLT ROSE: Have you seen change as a result of this continuous feedback relating to organisational burnout, fatigue, et cetera?

CAPT ROGAN: No changes that have resulted in significant parameter results being changed. I'd say that the Commanders, they're always in their best wishes to change these parameters, but in our organisation with the pace that we're tasked, the adult nature of our operations, it's hard for individuals to instigate that change, given our posting cycles, the ebbs and flows of our recruitment and our separation rates. But to have that presented, as an individual it's quite disheartening to see organisationally where we sit and where we have always sat as an organisation, at least from the workforce and how we feel.

FLTLT ROSE: Correct me if my maths is wrong, you've been in the Army for about 13 years?

CAPT ROGAN: Correct.

FLTLT ROSE: And Army Aviation for most of that; 10 of those years?

CAPT ROGAN: Yes, since 2016.

FLTLT ROSE: Is it the case that the whole time that you've been in Army Aviation there has been complaints and concerns about organisational burnout and fatigue, and other issues like that?

CAPT ROGAN: When you're part of the training system and you're young and naive and you're happy to sacrifice holidays and doing everything, you don't care, your horse blinkers are on and, you know, "I'm not getting out of this job for another six years". It's like I want to get after this. I think it's just the toll of your duration within that environment that it slowly creeps in. So you can talk to any young aviator and you can talk to me now and I'm proud to be an Army Aviator, and I think everyone is. I think it just slowly, over time, it's an environment that's – it's a young man's game, that's what it is. You don't see old fellas playing footy. Rarely.

MS McMURDO: Does it have to be?

CAPT ROGAN: I think what the Australian government expects of the capability, it does, in terms of the flexibility that is required, the sacrifice that's required. And that's also, ma'am, why you join, because you look for that excitement and that adventure. But you really have to temper and balance and prepare yourself so you don't become that statistic of burnout and you're not contributing in that facet, and you do enjoy your career, however long that is.

AVM HARLAND: If you had the resource to support you administratively and you had sufficient aviators in the Squadron to fulfil the tasking, would that be different?

CAPT ROGAN: I think it would. And I'm not ignorant that any organisation, it doesn't need to be Aviation, within the Australian Defence Force right now is struggling with staff levels and what's being asked of us increasingly by the government, by the public. Everyone's just trying to do the job and we're trying to do the best we can with the people that we have.

AVM HARLAND: During your time at the unit, did you always have the right number of people to fill the right number of positions that were set up for the unit?

CAPT ROGAN: On occasions we have, but I think the vast majority is we make do with the people that we have and we are deficient what our staffing levels and positions should be.

AVM HARLAND: Yes. So from that, and in kind of layman's terms, the organisational structure had gaps in it. But did you still feel that the tasking was for the organisational structure that was set up, not for the number of people that were in it?

CAPT ROGAN: Correct.

AVM HARLAND: Thank you.

FLTLT ROSE: Paragraph 38 of your statement you mention there are other ways that personnel can share their concerns about operational safety and you say that's within their chain of command, including to the Troop Commander, the Regiment Aviation Safety Officer, the OC or the CO.

CAPT ROGAN: Yes, that's correct.

FLTLT ROSE: You said:

> *Operational aircrew also routinely assist with the construction of content for the presentation to Airworthiness Boards and the WSWG in support of their OC.*

CAPT ROGAN: Yes, the Weapon Systems Working Groups.

FLTLT ROSE: So say that again?

CAPT ROGAN: Weapon Systems Working Groups.

FLTLT ROSE: So what is that?

CAPT ROGAN: So that is a – I think it's biannual – again, I'd have to take it on note with how frequently it sits, but it is specific to the weapon system. And don't think rifle, think weapon system in terms of the aircraft. So there'll be a specific Weapon System Working Group for CH-47, as there is for the Black Hawk, as there is for the MRH.

FLTLT ROSE: So it's a weaponry worthiness assessment?

CAPT ROGAN: Yes, it's a chance for the Command team at higher levels for Brigade and Avn Command to have a pulse on that operational capability, what they're doing well, what they're struggling with, what the concerns are, et cetera. It's easier in the 47 context, because there's only a Squadron, but as the operational Squadron, you contribute that data and prepare that data for presentation.

FLTLT ROSE: So in terms of the Airworthiness Boards, is it – can I understand from your evidence that personnel can make confidential references to Airworthiness Boards about safety concerns?

CAPT ROGAN: No. So that's not the purpose for the Airworthiness Board, but it is a chance for your Officer Commanding and your capability in general to raise concerns that you have with the capability, whether it's inappropriate equipment, whether it's falling behind on your rate of effort in terms of flying hours, or a serviceability issue that you've found, or it's – again, it's manning or staffing levels that you're struggling with or the expectation in terms of operational tasking is too much or too little. It is just that touchpoint with higher level on a frequent enough basis each year to update the Command team.

FLTLT ROSE: Is there a way for aircrew to make confidential complaints to anyone? Perhaps the Director of Operational Airworthiness or some other – the DFSB? I know there's the annual snapshot surveys, but a specific complaint in a confidential nature?

CAPT ROGAN: There is a mechanism, and the phraseology behind it escapes me at the moment. I think "something pause" – or not "pause". I'd have to get back to you on what it's called. But there is a mechanism where someone can instigate what flags at a higher level within the Safety Management Team where they'll come down and visit a unit and essentially put a pause on operations until they address the merits of that submission.

FLTLT ROSE: Has that happened often in your career?

CAPT ROGAN: Not that I can recall, no.

FLTLT ROSE: Has it ever happened in your career?

CAPT ROGAN: Not that I can recall here.

AVM HARLAND: Are you familiar with a confer?

CAPT ROGAN: That's what I'm referring to, sir, yes, a confer.

AVM HARLAND: Thank you.

FLTLT ROSE: At paragraph 38 you said that despite these various avenues in which you can raise safety concerns, you're not naive to the

reality that these reporting mechanisms may be difficult for some due to real or perceived presence of a command gradient.

CAPT ROGAN: Yes. And it's touching on the point again, being the one that's making a grievance or having concerns about, whether they are real or perceived, the consequences of bringing that complaint forward. And I'll only talk to my own irrational anxieties that would be around it, would be, "How does that affect my career, if I'm the one that puts a complaint in? How will that affect my longevity within the capability? Will I still be afforded an opportunity?" Now, this is just specific to me and they are not necessarily realistic anxieties to have, and nor have I seen examples where people have been shut down or anything like that as a result of raising their hand, but that is natural with junior aircrew, those that don't have their confidence or the seniority to understand the role they play within the system.

FLTLT ROSE: So you suspect, but you're not sure, there may be a stigma about speaking up because it may affect your career?

CAPT ROGAN: Not a stigma, but the confidence behind putting your hand up while you're a junior aircrew.

FLTLT ROSE: You also raise an issue at paragraph 39 about the additional pay that's paid to Troop Commanders in the Army and that Troop Commanders do not receive that additional remuneration for performing that role until they're a seven-year Captain, regardless of at what stage they were Troop Commander. Can you explain that?

CAPT ROGAN: So early in my career we transitioned over to a new pay scheme as part of our enterprise bargaining agreement – that's probably the wrong terminology again, I apologise – but where there was an inequity between what were senior aircrew at the time under a legacy pay system, and the junior aviators at the time were unfairly being underpaid – not underpaid, they were paid in accordance with the current pay scales, but there was a large differential between pay scales at the time. As part of that grievance, over time, a new package was submitted and approved by the Commonwealth, in which we had to fight to recognise Troop Commanders as a Command position.

Unique to Army, Troop Commanders are an O3 or a Captain position level, whereas the equivalents in the Royal Australian Air Force or the Royal Australian Navy are Flight Commanders, and they're an O4 or Major position. And part of that – and this is my understanding from the presentations that were given all those years ago. Part of the fight to receive that pay, despite that being a position for those other two Services,

was to not allocate it until your seventh year because of the veto rights that the other Services had on a subordinate receiving a similar pay to that O4 level in their Services.

FLTLT ROSE: So the result of that is you yourself started fulfilling the Troop Command position when you were about five-year Captain?

CAPT ROGAN: So last year I concluded, so I was a fourth year and fifth-year seniority Captain.

FLTLT ROSE: And you didn't receive any additional remuneration fulfilling that role until next year; is that right?

CAPT ROGAN: It's next year and it's also conveniently a year plus of everyone's return to service for 13 years. So in terms, it's just a sly retention bonus.

FLTLT ROSE: So if someone did leave after their return to service, they may never get that additional remuneration?

CAPT ROGAN: If you left before it, you wouldn't be entitled to it.

MS McMURDO: So do you get the back pay then for the time you've done it, or it only starts with certain things?

CAPT ROGAN: No, ma'am. I'd have to be a Captain 7 to receive that, and I have to proactively submit evidence to have that pay scale changed.

MS McMURDO: So it's only moving forward. It's not for what you've already done?

CAPT ROGAN: No, ma'am.

MS McMURDO: When did that come in, that pay package, do you remember?

CAPT ROGAN: I could give you a rough estimate, ma'am.

MS McMURDO: Please.

CAPT ROGAN: It would be – that was the legacy, the GOPS to OAPS pay system, and I was a junior aviator in the Squadron at the time, so I'd have a guess at 2019.

MS McMURDO: Somewhere around then.

CAPT ROGAN: Ma'am.

MS McMURDO: All right, thank you.

AVM HARLAND: Can you just confirm that if you're in a Troop Commander position and you haven't – you're not a Captain 7 at the time, you're expected to fulfil the complete role of a Troop Commander?

CAPT ROGAN: The responsibilities and duties don't change.

AVM HARLAND: Okay, thank you.

MS McMURDO: So how does the current pay arrangements compare to the Air Force and Navy?

CAPT ROGAN: Similar scales and without having the scales in front of me, ma'am, I wouldn't be able to accurately quote them.

MS McMURDO: You couldn't say.

CAPT ROGAN: But aviators in both the Navy and the Army are on the same pay scale as air mobility or general pilots in the Air Force. The fighter group are on a higher pay scale. Where it differentiates, sorry, is at that Flight Commander or Troop Commander pay level.

MS McMURDO: And you might not be able to answer this, but do you know whether in the Air Force and/or Navy the pilots are given the same responsibilities that Army - - -

CAPT ROGAN: My understanding is the roles and responsibilities of Flight Commanders and Troop Commanders are very similar, and that's through my interactions with Flight Commanders on embarked operations. The Air Force piece I can't speak too closely to, but in my – I guess in my engagements with friends and colleagues in the Air Force, it's my understanding through them that it's a very similar role.

MS McMURDO: Thank you.

FLTLT ROSE: Do you know what year CAPT Diesel was in 2023?

CAPT ROGAN: I wouldn't be able to tell you when Diesel promoted to Captain from Lieutenant, but he was at ADFA. He would have started ADFA in 2010, so he was two years my senior, but it all depended on when he graduated – when he was promoted from Lieutenant to Captain,

when that seniority started. So he was either a Captain 6 or a Captain 7 at the time of his death.

FLTLT ROSE: Does this contribute to the job dissatisfaction that you mentioned earlier in your evidence?

CAPT ROGAN: It does.

FLTLT ROSE: I'll ask you some questions now about the structure of – in terms of 5 Aviation's flying periods, do pilots in 5 Aviation fly every day of the week?

CAPT ROGAN: Yes. There are times when we try and quarantine Fridays, but the reality for maintenance of activities, taskings, exercises, we're essentially flying most business days, yes.

FLTLT ROSE: Do you fly weekends?

CAPT ROGAN: Only on dedicated exercises and operations.

FLTLT ROSE: Do you fly school holidays?

CAPT ROGAN: There are periods where the Commanding Officer – and this will vary over different iterations of Commanding Officers where they'll purposefully allocate reduced tempo periods and they're aligned with your state's school holiday period for those with families and young ones. It will be on the basis of what kind of maintenance follow-up or how behind we are on maintenance actions for the aircraft as to whether we try and book that two-week period out.

It's normally two weeks for school holidays as no flying, or we give the chance that there is no flying to both appropriately rest our maintenance and flying workforce prior to a second week being maintenance operations or limited flying for the other units of the Regiment, or the other CH-47 operators in my specific case.

FLTLT ROSE: Do you fly December-January?

CAPT ROGAN: We're not supposed to. I should say we're not supposed to. We're always on standby to fly during the high-risk weather season within Australia. But throughout my experience, I think there was one year we haven't been called out on multiple – on multi month-long operations over that period.

FLTLT ROSE: Sort of bushfire, flood assist, that sort of - - -

CAPT ROGAN: Bushfires, cyclones, volcanic eruptions, tsunamis. Every year it changes.

AVM HARLAND: So these reduced tempo periods, does that mean that the Squadron shuts its doors and everyone goes on leave, or is that - - -

CAPT ROGAN: That's what the Commanders would like. Again, you can't order someone to take leave. It just sets the conditions for there not to be work to entice someone to be there, so those with families will routinely take leave. Singles and some other people that don't want to burn their leave and save it for the festive time of the year will just parade at work, core business hours – catch up on some PERS admin, et cetera.

AVM HARLAND: What do the Executive Team of the Regiment and Squadron do during those periods?

CAPT ROGAN: They'll try and take leave. Again, it's personal preference whether they want to try and take their leave or if they can get away from their admin roles. What I witness is a lot of these key Command positions are quite finite in duration, 24 months, 18-month postings, and as a Commander – and as I was as a Troop Commander, and I see it in other Troop Commanders as well, you're just trying to keep the train on the tracks and you look at that as a period of time to catch up. So you normally don't take leave. You bank that up and wait until the end of your Command position to have a nice reset.

AVM HARLAND: Okay, thank you.

MS McMURDO: You're only entitled to four or five weeks a year, aren't you?

CAPT ROGAN: It's quite generous, ma'am, but in terms of when you can actually take that, ideally everyone likes to stand down over Christmas. But my experience is over the five to six years I've been in the Squadron, every year I've been called out and it gets to a point where why do you make bookings when you're just going to have to cancel and leave your family interstate, when you can just stay local and be prepared to call out as you see the next cyclone or bushfire or governmental decision that's pending.

And then when these actions are occurring, naturally as a Command team you're standing the Squadron up and getting them ready to react at the drop of a hat because we've done it so often and we know the precursors

to when we get the call. So there's a lot of lead-up action that we're required to do.

MS McMURDO: But is it only the position you can actually leave and switch off and be away from work when you actually take the four or five weeks' annual leave which you're entitled to – and from what you've said, not always then – but what I'm saying is if everyone took all the school holidays and all of the December-January period, it's a lot more than four or five weeks a year.

CAPT ROGAN: That's correct, yes. That would exceed what your annual leave balance is, but I guess for those that don't have leave, it also affords, in barracks, a period where flying isn't drawing that extra attention or work effort. That if you don't leave, it's still low tempo in the barracks that you can rock up in the morning, do some PT, have an early night, have a coffee and not worry about running out to an aircraft and doing maintenance, or flying it, or prepping for the next mission.

It's a chance there that Command have said, "No, we're not going to distract you with X", which is normally flying, "and you can just catch up in your own means, if you don't want to take leave, with your personal pursuits".

AVM HARLAND: So if you're on a period of leave, is there an expectation that you would get called out or you would be available to be called out?

CAPT ROGAN: Yes. I'm not sure I can, in this forum, quote what our recalls are, but you can take leave but you are on a register that if X, Y and Z happens, you are back here in that time period. So it's hard to switch off on leave or plan a holiday that doesn't surround work because you need to be back in barracks starting that aircraft in that timeframe, or you're in a key leadership position that requires you to be there even earlier to plan and engage and liaise in order to effect that.

AVM HARLAND: So when you're on leave, you still hold standby requirements.

CAPT ROGAN: Correct.

AVM HARLAND: Okay. Thank you.

FLTLT ROSE: Paragraph 44 of your statement, you state that:

There was a near miss involving two MRH-90s who were flying in a mixed formation during Exercise VIGILANT SCIMITAR in 2020.

CAPT ROGAN: Yes.

FLTLT ROSE: You weren't flying in that sortie, were you?

CAPT ROGAN: No, I was not.

FLTLT ROSE: But you were flying in that Exercise?

CAPT ROGAN: I was.

FLTLT ROSE: And do you recall what the specifics were of the near miss?

CAPT ROGAN: It was a night-time, mixed-type formation – and this is open source as well, through reporting – night-time, mixed-type formation, with the three Regiments in situ, and there was a re-join, after an extract of soldiers. And during that re-join there was, I believe – and I don't want to misquote – but I think there was some spatial disorientation during the re-join, and some high closure rates between aircraft that required positive handover of controls to rectify that closure rate, which then resulted in a loss of sight and loss of separation between two MRH-90s with fully laden combat loads on them.

FLTLT ROSE: Was there an investigation, or an initial investigation, into the incident within 5 Avn?

CAPT ROGAN: There was, initially. And that was instigated by the Regiment, post the accident – post the near miss, or the incident itself.

FLTLT ROSE: Was the exercise paused or discontinued after that near miss?

CAPT ROGAN: I think, due to it being a night flight – as is standard in our operating procedures, there are formation debriefs that are conducted. That was conducted of a night. But it wasn't until aircrew had that overnight period to reflect on what occurred that, the next day that was brought up again. The crews reconvened to discuss it, and that day's exercise flying was cancelled as a result of what was revealed.

FLTLT ROSE: Paragraph 46. You said the investigation was reopened by the DFSB six or 12 months later?

CAPT ROGAN: Yes.

FLTLT ROSE: Why is that?

CAPT ROGAN: My understanding is, from the aircrew involved, there was some dissatisfaction about the acknowledgement of the severity of the near miss, or how close the aircraft came. And it was – it took a bit to raise that grievance and that concern about how close it actually was, as compared to the initial reporting for it, to be escalated in terms of its categorisation of – as an ASR, to warrant DFSB's investigation.

FLTLT ROSE: ASR, is that an Air Safety Report?

CAPT ROGAN: An Aviation Safety Report. Yes.

FLTLT ROSE: And you said, at paragraph 47, that the DFSB made a number of recommendations following their investigation, and that Aviation Command introduced a number of SFIs, following the incident on 28 July 2023, that specifically related to the near miss back in 2020?

CAPT ROGAN: Yes. So my understanding was, as part of that Class B report, a number of recommendations were made to our Command at the time. So that would've been 16 Aviation Brigade, before the formation of Avn Command. Those recommendations related to a number of parameters about exploring how we gauge illumination levels, our formation flight recency tracking, proficiencies, et cetera. And it wasn't until post the 28th that those recommendations that were hungover from 2020 were implemented in terms of methods of tracking the last time you were in formation flight, how recent you were in more safety-critical phases of light, et cetera; and a means, in excess of what we had at the time, of gauging illumination levels by night.

FLTLT ROSE: Was that a surprise to you, that it took until the second half of 2023 for recommendations relating to a near miss in November 2020 to be implemented?

CAPT ROGAN: Yes.

FLTLT ROSE: So that was, in your experience of 10 years in Army Aviation, an extra – a long period of time for recommendations to be implemented?

CAPT ROGAN: I had seen examples where some recommendations go through quite quickly. But in the majority of cases, it's a slow evolving

beast, the organisation itself. And to effect change, I've routinely observed that it took time.

FLTLT ROSE: Did you receive any specific back briefs as to why it took so long to implement these particular recommendations from that near miss in 2020?

CAPT ROGAN: No, I did not.

FLTLT ROSE: At paragraph 48 you do state though that significant changes were made in 5 Aviation Regiment following the near miss and the investigations, such as:

> *redesigning the UTAP and increasing emphasis on formation flying recency, instructions, supervision, and the restriction of certain Flight Authorisation Officer privileges.*

Was that specific to 5 Aviation, or was that across Army Aviation generally?

CAPT ROGAN: From what I recall – and I don't want to say that it didn't happen across all of Army Aviation, but in our specific example, the 5th Aviation Regiment, it was – they pertained to us, as they were 5th Aviation Regiment special flying instructions that were issued at the time.

FLTLT ROSE: You were part of Exercise TALISMAN SABRE 2023, weren't you?

CAPT ROGAN: Yes.

FLTLT ROSE: At paragraph 50 you state that you were the Operational Troop Commander for the embarked Medium-Lift Helicopter Troop aboard the HMAS *Adelaide*?

CAPT ROGAN: Correct.

FLTLT ROSE: And which airframes were part of this MLH Troop?

CAPT ROGAN: So Medium-Lift Helicopter is – the only MLH helicopter we have in the Australian Army is the CH-47.

FLTLT ROSE: And you were based on HMAS Adelaide throughout Exercise TALISMAN SABRE?

CAPT ROGAN: It was a mix. So again, two operational Troops in the Squadron at the time. I commenced that activity as part of a Force integration training piece, alongside the 1st Aviation Regiment and A Squadron, flying MRH-90, land based, out of Townsville, while my sister Troop embarked on HMAS *Adelaide* to conduct the two first exercises of that. And then there was a swap, where I completed the third part of that amphibious exercises. In terms of on the ship at the time, we shared the flight deck with 186 Squadron, with their anti-submarine helicopter, which is a MH60-R.

FLTLT ROSE: As of 28 July 2023, you were embarked on HMAS *Adelaide*?

CAPT ROGAN: Yes.

FLTLT ROSE: Which was offshore, between Mackay and Rockhampton?

CAPT ROGAN: Yes.

FLTLT ROSE: At paragraph 54 you said you were:

> *flying a Chinook as part of a two-ship formation on 28 July 2023, in support of the Australian Amphibious Force's night-time long overwater flight airborne insertion of the Joint Pre-Landing Force into Shoalwater Bay Training Area near Rockhampton*.

CAPT ROGAN: Correct.

FLTLT ROSE: So in layman's terms, you were flying a sortie on the night of 28 July?

CAPT ROGAN: Yes. So it was a tactical insertion of the Pre-Landing Force to set the conditions for the amphibious lodgement, for the Australian Amphibious Force, at the time.

FLTLT ROSE: In terms of the timing of that, you finished your duty for the night at about 11 pm – so 2300 – and went to bed?

CAPT ROGAN: It would've been around about midnight, in terms of post-shutdown aircraft, maintenance actions, debriefing for the formation, et cetera, and then the receipt of orders for the next day. It was normal for us to retire at around that midnight mark.

FLTLT ROSE: So when did you hear about the crash of Bushman 83?

CAPT ROGAN: That day. I believe it was a gazetted rest day for the Force, for the flying Force, at the time. So we got an all-hands muster on the light vehicle deck, as a whole of Force ship's company, and AAF at the time, where Command of Land Forces, COL Pashley, briefed us that overnight 6 Avn – 6 Aviation Regiment – had lost a single MRH-90 in the vicinity of Hamilton Island – or Lindeman Island at the time, and that the condition of the crew was unknown, and that in effect the exercise was currently paused.

FLTLT ROSE: And you understood, from your briefings, that AMSA was coordinating the search and rescue?

CAPT ROGAN: So at a later date, or over the ensuing hours – and I guess that 24-hour period – we understood. And the Operations Team of the AAF, and the ship's company there, had shifted tack to now the search and recovery effort and supporting that, and that was in support of eventually having the Australian Maritime – so AMSA; the full acronym evades me – but having AMSA takeover command and control of the accident site.

FLTLT ROSE: So is it your understanding, from the briefing on 29 July, that it was already a search and recovery operation?

CAPT ROGAN: With the fog of time, I remember being the Troop Commander as well, I was in and out of operational briefs with the AAF on updates on what was going on. I was privy to that 6 Avn had flown to the end of their endurance that night. Central Queensland Rescue, out of Mackay, was flying in support. And I think the coalition partners, as part of the Special Operations Aviation tasking at the time, with fixed-wing assets, were continuing to fly. And that it was expected that we were soon to commence in support of those actions, alongside other Brigade assets in Townsville.

FLTLT ROSE: In your statement you state at paragraph 57 that from 30 July 2023 the HMAS *Adelaide* took over from HMAS *Brisbane*. Is it that you and your Troops started assisting in the search and rescue, or the search and recovery, on 30 July?

CAPT ROGAN: I believe so. I'd have to reference my flying logbook on the specific day, but I think the day we arrived on station was the morning of the 30th and by that time we were already in receipt of AMSA search pattern instructions, allocating sectors to individual aircraft to contribute in the search and rescue. I can't recall when it changed from search and

rescue to search and recovery but we were still under the impression that the aircrew – their state was still unknown and we were looking for them.

AVM HARLAND: Just a question. Noting that you were flying in TALISMAN SABRE '23, what did you understand to be the search and rescue/emergency response arrangements for Aviation for the exercise, i.e. like was there a standby chopper or was that assigned to a particular task unit?

CAPT ROGAN: So, sir, normally when we're embarked on our operations, we hold our own search and rescue capability. It's more of an alert status than an active status. So that is held internally with the AAF or the Aviation Task Unit afloat or embarked. For exercise season, I wouldn't be able to quote directly on that exercise, but I know that contracted medical evacuation, helicopter medical evacuation, AME, is normally contracted or it's held by an Aviation unit. Whether that was held organic to Army or whether it was contracted normally through Toll or Life Flight, et cetera, that is the norm on this scale of exercise. It's more geared towards land-based AME evacuation for personnel and live-fire exercises than it is for any helicopter crashes or incidences. That's normally held internal to that flying unit.

AVM HARLAND: So with that, there would be, like, a designated alert crew so that they were able to basically turn pretty quickly should they need a response?

CAPT ROGAN: For the land-base Force, that's correct. In terms of how we run embarked operations just due to how small our footprint is, we don't have an active crew when we stand down from flying operations. We're relying on formation aircraft and we have certain procedures in place where, without a serviceable jet ready to respond or a crew, then there's different parameters that we fly to enable a formation to respond to one another if it was a single aircraft incident.

AVM HARLAND: And that's all documented in your 5 Aviation SIs, or - - -

CAPT ROGAN: Not my discipline, but in terms of where those restrictions specific to the exercise and what capabilities there are, that would be part of the RMP that's generated for a specific exercise. But every Regiment will have their own crash response procedures. 5 Avn has their own crash response procedures that are – they're updated and managed through the Regimental Aviation Safety Officer.

AVM HARLAND: So it's like an organic unit: manage search and rescue capability.

CAPT ROGAN: Yes, and that complements, in our case, the RAAF stations' organic capabilities and Air Services crash response.

AVM HARLAND: Great. Okay, thank you.

FLTLT ROSE: At paragraph 58 of your statement, you state that you and your Squadron who embarked on HMAS *Adelaide* flew for one week with two aircraft per day, up to 10 hours per day in conjunction with a helicopter from 816 Squadron and the aircraft from 1 Aviation Regiment and the US Air Force. That's how long you were involved in the search and recovery and rescue efforts?

CAPT ROGAN: Yes, we were on station flying immediately and there was a period of time where the transfer of command and control and responsibility for where it changed from search and rescue to search and recovery, where AMSA had handed over to the AAF and the Commander of the Amphibious Task Force. Her name escapes me at the moment, but she was made the Commander for that JTF.

FLTLT ROSE: Would it be CAPT Phillipa Hay?

CAPT ROGAN: That rings a bell, yes.

FLTLT ROSE: You also, as part of flying over the area of operations searching, were also flying various people from the HMAS *Adelaide*, including QPS and DFSB personnel, around the area of operations?

CAPT ROGAN: Yes, so to enable that liaison because that FTF Headquarters was embarked aboard HMAS *Adelaide*. We had QPS elements out of Proserpine. We had people flying in from DFSB and that required a lot of coordination to have those key leadership teams meet with one another. So we also had some aircraft dedicated to enabling that.

FLTLT ROSE: When did you find out who the crew was of Bushman 83?

CAPT ROGAN: I make reference that I don't think I can recall in here, but I believe it was communicated to us individually as a task unit – sorry, not as a whole but through our Squadron Command Team, who the individuals were.

FLTLT ROSE: At paragraph 61 you said that the embarked Aviation combat element on HMAS *Adelaide* were able to assist with identifying

parts of Bushman 83 as they were brought ashore because they used to work with MRH before they'd been reassigned as part of 5 Aviation's transfer to the Black Hawk. So were you, yourself, involved in the identification of the debris?

CAPT ROGAN: No. So as a result of the withdrawal of the Special Operations Aviation Task Unit from Proserpine at the time, the local police salvage operations asked the flight our capabilities. They were struggling to identify what was sea debris versus what were aircraft components. This is last year, so at this point B Squadron, our sister Squadron within 5 Aviation Regiment, no longer flew MRH-90 and had lost a whole maintenance workforce during that period and they were, over the ensuing period, requalified and retrained to be CH-47 maintainers. We had X maintainers as aircrew, et cetera, and they all volunteered at the time to assist with the local authorities, in the absence of that SME being there, to help distinguish what were MRH componentry.

FLTLT ROSE: At paragraph 62, you said you were involved in escorting some of the MRH-90s that had been left at Proserpine after the incident back up to Townsville. I take it that was the – do you remember how many MRH-90s were transported back up to Townsville?

CAPT ROGAN: I can't recall the total number. I think there was four or five down there, but my participation only was the remaining airframe.

FLTLT ROSE: So the final airframe, you were involved in the road transport back up to Townsville?

CAPT ROGAN: Yes, because of the CCI that was carried on board, it couldn't be a civilian-only operation and required security pickets that were supported by 3 Brigade and the 5th Aviation Regiment over the time until the appropriate authorities said they could release those aircraft and it was determined that they wouldn't be flying out of there.

FLTLT ROSE: What's the CCI?

CAPT ROGAN: Classified crypto something, but it is – has a security classification assigned to equip. They can only be safe – or can only be handled by service personnel with the appropriate clearances.

FLTLT ROSE: You've given evidence to this Inquiry about your relationship with Diesel. You went to his funeral?

CAPT ROGAN: I did.

FLTLT ROSE: Did you know LT Max Nugent?

CAPT ROGAN: I'd engaged with him a few times when he was posted to the 5th Aviation Regiment – he was in a sister Squadron – and that would have been informally over the years at functions, but I didn't know him well, no.

FLTLT ROSE: Did you ever fly in a formation with Max?

CAPT ROGAN: Without reference to Max's logbook, I wouldn't be able to confirm that.

FLTLT ROSE: Did you know WO2 Phil Laycock?

CAPT ROGAN: I had heard his name around because of his seniority, but I don't believe I ever met him, no.

FLTLT ROSE: Did you know CPL Alex Naggs?

CAPT ROGAN: Through my partner, who's an aircrewman. I think she was of the same vintage and graduation as Naggs, so I would hear about him through her. But I don't think I had personally met him, no.

FLTLT ROSE: Those are my questions.

MS McMURDO: Thank you. Just one clarification for me. Could I take you to paragraph 48 of your statement, please? Going back to the changes that were made within 5 Aviation Regiment after the near miss in 2020. In light of the DFSB investigation which you said was about 12 to 18 months later, then in paragraph 48 you set out some changes that were made in terms of redesigning the unit training and assessment program and increasing the emphasis on formation flying recency, instruction and supervision and the restriction of certain flight authorisation officer privileges. Was that made before or after 28 July 2023?

CAPT ROGAN: That's was all before, ma'am.

MS McMURDO: Are you able to say whether that was done in other Aviation Regiments, Army Aviation Regiments, or whether it was just 5 Aviation.

CAPT ROGAN: I couldn't comment on the other Regiments.

MS McMURDO: You don't know.

CAPT ROGAN: Again, just due to the breadth of publications, I only read ones applicable to 5 Avn. And at the time, they were just released for our eyes.

MS McMURDO: Thank you. Any applications to cross-examine? Yes?

COL GABBEDY: Yes, thank you.

MS McMURDO: Yes, COL Gabbedy.

<CROSS-EXAMINATION BY COL GABBEDY

COL GABBEDY: Afternoon, Captain. I'm Nigel Gabbedy. I appear for MAJGEN Jobson, the Commander of Army Aviation. I've just got a few questions on your statement. When you go through the pilot stream, you've got two main options, do you not? You can go down the Qualified Flying Instructor's stream or the Command stream; is that right?

CAPT ROGAN: They're career streamline options. As you become greater in seniority as a Captain, they're open. Whether it's a choice, it's more what you're appropriate to. You can have desires, but it is part of Performance Capability Management Board, your attributes, that determine whether you're eligible to stream one or the other.

COL GABBEDY: Just unpack that for me. When you say "whether it's a choice", does that mean some options may not be available to you?

CAPT ROGAN: I can have a preference, but if I'm totally unsuitable for it, my Commander is not going to approve me to specialise or to pursue that stream. I could be a terrible leader but a great pilot, so they would prefer me to be a flying instructor than they would a Commander, if that gives you a bit more context.

COL GABBEDY: It couldn't work the other way around, could it? You couldn't be a terrible pilot and progress, could you?

CAPT ROGAN: You can do both or the other. That's just a basic example of how to distinguish how one would be – have the calibre or the recommendation.

COL GABBEDY: But generally speaking, the Command stream is a choice, is it not?

CAPT ROGAN: The Command stream is the default stream. So you can choose to remain a General Service Officer, and you will naturally progress through the Command stream. It's more where that diverges is if you choose to specialise.

COL GABBEDY: So if you choose to specialise, if you want to go down that qualified flying instructor's stream, your skills would need to be at a level that would justify your taking that stream, is that what you're telling me?

CAPT ROGAN: Normally that's the case, yes.

COL GABBEDY: If I take you to paragraph 22 of your statement, you were talking about conversation during your Regimental Officer's initial course, I take it that was a collegiate conversation despite the rank disparities?

CAPT ROGAN: It was, and that was the purpose of the Q&As throughout that week with the Senior Leadership Team.

COL GABBEDY: And CAPT Lyon was confident enough to speak openly?

CAPT ROGAN: As we all were at the time, yes.

COL GABBEDY: And as I understand it, there was no adverse outcome for him or anybody else who spoke openly to Command about their concerns?

CAPT ROGAN: No, there was not.

COL GABBEDY: What was the response that you received from BRIG Thompson about the issues that were raised?

CAPT ROGAN: He took them on notice. There was some discussion about, I guess, parallels where in his career he'd faced it, and it was respectfully – it's not – I shouldn't say "accepted", but it was respectfully discussed. And, as I made reference, D9 made an effort over the ensuing days, while we were still in Enoggera Barracks, to check in and have further discussions. And then we also pursued similar lines of effort with other senior Commanders, whether it's the Director of Operational Airworthiness, during informal chats like I discussed in the Officers' Mess.

COL GABBEDY: As you progress up the Command stream, it's the case that you get gradually increased levels of non-flying duties, isn't it?

CAPT ROGAN: Yes, your roles and responsibilities change. You know, if – whether you're an Officer Commanding, it depends. The Command stream has a number of avenues. Again, whether it's in operational airworthiness, whether it's across the standards piece, whether it's in project management, you can, depending on your preferences, still remain engaged with flying, or go and be completely detached from it.

COL GABBEDY: But in a flying Squadron, going from, say, a Troop Commander, to a 2IC, to the CO, your levels of non-flying work would incrementally increase?

CAPT ROGAN: I would say they decrease.

COL GABBEDY: They decrease?

CAPT ROGAN: Your flying rates.

COL GABBEDY: No, I'm talking about your non-flying duties?

CAPT ROGAN: Oh, yes. No.

COL GABBEDY: So your flying would decrease?

CAPT ROGAN: Your flying would decrease, but your roles and responsibilities increase.

COL GABBEDY: And that's part of the trade-off, isn't it? Your flying decreases because the other roles increase?

CAPT ROGAN: Correct.

COL GABBEDY: What's the solution? Do you see a solution for Troop Commanders in terms of reprioritising their work? Where would the admin work go?

CAPT ROGAN: It's not a reprioritisation of admin work; it is acknowledging what the workforce is telling you and appropriately allocating taskings and operations to reflect the reality of what that capability can deliver, how the morale and the esprit de corps of that capability is, and empower that workforce to make those decisions, or show that you're listening to them.

COL GABBEDY: To help me understand that answer, are you saying that there were too many flying tasks allocated to the workforce?

CAPT ROGAN: And there would be examples where we would highlight concerns and they were heard, and we would have the appropriate reduction in flying tasks. So whether we had a last-minute call out for high-risk weather season, and that would bleed into the exercise season – I'd seen examples during my career where Commanders had made the call to go, "We are going to try and quarantine you for this period", and at times that's worked, but as our organisation is and the state it is in currently, there are certain capabilities that are limited, and regardless of best intentions and words, when the government calls upon that capability, regardless of what's been said and promised, it needs to go.

COL GABBEDY: And there's a trade-off there, isn't there, sometimes? Sometimes planned tasks might need to be cut away because you've been given a short notice or a no-fail task that then takes priority?

CAPT ROGAN: I think that's just encased, with the business that we're in, yes.

COL GABBEDY: And we heard an example of that yesterday. There was a witness who gave evidence about the particular exercise on TALISMAN SABRE, and there was evidence to the extent that a planned exercise that was going to occur after 28 July was – there was talk of cancelling it because of a no-fail task that needed to be done by the Squadron back in Sydney a couple of days later. That thing would pop up from time to time, would it not?

CAPT ROGAN: I wouldn't use the terminology "no-fail" because that would set the workforce up in the wrong dynamic. But they would be assigned a level of priority, and that would be assigned at high level. And an example you could give is that there is a dignitary – or the governor-general would like to be transported somewhere, and that is assigned an appropriate priority for it over existing tasks.

COL GABBEDY: I think we're broadly in agreement, but to use your terminology, if a higher priority task came along, one of the things that Command could then do is cancel other planned activities in order to accommodate that task?

CAPT ROGAN: That would normally be the case. But I think what happens in reality, sir, is that our Squadrons and our capabilities are presented a multitude of tasks, operations, and exercises without an assigned priority, and they are left to then do the staff work to understand

and do the mission analysis on, "Okay, what assets do I have? What can I achieve without being provided a clear priority of what should be prioritised over the other?" And it's normally that flux going back and forth through the operations teams that lead to lost time, less preparation, because there is that miscommunication or that isn't a decision that's made higher prior to it being presented to the Squadron. It's left to the Squadron to kind of nit-pick and seek clarification after the fact.

COL GABBEDY: Thank you for that. You were asked some questions about the flying schedule, I think, at 6 Avn, and I think you said that 6 Avn flew Mondays to Fridays?

CAPT ROGAN: I did not.

COL GABBEDY: That was 5 Avn?

CAPT ROGAN: Correct.

COL GABBEDY: Did you understand that the flying schedule at 6 Avn was only Mondays to Thursdays?

CAPT ROGAN: I'm not privy to the flying rates of the other Regiments.

COL GABBEDY: Accept from me that that was the case, and that apart from that, it sounded like the flying schedules were similar in that there was ideally no school holidays and no flying December through January. Do you think that allows sufficient time to deal with some of these admin and personnel tasks during non-flying periods?

CAPT ROGAN: If you're a line pilot, a line aircrewman, yes. If you're in a key role, you specifically use those times to try and catch up. And I use "catch up", I don't say "get ahead", because the examples I've given you in the nature of the job and our capability specifically is we are on call 24 hours a day, 365 days of the year, at the beckon of the Australian government and their priorities. And that will result in – regardless of the best efforts of the Commanders to allocate time and your efforts to seek rest and respite, if you are part of that operational capability, you're going out the door when asked.

COL GABBEDY: Okay, I understand that. And you talked about leave, and you said the people were encouraged to take leave in the December-January period and during school holidays subject, of course, to what you've said about being on call. You said some people would elect to bank their leave. So that was a choice that individual members made?

CAPT ROGAN: Yes. So I'll give you an example, sir, where you may have gone on a European winter holiday. You would come back, and you have a deficient leave balance. You come up to a school holiday period, you, you want to save leave in order to have another holiday down the track which you want to have an extended duration so, you may only have, let's call it seven days of leave, but you want a holiday that goes for three weeks. You are not going to use that leave prematurely at a time and place that isn't of your choosing, if it's school holidays and you don't have children, you want to use that during high peak travel time – Christmas – for leisure pursuits, et cetera. It wants to be planned. Whereas it's more of an ad hoc nature when there are lulls or pauses about, "Okay, take some leave now".

It's like, "Well, that's not a fruitful use of my entitlement or leave if I haven't prepared – I haven't booked a holiday". That's the way that I look at it. I know that a number of my colleagues share the same thoughts.

COL GABBEDY: Yes. So, again, you're taking some control over your leave. But one of the things you can do, for example, is you look at your posting to an Aviation Regiment, you think, "Okay, I'm going to have a busy two years".

CAPT ROGAN: Yes.

COL GABBEDY: And then I'm going to take a chunk of leave and decompress before my next posting?

CAPT ROGAN: You can do that but your posting to an operational Squadron is six years. And in that six years, that is your only period to progress as an aviator prior to, like we just discussed, you fulfil secondary roles where your flying rate decreases. So you have a finite window to achieve the qualifications that you joined to get after the operational experiences that you seeked (sic) and joined and were encouraged to participate in prior to those opportunities slowly being withdrawn.

COL GABBEDY: And when you talk about "the opportunities being withdrawn", is that progression up the rank structure which removes your ability to do as much flying as you'd like to?

CAPT ROGAN: I'll give you an example. I'm sitting in Regimental Headquarters, I don't expect to go out the door with the operational Squadron as much as I would like to go and participate in the core role that I like to do. It is for the operational Squadron and the junior pilots

and the current Troop Commanders to have that experience. It's inappropriate for me to go in there. It doesn't develop their skillsets by me being parachuted in.

COL GABBEDY: And that's because the focus is on developing those junior pilots?

CAPT ROGAN: Correct, sir.

COL GABBEDY: Moving on to paragraphs 34 and 35, you're talking about the snapshot survey.

CAPT ROGAN: For 35? Yes.

COL GABBEDY: Yes. And that's anonymous?

CAPT ROGAN: It is, yes.

COL GABBEDY: That encourages a free-flowing exchange of information between all members of Aviation Command, does it not?

CAPT ROGAN: It allows a bottom up reporting mechanism that doesn't exist elsewhere.

COL GABBEDY: And that would then enable Command to take into account concerns being raised from all levels of the organisation?

CAPT ROGAN: A hundred per cent, and that's the purpose.

COL GABBEDY: You talked about distractions. And we've talked, at length, about the extra non-flying duties that you do. And your evidence, as I understood it, was that those distractions can interfere with your ability to focus in the cockpit. Is that right?

CAPT ROGAN: Whether it's the cockpit, whether it's lying in bed at night, whether it's enjoying a holiday with your family, work insidiously seeps in because of readiness for it, the short notice required of you. If I'm going camping on the weekend, I need to know whether I'm in phone reception because I can get that call. So now I'm tailoring what I do in my private time to be able to respond to work requirements. And I'm understanding of that. I joined to do that, so that doesn't come as a surprise. But over a period of time, that forms your behaviours, the way you act as a result.

COL GABBEDY: If I understand what you're saying, you're saying that over a period of time you're gradually getting – or your focus is being degraded over time as a result of this?

CAPT ROGAN: Yes. And the examples were junior aviators are normally quarantined from these so they can solely concentrate on their proficiency and their own progression, and they've got time to study. They have time to open the flight manual, be across the breadth of publications that we have prior to then taking on additional responsibilities and having that parallel priority or distraction outside the cockpit, or at times inside the cockpit if you're a Commander.

COL GABBEDY: With all of that, I assume that once you get into the cockpit and you're behind your controls, you're completely focused on the job at hand, are you not?

CAPT ROGAN: Yes. As an Aircraft Captain, that's your responsibilities. As anyone in a safety critical role, that's your responsibility from the refueller to the air traffic controller. That is your responsibility in a safety critical industry.

COL GABBEDY: It's part of the professionalism of the job?

CAPT ROGAN: Yes.

COL GABBEDY: And if you had any concerns at all about your ability to completely focus on that role, there were options either available to you, or to other members of your crew, to raise concerns?

CAPT ROGAN: There's raise concerns but there's also the reality of living with these distractions. You know, I'm not your Captain of QF1 from Sydney to Singapore whose only job is to read the weather in the morning before putting your family on board and flying. I have to worry about recall notices. I have to worry about new policies that are being implemented. I need to know the vaccination statuses of my Troops. I need to know whether we've done this mandatory training that's just got dropped on us. I need to know all these things. And these happened last-minute. It's an email. It's a pop-up as you walk in from your desk and you're authorising. It's, "Hey, I've got you in the hallway as you're leaving, don't forget you need to do this. The CO wants this" – or, "So-and-so wants this". I shouldn't throw the CO under the bus. "An individual wants X, Y and Z."

So it's just inherent and what has been systemically accepted within our industry that these are distractions that you work with.

COL GABBEDY: I accept all of that. But as I understood, your evidence is once you're behind those controls, you're job focused. You are on the job?

CAPT ROGAN: Yes.

COL GABBEDY: And that you - - -

AVM HARLAND: Could I just ask a question there?

COL GABBEDY: Certainly, sir.

AVM HARLAND: Because flying and the evolution of flying starts really at the briefing. Would you agree with that?

CAPT ROGAN: Yes, sir.

AVM HARLAND: During the evolution of that time, from briefing through your pre-flight activities into the cockpit and then after in debriefing, are you routinely, 100 per cent focused on flying or are you routinely interrupted by other distractions?

CAPT ROGAN: We can talk about flying, sir, but in terms of you're doing a mission profile – and I think there's been examples provided to the Inquiry previously – there's complex missions with inter-agencies that you're dealing with; whether it's passengers that aren't on time; whether it's you haven't got the clearance; or there's a break in the aircraft, it's not configured appropriately; what you're bouncing to, you're behind time.

They're operational pieces, those processes that we go through. So you go through a briefing and you might identify it as a flaw here and you quickly go and fix it or, you know, data cards haven't been loaded properly, or something drops – fills – just inherent pressures and the timelines that lead up to. And that's expected as normal. And that's what we deal with as professional aviators.

But as a Commander stepping out in a key secondary appointment, there is a large amount of baggage that you're trying to leave in the office as you go into the cockpit.

AVM HARLAND: We've heard previously incidents of a phone call being taken while walking out to the aircraft to deal with an administrative issue.

CAPT ROGAN: There'd be examples of that. I couldn't give you a personal example that I have. We've been flying airborne before as part of an embarkation for Operation TONGA ASSIST back in the high COVID – so I'm just going to clutch here at a date – 2021, where we deployed as a task unit pending COVID results. And then we were getting COVID results airborne, before embarking, and whether they were positive or negative and having to deal with those effects going through. So whether it's a phone, whether it's in operations, radios, updating on something, it's just something we deal with naturally within the operating role I have, in my experience, to continually deal with.

AVM HARLAND: Are you familiar with the concept of "flying box", where you give – from the time you debrief into a sortie, you're effectively 100 per cent focused on that - - -

CAPT ROGAN: Yes. You're quarantined in time, sir. And, yes, there's critical phases of flight that we do that for as well where it's sterile cockpits. It's like it's – yes.

AVM HARLAND: And would you employ that concept of a flying box in your experience?

CAPT ROGAN: I shouldn't say "actively". It's encouraged and it's just inherent that you try and leave people alone, but when you're in a key position people get called away for phone calls and because of the nature of their role and our readiness – so that phone call could be a, "You need to get the Squadron ready for a deployment in time X", and it's your responsibility to pick up that phone or to answer that message because that's the job we're fulfilling.

AVM HARLAND: Okay, thank you. Sorry, COL Gabbedy. Please continue.

COL GABBEDY: No, sir. That was helpful. Thank you, sir.

Just on the Air Vice-Marshal's question in relation to the phone, if you're about to embark on a mission as an aircraft pilot, should your phone either not be off or not with you at all?

CAPT ROGAN: That's not in our Standing Regulations, no.

COL GABBEDY: If you're flying an SO mission? Or do you not know?

CAPT ROGAN: I'm not a Special Operations pilot, sir.

COL GABBEDY: I'll move on to something else. At paragraph 44 to 48 you were talking about a near miss in 2020.

CAPT ROGAN: I see.

COL GABBEDY: My understanding of that is that although it took a couple of years for the special flight instructions to come out, was - - -

CAPT ROGAN: No, I think it was immediately. Not immediately proceeding but within the 12 months proceeding.

COL GABBEDY: Within 12 months they came out?

CAPT ROGAN: They were quite – for 5 Aviation Regiment Special Flying Instructions, yes.

COL GABBEDY: In understanding the timeframe, was it almost immediately that significant changes were made and those changes were followed up with the Special Flying Instructions?

CAPT ROGAN: So the SFI is the mechanism for those immediate changes, and they were done in the 5th Aviation text – context, sorry – and they were implemented by the then CO. What I reference is the delay. So there were recommendations outside of that Class B in terms of updating. We have a flight scheduling authorisation and electronic logbook program called Patriot Excalibur. It was identified that was deficient in highlighting to Authorisation Officers recency of formation flight, low illumination flight and terrain flight as a result of that near miss. And that mechanism wasn't even implemented until post the 28th.

COL GABBEDY: Understood. And just for my understanding, when you say in paragraph 48, "There were also significant changes made within 5 Avn Regiment after the near miss", are you referring to the SFIs, or are they different changes that were made in advance of the SFIs?

CAPT ROGAN: So if I can take you to the third sentence. So where I was discussing "formation flying recency and instruction and supervision", so that was all borne out of the updated Unit Training and Assessment Program that was specific to the 5th Aviation Regiment as an Air Mobile Regiment. And that saw greater allocation of training sorties or milestone events for formation flight in various environmentals, night, low illumination, et cetera, and a more robust system to qualify personnel and capture that that's been done.

COL GABBEDY: So just to make sure I've got it right, so the UTAP was immediately changed and then the SFIs followed that?

CAPT ROGAN: No, they would have been done in parallel. The UTAP is quite a large document, so the SFI, like I said, is the immediate instrument that can make change to our Standing Instructions, and because this was specific to the 5th Aviation Regiment, this is signed by our Commanding Officer and implemented immediately. So if the CO wants that implemented or the Standards Officer, that can be signed and released to all aircrew. And there's mechanisms within that system that I referenced before, Patriot Excalibur, where you have to acknowledge that you've read and understood that document and you provided it prior to going flying.

COL GABBEDY: Thank you for that. There's just one last area I want to cover with you, and it's covered in paragraph 51 of your statement. You refer to using soft ears. What are they?

CAPT ROGAN: So let me read the paragraph, sorry.

COL GABBEDY: At the bottom of page 8.

CAPT ROGAN: Yes. So in this case our accommodation, we're on an operational Navy vessel. It's 24-hour ops in terms of shifts that are changing over. There is concurrent and simultaneous or detached periods of dock operations and flying operations. Ships are inherently noisy as they move armoured vehicles up and down using elevators at your berthing, so normally abeam. So it's nothing like a P&O cruise, if you've ever experienced one. There are noises that aren't normally present in your bedroom at home, so some personnel will choose to put earphones in or they'll put noise-cancelling headphones on, or you just deal with the noise and fall asleep.

COL GABBEDY: And ships have their own routine that they run, regardless of who's embarked on them, don't they?

CAPT ROGAN: That's correct.

COL GABBEDY: So they will pipe using their schedules that may be completely out of whack with yours.

CAPT ROGAN: Our modern ships are quite good at being able to isolate sleeping areas during pipes afterhours. Obviously, if it is a damage-control station or there is an emergency on board the ship, it is behest of them to notify everyone on board. But there are periods of time

where they will restrict pipes. And if they do need to make a pipe, they will quarantine sleeping areas from receiving that pipe,

COL GABBEDY: But soft ears are either noise-cancelling headphones or some other noise - - -

CAPT ROGAN: Just part of the normal hearing CES that you deploy with in the aircraft for passengers, et cetera. So think about if you go to a noisy night club, what the bartender's serving you with in his ears.

COL GABBEDY: That was a way that you were able to cancel out the background noise and assist with your sleep hygiene.

CAPT ROGAN: Well, attempt to mitigate it.

COL GABBEDY: Did you find it effective?

CAPT ROGAN: You're in a new environment sleeping, it's always disruptive, it's uncomfortable if you have them in your ear and you're not used to sleeping with things in your ear, but it's just one means of trying to eliminate the noise.

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

MS McMURDO: Any re-examination?

FLTLT ROSE: No.

MS McMURDO: Thank you very much, CAPT Rogan, for your leadership and the time you've taken to come and give evidence to the Inquiry, it's greatly appreciated.

CAPT ROGAN: Thank you, ma'am.

<WITNESS WITHDREW

MS McMURDO: Thank you. We'll adjourn now for 45 minutes.

HEARING ADJOURNED

HEARING RESUMED

COL STREIT: Thank you, Ms McMurdo. I call Dr Adrian Smith.

<DR ADRIAN MICHAEL SMITH, Affirmed

<EXAMINATION-IN-CHIEF BY COL STREIT

DR SMITH: Ma'am, sir, families, counsels, good afternoon.

COL STREIT: Good afternoon.

MS McMURDO: Good afternoon, Dr Smith.

COL STREIT: Dr Smith, could you just please state your full name?

DR SMITH: Dr Adrian Michael Smith.

COL STREIT: And your present occupation?

DR SMITH: I'm an Aviation Medicine Specialist at the Air Force Institute of Aviation Medicine, and I hold the role of Principal Adviser in Aeromedical Analysis and Decision Support.

COL STREIT: Thank you. Dr Smith, you have been kind enough to furnish the Inquiry with an expert report, and I'll take you through that shortly. Can I just ask that the microphone in front of you amplifies a little bit, so just ensure that it's close to you, and if you could speak a little bit more slowly. I'm a little bit hard of hearing, and I don't want to miss anything that you say. Can I begin first by confirming with you that you received from the Inquiry Counsel Assisting a letter of instruction to prepare a report in relation to some matters. Is that right?

DR SMITH: I did.

COL STREIT: And as a result of that letter of instruction, you prepared an expert report addressing a number of areas and questions that Counsel Assisting had asked you in writing.

DR SMITH: That's correct, I did.

COL STREIT: And that report was prepared by you, and was signed by you on 3 June 2024. Is that correct?

DR SMITH: Correct.

COL STREIT: It attaches some annexures. Is that right?

DR SMITH: That's correct, yes.

COL STREIT: What I propose to do is provide to you a copy of your expert report and annexures, and then I will confirm with you that the documents you have are, in fact, what I have suggested they are, being your report and annexures.

DR SMITH: Thank you.

COL STREIT: The first document is the first document, your actual report of 3 June 2024.

DR SMITH: Yes, it is.

COL STREIT: The next document that's stapled, is that the letter of instruction from Counsel Assisting with a request for an expert report, dated 23 May 2024?

DR SMITH: Yes.

COL STREIT: The next document that is stapled is a copy of your curriculum vitae as at 30 May 2022.

DR SMITH: Correct.

COL STREIT: The next document is an article written by you titled, "Aeromedical and Human Factors of Night-vision Goggles", and then "(Extracted Contents of 2002)". Is that correct?

DR SMITH: That's correct. Yes.

COL STREIT: Next is a copy of the Defence Health Manual, Volume 3, Part 15, Chapter 23, Medications and Aviation-Related Occupations.

DR SMITH: That's correct.

COL STREIT: The next document that's stapled, which is Annexure 5, is the Defence Health Manual Information Sheet 15-01, Guidelines for

Commanders, Operational Use of Sleep-inducing Agents for Aviation Occupations.

DR SMITH: Correct.

COL STREIT: Next is Annexure 6, which is the ADF Form PM632, Agreements for Operational Use of Sleep-inducing Agents by Defence Members and Aviation-Related Occupations.

DR SMITH: Correct.

COL STREIT: And last, but by no means least, is Annexure 7, Defence Aviation Safety Regulations DASR MED.05, Aviation Medicine Training.

DR SMITH: That's correct.

COL STREIT: Those annexures form part of your report; is that right?

DR SMITH: That's correct, yes.

COL STREIT: Now, in the preparation of your report, can I just ask this? In the preparation of your report, on the first page at paragraph 2 you acknowledge that you've read the Expert Witness Code of Conduct – which was Annexure A – of the Federal Court of Australia's Expert Evidence Practice Note dated 25 October 2016. Correct?

DR SMITH: Yes, that's correct, and I have.

COL STREIT: And you agree to act in accordance with the spirit of that code when giving evidence to this Inquiry?

DR SMITH: I do.

COL STREIT: At paragraph 3 of your expert report you say:

> *The views expressed in this report are my own and do not necessarily reflect the official position of the Royal Australian Air Force Institute of Aviation Medicine, its parent units, or the Australian Defence Force, unless accompanied by official documents. This report was scaled to meet the time available to meet the deadline for the submission.*

Is that right?

DR SMITH: That's correct, yes.

COL STREIT: You also say at paragraph 4:

> *I have also provided expert advice to the Defence Flight Safety Bureau related to this mishap. As part of the engagement, I've been provided a factual summary of the sequence of events leading up to the crash. The DFSB briefing did not cover the lines of questioning raised by the IGADF, and I believe my response to the questions requested by IGADF have not been influenced by any information provided to me by DFSB.*

Is that right?

DR SMITH: That's correct, yes.

COL STREIT: Ms McMurdo, having regard to the witness' responses, I tender Dr Smith's report.

MS McMURDO: Exhibit 33, that's the report and the annexures.

#EXHIBIT 33 - REPORT OF DR ADRIAN SMITH, WITH ANNEXURES

COL STREIT: Yes, thank you. Dr Smith, can I take you to page 1 of your report, which is Annexure A. So in terms of your background and qualifications, can you indicate to the Inquiry, particularly in relation to Aviation Medicine, your qualifications?

DR SMITH: So I hold a general degree in medicine and surgery from Flinders University 1994. I then joined the Army for a period of time as a Regimental Medical Officer, including 5 Aviation Regiment, in 1999 and 2000. In terms of Aviation Medicine qualifications, from that basic sort of role as an Aviation Medical Officer in an Aviation unit, I was then posted to the Diploma in Aviation Medicine in the United Kingdom for six months. On completion of that, I was posted to the RAAF Institute of Aviation Medicine as a Staff Officer Grade 3 in Aviation Medicine as an Army posting, and I was there for three years.

After that, I worked for BAE Systems in Saudi Arabia, and then I came back in 2008 to work as a contract Research Medical Officer for Army at the institute. I then took on sort of senior roles in Air Force and I've been the Principal Adviser or the Head of Research since about 2013.

In addition to the Diploma in Aviation Medicine, I also have a Masters of Aerospace Medicine, and am completing my PhD in Aerospace Physiology.

COL STREIT: Your current role, could you just say that again, please?

DR SMITH: So my current role is Principal Adviser in Aeromedical Analysis and Decision Support.

COL STREIT: That's at the Royal Australian Air Force Institute of Aviation Medicine.

DR SMITH: That's correct, yes.

COL STREIT: Now, just before I move on to some other matters, can I just confirm with you that you've had the opportunity to observe the evidence of certain witnesses in this Inquiry, being D20?

DR SMITH: Yes.

COL STREIT: D15.

DR SMITH: Correct.

COL STREIT: MAJ Gallatly.

DR SMITH: Yes.

COL STREIT: And CAPT Rogan.

DR SMITH: That's correct, yes.

COL STREIT: I'll return to ask you some questions about your observations that might arise from their evidence, having regard to matters that you express opinions about, in particular relating to fatigue and its effect on pilots. We'll do that at a later stage as we move through your report.

MS McMURDO: Could I just ask you, Dr Smith, have you also read the statements prepared and tendered to the Inquiry for those witnesses?

DR SMITH: I have been provided with the statements and I've read those, yes.

MS McMURDO: Thank you.

COL STREIT: At paragraph 3, you say your medical practice has been exclusively in Aviation Medicine since 1999; is that correct?

DR SMITH: That's correct, yes.

COL STREIT: If you could assist the Inquiry, what encompasses Aviation Medicine?

DR SMITH: So Aviation Medicine is the medical discipline that is mainly concerned with the relationship between aircrew or passengers, but aircrew and the Aviation environment. It looks at that from two perspectives. It looks at that from the perspective of the stresses of the Aviation environment and what changes that can induce into the health, wellbeing, performance of aircrew. Then it also looks at aircrew and the conditions that might degrade their medical fitness, or their physiological readiness, or their sort of cognitive abilities, and what those impacts have on mission performance, flight safety, or their health and wellbeing.

It covers clinical medicine, physiology, biomechanics, ergonomics, as well as vision and hearing, life support systems and crashworthiness and survival. We work in partnership with Human Factor Specialists. So we complement Human Factor Specialists and Aviation psychologists, and then, together, we work to support engineers, airworthiness, and airmanship sort of domains as well. So we're part of that sort of suite that complements maintaining the optimum level of performance of aircrew in an Aviation system.

COL STREIT: Now, is it accurate to say that you have written extensively on matters concerning Aviation Medicine for a number of years?

DR SMITH: Correct, yes.

COL STREIT: A number of those papers that you have written, they're set out in your curriculum vitae; is that correct?

DR SMITH: That's correct, yes.

COL STREIT: Is it fair to say that it's almost been exclusively – those papers are exclusively in relation to Aviation Medicine or Aviation Medicine-associated matters?

DR SMITH: Correct, yes.

COL STREIT: At paragraph 5 of Annexure A of your report, you say you're a Fellow of the Australasian College of Aerospace Medicine, Royal Aeronautical Society, and Aerospace Medical Association. What is that Institution?

DR SMITH: Which institution is that?

COL STREIT: So the Australasian College of Aerospace Medicine, you say you're a fellow of the college. What is the college?

DR SMITH: So the Australasian College of Aerospace Medicine was established in 2012 to really bring a structure to the discipline of aerospace medicine or Aviation Medicine in Australia, and to define the qualifications necessary to achieve fellowship and maintain a professional standard within that discipline.

COL STREIT: Now, I take it the college is a mixture of medical professionals that practice in relation to civil Aviation as well as military Aviation?

DR SMITH: That's correct, yes.

COL STREIT: At paragraph 6 of your report, you say?

> *As an Aviation Medicine Specialist, my scope of practice is to assess the scientific literature to acquire a working knowledge of any condition, disease state, or physical or physiological limitation that could potentially jeopardise the health, wellbeing and safety of the crew member or their colleagues, or compromise flight safety or mission effectiveness. And to apply this knowledge to characterise the potential hazards and inform evidence-based discussions on the selection and implementation of control measures to mitigate these risks so far as reasonably practicable.*

So is it fair to say that your role, no doubt together with your other colleagues at the Institute of Aviation Medicine, is to value add to the field of Aviation Medicine to help the Defence Force?

DR SMITH: That's correct. So in my role as Decision Support, the intent of Decision Support is to recognise that Commanders and decision-makers are faced with real-world challenges that they need to figure out how to move forward, and different courses of actions, different decisions that are possible. Our role in supporting that is to provide them with the

information necessary for them to understand the nature of the hazard, as it relates to an aeromedical hazard or to a human factors hazard, understand the nature of that hazard when they're assessing the level of risk, and help them work through the various controls that can minimise the risk, or mitigate the risk so far as reasonably practicable, ultimately recognising that it is their decision that they have to make. But we can make sure that they are well informed and well prepared in making that decision.

COL STREIT: You have had some personal experience, haven't you, in relation to an aircraft incident which you address at paragraph 7 of your report? Is that right?

DR SMITH: That's correct, yes.

COL STREIT: So you were an occupant of a Black Hawk aircraft that crashed in Timor in 2000. The crash was due to spatial disorientation arising from degraded visual cues with NVDs. And you say your career has been characterised by a drive to optimise the delivery of Aviation Medicine support to promote flight safety. Is that correct?

DR SMITH: That's correct, yes.

COL STREIT: So you're not just a medical professional who assists Command in relation to your field of expertise, but you're a medical professional who has first-hand lived through the crash of military aircraft and that has been your drive to use your experience to assist, and expertise to assist, the ADF going forward. Is that right?

DR SMITH: That's correct. It certainly highlighted the perils of military Aviation and the importance of a robust safety system.

COL STREIT: Paragraph 8 of your report and onwards deals with the roles and responsibilities of the Institute of Aviation Medicine. But before I turn to ask you questions about that matter, one area I wish to identify with you – and for the benefit of counsel representing at the Bar table – is that I will not be leading evidence from you in relation the medical matter that you address at paragraph 119 of your report through to paragraph 130 of your report, and indicate to my colleagues that I respectfully request that no evidence be led in relation to that matter at this stage, and indicate that the plan is for you to be recalled, doctor, at a later stage, at another Inquiry hearing, to give evidence about those matters.

DR SMITH: I understand.

COL STREIT: Thank you.

MS McMURDO: And perhaps in other matters, too, with that point.

DR SMITH: That's fine, ma'am.

MS McMURDO: Thank you.

COL STREIT: Can I return to the role and responsibilities of the Institute of Aviation Medicine? You've set them out in some detail, so can I just ask you to explain, in broad compass, what the role and responsibilities of the institute are?

DR SMITH: So the Institute of Aviation Medicine, it's a Royal Australian Air Force institute, but it provides a centre of excellence in Aviation Medicine for the whole of the Defence Force. So the three Services, all platforms are covered by that. So we have several different pillars of activity. One is training. So we provide initial training to all aircrew in the Australian Defence Force. And then we provide periodic refresher training for Air Force on a sort of five-yearly basis. And then we work with Army and Navy to support their own Service-specific refresher training.

And then we also train Medical Officers to become Aviation Medical Officers, so qualified to manage aircrew medical problems and to provide expert support to aircrew and Commanders in the field. And we've already heard this week about the role of the Aviation Medical Officer in providing support in the field. So that's the level of training that we provide. And that is for all Aviation Medical Officers of the three Services.

The next pillar is clinical. So at the Institute of Aviation Medicine we don't provide day-to-day clinical care. The Aviation Medical Officers provide the day-to-day clinical care. But those complex cases that require a level of expertise to decide their fitness to continue with flying-related duties, or what treatment is necessary to be compatible with flying duties, those decisions are made by the Institute of Aviation Medicine. Although, for Army and Navy, there is an additional layer of a Single Service Aviation Medical Adviser in each of those Services, in the Headquarters element there.

Safety: we monitor the Aviation Safety Reports. We lean in to units, to see if there's any support that we can provide. Sometimes they appreciate a medical perspective when they're writing up the safety reports. If they're just written by aircrew, or other people, they may not have the

expertise to really understand some of the issues. So we will support them with that. We provide support to Defence Flight Safety Bureau in the event of an accident, or a serious event.

And then, finally, Decision Support is the area that I lead. And that is there to provide Commanders across the three Services, at any level, with an expert reach-back, so that they can say, "We're facing a problem. Can you help us understand the different courses of action and the hazards that might be involved in those?" And we will then work with the decision-makers to help them be reasonably informed when they're making a decision, to make sure that the risks are managed, insofar as reasonably practical, as is required by the risk-management process.

COL STREIT: Thank you. You mentioned that you lead a team in relation to Decision Support. How many members are in your team?

DR SMITH: So at the moment I have – I look after the safety person. I've got an Air Force analyst. I've got a public servant aeromedical analyst. We're just in the process of acquiring some other people. And, until December 2022, we had a Human Factor Specialist that was part of the team as well.

COL STREIT: And your position, as I understand it from your report, was established as a consequence of a finding or a recommendation from the 1996 Black Hawk Board of Inquiry. Is that correct?

DR SMITH: No, that's not exactly correct. So my position – when I was the Staff Officer Grade 3?

COL STREIT: Yes.

DR SMITH: That position was established at the Institute of Aviation Medicine to provide some expertise in understanding the human factors limitations of night-vision goggles, and training aircrew in that. So that was the Staff Officer Grade 3 position. That's unrelated to the position that I'm in now.

COL STREIT: And when was that position established, can you remember?

DR SMITH: I believe 1997.

COL STREIT: And were you the first incumbent in that position?

DR SMITH: No, there was somebody there before me. But I don't believe that that person had particular expertise in Aviation Medicine. So I think I was the first person to have been trained in Aviation Medicine to then roll into that position.

COL STREIT: Thank you.

AVM HARLAND: Just a question regarding training. Are you aware of why the difference between the delivery of the refresher courses for Air Force being back to the institute, versus Army and Navy delivering theirs via their SAVMO?

DR SMITH: I don't know the background. Army have historically been responsible for delivering their own refresher training back to, you know, 2000, when I was at 5 Aviation Regiment. Army was always responsible. So that's a long long-standing practice, for Army and Navy to be responsible for delivering their own refresher training. I think we're going through a process at the moment of reflecting on what is the best way to deliver consistent training across the Services.

AVM HARLAND: Yes. I was going to ask if there are any pros or cons with the more centralised delivery through the institute, compared to a Service-level delivery?

DR SMITH: I think that, and my sort of opinion is that, for the Air Force refresher training, historically that was always associated with refresher training in hypoxia, and that required them to come back to a centre so that they could do their training with a hyperbaric chamber. Army did not have that requirement. So they would be coming back to a centre – so they could be in a different building to receive lectures. So because that wasn't a fundamental part of their refresher training curriculum, I believe that the training was done with lectures remotely.

The advantage, historically, of that is that Army aircrew would receive refresher training about Army issues from Army people who were involved in operational matters and acquisition and things. So it wasn't just a generic lecture by somebody that didn't really have domain expertise. It was very, very operationally-focused in its delivery, to make sure that Army aircrew received the training that was fit-for-purpose for the issues that they were dealing with at that point in time.

AVM HARLAND: So it was more directly contextualised to their field of - - -

DR SMITH: I believe that that's the historical context, yes.

AVM HARLAND: Okay. Thank you.

DR SMITH: Yes.

COL STREIT: Can I turn now to paragraph 12 of your report, and the following paragraphs where you deal with the issue of what is meant by the human machine interface and human systems integration. First, can I just ask you to explain what is the human machine interface?

DR SMITH: So the human machine interface is really looking at the way that operators interact with a system. And designers and engineers can sometimes be very good at developing technically brilliant pieces of equipment, but not with the awareness of the requirements of the operators. And so you can sometimes have interfaces that aren't easy to operate. They're not intuitive. They may not be easy to understand or easy to operate. So the human machine interface is more about the interface of the device with the operator.

On the other hand, human systems integration is really looking at integrating the operator into the design, function and operation of the system. And that is really looking at what is the system supposed to do? What's its design intent? And what are the characteristics of the operators? And making sure that an operator can see and manipulate all of the controls and displays they need to be able to operate in a relaxed, comfortable posture within the range of adjustment of the seat and controls and things like that.

If a system is not well designed and people have to adopt awkward postures or they've got to bend or twist, then that becomes uncomfortable, that can then lead to musculoskeletal problems. It can lead to fatigue. It can also then lead to degraded performance.

If systems are difficult to understand, then what you're doing is imposing a burden of work on the operator to try and figure out what was meant when they designed it. If buttons are not in the right place – we've already heard examples of switches that have been inadvertently sort of deactivated because they just, in reaching up behind them, couldn't tell the difference between one switch and another switch. That's an example of poor sort of human systems integration.

And then also just looking at – in a human-centred design, we would be looking at what are the requirements of the operator, and ideally designing a system to meet those requirements so that they can be operated comfortably, bearing in mind that the range of operator anthropometrically

can be, you know, quite significant. We also have to talk about people when they're fatigued, people when they're in various stages of training, and things like that.

So human-centred design looks at the requirements of the operator and then aims to design a system to best meet those requirements, but from a human systems integration point of view. If that is not possible, what we can then do is come in and say, "Well, if this is the system that you've got and these are the operators that need to use it, what adjustments could be made to the system? What adjustments could be made to the work station?" If those adjustments are not reasonable, or practicable, or timely, then we can look to select people that fit into the system comfortably, and risk manage the people that are outside those ranges. And then, finally, we can look at bridging the deficiency between the system and the operator through training.

COL STREIT: I was about to ask you about that aspect. So when the rubber hits the road in attempting to assist Command in dealing with these systems and that human machine interface and integration, it comes down to training, doesn't it, ultimately?

DR SMITH: Training is the simplest way that is quick to do. Redesigning an aircraft system is very complicated, very expensive, time-consuming, and the certification process is onerous. And usually by the time the system arrives, the design has already been sort of unfossilised, and by the time we get involved, the possibilities to make fundamental changes to the system are limited. So then we have to look at what can we do, and one of the things that we can do is to train people to recognise the limitations and work around them.

But training can be a soft control because, you know, you can be trained, but if you're overloaded, you're stressed, you can forget if you're fatigued. Training is not a strong control for things that are not intuitive.

COL STREIT: Can I turn now to the question and the paragraphs under it which commences at paragraph 18, where you're asked to address your understanding of, and experience with, stresses and stress factors for pilots operating complex aircraft with high levels of system automation, and the need to manage inputs for multiple systems concurrently. We've had evidence before this Inquiry in various forms with pilots expressing opinions that the aircraft – that is, the MRH-90 – is complex and that it does have high levels of systems of automation. So that's the context of the question that you were asked.

Now, in paragraph 18 you say you provide your advice on the basis of your experience and scope of practice as an Aviation Medical Specialist. So in relation to your understanding of, and experience with, stresses and stress factors for pilots, and by reference to your report, can you just in short compass outline those stresses and stress factors for pilots?

DR SMITH: Yes. So probably before I answer that question, I'm answering this in my sort of scope of practice as an Aviation Medicine Specialist, which is the application and the end result of those stresses. A Human Factor Specialist would be better placed to describe the nature of a particular aircraft system, and what stresses they might impose, and especially if we're talking about the level of proficiency that you would need, or the level of recency, for those skills to remain fresh. That's probably on the edge of my scope. But the application of what that means I'm happy to talk about. And then the other caveat is that I don't have any detailed understanding of the events leading up to, or during, the accident.

So I'm not talking about particular stresses that I believe occurred to individual aircrew on the incident aircraft, and I'm not talking specifically about the stresses that are specific to the MRH-90, but just in general on first principles.

When you talk about automation, automation is not a set and forget. You don't just put the aircraft onto automated mode and then just sit back and relax. It is still a very cognitively demanding process. So you can automate some of the processes that would normally be flown or operated by one or other, or both, of the pilots, but we've heard testimony that sometimes automation can throw out anomalous sort of inputs. And so when you have an automated system, the role of the pilot then becomes a systems monitor and they are actively monitoring the system to make sure that it is performing as intended, looking for any indication that it's going to deviate, but then being prepared and ready to take over, if necessary, if an automation error occurs. And to do that, the pilot still has to be maintaining a high level of situational awareness.

So they're not just passively monitoring the system and then if it fails, then lean forward. At that point they've then got to figure out, "What's the aircraft doing? Where are we in space? Where are we moving? How are we in proximity to the other aircraft?" While they're monitoring the system, they're still maintaining situational awareness of where they are in time and space in relation to the other aircraft.

So although automation might decrease the workload of some aspects of the process, it doesn't necessarily decrease the workload to a level that is

not fatiguing because they still have to be cognitively monitoring and ready to engage.

COL STREIT: You've still got to fly the aircraft.

DR SMITH: Yes. So it's not sort of - - -

COL STREIT: Set and forget.

DR SMITH: - - - devolving responsibilities of the system. You are still responsible for the system. And so that – and when you're looking at instruments, you're looking at that with your central vision. You're cognitively processing all of that. You're thinking all of the time. Whereas if you were flying in good visual conditions in the daytime, your orientation is largely obtained through your peripheral vision, and that is processed subconsciously, so you don't have to think about where the horizon is in space in good visual conditions. But if you're now flying an aircraft that has a lot of systems, you're now looking at the instruments, and when you're looking at the instruments you're using your conscious thought to process that information, it's a very cognitively demanding and fatiguing process.

COL STREIT: Paragraph 19, in about the middle of that paragraph you say:

> *Flying in formation at relatively low altitude over featureless terrain in degraded visual conditions whilst wearing NVDs, the pilot must be ready to detect an undesirable systems state quickly and intervene immediately to ensure that flight safety is not compromised. Given the proximity to terrain and other aircraft, the pilot would be aware of the hazard that would be posed by a system anomaly.*

That's correct?

DR SMITH: That's correct, yes.

COL STREIT: You then say this at paragraph 20:

> *Monitoring complex systems in safety-critical roles, such as aviation, especially when flying in close proximity to known hazards, requires sustained vigilance, focussed attention, and intense concentration. All of which place a drain on the cognitive resources and contribute to cognitive fatigue.*

If cognitive fatigue becomes established vigilance, concentration and information processing become degraded which may have the net effect of further increasing the workload and accelerating the cognitive decline.

Is that right?

DR SMITH: That's correct, yes.

COL STREIT: What do you mean when you say "accelerating the cognitive decline"?

DR SMITH: If you are fatigued and you have exceeded your cognitive capacity and you're starting to decompensate, if you reduce your scanning because you don't have the capacity to do as good a scan, if you're not monitoring instruments as closely, the result of that is that the workload then increases because you're not monitoring it.

Which then means that your response then increases, which then means that you become incrementally more and more fatigued in a spiral because the workload has increased because you've exceeded your capacity to effectively monitor it.

COL STREIT: So what might be regarded as a non-complex sortie involving an aircraft flying might become complex if there's a level of fatigue that exists before the sortie commences in the aircrew?

DR SMITH: Aircrew who can fly sorties comfortably when they're not fatigued may struggle to fly as well when they're fatigued because fatigue has the net effect of reducing your cognitive ability, reducing your reaction time, slowing down your information processing and all those sorts of things. So the net effect of fatigue would be to potentially to make it difficult to fly a sortie that you would otherwise be able to fly if you were not fatigued.

COL STREIT: You say at paragraph 24:

Extensive aircrew training to maintain a high level of proficiency across a range of flight skills seeks to allow some of the more core routines to be executed with semi-automatic actions to reduce the cognitive demand, somewhat, and allow them to operate safely and effectively within their cognitive reserve.

Is that correct?

DR SMITH: That's correct, yes.

COL STREIT: When we talked about "cognitive reserve", what are you referring to?

DR SMITH: I mean your brain has a certain amount of capacity.

COL STREIT: Yes.

DR SMITH: And if you are unskilled or not highly proficient, then your ability to do a task requires an immense amount of concentration and effort. Everything is deliberate. There's a lot of memory recall, planning, "What do I need to do?" It's a very sort of methodical and sort of a stodgy sort of process, until you develop the high level of proficiency that you can do it in a semi-automated manner. When you then develop that level of proficiency and it becomes semi-automated, what you're then able to do is to do the same sort of job but with less cognitive effort because a lot of those processes have just become second nature.

You know, that's just normal acquisition of skills. When you're riding a bike, it's hard initially. When you become good at it, then you don't think about it all of the time. If you then have your processes that you can have as semi-automated, that then frees up capacity so that you can then be monitoring other things, but there's still a certain amount of capacity that you're able to manage.

Training and a high level of proficiency, and the recency necessary to maintain that level of proficiency, might allow you to do more within that bandwidth. Fatigue might actually start to erode your bandwidth so you've got less capacity to form cognitive processing.

COL STREIT: In the last sentence of paragraph 24 you say:

> *However, when the cognitive reserve is exhausted and bandwidth is exceeded, compensatory mechanisms may be unhelpful.*

And then you list a number of mechanisms, (a) through to (e). What does that mean, "compensatory mechanism may be unhelpful"?

DR SMITH: When you are in a position where you have saturated your abilities, it's a natural response that you start to prioritise on the things that are loudest, brightest, most important. But by prioritising some activities, you're then, by necessity, deprioritising other activities.

In prioritising things, you may not scan as much. You may not be looking

at all of the instruments and you may not be able to achieve the same degree of precision and accuracy. Your tolerance for error starts to spread and then you start to focus on certain things to the exclusion of other things and that's called coning of attention. And then, at some point, that then overwhelms your ability to fly effectively.

But all of these are natural human responses to being overstressed to the point that the demands that are placed on you exceed your cognitive capacity.

AVM HARLAND: Just a question there, if I may? Just regarding junior pilots who have got lower experience or proficiency, they haven't gone through these cycles as much, are they more likely or otherwise to deplete their cognitive reserve earlier than somebody who is more experienced, more proficient, has gone through more cycles?

DR SMITH: Somebody who is more experienced and has a high level of proficiency should be more resilient because they're much more skilled in those activities. And if those skills are resilient, then they should be enduring in the face of increased levels of stress. But that's why experienced people are Aircraft Captains, because they've got the experience if the same emergency is unfolding but you've got the skills galvanised to be resilient in the face of stress compared to somebody with a less proficiency, or less experience, or less opportunity to consolidate those skills. However, even somebody who is highly experienced will eventually reach the point that their cognitive capacity has been exceeded as well.

AVM HARLAND: Great. Okay, thank you.

COL STREIT: Paragraph 27, you start to deal with a term called "spatial disorientation". I'll just refer to your evidence, the report, first before I ask my question. Paragraph 27, you say:

> *Pilots who have become task-saturated or cognitively overwhelmed can be susceptible to spatial disorientation. Under conditions where pilots are not fatigued or overloaded, they are better able to set aside visual and vestibular illusions and ignore body sensations by referring to reliable instrument or display cues.*
>
> *However, when they are fatigued or overloaded or distracted, they may not be able to effectively overcome strong but erroneous visual or vestibular cues, or body sense, and the pilot may become spatially disorientated.*

So "spatially disorientated", what do you mean?

DR SMITH: Spatial disorientation is the inability to correctly sense your position in relation to the aircraft and objects around you and in relation to the ground or any other object that poses a hazard. So it's just an inability to detect where you are in space. In normal evolutionary sort of structure, you know, where we're standing on the ground, it's daytime, we've got good vision, our body senses are designed to reinforce. So we have got vision, most of our orientation comes from our peripheral vision. We're aware of where the horizon is but all we have to do is just know that when we're walking, where the horizon is, right. When you are flying, a lot of your normal body senses can be misled and the aircraft operates in modes and at speeds that overwhelm or, you know, confuse the body sensations.

Your body balance systems can be confused, but they would still give you inputs. And so if you have good visual cues, good reference, you can clearly see a horizon, then that strong horizon view can help a pilot disregard the confusing vestibular inputs. But if they are flying in degraded visual conditions where they don't have a strong horizon, then they have no other reference to tell whether their vestibular inputs are correct or not. So if they then believe their vestibular inputs, then they can become disorientated.

But what aircrew are trained to do is if they are in degraded visual conditions and they can't see a strong horizon, they are then supposed to convert on to instruments and fly on instruments, which then gives them the artificial horizon to tell them whether they're upright and straight and level. Now, that is a cognitive process. So your peripheral vision that you would normally use in the daytime is processed subconsciously. But if you're looking at instruments, you're now looking at the instruments with your central vision and you're now looking at it, concentrating, understanding what it means, and then projecting what that's going to mean. So that's a very cognitive process, which takes some time.

When aircrew become task-saturated or overloaded, or they become excessively fatigued, their ability to accurately or quickly use instruments or other sources of information for orientation can become degraded, and it's then more likely that they will then succumb to the erroneous visual or vestibular information and become disorientated. So fatigue and high workload are well-established, well-known risk factors for spatial disorientation.

COL STREIT: Spatial disorientation at its extreme or moving towards its extreme effect, does that mean potentially aircrew might not appreciate whether they're ascending or descending?

DR SMITH: That's correct, yes. So the spatial disorientation is the inability to orientate yourself in space, but you are still operating the aircraft. So based on what you perceive, you are then controlling the aircraft. You may have unrecognised spatial disorientation. So somebody outside the aircraft will have an idea of what the aircraft is doing, but if you're flying in degraded visual conditions and you've become disorientated, you may not be aware of it. At that point in time, you're flying based on what you feel the aircraft is doing.

If you then have recognised disorientation, that's where you recognise that the aircraft is in an unusual attitude, and that's when, sir, you were asking about unusual attitude recovery. So when you have recognised disorientation and you realise that the aircraft is in an unusual attitude, that's when you engage your airmanship training for unusual attitude recovery.

COL STREIT: And that training, given your evidence earlier, would effectively mean eyes in on the instruments in front of you as a pilot?

DR SMITH: I'm not a pilot.

COL STREIT: Sure.

DR SMITH: I believe that to be the case, to go onto instruments and make the instruments read what you want the aircraft to do. But I'm not a pilot, but that's what airmanship unusual attitude recovery training should be doing, yes.

COL STREIT: But I understand your evidence is, is that sometimes – well, there's a possibility that a pilot might not appreciate they're in a position of spatial disorientation?

DR SMITH: That's correct, yes.

AVM HARLAND: In terms of the unusual attitude recovery, is there a kind of currency and recency associated with it in terms of your performance in, firstly, recognising an unusual attitude and then dealing with it?

DR SMITH: I don't know what the currency requirements are, and that's probably more something for a Human Factor Specialist to answer, about

what's the desirable recency for that sort of training to maintain a proficiency in that skill.

AVM HARLAND: Yes. I guess, in simpler terms, would practice increase your – improve your performance?

DR SMITH: Practice will increase your performance. With disorientation, a lot of the – disorientation and unusual attitude recovery go sort of hand in glove. So a lot of our training has been providing aircrew with factual information about, "These are the illusions that you can experience, and these are the conditions that you can experience disorientation in". Unusual attitude recovery is, "If you find yourself in an unusual attitude, this is how you recover".

The rate of spatial disorientation has decreased over the last decades, but for the last 10 or 20 years has remained pretty static and we still have spatial disorientation accidents. So there's an increasing interest amongst Aviation Medicine Specialists around the world saying, "Well, is just providing academic training on – educating aircrew about facts enough to change behaviour? What do we need to do to actually change their behaviour?"

There's emerging evidence that simulator-based disorientation training before unusual attitude – so rather than saying, "You find yourself in an unusual attitude, this is how you recover", in a simulator session actually start to degrade the vision, start to have rising terrain, start to have distractions, and start to increase their workload until the aircrew say, "Hang on, I've now got a cluster of red flags that should be indicating I might be at high risk of disorientation. I'm going to now confirm, check", and all that.

So rather than waiting until they become disorientated and then conduct unusual attitude recovery training, actually train them to recognise the circumstances that place them at risk of developing disorientation. And by increasing their awareness of those risk factors, getting them to check with each other and confirm the safety of the aircraft before they become disorientated. And that's the only way we're going to make any headway on unrecognised disorientation. Because obviously if you wait until you recognise it, it then ceases to be unrecognised.

AVM HARLAND: So, effectively, moving the treatments into being proactive before the event rather than just purely after the event.

DR SMITH: Correct. So recognising the circumstances that can lead to the development of disorientation and then giving them practical solutions

to intervene at that point rather than waiting until they experience a familiar illusion or have the circumstances where they have unusual attitude.

AVM HARLAND: Thank you.

COL STREIT: At paragraph 28 you say this:

> *Bandwidth capacity can be reduced by any of the types of fatigue likely to be encountered during night flying: operating outside normal circadian rhythm, carried-forward fatigue from poor sleep the evening before, accumulated fatigue over several days of night flying, and possible sustained wakefulness prior to flying.*
>
> *In addition, flying in degraded visual conditions in formation with NVDs impose their own stressors and cognitive burden that can saturate and overwhelm the cognitive bandwidth.*

Is that correct?

DR SMITH: That's correct, yes.

MS McMURDO: So are they the types of risks that you were talking about that you would like to see pilots trained to identify early to become aware of to avoid spatial disorientation?

DR SMITH: Yes, that's correct, ma'am.

MS McMURDO: Thank you.

COL STREIT: Can I just move now to the next area, where you're asked:

> *The extent to which stress fractures arising from operating complex aircraft systems may be different when operating by day and night, and how those issues can or should be managed?*

Paragraph 29, you say:

> *Flying at night imposed significantly more stress than similar profiles during the day, primarily due to reduced visual cues compounding effects of fatigue.*

What do you mean "reduced visual cues"?

DR SMITH: So when you're flying at night, you're either flying night-unaided or without night-vision goggles, where you have very poor visual cues. Your vision at night is just not as good as it is during the day. In general, Army is geared up, and has been for decades, to use night-vision devices so that you're not flying night-unaided, you're actually flying with night-vision devices. Those night-vision devices are significantly better than night-unaided, but they do have some limitations.

The way the night-vision devices work, the current version of night-vision goggles can give you a visual acuity of [redacted]. Now, what that means is that what you can see from six metres with the NVGs, somebody with perfect vision should be able to see from nine metres or 12 metres away. So you have to get a little bit closer and so just the resolution is not as good. In really good full moon, no cloud, it might be [redacted], but generally we're talking about visual acuity that's not half as good as during the day. [redacted].

COL STREIT: [redacted]

DR SMITH: Yes. What I said before was so what you can see at six metres, somebody else with perfect vision should be able to see from 12 metres away. It's that degree of comparison. What that is, when you go to the doctor and you look at the eye chart, it's just looking at the eye chart and that's calibrated to a six-metre eye chart.

COL STREIT: Thank you.

DR SMITH: Now, that's with the reduced visual cues. Those visual cues are then moderated by the amount of illumination, the amount of obscureness in the atmosphere – you know, mist, rain, things like that – the terrain that you're flying over. So there are a lot of other factors that can determine the quality of the visual cues. But flying at night on NVGs does pose a challenge because the night-vision devices that you're using have a limitation, and the importance is to acknowledge that limitation and work within the limitations in a way that is safe. But that is a cognitive process.

Again, we talked about peripheral vision being important for orientation but at night-time, when you're looking through night-vision goggles, you've got a 40 degree central section that is illuminated green and you're looking at that with your central vision, and so all of your visual cueing is with cognitive processing. So it's a deliberate look and understand cognitive process, which can be demanding. That then is occurring at night-time. If you're flying at night, you're doing it at night-time, so

you're doing that at the time that your body clock is saying that you should be asleep. So you have a degree of fatigue because you're flying at night hours. Then if you're doing that on the second or the third night, you may have some incomplete sleep from the day before carrying over to the next day, and that's the cumulative fatigue.

Then the other aspect of flying at night, and as we've heard, if you wake up early, then you're actually awake for several hours or a long period of time during the day, you're accruing fatigue during that time of wakefulness and then you're going flying at night-time. You're actually flying at the back end of the day when you're already pretty fatigued. So flying at night imposes a significant fatigue burden, and it also then compounds that by providing you with visual cues that are not as good as your day-time vision, which makes it more challenging when you have to cognitively process the visual field.

COL STREIT: You identify at paragraph 34, you say:

> *Where circumstances known to pose a hazard for aviation safety can be anticipated, the aircrew can take actions to minimise their impact, including ensure that they're well rested and not fatigued when they fly. If flying at night, ensure adequate sleep can be obtained prior to conducting the mission. Every effort should be made to avoid extensive periods awake or prior to a night sortie. A strategic nap or short sleep shortly prior to a night flight would reduce fatigue during the flight.*

You go on and identify two other matters. So is the reality that when you're flying at night, you're already starting behind the line in one sense because you're doing something that's inconsistent with your circadian rhythm?

DR SMITH: You're at a disadvantage biologically because it's out of sync with your circadian rhythm, until you've done it for enough days for your circadian rhythm to catch up.

COL STREIT: Would it be difficult for your circadian rhythm to catch up if you were doing day flights and then the next day or within two days moved to a night flight and then back to a day flight?

DR SMITH: Yes, it normally takes three or four days for your circadian rhythm to start to synchronise with your activities and it may take up to 10 days for your circadian rhythm to fully adapt. So if you're doing chopping and changing, quickly rotating between night flying and day flying, your circadian rhythm never really gets a chance to reset and what

that means is that you're then operating at a significant disadvantage because your circadian rhythm is reducing your cognitive processing capacity at the time that you're trying to fly.

COL STREIT: Is it the situation that each individual's physiology will determine whether they are able to cope more with that mixed circadian rhythm outcome? So some might cope more readily with what's occurring in an operational context, and others might not?

DR SMITH: Yes, I think that it's reasonable to say that some people might cope with it easier than other people, but your circadian rhythm is a biological drive, and everybody has got a circadian rhythm. There are some people that are sort of night owls and some people that are sort of early birds. Some people wake up early and operate. Some people stay up later and operate. So there is some differences, but operating at night is expected to impose a cognitive challenge to everybody. Nobody's immune. We don't have super humans that can be selected to operate at night without a disadvantage.

COL STREIT: Can I turn now to the issue of stereopsis and the question in paragraph 38. The question is your understanding of, and experience treating, if at all, stereopsis or any other types of illusions that may affect pilots operating complex aircraft by day and night, including, but not limited to, when using TopOwl system on the MRH-90. At paragraph 38 you say:

> *I provide this advice on the basis of my knowledge and experience dealing with stereovision displays and within my scope of practice as an aviation medicine specialist.*

Then you identify an individual who might be able to provide more detail and technical advice. First, can you just explain or express your opinion as to what stereopsis is?

DR SMITH: So a stereopsis is a 3D vision or depth perception. So that's your body's ability to judge relative distance between two objects in your visual field and, naturally, our eyes are separated by 50 to 75 millimetres. What that means is that if we're looking at objects in our visual field, the image from our left eye will be slightly different to the image from our right eye. The difference between the image in the left eye and the right eye for objects that are close is greater than for objects that are further apart. So if you're looking at objects in your visual field, your brain is able to say, "Well, hang on, the difference between the left eye and the right eye for this image is greater than for that image. Therefore, this image must be closer than that image", and that's stereopsis.

COL STREIT: Now, at paragraph 40 you set out a description in relation to the TopOwl helmet. Can I just ask you to assist the Inquiry and explain your understanding of the operation of the TopOwl helmet?

DR SMITH: Yes. So the TopOwl helmet is a system that has a number of different components. It has an image intensifier tube, so night-vision devices, that are mounted off to the side, about at ear level but on the outside of the helmet. Those images are then projected on to a plate on the inside of the visor and another part of the TopOwl is the helmet-mounted sighting display. So I am less familiar with the HMSD aspect, more familiar with the night-vision device and the hyperstereopsis component of that. Sorry, did you want me to describe any of that in more detail?

COL STREIT: What I wanted to ask you further – and perhaps this might assist – is at paragraph 41 you say:

> *Hyper-stereopsis is a well-known characteristic associated with the TopOwl helmet-mounted display system.*

Can you just tell me what hyperstereopsis is?

DR SMITH: Yes, okay. So hyper-stereopsis – we've already described what stereopsis is, just normal depth deception that is based on the separation of your natural eyes, 50 to 75 millimetres. With the TopOwl, the image intensifier tubes sit on the outside of the helmet, and they're separated by 240 millimetres. So what they're doing is that they're looking at the landscape in front of you through the image intensifying devices, through the night-vision devices. They are capturing the display through image intensifier tubes that are separated by 240 millimetres. That image is then projected in front of your eyes, and your eyes are then trying to figure out how close is something based on the difference between the left eye and the right eye.

But because of the orientation of the TopOwl image intensifier tubes, the difference between the left image and the right image is now 240 millimetres and so, as far as your brain is concerned, that's really close. And that is just based on – you know, there's hundreds of thousands of hours of evolutionary experience just walking around in the daytime with your eyes separated by 50 to 75 millimetres. And we just understand depth perception naturally; we don't have to think about it. And then, for a couple of hundred hours a year, you put on a helmet that then suddenly magnifies it.

So the hyperstereopsis effect is an exaggerated sense of depth perception. It's actually about four or five times, because the separation is four or five times greater. So things will appear to be four or five times closer. The effect of that is that, if you're sitting in the aircraft, things might appear much closer. And because everything appears much closer, it's higher. And then you feel like you're sitting down low, like you're in a bowl. That can be problematic when you're trying to hover. That can be problematic if you're trying to fly in formation. That can be problematic if you're coming up to objects that are close.

Generally, that is a short-term phenomenon that you become accustomed to, and it can take, you know, 10 hours or so for you to become accustomed to the hyperstereopsis effect. And then, once you have relearnt what those cues feel like, it then becomes less of a problem.

And after about 10 or 20 hours, then aircrew wearing TopOwl can judge distance just as effectively, as accurately, as they can with their unaided, natural eyes. But there is some concern that it still is a learned – you're relearning cues. It's not a physical adaptation or tolerance. You're actually having to relearn cues.

And if you were in unusual circumstances, if the cues are ambiguous, if you're fatigued, if you don't have a lot of recency, there is some concern in the literature about how resilient your adaptation to hyperstereopsis can be in those conditions that would naturally degrade your learned behaviours.

COL STREIT: At paragraph 46 and 47 of your report you refer to matters concerning hyperstereopsis and adjustments to that condition are reported to occur within five to 10 hours of training. You refer to some authorities there. Can I just ask you – and you go on further, in paragraph 47, to say that:

> *Whereas true physiological adaption is resilient in the face of the stress, these learned behavioural adjustments that constitute adaption with TopOwl are susceptible to breakdown in conditions of cognitive impairment, distraction, or when under duress.*

And you refer to an authority there. You then say:

> *There is also some concern that relearning of visual cues occurs with repeated exposure to similar settings and may not easily transfer to novel or ambiguous visual cues.*

And you refer to another authority there.

Just in relation to those matters, in terms of the training and adjusting to wearing TopOwl and where things can appear closer than what they actually are depending on the distance you are from them, if you were to have that training but you then didn't fly for a few weeks, is that going to have an impact on your ability to have the benefits of the training you had earlier?

DR SMITH: So it's a learned skill. And when you have a lot of experience and a high level of proficiency, then you will develop a mastery of that and it will become second nature. After a period of non-exposure, you will start to get skills fade. So that experience will start to fade.

Talking to pilots that were wearing TopOwl when we sort of visited Oakey back in about 2015, there was a general sort of perception that once you had learnt it, if you didn't fly for a period of time, there was some loss of adaptation, but you very quickly got that back, and it wasn't the full 10 hours. It was relearning something that you had previously mastered.

Again, talking to a Human Factors Specialist about proficiency and recency might be beneficial. But in general principle, if you have a high degree of mastery for a long period of time, you can probably tolerate a bit of a break, and have a small amount of skill fade, and then recover that fairly quickly afterwards because you've got a very strong base of consolidated experience. In principle, if you have a lesser base of experience, then your degree of skills fade would be relative – or proportionally greater with a smaller break because you don't have that strong basis to sort of fall back on.

So for aircrew that are flying regularly, with a lot of recency, I would expect your habituation to the hyperstereopsis to be pretty good. But for aircrew who may be complaining of low levels of proficiency, I would believe that the erosion of their habituation to hyperstereopsis may form part of that sense of lack of confidence that they've got the proficiency to fly safely.

COL STREIT: And we're talking about flying at night, aren't we?

DR SMITH: Correct, yes.

COL STREIT: So a pilot might have a significant number of hours flying during the day, but where the condition of hyperstereopsis comes into existence is at night, when they're using the NVDs?

DR SMITH: That's correct, yes.

COL STREIT: So if they don't have a lot of experience flying at night, then the issues that you identify about skills degradation may come into existence?

DR SMITH: That's correct. So this is just another skill that they need to master. And if they don't have a period to consolidate that skillset properly, then it is a volatile skill. It's a perishable skill.

MS McMURDO: So even if they do have it, if it's not current, it then degrades somewhat?

DR SMITH: Yes. So currency and recency.

MS McMURDO: Yes.

DR SMITH: But what I was getting at, ma'am, is that if you are very experienced, you might be able to go for longer - - -

MS McMURDO: Periods. I understand.

DR SMITH: - - - and have a little – a moderate amount of skills fade, and then get it back quickly.

MS McMURDO: Yes.

DR SMITH: But if you don't start from that high level of mastery, the proportional effect may be greater. But it is about currency and - - -

MS McMURDO: And recency.

DR SMITH: - - - and recency, not just the number of hours, yes.

COL STREIT: Turning now to the next area of your report, where you're asked what physiological stressors of flight, and physiological events, a pilot of a helicopter flying in formation at about 80 knots and 200 feet above sea level at night, using night-vision devices, over water might experience, and how that might contribute to aviation risk.

You then say, at paragraph 51:

> *The conditions described above are all associated with increased level of physiological stress and may also have a compounding effect when they occur together.*

And you then go on to explain, in relation not night flying, several associated and overlapping stressors. Can you just outline those to the Inquiry, please?

DR SMITH: Yes. So, when you're doing night flying, there's a degree of fatigue and – sorry, several different types of fatigue, that can occur concurrently. So there's the fatigue because you're flying at night and you're operating outside your circadian cycle, and that imposes a degree of fatigue.

You may have carried-forward cumulative fatigue. Because if you've been flying for a couple of nights, or if you've been awake for a couple of nights, any inadequate sleep will amount to a sleep debt which is then carried forward from one day to the next day. We've already heard that it is quite common for people, before they go flying at night, to actually be awake and on duty for a period of time before. So they've already got a degree of accrued fatigue during the day, before they go flying at night.

The NVGs in particular – less so with the TopOwl – but night-vision goggles are heavy, and they are mounted on the front of the helmet, so they impose a stress, so there's a lot of muscle activity to sort of rebalance your helmet. That induces some physical fatigue. And then of course there's the cognitive fatigue when you're flying at night. You've got night-vision devices that are cognitively demanding. You are flying in degraded visual conditions. When you know that you're flying in degraded visual conditions, that then increases the level of stress and cognitive burden to fly as well. And then all of these can occur concurrently in terms of fatigue and have a compounding effect. So that's from a fatigue point of view.

The other aspect of flying at night is degraded visual cues. So even with – we talked about night-vision goggles. But with TopOwl, typically the current version of TopOwl night-vision devices would give you a visual acuity in the order of [redacted]. So if you're flying in low levels of illumination, the TopOwl will give you degraded visual cues, and you are then looking at those degraded visual cues for your information.

With the TopOwl, there's the advantage that it has the HMSD overlay. So there is a head-up display, there is a pitch-roll attitude indicator, altimeter, and things like that. So it's not just flying on degraded visual cues. But the degraded visual cues are the background with a head-up display HMSD laid over the top. And then all of those add to the degree of stress that you're experiencing.

COL STREIT: Paragraph 53, you deal with night-vision devices.

MS McMURDO: Could I just add in there – ask you about this? You've heard the evidence of significant stress and upset within the flying team shortly before the flight. You've heard that evidence. Would that also contribute – is that also a fatigue factor?

DR SMITH: Any particular event that is out of the ordinary. So I'm just referring in general principle to flying at night. But, yes, certainly, if there has been a specific event that has caused a degree of stress, then that stress would occupy – it does change your cognitive capacity. You are somewhat distracted and that would contribute to overall level of fatigue and distress, yes.

MS McMURDO: Thank you.

COL STREIT: At paragraph 53 you express some opinions concerning night-vision devices. You say:

> *In addition to the fatigue accrued when flying at night, night-vision devices may increase physiological stress through their design limitations. Whilst arguably better than night-unaided vision, they may impose some visual limitations in degraded visual conditions or in low levels of illumination.*

Can you just explain what you mean by that?

DR SMITH: Flying with night-vision goggles is not a natural thing, it's a learned skill. It is much better than flying in dark night conditions without night-vision goggles. So there is a significant safety advantage, and operational advantage, to flying with night-vision goggles. They are essential for Army to be able to achieve the capability that it is required to do. But because it does have a human factors limitation, your visual acuity is not as good as your daytime visual acuity, so that difference is something that we need aircrew to be aware of and trained to address and work around.

COL STREIT: Turning now to formation flying, which is at paragraph 54 of your report, you say:

> *Formation flying requires the crew to maintain close proximity to other aircraft; in helicopters often measured in terms of rotor diameters. To maintain this proximity, pilots may not scan as much outside as they would otherwise lest the aircraft*

unintentionally drift together. Formation flying at night on NVDs requires a level of precision that would be associated with increased levels of stress.

Is that correct?

DR SMITH: That's correct. So what I would say though is that I'm not a pilot, and so pilots have got training to do that flying in formation safely. But when you're flying in formation you – it is a stressful setting. You are trying – we heard evidence that you're delicately balancing getting close enough to the other aircraft so that you can see them. That's then challenged by the degraded visual cues when you're looking through your night-vision devices.

It's compounded possibly by the configuration of the formation lights, whether they're designed in a way that makes it easy to fly in formation or not. But you're trying to get as close as you need to be able to fly in formation, maintaining your two rotor diameters, but then knowing that if you get too close, there is a risk of a collision. So that's that riding that crest of close enough to see, but not so close that you're going to be at risk. And then you're doing that flying above featureless terrain or over water where you, again, know that you're flying close enough to not have a lot of safety margin should you drift. And that awareness that you are very close to mid-air collision, or very close to controlled flight into terrain, is a very stressful margin to be operating in.

COL STREIT: At paragraph 56 you say:

The combined stresses of these factors and the cognitive burden that would have been associated with this type of profile are substantial. Extensive aircrew training to maintain a high level of proficiency across a range of flight skills seeks to allow some of the core routines to be executed with semi-automatic actions to reduce the cognitive demand somewhat, and allow them to operate safely and effectively within their cognitive reserve.

So in that paragraph where you say "the combined stresses of these factors", that's the factors you've identified earlier in your report concerning physiological stresses, night flying, night-vision devices, formation flying, and over flight water (sic). Is that correct?

DR SMITH: Yes, those factors are well-known and well-studied to be highly stressful flight conditions.

COL STREIT: So to reduce the stresses of those factors, extensive aircrew training and maintaining a high-level proficiency are the key to reduction of those stresses?

DR SMITH: Yes. The purpose of training is to develop a level of proficiency that allows you to do something with the least amount of effort to do it safely, yes.

COL STREIT: Can I take you to paragraph 57. You say:

> *When fatigued or overloaded or distracted, pilots can be susceptible to spatial disorientation. When under non-fatigued conditions, pilots are able to set aside visual and vestibular illusions and ignore body sensations by referring to reliable instrumental display cues. However, when they are fatigued or overloaded or distracted, they may not be able to effectively overcome strong but erroneous visual or vestibular cues, or body senses, and the pilot may become spatially disorientated.*

Is that really a reference to some of the evidence you gave earlier about spatial disorientation?

DR SMITH: Yes, that's correct. So fatigue and workload are well-identified as risk factors for spatial disorientation, and that is due to the fact that trying to orientate yourself in space when you are flying without strong visual cues is a very cognitively demanding process and any conditions that erode your cognitive capacity will have an effect on reducing your ability to become orientated, and increase the likelihood of developing disorientation.

COL STREIT: You've given some evidence earlier in relation to training and courses offered by the Institute of Aviation Medicine, so I won't – you've given evidence in relation to those matters in the context of your report, paragraph 63 through to 72 onwards. Can I just ask you some questions in relation to an outline of Army Aviation governance framework on preventing aircrew fatigue, particularly on exercises, including but not limited to, work/rest tables? At paragraph 73 you make reference to:

> *SI (AVN) OPS 6-201, SFI 12/2003, DASR AVFM 10/3, and companion DFSB Fatigue Management Guidance document, and DFSB Fatigue Risk Assessment Tool.*

What are those policy – what does that governance framework do? How does it actually assist in preventing aircrew fatigue?

DR SMITH: My understanding of the governance framework is that it starts with the Defence Aviation Safety Regulations that set out the expectation for what the principles should be, and the Aviation Fatigue Management refers – Aviation Fatigue Management Regulation refers to the Defence Aviation Fatigue Management Guidelines, and refers to them as benchmark best practice, and then encourages the development of unit-level fatigue management programs to be based on the principles espoused in the guidelines. And then cautions that failure to adhere to those guidelines can result in a deficient Aviation Fatigue policy that may not suitably control fatigue.

And then, based on that, units are supposed to develop Standing Instructions to manage fatigue. I have had a look at SI (AVN) OPS 6-201. That's the aircrew and operator endurance, and I've looked at that. I suppose to caveat this, I'm not aware of the crew duty and rest timings of the incident aircrew, and I'm not aware of fatigue-specific issues in the accident, but I'm just talking about in general principles.

Would you like me to make a comment about the SI?

COL STREIT: Well, what I was going to ask you – and maybe this will be the comment that you had in mind – but at paragraph 75 you give some evidence about SI (AVN) OPS 6-201. You say:

> *It does not preclude additional non-flying work-related duties prior to commencing a night sortie as long as the 10-hour limit for flying and the requirement for a 10-hour rest period in a duty day are satisfied.*

What do you mean when you say that?

DR SMITH: So the Defence Aviation Fatigue Management Guidelines are that the Aviation Fatigue Management Regulations are held up as benchmark best practice. They actually talk about the accrual of fatigue on the basis of duty time, and it's about your time awake, and your time on duty, that is responsible for the accrual of fatigue. And, you know, they talk about eight hours of normal work duty is sustainable. Any more than 10 to 12 hours is sustainable only for short periods when there is a dedicated rest, and that periods longer than that are going to develop chronic fatigue. So, you know, those numbers are laid out.

But the SI then talks about flying hours. So they talk about 10 hours of flying in a duty day, or 40 hours of flying in a duty period. But if you

count just flying hours, in addition to flying hours, there are a number of other Aviation-related duties that go into preparing for flying, and - - -

COL STREIT: Like mission planning?

DR SMITH: So, yes. A planning briefing, pre-flight, you know, post-flight debriefing and all those sorts of things. So if you're going to have 10 hours of flying – we would need to check with the pilots – but there will be a period of time longer than that, that you're actually on duty. And then we've heard testimony of all of the other secondary duties and other staff activities that take up your day.

So I think that where the SI (AVN) OPS 6-201 is focussed on flying hours, I'm not sure that that reflects the intent of the Aviation Fatigue Management Guidelines. That is more about the accrual of fatigue in the time that you are awake and on duty, regardless of whether you're flying or not flying. So I suppose that's the first thing.

Then the second thing is that, you know, it does say that Commanders should ensure that aircrew are provided with the maximum rest period possible, and that's good. But a lot of the testimony that I've heard in the last couple of days has been really focussed on at least 10 hours, you've had your 10 hours of rest.

So the Aviation Fatigue Management Guidelines talk about an over-reliance on crew duty limits, and the 10-hour rest period. And if they're your mainstay of a fatigue policy, that is unlikely to achieve effective management of fatigue because it doesn't address all of the nuances and the complexities of cumulative fatigue and chronic fatigue. The Fatigue Management Guidelines say that if you've been at work – if you've been working for more than six days, it should be followed by 48 hours of no duty. Whereas the SI says that if you've been flying for 10 days, that you have 24 hours off.

So those departures from the best practice as outlined in the Fatigue Management Guidelines I think introduce a degree of risk that needs to be acknowledged when deciding whether an activity is high risk or low risk. And if you then rely on a 10-hour rest period as being this is what we're going to put forward to offset the fatigue, you then have to read into that all of the rest of the Aviation Fatigue Management Guideline that says, you know, if you've had inadequate sleep, then 10 hours of rest should be giving you eight hours of sleep. But if you're sleeping in the heat and you're only getting three hours or four hours of restful sleep, your 10 hours' rest period doesn't necessarily confer the same degree of restorative benefit as 10 hours of rest sleeping in your own bed.

COL STREIT: So a bit like it's the quality, not the quantity.

DR SMITH: It's the quality of sleep. The first paragraph of the Aviation Fatigue Management Guidelines actually cautions against having an over-reliance on crew duty limit rules because that tends to be a set and forget. And then it also cautions against having the 10 hours as a planning – 10 hours rest as a planning – so if you say, "Well, as long as they've got their 10 hours' rest, I can then work them for the rest of the day". Now, whether that's a deliberate strategy, or whether that is just the work is such that that aircrew naturally just work as long as they have to get the work done, but I think the end result is that we saw evidence that people were working consistently longer than the period of time when you would reasonably expect people to develop fatigue.

COL STREIT: I'll just pause there. Is that a reference to the evidence of D20 and D15?

DR SMITH: Yes. And, you know, the spotlight – pulse sort of surveys, and things like that. So if people are working long hours, then that is associated with a degree of fatigue. If you have sort of cumulative fatigue, so rolling over a sleep debt from one night of not a full eight hours of sleep, then that then means that the next day you need to have more than eight hours' sleep, and that then means that the next day you need to have more than eight hours sleep. And the 10-hour rest period that should give you an eight-hour sleep period, you may actually need 48 or 72 hours of that sleep cycle to recover a sleep debt that you accrue in a six-day working week. So not really understanding how the accrual of fatigue occurs in cumulative fatigue and the effect of chronic fatigue.

The fatigue rules are really based around acute fatigue, and so if you then apply rules that are based around acute fatigue and then not take into consideration the full impact of the compounding effect of cumulative fatigue – we heard evidence yesterday of – I'll hopefully get to talk about this in a moment – but, you know, "We were fatigued yesterday. We were fatigued the day before. What was different about today?" Well, what's different about today is you've got today's fatigue, plus the fatigue from yesterday, plus the fatigue from the day before. So to think that a simple rest period is going to wipe out three days of cumulative fatigue is not based on science.

Now, there are - - -

COL STREIT: Sorry, doctor, can I just - - -

DR SMITH: Yes.

COL STREIT: Can I just ask you this? So we understand what you mean by cumulative fatigue. Now, you prepared a paper in August 2022. It's Enclosure 3 to your report. That's correct?

DR SMITH: Yes, correct.

COL STREIT: Can I just ask you to turn to paragraph 6.32, first?

AVM HARLAND: So that's where - - -

DR SMITH: What paragraph, sorry?

COL STREIT: 6.32.

DR SMITH: Yes.

COL STREIT: That's where you've got a section heading of "Fatigue". You say:

> *Pilot fatigue is a serious aeromedical concern in military Aviation. Operational flying is increasingly becoming "around the clock", with aircrew required to work for extended periods of time with limited opportunities for good quality sleep. The sleep opportunities may be intermittent, disrupted and incompletely restorative.*

That's still your opinion today, what you've said in 2022?

DR SMITH: Yes, definitely.

COL STREIT: If you turn the page and go to paragraph 6.48.

DR SMITH: Yes.

COL STREIT: I'll start again. 6.47, you set out types of fatigue. At 6.48 you describe "Acute Fatigue":

> *Acute fatigue describes the natural tiredness experienced after intensive physical exertion demanding physiological tasks or a long work day - - -*

MS McMURDO: Psychological tasks. Sorry.

COL STREIT: "Psychological takes". Thank you, Ms McMurdo.

Psychological tasks or long work day - - -

might be reflective of my long work day –

acute fatigue is normally short-lived and can be expected to be relieved with rest. Acute fatigue is commonly referred to as, "being tired."

That's correct?

DR SMITH: That's correct, yes.

COL STREIT: And 6.49, "Cumulative Fatigue", you say this:

Cumulative fatigue is usually more insidious than acute fatigue and is characterised by an accumulation of fatigue over days to weeks. This can be the result of extended work weeks with little time off or normal work days separated by inadequate periods of rest, short duration, or poor quality of sleep. Cumulative fatigue is often simply called fatigue, distinct from acute fatigue or tiredness.

6.50:

Cumulative fatigue is often manifest by the sensation of being "burnt out". Recovery may take more than one rest period to regain normal performance levels or a feeling of being refreshed. Cumulative fatigue results in an increase in performance errors.

The performance manifestations of fatigue were discussed earlier. You then say:

For NVG operators, cumulative fatigue may be associated with an incremental decline in performance from one day to the next, with a more pronounced decline towards the end of each duty period as the operator experiences acute fatigue.

Those opinions that I've just read out to you expressed in your paper of August 2022, they still hold true today?

DR SMITH: Yes, that's correct.

COL STREIT: Returning to your earlier evidence set out, the impact of – or your consideration about the governance framework and the operation of SI (AVN) OPS 6-201 and the DFSB Fatigue Management Guide document, is there anything in those documents and you're aware of that deals with the effect – or managing the effect of cumulative fatigue?

DR SMITH: Yes. The Fatigue Management Guidelines actually have a Fatigue Risk Management Chart. It's a tool that's available and that is there intended to help Commanders understand whether a fatigue risk is lower risk, medium risk or high risk. And I would, you know, believe that those risks are lower risk and higher risk rather than being associated with a risk on the Defence harmonised risk category matrix.

I don't believe that it is a high risk, it's a higher risk. But what they do is rather than just saying how fatigued you feel you are or just your acute fatigue, they actually ask – you know, get you to look at what's your daily working hours and then it gives you objectively that if it's less than nine, then that's a lower risk.

If it's, you know, more than 12, then that's a higher risk. It then also talks about, you know, "How many consecutive days have you worked? What's your average weekly hours? How many hours have you worked in the last three months? What type of scheduling are you on? How long have you been awake continuously at the time that you're performing the duty? How often have you had your rest periods interrupted? And how often have you been asked to work excessive hours over and above your 10 hours?"

And there's about 30 or 40 different questions on this form and each of those is associated with an objective number that divides that element of risk into lower risk or higher risk, and that includes acute fatigue, and cumulative fatigue, and chronic fatigue, and circadian fatigue, to give somebody an overall picture of your level of fatigue risk based on all of those factors.

And then off to the side, it actually then gives you practical examples of strategies that you might be able to implement to try and mitigate or minimise those risks.

COL STREIT: That document is the DFSB Fatigue Risk Assessment Tool, is it?

DR SMITH: It's the Fatigue Risk Management Chart that is actually contained in the Fatigue Management Guidelines. There's a separate form which is the Fatigue Management tool, and that's more of a – that's more

intended – so when the Defence Aviation Fatigue Management Guidelines says that self-assessment – so let's say FACE check is a poor indicator of your own level of fatigue because we're poor judges of that. However, if you then move away from asking individual aircrew, "Do you feel fatigued?", and just leave it up to them and their discretion whether they feel fatigued, if you ask them specific questions like, "How many hours sleep have you had in the last 24 hours? How many hours sleep have you had in the last 48 hours? How long will you have been awake by the end of your current duty period? What time are you working and how alert are you feeling?", the sensitivity of those discrete objective questions that give you a numerical answer and then, like with the Fatigue Chart, each of those questions is then associated with an objective answer which then helps a layperson divide the level of risk into, "This is a monitoring risk, this is an actively managed risk, or this is a caution risk". And again, with practical strategies of how to mitigate or minimise those risks.

So, basically, you've got two tools that are available to assist with the assessment of acute, cumulative, chronic, and circadian fatigue.

COL STREIT: But those tools are only useful if they're actually used.

DR SMITH: Correct.

COL STREIT: They're available on the framework that you've examined, the governance framework. That's right?

DR SMITH: Correct, yes.

COL STREIT: But it's a question of whether or not they're used.

DR SMITH: I don't know whether they're used or not.

COL STREIT: No, I'm not asking you, but - - -

DR SMITH: I haven't heard that they've been used.

COL STREIT: The DFSB documents you've referred to, they're within the DFSB framework. They're not replicated in the Aviation instruction you referred to?

DR SMITH: No, that's correct. So they're contained in the Defence Aviation Fatigue Management Guidelines that are referred to as the benchmark best practice by the Aviation Fatigue Management Regulations.

MS McMURDO: The document you were most recently quoting from I think was the DFSB Fatigue Management Guidance document; is that right?

DR SMITH: That's correct, yes.

MS McMURDO: Thank you.

DR SMITH: And the recommendation is that, in developing a unit-level fatigue management plan, there should be reference to those guidelines for best practice.

AVM HARLAND: So if I was to paraphrase my understanding of what you've said there, is that FACE checks by themselves are not infallible, and an individual is not a great judge of their own fatigue. However, if you added some more objective assessment, like asking questions from the DFSB Fatigue Risk Management Chart, you can increase - - -

MS McMURDO: The Management Guidance document.

AVM HARLAND: From the guidance document, yes.

DR SMITH: Yes.

AVM HARLAND: You can increase the effectiveness of that risk control.

DR SMITH: The Direction from the guidance document is that if you leave it to an individual's discretion with a vague term like "Do you feel fatigued?", that's very difficult to judge and it's insensitive. But if you give them a series of questions on which to base objectively a measure of fatigue benchmarked against population studies where we know that if you've been awake for 14, 16, 18 hours, we know that you're fatigued. Rather than asking an individual, "Do you feel fatigued?", if you ask them, "How long have you been awake for?", we can then understand what level of fatigue they might have.

AVM HARLAND: So would you consider it wise to consider being more objective and use these tables should you have indications that your organisation is telling you that you're fatigued?

DR SMITH: Correct. So my general approach as an aeromedical analyst, is that if you've got a rule set to control fatigue or any other problem, and yet people are still complaining of fatigue, to go back and say "But we've got a rule. We've still got fatigue, but we've got a rule". So somebody

has to say, "Well, maybe that rule set is not being complied with. Maybe the rule set is inadequate. Maybe it is not going to be effective. But if people are complaining about the condition that that rule is supposed to stop, then we have to go back and reflect on is that rule set adequate, and what can we do to improve it. And one of the ways that we can do – to improve is to refer back to the guidance document and use the tools that are available".

AVM HARLAND: So if the rule set is intended to manage or control risk, it could either be not implemented correctly, in which case that's the rectification available. Or you may need to take other steps because the rule is actually ineffective.

DR SMITH: That's correct, yes.

AVM HARLAND: Thank you.

COL STREIT: Can I just take you to paragraph 80 of your report, where you're responding to a question of your understanding of the impact on safety, if any, when aircrew change cycles from flying by day to flying by night, including reverse cycling. You've given some evidence in relation to this particular matter earlier. But can I just ask you, what does "reverse cycling" mean?

DR SMITH: So I'm not sure that reverse cycling has a definition. On one level reverse cycling is actually inverting your day/night cycle. So flying at night, but then engaging a number of other – so just reversing your lifecycle so that you – if we flew during the daytime, we would wake up at 6, you would get up, you have a cup of coffee, you watch the news, you then go to work, an hour or two later you're getting ready to fly. And then you go home, you go for a run, you go to the gym, you watch telly and then you go to bed. If that's your normal lifecycle, all of those cues to this is daytime: we're getting ready, we're gearing up to go to work. They reinforce your circadian cycle. And then all of the behaviours that you engage in to wind down at night reinforce your circadian cycle to say that you're getting ready to go to sleep.

For shift work, the best response is to actually say, "Well, I'm going to – if I'm starting work at 8 o'clock, I'm going to set the alarm to wake up at 6, because I would normally wake up two hours before I have to go to work". If you then say, "Well, I've got the whole day to myself, I'm going to get up in the morning and go shopping and do all the fun stuff and then go to work", you're working at night but you're still on a half-day shift. So that half being in the day and half working at night imposes a significant challenge.

So, for me, reverse cycling is actually trying to engage in a lifestyle that supports a natural transition into waking up, preparing to go to work, working at night, and then doing whatever you need to do to unwind and get ready to go to bed, but just do it at a shifted cycle in the day.

But I think that in common usage, reverse cycling is just flying at night. But that is, as we've heard, not necessarily only night operations, it might be involving being awake during the day and doing other daytime activities in the lead-up to flying at night.

COL STREIT: At paragraph 86 of your report you say:

> *IAM* –

stands for Institute of Aviation Medicine, I take it?

DR SMITH: Yes.

COL STREIT:

> *Has provided advice* –

and you refer to a reference there –

> *on ways to prepare for and manage the hazards of reverse cycling to support night operations.*

And then you list a number of areas from (a) through to (g). Are you just able to, in broad compass, summarise those matters for the Inquiry?

DR SMITH: Probably what I can do is say, well, that is the – the reference that I cite is the Aeromedical and Human Factors of Night-Vision Goggles document.

COL STREIT: Yes.

DR SMITH: But all of those are elements more recently described in the Aviation Fatigue Management Guidelines. So they're not things that I have recommended. I recommended best practice according to the literature. That same best practice has been incorporated into more recent documents. But generally, ideally avoid rapidly swapping onto night shift. Night shift can take a couple of days to make sure that your circadian cycle and your performance is synchronised to get the optimum

benefit. On the first night you're often fatigued because it's your first night working.

Rapidly changing: so ideally you would extend it by about an hour to an hour and a half and then the next night do a little bit later and then a little bit later, so that you're gradually moving into the night shift and allowing your circadian rhythm to catch up.

Making sure that we understand the natural cycle: so if you're flying from 8, 9, 10 o'clock, your circadian cycle is just beginning to wind down but you're still alert. If you're flying at 2 and 3 o'clock in the morning, well then your circadian cycle is starting to wind down, telling you that you should be asleep. So the risk of flying at 10 and 11 o'clock is less than the risk of flying at 2 or 3 o'clock. So making sure that, when you're timing the night sortie, that you understand when you're timing that sortie to understand what level of cognitive impairment and drowsiness is likely to be associated with that.

And then trying to minimise disruptions in the daytime so that aircrew can fly at night and be operating at night-time and then sleeping and resting during the day. If you start to provide them with other duties during the daytime, then you're actually reducing their opportunity to sleep. You're then also increasing their time awake, which is then increasing the accrual of fatigue before they actually get involved in flying at night. So it really is a sensitive management to get the best possible capability out of people that are operating at night.

Shift work is known to be difficult, but people that do shift work who do it well are well accustomed. And a number of people operate night shifts routinely, but what they do is they make sure that they plan their life to support an optimum and effective night shift. But sometimes in Defence your night shift and your day shift are then interrupted based on operational tasks, and that swapping between night shift and day shift doesn't really give your body a chance to properly adjust in a way that allows you to operate to your best possible level.

COL STREIT: I note, Ms McMurdo, we've been going for two hours, whether a short comfort break might be appropriate?

MS McMURDO: That's probably a good idea. Just before we do, could I just ask you, is adrenaline a counterpoint to this?

DR SMITH: I believe that adrenaline would be a temporary, unsustainable and unreliable counter, although you might get an alerting or an arousal effect. If you have an adrenaline rush, then that can also

lead to just being overwhelmed and things like that. So I wouldn't call that a good strategy.

However, caffeine – so the strategic use of caffeine is known to be an effective way of moderating alertness when you're working on night, but that to get the best effect means that you should restrict the amount of caffeine that you take in during the day so that the caffeine that you have when you need to be aroused is maximally effective. If you drink coffee all day and then you have one more coffee at night, then it has a limited effect. But there is advice in the guidelines, and IAM has issued separate advice about the strategic use of caffeine as a specific mitigator for fatigue in operational environments. And acknowledging that caffeine in drinks can be difficult to manage in aircraft.

We are in the final stages of trying to introduce caffeinated gum into Defence service that would allow aircrew the opportunity to have a quick-acting, no-spill, no drink in a cup, coffee. But if you're feeling fatigued and you need to be aroused, some gum and within 10 minutes you get a spike of arousal. That's a strategic tool that we're trying to introduce to provide aircrew with the level of arousal that they might need on night duty.

AVM HARLAND: I think the legal profession might be interested in that.

MS McMURDO: I think a few people would. All right, we'll just have a 15-minute break now. Thank you.

HEARING ADJOURNED

HEARING RESUMED

COL STREIT: Thank you, Dr Smith. Can I just take you back to paragraph 73 of your report, where you identify the DFSB Fatigue Management Guidance document, and the DFSB Fatigue Risk Assessment Tool. Are you able to recall or, if you have those documents before you in your material there, are you able to indicate the dates of those documents?

DR SMITH: The Aviation Fatigue Management Guidebook is dated April 2021, and that contains both of these tools.

COL STREIT: I see. Thank you. We were dealing with your understanding of the impact of safety, if any, when aircrew change cycles from flying by day to flying by night, including reverse cycling. Can I take you to paragraph 86(f)? You say:

> *Aircrew should be provided with an environment that is conducive to good quality, uninterrupted, restorative sleep. The room should be cool, dark and free from intrusive noise or interruptions.*

Why do you provide those parameters?

DR SMITH: The scientific literature, you know, clearly identifies that for good quality restful sleep to offset fatigue, it needs to be cool. 15 to 20 degrees is ideal. Any more than 25 degrees, you're just tossing and turning because it's too hot, and you might be drifting in and out of sleep but you're not getting good quality restorative sleep, so when you wake up you don't feel refreshed. Noise and intrusion, light, all of those things just prevent you from falling asleep. When you fall asleep, there is a natural order. It's not just, you know, go to sleep and then just wake up. You know, your brain goes through a couple of periods of slowing down, relaxing, and then you get a period of slow wave sleep where you can get restorative sleep, and then you have a period of dreaming – rapid eye movement sleep. And then over the course of the night that's about a 90-minute cycle.

You repeat that several times over the course of the night, and gradually you get less and less sleep, slow wave sleep, and the balance of dreaming increases. But that natural pattern is necessary for you to wake feeling refreshed and restored. And whereas sleep is a nice commodity for normal people to have, if it's used as a risk control for fatigue, where we know that fatigue is associated with cognitive impairment and we know that cognitive impairment is associated with, you know, flight safety risks, it's more than just a nice sleep, it's actually an essential sleep if you want to effectively offset the effects of fatigue.

And so if you want to have the maximum benefit of the restorative sleep, it needs to be conducted in an environment that is conducive to that sleep. The fatigue management guidelines say that if you don't provide – if you just get somebody to sleep in the daytime and they're not in an environment conducive to sleep, they might only be getting one to three hours of sleep. So you may have given them a 10-hour rest period, but if they're only getting one to three hours of sleep or that sleep is interrupted or disrupted, or it doesn't allow you to develop – so if it's just light sleep because there's always noise outside, then that means that you

never really go into the deep sleep necessary to wake feeling refreshed, in which case it's not an effective control for fatigue.

COL STREIT: You've heard the evidence of some witnesses about their experiences at Proserpine Airport as part of the deployment of 6 Aviation Regiment on Exercise TALISMAN SABRE. Is there anything – having regard to that evidence and their sleeping arrangements, what were your observations in relation to those matters?

DR SMITH: My observation is that that's not ideal. And, you know, sleeping in a tent is unlikely to provide you with the temperature that you require for optimum sleep. And, you know, if the prevailing temperature is 23/24 degrees during the day, even if the end of the tent's open, it's likely to be stuffy inside. Tents are not good at blocking out light. So, you know, you're going to have light interruption, unless you've got eyeshades on. Having vehicles going past, having plant operating, having people walking past your tent and talking, and things like that, being situated on an airfield with aircraft taking off during the day, all of those are going to degrade the quality and the quantity of sleep. And therefore I don't believe that the 10-hour rest period that is associated with that disrupted sleep will give you the degree of benefit that you would expect to be an effective risk control.

COL STREIT: Would also separating out those who were doing, essentially, night duty or night flying away from those who were doing day duty – separating out the sleeping arrangements for those two groups, would that also be important, so they're not disrupting each other?

DR SMITH: I think that is a well-meaning – you know, a well-intentioned activity. It does seem sensible. But I don't know how effective it would be, just separating out different shifts, if you're sleeping in a tent on the side of an airfield. So I don't know that that concession, by itself, would fundamentally improve the quality of sleep.

COL STREIT: Can I take you to paragraph 90, where you deal with the question of your understanding, and what the ideal sleeping conditions should be for aircrew on exercises and what sleeping conditions can exacerbate safety risks. You say, at paragraph 90:

> *I provide this advice from my working knowledge and scope of practice as an Aviation Medicine Specialist.*

And then you identify a person who might be able to provide further technical advice to the Inquiry.

At 91 you say:

> *Restful sleep, necessary to offset the effects of fatigue, requires:*
>
> *(a) an environment that is dark and quiet and free from disruptions or intrusive noise;*
>
> *(b) an environment that is cool, ideally between 15 to 20 degrees, but no more than 25 degrees;*
>
> *(c) sleep opportunities that coincide with window of circadian low, and napping opportunities in the mid-afternoon, during which time it is easier to fall asleep naturally with body sleep wake rhythm;*
>
> *(d) an opportunity to wind down after a duty period and allow the mind to clear of work stressors. Ideally, this would take place in an atmosphere of subdued lighting or lighting optimised to promote sleep conditioning; and*
>
> *(e) avoiding vigorous exercise, caffeine, nicotine, in a period before intended sleep.*

So in the circumstances of those matters, and in 6 Aviation Regiment participating in Exercise TALISMAN SABRE, which involved a deployment for training purposes, how might – obviously there's a tension, is there, between achieving an operational training outcome in the bush against what is actually necessary to maintain safe practice for the conduct of Aviation operations?

DR SMITH: Yes.

COL STREIT: Would you accept that?

DR SMITH: Yes.

COL STREIT: And how might that tension be addressed?

DR SMITH: So, on the one hand, there is the optimum conditions for sleep if you want to get the greatest benefit for greatest impact. On the other hand, there's the real-world considerations of operational deployments, timelines, constraints, environments, and the like. So my approach to this, if I was involved in a risk-based discussion, would be to start from, "Well, this is what ideal sleep conditions are like. If it's not

reasonable or practicable to provide that, then let's move away. What can you provide? And what can we do to try and mitigate that risk?"

But, at the end of the day, there should be an acceptance that if we want a baseline level of risk, but we're going to be providing people to sleep in a tent on an airfield where there's lots of disruption, then you can't then assume that you're getting the full quantum of restorative sleep. Therefore, your level of risk from fatigue is going to be a little bit elevated.

Now, it is not unreasonable for somebody to say, "In the real world, I feel compelled to take that position because that is what I need to do to achieve the job". That's fine. I will participate in that decision process. But in making that decision, "We're going to be accommodated in tents", that should be associated with, "We now no longer have a baseline level of fatigue. We're not getting eight hours of sleep. We're not having a full 10-hour" – sorry, "the 10 hours of rest is not providing the full measure of sleep. Therefore, our risk control is now a little bit weakened. We're going to do this, but accept that we have a heightened level of risk in doing so".

So it's not – I'm not opposed to sleeping in tents because I understand that sometimes that might be necessary. But what I do need to make sure is that, in making that decision, that they understand that that decision brings with it an element of risk, because you have just eroded one of the risk controls for a hazard of fatigue.

COL STREIT: So may be a way to reduce the risk, if you're having to live in tents for an operational purpose and conduct training – and you accept that that is not ideal, for the reasons you've identified: it's not a cool environment, all of those things – then, a control measure might be, instead of doing two flights a day, you do one flight per day, recognising the need for additional rest?

DR SMITH: Something like that would be appropriate. But it's really just acknowledging that the control that you're relying on in the SI is not going to be fully effective in that environment; therefore, the risk that that seeks to control is going to be, you know, less well-controlled. But other things like napping – so if you have, you know, a poor, interrupted sleep during the day, and that's your main sleep, there may be an opportunity to say, "Before you go flying, have a 30-minute nap", and that might be enough to just give you enough fatigue relief to mitigate the risk of fatigue in the subsequent flight.

So it's not just the sleep. The sleep is one of the tools. But if that tool is not effective or not optimally effective, you can think about, "What are some of the secondary controls that we can introduce to try and offset or mitigate that unintended effect?"

COL STREIT: I'll take you to - - -

AVM HARLAND: A quick question, if I may, COL Streit.

COL STREIT: Sure.

AVM HARLAND: It might sound like an odd question, but can you get better at working in a fatigue state by practicing?

DR SMITH: If you have a skilled task, if you have a high level of proficiency, then those tasks that you have a high level of proficiency in, you can do in a greater level of fatigue because you're not consciously thinking and rendering their skills. So, yes, if you have a high level of proficiency in a skill, then those things are somewhat resilient to fatigue. But with enough fatigue, then those skills will be degraded as well, but you might be able to push through a little bit further. But cognitively, like memory recall, thinking, judgment, executive function, all of those skills are not skills that you can practice and they're the skills in Aviation that are fragile.

And when you're fatigued, it's your information processes, it's not your stick and rudder skills. You don't forget how to operate the aircraft but your ability to respond quickly to new information, to a multi-channel process, your vigilance, your reaction time, those things are degraded and then your judgment and your executive function are degraded. And they're not things that you can practice.

AVM HARLAND: Okay. So a follow-on question. By practising operating in a fatigued state, can you improve your performance in operating in a fatigued state?

DR SMITH: No, I don't believe that that is effective. That might be effective in physical skills but cognitive performance, there's no benefit to practising in a fatigued state. It's like trying to drive when you're drunk. You don't get better at driving just because you've practised lots. If you're impaired, you're impaired, so there's no benefit to training in fatigue in order to improve a cognitive skill. A cognitive skill is degraded with fatigue, and that's just a biological sort of a fact. Physical skills, if you train those, physical skills can be preserved a little bit longer, but cognitive skills are not.

AVM HARLAND: Okay, that's great. Thank you.

COL STREIT: At paragraph 99 you say:

> *Short-term use of sleep-inducing medications such as Temazepam and –*

Can you tell me what that word is or pronounce that word correctly?

DR SMITH: Zolpidem.

COL STREIT: Zolpidem.

DR SMITH: That's another sleep-inducing agent.

COL STREIT: Thank you.

> *Are useful in conditions where natural sleep is not easy and this could include environmental conditions where environmental temperature, along with intrusive light and noise, are not conducive to sleep.*

You then identify what appears to be some limitations in relation to using those sleep-inducing medications at A and B. Can you just, in broad compass, assist the Inquiry and explain those matters?

DR SMITH: Yes. So Temazepam and Zolpidem are medications that induce sleep and they have been used in Defence for 30-plus years, and are widely used in other Defence Forces as well. So they are a common and accepted way of assisting aircrew to get sleep in conditions where they would not normally be able to sleep naturally and the cost of that is that if you can't sleep naturally, then you're going to be flying when you're fatigued.

We know that flying when you're fatigued is very dangerous. So the effects of fatigue on cognitive performance and the effects of that on flight safety are well known and to be avoided. So if you can't sleep and the option is to fly when you're fatigued, well the other option that we put forward is that if you had sleeping tablets, then we can induce sleep for a period so that you can have your restorative effect to offset fatigue. That is a very effective way of offsetting fatigue.

COL STREIT: It's a bit of a quick fix though, isn't it?

DR SMITH: It is, and I think we'll come to this later on. But in the teaching in AVMED that IAM has, and the policy documents, it's very clearly stated that natural sleep is the preferred option because natural sleep is better. So we're not advocating that everybody just get sleeping tablets as a quick fix. The best option is to actually create an environment where natural sleep will occur. But if that is not possible, then it's better to have sleeping tablets than to be fatigued.

Now, sleeping tablets, they induce sleep but it's artificial, and so you may not get the full progression through the sleep cycles. So you wake up feeling refreshed, but you might have a bit of a hangover, feel a bit drowsy for a little while, have a bit of a headache. And that's the purpose of the ground trial. We can talk about that later on, if you want.

COL STREIT: We might address that now, given we're on this topic.

DR SMITH: Yes. So the purpose of a ground trial: in Aviation, before you are authorised to take medication of any sort and fly, you are required to have a ground trial and the ground trial, and I think that's one of the enclosures, was the ground trial form. And the ground trial is a measured dose of a medication when you're not flying. It might be 24 or 48 hours, and we just see, "Did you have any side effects when you took the medication? Did you wake up quickly when you woke up? Were you clear? Did you have sleep inertia? Did you have a hangover? Did you wake up with a headache? Did you wake up feeling groggy? How long did it take you to feel like you could operate?" "Understand in giving the medication, we have demonstrated in a controlled environment that you were able to take the medication with good effect, that you took it and you went asleep. You went to sleep for the period of time that we require you to be asleep and when you woke up, you would be able to mount duty with a clear mind, without any ongoing side effects. So we demonstrate that in a ground trial and once you've successfully completed the ground trial, then we authorise you to use those sleeping tablets."

However, the use of sleeping tablets, both Temazepam – Temazepam was the preferred agent, and Zolpidem is a second-line agent only if the Temazepam is found not to be satisfactory or it's got some side effects. They are a Command tool to authorise aircrew to take sleeping tablets for a particular purpose in order to restore a sleep/wake cycle as part of an operational deployment.

Under this policy, this is not for the management of fatigue in a chronic stage. If somebody has worked for weeks and weeks and they're nearing burnout and they just need to get some sleep, that is not the appropriate purpose for this. That is a clinical – so if you're approaching burnout and

you're seeing a doctor because you have a medical problem, then they can treat you however they see fit, as clinically indicated. But that's not the same as a Commander saying, "I need you to fly tomorrow night and, because I need you to fly at midnight, I need you to sleep during the afternoon. It's hot. You're not going to be able to sleep naturally. Here is a sleeping tablet. I authorise you to take a sleeping tablet and then have directed sleep in preparation for a future mission". So that's the intent of the sleeping tablets.

COL STREIT: So as you said earlier, it's not a quick fix – sorry, it's a quick fix, but it's not designed to substitute natural sleep.

DR SMITH: No, it's not a substitute for natural sleep and it's also a targeted fix because we only want you to take it for no more than three days in a row and no more than – so we put limits on how much you can have. So it's not an every day sleeping tablet because you're flying at night. It really is just a targeted measure to get you into an environment where you can sleep properly.

COL STREIT: At paragraph 99, you say:

> *These agents are only authorised for a maximum of three consecutive days and not for more than 20 days in a 60-day window.*

Is that correct?

DR SMITH: That's correct, and that's primarily because if you take sleeping tablets regularly then your body can develop a tolerance for them, which then means that if you try and sleep without sleeping tablets then you can't sleep. So we want to maximise the effectiveness of the sleeping tablets to induce sleep when it's operationally required at the direction of a Commander, but not allow you to become habituated that you need sleeping tablets routinely to get to sleep.

COL STREIT: You deal also with this at paragraph 103 onwards of your report. At paragraph 103 you refer to the Defence Aviation Safety Regulation, MED 15.A, which you say was amended – or updated, rather, in November 2023. I just draw your attention to the third dot point:

> *The use of Temazepam and Zolpidem for clinical reasons is to be made on a case-by-case basis by the AVMO.*

What does "AVMO" stand for?

DR SMITH: That's the Aviation Medical Officer.

COL STREIT:

> *AVMO with reference to the ADF medication list for Aviation-related occupations and the aeromedical significance of the underlying medical condition requiring treatment with the medications.*

Next dot point:

> *The use of sleep-inducing agents is one part of an overarching system of controls to manage fatigue, and Commanders who determine that the use of these agents is warranted to make this decision with reference to the Defence Aviation Fatigue Management Guidebook –*

can I just ask you this: where it talks about "Commanders who determine the use of these agents is warranted to make this decision with reference to that guidebook", when it's a reference to a Commander, is that the Commander that's – sorry, how does the Commander's relationship work with the Aviation Medical Officer if the Aviation Medical Officer is prescribing the sleep-inducing agent but the Commander is authorising its use?

DR SMITH: There are two different reasons for having sleeping tablets. One of them is a Commander says, "I need this person to have sleeping tablets this afternoon because I need them to be well rested to fly tonight". In that situation, as long as the person has had the ground trial, then the Aviation Medical Officer will then dispense that because the CO, or the Commander, or the DET Commander, has authorised it.

Essentially, we don't want people having sleeping tablets outside the visibility of the Commander because the Commander, as we've heard, might have the – you know, "A change of plans. You were going to be flying tonight, I now need you to do, you know, another mission today". And if you didn't say, "Oh, sorry, I took sleeping tablets", well, then that sort of - - -

COL STREIT: In eight hours, yes.

DR SMITH: - - - robs the Commander of an asset. We do not approve individual use of sleeping tablets to manage sleep. It is a Command Direction so that they know who's taking sleeping tablets and for what purpose, and when. And then in doing so, they are then allocated for a

specific mission.

The other application is that if somebody goes to the AVMO and says, "I'm having difficulty sleeping. There's a lot of stress and I'm really tired. I'm fatigued", that's then a clinical problem. The AVMO will then prescribe whatever medication is clinically indicated, possibly including sleeping tablets. But in those circumstances, that person would be made temporarily medical unfit for flying duties and they would not be allowed to fly because they are being clinically treated for a condition that makes them unfit to fly for the duration.

So the flying within eight hours of having sleeping tablets is really the case where the Commander has authorised its use as one of the tools at their disposal to ensure that aircrew are well rested in order to have the maximum effectiveness when they're flying.

Does that answer your question?

COL STREIT: It does, thank you. Can I return just to paragraph 100. You say:

> *The significant impact on aviation safety imposed by fatigue has been comprehensively described, DFSB Aviation Fatigue Management 2021 and Wingelaar-Jagt.*

sorry, I can't pronounce those names. There's an authority, you say there at "2021", and will not be detailed here. You say:

> *It is sufficient to say that fatigue has a known impact on a broad range of cognitive processes, including reduced alertness, easy distractibility, complacency and inattention to detail, impaired vigilance and a slow reaction time, poor judgment and impaired decision-making, impaired cognition and information processing, irritability or mood change, impaired working and long-term memory, impaired coordination, and poor communication.*

Do you recall the evidence of D15 in relation to his observations of fractured relationships whilst at Proserpine?

DR SMITH: Yes.

COL STREIT: Would that fractured relationships be something that could derive from irritability and mood change?

DR SMITH: Irritability and mood changes are common with fatigue and

they would then manifest, in part, with disagreements with colleagues or rub points. So, yes, that is certainly a manifestation that we would be expecting to see.

COL STREIT: Paragraph 101, you say:

> *Fatigue is a significant contributing factor for loss of situational awareness and development of spatial disorientation.*

What's the difference between loss of situational awareness and spatial disorientation, please?

DR SMITH: Spatial disorientation is more your awareness of your body inside the aircraft and the aircraft in relation to space. Situational awareness is more a temporal sort of phenomenon. It's what's happening now, projecting forward. If we continue down this trajectory, what is likely to happen in the seconds in the front, anticipating future events and just having the wherewithal of what's happening around you. That's more of a temporal awareness and a context awareness. Spatial disorientation is a physical awareness of your position in space.

COL STREIT: Can I just turn to question 109:

> *Any involvement that the Institute of Aviation has or had either directly or indirectly in respect of training or advising medical personnel about any programs that Army Aviation aircrew can participate in to allow them to take prescription sleep-inducing medications?*

Can you just explain your responses to that question as set out in your report?

DR SMITH: Yes. All Aviation Medical Officers and Aviation Nursing Officers and Medical Assistants that attend the Aviation Nursing Officers' Course – all of our health professional courses have got specific training on fatigue and specific training on medication, just broadly. But in the fatigue lecture, it is about understanding: the hazards posed by the circumstances leading to fatigue; the safety hazards posed by fatigue; a range of operational countermeasures to fatigue, including, you know, sleep arrangements and napping and strategic use of caffeine; one of the tools that's available is Temazepam and Zolpidem. And then, both in the fatigue lecture and in the medication lecture: the guidelines for the use of Temazepam and Zolpidem; the dispensing requirements; the ground trial requirements; the auditing requirements; the fact that individuals, when they are authorised to use sleep-inducing agents, actually sign an

acknowledgement form saying that they understand what it's for, how to use it, the circumstances that they're only allowed to use it when authorised by a Commander for the purpose of managing sleep/wake cycle on operations, and all that.

So we make sure that we're not just giving them a medication that could be potentially hazardous if used in the wrong circumstance or if people took it thinking that they were going to go to sleep and then when the Commander then redirects them onto a different task, they fly ill-advisedly. So they understand the purpose of that and they acknowledge that.

And they then participate in the sleeping tablet program fully aware and acknowledging what the conditions, precautions, and caveats are. All of our Aviation Medical Officers, Nursing Officers and the Medical Assistants that do those courses are trained to do that and to provide advice to Commanders and aircrew on those topics.

COL STREIT: Thank you. Acknowledging, Dr Smith, that the intention is to recall you at a later stage in hearings, so I just propose now to address one final area, subject to questioning of others. You have had the opportunity to observe – well, first, read the statements of and now observe the evidence of D20, D15, MAJ Gallatly and CAPT Rogan. Are you able to assist the Inquiry with the benefit of any observations you feel comfortable in making in relation to their evidence collectively as against the items you have identified in your report concerning fatigue and cumulative fatigue and sleeping arrangements for aircrew?

DR SMITH: Yes, and thank you for the opportunity for allowing me to listen to those witnesses, and I think a lot of the areas that I have already covered in the written report are echoed in there and, you know, it reinforces their real-world experience. But a couple of areas that came to me quite strongly – one is the level of fatigue that people are concerned about, and we have talked about fatigue and fatigue management and some of the issues around the rule sets governing that. I will just have a few points about that.

There's also a level of concern that I think has merit in terms of the level of proficiency and recency to feel confident that you are operating the aircraft in the best way possible, or to a level that the aircrew themselves feel is adequate.

Some of those issues will be better dealt with by Human Factors Specialists to understand what level of proficiency do you need, but on first principles, a common currency and proficiency and recency

program – sorry, a current – a generic currency and recency Standing Instruction covering all aircraft from a basic Kiowa through to a Black Hawk through to a very complicated aircraft with lots of systems.

I think that if aircrew are saying that flying the MRH-90, they don't feel that they've got the proficiency or the recency to feel confident flying, I think that trying to understand in terms of a human-centred design what sort of training is necessary to effectively operate a complex system rather than saying, "Well, this is the rule set and this is a new aircraft, so they may not be necessarily the same". So I think that where aircrew are complaining or raising concerns about their level of proficiency, it certainly seems to have merit to me to go back and look at the proficiency requirements and currency and recency requirements, but those things will be best dealt with from a Human Factor Specialist.

From an aeromedical point of view, though, if aircrew feel that they've got a low level of proficiency, even if it is adequate – so I'm not suggesting that aircrew were flying when they felt unsafe, but if they felt that they didn't feel confident that they had the degree of mastery or proficiency that they felt they should have, from an aeromedical point of view, what I think that would do is that that then means that the way that you fly is then very cognitive – recall deliberate – and you're trying to remember how to fly because you don't have that level of proficiency. Whereas on another aircraft, if you do have a high level of proficiency which you may be able to achieve and maintain with less recency if the aircraft is more basic – so I mean, you know, it takes a long time to forget how to ride a bike. It's a very basic skill, but once you've mastered it, you don't easily forget that.

But I think the more complicated the system is, the more we have to think about how much recency is necessary to prevent the skills fade, and those skills fade might be cognitive. So if it's about menu selection and switches and that is not the stick and button skills of flying, it's the menu selection and the systems operation that requires a higher degree of recency to maintain a level of proficiency, and so if we're talking about the effect of fatigue, I think that the effect of fatigue in somebody that has a low level of proficiency is going to be amplified.

And if we're talking about the cognitive capacity and how quickly you can saturate your cognitive demand and when you start to decompensate, I think that a pilot that has a marginal or low level of proficiency or doesn't have a recency of experience might actually find themselves reaching that limit sooner than somebody that does have a degree of mastery.

So certainly I hear those concerns expressed very loudly and, when I have just approached it from an aeromedical point of view, I think that they have merit and need to be considered, but the details are probably best considered by a Human Factors Specialist.

Probably the thing that I wanted to talk about is fatigue, fatigue management and the understanding of risk to do with fatigue and, you know, the drivers for fatigue are well understood. The effects of fatigue on cognitive performance are well understood. The effects of fatigue and cognitive impairment on flight safety are well understood. The controls and the levers that you can manipulate to mitigate or minimise fatigue are well documented.

What's complex, however, is taking population data and trying to assess the level of risk to an individual, especially where you've got an individual with multiple overlapping types of – so you've got somebody who is fatigued because they're on operations. They've got circadian fatigue because they're flying at night. They've got cumulative fatigue because they've had disrupted sleep from one day to the next and it's carried forward, and that's on the back of several weeks of high intensity working. That's not the context that is easily described in a simple rule set.

And so, although all of the elements are well understood, it's quite complex to properly attach a level of risk to an individual in a specific context and especially in a military setting where operating in the safest way possible is not the option. What the option is, is what is reasonably practicable in order to deliver the capability within the constraint?

So we're not talking about a margin of safety. We're talking about a margin of risk and understanding that quantum of risk. There are disciplines – Fatigue Science, Human Factors Specialists, Aviation Medicine people – that have a lot of experience in assessing and managing fatigue and understanding the risk posted by fatigue, but what I see is that fatigue in Army Aviation, as I have heard it in the evidence, is managed by well-meaning people that are operating outside their level of expertise and may not fully possess the expertise necessary to understand the complexity of managing fatigue.

And so, you know, what we have to do is to try and support those people with reach back to the level of expertise that they need or with access to the tools that they need, and provide them with the training that they need to properly understand fatigue.

I think that there is a degree of what's called the Dunning-Kruger effect, which is a psychological effect where people feel confident making decisions outside their sphere of expertise, in part because they lack the experience to understand the nuances of what makes a complex thing complex. And if you don't have the experience to understand the nuances of why something is complex, it then seems really simple and then you think, "Okay, well, I've got the 10 hours. As long as you've got your 10 hours, I can apply a simple rule or I can apply a simple control and in my mind" – because I don't understand why it's so complex – "I'm confident that that is the right decision to make". And that's a well-known psychological phenomenon.

And so what we need to do is to make sure – and that is in part because your perception of risk is influenced by a number of factors. Amongst those is familiarity. So, you know, we are generally, as people, quite comfortable to accept risks if we see them all the time and we do them habitually. And evidence from yesterday talked about normalising fatigue. So, you know, if everybody is fatigued and I was fatigued and you were fatigued and we were flying and we were fatigued yesterday, we were fatigued last week, and we've always been fatigued, and when I marched into the unit we were fatigued, fatigue just becomes this background risk that you're not aware of, necessarily, and it doesn't rise above the level of awareness.

So for fatigue to be seen as a risk, there's got to be a magnitude greater than what we would normally see. So being - - -

COL STREIT: Can I just pause there for a moment, just to illustrate perhaps the point you're making? Is it simply the distinction there is a person – you talk about, effectively, cumulative effect and fatigue on an individual, so really fail to recognise the fatigue and the risk associated with it. Is that fair?

DR SMITH: Yes, that's correct.

COL STREIT: So, in that particular context, they might consider, because they've sat within the 10-hour window for a rest period before they fly, that they're good to go because it's in compliance with a particular Aviation Instruction.

DR SMITH: Yes.

COL STREIT: But if they had actually used the document you referred to from the Defence Flight Safety Bureau and asked themselves a series of questions – "How many hours have you actually had to sleep?", for

example, and a series of others – they might actually arrive at an outcome where they shouldn't be flying.

DR SMITH: That's right. So there's an external framework that's actually guiding them, not just to say, "Look around, and how do you perceive the level of risk?" It's actually guiding you to say, "Let's look objectively, in a structured manner, at specific questions according to the science. You know, if you polled 1000 people and you tested them, this is the level of fatigue that we would expect". And so doing something objective like that would be good.

So, you know, I think that what we need to do now is to work with Army, and other operators, to make sure that the people that are assessing fatigue and attaching a risk to that level of fatigue are well informed and have a reasonable knowledge of the hazard, and understand the nature of harm as is required by steps 1 and 2 of the seven-step risk process where you're supposed to engage with stakeholders that are able to inform the discussion.

But if you reach out to stakeholders and those stakeholders are other aircrew who similarly don't have a contextual understanding of complex management of fatigue, then you get a very shallow understanding of fatigue, which means that your management strategies are unlikely to be effective.

You know, we can upskill aircrew to operate in that realm. We can support them with the fatigue management tools that I've talked about. I would actually sort of be a bit hesitant to spend too much time upskilling aircrew, only in that we are already aware that they have other secondary duties. So if we then say, "You've got to do another course, and now you're going to be the unit fatigue specialist as well", we have to be careful not to introduce an unintended secondary consequence.

But, you know, there are reach-back facilities. You know, we can make sure that the Aviation Medical Officer, when they go on a detachment, actually turns up to the Command tent and says, "Hi, I'm your AVMO. This is what I can do for you. Let me talk to you about fatigue. What can we do?", and make sure that they are active, rather than a resource that a Commander can reach out to if they actually know that that resource exists. Make sure that they lean forward and offer support.

There are Human Factor Specialists. Other Air Forces internationally have had good success with Human Performance Optimisation Teams, noting that personnel are fundamental inputs to capability. So it doesn't actually matter what your weapons system is. You can have the best

aircraft in the world, with the best weapons system, but if that's operated by a fatigued pilot you're going to have a limited effect. So if you want to have the best capability, you have to make sure that that aircraft is operated by aircrew in the best possible readiness state.

And there are teams of people – psychologists, human factor specialists, physiologists and others – you know, the composition of the team can be as big or as small as you want, but the idea of saying that there is a team of people that look after aircraft serviceability – and the Commanders know this is your current serviceability, this is your projected serviceability for tomorrow. When you're planning, this is what you have to plan with. When it comes to fuel, spare parts, ammunition, all of those things are actively managed, and yet when it comes to the operator we rely on a rule set that is inadequate. And then the final check is the FACE check, which we've already established is soft and porous, and not a strong control.

And so, in that context, aircrew that have a strong can-do attitude and a sense of duty will expand or contract to deliver a capability up until the point that they feel that they can't do it anymore. But by the time they are prepared to say – so I've said that the FACE check is soft and a poor control. If a crew member says, "I'm actually really, really tired. I don't think I can fly", you have to believe them. But by that point they've probably been impaired for hours or days beforehand, so that's a very late thing. So the idea of actually managing your human resource actively with a team of people that say, "Commander, what mission do you need tomorrow? If you need a crew tomorrow, let me take them off line. I will manage their sleep so that I'll make sure that tomorrow they are well rested, well hydrated".

Other Human Performance Optimisation Teams have even gone to the point of saying, "Let's get rid of neck pain and back pain". So we know that neck pain and back pain occurs on operations, and that degrades capability. So let's make sure that we manage neck pain and back pain so that if you've got a mission, we can make sure that aircrew are flying with the minimum amount of that.

So the idea of actually actively managing the readiness state of aircrew as an input to capability to give the Commander the best resource is something that can be done.

Now, in order to provide the decision-makers in fatigue – we've talked about the Fatigue Management Chart and the Fatigue Risk Assessment. The other tool that is available through DFSB is a Fatigue Avoidance Scheduling tool. So that is a bio-mathematical model that is based on

population data, cognitive performance, and fatigue states of thousands of people, and that maps your circadian cognitive effect. You put in your time awake, your time of duty, and when you're going to be operating, and that will then predict – and then you can also put in how much sleep did you get, and your quality of sleep, and it can look back 14 days. That actually can map your current and projected fatigue state, and measure that in terms of you're in a low fatigue state, a medium fatigue state, or a high state of fatigue. It gives you the relative cognitive performance to say, "In this fatigue state, we anticipate that your cognitive performance is going to be 75 per cent baseline". It will say, "At this level, that is equivalent to a blood alcohol of .03". It will then say, "At this level, we expect you to be three times more likely to make an error".

Now, that is not intended as a go/no go, but it certainly is a risk informer that you can then say, "Right, if this is the work/rest cycle that we've had over the last 14 days, and I need somebody to fly tomorrow, these crew are going to be in a moderate state of fatigue". So you've got two options. You either go ahead but accept that this is not a low level of risk. This is a higher level of risk because you've got reasonable information that they are fatigued – circadian low, disrupted sleep, carried-forward cumulative fatigue, and all of that – or you can say, "If we look at this sleep/rest pattern, four days on, three days – four days flying nights, and three days off, and then we go back to flying four days/nights again, what level of fatigue would we expect to see after one or two weeks of doing that?" And that will then project, "After two weeks, this is the level of fatigue that we will see".

Your option then is to say to an SME, "Can you help me manipulate – what happens if I did five days? What happens if I did 10 days in a row? What happens if I nap?" So if you want to know the effect of a strategic nap, we then plan in a nap, and it will then say, "If you napped for 20 minutes at this point in time, this is what would happen to your fatigue in the five hours afterwards". And so that is a very useful planning tool to optimise the design of night-flying rosters; looking at the effect of acute and cumulative fatigue, and then planning the time of napping.

So those tools are available. Those tools are available to a number of people in Defence Aviation. It's a resource offered by DFSB. But IAM has previously – and, you know, we're a tri-Service organisation. We would provide support to Army or Navy, or anybody. But for Air Force, we routinely engage with Air Force operators who say, "We're thinking of deploying. This is our current roster". We will then say, "Well, this is the level of fatigue that we project that you're going to have, but if you changed a few little things here and there and left earlier, departed later, had a break here, this is the impact that that would have on your level of

fatigue. So if you did it this way, you would have a less fatigued population when you got to the other end". We have also sent a Human Factors Specialist on a deployment with the Squadron to actually say, "Here is some advice about your sleeping patterns. Here is some advice about heat acclimatisation. Here is some advice about managing all of those other things. So" - - -

COL STREIT: Sorry to interrupt you. When was that?

DR SMITH: Back in probably 2012, or '13. But since then – so that's the deployment. But since then, we routinely offer a reach-back service. Now, I'm cognisant that within Army, within Army Aviation Command, there are the Single-Service Aviation Medicine Adviser and there's a staff Officer Grade 1 Aviation Psychology. They are well-positioned to provide that level of support to Army. So IAM wouldn't impose and say "We know better than you". But we would certainly be happy to work with Army and complement whatever resources are there.

But the idea of actually forecasting, planning and modelling fatigue states in a way that allows you to manipulate different parameters to see whether you can get a better fatigue state and a better readiness state, is something that is available. At the very least those risk management tools help a semi-informed operator step through in a structured way to provide some weighting of lower risk and higher risk when it comes to fatigue when they're operating outside their sphere of expertise.

COL STREIT: Thank you, Doctor.

Ms McMurdo, I note the time. I'm not – Dr Smith will be recalled at a later stage to give further evidence and, on reflection, it might simply be easier that he remains in evidence-in-chief and his evidence is simply adjourned to another hearing. My colleagues will have an opportunity to ask questions of the doctor after he gives further evidence in-chief at that subsequent hearing. It will also provide the Inquiry Counsel Assisting team an opportunity to track down some of the tools that the doctor has identified in his evidence, and that might generate some further questions.

MS McMURDO: Yes. Well, given the time, and it's been a very long week, and hearing the doctor's evidence about the importance of fatigue management, unless there are submissions to the contrary, I think that's a very good idea.

So thank you very much for your evidence, Dr Smith, it's been very helpful so far and we look forward to hearing more from you later, when we have some more definite information to place before you.

COL STREIT: Can I raise one matter?

MS McMURDO: Yes.

COL STREIT: I simply ask for the Inquiry's permission to be able to engage with the doctor before he provides further evidence to ensure he receives appropriate materials. Ordinarily, counsel wouldn't speak with a witness who's giving evidence, but if that's permissible - - -

MS McMURDO: Well, he's an expert witness.

COL STREIT: Yes, I just wanted to put that on the record for everyone.

MS McMURDO: Yes, it seems entirely appropriate, in fact necessary, to me. I take it there are no submissions to the contrary? No.

COL STREIT: Thank you, Ms McMurdo.

MS McMURDO: Thank you. Could I just say before we close this sitting, this hearing tranche, that so far we've received 39 submissions, including six further submissions this week. So I encourage people with information to provide a submission to the Inquiry and remind them that submissions can be anonymous and confidential when that is requested, and that can be done through our web page on the IGADF website.

We'll adjourn now. I think our next hearings are likely to be in Sydney. Is that definite, in the Sydney region?

COL STREIT: That's correct. Commencing, at this stage, on 5 August.

MS McMURDO: 5 August, yes. If we just adjourn the Inquiry hearing at this point, that would be appropriate. Thank you.

<WITNESS WITHDREW

PUBLIC INQUIRY ADJOURNED UNTIL
MONDAY, 5 AUGUST 2024